Date: 21 January 2000
To: Bechtel Hanford Inc. (technical representative)
From: TechLaw, Inc.
Project: 200 Area Source Characterization - 200-CW-1 Operable Unit
Subject: Wet Chemistry - Data Package No. H0506-RLN (SDG No. H0506)

INTRODUCTION

This memo presents the results of data validation on Summary Data Package No. H0506-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	Media	Validation	Analysis
B0W6B0	8/25/99	Soil	C	See note 1
B0W6B1	8/25/99	Soil	C	See note 1
B0W692	8/25/99	Soil	C	See note 1
B0W693	8/25/99	Soil	C	See note 1
B0W694	8/25/99	Soil	C	See note 1
B0W697	8/25/99	Soil	C	See note 1
B0W698	8/25/99	Soil	C	See note 1
B0W699	8/25/99	Soil	C	See note 1

1 - IC Anions - 300.0 (chloride, fluoride, nitrate, nitrite, phosphate, sulfate); ammonia - 350.3; cyanide - 9010B; pH - 9045C; sulphide - 9030B; chromium-VI - 7196A; nitrate/nitrite - 353.2.

Data validation was conducted in accordance with the BHI validation statement of work and the *200-CW-1 Operable Unit RI/FS Work Plan and 216-B-3 RCRA TSD Unit Sampling Plan*, DOE/RL-99-07, Draft B. Appendices 1 through 5 provide the following information as indicated below:

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

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DATA QUALITY OBJECTIVES

- **Holding Times**

Analytical holding times are assessed to ascertain whether the holding time requirements have been met by the laboratory. The holding time requirements are as follows: 30 days for chromium VI; 28 days for ammonia, nitrate/nitrite and IC anions (chloride, fluoride, and sulfate); 14 days for cyanide; 7 days for sulfide; 2 days for IC anion (phosphate, nitrate and nitrite); and immediate for pH.

If holding times are exceeded, but not by greater 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 detectable sample results are qualified as estimates and flagged "J" and all non-detects are rejected and flagged "UR".

Holding times were met for all parameters and samples.

- **Blanks**

Method blank analyses are performed to determine the extent of laboratory contamination introduced through sampling, sample preparation and analysis. At least one acceptable method blank analysis must be conducted for every 20 samples. No contaminants should be present in the method blank. All blank results must fall below the CRQL to be acceptable.

All method blank results were acceptable.

- **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 value 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 "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 PQL/CRQL, all associated sample results are qualified as estimated and flagged "J". If RPD values are plus or minus two times the PQL/CRQL and the sample concentration is less than five times the PQL/CRQL, all associated sample results are qualified as estimated and flagged "J/UJ".

Due to the lack of a duplicate, all cyanide results were qualified as estimates and flagged "J".

All other laboratory duplicate results were within the required control limits.

- **Analytical Detection Levels**

Reported analytical detection levels are compared against the CRDL to ensure that laboratory detection levels meet the required criteria. The following reported detection limits were above the CRDL: All undetected fluoride, nitrite and ammonia results and the chromium-VI result in sample B0W694 exceeded the PQL. Under the BHI statement of work, no qualification is required. All other reported laboratory detection levels met the analyte specific CRDL.

- **Completeness**

Data Package No. H0506-RLN (SDG No. H0506) was submitted for validation and verified for completeness. The completion rate was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

Due to the lack of a matrix spike analysis, all ammonia and results were qualified as estimates and flagged "J". Due to the lack of a duplicate, all cyanide results were qualified as estimates and flagged "J". Data flagged "J" is an estimate, but under the BHI validation SOW, the data may be usable for decision-making purposes. All other validated results are considered accurate within the standard error associated with the methods.

The following reported detection limits were above the CRDL: All undetected fluoride, nitrite and ammonia results and the chromium-VI result in sample B0W694 exceeded the PQL. 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-99-07, Draft B, *200-CW-1 Operable Unit RI/FS Work Plan and 216-B-3 RCRA TSD Unit Sampling Plan*.

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers which may be applied by data validators in compliance with WHC procedures 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: H0506	REVIEWER: TLI	DATE: 1/21/00	PAGE 1 OF 1
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Ammonia	J	All	No MS analysis
Cyanide	J	All	No duplicate analysis

Appendix 3

Qualified Data Summary and Annotated Laboratory Reports

GENERAL CHEMISTRY ANALYSIS, SOIL MATRIX, (MG/KG)

Project: BECHTEL-HANFORD																																		
Laboratory: Recra LabNet																																		
Case	SDG: H0506																																	
Sample Number		B0W692		B0W693		B0W694		B0W697		B0W698		B0W699		B0W6B0		B0W6B1																		
Location		GP-2		GP-2		GP-2		GP-2		GP-2		GP-2		GP-2		GP-2																		
Remarks																																		
Sample Date		08/25/99		08/25/99		08/25/99		08/25/99		08/25/99		08/25/99		08/25/99		08/25/99																		
General Chemistry	CRDL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q																	
Chloride	2	3.6		3.0		9.4		2.1		1.4		1.4		2.3		1.5																		
Fluoride	1	2.8	U	2.8	U	6.9		2.7	U	2.6	U	2.6	U	2.6	U	2.6	U																	
Nitrite	1	1.4	U	1.4	U	1.8	U	1.4	U	1.3	U	1.3	U	1.3	U	1.3	U																	
Nitrate	0.2	64		65		140		42		11		12		4.6		8.8																		
Cyanide	1	0.56	UJ	0.56	UJ	0.73	UJ	0.54	UJ	0.52	UJ	0.52	UJ	0.52	UJ	0.52	UJ																	
Phosphate by IC	6	1.4	U	1.4	U	1.8	U	1.4	U	1.3	U	1.3	U	1.3	U	1.3	U																	
Chromium VI	0.7	0.44	U	0.44	U	11.7	U	0.44	U	0.42	U	0.42	U	0.41	U	0.42	U																	
Sulfate by IC	10	1,850		1,120		3,640		462		16.9		73.2		15.7		53.1																		
Nitrate/Nitrite		13.5		16.7		33.8		8.9		2.7		4.1		0.66		2.2																		
Ammonia	0.5	27.9	J	28.0	J	75.6	J	4.4	J	1.3	UJ	1.3	J	1.3	UJ	1.6	J																	
pH*		4.6		5.5		3.9		7.5		8.4		8.6		8.9		8.5																		
Sulfide	20	4.5		1.1	U	1.5	U	1.1	U	1.0	U	1.0	U	4.0		3.9																		

* - Units are pH units

000010

Recra LabNet - Lionville

INORGANICS DATA SUMMARY REPORT 09/29/99

CLIENT: TNU-HANFORD B99-078 RECRA LOT #: 9908L906

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

SAMPLE	SITE ID	ANALYTE	RESULT		UNITS	REPORTING LIMIT	DILUTION FACTOR
-001	B0W6B0	% Solids	97.1		%	0.01	1.0
		Chloride by IC	2.3		MG/KG	1.3	1.0
		Fluoride by IC	2.6	u	MG/KG	2.6	1.0
		Nitrite by IC	1.3	u	MG/KG	1.3	1.0
		Nitrate by IC	4.6		MG/KG	2.6	1.0
		Cyanide, Total	0.52	u J	MG/KG	0.52	1.0
		Phosphate by IC	1.3	u	MG/KG	1.3	1.0
		Chromium VI	0.41	u	MG/KG	0.41	1.0
		Sulfate by IC	15.7		MG/KG	1.3	1.0
		Nitrate Nitrite	0.66		MG/KG	0.20	1.0
		Ammonia, as N	1.3	u J	MG/KG	1.3	1.0
		pH	8.9		SOIL PH	0.0	1.0
		Sulfide	4.0		MG/KG	1.0	1.0
-002	B0W699	% Solids	95.6		%	0.01	1.0
		Chloride by IC	1.4		MG/KG	1.3	1.0
		Fluoride by IC	2.6	u	MG/KG	2.6	1.0
		Nitrite by IC	1.3	u	MG/KG	1.3	1.0
		Nitrate by IC	12		MG/KG	2.6	1.0
		Cyanide, Total	0.52	u J	MG/KG	0.52	1.0
		Phosphate by IC	1.3	u	MG/KG	1.3	1.0
		Chromium VI	0.42	u	MG/KG	0.42	1.0
		Sulfate by IC	73.2		MG/KG	5.2	4.0
		Nitrate Nitrite	4.1		MG/KG	0.21	1.0
		Ammonia, as N	1.3	J	MG/KG	1.3	1.0
		pH	8.6		SOIL PH	0.0	1.0
		Sulfide	1.0	u	MG/KG	1.0	1.0
-003	B0W697	% Solids	91.9		%	0.01	1.0
		Chloride by IC	2.1		MG/KG	1.4	1.0
		Fluoride by IC	2.7	u	MG/KG	2.7	1.0
		Nitrite by IC	1.4	u	MG/KG	1.4	1.0
		Nitrate by IC	42		MG/KG	2.7	1.0
		Cyanide, Total	0.54	u J	MG/KG	0.54	1.0
		Phosphate by IC	1.4	u	MG/KG	1.4	1.0
		Chromium VI	0.44	u	MG/KG	0.44	1.0
		Sulfate by IC	462		MG/KG	27.2	20.0
		Nitrate Nitrite	8.9		MG/KG	0.22	1.0
		Ammonia, as N	4.4	J	MG/KG	1.3	1.0
		pH	7.5		SOIL PH	0.0	1.0

1/7/00

Recra LabNet - Lionville

INORGANICS DATA SUMMARY REPORT 09/29/99

CLIENT: TNU-HANFORD B99-078 RECRA LOT #: 9908L906

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

SAMPLE	SITE ID	ANALYTE	RESULT		UNITS	REPORTING LIMIT	DILUTION FACTOR
-003	B0W697	Sulfide	1.1	u	MG/KG	1.1	1.0
-004	B0W694	% Solids	68.2		%	0.01	1.0
		Chloride by IC	9.4		MG/KG	1.8	1.0
		Fluoride by IC	6.9		MG/KG	3.7	1.0
		Nitrite by IC	1.8	u	MG/KG	1.8	1.0
		Nitrate by IC	140		MG/KG	18	10
		Cyanide, Total	0.73	uJ	MG/KG	0.73	1.0
		Phosphate by IC	1.8	u	MG/KG	1.8	1.0
		Chromium VI	11.7	u	MG/KG	11.7	20.0
		Sulfate by IC	3640		MG/KG	91.6	50.0
		Nitrate Nitrite	33.8		MG/KG	1.5	5.0
		Ammonia, as N	75.6	J	MG/KG	1.8	1.0
		pH	3.9		SOIL PH	0.0	1.0
		Sulfide	1.5	u	MG/KG	1.5	1.0
-005	B0W692	% Solids	89.9		%	0.01	1.0
		Chloride by IC	3.6		MG/KG	1.4	1.0
		Fluoride by IC	2.8	u	MG/KG	2.8	1.0
		Nitrite by IC	1.4	u	MG/KG	1.4	1.0
		Nitrate by IC	64		MG/KG	5.6	4.0
		Cyanide, Total	0.56	uJ	MG/KG	0.56	1.0
		Phosphate by IC	1.4	u	MG/KG	1.4	1.0
		Chromium VI	0.44	u	MG/KG	0.44	1.0
		Sulfate by IC	1850		MG/KG	69.5	50.0
		Nitrate Nitrite	13.5		MG/KG	1.1	5.0
		Ammonia, as N	27.9	J	MG/KG	1.4	1.0
		pH	4.6		SOIL PH	0.0	1.0
		Sulfide	4.5		MG/KG	1.1	1.0
-006	B0W6B1	% Solids	95.7		%	0.01	1.0
		Chloride by IC	1.5		MG/KG	1.3	1.0
		Fluoride by IC	2.6	u	MG/KG	2.6	1.0
		Nitrite by IC	1.3	u	MG/KG	1.3	1.0
		Nitrate by IC	8.8		MG/KG	2.6	1.0
		Cyanide, Total	0.52	uJ	MG/KG	0.52	1.0
		Phosphate by IC	1.3	u	MG/KG	1.3	1.0
		Chromium VI	0.42	u	MG/KG	0.42	1.0
		Sulfate by IC	53.1		MG/KG	2.6	2.0
		Nitrate Nitrite	2.2		MG/KG	0.21	1.0

1/7/00

Recra LabNet - Lionville

INORGANICS DATA SUMMARY REPORT 09/29/99

CLIENT: TNU-HANFORD B99-078 RECRA LOT #: 9908L906

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

SAMPLE	SITE ID	ANALYTE	RESULT		UNITS	REPORTING LIMIT	DILUTION FACTOR
-006	B0W6B1	Ammonia, as N	1.6	J	MG/KG	1.3	1.0
		pH	8.5		SOIL PH	0.0	1.0
		Sulfide	3.9		MG/KG	1.0	1.0
-007	B0W693	% Solids	89.9		%	0.01	1.0
		Chloride by IC	3.0		MG/KG	1.4	1.0
		Fluoride by IC	2.8	u	MG/KG	2.8	1.0
		Nitrite by IC	1.4	u	MG/KG	1.4	1.0
		Nitrate by IC	65		MG/KG	5.2	4.0
		Cyanide, Total	0.56	uJ	MG/KG	0.56	1.0
		Phosphate by IC	1.4	u	MG/KG	1.4	1.0
		Chromium VI	0.44	u	MG/KG	0.44	1.0
		Sulfate by IC	1120		MG/KG	69.5	50.0
		Nitrate Nitrite	16.7		MG/KG	1.1	5.0
		Ammonia, as N	28.0	J	MG/KG	1.4	1.0
		pH	5.5		SOIL PH	0.0	1.0
		Sulfide	1.1	u	MG/KG	1.1	1.0
-008	B0W698	% Solids	96.2		%	0.01	1.0
		Chloride by IC	1.4		MG/KG	1.3	1.0
		Fluoride by IC	2.6	u	MG/KG	2.6	1.0
		Nitrite by IC	1.3	u	MG/KG	1.3	1.0
		Nitrate by IC	11		MG/KG	2.6	1.0
		Cyanide, Total	0.52	uJ	MG/KG	0.52	1.0
		Phosphate by IC	1.3	u	MG/KG	1.3	1.0
		Chromium VI	0.42	u	MG/KG	0.42	1.0
		Sulfate by IC	16.9		MG/KG	1.3	1.0
		Nitrate Nitrite	2.7		MG/KG	0.21	1.0
		Ammonia, as N	1.3	uJ	MG/KG	1.3	1.0
		pH	8.4		SOIL PH	0.0	1.0
		Sulfide	1.0	u	MG/KG	1.0	1.0

1/7/00

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

RECRA LabNet

a division of Recra Environmental, Inc.

Virtual Laboratories Everywhere

OCT 1999 RECEIVED Data Log In

Recra LabNet Philadelphia
Analytical Report

Client : TNU-HANFORD B99-078
RFW# : 9908L906
SDG# : H0506
SAF# : B99-078

W.O. # : 10985-001-001-9999-00
Date Received: 08-27-99

INORGANIC CASE NARRATIVE

1. This narrative covers the analyses of 8 soil samples.

2. The samples were prepared and analyzed in accordance with the methods indicated 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 blanks were within method criteria.

6. The Laboratory Control Samples (LCS) were within the laboratory control limits. The duplicate LCS were within the 20% Relative Percent Difference (RPD) control limit.

7. The matrix spike recoveries were within the 75-125% control limits. The matrix spike duplicates were within the 20% RPD control limit.

8. The replicate analyses were within the 20% RPD control limit with the exception of Chloride which was outside the limit.

9. Results for solid samples are reported on a dry weight basis.

10. Matrix quality control analyses were not performed for Total Cyanide and Ammonia. These analyses will be performed and data will be submitted as required by the client.

J. Michael Taylor
Vice President
Philadelphia Analytical Laboratory

9-29-99
Date

njp\i08-906

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 25 pages.

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	B99-078-87	Page 1 of 1

Collector: Bowers/Porter/Nielson	Company Contact: Chris Cearlock	Telephone No.: 372-9574	Project Coordinator: TRENT, SJ
Price Code: 8N	Data Turnaround: 45 Days		
Project Designation: 200 Area Source characterization - 200-CW-1 OU	Sampling Location: GP-2 >15' bgs 22'-23'	SAF No.: B99-078	
Ice Chest No.: GWS 130	Field Logbook No.: EL-1511	Method of Shipment: Federal Express	
Shipped To: ~~TMA/RECRA~~ 8.25.99	Offsite Property No.: A990230	Bill of Lading/Air Bill No.: 4235 7952 8749	
		COA: B20CW1-671C	

POSSIBLE SAMPLE HAZARDS/REMARKS											
	Preservation	None	None	None	None	None	Cool 4C	None	Cool 4C	None	Cool 4C
	Type of Container	sG	sG	sG	sG	sG	sG	sG	sG	sG	sG
Special Handling and/or Storage	No. of Container(s)	1	1	1	1	1	1	1	1	1	1
	Volume	60mL	60mL	60mL	60mL	120mL	250mL	250mL	500mL	500mL	1000mL
SAMPLE ANALYSIS		Isotopic Uranium	Neptunium-237	Nickel-63	Technetium-99	Tritium - H3	VOA - 8260A (TCL); VOA - 8260A (Add-On) [1-Propanol, Ethanol]	pH (Soil) - 9045	Semi-VOA - 8270A (TCL); TPH-Diesel Range - WTPH-D; PCBs - 8082	See item (1) in Special Instructions.	See item (2) in Special Instructions.
Sample No.	Matrix *	Sample Date	Sample Time								
B0W6B0	Soil	8/25/99	11:03					X	X	X	X
											BOWSM1

CHAIN OF POSSESSION	Sign/Print Names		
Relinquished By: Brent Porter	Date/Time: 8/25/99/1410	Received By: Peter JB	Date/Time: 8/25/99/1410
Relinquished By: RFGIB	Date/Time: 8/26/99 11:00	Received By: CTRICE/Chris	Date/Time: 8/26/99 11:00
Relinquished By: CTRICE/Chris	Date/Time: 8/26/99 14:00	Received By: FEDEX	Date/Time:
Relinquished By: FedEx	Date/Time: 8.27.99/0930	Received By: D. Jones	Date/Time: 8.27.99/0930

SPECIAL INSTRUCTIONS

See chain of custody comments on SAF B99-078.

COLLECTOR UNAVAILABLE TO SIGN COC

(1) ICP Metals - 6010A (Superfrace) [Arsenic, Barium, Beryllium, Cadmium, Chromium, Copper, Lead, Nickel, Selenium, Silver, Vanadium, Zinc]; Mercury - 7471 - (CV); Chromium Hex - 7196

(2) NO2/NO3 - 353.1; IC Anions - 300.0 [Chloride, Fluoride, Nitrate, Nitrite, Phosphate, Sulfate]; Sulfides - 9030; Ammonia; Total Cyanide - 9010

4235 7952 8750 4.2

4235 7952 8749 5.1

4476545 931 3.8

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

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

9700026

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	B99-078-86	Page 1 of 1

Collector: Bowers/Porter/Nielson	Company Contact: Chris Cearlock	Telephone No.: 372-9574	Project Coordinator: TRENT, SJ
Price Code: 8N	Data Turnaround: 45 Days		
Project Designation: 200 Area Source characterization - 200-CW-1 OU	Sampling Location: GP-2 >15' bgs 20'-21'	SAF No.: B99-078	
Ice Chest No.: GWS 130	Field Logbook No.: EL-1511	Method of Shipment: Federal Express	
Shipped To: TMA/RECRA	Offsite Property No.: A990230	Bill of Lading/Air Bill No.: 4235 7952 8749	
		COA: B20CW1 671C	

POSSIBLE SAMPLE HAZARDS/REMARKS											
	Preservation	None	None	None	None	None	Cool 4C	None	Cool 4C	None	Cool 4C
	Type of Container	sG	sG	sG	sG	sG	sG	sG	sG	sG	sG
	No. of Container(s)	1	1	1	1	1	1	1	1	1	1
Special Handling and/or Storage	Volume	60mL	60mL	60mL	60mL	120mL	250mL	250mL	500mL	500mL	1000mL
SAMPLE ANALYSIS		Isotopic Uranium	Neptunium-237	Nickel-63	Technetium-99	Tritium - H3	VOA - 8260A (TCL); VOA - 8260A (Add-On) [1-Propanol, Ethanol]	pH (Soil) - 9045	Semi-VOA - 8270A (TCL); TPH-Diesel Range - WTPH-D; PCBs - 8082	See item (1) in Special Instructions	See item (2) in Special Instructions
Sample No.	Matrix * / Sample Date / Sample Time										
B0W699	Soil / 8/25/99 / 10:51						X	X	X	X	X
										Bows	m

CHAIN OF POSSESSION	Sign/Print Names		
Relinquished By: Brent Porter	Date/Time: 8/25/99/1410	Received By: Peter JB	Date/Time: 8/25/99/1410
Relinquished By: RFB JB	Date/Time: 8/26/99 11:00	Received By: CTRICE/Chris	Date/Time: 8/26/99 11:00
Relinquished By: CTRICE/Chris	Date/Time: 8/26/99 14:00	Received By: FEDEX	Date/Time:
Relinquished By: Fed Ex	Date/Time: 8-27-99/0930	Received By: D. [illegible]	Date/Time: 8-27-99/0930

SPECIAL INSTRUCTIONS

See chain of custody comments on SAF B99-078.

COLLECTOR UNAVAILABLE TO SIGN COC

(1) ICP Metals - 6010A (Supertrace) [Arsenic, Barium, Beryllium, Cadmium, Chromium, Copper, Lead, Nickel, Selenium, Silver, Vanadium, Zinc]; Mercury - 7471 - (CV); Chromium Hex - 7196

(2) NO2/NO3 - 353.1; IC Anions - 300.0 [Chloride, Fluoride, Nitrate, Nitrite, Phosphate, Sulfate]; Sulfides - 9030; Ammonia - 350.3; Total Cyanide - 9010

Matrix *

Soil
Water
Vapor
Other Solid
Other Liquid

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

00002

Bechtel Hanford Inc.		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	B99-078-84	Page 1 of 1

Collector: Bowers/Porter/Nielson	Company Contact: Chris Cearlock	Telephone No.: 372-9574	Project Coordinator: TRENT, SJ	Price Code: 8N	Data Turnaround: 45 Days
Project Designation: 200 Area Source characterization - 200-CW-1 OU	Sampling Location: GP-2 >15' bgs 15'-16'		SAF No.: B99-078		
Ice Chest No.: GWS 130	Field Logbook No.: EL-1511		Method of Shipment: Federal Express		
Shipped To: TMA/RECRA	Offsite Property No.: A990230		Bill of Lading/Air Bill No.: 4235 7952 8749		
			COA: B2CW1 671C		

POSSIBLE SAMPLE HAZARDS/REMARKS

Special Handling and/or Storage

Preservation	None	None	None	None	None	Cool 4C	None	Cool 4C	None	Cool 4C
Type of Container	sG	sG	sG	sG	sG	sG	sG	sG	sG	sG
No. of Container(s)	1	1	1	1	1	1	1	1	1	1
Volume	60mL	60mL	60mL	60mL	120mL	250mL	250mL	500mL	500mL	1000mL
SAMPLE ANALYSIS	Isotopic Uranium	Neptunium-237	Nickel-63	Technetium-99	Tritium - H3	VOA - 8260A (TCL); VOA - 8260A (Add-On) (1-Propanol, Ethanol)	pH (Soil) - 9045	Semi-VOA - 8270A (TCL); TPH-Diesel Range - WTPH-D; PCBs - 8082	See item (1) in Special Instructions	See item (2) in Special Instructions

Sample No.	Matrix *	Sample Date	Sample Time										
B0W697	Soil	8/25/99	10:04						X	X	X	X	X
												Dup (1)	

CHAIN OF POSSESSION — Sign/Print Names

Relinquished By	Date/Time	Received By	Date/Time
Brent Porter	8/25/99/1410	Peter JB	8/25/99/1410
RFG 1B	8/26/99 11:00	CTRICE/Chrice	8/26/99 11:00
CTRICE/Chrice	8/26/99 14:00	FEDEX	
D. Fed Ex	8/27/99/0930	D. Johnson	8/27/99/0930

SPECIAL INSTRUCTIONS

See chain of custody comments on SAF B99-078.

COLLECTOR UNAVAILABLE TO SIGN COC

(1) ICP Metals - 6010A (Supertrace) (Arsenic, Barium, Beryllium, Cadmium, Chromium, Copper, Lead, Nickel, Selenium, Silver, Vanadium, Zinc); Mercury - 7471 - (CV); Chromium Hex - 7196

(2) NO2/NO3 - 353.1; IC Anions - 300.0 (Chloride, Fluoride, Nitrate, Nitrite, Phosphate, Sulfate); Sulfides - 9030; Ammonia - 350.3; Total Cyanide - 9010

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

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

000028

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	B99-078-81	Page 1 of 1

Collector: Bowers/Porter/Nielson	Company Contact: Chris Cearlock	Telephone No.: 372-9574	Project Coordinator: TRENT, SJ
Price Code: 8N	Data Turnaround: 45 Days		
Project Designation: 200 Area Source characterization - 200-CW-1 OU	Sampling Location: GP-2 <15' bgs 14'-15'	SAF No.: B99-078	
Ice Chest No.: ETC6-96059	Field Logbook No.: EL-1511	Method of Shipment: Federal Express	
Shipped To: ~~TMA~~/RECRA D78 8-25-99	Offsite Property No.: N/A	Bill of Lading/Air Bill No.: N/A	
		COA: B20CW1 671C	

POSSIBLE SAMPLE HAZARDS/REMARKS

Special Handling and/or Storage

Preservation	None	None	Cool 4C	None	Cool 4C	None	Cool 4C	None		
Type of Container	sG	sG	sG	sG	sG	sG	sG	sG		
No. of Container(s)	1	1	1	1	1	1	1	1		
Volume	60mL	60mL	250mL	250mL	500mL	500mL	1000mL	1000mL		
SAMPLE ANALYSIS	Isotopic Uranium	Neptunium-237	VOA - 8260A (TCL); VOA - 8260A (Add-On) (1-Propanol, Ethanol)	pH (Soil) - 9045	Semi-VOA - 8270A (TCL); TPH-Diesel Range - WTPH-D; PCBs - 8082	See item (1) in Special Instructions.	See item (2) in Special Instructions.	See item (3) in Special Instructions.		
Sample No.	Matrix *	Sample Date	Sample Time								
B0W694	Soil	8/25/99	09:26			X	X	X	X	X	X

CHAIN OF POSSESSION	Sign/Print Names		
Relinquished By: Brent Porter	Date/Time: 8/25/99/1410	Received By: Peter JB	Date/Time: 8/25/99/1410
Relinquished By: Bof 1-B	Date/Time: 8-26-99 0800	Received By: R. Fahlberg / R Fahlberg	Date/Time: 8-26-99 0800
Relinquished By: R Fahlberg / R Fahlberg	Date/Time: 1400 8-26-99	Received By: FedEx	Date/Time:
Relinquished By: FedEx	Date/Time: 8-27-99/0930	Received By: D. Johnson	Date/Time: 8-27-99/0930

SPECIAL INSTRUCTIONS

See chain of custody comments on SAF B99-078.

(1) ICP Metals - 6010A (Supertrace) (Arsenic, Barium, Beryllium, Cadmium, Chromium, Copper, Lead, Nickel, Selenium, Silver, Vanadium, Zinc); Mercury - 7471 - (CV); Chromium Hex - 7196
(2) NO2/NO3 - 353.1; IC Anions - 300.0 (Chloride, Fluoride, Nitrate, Nitrite, Phosphate, Sulfate); Sulfides - 9030; Ammonia - 350.3; Total Cyanide - 9010
(3) Gamma Spectroscopy (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155); Gamma Spec - Add-on (Americium-241); Strontium-89,90 -- Total Sr; Total Uranium (Uranium); Isotopic Plutonium; Isotopic Thorium (Thorium-232); Americium-241

COLLECTOR UNAVAILABLE TO SIGN COC.

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

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

000049

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	B99-078-79	Page 1 of 1

Collector: Bowers/Porter/Nielson	Company Contact: Chris Cearlock	Telephone No.: 372-9574	Project Coordinator: TRENT, SJ
Price Code: 8N	Data Turnaround: 45 Days		
Project Designation: 200 Area Source characterization - 200-CW-1 OU	Sampling Location: GP-2 <15' bgs 10'-11'	SAF No.: B99-078	
Ice Chest No.: ERC 96 059	Field Logbook No.: EL-1511	Method of Shipment: Federal Express	
Shipped To: ~~TMA/RECRA~~ 810 8-25-99	Offsite Property No.: N/A	Bill of Lading/Air Bill No.: N/A	
		COA: B20CW1-671C	

POSSIBLE SAMPLE HAZARDS/REMARKS

Special Handling and/or Storage

Preservation	None	None	Cool 4C	None	Cool 4C	None	Cool 4C	None		
Type of Container	sG	sG	sG	sG	sG	sG	sG	sG		
No. of Container(s)	1	1	1	1	1	1	1	1		
Volume	60mL	60mL	250mL	250mL	500mL	500mL	1000mL	1000mL		
SAMPLE ANALYSIS	Isotopic Uranium	Neptunium-237	VOA - 8260A (TCL); VOA - 8260A (Add-On) [1-Propanol, Ethanol]	pH (Soil) - 9045	Semi-VOA - 8270A (TCL); TPH-Diesel Range - WTPH-D; PCBs - 8082	See item (1) in Special Instructions.	See item (2) in Special Instructions.	See item (3) in Special Instructions.		

Sample No.	Matrix *	Sample Date	Sample Time										
B0W692	Soil	8/25/99	08:45			X	X	X	X	X		B0W569	

CHAIN OF POSSESSION — Sign/Print Names

Relinquished By	Date/Time	Received By	Date/Time
Brent Porter	8/25/99/1410	Refer JB	8/25/99/1410
Ref J-B	8-26-99 0800	R. Fahlberg / R. Fahlberg	8-26-99 0800
R. Fahlberg / R. Fahlberg	8-26-99 1400	FED Ex	
Fed Ex	8-27-99/0930	D. Amos	8-27-99/0930

SPECIAL INSTRUCTIONS

See chain of custody comments on SAF B99-078.

(1) ICP Metals - 6010A (Supertrace) (Arsenic, Barium, Beryllium, Cadmium, Chromium, Copper, Lead, Nickel, Selenium, Silver, Vanadium, Zinc); Mercury - 7471 - (CV); Chromium Hex - 7196
(2) NO2/NO3 - 353.1; IC Anions - 300.0 (Chloride, Fluoride, Nitrate, Nitrite, Phosphate, Sulfate); Sulfides - 9030; Ammonia - 350.3; Total Cyanide - 9010
(3) Gamma Spectroscopy (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155); Gamma Spec - Add-on (Americium-241); Strontium-89,90 -- Total Sr; Total Uranium (Uranium); Isotopic Plutonium; Isotopic Thorium (Thorium-232); Americium-241

COLLECTOR UNAVAILABLE TO SIGN COC.

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

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

020050

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	B99-078-88	Page 1 of 1

Collector Bowers/Porter/Nielson	Company Contact Chris Cearlock	Telephone No. 372-9574	Project Coordinator TRENT, SJ
Project Designation 200 Area Source characterization - 200-CW-1 OU	Sampling Location GP-2 >15' bgs 24'-25'		SAF No. B99-078
Ice Chest No. ERC 96-051	Field Logbook No. EL-1511		Method of Shipment Federal Express
Shipped To ~~TMA~~/RECRA 8.25.99	Offsite Property No. ~~NA~~ A990230 RE 8-26-99		Bill of Lading/Air Bill No. 4235 7952 8750
			COA B20CW1 671C

Price Code 8N

Data Turnaround 45 Days

POSSIBLE SAMPLE HAZARDS/REMARKS	Preservation	None	None	None	None	None	Cool 4C	None	Cool 4C	None	Cool 4C
	Type of Container	sG	sG	sG	sG	sG	sG	sG	sG	sG	sG
	No. of Container(s)	1	1	1	1	1	1	1	1	1	1
Special Handling and/or Storage	Volume	60mL	60mL	60mL	60mL	120mL	250mL	250mL	500mL	500mL	1000mL
SAMPLE ANALYSIS		Isotopic Uranium	Neptunium-237	Nickel-63	Technetium-99	Tritium - H3	VOA - 8260A (TCL); VOA - 8260A (Add-On) [1-Propanol, Ethanol]	pH (Soil) - 9045	Semi-VOA - 8270A (TCL); TPH-Diesel Range - WTPH-D; PCBs - 8082	See item (1) in Special Instructions	See item (2) in Special Instructions

Sample No.	Matrix *	Sample Date	Sample Time										
B0W6B1	Soil	8/25/99	11:18						X	X	X	X	X
											Bowers		

CHAIN OF POSSESSION	Sign/Print Names		
Relinquished By Brent Porter	Date/Time 8/25/99/1410	Received By Reyes JB	Date/Time 8/25/99/1410
Relinquished By Reyes JB	Date/Time 8-26-99 0800	Received By R. Fobian / R. Fahlman	Date/Time 0800 8-26-99
Relinquished By R. Fobian / R. Fahlman	Date/Time 8-26-99 1400	Received By Fed Ex	Date/Time
Relinquished By Fed Ex	Date/Time 8-27-99/0930	Received By [illegible]	Date/Time 8-27-99/0930

SPECIAL INSTRUCTIONS

See chain of custody comments on SAF B99-078.

(1) ICP Metals - 6010A (Supertrace) (Arsenic, Barium, Beryllium, Cadmium, Chromium, Copper, Lead, Nickel, Selenium, Silver, Vanadium, Zinc); Mercury - 7471 - (CV); Chromium Hex - 7196

(2) NO2/NO3 - 353.1; IC Anions - 300.0 (Chloride, Fluoride, Nitrate, Nitrite, Phosphate, Sulfate); Sulfides - 9030; Ammonia - 350.3; Total Cyanide - 9010

collector not available to sign COC

Matrix *

Soil
Water
Vapor
Other Solid
Other Liquid

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

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	B99-078-80	Page 1 of 1

Collector: Bowers/Porter/Nielson	Company Contact: Chris Cearlock	Telephone No.: 372-9574	Project Coordinator: TRENT, SJ
Price Code: 8N	Data Turnaround: 45 Days		
Project Designation: 200 Area Source characterization - 200-CW-1 OU	Sampling Location: GP-2 <15' bgs 12.5'-13.5'	SAF No.: B99-078	
Ice Chest No.: ERC-96-051	Field Logbook No.: EL-1511	Method of Shipment: Federal Express	
Shipped To: ~~LMA~~/RECRA ~~DID 8.27.99~~	Offsite Property No.: A990230	Bill of Lading/Air Bill No.: 4235 7952 8750	
		COA: B20W1 671C	

POSSIBLE SAMPLE HAZARDS/REMARKS

Special Handling and/or Storage

SAMPLE ANALYSIS													
Preservation				None	None	Cool 4C	None	Cool 4C	None	Cool 4C	None		
Type of Container				sG	sG	sG	sG	sG	sG	sG	sG		
No. of Container(s)				1	1	1	1	1	1	1	1		
Volume				60mL	60mL	250mL	250mL	500mL	500mL	1000mL	1000mL		
				Isotopic Uranium	Neptunium-237	VOA - 8260A (TCL); VOA - 8260A (Add-On) (1-Propanol, Ethanol)	pH (Soil) - 9045	Semi-VOA - 8270A (TCL); TPH-Diesel Range - WTPH-D; PCBs - 8082	See item (1) in Special Instructions.	See item (2) in Special Instructions.	See item (3) in Special Instructions.		
Sample No.	Matrix *	Sample Date	Sample Time										
B0W693	Soil	8/25/99	09:09			X	X	X	X	X		Dow340	

CHAIN OF POSSESSION	Sign/Print Names		
Relinquished By: Brent Porter	Date/Time: 8/25/99/1410	Received By: Refer JB	Date/Time: 8/25/99/1410
Relinquished By: Ref JB	Date/Time: 8.26.99 0800	Received By: R.Felling/R.Felling	Date/Time: 0800 8.26.99
Relinquished By: R.Felling/R.Felling	Date/Time: 1400 8.26.99	Received By: Fed Ex	Date/Time:
Relinquished By: Fed Ex	Date/Time: 8.27.99/0930	Received By: D. Arnold	Date/Time: 8.27.99/0930

SPECIAL INSTRUCTIONS

See chain of custody comments on SAF B99-078.

(1) ICP Metals - 6010A (Supertrace) (Arsenic, Barium, Beryllium, Cadmium, Chromium, Copper, Lead, Nickel, Selenium, Silver, Vanadium, Zinc); Mercury - 7471 - (CV); Chromium Hex - 7196
(2) NO2/NO3 - 353.1; IC Anions - 300.0 (Chloride, Fluoride, Nitrate, Nitrite, Phosphate, Sulfate); Sulfides - 9030; Ammonia - 350.3; Total Cyanide - 9010
(3) Gamma Spectroscopy (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155); Gamma Spec - Add-on (Americium-241); Strontium-89,90 – Total Sr; Total Uranium (Uranium); Isotopic Plutonium; Isotopic Thorium (Thorium-232); Americium-241

collector not available to sign COC

Matrix *
Soil
Water
Vapor
Other Solid
Other Liquid

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

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	B99-078-85	Page 1 of 2

Collector: Bowers/Porter/Nielson	Company Contact: Chris Cearlock	Telephone No.: 372-9574	Project Coordinator: TRENT, SJ
Price Code: 8N	Data Turnaround: 45 Days		
Project Designation: 200 Area Source characterization - 200-CW-1 OU	Sampling Location: GP-2 >15' bgs 12.5 - 18.5	SAF No.: B99-078	
Ice Chest No.: ERC 96-051	Field Logbook No.: EL-1511	Method of Shipment: Federal Express	
Shipped To: ~~TMA~~/RECRA	Offsite Property No.: A990230	Bill of Lading/Air Bill No.: 4235 7952 8750	
		COA: B20CW1 + B20CW1 671C	

POSSIBLE SAMPLE HAZARDS/REMARKS

Special Handling and/or Storage

Preservation	None	None	None	None	None	Cool 4C	None	Cool 4C	None	Cool 4C
Type of Container	sG	sG	sG	sG	sG	sG	sG	sG	sG	sG
No. of Container(s)	1	1	1	1	1	1	1	1	1	1
Volume	60mL	60mL	60mL	60mL	120mL	250mL	250mL	500mL	500mL	1000mL
SAMPLE ANALYSIS	Isotopic Uranium	Neptunium-237	Nickel-63	Technetium-99	Tritium - H3	VOA - 8260A (TCL); VOA - 8260A (Add-On) (1-Propanol, Ethanol)	pH (Soil) - 9045	Semi-VOA - 8270A (TCL); TPH-Diesel Range - WTPH-D; PCBs - 8082	See item (1) in Special Instructions.	See item (2) in Special Instructions.
Sample No.	Matrix *	Sample Date	Sample Time							
B0W698	Soil	8/25/99	10:32					X	X	X	X	X
											0005ml

CHAIN OF POSSESSION — Sign/Print Names

Relinquished By	Date/Time	Received By	Date/Time
Brent Porter	8/25/99 1440	Peter JB	8/25/99 1440
Peter J.B	8-26-99 0800	R.Fahlberg / R.Fahlberg	8-26-99 0800
R.Fahlberg / R.Fahlberg	8-26-99 1400	Fed Ex	
Fed Ex	8-27-99 0930	D.Johnson	8-27-99 0930

SPECIAL INSTRUCTIONS

See chain of custody comments on SAF B99-078.

(1) ICP Metals - 6010A (Supertrace) [Arsenic, Barium, Beryllium, Cadmium, Chromium, Copper, Lead, Nickel, Selenium, Silver, Vanadium, Zinc]; Mercury - 7471 - (CV); Chromium Hex - 7196
(2) NO2/NO3 - 353.1; IC Anions - 300.0 [Chloride, Fluoride, Nitrate, Nitrite, Phosphate, Sulfate]; Sulfides - 9030; Ammonia - 350.3; Total Cyanide - 9010

collector not available to sign coc

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

LABORATORY SECTION — Received By — Title — Date/Time

FINAL SAMPLE DISPOSITION — Disposal Method — Disposed By — Date/Time

B0000023

Appendix 5

Data Validation Supporting Documentation

GENERAL CHEMISTRY DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E

PROJECT: 200-CW-1	DATA PACKAGE: H0506	
VALIDATOR: TLI	LAB: RECRT	DATE: 12/20/99
CASE:	SDG: H0506	

ANALYSES PERFORMED

☒ Anions/IC	☐ TOC	☐ TOX	☐ TPH-418.1	Oil and Grease	Alkalinity
☒ Ammonia	☐ BOD/COD	☐ Chloride	☐ Chromium-VI	☒ pH	☒ NO_2/NO_3
☐ Sulfate	☐ TDS	☐ TKN	☐ Phosphate	☒ CR VI	☒ Cyanide
☐	☐	☐	☐	☐	☒ Sulfide

SAMPLES/MATRIX	BOW692	BOW693	BOW694	BOW697
	BOW698	BOW699	BOW680	BOW681
				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:

GENERAL CHEMISTRY DATA VALIDATION CHECKLIST

3. INSTRUMENT CALIBRATION

Was initial calibration performed for all applicable analyses? Yes No N/A
Are initial calibration results acceptable? . . . . . Yes No N/A
Was a calibration check performed for all applicable analyses? Yes No N/A
Are calibration check results acceptable? . . . . . Yes No N/A
Comments:

4. BLANKS

Were laboratory blanks analyzed? . . . . . Yes No N/A
Are laboratory 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:

5. ACCURACY

Were spike samples analyzed at the required frequency? . . . . Yes No N/A
Are spike recoveries acceptable? . . . . . Yes No N/A
Were LCS analyses performed at the required frequency? . . . . Yes No N/A
Are LCS recoveries acceptable? . . . . . Yes No N/A
Comments: No ammonia or cyanide → not required

6. PRECISION

Were laboratory duplicate samples analyzed at the required frequency? . . . . . Yes No N/A
Are laboratory duplicate sample RPD 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

GENERAL CHEMISTRY DATA VALIDATION CHECKLIST

Comments: no cyanide dup J

7. ANALYTE QUANTITATION

Was analyte quantitation performed properly? . . . . . Yes No N/A

Comments:

8. REPORTED RESULTS AND DETECTION LIMITS

Are results reported for all requested analyses? . . . . . Yes No N/A

Are 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: all nitrite over - all U's

all phosphate over

all cyanide over

Fluoride - 92, 93, 97, 98, 99, 80 + 81 - over

→ all U's

ammonia - 98 + 80

A-25

Recra LabNet - Lionville

INORGANICS PRECISION REPORT 09/29/99

CLIENT: TNU-HANFORD B99-078 RECRA LOT #: 9908L906

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

SAMPLE	SITE ID	ANALYTE	INITIAL RESULT	REPLICATE	RPD	DILUTION FACTOR (REP)
-001REP	B0W6B0	% Solids	97.1	96.8	0.32	1.0
		Chloride by IC	2.3	1.3	53.4	1.0
		Fluoride by IC	2.6 u	2.6 u	NC	1.0
		Nitrite by IC	1.3 u	1.3 u	NC	1.0
		Nitrate by IC	4.6	4.6	1.4	1.0
		Phosphate by IC	1.3 u	1.3 u	NC	1.0
		Chromium VI	0.41u	0.41u	NC	1.0
		Sulfate by IC	15.7	15.3	2.3	1.0
		Nitrate Nitrite	0.66	0.95	35.2	1.0
-008REP	B0W698	pH	8.4	8.4	0.0	1.0
		Sulfide	1.0 u	1.0 u	NC	1.0

Date: 21 January 2000
To: Bechtel Hanford, Inc. (technical representative)
From: TechLaw, Inc.
Project: 200 Area Source Characterization - 200-CW-1 Operable Unit
Subject: Radiochemistry - Data Package No. H0506-TNU (SDG No. H0506)

INTRODUCTION

This memo presents the results of data validation on Summary Data Package No. H0506-TNU which was prepared by Thermo NUtech (TNU). A list of samples validated along with the analyses reported and the requested analytes is provided in the following table.

Sample ID	Sample	Media	Validation	Analysis
B0W6B0	8/25/99	Soil	C	See note 1
B0W6B1	8/25/99	Soil	C	See note 1
B0W692	8/25/99	Soil	C	See note 1
B0W693	8/25/99	Soil	C	See note 1
B0W694	8/25/99	Soil	C	See note 1 & 2
B0W697	8/25/99	Soil	C	See note 1
B0W698	8/25/99	Soil	C	See note 1
B0W699	8/25/99	Soil	C	See note 1

1 - Strontium-90; alpha spectroscopy (isotopic plutonium, isotopic thorium and americium-241); tritium; nickel-63; technetium-99; neptunium-237; gamma spectroscopy; total uranium.
2 - Isotopic uranium.

Data validation was conducted in accordance with the BHI validation statement of work and the *200-CW-1 Operable Unit RI/FS Work Plan and 216-B-3 RCRA TSD Unit Sampling Plan*, DOE/RL-99-07, Draft B. 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 analysis within 7 days of distillation for liquid scintillation counting.

  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 RDL, the following qualifiers are applied: All positive sample results less than five times the highest blank concentration are qualified as estimates and flagged "J"; sample results below the MDA are qualified as undetected and flagged "U"; sample results above the MDA and greater than five times the highest blank concentration are not qualified.

  Due to the gamma spectroscopy blank analysis not being conducted at the same time as samples B0W693, B0W697, B0W698, B0W699, B0W6B0 and B0W6B1, the gamma spectroscopy results in those samples were qualified as estimates and flagged "J".

  All other laboratory blank results were acceptable.

- **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 70-130% (or 80-120% for gamma spectroscopy). In addition, samples may be spiked with a radiochemical tracer to assist in isolating the radioisotope of interest with the yield of the tracer being used in calculating sample activity. The acceptable range for tracer recovery is 20% to 105%. Spike sample results outside the

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

Due to the lack of a matrix spike analysis, all tritium results were qualified as estimates and flagged "J".

Due to the LCS not being analyzed with samples B0W692 and B0W694, the gamma spectroscopy results in those samples were qualified as estimates and flagged "J".

All other accuracy results were acceptable.

- **Precision**

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

Due to an RPD of 40%, all thorium-228(aspec) results were qualified as estimates and flagged "J".

Due to an RPD of 45%, all radium-228(gea) and thorium-232(gea) results were qualified as estimates and flagged "J".

All other duplicate results were acceptable.

- **Detection Levels**

Reported analytical detection levels are compared against contract required MDAs to ensure that laboratory detection levels meet the required criteria. The reported detection limit exceeded the contract required MDA for the following: europium-152, europium-154, and europium-155 in sample B0W692; europium-152 and europium-155 in sample B0W693; europium-152 and europium-155 in

sample B0W694; europium-152 and europium-155 in sample B0W697; and europium-155 in samples B0W698, B0W6B1 and B0W6B0. Under the BHI statement of work, no qualification is required. All other reported laboratory detection levels met the analyte specific MDA.

- **Completeness**

  Data Package No. H0506 (SDG No. H0506) was submitted for validation and verified for completeness. The completion rate was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

Due to the lack of a matrix spike analysis, all tritium results were qualified as estimates and flagged "J". Due to the gamma spectroscopy blank analysis not being conducted at the same time as samples B0W693, B0W697, B0W698, B0W699, B0W6B0 and B0W6B1, the gamma spectroscopy results in those samples were qualified as estimates and flagged "J". Due to the LCS not being analyzed with samples B0W692 and B0W694, the gamma spectroscopy results in those samples were qualified as estimates and flagged "J". Due to an RPD of 40%, all thorium-228(aspec) results were qualified as estimates and flagged "J". Due to an RPD of 45%, all radium-228(gea) and thorium-232(gea) results were qualified as estimates and flagged "J". Data flagged "J" is an estimate, but under the BHI validation SOW, the data may be usable for decision-making purposes. All other validated results are considered accurate within the standard error associated with the methods.

The reported detection limit exceeded the contract required MDA for the following: europium-152, europium-154, and europium-155 in sample B0W692; europium-152 and europium-155 in sample B0W693; europium-152 and europium-155 in sample B0W694; europium-152 and europium-155 in sample B0W697; and europium-155 in samples B0W698, B0W6B1 and B0W6B0. 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-99-07, Draft B, *200-CW-1 Operable Unit RI/FS Work Plan and 216-B-3 RCRA TSD Unit Sampling Plan*.

Appendix 1

Glossary of Data Reporting Qualifiers

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

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

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

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

R - Indicates the compound or analyte was analyzed for, detected, and due to an identified QC deficiency, the data are unusable.

UR - Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data is unusable due to an identified QC deficiency.

Appendix 2

Summary of Data Qualification

DATA QUALIFICATION SUMMARY

SDG: H0506	REVIEWER: TLI	DATE: 1/21/00	PAGE_1_OF_1_
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Tritium	J	All	No matrix spike analysis
Gamma spectroscopy	J	B0W693, B0W697, B0W698, B0W699, B0W6B0, B0W6B1	Blank not analyzed w/samples
Gamma spectroscopy	J	B0W692, B0W694	LCS not run w/samples
Thorium-228(aspec) Radium-228(gea) Thorium-232(gea)	J	All	RPD

Appendix 3

Qualified Data Summary and Annotated Laboratory Reports

RADIOCHEMISTRY ANALYSIS, SOIL MATRIX, (PCi/G)

Project: BECHTEL-HANFORD																			
Laboratory: TNU																			
Case	SDG: H0506																		
Sample Number		B0W692		B0W693		B0W694		B0W697		B0W698		B0W699		B0W680		B0W681			
Location		GP-2		GP-2		GP-2		GP-2		GP-2		GP-2		GP-2		GP-2			
Remarks																			
Sample Date		08/25/99		08/25/99		08/25/99		08/25/99		08/25/99		08/25/99		08/25/99		08/25/99			
Radiochemistry	CRDL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Tritium	400	NA		NA		NA		-0.001	UJ	-0.006	UJ	0.007	UJ	-0.029	UJ	-0.016	UJ		
Technetium-99	15	NA		NA		NA		0.013	U	-0.081	U	-0.045	U	-0.080	U	0.058	U		
Neptunium-237	1	-0.002	U	0.003	U	-0.002	U	-0.007	U	-0.005	U	0.008	U	0	U	0	U		
Uranium-233/234	1	NA		NA		0.858		NA		NA		NA		NA		NA			
Uranium-235	1	NA		NA		0.067		NA		NA		NA		NA		NA			
Uranium-238	1	NA		NA		0.733		NA		NA		NA		NA		NA			
Total Uranium*	1	1.210		0.893		1.45		0.696		0.554		0.591		0.515		0.720			
Plutonium-238	1	0.005	U	-0.005	U	0.033	U	-0.004	U	0	U	0.009	U	0	U	0.004	U		
Plutonium-239/240	1	0.181		0.065		1.14		0.037	U	-0.008	U	0.019	U	0.017	U	0.004	U		
Nickel-63	30	NA		NA		NA		-5.33	U	-2.92	U	-2.24	U	-3.24	U	-2.08	U		
Americium-241	1	0.178		0.170		1.28		0.077		0.016	U	0.008	U	0.023	U	0.012	U		
Total Strontium	1	2.98		0.991		9.36		4.77		58.8		22.7		7.27		12.5			
Thorium-228		0.405	J	0.353	UJ	0.246	J	0.326	J	0.160	UJ	0.236	J	0.256	J	0.125	UJ		
Thorium-230		0.057	U	0.441		0.683		0.170	U	0.660		1.01		0.331		0.486			
Thorium-232	1	0.254		0.265		0.150		0.465		0.251		0.338		0.224		0.407			
Potassium-40		10.5	J	12.4	J	10.6	J	11.0	J	10.5	J	12.4	J	14.1	J	12.6	J		
Cobalt 60	0.1	U	UJ	U	UJ	U	UJ	U	UJ	U	UJ	U	UJ	U	UJ	U	UJ		
Cesium 137	0.1	632	J	592	J	7180	J	143		0.314	J	11.1	J	0.624	J	27.3	J		
Europium 152	0.2	U	UJ	U	UJ	U	UJ	U	UJ	U	UJ	U	UJ	U	UJ	U	UJ		
Europium 154	0.2	U	UJ	0.454	J	3.37	J	U	UJ	U	UJ	U	UJ	U	UJ	U	UJ		
Europium 155	0.1	U	UJ	U	UJ	U	UJ	U	UJ	U	UJ	U	UJ	U	UJ	U	UJ		
Radium-226		0.645	J	U	UJ	U	UJ	0.528	J	0.424	J	0.428	J	0.489	J	U	UJ		
Radium-228		0.507	J	U	UJ	U	UJ	0.816	J	0.563	J	0.636	J	0.739	J	U	UJ		
Thorium-228		U	UJ	U	UJ	2.67	J	0.835	J	0.554	J	0.541	J	0.520	J	U	UJ		
Thorium-232		0.507	J	U	UJ	U	UJ	0.816	J	0.563	J	0.636	J	0.739	J	U	UJ		
Americium-241 (gea)		U	UJ	0.190	J	U	UJ	U	UJ	U	UJ	U	UJ	U	UJ	U	U		
Uranium-238 (gea)		U	UJ	U	UJ	U	UJ	U	UJ	U	UJ	U	UJ	U	UJ	U	U		
Uranium-235 (gea)		U	UJ	U	UJ	U	UJ	U	UJ	U	UJ	U	UJ	U	UJ	U	U		

* - Units are mg/kg

000011

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0506

N508160-01 BCW692

DATA SHEET

SDG	7188	Client/Case no	Hanford SDG-H0506
Contact	Kevin C. Johnson	Contract	TRB-SBB-207925
Lab sample id	N508160-01	Client sample id	BCW692
Dept sample id	7188-001	Location/Matrix	GP-2<15'bgs 10'-11' SOLID
Received	08/27/99	Collected	08/25/99 08:45
% solids	87.7	Custody/SAF No	B99-076-79 B99-078

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALIFIERS	TEST
Neptunium 237	13994-20-2	-0.002	0.003	0.012		U	NP
Total Uranium (ug/g)	7440-61-1	1.21	0.15	0.014	1.0		U_T
Plutonium 238	13981-16-3	0.005	0.015	0.027	1.0	U	PU
Plutonium 239/240	PU-239/240	0.181	0.045	0.033	1.0		PU
Americium 241	14596-10-2	0.178	0.072	0.068	1.0		AM
Total Strontium	SR-RAD	2.98	0.22	0.15	1.0		SR
Thorium 228	14274-82-9	0.405	0.13	0.13	1.0	J	TH
Thorium 230	14269-63-7	0.057	0.11	0.17	1.0	U	TH
Thorium 232	TH-232	0.254	0.095	0.072	1.0		TH
Potassium 40	13966-00-2	10.5	1.3	0.83		J	GAM
Cobalt 60	10198-40-0	U		0.090	0.050	U	GAM
Cesium 137	10045-97-3	632	1.7	0.41	0.10		GAM
Europium 152	14683-23-9	U		1.6	0.10	U	GAM
Europium 154	15585-10-1	U		0.31	0.10	U	GAM
Europium 155	14391-16-3	U		0.74	0.10	U	GAM
Radium 226	13982-63-3	0.645	0.47	0.62	0.10		GAM
Radium 228	15262-20-1	0.507	0.29	0.31	0.20		GAM
Thorium 228	14274-82-9	U		0.65		U	GAM
Thorium 232	TH-232	0.507	0.29	0.31			GAM
Americium 241	14596-10-2	U		0.45		U	GAM
Uranium 238	U-238	U		11		U	GAM
Uranium 235	15117-96-1	U		1.4		U	GAM

200 Area source chctzn-200-CW-1 OU

pr 2/14/00

Lab id	TMANC
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	02/13/00

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0506

N908160-02 BCW693

DATA SHEET

SDG	7188	Client/Case no	Hanford SDG-H0506
Contact	Kevin C. Johnson	Contract	TRB-SBB-207925
Lab sample id	N908160-02	Client sample id	BCW693
Dept sample id	7188-002	Location/Matrix	GP-2<15'bgs 12.5-13.5 SOLID
Received	06/27/99	Collected	08/25/99 09:09
% solids	89.0	Custody/SAF No.	B99-078-80 B99-078

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALIFIERS	TEST
Neptunium 237	13994-20-2	0.003	0.006	0.015		U	NP
Total Uranium (ug/g)	7440-61-1	0.893	0.11	0.014	1.0		U_T
Plutonium 238	13981-16-3	-0.005	0.022	0.052	1.0	U	PU
Plutonium 239/240	PU-239/240	0.065	0.044	0.052	1.0		PU
Americium 241	14596-10-2	0.170	0.060	0.050	1.0		AM
Total Strontium	SR-RAD	0.991	0.16	0.17	1.0		SR
Thorium 228	14274-82-9	0.353	0.27	0.36	1.0	U J	TH
Thorium 230	14269-63-7	0.441	0.22	0.21	1.0		TH
Thorium 232	TH-232	0.265	0.18	0.17	1.0		TH
Potassium 40	13966-00-2	12.4	1.7	0.21		J	GAM
Cobalt 60	10198-40-0	U		0.020	0.050	U	GAM
Cesium 137	10045-97-3	592	0.60	0.10	0.10		GAM
Europium 152	14683-23-9	U		0.52	0.10	U	GAM
Europium 154	15585-10-1	0.454	0.085	0.095	0.10		GAM
Europium 155	14391-16-3	U		0.43	0.10	U	GAM
Radium 226	13982-63-3	U		0.22	0.10	U	GAM
Radium 228	15262-20-1	U		0.17	0.20	U	GAM
Thorium 228	14274-82-9	U		0.23		U	GAM
Thorium 232	TH-232	U		0.17		U	GAM
Americium 241	14596-10-2	0.190	0.086	0.14			GAM
Uranium 238	U-238	U		4.1		U	GAM
Uranium 235	15117-96-1	U		0.52		U	GAM

200 Area source chctzn-200-CW-1 OU

pr 2/14/00

Lab id	TMANC
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	02/13/00

TMA/RICHMOND

SAMPLE DELIVERY GROUP B0506

N9D8160-03

B0W694

DATA SHEET

SDG	7188	Client/Case no	Hanford	SDG-HC506	
Contact	Kevin C. Johnson	Contract	TRP-SPB-207925		
Lab sample id	N9D8160-03	Client sample id	B0W694		
Dept sample id	7188-003	Location/Matrix	GP-2<15'bgs 14'-15'	SOLID	
Received	08/27/99	Collected	08/25/99 09:26		
% solids	70.0	Custody/SAF No	B99-078-81	B99-078	

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALIFIERS	TEST
Neptunium 237	13994-20-2	-0.002	0.010	0.023		U	NP
Uranium 233	U-233/234	0.658	0.093	0.025	1.0	U	U
Uranium 235	15117-96-1	0.067	0.025	0.019	1.0	U	U
Uranium 238	U-238	0.733	0.084	0.023	1.0		U
Total Uranium (ug/g)	7440-61-1	1.45	0.18	0.014	1.0		U_T
Plutonium 238	13981-16-3	0.033	0.025	0.039	1.0	U	PU
Plutonium 239/240	PU-239/240	1.14	0.16	0.031	1.0		PU
Americium 241	14596-10-2	1.28	0.16	0.039	1.0		AM
Total Strontium	SR-RAD	9.36	0.45	0.18	1.0		SR
Thorium 228	14274-82-9	0.246	0.14	0.18	1.0	J	TH
Thorium 230	14269-63-7	0.683	0.22	0.20	1.0		TH
Thorium 232	TH-232	0.150	0.11	0.13	1.0		TH
Potassium 40	13966-00-2	10.6	1.4	0.66		J	GAM
Cobalt 60	10198-40-0	U		0.066	0.050	U	GAM
Cesium 137	10045-97-3	7180	7.0	2.1	0.10		GAM
Europium 152	14683-23-9	U		6.0	0.10	U	GAM
Europium 154	15585-10-1	3.37	0.69	0.70	0.10		GAM
Europium 155	14391-16-3	U		3.8	0.10	U	GAM
Radium 226	13982-63-3	U		2.9	0.10	U	GAM
Radium 228	15262-20-1	U		1.2	0.20	U	GAM
Thorium 228	14274-82-9	2.67	1.8	2.6			GAM
Thorium 232	TH-232	U		1.2		U	GAM
Americium 241	14596-10-2	U		3.6		U	GAM
Uranium 238	U-238	U		35		U	GAM
Uranium 235	15117-96-1	U		5.5		U	GAM

200 Area source chctsn-200-CW-1 OU

2/14/00

Lab id	TMANC
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	02/13/00

TMA/RICHMOND

SAMPLE DELIVERY GROUP B0506

N908160-04

B0W697

DATA SHEET

SDG	7188	Client/Case no	Hanford SDG-H0506
Contact	Kevin C. Johnson	Contract	TRB-SBB-207525
Lab sample id	N908160-04	Client sample id	B0W697
Dept sample id	7188-004	Location/Matrix	GP-2<15'bgs 15'-16' SOLID
Received	08/27/99	Collected	08/25/99 10:04
% solids	93.2	Custody/SAF No	B99-078-84 B99-078

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALIFIERS	TEST
Tritium	10028-17-8	-0.001	0.041	0.069	400	U J	H
Neptunium 237	13994-20-2	-0.007	0.021	0.047		U	NP
Technetium 99	14133-76-7	0.013	0.20	0.54	15	U	TC
Total Uranium (ug/g)	7440-61-1	0.696	0.088	0.014	1.0		U_T
Plutonium 238	13981-16-3	-0.004	0.015	0.035	1.0	U	PU
Plutonium 239/240	PU-239/240	0.037	0.030	0.049	1.0	U	PU
Nickel 63	13981-37-8	-5.33	2.8	5.0	30	U	NI_L
Americium 241	14596-10-2	0.077	0.041	0.039	1.0		AM
Total Strontium	SR-RAD	4.77	0.29	0.16	1.0		SR
Thorium 228	14274-82-9	0.326	0.19	0.26	1.0	J	TH
Thorium 230	14269-63-7	0.170	0.19	0.24	1.0	U	TH
Thorium 232	TH-232	0.465	0.19	0.17	1.0		TH
Potassium 40	13966-00-2	11.0	0.86	0.39		J	GAM
Cobalt 60	10198-40-0	U		0.052	0.050	U	GAM
Cesium 137	10045-97-3	143	0.60	0.16	0.10		GAM
Europium 152	14683-23-9	U		0.62	0.10	U	GAM
Europium 154	15585-10-1	U		0.19	0.10	U	GAM
Europium 155	14391-16-3	U		0.35	0.10	U	GAM
Radium 226	13982-63-3	0.528	0.24	0.29	0.10		GAM
Radium 228	15262-20-1	0.816	0.23	0.21	0.20		GAM
Thorium 228	14274-82-9	0.835	0.23	0.30			GAM
Thorium 232	TH-232	0.816	0.23	0.21			GAM
Americium 241	14596-10-2	U		0.18		U	GAM
Uranium 238	U-238	U		6.9		U	GAM
Uranium 235	15117-96-1	U		0.57		U	GAM

200 Area source chctzn-200-CW-1 OU

2/14/00

Lab id	TMANC
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	02/13/00

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0506

N908160-05 BOW698

DATA SHEET

SDG	7188	Client/Case no	Hanford SDG-H0506
Contact	Kevin C. Johnson	Contract	TRB-SEB-207925
Lab sample id	N908160-05	Client sample id	BOW698
Dept sample id	7188-005	Location/Matrix	GP-2<15'bgs 17.5'-18.5' SOLID
Received	08/27/99	Collected	08/25/99 10:32
% solids	96.2	Custody/SAF No	E99-078-85 E99-078

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALIFIERS	TEST
Tritium	10028-17-8	-0.006	0.040	0.069	400	U J	H
Neptunium 237	13994-20-2	-0.005	0.009	0.026		U	NP
Technetium 99	14133-76-7	-0.081	0.13	0.39	15	U	TC
Total Uranium (ug/g)	7440-61-1	0.554	0.070	0.014	1.0		U_T
Plutonium 238	13981-16-3	0	0.025	0.055	1.0	U	PU
Plutonium 239/240	PU-239/240	-0.008	0.016	0.050	1.0	U	PU
Nickel 63	13981-37-8	-2.92	1.9	3.3	30	U	NI_L
Americium 241	14596-10-2	0.016	0.025	0.031	1.0	U	AM
Total Strontium	SR-RAD	58.8	3.2	0.63	1.0	J	SR
Thorium 228	14274-82-9	0.160	0.27	0.51	1.0	U	TH
Thorium 230	14269-63-7	0.660	0.28	0.22	1.0		TH
Thorium 232	TH-232	0.251	0.18	0.17	1.0		TH
Potassium 40	13966-00-2	10.5	0.77	0.38		J	GAM
Cobalt 60	10198-40-0	U		0.041	0.050	U	GAM
Cesium 137	10045-97-3	0.314	0.040	0.040	0.10		GAM
Europium 152	14683-23-9	U		0.10	0.10	U	GAM
Europium 154	15585-10-1	U		0.11	0.10	U	GAM
Europium 155	14391-16-3	U		0.17	0.10	U	GAM
Radium 226	13982-63-3	0.424	0.078	0.079	0.10		GAM
Radium 228	15262-20-1	0.563	0.15	0.16	0.20		GAM
Thorium 228	14274-82-9	0.554	0.048	0.053			GAM
Thorium 232	TH-232	0.563	0.15	0.16			GAM
Americium 241	14596-10-2	U		0.22		U	GAM
Uranium 238	U-238	U		4.6		U	GAM
Uranium 235	15117-96-1	U		0.21		U	GAM

200 Area source chctzn-200-CW-1 OU

2/14/00

Lab id	TMANC
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	02/13/00

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0506

N908160-06 B0W699

DATA SHEET

SDG	7188	Client/Case no	Hanford SDG-H0506
Contact	Kevin C. Johnson	Contract	TRB-SEB-207925
Lab sample id	N908160-06	Client sample id	B0W699
Dept sample id	7188-006	Location/Matrix	GP-2<15'bgs 20'-21' SOLID
Received	08/27/99	Collected	08/25/99 10:51
% solids	95.6	Custody/SAF No	B99-078-86 B99-078

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALIFIERS	TEST
Tritium	10028-17-8	0.007	0.042	0.071	400	U J	H
Neptunium 237	13994-20-2	0.008	0.023	-0.046		U	NP
Technetium 99	14133-76-7	-0.045	0.15	0.46	15	U	TC
Total Uranium (ug/g)	7440-61-1	0.591	0.076	0.014	1.0		U_T
Plutonium 238	13981-16-3	0.009	0.019	0.045	1.0	U	PU
Plutonium 239/240	PU-239/240	0.019	0.028	0.045	1.0	U	PU
Nickel 63	13981-37-8	-2.24	1.8	3.1	30	U	NI_L
Americium 241	14596-10-2	0.008	0.023	0.048	1.0	U	AM
Total Strontium	SR-RAD	22.7	1.2	0.37	1.0		SR
Thorium 228	14274-82-9	0.236	0.14	0.19	1.0	J	TH
Thorium 230	14269-63-7	1.01	0.25	0.16	1.0		TH
Thorium 232	TH-232	0.338	0.14	0.086	1.0		TH
Potassium 40	13966-00-2	12.4	0.50	0.18		J	GAM
Cobalt 60	10198-40-0	U		0.023	0.050	U	GAM
Cesium 137	10045-97-3	11.1	0.12	0.036	0.10		GAM
Europium 152	14683-23-9	U		0.11	0.10	U	GAM
Europium 154	15585-10-1	U		0.080	0.10	U	GAM
Europium 155	14391-16-3	U		0.10	0.10	U	GAM
Radium 226	13982-63-3	0.428	0.053	0.058	0.10		GAM
Radium 228	15262-20-1	0.636	0.094	0.087	0.20		GAM
Thorium 228	14274-82-9	0.541	0.038	0.050			GAM
Thorium 232	TH-232	0.636	0.094	0.087			GAM
Americium 241	14596-10-2	U		0.11		U	GAM
Uranium 238	U-238	U		2.6		U	GAM
Uranium 235	15117-96-1	U		0.14		U	GAM

200 Area source chctzn-200-CW-1 OU

2/14/00

Lab id	TMANC
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DS
Version	1.06
Report date	02/13/00

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0506

N906160-07 B0W6B0

DATA SHEET

SDG	7188	Client/Case no	Hanford	SDG-H0506	
Contact	Kevin C. Johnson	Contract	TRB-SEB-207525		
Lab sample id	N906160-07	Client sample id	B0W6B0		
Dept sample id	7188-007	Location/Matrix	GP-2<15'bgs 22'-23'	SOLID	
Received	08/27/99	Collected	08/25/99 11:03		
% solids	96.7	Custody/SAF No	B99-078-87	B99-078	

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALIFIERS	TEST
Tritium	10028-17-8	-0.029	0.039	0.068	400	U J	H
Neptunium 237	13994-20-2	0	0.003	0.013		U	NP
Technetium 99	14133-76-7	-0.080	0.16	0.46	15	U	TC
Total Uranium (ug/g)	7440-61-1	0.515	0.065	0.014	1.0	~~U~~	U_T
Plutonium 238	13981-16-3	0	0.017	0.048	1.0	U	PU
Plutonium 239/240	PU-239/240	0.017	0.017	0.033	1.0	U	PU
Nickel 63	13981-37-8	-3.24	1.9	3.4	30	U	NI_L
Americium 241	14596-10-2	0.023	0.061	0.12	1.0	U	AM
Total Strontium	SR-RAD	7.27	0.58	0.45	1.0		SR
Thorium 228	14274-82-9	0.256	0.13	0.16	1.0	~~U~~ J	TH
Thorium 230	14269-63-7	0.331	0.15	0.19	1.0	~~U~~	TH
Thorium 232	TH-232	0.224	0.11	0.082	1.0	~~U~~	TH
Potassium 40	13966-00-2	14.1	0.71	0.26		J	GAM
Cobalt 60	10198-40-0	U		0.030	0.050	U	GAM
Cesium 137	10045-97-3	0.624	0.050	0.042	0.10		GAM
Europium 152	14683-23-9	U		0.084	0.10	U	GAM
Europium 154	15585-10-1	U		0.11	0.10	U	GAM
Europium 155	14391-16-3	U		0.12	0.10	U	GAM
Radium 226	13982-63-3	0.489	0.062	0.061	0.10		GAM
Radium 228	15262-20-1	0.739	0.14	0.12	0.20		GAM
Thorium 228	14274-82-9	0.520	0.039	0.042			GAM
Thorium 232	TH-232	0.739	0.14	0.12			GAM
Americium 241	14596-10-2	U		0.30		U	GAM
Uranium 238	U-238	U		4.0		U	GAM
Uranium 235	15117-96-1	U		0.15		U	GAM

200 Area source chctzn-200-CW-1 OU

2/14/00

Lab id	TMANC
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	02/13/00

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0506

N908160-08

B0W6B1

DATA SHEET

SDG	7188	Client/Case no	Hanford SDG-H0506
Contact	Kevin C. Johnson	Contract	TRB-SEB-207925
Lab sample id	N908160-08	Client sample id	B0W6B1
Dept sample id	7188-008	Location/Matrix	GP-2<15'bgs 24'-25' SOLID
Received	08/27/99	Collected	08/25/99 11:18
% solids	96.1	Custody/SAF No	B99-078-88 B99-078

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALIFIERS	TEST
Tritium	10028-17-8	-0.016	0.041	0.070	400	U J	H
Neptunium 237	13994-20-2	0	0.031	0.070		U	NP
Technetium 99	14133-76-7	0.058	0.16	0.42	15	U	TC
Total Uranium (ug/g)	7440-61-1	0.720	0.091	0.014	1.0		U_T
Plutonium 238	13981-16-3	0.004	0.023	0.050	1.0	U	PU
Plutonium 239/240	PU-239/240	0.004	0.023	0.046	1.0	U	PU
Nickel 63	13981-37-8	-2.08	1.8	3.2	30	U	NI_L
Americium 241	14596-10-2	0.012	0.025	0.046	1.0	U	AM
Total Strontium	SR-RAD	12.5	0.66		1.0		SR
Thorium 228	14274-82-9	0.125	0.16	0.24	1.0	U J	TH
Thorium 230	14269-63-7	0.486	0.22	0.25	1.0		TH
Thorium 232	TH-232	0.407	0.16	0.12	1.0		TH
Potassium 40	13966-00-2	12.6	1.7	0.28		J	GAM
Cobalt 60	10198-40-0	U		0.026	0.050	U	GAM
Cesium 137	10045-97-3	27.3	0.19	0.061	0.10		GAM
Europium 152	14683-23-9	U		0.18	0.10	U	GAM
Europium 154	15585-10-1	U		0.084	0.10	U	GAM
Europium 155	14391-16-3	U		0.12	0.10	U	GAM
Radium 226	13982-63-3	U		0.11	0.10	U	GAM
Radium 228	15262-20-1	U		0.17	0.20	U	GAM
Thorium 228	14274-82-9	U		0.37		U	GAM
Thorium 232	TH-232	U		0.17		U	GAM
Americium 241	14596-10-2	U		0.066		U	GAM
Uranium 238	U-238	U		3.0		U	GAM
Uranium 235	15117-96-1	U		0.20		U	GAM

200 Area source chctzn-200-CW-1 OU

2/14/00

Lab id	TMANC
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	02/13/00

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

Case Narrative

1.0 GENERAL

Bechtel Hanford Inc. Sample Delivery Group H0506 is composed of eight solid (soil) samples designated under SAF No. B99-078 with a Project Designation of: 200 Area Source characterization-200-CW-1 OU.

The samples were received as stated on the Chain-of-Custody documents. Any discrepancies are noted on the TNU Sample Receipt Checklists. The results were transmitted to BHI via facsimile on October 11, 1999 with the exception of Neptunium-237 and Technetium-99, which were transmitted to BHI on October 12, 1999.

2.0 ANALYSIS NOTES

2.1 Total Strontium Analyses

No problems were encountered during the course of the analyses.

2.2 Total and Isotopic Uranium Analyses

Isotopic analyses were to be based on the results from the total uranium analyses. Isotopic Uranium was requested on sample B0W694. No problems were encountered during the course of the analyses.

2.3 Gamma Spec Analyses

No problems were encountered during the course of the analyses though a recount was performed for sample B0W693.

2.4 Isotopic Plutonium Analyses

No problems were encountered during the course of the analyses. A recount was performed on sample B0W692.

2.5 Americium-241 Analyses

Samples B0W692 and B0W6B0 had low chemical yields after the initial analysis. The yields were acceptable after the samples were reanalyzed. The reanalysis data is reported for samples B0W692 and B0W6B0. No other problems were encountered during the course of the analyses.

2.6 Tritium Analyses

No problems were encountered during the course of the analyses.

2.7 Nickel-63 Analyses

No problems were encountered during the course of the analyses.

2.8 Technetium-99 Analyses

No problems were encountered during the course of the analyses.

NOV 1999
RECEIVED
Data
Log In

2.9 Isotopic Thorium Analyses

No problems were encountered during the course of the analyses.

2.10 Neptunium-237 Analyses

No problems were encountered during the course of the analyses. The tracer yield of the duplicate analysis was 11%, however the data for the sample was in agreement with the original analysis.

Collector: Bowers/Porter/Nielson	Company Contact: Chris Cearlock	Telephone No.: 372-9574	Project Coordinator: TRENT, SJ
Price Code: 8N	Data Turnaround: 45 Days		
Project Designation: 200 Area Source characterization - 200-CW-1 OU	Sampling Location: GP-2 <15' bgs 12.5 – 13.5		SAF No.: B99-078
Ice Chest No.: SMC 127	Field Logbook No.: EL-1511		Method of Shipment: Federal Express
Shipped To: TMA/~~REGRA~~ BJB 8-25-99	Offsite Property No.: A990231		Bill of Lading/Air Bill No.: 4235 7952 8760
			COA B20W01 671C

POSSIBLE SAMPLE HAZARDS/REMARKS											
	Preservation	None	None	Cool 4C	None	Cool 4C	None	Cool 4C	None		
	Type of Container	aG	aG	aG	aG	aG	aG	aG	aG		
Special Handling and/or Storage	No. of Container(s)	1	1	1	1	1	1	1	1		
	Volume	60mL	60mL	250mL	250mL	500mL	500mL	1000mL	1000mL		
SAMPLE ANALYSIS		Isotopic Uranium	Neptunium-237	VOA - 8260A (TCL); VOA - 8260A (Add-On) (1-Propanol, Ethanol)	pH (Soil) - 9045	Semi-VOA - 8270A (TCL); TPH-Diesel Range - WTPH-D; PCBs - 8082	See item (1) in Special Instructions.	See item (2) in Special Instructions.	See item (3) in Special Instructions.		
Sample No.	Matrix * / Sample Date / Sample Time										
B0W593	Soil / 8/25/99 / 09:09	X	X						X	Bowers	

CHAIN OF POSSESSION	Sign/Print Names		
Relinquished By: Brent Porter	Date/Time: 8/25/99/1410	Received By: Peter JB	Date/Time: 8/25/99/1410
Relinquished By: Peter JB	Date/Time: 8-26-99 0800	Received By: R. Fellows / R. Fellows	Date/Time: 8-26-99 0800
Relinquished By: R. Fellows / R. Fellows	Date/Time: 8-26-99 1400	Received By: Fed Ex	Date/Time: 8-26-99
Relinquished By: FedEx	Date/Time: 8-27-99 9:30	Received By: TNV M. Goldenberg	Date/Time: 8-27-99 9:30

SPECIAL INSTRUCTIONS

See chain of custody comments on SAF B99-078.

(1) ICP Metals - 6010A (Supertrace) (Arsenic, Barium, Beryllium, Cadmium, Chromium, Copper, Lead, Nickel, Selenium, Silver, Vanadium, Zinc); Mercury - 7471 - (CV); Chromium Hex - 7196
(2) NO2/NO3 - 353.1; IC Anions - 300.0 (Chloride, Fluoride, Nitrate, Nitrite, Phosphate, Sulfate); Sulfides - 9030; Ammonia - 350.3; Total Cyanide - 9010
(3) Gamma Spectroscopy (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155); Gamma Spec - Add-on (Americium-241)/ Strontium-89,90 -- Total Sr/ Total Uranium (Uranium)/ Isotopic Plutonium/ Isotopic Thorium (Thorium-232)/ Americium-241

Matrix *
Soil
Water
Vapor
Other Solid
Other Liquid

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

090023

Bechtel Hanford Inc.

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

B99-078-81

Collector: Bowers/Porter/Nielson	Company Contact: Chris Cearlock	Telephone No.: 372-9574	Project Coordinator: TRENT, SJ
Project Designation: 200 Area Source characterization - 200-CW-1 OU	Sampling Location: GP-2 <15' bgs 14'-15' 8-25-99		SAF No.: B99-078
Ice Chest No.: ERC 99-018	Field Logbook No.: EL-1511		Method of Shipment: Federal Express
Shipped To: TMA/~~HECRA~~ 8-25-99	Offsite Property No.: NA		Bill of Lading/Air Bill No.: N/A

Price Code: 8N

Data Turnaround: 45 Days

COA: B20CW1-~~671B~~ 671C

POSSIBLE SAMPLE HAZARDS/REMARKS

Special Handling and/or Storage

Preservation	None	None	Cool 4C	None	Cool 4C	None	Cool 4C	None		
Type of Container	aG	aG	aG	aG	aG	aG	aG	aG		
No. of Container(s)	1	1	1	1	1	1	1	1		
Volume	60mL	60mL	250mL	250mL	500mL	500mL	1000mL	1000mL		
SAMPLE ANALYSIS	Isotopic Uranium	Neptunium-237	VOA - 8260A (TCL); VOA - 8260A (Add-On) (1-Propanol, Ethanol)	pH (Soil) - 9045	Semi-VOA - 8270A (TCL); TPH-Diesel Range - WTPH-D; PCBs - 8082	See item (1) in Special Instructions.	See item (2) in Special Instructions.	See item (3) in Special Instructions.		
Sample No.	Matrix *	Sample Date	Sample Time								
B0W594	Soil	8/25/99	09:26	X	X					X	CPM 12
										Dows 42	

CHAIN OF POSSESSION — Sign/Print Names

Relinquished By	Date/Time	Received By	Date/Time
Brent Porter	8/25/99 1410	Peter JB	8/25/99 1410
Peter JB	8:26-99 0800	R. Fahlberg	8-26-99 0800
R. Fahlberg / R. Fahlberg	8-26-99 1400	Fed Ex	8-26-99
Fed Ex	8-27-99 9:30	TNV M. Goldenberg	8-27-99 9:30

SPECIAL INSTRUCTIONS

See chain of custody comments on SAF B99-078.

(1) ICP Metals - 6010A (Supertrace) (Arsenic, Barium, Beryllium, Cadmium, Chromium, Copper, Lead, Nickel, Selenium, Silver, Vanadium, Zinc); Mercury - 7471 - (CV); Chromium Hex - 7196
(2) NO2/NO3 - 353.1; IC Anions - 300.0 (Chloride, Fluoride, Nitrate, Nitrite, Phosphate, Sulfate); Sulfides - 9030; Ammonia - 350.3; Total Cyanide - 9010
(3) Gamma Spectroscopy (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155); Gamma Spec - Add-on (Americium-241) Strontium-89,90 – Total Sr Total Uranium (Uranium) Isotopic Plutonium Isotopic Thorium (Thorium-232) Americium-241

Collector unavailable to sign COC

Matrix *
Soil
Water
Vapor
Other Solid
Other Liquid

LABORATORY SECTION — Received By — Title — Date/Time

FINAL SAMPLE DISPOSITION — Disposal Method — Disposed By — Date/Time

000034

... ANALYSIS REQUEST

B99-078-84 Page 1 of 1

Collector: Bowers/Porter/Nielson	Company Contact: Chris Cearlock	Telephone No.: 372-9574	Project Coordinator: TRENT, SJ
Price Code: 8N	Data Turnaround: 45 Days		
Project Designation: 200 Area Source characterization - 200-CW-1 OU	Sampling Location: GP-2 >15' bgs 15'-16'		SAF No.: B99-078
Ice Chest No.: SML-591	Field Logbook No.: EL-1511		Method of Shipment: Federal Express
Shipped To: TMA/RECA 8-05-99	Offsite Property No.: A990231		Bill of Lading/Air Bill No.: 42357952 8771
			COA: B2CW1-671C

POSSIBLE SAMPLE HAZARDS/REMARKS	Preservation	None	None	None	None	None	Cool 4C	None	Cool 4C	None	Cool 4C
	Type of Container	aG	aG	aG	aG	aG	aG	aG	aG	aG	aG
	No. of Container(s)	1	1	1	1	1	1	1	1	1	1
Special Handling and/or Storage	Volume	60mL	60mL	60mL	60mL	120mL	250mL	250mL	500mL	500mL	1000mL
SAMPLE ANALYSIS		Isotopic Uranium	Neptunium-237	Nickel-63	Technetium-99	Tritium - H3	VOA - 8260A (TCL); VOA - 8260A (Add-On) (1-Propanol, Ethanol)	pH (Soil) - 9045	Semi-VOA - 8270A (TCL); TPH-Diesel Range - WTPH-D; PCBs - 8082	See item (1) in Special Instructions.	See item (2) in Special Instructions.
Sample No.	Matrix *	Sample Date	Sample Time								
B0W697	Soil	8/25/99	10:04	X	X	X	X	X			
										Bowers/N	

00035

CHAIN OF POSSESSION	Sign/Print Names		
Relinquished By: Brent Porter	Date/Time: 8/25/99/1400	Received By: Refer JB	Date/Time: 8/25/99/1400
Relinquished By: RFG #1B	Date/Time: 8/26/99 11:00	Received By: CTRICE/Ctrice	Date/Time: 8/26/99 11:00
Relinquished By: CTRICE/Ctrice	Date/Time: 8/26/99 1400	Received By: FEDEX	Date/Time: 8-26-99
Relinquished By: FedEx 8-27-99	Date/Time: 9:30	Received By: TNV M. Goldenberg 9:30	Date/Time: 8-27-99

SPECIAL INSTRUCTIONS

See chain of custody comments on SAF B99-078.

COLLECTOR UNAVAILABLE TO SIGN COC.

(1) ICP Metals - 6010A (Supertrace) [Arsenic, Barium, Beryllium, Cadmium, Chromium, Copper, Lead, Nickel, Selenium, Silver, Vanadium, Zinc]; Mercury - 7471 - (CV); Chromium Hex - 7196

(2) NO2/NO3 - 353.1; IC Anions - 300.0 (Chloride, Fluoride, Nitrate, Nitrite, Phosphate, Sulfate); Sulfides - 9030; Ammonia - 350.3; Total Cyanide - 9010

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

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

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

B99-078-84 | Page 1 of 1

Collector: Bowers/Porter/Nielson	Company Contact: Chris Cearlock	Telephone No.: 372-9574	Project Coordinator: TRENT, SJ
Price Code: 8N	Data Turnaround: 45 Days		
Project Designation: 200 Area Source characterization - 200-CW-1 OU	Sampling Location: GP-2 >15' bgs 15'-16'		SAF No.: B99-078
Ice Chest No.: SML-591	Field Logbook No.: EL-1511		Method of Shipment: Federal Express
Shipped To: TMA/RECRA B20 8-25-99	Offsite Property No.: A990231		Bill of Lading/Air Bill No.: 4235 7952 8771
			COA: B20CW1 671C

POSSIBLE SAMPLE HAZARDS/REMARKS

Special Handling and/or Storage

Preservation	None											
Type of Container	aG											
No. of Container(s)	1											
Volume	1000mL											
SAMPLE ANALYSIS	See item (1) in Special Instructions.											
Sample No.	Matrix *	Sample Date	Sample Time									
B0V697	Soil	8/25/99	10:04	X								B0W541

CHAIN OF POSSESSION — Sign/Print Names

Relinquished By	Date/Time	Received By	Date/Time
Brent Porter	8/25/99/1410	Peter JB	8/25/99/1410
RFG #1B	8/26/99 11:00	CTRICE/C Trice	8/26/99 11:00
CTRICE/C Trice	8/26/99 14:00	FEDEX	8-26-99
FedEx	8-27-99 9:30	TNV McGoldenberg	8-27-99 9:30

SPECIAL INSTRUCTIONS

See chain of custody comments on SAF B99-078.

COLLECTOR UNAVAILABLE TO SIGN COC

(1) Gamma Spectroscopy (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155); Gamma Spec - Add-on (Americium-241)/Strontium-89,90 – Total Sr/ Total Uranium (Uranium)/Isotopic Plutonium/Isotopic Thorium (Thorium-232)/ Americium-241

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

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

000028

Collector Bowers/Porter/Nielson	Company Contact Chris Cearlock	Telephone No. 372-9574	Project Coordinator TRENT, SJ
Project Designation 200 Area Source characterization - 200-CW-1 OU	Sampling Location GP-2 >15' bgs 17.5'–18.5'		SAF No. B99-078
Ice Chest No. SML 127	Field Logbook No. EL-1511		Method of Shipment Federal Express
Shipped To TRAMPCO 9M 8.15.99	Offsite Property No. A990231		Bill of Lading/Air Bill No. 4235 7952 8760
			COA B20CW1 671C

Price Code 8N

Data Turnaround 45 Days

POSSIBLE SAMPLE HAZARDS/REMARKS

Special Handling and/or Storage

Preservation	None	None	None	None	None	Cool 4C	None	Cool 4C	None	Cool 4C
Type of Container	aG	aG	aG	aG	aG	aG	aG	aG	aG	aG
No. of Container(s)	1	1	1	1	1	1	1	1	1	1
Volume	60mL	60mL	60mL	60mL	120mL	250mL	250mL	500mL	500mL	1000mL
SAMPLE ANALYSIS	Isotopic Uranium	Neptunium-237	Nickel-63	Technetium-99	Tritium - H3	VOA - 8260A (TCL); VOA - 8260A (Add-On) [1-Propanol, Ethanol]	pH (Soil) - 9045	Semi-VOA - 8270A (TCL), TPH-Diesel Range - WTPH-D, PCBs - 8082	See item (1) in Special Instructions.	See item (2) in Special Instructions.

Sample No.	Matrix *	Sample Date	Sample Time										
B0W698	Soil	8/25/99	10:32	X*	X*	X*	X*	X*					
												Down	

SPECIAL INSTRUCTIONS

See chain of custody comments on SAF B99-078.

(1) ICP Metals - 6010A (Supertrace) [Arsenic, Barium, Beryllium, Cadmium, Chromium, Copper, Lead, Nickel, Selenium, Silver, Vanadium, Zinc]; Mercury - 7471 - (CV); Chromium Hex - 7196

(2) NO2/NO3 - 353.1; IC Anions - 300.0 [Chloride, Fluoride, Nitrate, Nitrite, Phosphate, Sulfate]; Sulfides - 9030; Ammonia - 350.3; Total Cyanide - 9010

Matrix *
Soil
Water
Vapor
Other Solid
Other Liquid

CHAIN OF POSSESSION — Sign/Print Names

Relinquished By	Date/Time	Received By	Date/Time
Brent Porter	8/25/99 1410	Peter JB	8/25/99 1410
Peter J-B	8-26-99 0800	R. Fellers / R. Fellers	8-26-99 0800
R. Fellers / R. Fellers	8-26-99 1400	Fed Ex	8-26-99
FedEx	8-27-99 9:30	TNW M. Goldenberg	8-27-99 9:30

collector not available to sign COC

LABORATORY SECTION — Received By — Title — Date/Time

FINAL SAMPLE DISPOSITION — Disposal Method — Disposed By — Date/Time

000027

Decker Harbor Inc.

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

Collector Bowers/Porter/Nielson	Company Contact Chris Cearlock Telephone No. 372-9574	Project Coordinator TRENT, SJ	Price Code 8N Data Turnaround 45 Days
Project Designation 200 Area Source characterization - 200-CW-1 OU	Sampling Location GP-2 >15' bgs 17.5' - 18.5'	SAF No. B99-078	
Ice Chest No. SML 127	Field Logbook No. EL-1511	Method of Shipment Federal Express	
Shipped To TMA/~~RICRA~~ ~~8/25-27-99~~	Offsite Property No. A990231	Bill of Lading/Air Bill No. 4235 7952 8760	
		COA B20CW1-671C	

POSSIBLE SAMPLE HAZARDS/REMARKS												
	Preservation	None										
	Type of Container	aG										
Special Handling and/or Storage	No. of Container(s)	1										
	Volume	1000mL										
SAMPLE ANALYSIS		See item (1) in Special Instructions.										
Sample No.	Matrix * / Sample Date / Sample Time											
B6W698	Soil / 8/25/99 / 10:32	X										Dowsyl

CHAIN OF POSSESSION	Sign/Print Names		
Relinquished By Brent Porter 8/25/99/1410	Received By Peter JB 8/25/99/1410		
Relinquished By Ref 1.13 8.26.99 0800	Received By R Fellberg / R Fellberg 8.26.99 0800		
Relinquished By R Fellberg / R Fellberg 8-26-99 1400	Received By Fed Ex 8-26-99 9:30		
Relinquished By Fed Ex 8-27-99 9:30	Received By TNV M. Goldenberg 8-27-99		
LABORATORY SECTION	Received By	Title	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

SPECIAL INSTRUCTIONS

See chain of custody comments on SAF B99-078.

(1) Gamma Spectroscopy (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155); Gamma Spec - Add-on (Americium-241); Strontium-89,90 -- Total Sr; Total Uranium (Uranium); Isotopic Plutonium; Isotopic Thorium (Thorium-232); Americium-241

Collector not available to sign COC

Matrix *

Soil
Water
Vapor
Other Solid
Other Liquid

000028

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

B99-078-86 | Page 1 of 1

Collector: Bowers/Porter/Nielson	Company Contact: Chris Cearlock	Telephone No.: 372-9574	Project Coordinator: TRENT, SJ
Price Code: 8N	Data Turnaround: 45 Days		
Project Designation: 200 Area Source characterization - 200-CW-1 OU	Sampling Location: GP-2 >15' bgs 20'-21'		SAF No.: B99-078
Ice Chest No.: SML-591	Field Logbook No.: EL-1511		Method of Shipment: Federal Express
Shipped To: TMA/~~FECRA~~ 8-25-99	Offsite Property No.: A990231		Bill of Lading/Air Bill No.: 4235 7952 8771
			COA B20CW1 L67HC

POSSIBLE SAMPLE HAZARDS/REMARKS											
	Preservation	None	None	None	None	None	Cool 4C	None	Cool 4C	None	Cool 4C
	Type of Container	aG	aG	aG	aG	aG	aG	aG	aG	aG	aG
	No. of Container(s)	1	1	1	1	1	1	1	1	1	1
Special Handling and/or Storage	Volume	60mL	60mL	60mL	60mL	120mL	250mL	250mL	500mL	500mL	1000mL
SAMPLE ANALYSIS		Isotopic Uranium	Neptunium-237	Nickel-63	Technetium-99	Tritium - H3	VOA - 8260A (TCL), VOA - 8260A (Add-On) [1-Propanol, Ethanol]	pH (Soil) - 9045	Semi-VOA - 8270A (TCL), TPH-Diesel Range - WTPH-D; PCBs - 8082	See item (1) in Special Instructions.	See item (2) in Special Instructions.

Sample No.	Matrix *	Sample Date	Sample Time										
B0W659	Soil	8/25/99	10:51	X	X	X	X	X					
												D 0.25 TAL	

CHAIN OF POSSESSION — Sign/Print Names

Relinquished By	Date/Time	Received By	Date/Time
Brenton R. Porter	8/25/99 1410	Peter IB	8/25/99 1410
PE6 #1B	8/26/99 11:00	CTRICE/C Trice	8/26/99 11:00
CTRICE/C Trice	8/26/99 14:00	FEDEX	8-26-99 9:30
FedEx 8-27-99 9:30		FNV M. Goldenberg	8-27-99

SPECIAL INSTRUCTIONS

See chain of custody comments on SAF B99-078.

COLLECTOR UNAVAILABLE TO SIGN COC

(1) ICP Metals - 6010A (Supertrace) [Arsenic, Barium, Beryllium, Cadmium, Chromium, Copper, Lead, Nickel, Selenium, Silver, Vanadium, Zinc]; Mercury - 7471 - (CV); Chromium Hex - 7196

(2) NO2/NO3 - 353.1; IC Anions - 300.0 [Chloride, Fluoride, Nitrate, Nitrite, Phosphate, Sulfate]; Sulfides - 9030; Ammonia - 350.3; Total Cyanide - 9010

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

LABORATORY SECTION: Received By | Title | Date/Time

FINAL SAMPLE DISPOSITION: Disposal Method | Disposed By | Date/Time

B0W029

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

B99-078-86 | Page 2 of 2

Collector: Bowers/Porter/Nielson	Company Contact: Chris Cearlock	Telephone No.: 372-9574	Project Coordinator: TRENT, SJ
Price Code: 8N	Data Turnaround: 45 Days		
Project Designation: 200 Area Source characterization - 200-CW-1 OU	Sampling Location: GP-2 >15' bgs 20'-21'		SAF No.: B99-078
Ice Chest No.: SML-591	Field Logbook No.: EL-1511		Method of Shipment: Federal Express
Shipped To: TMA/~~RECRA~~ 8-25-99	Offsite Property No.: A990231		Bill of Lading/Air Bill No.: 4235 7952 8771
			COA: B20CW1-671C

POSSIBLE SAMPLE HAZARDS/REMARKS												
	Preservation	None										
	Type of Container	aG										
Special Handling and/or Storage	No. of Container(s)	1										
	Volume	1000mL										
SAMPLE ANALYSIS		See item (1) in Special Instructions.										
Sample No.	Matrix *	Sample Date	Sample Time									
B0W699	Soil	8/25/99	10:51	X								Dowm

000030

CHAIN OF POSSESSION	Sign/Print Names		
Relinquished By: Brent Porter	Date/Time: 8/25/99/1410	Received By: Refer JB	Date/Time: 8/25/99/1410
Relinquished By: REG#1B	Date/Time: 8/26/99 11:00	Received By: CTRICE/Chris	Date/Time: 8/26/99 11:00
Relinquished By: CTRICE/Chris	Date/Time: 8/26/99 14:00	Received By: FEDEX	Date/Time: 8-26-99
Relinquished By: FedEx	Date/Time: 8-27-99 9:30	Received By: TNV M. Goldenberg	Date/Time: 8-27-99 9:30

SPECIAL INSTRUCTIONS

See chain of custody comments on SAF B99-078.

COLLECTOR UNAVAILABLE TO SIGN COC

(1) Gamma Spectroscopy (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155); Gamma Spec - Add-on (Americium-241); Strontium-89,90 – Total Sr; Total Uranium (Uranium); Isotopic Plutonium; Isotopic Thorium (Thorium-232); Americium-241

Matrix *

Soil
Water
Vapor
Other Solid
Other Liquid

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

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

B99-078-87

Collector Bowers/Porter/Nielson	Company Contact Chris Cearlock	Telephone No. 372-9574	Project Coordinator TRENT, SJ
Price Code 8N	Data Turnaround 45 Days		
Project Designation 200 Area Source characterization - 200-CW-1 OU	Sampling Location GP-2 >15' bgs 22'-23'		SAF No. B99-078
Ice Chest No. SML-591	Field Logbook No. EL-1511		Method of Shipment Federal Express
Shipped To TEAWRECRA 8-25-99	Offsite Property No. A990231		Bill of Lading/Air Bill No. 42357952 8771
			COA B20CW1671C

POSSIBLE SAMPLE HAZARDS/REMARKS										
	Preservation	None	None	None	None	None	Cool 4C	None	Cool 4C	None	Cool 4C
	Type of Container	aG	aG	aG	aG	aG	aG	aG	aG	aG	aG
	No. of Container(s)	1	1	1	1	1	1	1	1	1	1
Special Handling and/or Storage	Volume	60mL	60mL	60mL	60mL	120mL	250mL	250mL	500mL	500mL	1000mL
SAMPLE ANALYSIS		Isotopic Uranium	Neptunium-237	Nickel-63	Technetium-99	Tritium - H3	VOA - 8260A (TCL); VOA - 8260A (Add-On) [1-Propanol, Ethanol]	pH (Soil) - 9045	Semi-VOA - 8270A (TCL); TPH-Diesel Range - WTPH-D; PCBs - 8082	See item (1) in Special Instructions.	See item (2) in Special Instructions.
Sample No.	Matrix *	Sample Date	Sample Time								
B0W680	Soil	8/25/99	11:03	X	X	X	X	X			
									BWT91		

CHAIN OF POSSESSION	Sign/Print Names		
Relinquished By Brent Porter	Date/Time 8/25/99 1410	Received By Peter JB	Date/Time 8/25/99 1410
Relinquished By REGH JB	Date/Time 8/26/99 11:00	Received By CTRICE/C Brice	Date/Time 8/26/99 11:00
Relinquished By CTRICE/CBrice	Date/Time 8/26/99 14:00	Received By FEDEX	Date/Time 8-26-99
Relinquished By FedEx 8-27-99	Date/Time 9:30	Received By TNV M. Goldenberg 8-27-99	Date/Time 9:30
LABORATORY SECTION	Received By	Title	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

SPECIAL INSTRUCTIONS

See chain of custody comments on SAF B99-078.

COLLECTOR UNAVAILABLE TO SIGN COC

(1) ICP Metals - 6010A (Supertrace) [Arsenic, Barium, Beryllium, Cadmium, Chromium, Copper, Lead, Nickel, Selenium, Silver, Vanadium, Zinc]; Mercury - 7471 - (CV); Chromium Hex - 7196

(2) NO2/NO3 - 353.1; IC Anions - 300.0 (Chloride, Fluoride, Nitrate, Nitrite, Phosphate, Sulfate); Sulfides - 9030; Ammonia - 350.3; Total Cyanide - 9010

Matrix *

Soil
Water
Vapor
Other Solid
Other Liquid

0009031

Bechtel Hanford Inc.

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

Collector: Bowers/Porter/Nielson	Company Contact: Chris Cearlock	Telephone No.: 372-9574	Project Coordinator: TRENT, SJ
Price Code: 8N	Data Turnaround: 45 Days		
Project Designation: 200 Area Source characterization - 200-CW-1 OU	Sampling Location: GP-2 >15' bgs 22'-23'	SAF No.: B99-078	
Ice Chest No.: SML-591	Field Logbook No.: EL-1511	Method of Shipment: Federal Express	
Shipped To: TMA/~~RECRA~~ 8-26-99	Offsite Property No.: A990231	Bill of Lading/Air Bill No.: 4235 7952 8771	
		COA: B20CW1-671C	

POSSIBLE SAMPLE HAZARDS/REMARKS

Special Handling and/or Storage

Preservation	None											
Type of Container	aG											
No. of Container(s)	1											
Volume	1000mL											
SAMPLE ANALYSIS	See item (1) in Special Instructions.											
Sample No.	Matrix *	Sample Date	Sample Time									
B0W6B0	Soil	8/25/99	11:03	X								DOUSM

SPECIAL INSTRUCTIONS

See chain of custody comments on SAF B99-078.

COLLECTOR UNAVAILABLE TO SIGN COC

(1) Gamma Spectroscopy (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155); Gamma Spec - Add-on (Americium-241) (Strontium-89,90 -- Total S Total Uranium (Uranium) Isotopic Plutonium (Isotopic Thorium (Thorium-232) Americium-241

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

CHAIN OF POSSESSION	Sign/Print Names	Date/Time
Relinquished By: Brent Porter	Received By: Peter JB	8/25/99 14:10
Relinquished By: RF6 #1B	Received By: CTRICE/CAlice	8/26/99 11:00
Relinquished By: CTRICE/CAlice	Received By: FEDEX	8-26-99 9:30
Relinquished By: FedEx	Received By: TNV M. Goldenberg	8-27-99

LABORATORY SECTION: Received By: Title: Date/Time

FINAL SAMPLE DISPOSITION: Disposal Method: Disposed By: Date/Time

000022

Collector Bowers/Porter/Nielson	Company Contact Chris Cearlock	Telephone No. 372-9574	Project Coordinator TRENT, SJ
Project Designation 200 Area Source characterization - 200-CW-1 OU	Sampling Location GP-2 >15' bgs 24' - 25'		SAF No. B99-078
Ice Chest No. SAML 127	Field Logbook No. EL-1511		Method of Shipment Federal Express
Shipped To TMA/~~RECRA~~ 8-25-99	Offsite Property No. A990231		Bill of Lading/Air Bill No. 4235 7952 8760
			COA B20CW1 671C

Price Code 8N

Data Turnaround 45 Days

POSSIBLE SAMPLE HAZARDS/REMARKS

Special Handling and/or Storage

Preservation	None	None	None	None	None	Cool 4C	None	Cool 4C	None	Cool 4C
Type of Container	aG	aG	aG	aG	aG	aG	aG	aG	aG	aG
No. of Container(s)	1	1	1	1	1	1	1	1	1	1
Volume	60mL	60mL	60mL	60mL	120mL	250mL	250mL	500mL	500mL	1000mL
SAMPLE ANALYSIS	Isotopic Uranium	Neptunium-237	Nickel-63	Technetium-99	Tritium - H3	VOA - 8260A (TCL); VOA - 8260A (Add-On) (1-Propanol, Ethanol)	pH (Soil) - 9045	Semi-VOA - 8270A (TCL); TPH-Diesel Range - WTPH-D; PCBs - 8082	See item (1) in Special Instructions.	See item (2) in Special Instructions.

Sample No.	Matrix *	Sample Date	Sample Time										
B0W681	Soil	8/25/99	11:18	X *	X *	X *	X *	X *					
											B0W5M1		

B20CW1

CHAIN OF POSSESSION — Sign/Print Names

Relinquished By	Date/Time	Received By	Date/Time
Brent Porter	8/25/99/1410	Peter JB	8/25/99/1410
Relinquished By	Date/Time	Received By	Date/Time
R.E. J.B.	8-26-99 0800	R. Fallows / R. Fallows	8-26-99 0800
Relinquished By	Date/Time	Received By	Date/Time
R. Fallows / R. Fallows	8-26-99 1400	Fed Ex	8-26-99
Relinquished By	Date/Time	Received By	Date/Time
Fed Ex	8-27-99 9:30	TNV M. Goldenberg	8-27-99 9:30

SPECIAL INSTRUCTIONS

See chain of custody comments on SAF B99-078.

(1) ICP Metals - 6010A (Supertrace) (Arsenic, Barium, Beryllium, Cadmium, Chromium, Copper, Lead, Nickel, Selenium, Silver, Vanadium, Zinc); Mercury - 7471 - (CV); Chromium Hex - 7196

(2) NO2/NO3 - 353.1; IC Anions - 300.0 (Chloride, Fluoride, Nitrate, Nitrite, Phosphate, Sulfate); Sulfides - 9030; Ammonia - 350.3; Total Cyanide - 9010

collector not available to sign COC

Matrix *

Soil
Water
Vapor
Other Solid
Other Liquid

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

Collector Bowers/Porter/Nielson	Company Contact Chris Cearlock	Telephone No. 372-9574	Project Coordinator TRENT, SJ
Project Designation 200 Area Source characterization - 200-CW-1 OU	Sampling Location GP-2 >15' bgs 24' - 25'		SAF No. B99-078
Ice Chest No. SML 127	Field Logbook No. EL-1511		Method of Shipment Federal Express
Shipped To TMA/~~REGRA~~ B 8-25-99	Offsite Property No. A990231		Bill of Lading/Air Bill No. 4235 7952 8760
			COA B20CW1 671C

Price Code 8N

Data Turnaround 45 Days

POSSIBLE SAMPLE HAZARDS/REMARKS												
	Preservation	None										
	Type of Container	aG										
Special Handling and/or Storage	No. of Container(s)	1										
	Volume	100mL										
SAMPLE ANALYSIS		See item (1) in Special Instructions.										

Sample No.	Matrix *	Sample Date	Sample Time										
B0W6B1	Soil	8/25/99	11:18	X									Dup 5/1

SPECIAL INSTRUCTIONS

See chain of custody comments on SAF B99-078.

(1) Gamma Spectroscopy (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155); Gamma Spec - Add-on (Americium-241); Strontium-89,90 – Total Sr; Total Uranium (Uranium); Isotopic Plutonium; Isotopic Thorium (Thorium-232); Americium-241

Matrix *
Soil
Water
Vapor
Other Solid
Other Liquid

CHAIN OF POSSESSION	Sign/Print Names		
Relinquished By: Brent Porter	Date/Time: 8/25/99/1410	Received By: Peter JB	Date/Time: 8/25/99/1410
Relinquished By: Peter J.B	Date/Time: 8-26-99 0800	Received By: [illegible]	Date/Time: 0800 8-26-99
Relinquished By: [illegible]	Date/Time: 1400 8-26-99	Received By: Fed Ex	Date/Time: 8-26-99
Relinquished By: FedEx 8-27-99 9:30		Received By: TNV McGoldenberg	Date/Time: 9:30 8-27-99

collector not available to sign COC

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

000034

Collector Bowers/Porter/Nielson	Company Contact Chris Cearlock	Telephone No. 372-9574	Project Coordinator TRENT, SJ
Project Designation 200 Area Source characterization - 200-CW-1 OU	Sampling Location GP-2 <15' bgs 10'-11'		SAF No. B99-078
Ice Chest No. FRC 99-018	Field Logbook No. EL-1511		Method of Shipment Federal Express
Shipped To TMA/~~RECIA~~ RB 8-25-99	Offsite Property No. N A		Bill of Lading/Air Bill No. N/A
			COA B20CW1-671C

Price Code 8N

Data Turnaround 45 Days

POSSIBLE SAMPLE HAZARDS/REMARKS											
	Preservation	None	None	Cool 4C	None	Cool 4C	None	Cool 4C	None		
	Type of Container	aG	aG	aG	aG	aG	aG	aG	aG		
	No. of Container(s)	1	1	1	1	1	1	1	1		
Special Handling and/or Storage	Volume	60mL	60mL	250mL	250mL	500mL	500mL	1000mL	1000mL		
SAMPLE ANALYSIS		Isotopic Uranium	Neptunium-237	VOA - 8260A (TCL); VOA - 8260A (Add-On) [1-Propanol, Ethanol]	pH (Soil) - 9045	Semi-VOA - 8270A (TCL); TPH-Diesel Range - WTPH-D; PCBs - 8082	See item (1) in Special Instructions.	See item (2) in Special Instructions.	See item (3) in Special Instructions.		

Sample No.	Matrix *	Sample Date	Sample Time										
B0W592	Soil	8/25/99	08:45	X	X						X	Bowers	LG
													CPM
													400

CHAIN OF POSSESSION	Sign/Print Names		
Relinquished By Brent Porter	Date/Time 8/25/99 1410	Received By Peter JB	Date/Time 8/25/99 1410
Relinquished By Pete J-B	Date/Time 8-26-99 0800	Received By R. Fabela / R. Williams	Date/Time 8-26-99 0800
Relinquished By R. Fabela / R. Williams	Date/Time 8-26-99 1400	Received By Fed Ex	Date/Time 8-26-99 9:30
Relinquished By Fed Ex	Date/Time 8-27-99 9:30	Received By TNU M. Goldenberg	Date/Time 8-27-99

SPECIAL INSTRUCTIONS

See chain of custody comments on SAF B99-078.

(1) ICP Metals - 6010A (Supertrace) (Arsenic, Barium, Beryllium, Cadmium, Chromium, Copper, Lead, Nickel, Selenium, Silver, Vanadium, Zinc); Mercury - 7471 - (CV); Chromium Hex - 7196
(2) NO2/NO3 - 353.1; IC Anions - 300.0 (Chloride, Fluoride, Nitrate, Nitrite, Phosphate, Sulfate); Sulfides - 9030; Ammonia - 350.3; Total Cyanide - 9010
(3) Gamma Spectroscopy (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155); Gamma Spec - Add-on (Americium-241); Strontium-89,90 -- Total Sr; Total Uranium (Uranium); Isotopic Plutonium; Isotopic Thorium (Thorium-232); Americium-241

collector unavailable to sign COC

Matrix *
Soil
Water
Vapor
Other Solid
Other Liquid

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

B0W0085

Appendix 5

Data Validation Supporting Documentation

RADIOCHEMICAL DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	(C)	D	E

PROJECT: 200-CW-1		DATA PACKAGE: H0506	
VALIDATOR: TLI	LAB: ~~Rect~~ JNL	DATE:	
CASE:		SDG: H0506	

ANALYSES PERFORMED

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

SAMPLES/MATRIX BOW692, BOW693, BOW694, BOW697
BOW698, BOW699, BOW680, BOW681

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: ~~Blk not prepared w/ SDX J 7, 8, 9, 80, 81 — 3 H~~
Blk not run w/ 93, 97, 98, 99, 80, 81 — J gam

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: MS - 1R J tritium

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

LCS analyzed? . . . . . Yes No N/A
LCS recoveries acceptable? . . . . . Yes No N/A
LCS traceable? . . . . . Yes No N/A
Transcription/Calculation Errors? . . . . . Yes No N/A

Comments: ~~LCS not prepared w/SDG~~ ~~J - 7,8,9, Bo, B1 - 3H~~
~~gamma~~ no LCS w/ 92, 94, - J
~~Am241 - no LCS 92, 150~~

7. Chemical Recovery . . . . . ☐ N/A

Chemical carrier added? . . . . . Yes No N/A
Chemical recovery acceptable? . . . . . ~~Yes~~ ~~No~~ N/A yes
Chemical carrier traceable? . . . . . Yes No N/A
Chemical carrier expired? . . . . . Yes No N/A
Transcription/Calculation errors? . . . . . Yes No N/A

Comments: Neptunium - B1 ~~2370 J~~

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: thorium - 228 J all 40% RPD usgs
~~Eu154 J all~~ ~~th232 38% J~~
Ra228 J all 45% RPD } gen
th232 J all 45% RPD
~~thorium 232 J all 38% - usgs~~

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:

10. Holding Times

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

Comments: ~~3H 97, 98, 99, 80, 81 - R 13 days between prep + analysis not prepared (LSS - 3H) w/ STD~~

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: 92 Co-60, 152, 154, 155 93 - 152, 155, RA226, 94 - Co60, 152, 155, 226, 228 Ra
98 Co60, 152, 154, 155 98 - 154, 155 99 - 152 00 - 154, 155
81 - 152, 155, RA226

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0506

N908160-11 EOW692

DUPLICATE

SDG	7188	Client/Case no	Hanford SDG-H0506
Contact	Kevin C. Johnson	Case no	TRB-SPB-207925
DUPLICATE		ORIGINAL	
Lab sample id	N908160-11	Lab sample id	N908160-01
Dept sample id	7188-C11	Dept sample id	7188-001
		Received	08/27/99
% solids	87.7	% solids	89.7
Client sample id	EOW692		
Location/Matrix	GP-2c15'bgs 10'-11' SOLID		
Collected	08/25/99 08:45		
Custody/SAF No	B99-078-79 B99-078		

ALYTE	DUPLICATE pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST	ORIGINAL pCi/g	2σ ERR (COUNT)	MDA pCi/g	QUALI-FIERS	RPD %	3σ TOT	PROT LIMIT
ptunium 237	0.010	0.061	0.14		U	NP	-0.002	0.003	0.012	U	-		
lutonium 238	-0.021	0.021	0.056	1.0	U	PU	0.005	0.016	0.027	U	-		
lutonium 239/240	0.165	0.049	0.042	1.0	J	PU	0.181	0.045	0.033	J	9	59	
mericium 241	0.294	0.064	0.034	1.0	J	AM	0.178	0.072	0.068	J	49	62	
tal Strontium	2.90	0.27	0.21	1.0		SR	2.98	0.22	0.15		3	28	
orium 228	0.271	0.079	0.080	1.0	J	TH	0.405	0.13	0.13	J	40	68	
orium 230	0.241	0.11	0.16	1.0	J	TH	0.057	0.11	0.17	U	124	157	
orium 232	0.172	0.069	0.054	1.0	J	TH	0.254	0.095	0.072	J	38	63	
otassium 40	10.3	0.89	0.48			GAM	10.5	1.3	0.83		2	39	
obalt 60	U		0.052	0.050	U	GAM	U		0.090	U	-		
esium 137	622	1.3	0.38	0.10		GAM	632	1.7	0.41		2	32	
ropium 152	U		1.2	0.10	U	GAM	U		1.6	U	-		
ropium 154	0.526	0.35	0.17	0.10		GAM	U		0.31	U	52	126	
ropium 155	U		1.0	0.10	U	GAM	U		0.74	U	-		
dium 226	0.557	0.40	0.58	0.10	U	GAM	0.645	0.47	0.62		15	187	
dium 228	0.802	0.28	0.25	0.20		GAM	0.507	0.29	0.31		45	94	
orium 228	0.516	0.37	0.54		U	GAM	U		0.65	U	-		
orium 232	0.802	0.25	0.26			GAM	0.507	0.29	0.31		45	94	
mericium 241	U		0.74		U	GAM	U		0.45	U	-		
anium 238	U		7.5		U	GAM	U		11	U	-		
anium 235	U		112		U	GAM	U		1.4	U	-		

0 Area source chctzn-200-CW-1 OU

-DUP#1 31760

Lab id	TMANC
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DUP
Version	3.05
Report date	02/13/00

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0506

METHOD SUMMARY

GAMMA SCAN

GAMMA SPECTROSCOPY

Test GAM Matrix SOLID
SDG 7188
Contact Kevin C. Johnson

Client Hanford
Contract TRF-SEE-207925
Case no SDG-H0506

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUP-FIX	FLANCHET	Cobalt 60	Cesium 137
Preparation batch 6893-125						
BOW692	N908160-01			7188-001	U	632
BOW693	N908160-02			7188-002	U	592
BOW694	N908160-03			7188-003	U	7180
BOW697	N908160-04			7188-004	U	143
BOW698	N908160-05			7188-005	U	0.314
BOW699	N908160-06			7188-006	U	11.1
BOW6B0	N908160-07			7188-007	U	0.624
BOW6B1	N908160-08			7188-008	U	27.3
BLK (QC ID=31767)	N908160-10			7188-010	U	U
LCS (QC ID=31766)	N908160-09			7188-009	ok	ok
Duplicate (N908160-01)	N908160-11			7188-011	- U	ok
Nominal values and limits from method				RDLs (pCi/g)	0.050	0.10

200 Area source chctzn-200-CW-1 QU

METHOD PERFORMANCE

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUP-FIX	MAX MDA pCi/g	ALIQ g	PREP FAC	DILU-TION	YIELD %	EFF %	COUNT min	FWHM keV	DRIFT keV	DAYS HELD	PREPARED	ANAL-YZED	DETECTOR
Preparation batch 6893-125 2σ prep error 15.0 % Reference Lab Notebook 6893 pg.125																
BOW692	N908160-01			0.20	148					423			36	09/14/99	09/30	JR,01,00
BOW693	N908160-02			0.063	721					322			41	09/14/99	10/05	MB,07,00
BOW694	N908160-03			0.52	106					412			36	09/14/99	09/30	JR,03,00
BOW697	N908160-04			0.13	748					142			41	09/14/99	10/05	02,01,00
BOW698	N908160-05			0.091	785					143			41	09/14/99	10/05	02,03,00
BOW699	N908160-06			0.059	795					143			41	09/14/99	10/05	02,04,00
BOW6B0	N908160-07			0.086	758					143			41	09/14/99	10/05	MB,05,00
BOW6B1	N908160-08			0.055	766					143			41	09/14/99	10/05	MB,07,00
BLK (QC ID=31767)	N908160-10			0.016	689					421				09/14/99	10/01	MB,05,00
LCS (QC ID=31766)	N908160-09			0.022	689					201				09/14/99	10/05	01,01,00
Duplicate (N908160-01) (QC ID=31768)	N908160-11			0.13	148					670			37	09/14/99	10/01	JR,03,00
Nominal values and limits from method				0.050	100					100			180			

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-CMS
Version 3.06
Report date 02/13/00

Date: 21 January 2000
To: Bechtel Hanford Inc. (technical representative)
From: TechLaw, Inc.
Project: 200 Area Source Characterization - 200-CW-1 Operable Unit
Subject: Volatiles - Data Package No. H0506-RLN (SDG No. H0506)

INTRODUCTION

This memo presents the results of data validation on Summary Data Package No. H0506-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	Media	Validation	Analysis
B0W6B0	8/25/99	Soil	C	See note 1 & 2
B0W6B1	8/25/99	Soil	C	See note 1 & 2
B0W692	8/25/99	Soil	C	See note 1 & 2
B0W693	8/25/99	Soil	C	See note 1 & 2
B0W694	8/25/99	Soil	C	See note 1 & 2
B0W697	8/25/99	Soil	C	See note 1 & 2
B0W698	8/25/99	Soil	C	See note 1 & 2
B0W699	8/25/99	Soil	C	See note 1 & 2

1 - Volatiles by EPA 8260A
2 - Alcohols (n-propyl alcohol and ethanol) by 8015B and diesel range organics by 8015B

Data validation was conducted in accordance with the BHI validation statement of work and the *200-CW-1 Operable Unit RI/FS Work Plan and 216-B-3 RCRA TSD Unit Sampling Plan*, DOE/RL-99-07, Draft B. 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 are assessed to ascertain whether the holding time requirements were met by the laboratory. Preserved water samples must be analyzed within 14 days of the date of sample collection for VOA, diesel and alcohols. If holding times are exceeded, but not by greater than twice 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 twice the limit, all associated detected sample results are qualified as estimates and flagged "J" and all non-detects are rejected and flagged "UR".

All holding times were met.

- **Blanks**

Method blank analyses are conducted to determine the extent of laboratory contamination introduced through sampling, sample preparation and analysis. At least one acceptable method blank analysis must be conducted for every 20 samples of a given matrix. No contaminants should be present in the method blank. Analytical results for analytes present in any sample at less than five times the concentration of that analyte found in the associated blank are qualified as non-detects and flagged "U". Common laboratory contaminants present in samples at less than ten times the concentration of that analyte found in the associated blank are qualified as non-detects. If a sample result is less than the CRQL and is less than five times (or less than ten times for laboratory contaminants) the highest associated blank result, the sample result value is raised to the CRQL, qualified as undetected and flagged "U".

Due to laboratory blank contamination, the methylene chloride results in all samples were qualified as undetected and flagged "U".

Due to laboratory blank contamination, the acetone results in all samples except B0W692 were raised to the CRDL, qualified as undetected and flagged "U".

All other method blank results were acceptable.

- **Accuracy**

Matrix Spike/Matrix Spike Duplicate Recoveries

Matrix spike/matrix spike duplicate 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/matrix spike duplicate analyses are performed in duplicate using the target compounds for which percent recoveries must be within established laboratory quality control limits. If spike recoveries are outside control limits (70-130%), detected sample results less than five times the spike concentration are qualified as estimates and flagged "J". Undetected 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 recovery results were acceptable.

Surrogate Recovery

The analysis of surrogate compounds provides a measure of system performance for individual samples. Matrix-specific surrogate compound recovery control windows have been established by the laboratory program. When a surrogate compound recovery is out of the control window, all positively identified target compounds associated with the unacceptable surrogate recoveries are qualified as estimates and flagged "J". Undetected compounds with surrogate recoveries less than the lower control limit are qualified as having an estimated detection limit and flagged "UJ". Samples with surrogate recoveries less than ten percent are qualified as estimates and flagged "J" for detects, and rejected and flagged "UR" for nondetects. Undetected compounds with surrogate recoveries greater than the upper control limit require no qualification. Surrogates are not required for formaldehyde analysis.

Due to the lack of a surrogate analysis, all n-propyl alcohol and ethanol results were qualified as estimates and flagged "J".

Due to surrogate recoveries outside QC limits, the chloromethane bormomethane, vinyl chloride, chloroethane, 2-butanone, methylene chloride, 2-hexanone and 4-methyl-2-pentanone results in sample B0W694 were qualified as estimates and flagged "J".

Due to a surrogate recovery outside QC limits, the chlorobenzene results in samples B0W692 and B0W694 were qualified as estimates and flagged "UJ".

All other 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 by the RPD between the recoveries of duplicate matrix spike analyses performed on a sample. For samples analyzed using SW-846 protocol, results must be within RPD limits of +/- 30% for solid samples. If RPD values are out of specification and the sample concentration is less than five times the spike concentration, all associated sample results are qualified as estimates and flagged "J" for detects and "UJ" for non-detects. 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.

- **Analytical Detection Levels**

Reported analytical detection levels are compared against the PQL to ensure that laboratory detection levels meet the required criteria. Chloromethane bromomethane, vinyl chloride, chloroethane, 4-methyl-2-pentanone and 2-hexanone were reported above the PQL in all samples; 2-butonone in samples B0W693 and B0W694; all undetected volatile organic results in samples B0W693 and B0W694; and diesel range organics in sample B0W694. Under the BHI validation SOW, no qualification is required. All other reported detection limits met their PQL.

- **Completeness**

Data package No. H0506-RLN (SDG No. H0506) was submitted for validation and verified for completeness. The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

Due to laboratory blank contamination, the methylene chloride results in all samples were qualified as undetected and flagged "U". Due to laboratory blank contamination, the acetone results in all samples except B0W692 were raised to the CRDL, qualified as undetected and flagged "U". Due to the lack of a surrogate analysis, all n-propyl alcohol and ethanol results were qualified as estimates and flagged "J". Due to surrogate recoveries outside QC limits, the chloromethane bormomethane, vinyl chloride, chloroethane, 2-butanone, methylene chloride, 2-hexanone and 4-methyl-2-pentanone results in sample B0W694 were qualified as estimates and flagged "J". Due to a surrogate recovery outside QC limits, the chlorobenzene results in samples B0W692 and B0W694 were qualified as estimates and flagged "UJ". 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.

Chloromethane bromomethane, vinyl chloride, chloroethane, 4-methyl-2-pentanone and 2-hexanone were reported above the PQL in all samples; 2-butonone in samples B0W693 and B0W694; all undetected volatile organic results in samples B0W693 and B0W694; and diesel range organics in sample B0W694. Under the BHI validation SOW, no qualification is required.

REFERENCES

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

DOE/RL-99-07, Draft B, *200-CW-1 Operable Unit RI/FS Work Plan and 216-B-3 RCRA TSD Unit Sampling Plan*.

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers which may be applied by data validator in compliance with the 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 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: H0506	REVIEWER: TLI	DATE: 1/21/00	PAGE_1_OF_1_
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Methylene chloride	U	All	Blank contamination
Acetone	U	B0W6B0, B0W699, B0W697, B0W694, B0W6B1, B0W693, B0W698	Blank contamination
n-Propyl alcohol, ethanol	J	All	No surrogate analysis
Chloromethane, bromomethane, vinyl chloride, chloroethane, 2-butanone, methylene chloride, 2-hexanone, 4-methyl-2-pentanone	J	B0W694	Surrogate recovery outside QC limits
Chlorobenzene	J	B0W692, B0W694	Surrogate recovery outside QC limits

Appendix 3

Qualified Data Summary and Annotated Laboratory Reports

VOLATILE ORGANIC/ALCOHOL/DIESEL ANALYSIS, SOIL MATRIX, (UG/KG)

Project: BECHTEL-HANFORD																	
Laboratory: RECRA LabNet																	
Case:	SDG: H0506																
Sample Number		B0W692		B0W693		B0W694		B0W697		B0W698		B0W699		B0W6B0		B0W6B1	
Location		GP-2		GP-2		GP-2		GP-2		GP-2		GP-2		GP-2		GP-2	
Remarks																	
Sample Date		08/25/99		08/25/99		08/25/99		08/25/99		08/25/99		08/25/99		08/25/99		08/25/99	
Analysis Date		09/08/99		09/08/99		09/08/99		09/08/99		09/08/99		09/08/99		09/08/99		09/08/99	
VOA/Alcohols/Diesel	CRQL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Chloromethane	5	10	U	11	U	15	UJ	10	U	10	U	10	U	10	U	10	U
Bromomethane	5	10	U	11	U	15	UJ	10	U	10	U	10	U	10	U	10	U
Vinyl Chloride	5	10	U	11	U	15	JU	10	U	10	U	10	U	10	U	10	U
Chloroethane	5	10	U	11	U	15	UJ	10	U	10	U	10	U	10	U	10	U
Methylene Chloride	5	9	U	6	U	15	UJ	9	U	5	U	7	U	7	U	5	U
Acetone	10	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Carbon Disulfide		5	U	6	U	8	U	5	U	5	U	5	U	5	U	5	U
1,1-Dichloroethene	5	5	U	6	U	8	U	5	U	5	U	5	U	5	U	5	U
1,1-Dichloroethane	5	5	U	6	U	8	U	5	U	5	U	5	U	5	U	5	U
1,2-Dichloroethene (total)	5	5	U	6	U	8	U	5	U	5	U	5	U	5	U	5	U
Chloroform	5	5	U	6	U	8	U	5	U	5	U	5	U	5	U	5	U
1,2-Dichloroethane	5	5	U	6	U	8	U	5	U	5	U	5	U	5	U	5	U
2-Butanone	10	10	U	11	U	15	UJ	10	U	10	U	10	U	10	U	10	U
1,1,1-Trichloroethane	5	5	U	6	U	8	U	5	U	5	U	5	U	5	U	5	U
Carbon Tetrachloride	5	5	U	6	U	8	U	5	U	5	U	5	U	5	U	5	U
Bromodichloromethane	5	5	U	6	U	8	U	5	U	5	U	5	U	5	U	5	U
1,2-Dichloropropane	5	5	U	6	U	8	U	5	U	5	U	5	U	5	U	5	U
cis-1,3-Dichloropropene	5	5	U	6	U	8	U	5	U	5	U	5	U	5	U	5	U
Trichloroethene	5	5	U	6	U	8	U	5	U	5	U	5	U	5	U	5	U
Dibromochloromethane	5	5	U	6	U	8	U	5	U	5	U	5	U	5	U	5	U
1,1,2-Trichloroethane	5	5	U	6	U	8	U	5	U	5	U	5	U	5	U	5	U
Benzene	5	5	U	6	U	8	U	5	U	5	U	5	U	5	U	5	U
trans-1,3-Dichloropropene	5	5	U	6	U	8	U	5	U	5	U	5	U	5	U	5	U
Bromoform	5	5	U	6	U	8	U	5	U	5	U	5	U	5	U	5	U
4-Methyl-2-pentanone	5	10	U	11	U	15	UJ	10	U	10	U	10	U	10	U	10	U
2-Hexanone	5	10	U	11	U	15	UJ	10	U	10	U	10	U	10	U	10	U
Tetrachloroethene	5	5	U	6	U	8	U	5	U	5	U	5	U	5	U	5	U
1,1,2,2-Tetrachloroethane	5	5	U	6	U	8	U	5	U	5	U	5	U	5	U	5	U
Toluene	5	5	U	6	U	8	U	5	U	5	U	5	U	5	U	5	U
Chlorobenzene	5	5	UJ	6	U	8	UJ	5	U	5	U	5	U	5	U	5	U
Ethylbenzene	5	5	U	6	U	8	U	5	U	5	U	5	U	5	U	5	U
Styrene		5	U	6	U	8	U	5	U	5	U	5	U	5	U	5	U
Xylenes (total)	5	5	U	6	U	8	U	5	U	5	U	5	U	5	U	5	U
n-Propyl Alcohol		5.5	UJ	5.5	UJ	6.0	UJ	5.5	UJ	4.8	UJ	4.2	UJ	2.7	UJ	3.9	UJ
Ethanol		5.5	UJ	5.5	UJ	6.0	UJ	5.5	UJ	4.8	UJ	4.2	UJ	2.7	UJ	3.9	UJ
Diesel Range Organics	5	4.4	U	4.3	U	5.8	U	4.3	U	4.1	U	4.1	U	4.0	U	4.0	U

Recra LabNet - Lionville Laboratory

Volatiles by GC/MS, HSL List

Report Date: 10/04/99 01:37

RFW Batch Number: 9908L906 Client: TNU-HANFORD B99-078 Work Order: 10985001001 Page: 1a

	Cust ID:	B0W6B0	B0W699	B0W697	B0W694	B0W694	B0W692
Sample Information	RFW#:	001	002	003	004	004	005
	Matrix:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	D.F.:	0.980	0.943	0.926	1.04	0.962	0.943
	Units:	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG
						REPREP	
Surrogate Recovery	Toluene-d8	111 %	116 %	114 %	132 * %	122 * %	121 * %
	Bromofluorobenzene	88 %	88 %	82 %	65 * %	80 %	70 * %
	1,2-Dichloroethane-d4	103 %	112 %	113 %	134 * %	138 * %	93 %
Chloromethane		10 U	10 U	10 U	15 U J	14 U	10 U
Bromomethane		10 U	10 U	10 U	15 U J	14 U	10 U
Vinyl Chloride		10 U	10 U	10 U	15 U J	14 U	10 U
Chloroethane		10 U	10 U	10 U	15 U J	14 U	10 U
Methylene Chloride		7 ~~B~~ U	7 ~~B~~ U	9 ~~B~~ U	15 ~~B~~ UJ	18 B	9 ~~B~~ U
Acetone		16 ~~J~~ ~~JB~~	10 ~~J~~ ~~JB~~	10 ~~J~~ ~~JB~~	10 ~~J~~ ~~JB~~	9 JB	10 U
Carbon Disulfide		5 U	5 U	5 U	8 U	7 U	5 U
1,1-Dichloroethene		5 U	5 U	5 U	8 U	7 U	5 U
1,1-Dichloroethane		5 U	5 U	5 U	8 U	7 U	5 U
1,2-Dichloroethene (total)		5 U	5 U	5 U	8 U	7 U	5 U
Chloroform		5 U	5 U	5 U	8 U	7 U	5 U
1,2-Dichloroethane		5 U	5 U	5 U	8 U	7 U	5 U
2-Butanone		10 U	10 U	10 U	15 U J	14 U	10 U
1,1,1-Trichloroethane		5 U	5 U	5 U	8 U	7 U	5 U
Carbon Tetrachloride		5 U	5 U	5 U	8 U	7 U	5 U
Bromodichloromethane		5 U	5 U	5 U	8 U	7 U	5 U
1,2-Dichloropropane		5 U	5 U	5 U	8 U	7 U	5 U
cis-1,3-Dichloropropene		5 U	5 U	5 U	8 U	7 U	5 U
Trichloroethene		5 U	5 U	5 U	8 U	7 U	5 U
Dibromochloromethane		5 U	5 U	5 U	8 U	7 U	5 U
1,1,2-Trichloroethane		5 U	5 U	5 U	8 U	7 U	5 U
Benzene		5 U	5 U	5 U	8 U	7 U	5 U
Trans-1,3-Dichloropropene		5 U	5 U	5 U	8 U	7 U	5 U
Bromoform		5 U	5 U	5 U	8 U	7 U	5 U
4-Methyl-2-pentanone		10 U	10 U	10 U	15 U J	14 U	10 U
2-Hexanone		10 U	10 U	10 U	15 U J	14 U	10 U
Tetrachloroethene		5 U	5 U	5 U	8 U	7 U	5 U
1,1,2,2-Tetrachloroethane		5 U	5 U	5 U	8 U	7 U	5 U
Toluene		5 U	5 U	5 U	8 U	7 U	5 U

*= Outside of EPA CLP QC limits.

2/10/00

00012

40

RFW Batch Number: 9908L906 Client: TNU-HANFORD B99-078 Work Order: 10985001001 Page: 1b

Cust ID:	B0W6B0	B0W699	B0W697	B0W694	B0W694	B0W692
RFW#:	001	002	003	004	004 REPREP	005
Chlorobenzene	5 U	5 U	5 U	8 U J	7 U	5 U J
Ethylbenzene	5 U	5 U	5 U	8 U	7 U	5 U
Styrene	5 U	5 U	5 U	8 U	7 U	5 U
Xylene (total)	5 U	5 U	5 U	8 U	7 U	5 U

*= Outside of EPA CLP QC limits.

2/10/00

000013

Recra LabNet - Lionville Laboratory

Volatiles by GC/MS, HSL List

Report Date: 10/04/99 01:37

RFW Batch Number: 9908L906 Client: TNU-HANFORD B99-078 Work Order: 10985001001 Page: 2a

30

2/10/00

	Cust ID:	B0W692	B0W692	B0W6B1	B0W693	B0W698	VBLKQA
Sample Information	RFW#:	005 MS	005 MSD	006	007	008	99LVN266-MB1
	Matrix:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	D.F.:	1.04	1.04	0.962	1.00	0.980	1.00
	Units:	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG
Surrogate Recovery	Toluene-d8	101 %	102 %	112 %	113 %	107 %	111 %
	Bromofluorobenzene	84 %	84 %	84 %	80 %	84 %	87 %
	1,2-Dichloroethane-d4	112 %	117 %	103 %	117 %	103 %	100 %
Chloromethane		12 U	12 U	10 U	11 U	10 U	10 U
Bromomethane		12 U	12 U	10 U	11 U	10 U	10 U
Vinyl Chloride		12 U	12 U	10 U	11 U	10 U	10 U
Chloroethane		12 U	12 U	10 U	11 U	10 U	10 U
Methylene Chloride		14 B	14 B	5 ~~B~~ U	6 ~~B~~ U	5 ~~JB~~ U	8
Acetone		5 JB	5 JB	10 ~~JB~~	10 ~~JB~~	10 ~~JB~~	1 J
Carbon Disulfide		6 U	6 U	5 U	6 U	5 U	5 U
1,1-Dichloroethene		101 %	105 %	5 U	6 U	5 U	5 U
1,1-Dichloroethane		6 U	6 U	5 U	6 U	5 U	5 U
1,2-Dichloroethene (total)		6 U	6 U	5 U	6 U	5 U	5 U
Chloroform		6 U	6 U	5 U	6 U	5 U	5 U
1,2-Dichloroethane		6 U	6 U	5 U	6 U	5 U	5 U
2-Butanone		12 U	12 U	10 U	11 U	10 U	10 U
1,1,1-Trichloroethane		6 U	6 U	5 U	6 U	5 U	5 U
Carbon Tetrachloride		6 U	6 U	5 U	6 U	5 U	5 U
Bromodichloromethane		6 U	6 U	5 U	6 U	5 U	5 U
1,2-Dichloropropane		6 U	6 U	5 U	6 U	5 U	5 U
cis-1,3-Dichloropropene		6 U	6 U	5 U	6 U	5 U	5 U
Trichloroethene		108 %	117 %	5 U	6 U	5 U	5 U
Dibromochloromethane		6 U	6 U	5 U	6 U	5 U	5 U
1,1,2-Trichloroethane		6 U	6 U	5 U	6 U	5 U	5 U
Benzene		114 %	122 %	5 U	6 U	5 U	5 U
Trans-1,3-Dichloropropene		6 U	6 U	5 U	6 U	5 U	5 U
Bromoform		6 U	6 U	5 U	6 U	5 U	5 U
4-Methyl-2-pentanone		12 U	12 U	10 U	11 U	10 U	10 U
2-Hexanone		12 U	12 U	10 U	11 U	10 U	10 U
Tetrachloroethene		6 U	6 U	5 U	6 U	5 U	5 U
1,1,2,2-Tetrachloroethane		6 U	6 U	5 U	6 U	5 U	5 U
Toluene		123 %	130 %	5 U	6 U	5 U	5 U

*= Outside of EPA CLP QC limits.

000014

RFW Batch Number: 9908L906 Client: TNU-HANFORD B99-078 Work Order: 10985001001 Page: 2b

Cust ID:	B0W692	B0W692	B0W6B1	B0W693	B0W698	VBLKQA
RFW#:	005 MS	005 MSD	006	007	008	99LVN266-MB1
Chlorobenzene	111 %	118 %	5 U	6 U	5 U	5 U
Ethylbenzene	6 U	6 U	5 U	6 U	5 U	5 U
Styrene	6 U	6 U	5 U	6 U	5 U	5 U
Xylene (total)	6 U	6 U	5 U	6 U	5 U	5 U

*= Outside of EPA CLP QC limits.

2/10/00

004

	Cust ID:	B0W6B0	B0W6B0	B0W6B0	B0W699	B0W697	B0W694
Sample Information	RFW#:	001	001 MS	001 MSD	002	003	004
	Matrix:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	D.F.:	1.00	1.00	1.00	1.00	1.00	1.00
	Units:	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
n-Propyl Alcohol		2.7 U J	102 %	104 %	4.2 U J	5.5 U J	6.0 U J
Ethanol		2.7 U J	3.0 U	4.2 U	4.2 U J	5.5 U J	6.0 U J

	Cust ID:	B0W692	B0W6B1	B0W693	B0W698	BLK	BLK BS
Sample Information	RFW#:	005	006	007	008	99LLC129-MB1	99LLC129-MB1
	Matrix:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	D.F.:	1.00	1.00	1.00	1.00	1.00	1.00
	Units:	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
n-Propyl Alcohol		5.5 U J	3.9 U J	5.5 U J	4.8 U J	5.0 U	95 %
Ethanol		5.5 U J	3.9 U J	5.5 U J	4.8 U J	5.0 U	5.0 U

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

000046

1/7/00

09/10/99

Recra LabNet - Lionville Laboratory

DIESEL RANGE ORGANICS BY GC

Report Date: 09/20/99 11:44

RFW Batch Number: 9908L906 Client: TNU-HANFORD B99-078 Work Order: 10985-001-001-9999-00 Page: 1

003

	Cust ID:	B0W6B0	B0W6B0	B0W6B0	B0W699	B0W697	B0W694
Sample Information	RFW#:	001	001 MS	001 MSD	002	003	004
	Matrix:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	D.F.:	1.00	1.00	1.00	1.00	1.00	1.00
	Units:	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Surrogate:	p-Terphenyl	53 % fl	88 % fl	75 % fl	76 % fl	60 % fl	62 % fl
Diesel Range Organics		4.0 U	76 %	78 %	4.1 U	4.3 U	5.8 U

	Cust ID:	B0W692	B0W6B1	B0W693	B0W698	BLK	BLK BS
Sample Information	RFW#:	005	006	007	008	99LE1062-MB1	99LE1062-MB1
	Matrix:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	D.F.:	1.00	1.00	1.00	1.00	1.00	1.00
	Units:	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Surrogate:	p-Terphenyl	89 % fl	93 % fl	67 % fl	67 % fl	69 % fl	73 % fl
Diesel Range Organics		4.4 U	4.0 U	4.3 U	4.1 U	4.0 U	72 %

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

000027

9/20/99

1/7/00

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

RECRA
ENVIRONMENTAL
INC.

Chemical and Environmental Measurement Information

Recra LabNet Philadelphia
Analytical Report

Client : TNU-HANFORD B99-078
RFW# : 9908L906
SDG/SAF #: H0506/B99-078

W.O. #: 10985-001-001-9999-00
Date Received: 08-27-99

GC/MS VOLATILE

Eight (8) soil samples were collected on 08-25-99.

The samples and their associated QC samples were analyzed according to criteria set forth in Recra OPs based on SW 846 Method 8260A for TCL Volatile target compounds on 09-08-99.

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

1. The cooler temperatures upon receipt have been recorded on the chain-of-custody.

2. The required holding time for analysis was met.

3. Non-target compounds were not detected in the samples.

4. Seven (7) of thirty-six (36) surrogate recoveries were outside EPA QC limits. The analyses of associated matrix spike samples fulfills the reanalysis requirements for sample B0W692 Sample B0W692 was reanalyzed on 09-08-99 and reported.

5. All matrix spike recoveries were within EPA QC limits.

6. The method blank contained the common laboratory contaminants Methylene Chloride and Acetone at levels less than 2x the CRQL.

OCT 1999
RECEIVED
Data
Log In

By J. Michael Taylor
Vice President
Philadelphia Analytical Laboratory

10-12-99
Date

som\group\data\ vos\tnu08906.doc

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 17 pages.

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

RECRA ENVIRONMENTAL INC.

Chemical and Environmental Measurement Information

Recra LabNet Philadelphia
Analytical Report

Client: TNU HANFORD B99-078
RFW #: 9908L906
SDG/SAF#: H0506/B99-078

W.O. #: #: 10985-001-001-9999-00
Date Received: 08-27-99

GC SCAN

The set of samples consisted of eight (8) soil samples collected on 08-25-99.

The samples and their associated QC samples were prepared on 08-31-99 and 09-02-99 and analyzed by methodology based on EPA Method 8015B for Ethanol and Butanol on 09-02,03-99.

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

1. The samples were packaged and stored as specified in the method protocol; the cooler temperature upon receipt has been recorded on the chain-of-custody.

2. The required holding time for analysis was met.

3. All initial calibrations associated with this data set were within acceptance criteria.

4. Continuing calibration criteria (±15%) were exceeded for the continuing calibration verification standard analyzed prior to the sample extracts. Outlying standard(s) generally exhibited increased instrument response. However sample data were not impacted as target analytes were not detected in the associated samples analyzed immediately after such standard(s). A copy of the Sample Discrepancy Report (SDR) has been enclosed in the data package.

5. Surrogates were not used for this analysis.

6. The blank spike recovery was within advisory control limits of 50%-150%.

7. All matrix spike recoveries were within advisory control limits of 50%-150%.

OCT 1999 RECEIVED Data Log In

J. Michael Taylor
Vice President
Philadelphia Analytical Laboratory

9-20-99
Date

r:\share\lc\gcscan\08-906.doc

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.

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RECRA
ENVIRONMENTAL
INC.

Chemical and Environmental Measurement Information

OCT 1999
RECEIVED
Data
Log In

Recra LabNet Philadelphia
Analytical Report

Client : TNU-HANFORD B99-078
RFW# : 9908L906
SDG/SAF#: H0506/B99-078

W.O #: 10985-001-001-9999-00
Date Received: 08-27-99

DIESEL RANGE ORGANICS

The set of samples consisted of eight (8) soil samples collected on 08-25-99.

The samples and their associated QC samples were prepared on 08-31-99 and analyzed by methodology based on EPA Method 8015B for Diesel Range Petroleum Hydrocarbons on 09-16,17-99. The analysis met the intent of method WTPH-D.

1. The cooler temperature has been recorded on the chain-of-custody.
2. All required holding times for extraction and analysis were met.
3. All initial calibrations associated with this data set were within acceptance criteria.
4. All diesel continuing calibration standards analyzed prior to the sample extracts were within acceptance criteria.
5. All surrogate recoveries were within acceptance criteria.
6. All blank spike recoveries were within acceptance criteria.
7. All matrix spike recoveries were within acceptance criteria.
8. Sample B0W694 contained contamination beyond (heavier) the diesel range with estimated concentrations of 21 mg/kg.

J. Michael Taylor
Vice President
Philadelphia Analytical Laboratory

9-27-99
Date

R:\SHARE\LC\GCSCAN\08-906d.doc

The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage. All pages of this report are integral parts of the analytical data. Therefore, this report should only be reproduced in its entirety of 13 pages.

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

Sample Discrepancy Report (SDR) SDR #: 744052

Initiator: C Schnell
Date: 9/16/99
Client: TNU-Hanford

RFW Batch: 9908L821 9908L857 9908L880 9908L931 9908L936 9908L963
Samples: 99091006
Method: SW846/MCAWW/CLP/

Parameter: OGCSC
Matrix: ____
Prep Batch: Multiple

1. Reason for SDR

a. COC Discrepancy __ Tech Profile Error __ Client Request __ Sampler Error on C-O-C __ Transcription Error __ Wrong Test Code __ Other ____

b. General Discrepancy

__ Missing Sample/Extract __ Container Broken __ Wrong Sample Pulled __ Label ID's Illegible
__ Hold Time Exceeded __ Insufficient Sample __ Preservation Wrong __ Received Past Hold
__ Improper Bottle Type __ Not Amenable to Analysis

Note: Verified by [Log-In] or [Prep Group] (circle)...signature/date: ____

c. QC Problem (Include all relevant specific results; attach data if necessary)

CCV response somewhat erratic during sample analysis, most being high. In cases whereby instrument response decreased, the decrease did not exceed -20% Deviation.

2. Known or Probable Causes(s)

- Heavy analysis load combined with aqueous matrix contributes to reduced stability of instrument response compared to solvent type matrices.

3. Discussion and Proposed Action

__ Re-log
__ Entire Batch
__ Following Samples: ____
__ Re-leach
__ Re-extract
__ Re-digest
__ Revise EDD
__ Change Test Code to ____
__ Place On/Take Off Hold (circle)

Other Description:

- No positives found in any samples.
- The laboratory limit of ±15% Deviation is derived from common analyses and may not be applicable to extended runs of aqueous samples, where such criteria may not be readily achievable.

4. Project Manager Instructions...signature/date: Gilbert G. Johnson 9/16/99

__ Concur with Proposed Action
__ Disagree with Proposed Action; See Instruction
__ Include in Case Narrative
__ Client Contacted:
Date/Person ____
__ Add
__ Cancel

5. Final Action...signature/date: [illegible] 9/16/99

Other Explanation:

__ Verified re-[log][leach][extract][digest][analysis] (circle)
__ Included in Case Narrative
__ Hard Copy COC Revised
__ Electronic COC Revised
__ EDD Corrections Completed

When Final Action has been recorded, forward original to QA Specialist for distribution and filing.

Route	Distribution of Completed SDR	Route	Distribution of Completed SDR
2	X Initiator	__	__ Metals: Doughty
	X Lab Manager: M. Taylor	__	__ Inorganic: Perrone
I	X Project Mgr: Stone/Carey/Schrenkel/Johnson	__	__ GC/LC: Schnell
	X Section Mgr: Wesson/Daniels	__	__ MS: LeMin/Taylor
4	X QA (file): Racioppi	__	__ Log-in: Toder
3	__ Data Management: Feldman	__	__ Admin: Soos
__	__ Sample Prep: Schnell/Doughty/Kauffman	__	__ Other: ____

L-WI-006/E-03/99

7900L100

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	B99-078-87	Page 1 of 2

Collector: Bowers/Porter/Nielson	Company Contact: Chris Cearlock	Telephone No.: 372-9574	Project Coordinator: TRENT, SJ
Price Code: 8N	Data Turnaround: 45 Days		
Project Designation: 200 Area Source characterization - 200-CW-1 OU	Sampling Location: GP-2 >15' bgs 22'-23'	SAF No.: B99-078	
Ice Chest No.: GWS 130	Field Logbook No.: EL-1511	Method of Shipment: Federal Express	
Shipped To: ~~TMA/RECRA~~ 8.25.99	Offsite Property No.: A990230	Bill of Lading/Air Bill No.: 4235 7952 8749	
		COA: B20CW1-671C	

POSSIBLE SAMPLE HAZARDS/REMARKS

Special Handling and/or Storage

Preservation	None	None	None	None	None	Cool 4C	None	Cool 4C	None	Cool 4C
Type of Container	sG	sG	sG	sG	sG	sG	sG	sG	sG	sG
No. of Container(s)	1	1	1	1	1	1	1	1	1	1
Volume	60mL	60mL	60mL	60mL	120mL	250mL	250mL	500mL	500mL	1000mL
SAMPLE ANALYSIS	Isotopic Uranium	Neptunium-237	Nickel-63	Technetium-99	Tritium - H3	VOA - 8260A (TCL); VOA - 8260A (Add-On) [1-Propanol, Ethanol]	pH (Soil) - 9045	Semi-VOA - 8270A (TCL); TPH-Diesel Range - WTPH-D; PCBs - 8082	See item (1) in Special Instructions.	See item (2) in Special Instructions

Sample No.	Matrix *	Sample Date	Sample Time										
B0W6B0	Soil	8/25/99	11:03						X	X	X	X	X
												Bowers/N1	

CHAIN OF POSSESSION — Sign/Print Names

Relinquished By	Date/Time	Received By	Date/Time
Bowers/Porter	8/25/99/1410	Peter JB	8/25/99/1410
RF61B	8/26/99 11:00	CTRICE/Chris	8/26/99 11:00
CTRICE/Chris	8/26/99 14:00	FEDEX	
FedEx	8.27.99/0930	D. Smith	8.27.99/0930

SPECIAL INSTRUCTIONS

See chain of custody comments on SAF B99-078.

COLLECTOR UNAVAILABLE TO SIGN COC

(1) ICP Metals - 6010A (Superfrace) [Arsenic, Barium, Beryllium, Cadmium, Chromium, Copper, Lead, Nickel, Selenium, Silver, Vanadium, Zinc]; Mercury - 7471 - (CV); Chromium Hex - 7196

(2) NO2/NO3 - 353.1; IC Anions - 300.0 [Chloride, Fluoride, Nitrate, Nitrite, Phosphate, Sulfate]; Sulfides - 9030; Ammonia; Total Cyanide - 9010

4235 7952 8750 4.2

4235 7952 8749 5.1

4476545 931 3.8

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

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

00 0223

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	B99-078-86	Page 1 of 1

Collector: Bowers/Porter/Nielson	Company Contact: Chris Cearlock	Telephone No.: 372-9574	Project Coordinator: TRENT, SJ
Price Code: 8N	Data Turnaround: 45 Days		
Project Designation: 200 Area Source characterization - 200-CW-1 OU	Sampling Location: GP-2 >15' bgs 20'-21'	SAF No.: B99-078	
Ice Chest No.: GWS 130	Field Logbook No.: EL-1511	Method of Shipment: Federal Express	
Shipped To: TMA/RECRA	Offsite Property No.: A990230	Bill of Lading/Air Bill No.: 4235 7952 8749	
		COA: B20CW1 671C	

POSSIBLE SAMPLE HAZARDS/REMARKS

Special Handling and/or Storage

Preservation	None	None	None	None	None	Cool 4C	None	Cool 4C	None	Cool 4C
Type of Container	sG	sG	sG	sG	sG	sG	sG	sG	sG	sG
No. of Container(s)	1	1	1	1	1	1	1	1	1	1
Volume	60mL	60mL	60mL	60mL	120mL	250mL	250mL	500mL	500mL	1000mL
SAMPLE ANALYSIS	Isotopic Uranium	Neptunium-237	Nickel-63	Technetium-99	Tritium - H3	VOA - 8260A (TCL); VOA - 8260A (Add-On) (1-Propanol, Ethanol)	pH (Soil) - 9045	Semi-VOA - 8270A (TCL); TPH-Diesel Range - WTPH-D; PCBs - 8082	See item (1) in Special Instructions	See item (2) in Special Instructions
Sample No. / Matrix * / Sample Date / Sample Time										
B0W699 / Soil / 8/25/99 / 10:51						X	X	X	X	X
									Dowg	Mg

CHAIN OF POSSESSION	Sign/Print Names		
Relinquished By: Brent Porter	Date/Time: 8/25/99/1410	Received By: Peter JB	Date/Time: 8/25/99/1410
Relinquished By: RFB JB	Date/Time: 8/26/99 11:00	Received By: CTRICE/Chris	Date/Time: 8/26/99 11:00
Relinquished By: CTRICE/Chris	Date/Time: 8/26/99 14:00	Received By: FEDEX	Date/Time:
Relinquished By: Fed Ex	Date/Time: 8-27-99/0930	Received By: D. Ignatio	Date/Time: 8-27-99/0930

SPECIAL INSTRUCTIONS

See chain of custody comments on SAF B99-078.

COLLECTOR UNAVAILABLE TO SIGN COC

(1) ICP Metals - 6010A (Supertrace) (Arsenic, Barium, Beryllium, Cadmium, Chromium, Copper, Lead, Nickel, Selenium, Silver, Vanadium, Zinc); Mercury - 7471 - (CV); Chromium Hex - 7196

(2) NO2/NO3 - 353.1; IC Anions - 300.0 (Chloride, Fluoride, Nitrate, Nitrite, Phosphate, Sulfate); Sulfides - 9030; Ammonia - 350.3; Total Cyanide - 9010

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

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

(800024)

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	B99-078-84	Page 1 of 1

Collector: Bowers/Porter/Nielson	Company Contact: Chris Cearlock — Telephone No.: 372-9574	Project Coordinator: TRENT, SJ	Price Code: 8N — Data Turnaround: 45 Days
Project Designation: 200 Area Source characterization - 200-CW-1 OU	Sampling Location: GP-2 >15' bgs 15'-16'	SAF No.: B99-078	
Ice Chest No.: GWS 130	Field Logbook No.: EL-1511	Method of Shipment: Federal Express	
Shipped To: TMA/RECRA	Offsite Property No.: A990230	Bill of Lading/Air Bill No.: 4235 7952 8749	
		COA: B20W1 671C	

POSSIBLE SAMPLE HAZARDS/REMARKS											
	Preservation	None	None	None	None	None	Cool 4C	None	Cool 4C	None	Cool 4C
	Type of Container	sG	sG	sG	sG	sG	sG	sG	sG	sG	sG
	No. of Container(s)	1	1	1	1	1	1	1	1	1	1
Special Handling and/or Storage	Volume	60mL	60mL	60mL	60mL	120mL	250mL	250mL	500mL	500mL	1000mL
SAMPLE ANALYSIS		Isotopic Uranium	Neptunium-237	Nickel-63	Technetium-99	Tritium - H3	VOA - 8260A (TCL); VOA - 8260A (Add-On) (1-Propanol, Ethanol)	pH (Soil) - 9045	Semi-VOA - 8270A (TCL); TPH-Diesel Range - WTPH-D; PCBs - 8082	See item (1) in Special Instructions	See item (2) in Special Instructions
Sample No.	Matrix * / Sample Date / Sample Time										
B0W697	Soil / 8/25/99 / 10:04						X	X	X	X	X
										Dup-541	

CHAIN OF POSSESSION	Sign/Print Names		
Relinquished By: Brent Porter	Date/Time: 8/25/99/1410	Received By: Refer JB	Date/Time: 8/25/99/1410
Relinquished By: RFG 1B	Date/Time: 8/26/99 11:00	Received By: CTRICE/Ctrice	Date/Time: 8/26/99 11:00
Relinquished By: CTRICE/Ctrice	Date/Time: 8/26/99 14:00	Received By: FEDEX	Date/Time:
Relinquished By: D. Fed Ex	Date/Time: 8/27/99/0930	Received By: D. Smith	Date/Time: 8/27/99/0930
LABORATORY SECTION — Received By		Title	Date/Time
FINAL SAMPLE DISPOSITION — Disposal Method		Disposed By	Date/Time

SPECIAL INSTRUCTIONS

See chain of custody comments on SAF B99-078.

COLLECTOR UNAVAILABLE TO SIGN COC

(1) ICP Metals - 6010A (Supertrace) (Arsenic, Barium, Beryllium, Cadmium, Chromium, Copper, Lead, Nickel, Selenium, Silver, Vanadium, Zinc); Mercury - 7471 - (CV); Chromium Hex - 7196

(2) NO2/NO3 - 353.1; IC Anions - 300.0 (Chloride, Fluoride, Nitrate, Nitrite, Phosphate, Sulfate); Sulfides - 9030; Ammonia - 350.3; Total Cyanide - 9010

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

03000025

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	B99-078-81	Page 1 of 1

Collector: Bowers/Porter/Nielson	Company Contact: Chris Cearlock	Telephone No.: 372-9574	Project Coordinator: TRENT, SJ
Price Code: 8N	Data Turnaround: 45 Days		
Project Designation: 200 Area Source characterization - 200-CW-1 OU	Sampling Location: GP-2 <15' bgs 14'-15'		SAF No.: B99-078
Ice Chest No.: ETC-96059	Field Logbook No.: EL-1511		Method of Shipment: Federal Express
Shipped To: TMA/RECRA 0700 8-25-99	Offsite Property No.: N/A		Bill of Lading/Air Bill No.: N/A
			COA: B20CW1 671C

POSSIBLE SAMPLE HAZARDS/REMARKS

Special Handling and/or Storage

Preservation	None	None	Cool 4C	None	Cool 4C	None	Cool 4C	None		
Type of Container	aG	aG	aG	aG	aG	aG	aG	aG		
No. of Container(s)	1	1	1	1	1	1	1	1		
Volume	60mL	60mL	250mL	250mL	500mL	500mL	1000mL	1000mL		
SAMPLE ANALYSIS	Isotopic Uranium	Neptunium-237	VOA - 8260A (TCL); VOA - 8260A (Add-On) (t-Propanol, Ethanol)	pH (Soil) - 9045	Semi-VOA - 8270A (TCL); TPH-Diesel Range - WTPH-D; PCBs - 8082	See Item (1) in Special Instructions.	See Item (2) in Special Instructions.	See Item (3) in Special Instructions.		
Sample No. / Matrix * / Sample Date / Sample Time										
B0W694 / Soil / 8/25/99 / 09:26			X	X	X	X	X	X	Dow 542	

Sample No.	Matrix *	Sample Date	Sample Time
B0W694	Soil	8/25/99	09:26

CHAIN OF POSSESSION — Sign/Print Names

Relinquished By	Date/Time	Received By	Date/Time
Brent Porter	8/25/99/1410	Peter JB	8/25/99/1410
Peter JB	8-26-99 0800	R. Fahlberg / R Fahlberg	8-26-99 0800
R Fahlberg / R Fahlberg	8-26-99	Fed Ex	
Fed Ex	8-27-99/0930	D Smith	8-27-99/0930

SPECIAL INSTRUCTIONS

See chain of custody comments on SAF B99-078.

(1) ICP Metals - 6010A (Supertrace) (Arsenic, Barium, Beryllium, Cadmium, Chromium, Copper, Lead, Nickel, Selenium, Silver, Vanadium, Zinc); Mercury - 7471 - (CV); Chromium Hex - 7196
(2) NO2/NO3 - 353.1; IC Anions - 300.0 (Chloride, Fluoride, Nitrate, Nitrite, Phosphate, Sulfate); Sulfides - 9030; Ammonia - 350.3; Total Cyanide - 9010
(3) Gamma Spectroscopy (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155); Gamma Spec - Add-on (Americium-241); Strontium-89,90 -- Total Sr; Total Uranium (Uranium); Isotopic Plutonium; Isotopic Thorium (Thorium-232); Americium-241

COLLECTOR UNAVAILABLE TO SIGN COC.

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

LABORATORY SECTION — Received By — Title — Date/Time

FINAL SAMPLE DISPOSITION — Disposal Method — Disposed By — Date/Time

920000026

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	B99-078-79	Page 1 of 1

Collector: Bowers/Porter/Nielson	Company Contact: Chris Cearlock — Telephone No.: 372-9574	Project Coordinator: TRENT, SJ	Price Code: 8N — Data Turnaround: 45 Days
Project Designation: 200 Area Source characterization - 200-CW-1 OU	Sampling Location: GP-2 <15' bgs 10'-11'	SAF No.: B99-078	
Ice Chest No.: FRC 96 059	Field Logbook No.: EL-1511	Method of Shipment: Federal Express	
Shipped To: ~~TMA~~/RECRA 810 8-25-99	Offsite Property No.: N/A	Bill of Lading/Air Bill No.: N/A	
		COA: B20CW1-671C	

POSSIBLE SAMPLE HAZARDS/REMARKS											
	Preservation	None	None	Cool 4C	None	Cool 4C	None	Cool 4C	None		
	Type of Container	sG	sG	sG	sG	sG	sG	sG	sG		
	No. of Container(s)	1	1	1	1	1	1	1	1		
Special Handling and/or Storage	Volume	60mL	60mL	250mL	250mL	500mL	500mL	1000mL	1000mL		
SAMPLE ANALYSIS		Isotopic Uranium	Neptunium-237	VOA - 8260A (TCL); VOA - 8260A (Add-On) (1-Propanol, Ethanol)	pH (Soil) - 9045	Semi-VOA - 8270A (TCL); TPH-Diesel Range - WTPH-D; PCBs - 8082	See item (1) in Special Instructions	See item (2) in Special Instructions	See item (3) in Special Instructions		
Sample No.	Matrix * / Sample Date / Sample Time										
B0W692	Soil / 8/25/99 / 08:45			X	X	X	X	X		B0W569	

CHAIN OF POSSESSION	Sign/Print Names		
Relinquished By: Brent Porter — Date/Time: 8/25/99/1410	Received By: Refer JB — Date/Time: 8/25/99/1410		
Relinquished By: Ref J-B — Date/Time: 8-26-99 0800	Received By: R. Fahlberg / R. Fahlberg — Date/Time: 8-26-99 0800		
Relinquished By: R. Fahlberg / R. Fahlberg — Date/Time: 8-26-99 1400	Received By: FED Ex — Date/Time:		
Relinquished By: Fed Ex — Date/Time: 8-27-99/0930	Received By: D. Amaro — Date/Time: 8-27-99/0930		
LABORATORY SECTION	Received By	Title	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

SPECIAL INSTRUCTIONS

See chain of custody comments on SAF B99-078.

(1) ICP Metals - 6010A (Supertrace) [Arsenic, Barium, Beryllium, Cadmium, Chromium, Copper, Lead, Nickel, Selenium, Silver, Vanadium, Zinc]; Mercury - 7471 - (CV); Chromium Hex - 7196
(2) NO2/NO3 - 353.1; IC Anions - 300.0 (Chloride, Fluoride, Nitrate, Nitrite, Phosphate, Sulfate); Sulfides - 9030; Ammonia - 350.3; Total Cyanide - 9010
(3) Gamma Spectroscopy [Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155]; Gamma Spec - Add-on [Americium-241]; Strontium-89,90 -- Total Sr; Total Uranium [Uranium]; Isotopic Plutonium; Isotopic Thorium [Thorium-232]; Americium-241

COLLECTOR UNAVAILABLE TO SIGN COC.

Matrix *
Soil
Water
Vapor
Other Solid
Other Liquid

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	B99-078-88	Page 1 of 1

Collector: Bowers/Porter/Nielson	Company Contact: Chris Cearlock — Telephone No.: 372-9574	Project Coordinator: TRENT, SJ	Price Code: 8N — Data Turnaround: 45 Days
Project Designation: 200 Area Source characterization - 200-CW-1 OU	Sampling Location: GP-2 >15' bgs 24.25'	SAF No.: B99-078	
Ice Chest No.: EBC 96-057	Field Logbook No.: EL-1511	Method of Shipment: Federal Express	
Shipped To: ~~TMA~~ RECRA 8/27/99	Offsite Property No.: ~~AA~~ A99023Ø RE 8-26-99	Bill of Lading/Air Bill No.: 4235 7952 8750	
		COA: B20CW1 671C	

POSSIBLE SAMPLE HAZARDS/REMARKS

Special Handling and/or Storage

Preservation	None	None	None	None	None	Cool 4C	None	Cool 4C	None	Cool 4C
Type of Container	sG	sG	sG	sG	sG	sG	sG	sG	sG	sG
No. of Container(s)	1	1	1	1	1	1	1	1	1	1
Volume	60mL	60mL	60mL	60mL	120mL	250mL	250mL	500mL	500mL	1000mL
SAMPLE ANALYSIS	Isotopic Uranium	Neptunium-237	Nickel-63	Technetium-99	Tritium - H3	VOA - 8260A (TCL); VOA - 8260A (Add-On) (1-Propanol, Ethanol)	pH (Soil) - 9045	Semi-VOA - 8270A (TCL); TPH-Diesel Range - WTPH-D; PCBs - 8082	See item (1) in Special Instructions	See item (2) in Special Instructions

Sample No.	Matrix *	Sample Date	Sample Time	Isotopic Uranium	Neptunium-237	Nickel-63	Technetium-99	Tritium - H3	VOA - 8260A (TCL); VOA - 8260A (Add-On) (1-Propanol, Ethanol)	pH (Soil) - 9045	Semi-VOA - 8270A (TCL); TPH-Diesel Range - WTPH-D; PCBs - 8082	See item (1) in Special Instructions	See item (2) in Special Instructions
B0W6B1	Soil	8/25/99	11:18						X	X	X	X	X
											Bow 5/1		

CHAIN OF POSSESSION — Sign/Print Names

Relinquished By	Date/Time	Received By	Date/Time
Brent Porter	8/25/99/1410	Refer JB	8/25/99/1410
Ref 1.B	8-26-99 0800	R. Fellows / R. Fahrney	8-26-99 0800
R. Fellows / R. Fahrney	8-26-99 1400	Fed Ex	
Fed Ex	8-27-99/0930	[illegible]	8-27-99/0930

SPECIAL INSTRUCTIONS

See chain of custody comments on SAF B99-078.

(1) ICP Metals - 6010A (Supertrace) (Arsenic, Barium, Beryllium, Cadmium, Chromium, Copper, Lead, Nickel, Selenium, Silver, Vanadium, Zinc); Mercury - 7471 - (CV); Chromium Hex - 7196

(2) NO2/NO3 - 353.1; IC Anions - 300.0 (Chloride, Fluoride, Nitrate, Nitrite, Phosphate, Sulfate); Sulfides - 9030; Ammonia - 350.3; Total Cyanide - 9010

collector not available to sign COC

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

LABORATORY SECTION — Received By — Title — Date/Time

FINAL SAMPLE DISPOSITION — Disposal Method — Disposed By — Date/Time

000028

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	B99-078-80	Page 1 of 1

Collector: Bowers/Porter/Nielson	Company Contact: Chris Cearlock — Telephone No.: 372-9574	Project Coordinator: TRENT, SJ	Price Code: 8N — Data Turnaround: 45 Days
Project Designation: 200 Area Source characterization - 200-CW-1 OU	Sampling Location: GP-2 <15' bgs 12.5'-13.1'	SAF No.: B99-078	
Ice Chest No.: ERC-96-051	Field Logbook No.: EL-1511	Method of Shipment: Federal Express	
Shipped To: ~~TMA~~ RECRA 8-26-99	Offsite Property No.: A990230	Bill of Lading/Air Bill No.: 4235 7952 8750	
		COA: B20CW1 671C	

POSSIBLE SAMPLE HAZARDS/REMARKS

Special Handling and/or Storage

Preservation	None	None	Cool 4C	None	Cool 4C	None	Cool 4C	None	
Type of Container	sG	sG	sG	sG	sG	sG	sG	sG	
No. of Container(s)	1	1	1	1	1	1	1	1	
Volume	60mL	60mL	250mL	250mL	500mL	500mL	1000mL	1000mL	
SAMPLE ANALYSIS	Isotopic Uranium	Neptunium-237	VOA - 8260A (TCL); VOA - 8260A (Add-On) (1-Propanol, Ethanol)	pH (Soil) - 9045	Semi-VOA - 8270A (TCL); TPH-Diesel Range - WTPH-D; PCBs - 8082	See item (1) in Special Instructions.	See item (2) in Special Instructions.	See item (3) in Special Instructions.	

Sample No.	Matrix *	Sample Date	Sample Time										
B0W693	Soil	8/25/99	09:09			X	X	X	X	X		Bowers	

CHAIN OF POSSESSION — Sign/Print Names

Relinquished By	Date/Time	Received By	Date/Time
Brent Porter	8/25/99/1410	Peter JB	8/25/99/1410
Peter JB	8-26-99 0800	R. Felling / R. Felling	0800 8-26-99
R. Felling / R. Felling	8-26-99 1400	Fed Ex	
Fed Ex	8-27-99/0930	[signature]	8-27-99/0930

SPECIAL INSTRUCTIONS

See chain of custody comments on SAF B99-078.

(1) ICP Metals - 6010A (Supertrace) (Arsenic, Barium, Beryllium, Cadmium, Chromium, Copper, Lead, Nickel, Selenium, Silver, Vanadium, Zinc); Mercury - 7471 - (CV); Chromium Hex - 7196
(2) NO2/NO3 - 353.1; IC Anions - 300.0 (Chloride, Fluoride, Nitrate, Nitrite, Phosphate, Sulfate); Sulfides - 9030; Ammonia - 350.3; Total Cyanide - 9010
(3) Gamma Spectroscopy (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155); Gamma Spec - Add-on (Americium-241); Strontium-89,90 -- Total Sr; Total Uranium (Uranium); Isotopic Plutonium; Isotopic Thorium (Thorium-232); Americium-241

collector not available to sign COC

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

LABORATORY SECTION — Received By — Title — Date/Time

FINAL SAMPLE DISPOSITION — Disposal Method — Disposed By — Date/Time

020000023

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	B99-078-85	Page 1 of 21

Collector: Bowers/Porter/Nielson	Company Contact: Chris Cearlock — Telephone No.: 372-9574	Project Coordinator: TRENT, SJ	Price Code: 8N — Data Turnaround: 45 Days
Project Designation: 200 Area Source characterization - 200-CW-1 OU	Sampling Location: GP-2 >15' bgs 17.5 - 18.5	SAF No.: B99-078	
Ice Chest No.: ERC 96-051	Field Logbook No.: EL-1511	Method of Shipment: Federal Express	
Shipped To: ~~TMA~~/RECRA	Offsite Property No.: A990230	Bill of Lading/Air Bill No.: 4235 7952 8750	
		COA: B20CW1 + B20CW1 671C	

POSSIBLE SAMPLE HAZARDS/REMARKS

Special Handling and/or Storage

Preservation	None	None	None	None	None	Cool 4C	None	Cool 4C	None	Cool 4C
Type of Container	sG	sG	sG	sG	sG	sG	sG	sG	sG	sG
No. of Container(s)	1	1	1	1	1	1	1	1	1	1
Volume	60mL	60mL	60mL	60mL	120mL	250mL	250mL	500mL	500mL	1000mL
SAMPLE ANALYSIS	Isotopic Uranium	Neptunium-237	Nickel-63	Technetium-99	Tritium - H3	VOA - 8260A (TCL); VOA - 8260A (Add-On) (1-Propanol, Ethanol)	pH (Soil) - 9045	Semi-VOA - 8270A (TCL); TPH-Diesel Range - WTPH-D; PCBs - 8082	See item (1) in Special Instructions	See item (2) in Special Instructions

Sample No.	Matrix *	Sample Date	Sample Time										
B0W698	Soil	8/25/99	10:32						X	X	X	X	X
												Bowsm	

CHAIN OF POSSESSION — Sign/Print Names

Relinquished By	Date/Time	Received By	Date/Time
Brent Porter	8/25/99 1440	Refer 1B	8/25/99 1440
Ref 1.B	8.26.99 0800	R.Fahlberg / R.Fahlberg	8.26.99 0800
R.Fahlberg / R.Fahlberg	8.26.99 1400	Fed Ex	
Fed Ex	8.27.99 0930	D. Johnston	8.27.99 0930

SPECIAL INSTRUCTIONS

See chain of custody comments on SAF B99-078.

(1) ICP Metals - 6010A (Supertrace) [Arsenic, Barium, Beryllium, Cadmium, Chromium, Copper, Lead, Nickel, Selenium, Silver, Vanadium, Zinc]; Mercury - 7471 - (CV); Chromium Hex - 7196

(2) NO2/NO3 - 353.1; IC Anions - 300.0 (Chloride, Fluoride, Nitrate, Nitrite, Phosphate, Sulfate]; Sulfides - 9030; Ammonia - 350.3; Total Cyanide - 9010

collector not available to sign coc

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

LABORATORY SECTION — Received By — Title — Date/Time

FINAL SAMPLE DISPOSITION — Disposal Method — Disposed By — Date/Time

0080030

Appendix 5

Data Validation Supporting Documentation

GC/MS ORGANIC DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	(C)	D	E
PROJECT: 200-CW-1			DATA PACKAGE: H0506		
VALIDATOR: TLI		LAB: RECRA		DATE: 12/20/99	
CASE:			SDG: H0506		

ANALYSES PERFORMED

☐ CLP Volatiles	☐ SW-846 8240 (cap column)	☑ SW-846 8260 (packed column)	☐ CLP Semivolatiles	☐ SW-846 8270 (cap column)	☐ SW-846 (packed column)
☐	☐	☐	☐	☐	☐

SAMPLES/MATRIX BOW672 BOW693 BOW694 BOW697
BOW698 BOW699 BOW680 BOW681

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: Check for preserved + butanol in SAF
1R - Butanol?

GC/MS ORGANIC DATA VALIDATION CHECKLIST

3. INSTRUMENT TUNING AND CALIBRATION

Is the GC/MS tuning/performance check acceptable? . . . . . Yes No N/A

Are initial calibrations acceptable? . . . . . Yes No N/A

Are continuing calibrations acceptable? . . . . . Yes No N/A

Comments:

4. BLANKS

Were laboratory blanks analyzed? . . . . . Yes No N/A

Are laboratory 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: methylene chloride - all U acetone - all but 92 U or CRDL U

5. ACCURACY

Were surrogates/System Monitoring Compounds analyzed? . . . . . Yes No N/A

Are surrogate/System Monitoring Compound recoveries acceptable? Yes No N/A

Were MS/MSD samples analyzed? . . . . . Yes No N/A

Are MS/MSD results acceptable? . . . . . Yes No N/A

Comments: J - 694 surrogate - all 8 analytes

~~J - 692 " " toluene & Bromo assoc~~

not required

692 - Bromofluoro mixture - Chlorobenzene J + 694

GC/MS ORGANIC DATA VALIDATION CHECKLIST

6. PRECISION

Are MS/MSD RPD 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. SYSTEM PERFORMANCE

Were internal standards analyzed? . . . . . Yes No N/A

Are internal standard areas acceptable? . . . . . Yes No N/A

Are internal standard retention times acceptable? . . . . . 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

Has the laboratory properly identified and coded all TIC? . . . Yes No N/A

Comments: ~~chloromethane - 93, 94 Bromomethane - 93, 94 Vinylchloride 93-94~~
~~chloroethane 93, 94 2-butanone - 94, 93 4-methyl-2pentanone - 94 93~~
~~2Hexanone - 94 93~~ 93+94 - all unclear
1st 4 in all Check w/ TIC area sample plot
hexane + 4 methyl 2 pentanone in all

GENERAL GC DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	(C)	D	E
PROJECT: 200-CW-1			DATA PACKAGE: H0506		
VALIDATOR: TLI		LAB: Recra		DATE: 12/20/99	
CASE:			SDG: H0506		

ANALYSES PERFORMED					
☐ 8010	☒ 8015 Diesel Organics	☐ 8020	☐ 8021	8140	8141
☐ 8150	☐ 8151	☐ WTPH-HCID	☐ WTPH-G	☐ WTPH-D	☐
☐	☐	☐	☐	☐	☐

SAMPLES/MATRIX:				
	BOW492	BOW493	BOW494	BOW497
	BOW498	BOW499	BOW500	BOW501

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: check SAF

GENERAL GC DATA VALIDATION CHECKLIST

3. INSTRUMENT CALIBRATION

3.1 INITIAL CALIBRATION

Was an initial calibration performed? . . . . . Yes No N/A

Are %RSD values for calibration or response factors acceptable? . . . . . Yes No N/A

Comments:

3.2 CONTINUING CALIBRATION

Was a continuing calibration check performed? . . . . . Yes No N/A

Are %D values for calibration or response factors acceptable? . Yes No N/A

Comments:

4. BLANKS

Were laboratory blanks analyzed? . . . . . Yes No N/A

Are laboratory 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:

5. ACCURACY

Were surrogates analyzed? . . . . . Yes No N/A

Are surrogate recoveries acceptable? . . . . . Yes No N/A

Were MS/MSD samples analyzed? . . . . . Yes No N/A

Are MS/MSD recoveries acceptable? . . . . . Yes No N/A

Were LCS samples analyzed? . . . . . Yes No N/A

Are LCS recoveries acceptable? . . . . . Yes No N/A

GENERAL GC DATA VALIDATION CHECKLIST

Comments:

6. PRECISION

Are MS/MSD sample RPD 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. COMPOUND IDENTIFICATION AND QUANTITATION

Is compound identification acceptable? . . . . . Yes No N/A

Is compound quantitation 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

Do results meet the CRQLs? . . . . . Yes No N/A

Comments: 694 — Diesel

GENERAL GC DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: 200-CW-1			DATA PACKAGE: H0506		
VALIDATOR: TLI		LAB: Recra		DATE: 12/20/99	
CASE:			SDG: H0506		

ANALYSES PERFORMED

☐ 8010	☒ 8015 alcohols	☐ 8020	☐ 8021	8140	8141
☐ 8150	☐ 8151	☐ WTPH-HCID	☐ WTPH-G	☐ WTPH-D	☐
☐	☐	☐	☐	☐	☐

SAMPLES/MATRIX: BOW692 BOW693 BOW694 BOW697
BOW698 BOW699 BOW600 BOW601

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: check SAF

GENERAL GC DATA VALIDATION CHECKLIST

3. INSTRUMENT CALIBRATION

3.1 INITIAL CALIBRATION

Was an initial calibration performed? . . . . . Yes No N/A

Are %RSD values for calibration or response factors acceptable? . . . . . Yes No N/A

Comments:_____

3.2 CONTINUING CALIBRATION

Was a continuing calibration check performed? . . . . . Yes No N/A

Are %D values for calibration or response factors acceptable? . Yes No N/A

Comments:_____

4. BLANKS

Were laboratory blanks analyzed? . . . . . Yes No N/A

Are laboratory 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:_____

5. ACCURACY

Were surrogates analyzed? . . . . . Yes No N/A

Are surrogate recoveries acceptable? . . . . . Yes No N/A

Were MS/MSD samples analyzed? . . . . . Yes No N/A

Are MS/MSD recoveries acceptable? . . . . . Yes No N/A

Were LCS samples analyzed? . . . . . Yes No N/A

Are LCS recoveries acceptable? . . . . . Yes No N/A

GENERAL GC DATA VALIDATION CHECKLIST

Comments: IR for surrogate
UO surrogates - J all

6. PRECISION

Are MS/MSD sample RPD 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. COMPOUND IDENTIFICATION AND QUANTITATION

Is compound identification acceptable? . . . . . Yes No N/A
Is compound quantitation 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
Do results meet the CRQLs? . . . . . Yes No N/A

Comments:

Date: 21 January 2000
To: Bechtel Hanford Inc. (technical representative)
From: TechLaw, Inc.
Project: 200 Area Source Characterization - 200-CW-1 Operable Unit
Subject: Semivolatiles - Data Package No. H0506-RLN (SDG No. H0506)

INTRODUCTION

This memo presents the results of data validation on Summary Data Package No. H0506-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	Media	Validation	Analysis
B0W6B0	8/25/99	Soil	C	See note 1
B0W6B1	8/25/99	Soil	C	See note 1
B0W692	8/25/99	Soil	C	See note 1
B0W693	8/25/99	Soil	C	See note 1
B0W694	8/25/99	Soil	C	See note 1
B0W697	8/25/99	Soil	C	See note 1
B0W698	8/25/99	Soil	C	See note 1
B0W699	8/25/99	Soil	C	See note 1

1 - Semivolatiles by EPA 8270B

Data validation was conducted in accordance with the BHI validation statement of work and the *200-CW-1 Operable Unit RI/FS Work Plan and 216-B-3 RCRA TSD Unit Sampling Plan*, DOE/RL-99-07, Draft B. 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, but not by greater 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 detectable sample results are qualified as estimates and flagged "J" and all non-detects are rejected and flagged "UR".

All holding times were met.

- **Blanks**

Method blank analyses are conducted to determine the extent of laboratory contamination introduced through sampling, sample preparation and analysis. At least one acceptable method blank analysis must be conducted for every 20 samples. No contaminants should be present in the method blank. Analytical results for analytes present in any sample at less than five times the concentration of that analyte found in the associated blank are qualified as non-detects and flagged "U". Common laboratory contaminants present in samples at less than ten times the concentration of that analyte found in the associated blank are qualified as non-detects. If a sample result is less than the CRQL and is less than five times (or less than ten times for lab contaminants) the highest associated blank result, the sample result value is raised to the CRQL level and qualified as undetected "U".

All method blank results were acceptable.

- **Accuracy**

<u>Matrix Spike/Matrix Spike Duplicate Recoveries</u>

Matrix spike/matrix spike duplicate 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/matrix spike duplicate analyses are performed in duplicate using five compounds for which percent recoveries must be within 70-130%. If spike recoveries are outside control

limits, detected sample results less than five times the spike concentration are qualified as estimates and flagged "J". Undetected 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.

Due to a matrix spike recovery of 65%, the phenol, 2-methylphenol, 4-methylphenol, 2,4-dimethylphenol, dimethylphthalate, di-n-butylphthalate, butylbenzylphthalate, bis(2-ethylhexyl)phthalate, di-n-octylphthalate, and isophorone results in all samples were qualified as estimates and flagged "J".

Due to a matrix spike recovery of 64%, the 2-chlorophenol, 2,4-dichlorophenol, bis(2-chloroethyl)ether, bis(2-chloroethoxy)methane, 4-chorophenyl phenyl ether, and 4-bromophenyl phenyl ether results in all samples were qualified as estimates and flagged "J".

Due to a matrix spike recovery of 69%, the 1,3,-dichlorobenzene, 1,4-dichlorobenzene, 1,2-dichlorobenzene, hexachloroethane, hexachlorobutadiene and hexaclorocyclopentadiene results in all samples were qualified as estimates and flagged "J".

Due to a matrix spike recovery of 64%,the 4-chloro-3-methylphenol results in all samples were qualified as estimates and flagged "J".

Due to a matrix spike recovery of 59%, the 4-nitrophenol, 2-nitrophenol and 2,4-dinitrophenol results in all samples were qualified as estimates and flagged "J".

Due to a matrix spike recovery of 64%, the pentachlorphenol, 2,4,6-trichlorophenol and 2,4,5-trichlorophenol results in all samples were qualified as estimates and flagged "J".

All other accuracy results were acceptable.

Surrogate Recovery

The analyses of surrogate compounds provide a measure of performance for individual samples. Matrix-specific surrogate compound recovery control windows have been established by the EPA CLP program. If two surrogates of the same class of compounds (base/neutral or acid) are out of control limits, all associated sample results greater than the CRQL are qualified as estimates and flagged "J". Sample results less than the CRQL and below the lower control limit are qualified as estimates and flagged "UJ". Sample results less than the CRQL with recoveries above the upper control limit require no qualification. If a

surrogate recovery is less than 10%, detects are qualified as estimates and flagged "J" and nondetects are rejected and flagged "UR".

All sample 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 by the RPD between the recoveries of duplicate matrix spike analyses performed on a sample. Samples results must be within RPD limits of +/-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 MS/MSD RPD results were acceptable.

- **Analytical Detection Levels**

Reported analytical detection levels are compared against the CRQLs to ensure that laboratory detection levels meet the required criteria. All reported laboratory detection levels for undetected analytes were above the analyte specific CRQL. Under the BHI statement of work, no qualification is required.

- **Completeness**

Data package No. H0506 was submitted for validation and verified for completeness. The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

The following minor deficiencies were found:

- Due to a matrix spike recovery of 65%, the phenol, 2-methylphenol, 4-methylphenol, 2,4-dimethylphenol, dimethylphthalate, di-n-butylphthalate, butylbenzylphthalate, bis(2-ethylhexyl)phthalate, di-n-octylphthalate, and isophorone results in all samples were qualified as estimates and flagged "J".

- Due to a matrix spike recovery of 64%, the 2-chlorophenol, 2,4-dichlorophenol, 4-chloro-3-methylphenol, bis(2-chloroethyl)ether, bis(2-chloroethoxy)methane, 4-chorophenyl phenyl ether, and 4-bromophenyl phenyl ether results in all samples were qualified as estimates and flagged "J".

- Due to a matrix spike recovery of 69%, the 1,3,-dichlorobenzene, 1,4-dichlorobenzene, 1,2-dichlorobenzene, hexachloroethane, hexachlorobutadiene and hexaclorocyclopentadiene results in all samples were qualified as estimates and flagged "J".

- Due to a matrix spike recovery of 64%,the 4-chloro-3-methylphenol results in all samples were qualified as estimates and flagged "J".

- Due to a matrix spike recovery of 59%, the 4-nitrophenol, 2-nitrophenol and 2,4-dinitrophenol results in all samples were qualified as estimates and flagged "J".

- Due to a matrix spike recovery of 64%, the pentachlorphenol, 2,4,6-trichlorophenol and 2,4,5-trichlorophenol results in all samples were qualified as estimates and flagged "J".

All reported laboratory detection levels for undetected analytes were above the analyte specific CRQL. 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-99-07, Draft B, *200-CW-1 Operable Unit RI/FS Work Plan and 216-B-3 RCRA TSD Unit Sampling Plan*.

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers which may be applied by data validators in compliance with the 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 same 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 usable for decision-making purposes).

Appendix 2

Summary of Data Qualification

DATA QUALIFICATION SUMMARY

SDG: H0506	REVIEWER: TLI	DATE: 1/21/00	PAGE 1 OF 1
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
phenol, 2-methylphenol, 4-methylphenol, 2,4-dimethylphenol, dimethylphthalate, di-n-butylphthalate, butylbenzylphthalate, bis(2-ethylhexyl)phthalate, di-n-octylphthalate, isophorone, 2-chlorophenol, 2,4-dichlorophenol, bis(2-chloroethyl)ether, bis(2-chloroethoxy)methane, 4-chorophenyl phenyl ether, 4-bromophenyl phenyl ether 1,3,-dichlorobenzene, 1,4-dichlorobenzene, 1,2-dichlorobenzene, hexachloroethane, hexachlorobutadiene, hexaclorocyclopentadiene, 4-chloro-3-methylphenol, 4-nitrophenol, 2-nitrophenol, 2,4-dinitrophenol, pentachlorphenol, 2,4,6-trichlorophenol, 2,4,5-trichlorophenol	J	All	MS recovery

Appendix 3

Qualified Data Summary and Annotated Laboratory Reports

SEMIVOLATILE ANALYSIS, SOIL MATRIX, (UG/KG)

Project: BECHTEL-HANFORD																	
Laboratory: RECRA LabNet																	
Case:	SDG: H0506																
Sample Number		B0W6B0		B0W699		B0W697		B0W694		B0W692		B0W6B1		B0W693		B0W698	
Location		GP-2		GP-2		GP-2		GP-2		GP-2		GP-2		GP-2		GP-2	
Remarks																	
Sample Date		8/25/99		8/25/99		8/25/99		8/25/99		8/25/99		8/25/99		8/25/99		8/25/99	
Extraction Date		9/7/99		9/7/99		9/7/99		9/7/99		9/7/99		9/7/99		9/7/99		9/7/99	
Analysis Date		9/23/99		9/23/99		9/23/99		9/23/99		9/23/99		9/23/99		9/23/99		9/23/99	
Semivolatile (8270B)	CRQL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Phenol	330	18	J	20	J	20	J	980	UJ	25	J	350	UJ	23	J	350	UJ
bis(2-Chloroethyl)ether	330	340	UJ	350	UJ	360	UJ	980	UJ	370	UJ	350	UJ	370	UJ	350	UJ
2-Chlorophenol	330	340	UJ	350	UJ	360	UJ	980	UJ	370	UJ	350	UJ	370	UJ	350	UJ
1,3-Dichlorobenzene	330	340	UJ	350	UJ	360	UJ	980	UJ	370	UJ	350	UJ	370	UJ	350	UJ
1,4-Dichlorobenzene	330	340	UJ	350	UJ	360	UJ	980	UJ	370	UJ	350	UJ	370	UJ	350	UJ
1,2-Dichlorobenzene	330	340	UJ	350	UJ	360	UJ	980	UJ	370	UJ	350	UJ	370	UJ	350	UJ
2-Methylphenol	330	340	UJ	350	UJ	360	UJ	980	UJ	370	UJ	350	UJ	370	UJ	350	UJ
2,2'-oxybis(1-Chloropropane)	330	340	U	350	U	360	U	980	U	370	U	350	U	370	U	350	U
4-Methylphenol	330	340	UJ	350	UJ	360	UJ	980	UJ	370	UJ	350	UJ	370	UJ	350	UJ
N-Nitroso-di-n-propylamine	330	340	U	350	U	360	U	980	U	370	U	350	U	370	U	350	U
Hexachloroethane	330	340	UJ	350	UJ	360	UJ	980	UJ	370	UJ	350	UJ	370	UJ	350	UJ
Nitrobenzene	330	340	U	350	U	360	U	980	U	370	U	350	U	370	U	350	U
Isophorone	330	340	UJ	350	UJ	360	UJ	980	UJ	370	UJ	350	UJ	370	UJ	350	UJ
2-Nitrophenol	330	340	UJ	350	UJ	360	UJ	980	UJ	370	UJ	350	UJ	370	UJ	350	UJ
2,4-Dimethylphenol	330	340	UJ	350	UJ	360	UJ	980	UJ	370	UJ	350	UJ	370	UJ	350	UJ
bis(2-Chloroethoxy)methane	330	340	UJ	350	UJ	360	UJ	980	UJ	370	UJ	350	UJ	370	UJ	350	UJ
2,4-Dichlorophenol	330	340	UJ	350	UJ	360	UJ	980	UJ	370	UJ	350	UJ	370	UJ	350	UJ
1,2,4-Trichlorobenzene	330	340	U	350	U	360	U	980	U	370	U	350	U	370	U	350	U
Naphthalene	330	340	U	350	U	360	U	980	U	370	U	350	U	370	U	350	U
4-Chloroaniline	330	340	U	350	U	360	U	980	U	370	U	350	U	370	U	350	U
Hexachlorobutadiene	330	340	UJ	350	UJ	360	UJ	980	UJ	370	UJ	350	UJ	370	UJ	350	UJ
4-Chloro-3-methylphenol	330	340	UJ	350	UJ	360	UJ	980	UJ	370	UJ	350	UJ	370	UJ	350	UJ
2-Methylnaphthalene	330	340	U	350	U	360	U	980	U	370	U	350	U	370	U	350	U
Hexachlorocyclopentadiene	330	340	UJ	350	UJ	360	UJ	980	UJ	370	UJ	350	UJ	370	UJ	350	UJ
2,4,6-Trichlorophenol	330	340	UJ	350	UJ	360	UJ	980	UJ	370	UJ	350	UJ	370	UJ	350	UJ
2,4,5-Trichlorophenol	800	860	UJ	870	UJ	900	UJ	2400	UJ	920	UJ	870	UJ	920	UJ	860	UJ
2-Chloronaphthalene	330	340	U	350	U	360	U	980	U	370	U	350	U	370	U	350	U
2-Nitroaniline	800	860	U	870	U	900	U	2400	U	920	U	870	U	920	U	860	U
Dimethylphthalate	330	340	UJ	350	UJ	360	UJ	980	UJ	370	UJ	350	UJ	370	UJ	350	UJ
Acenaphthylene	330	340	U	350	U	360	U	980	U	370	U	350	U	370	U	350	U
2,6-Dinitrotoluene	330	340	U	350	U	360	U	980	U	370	U	350	U	370	U	350	U

000010

SEMIVOLATILE ANALYSIS, SOIL MATRIX, (UG/KG)

Project: BECHTEL-HANFORD																	
Laboratory: RECRA LabNet																	
Case:	SDG: H0506																
Sample Number		B0W6B0		B0W699		B0W697		B0W694		B0W692		B0W6B1		B0W693		B0W698	
Location		GP-2		GP-2		GP-2		GP-2		GP-2		GP-2		GP-2		GP-2	
Remarks																	
Sample Date		8/25/99		8/25/99		8/25/99		8/25/99		8/25/99		8/25/99		8/25/99		8/25/99	
Extraction Date		9/7/99		9/7/99		9/7/99		9/7/99		9/7/99		9/7/99		9/7/99		9/7/99	
Analysis Date		9/23/99		9/23/99		9/23/99		9/23/99		9/23/99		9/23/99		9/23/99		9/23/99	
Semivolatile (8270B)	CRQL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
3-Nitroaniline	800	860	U	870	U	900	U	2400	U	920	U	870	U	920	U	860	U
Acenaphthene	330	340	U	350	U	360	U	980	U	370	U	350	U	370	U	350	U
2,4-Dinitrophenol	800	860	UJ	870	UJ	900	UJ	2400	UJ	920	UJ	870	UJ	920	UJ	860	UJ
4-Nitrophenol	800	860	UJ	870	UJ	900	UJ	2400	UJ	920	UJ	870	UJ	920	UJ	860	UJ
Dibenzofuran	330	340	U	350	U	360	U	980	U	370	U	350	U	370	U	350	U
2,4-Dinitrotoluene	330	340	U	350	U	360	U	980	U	370	U	350	U	370	U	350	U
Diethylphthalate	330	340	U	350	U	360	U	980	U	370	U	350	U	370	U	350	U
4-Chlorophenyl-phenyl ether	330	340	UJ	350	UJ	360	UJ	980	UJ	370	UJ	350	UJ	370	UJ	350	UJ
Fluorene	330	340	U	350	U	360	U	980	U	370	U	350	U	370	U	350	U
4-Nitroaniline	800	860	U	870	U	900	U	2400	U	920	U	870	U	920	U	860	U
4,6-Dinitro-2-methylphenol	800	860	U	870	U	900	U	2400	U	920	U	870	U	920	U	860	U
N-Nitrosodiphenylamine	330	340	U	350	U	360	U	980	U	370	U	350	U	370	U	350	U
4-Bromophenyl-phenyl ether	330	340	UJ	350	UJ	360	UJ	980	UJ	370	UJ	350	UJ	370	UJ	350	UJ
Hexachlorobenzene	330	340	U	350	U	360	U	980	U	370	U	350	U	370	U	350	U
Pentachlorophenol	800	860	UJ	870	UJ	900	UJ	2400	UJ	920	UJ	870	UJ	920	UJ	860	UJ
Phenanthrene	330	340	U	350	U	360	U	980	U	370	U	350	U	370	U	350	U
Anthracene	330	340	U	350	U	360	U	980	U	370	U	350	U	370	U	350	U
Carbazole	330	340	U	350	U	360	U	980	U	370	U	350	U	370	U	350	U
Di-n-butylphthalate	330	340	UJ	350	UJ	360	UJ	980	UJ	370	UJ	350	UJ	370	UJ	350	UJ
Fluoranthene	330	340	U	350	U	360	U	980	U	370	U	350	U	370	U	350	U
Pyrene	330	340	U	350	U	360	U	980	U	370	U	350	U	370	U	350	U
Butylbenzylphthalate	330	340	UJ	350	UJ	360	UJ	980	UJ	370	UJ	350	UJ	370	UJ	350	UJ
3,3'-Dichlorobenzidine	330	340	U	350	U	360	U	980	U	370	U	350	U	370	U	350	U
Benzo(a)anthracene	330	340	U	350	U	360	U	980	U	370	U	350	U	370	U	350	U
Chrysene	330	340	U	350	U	360	U	980	U	370	U	350	U	370	U	350	U
bis(2-Ethylhexyl)phthalate	330	340	UJ	350	UJ	360	UJ	980	UJ	370	UJ	350	UJ	370	UJ	350	UJ
Di-n-octylphthalate	330	340	UJ	350	UJ	360	UJ	980	UJ	370	UJ	350	UJ	370	UJ	350	UJ
Benzo(b)fluoranthene	330	340	U	350	U	360	U	980	U	370	U	350	U	370	U	350	U
Benzo(k)fluoranthene	330	340	U	350	U	360	U	980	U	370	U	350	U	370	U	350	U
Benzo(a)pyrene	330	340	U	350	U	360	U	980	U	370	U	350	U	370	U	350	U
Indeno(1,2,3-cd)pyrene	330	340	U	350	U	360	U	980	U	370	U	350	U	370	U	350	U
Dibenz(a,h)anthracene	330	340	U	350	U	360	U	980	U	370	U	350	U	370	U	350	U
Benzo(g,h,i)perylene	330	340	U	350	U	360	U	980	U	370	U	350	U	370	U	350	U

Recra LabNet - Lionville Laboratory

Semivolatiles by GC/MS, HSL List

Report Date: 09/30/99 15:18

RFW Batch Number: 9908L906 Client: TNU-HANFORD B99-078 Work Order: 10985001001 Page: 1a

	Cust ID:	B0W6B0		B0W6B0		B0W6B0		B0W699		B0W697		B0W694	
Sample Information	RFW#:	001		001 MS		001 MSD		002		003		004	
	Matrix:	SOIL		SOIL		SOIL		SOIL		SOIL		SOIL	
	D.F.:	1.00		1.00		1.00		1.00		1.00		2.00	
	Units:	UG/KG		UG/KG		UG/KG		UG/KG		UG/KG		UG/KG	
Surrogate Recovery	Nitrobenzene-d5	90	%	75	%	95	%	99	%	86	%	77	%
	2-Fluorobiphenyl	89	%	74	%	89	%	96	%	84	%	79	%
	Terphenyl-d14	100	%	82	%	101	%	105	%	95	%	83	%
	Phenol-d5	81	%	68	%	85	%	86	%	79	%	68	%
	2-Fluorophenol	77	%	65	%	81	%	82	%	74	%	67	%
	2,4,6-Tribromophenol	83	%	67	%	78	%	78	%	75	%	66	%
			fl		fl		fl		fl		fl		fl
Phenol		18	~~U~~ J	65	%	76	%	20	~~U~~ J	20	~~U~~ J	980	~~U~~ J
bis(2-Chloroethyl)ether		340	U	340	U	340	U	350	U	360	U	980	U
2-Chlorophenol		340	U	64	%	76	%	350	U	360	U	980	U
1,3-Dichlorobenzene		340	U	340	U	340	U	350	U	360	U	980	U
1,4-Dichlorobenzene		340	U	69	%	83	%	350	U	360	U	980	U
1,2-Dichlorobenzene		340	U	340	U	340	U	350	U	360	U	980	U
2-Methylphenol		340	U	340	U	340	U	350	U	360	U	980	U
2,2'-oxybis(1-Chloropropane)		340	U	340	U	340	U	350	U	360	U	980	U
4-Methylphenol		340	U J	340	U	340	U	350	U J	360	U J	980	U J
N-Nitroso-di-n-propylamine		340	U	87	%	100	%	350	U	360	U	980	U
Hexachloroethane		340	U J	340	U	340	U	350	U J	360	U J	980	U J
Nitrobenzene		340	U	340	U	340	U	350	U	360	U	980	U
Isophorone		340	U J	340	U	340	U	350	U J	360	U J	980	U J
2-Nitrophenol		340	U	340	U	340	U	350	U	360	U	980	U
2,4-Dimethylphenol		340	U	340	U	340	U	350	U	360	U	980	U
bis(2-Chloroethoxy)methane		340	U	340	U	340	U	350	U	360	U	980	U
2,4-Dichlorophenol		340	U	340	U	340	U	350	U	360	U	980	U
1,2,4-Trichlorobenzene		340	U	72	%	87	%	350	U	360	U	980	U
Naphthalene		340	U	340	U	340	U	350	U	360	U	980	U
4-Chloroaniline		340	U	340	U	340	U	350	U	360	U	980	U
Hexachlorobutadiene		340	U J	340	U	340	U	350	U J	360	U J	980	U J
4-Chloro-3-methylphenol		340	U J	64	%	76	%	350	U J	360	U J	980	U J
2-Methylnaphthalene		340	U	340	U	340	U	350	U	360	U	980	U
Hexachlorocyclopentadiene		340	U J	340	U	340	U	350	U J	360	U J	980	U J
2,4,6-Trichlorophenol		340	U J	340	U	340	U	350	U J	360	U J	980	U J
2,4,5-Trichlorophenol		860	U J	860	U	860	U	870	U J	900	U J	2400	U J

*= Outside of EPA CLP QC limits.

0000042

RFW Batch Number: 9908L906 Client: TNU-HANFORD B99-078 Work Order: 10985001001 Page: 1b

11/7/00

Cust ID:	B0W6B0		B0W6B0		B0W6B0		B0W699		B0W697		B0W694	
RFW#:	001		001 MS		001 MSD		002		003		004	
2-Chloronaphthalene	340	U	340	U	340	U	350	U	360	U	980	U
2-Nitroaniline	860	U	860	U	860	U	870	U	900	U	2400	U
Dimethylphthalate	340	UJ	340	U	340	U	350	UJ	360	UJ	980	UJ
Acenaphthylene	340	U	340	U	340	U	350	U	360	U	980	U
2,6-Dinitrotoluene	340	U	340	U	340	U	350	U	360	U	980	U
3-Nitroaniline	860	U	860	U	860	U	870	U	900	U	2400	U
Acenaphthene	340	U	75	%	89	%	350	U	360	U	980	U
2,4-Dinitrophenol	860	UJ	860	U	860	U	870	UJ	900	UJ	2400	UJ
4-Nitrophenol	860	UJ	59	%	70	%	870	UJ	900	UJ	2400	UJ
Dibenzofuran	340	U	340	U	340	U	350	U	360	U	980	U
2,4-Dinitrotoluene	340	U	75	%	89	%	350	U	360	U	980	U
Diethylphthalate	340	U	340	U	340	U	350	U	360	U	980	U
4-Chlorophenyl-phenylether	340	UJ	340	U	340	U	350	UJ	360	UJ	980	UJ
Fluorene	340	U	340	U	340	U	350	U	360	U	980	U
4-Nitroaniline	860	U	860	U	860	U	870	U	900	U	2400	U
4,6-Dinitro-2-methylphenol	860	U	860	U	860	U	870	U	900	U	2400	U
N-Nitrosodiphenylamine (1)	340	U	340	U	340	U	350	U	360	U	980	U
4-Bromophenyl-phenylether	340	UJ	340	U	340	U	350	UJ	360	UJ	980	UJ
Hexachlorobenzene	340	U	340	U	340	U	350	U	360	U	980	U
Pentachlorophenol	860	UJ	64	%	79	%	870	UJ	900	UJ	2400	UJ
Phenanthrene	340	U	340	U	340	U	350	U	360	U	980	U
Anthracene	340	U	340	U	340	U	350	U	360	U	980	U
Carbazole	340	U	340	U	340	U	350	U	360	U	980	U
Di-n-butylphthalate	340	UJ	340	U	340	U	350	UJ	360	UJ	980	UJ
Fluoranthene	340	U	340	U	340	U	350	U	360	U	980	U
Pyrene	340	U	79	%	91	%	350	U	360	U	980	U
Butylbenzylphthalate	340	UJ	340	U	340	U	350	UJ	360	UJ	980	UJ
3,3'-Dichlorobenzidine	340	U	340	U	340	U	350	U	360	U	980	U
Benzo(a)anthracene	340	U	340	U	340	U	350	U	360	U	980	U
Chrysene	340	U	340	U	340	U	350	U	360	U	980	U
bis(2-Ethylhexyl)phthalate	340	UJ	340	U	340	U	350	UJ	360	UJ	980	UJ
Di-n-octyl phthalate	340	UJ	340	U	340	U	350	UJ	360	UJ	980	UJ
Benzo(b)fluoranthene	340	U	340	U	340	U	350	U	360	U	980	U
Benzo(k)fluoranthene	340	U	340	U	340	U	350	U	360	U	980	U
Benzo(a)pyrene	340	U	340	U	340	U	350	U	360	U	980	U
Indeno(1,2,3-cd)pyrene	340	U	340	U	340	U	350	U	360	U	980	U
Dibenz(a,h)anthracene	340	U	340	U	340	U	350	U	360	U	980	U
Benzo(g,h,i)perylene	340	U	340	U	340	U	350	U	360	U	980	U

(1) - Cannot be separated from Diphenylamine. *= Outside of EPA CLP QC limits.

Recra LabNet - Lionville Laboratory

Semivolatiles by GC/MS, HSL List

Report Date: 09/30/99 15:18

RFW Batch Number: 9908L906 Client: TNU-HANFORD B99-078 Work Order: 10985001001 Page: 2a

Rev 1/7/00

	Cust ID:	B0W692	B0W6B1	B0W693	B0W698	SBLKCP	SBLKCP BS
Sample Information	RFW#:	005	006	007	008	99LE1086-MB1	99LE1086-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 Recovery	Nitrobenzene-d5	88 %	91 %	89 %	88 %	99 %	95 %
	2-Fluorobiphenyl	86 %	88 %	86 %	80 %	100 %	91 %
	Terphenyl-d14	90 %	95 %	92 %	84 %	103 %	103 %
	Phenol-d5	79 %	82 %	80 %	74 %	84 %	86 %
	2-Fluorophenol	75 %	79 %	76 %	73 %	79 %	81 %
	2,4,6-Tribromophenol	80 %	72 %	68 %	73 %	77 %	83 %
		fl	fl	fl	fl	fl	fl
Phenol		25 ~~U~~ J	350 U J	23 ~~U~~ J	350 U J	330 U	78 %
bis(2-Chloroethyl)ether		370 U	350 U	370 U	350 U	330 U	330 U
2-Chlorophenol		370 U	350 U	370 U	350 U	330 U	79 %
1,3-Dichlorobenzene		370 U	350 U	370 U	350 U	330 U	330 U
1,4-Dichlorobenzene		370 U	350 U	370 U	350 U	330 U	85 %
1,2-Dichlorobenzene		370 U	350 U	370 U	350 U	330 U	330 U
2-Methylphenol		370 U	350 U	370 U	350 U	330 U	330 U
2,2'-oxybis(1-Chloropropane)		370 U	350 U	370 U	350 U	330 U	330 U
4-Methylphenol		370 U J	350 U J	370 U J	350 U J	330 U	330 U
N-Nitroso-di-n-propylamine		370 U	350 U	370 U	350 U	330 U	102 %
Hexachloroethane		370 U J	350 U J	370 U J	350 U J	330 U	330 U
Nitrobenzene		370 U	350 U	370 U	350 U	330 U	330 U
Isophorone		370 U J	350 U J	370 U J	350 U J	330 U	330 U
2-Nitrophenol		370 U	350 U	370 U	350 U	330 U	330 U
2,4-Dimethylphenol		370 U	350 U	370 U	350 U	330 U	330 U
bis(2-Chloroethoxy)methane		370 U	350 U	370 U	350 U	330 U	330 U
2,4-Dichlorophenol		370 U	350 U	370 U	350 U	330 U	330 U
1,2,4-Trichlorobenzene		370 U	350 U	370 U	350 U	330 U	89 %
Naphthalene		370 U	350 U	370 U	350 U	330 U	330 U
4-Chloroaniline		370 U	350 U	370 U	350 U	330 U	330 U
Hexachlorobutadiene		370 U J	350 U J	370 U J	350 U J	330 U	330 U
4-Chloro-3-methylphenol		370 U J	350 U J	370 U J	350 U J	330 U	80 %
2-Methylnaphthalene		370 U	350 U	370 U	350 U	330 U	330 U
Hexachlorocyclopentadiene		370 U J	350 U J	370 U J	350 U J	330 U	330 U
2,4,6-Trichlorophenol		370 U J	350 U J	370 U J	350 U J	330 U	330 U
2,4,5-Trichlorophenol		920 U J	870 U J	920 U J	860 U J	840 U	840 U

*= Outside of EPA CLP QC limits.

000014

RFW Batch Number: 9908L906 Client: TNU-HANFORD B99-078 Work Order: 10985001001 Page: 2b

1/7/00

Cust ID:	B0W692		B0W6B1		B0W693		B0W698		SBLKCP		SBLKCP BS	
RFW#:	005		006		007		008		99LE1086-MB1		99LE1086-MB1	
2-Chloronaphthalene	370	U	350	U	370	U	350	U	330	U	330	U
2-Nitroaniline	920	U	870	U	920	U	860	U	840	U	840	U
Dimethylphthalate	370	U J	350	U J	370	U J	350	U J	330	U	330	U
Acenaphthylene	370	U	350	U	370	U	350	U	330	U	330	U
2,6-Dinitrotoluene	370	U	350	U	370	U	350	U	330	U	330	U
3-Nitroaniline	920	U	870	U	920	U	860	U	840	U	840	U
Acenaphthene	370	U	350	U	370	U	350	U	330	U	91	%
2,4-Dinitrophenol	920	U J	870	U J	920	U J	860	U J	840	U	840	U
4-Nitrophenol	920	U J	870	U J	920	U J	860	U J	840	U	70	%
Dibenzofuran	370	U	350	U	370	U	350	U	330	U	330	U
2,4-Dinitrotoluene	370	U	350	U	370	U	350	U	330	U	91 *	%
Diethylphthalate	370	U	350	U	370	U	350	U	330	U	330	U
4-Chlorophenyl-phenylether	370	U J	350	U J	370	U J	350	U J	330	U	330	U
Fluorene	370	U	350	U	370	U	350	U	330	U	330	U
4-Nitroaniline	920	U	870	U	920	U	860	U	840	U	840	U
4,6-Dinitro-2-methylphenol	920	U	870	U	920	U	860	U	840	U	840	U
N-Nitrosodiphenylamine (1)	370	U	350	U	370	U	350	U	330	U	330	U
4-Bromophenyl-phenylether	370	U J	350	U J	370	U J	350	U J	330	U	330	U
Hexachlorobenzene	370	U	350	U	370	U	350	U	330	U	330	U
Pentachlorophenol	920	U J	870	U J	920	U J	860	U J	840	U	79	%
Phenanthrene	370	U	350	U	370	U	350	U	330	U	330	U
Anthracene	370	U	350	U	370	U	350	U	330	U	330	U
Carbazole	370	U	350	U	370	U	350	U	330	U	330	U
Di-n-butylphthalate	23	~~J~~	350	U J	370	U J	350	U J	330	U	330	U
Fluoranthene	370	U	350	U	370	U	350	U	330	U	330	U
Pyrene	370	U	350	U	370	U	350	U	330	U	94	%
Butylbenzylphthalate	370	U	350	U	370	U	350	U	330	U	330	U
3,3'-Dichlorobenzidine	370	U	350	U	370	U	350	U	330	U	330	U
Benzo(a)anthracene	370	U	350	U	370	U	350	U	330	U	330	U
Chrysene	370	U	350	U	370	U	350	U	330	U	330	U
bis(2-Ethylhexyl)phthalate	370	U J	350	U J	370	U J	350	U J	330	U	330	U
Di-n-octyl phthalate	370	U J	350	U J	370	U J	350	U J	330	U	330	U
Benzo(b)fluoranthene	370	U	350	U	370	U	350	U	330	U	330	U
Benzo(k)fluoranthene	370	U	350	U	370	U	350	U	330	U	330	U
Benzo(a)pyrene	370	U	350	U	370	U	350	U	330	U	330	U
Indeno(1,2,3-cd)pyrene	370	U	350	U	370	U	350	U	330	U	330	U
Dibenz(a,h)anthracene	370	U	350	U	370	U	350	U	330	U	330	U
Benzo(g,h,i)perylene	370	U	350	U	370	U	350	U	330	U	330	U

(1) - Cannot be separated from Diphenylamine. *= Outside of EPA CLP QC limits.

000015

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

RECRA
ENVIRONMENTAL
INC.

Chemical and Environmental Measurement Information

Recra LabNet Philadelphia
Analytical Report
****REVISION****

Client : TNU-HANFORD B99-078
RFW# : 9908L906
SDG/SAF #: H0506/B99-078

W.O. #: 10985-001-001-9999-00
Date Received: 08-27-99

SEMIVOLATILE

This narrative was corrected to add the TIC search for Tributylphosphate.

Eight (8) soil samples were collected on 08-25-99.

The samples and their associated QC samples were extracted on 09-07-99 and analyzed according to criteria set forth in Recra OPs based on SW 846 Method 8270B for TCL Semivolatile target compounds on 09-23-99.

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

1. The cooler temperatures upon receipt have been recorded on the chain-of-custody.
2. The required holding times for extraction and analysis were met.
3. Non-target compounds were detected in the samples.
4. Sample B0W694 required 2-fold dilution due to high levels of both target and non-target compounds.
5. All surrogate recoveries were within EPA QC limits.
6. All matrix spike recoveries were within EPA QC limits.
7. One (1) of eleven (11) blank spike recoveries was outside EPA QC limits.
8. The samples were spectrally searched for Butylated Hydroxytoluene and Tributylphosphate; however, they were not identified in the sample.

FEB 2000
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Data
Log In

J. Michael Taylor
Vice President
Philadelphia Analytical Laboratory

01-27-00
Date

pef\gorup\data\bna\mu08906.doc

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 26 pages.

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

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	B99-078-87	Page 1 of 2

Collector: Bowers/Porter/Nielson	Company Contact: Chris Cearlock	Telephone No.: 372-9574	Project Coordinator: TRENT, SJ
Price Code: 8N	Data Turnaround: 45 Days		
Project Designation: 200 Area Source characterization - 200-CW-1 OU	Sampling Location: GP-2 >15' bgs 22'-23'		SAF No.: B99-078
Ice Chest No.: GWS 130	Field Logbook No.: EL-1511		Method of Shipment: Federal Express
Shipped To: ~~TMA~~/RECRA 8.25.99	Offsite Property No.: A990230		Bill of Lading/Air Bill No.: 4235 7952 8749
			COA: B20CW1-671C

POSSIBLE SAMPLE HAZARDS/REMARKS											
	Preservation	None	None	None	None	None	Cool 4C	None	Cool 4C	None	Cool 4C
	Type of Container	sG	sG	sG	sG	sG	sG	sG	sG	sG	sG
	No. of Container(s)	1	1	1	1	1	1	1	1	1	1
Special Handling and/or Storage	Volume	60mL	60mL	60mL	60mL	120mL	250mL	250mL	500mL	500mL	1000mL
SAMPLE ANALYSIS		Isotopic Uranium	Neptunium-237	Nickel-63	Technetium-99	Tritium - H3	VOA - 8260A (TCL); VOA - 8260A (Add-On) (1-Propanol, Ethanol)	pH (Soil) - 9045	Semi-VOA - 8270A (TCL); TPH-Diesel Range - WTPH-D; PCBs - 8082	See item (1) in Special Instructions.	See item (2) in Special Instructions.
Sample No.	Matrix * / Sample Date / Sample Time										
B0W6B0	Soil / 8/25/99 / 11:03						X	X	X	X	X
										BOWSM1	

CHAIN OF POSSESSION	Sign/Print Names		
Relinquished By: Brent Porter	Date/Time: 8/25/99/1410	Received By: Peter JB	Date/Time: 8/25/99/1410
Relinquished By: RF61B	Date/Time: 8/26/99 11:00	Received By: CTRICE/Chris	Date/Time: 8/26/99 11:00
Relinquished By: CTRICE/Chris	Date/Time: 8/26/99 14:00	Received By: FEDEX	Date/Time:
Relinquished By: FedEx	Date/Time: 8.27.99/0930	Received By: D. Smith	Date/Time: 8.27.99/0930

SPECIAL INSTRUCTIONS

See chain of custody comments on SAF B99-078.

COLLECTOR UNAVAILABLE TO SIGN COC

(1) ICP Metals - 6010A (Supertrace) (Arsenic, Barium, Beryllium, Cadmium, Chromium, Copper, Lead, Nickel, Selenium, Silver, Vanadium, Zinc); Mercury - 7471 - (CV); Chromium Hex - 7196

(2) NO2/NO3 - 353.1; IC Anions - 300.0 (Chloride, Fluoride, Nitrate, Nitrite, Phosphate, Sulfate); Sulfides - 9030; Total Cyanide - 9010

4235 7952 8750 4.2

4235 7952 8749 5.1

4476 5459 31 3.8

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

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

00015

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	B99-078-86	Page 1 of 1 BED 9-25-99

Collector: Bowers/Porter/Nielson	Company Contact: Chris Cearlock	Telephone No.: 372-9574	Project Coordinator: TRENT, SJ
Price Code: 8N	Data Turnaround: 45 Days		
Project Designation: 200 Area Source characterization - 200-CW-1 OU	Sampling Location: GP-2 >15' bgs 20'-21'	SAF No.: B99-078	
Ice Chest No.: GWS 130	Field Logbook No.: EL-1511	Method of Shipment: Federal Express	
Shipped To: ~~TMA~~/RECRA BED 9-25-99	Offsite Property No.: A990230	Bill of Lading/Air Bill No.: 4235 7952 8749	
		COA: B20CW1 671C	

POSSIBLE SAMPLE HAZARDS/REMARKS

Special Handling and/or Storage

Preservation	None	None	None	None	None	Cool 4C	None	Cool 4C	None	Cool 4C
Type of Container	sG	sG	sG	sG	sG	sG	sG	sG	sG	sG
No. of Container(s)	1	1	1	1	1	1	1	1	1	1
Volume	60mL	60mL	60mL	60mL	120mL	250mL	250mL	500mL	500mL	1000mL
SAMPLE ANALYSIS	Isotopic Uranium	Neptunium-237	Nickel-63	Technetium-99	Tritium - H3	VOA - 8260A (TCL); VOA - 8260A (Add-On) (1-Propanol, Ethanol)	pH (Soil) - 9045	Semi-VOA - 8270A (TCL); TPH-Diesel Range - WTPH-D, PCBs - 8082	See item (1) in Special Instructions	See item (2) in Special Instructions
Sample No.	Matrix *	Sample Date	Sample Time								
B0W699	Soil	8/25/99	10:51					X	X	X	X	X
											Bowers	M

CHAIN OF POSSESSION	Sign/Print Names		
Relinquished By: Brent Porter	Date/Time: 8/25/99/1410	Received By: Peter JB	Date/Time: 8/25/99/1410
Relinquished By: RFG JB	Date/Time: 8/26/99 11:00	Received By: CTRICE/Chris	Date/Time: 8/26/99 11:00
Relinquished By: CTRICE/Chris	Date/Time: 8/26/99 14:00	Received By: FEDEX	Date/Time:
Relinquished By: Fed Ex	Date/Time: 8-27-99/0930	Received By: D. Smith	Date/Time: 8-27-99/0930

SPECIAL INSTRUCTIONS

See chain of custody comments on SAF B99-078.

COLLECTOR UNAVAILABLE TO SIGN COC

(1) ICP Metals - 6010A (Supertrace) (Arsenic, Barium, Beryllium, Cadmium, Chromium, Copper, Lead, Nickel, Selenium, Silver, Vanadium, Zinc); Mercury - 7471 - (CV); Chromium Hex - 7196

(2) NO2/NO3 - 353.1; IC Anions - 300.0 (Chloride, Fluoride, Nitrate, Nitrite, Phosphate, Sulfate); Sulfides - 9030; Ammonia - 350.3; Total Cyanide - 9010

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

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

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	B99-078-84	Page 1 of 1

Collector: Bowers/Porter/Nielson	Company Contact: Chris Cearlock — Telephone No.: 372-9574	Project Coordinator: TRENT, SJ	Price Code: 8N — Data Turnaround: 45 Days
Project Designation: 200 Area Source characterization - 200-CW-1 OU	Sampling Location: GP-2 >15' bgs 15-16'	SAF No.: B99-078	
Ice Chest No.: GWS 130	Field Logbook No.: EL-1511	Method of Shipment: Federal Express	
Shipped To: TMA/RECRA	Offsite Property No.: A990230	Bill of Lading/Air Bill No.: 4235 7952 8749	
		COA B20W1 671C	

POSSIBLE SAMPLE HAZARDS/REMARKS											
	Preservation	None	None	None	None	None	Cool 4C	None	Cool 4C	None	Cool 4C
	Type of Container	aG	aG	aG	aG	aG	aG	aG	aG	aG	aG
	No. of Container(s)	1	1	1	1	1	1	1	1	1	1
Special Handling and/or Storage	Volume	60mL	60mL	60mL	60mL	120mL	250mL	250mL	500mL	500mL	1000mL
SAMPLE ANALYSIS		Isotopic Uranium	Neptunium-237	Nickel-63	Technetium-99	Tritium - H3	VOA - 8260A (TCL); VOA - 8260A (Add-On) (1-Propanol, Ethanol)	pH (Soil) - 9045	Semi-VOA - 8270A (TCL); TPH-Diesel Range - WTPH-D; PCBs - 8082	See item (1) in Special Instructions	See item (2) in Special Instructions

Sample No.	Matrix *	Sample Date	Sample Time										
B0W697	Soil	8/25/99	10:04						X	X	X	X	X
												Dup-5N1	

CHAIN OF POSSESSION	Sign/Print Names		
Relinquished By: Brent Porter	Date/Time: 8/25/99/1410	Received By: Peter JB	Date/Time: 8/25/99/1410
Relinquished By: REG 1B	Date/Time: 8/26/99 11:00	Received By: CTRICE/Ctrice	Date/Time: 8/26/99 11:00
Relinquished By: CTRICE/Ctrice	Date/Time: 8/26/99 14:00	Received By: FEDEX	Date/Time:
Relinquished By: Fed Ex	Date/Time: 8-27-99/0930	Received By: D. Jones	Date/Time: 8-27-99/0930

SPECIAL INSTRUCTIONS

See chain of custody comments on SAF B99-078.

COLLECTOR UNAVAILABLE TO SIGN COC

(1) ICP Metals - 6010A (Supertrace) (Arsenic, Barium, Beryllium, Cadmium, Chromium, Copper, Lead, Nickel, Selenium, Silver, Vanadium, Zinc); Mercury - 7471 - (CV); Chromium Hex - 7196

(2) NO2/NO3 - 353.1; IC Anions - 300.0 (Chloride, Fluoride, Nitrate, Nitrite, Phosphate, Sulfate); Sulfides - 9030; Ammonia - 350.3; Total Cyanide - 9010

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

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

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	B99-078-81	Page 1 of 1

Collector: Bowers/Porter/Nielson	Company Contact: Chris Cearlock	Telephone No.: 372-9574	Project Coordinator: TRENT, SJ
Project Designation: 200 Area Source characterization - 200-CW-1 OU	Sampling Location: GP-2 <15' bgs 14'-15'		SAF No.: B99-078
Ice Chest No.: EICE-96059	Field Logbook No.: EL-1511		Method of Shipment: Federal Express
Shipped To: ~~TMA~~/RECRA 08 8.25.99	Offsite Property No.: N/A		Bill of Lading/Air Bill No.: N/A
			COA: B20CW1 671C

Price Code: 8N

Data Turnaround: 45 Days

POSSIBLE SAMPLE HAZARDS/REMARKS

Special Handling and/or Storage

Preservation	None	None	Cool 4C	None	Cool 4C	None	Cool 4C	None		
Type of Container	aG	aG	aG	aG	aG	aG	aG	aG		
No. of Container(s)	1	1	1	1	1	1	1	1		
Volume	60mL	60mL	250mL	250mL	500mL	500mL	1000mL	1000mL		
SAMPLE ANALYSIS	Isotopic Uranium	Neptunium-237	VOA - 8260A (TCL); VOA - 8260A (Add-On) (I-Propanol, Ethanol)	pH (Soil) - 9045	Semi-VOA - 8270A (TCL); TPH-Diesel Range - WTPH-D; PCBs - 8082	See item (1) in Special Instructions.	See item (2) in Special Instructions.	See item (3) in Special Instructions.		

Sample No.	Matrix *	Sample Date	Sample Time										
B0W694	Soil	8/25/99	09:26			X	X	X	X	X	X	Bowers	

04 000021

CHAIN OF POSSESSION — Sign/Print Names

Relinquished By	Date/Time	Received By	Date/Time
Brent Porter	8/25/99/1410	Peter JB	8/25/99/1410
Ref JB	8-26-99 0800	R. Fahlberg / RFahlberg	8-26-99 0800
R Fahlberg / RFahlberg	8-26-99 1400	Fed Ex	
Fed Ex	8-27-99 / 0930	D. Jones	8-27-99 / 0930

SPECIAL INSTRUCTIONS

See chain of custody comments on SAF B99-078.

(1) ICP Metals - 6010A (Supertrace) (Arsenic, Barium, Beryllium, Cadmium, Chromium, Copper, Lead, Nickel, Selenium, Silver, Vanadium, Zinc); Mercury - 7471 - (CV); Chromium Hex - 7196
(2) NO2/NO3 - 353.1; IC Anions - 300.0 (Chloride, Fluoride, Nitrate, Nitrite, Phosphate, Sulfate); Sulfides - 9030; Ammonia - 350.3; Total Cyanide - 9010
(3) Gamma Spectroscopy (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155); Gamma Spec - Add-on (Americium-241); Strontium-89,90 -- Total Sr; Total Uranium (Uranium); Isotopic Plutonium; Isotopic Thorium (Thorium-232); Americium-241

COLLECTOR UNAVAILABLE TO SIGN COC.

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

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

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	B99-078-79	Page 1 of 1

Collector Bowers/Porter/Nielson	Company Contact Chris Cearlock	Telephone No. 372-9574	Project Coordinator TRENT, SJ
Price Code 8N	Data Turnaround 45 Days		
Project Designation 200 Area Source characterization - 200-CW-1 OU	Sampling Location GP-2 <15' bgs 10' - 11'	SAF No. B99-078	
Ice Chest No. ERC 96 059	Field Logbook No. EL-1511	Method of Shipment Federal Express	
Shipped To ~~TMA~~/RECRA BTO 8-25-99	Offsite Property No. N/A	Bill of Lading/Air Bill No. N/A	
		COA B20CW1-671C	

POSSIBLE SAMPLE HAZARDS/REMARKS

Special Handling and/or Storage

Preservation	None	None	Cool 4C	None	Cool 4C	None	Cool 4C	None		
Type of Container	aG	aG	aG	aG	aG	aG	aG	aG		
No. of Container(s)	1	1	1	1	1	1	1	1		
Volume	60mL	60mL	250mL	250mL	500mL	500mL	1000mL	1000mL		
SAMPLE ANALYSIS	Isotopic Uranium	Neptunium-237	VOA - 8260A (TCL); VOA - 8260A (Add-On) (1-Propanol, Ethanol)	pH (Soil) - 9045	Semi-VOA - 8270A (TCL); TPH-Diesel Range - WTPH-D; PCBs - 8082	See item (1) in Special Instructions.	See item (2) in Special Instructions.	See item (3) in Special Instructions		
Sample No. / Matrix * / Sample Date / Sample Time										
B0W692 / Soil / 8/25/99 / 08:45			X	X	X	X	X		B0W5L9	

CHAIN OF POSSESSION — Sign/Print Names

Relinquished By	Date/Time	Received By	Date/Time
Brent Porter	8/25/99/1410	Peter JB	8/25/99/1410
Peter J-B	8-26-99 0800	R. Fahlberg / R. Fahlberg	8-26-99 0800
R. Fahlberg / R. Fahlberg	8-26-99 1400	FED Ex	
Fed Ex	8-27-99/0930	D. Amen	8-27-99/0930

SPECIAL INSTRUCTIONS

See chain of custody comments on SAF B99-078.

(1) ICP Metals - 6010A (Supertrace) (Arsenic, Barium, Beryllium, Cadmium, Chromium, Copper, Lead, Nickel, Selenium, Silver, Vanadium, Zinc); Mercury - 7471 - (CV); Chromium Hex - 7196
(2) NO2/NO3 - 353.1; IC Anions - 300.0 (Chloride, Fluoride, Nitrate, Nitrite, Phosphate, Sulfate); Sulfides - 9030; Ammonia - 350.3; Total Cyanide - 9010
(3) Gamma Spectroscopy (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155); Gamma Spec - Add-on (Americium-241); Strontium-89,90 -- Total Sr; Total Uranium (Uranium); Isotopic Plutonium; Isotopic Thorium (Thorium-232); Americium-241

COLLECTOR UNAVAILABLE TO SIGN COC.

Matrix *
Soil
Water
Vapor
Other Solid
Other Liquid

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

22000022

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	B99-078-88	Page 1 of 21

Collector: Bowers/Porter/Nielson	Company Contact: Chris Cearlock	Telephone No.: 372-9574	Project Coordinator: TRENT, SJ
Price Code: 8N	Data Turnaround: 45 Days		
Project Designation: 200 Area Source characterization - 200-CW-1 OU	Sampling Location: GP-2 >15' bgs 24'-25'	SAF No.: B99-078	
Ice Chest No.: EBC 96-051	Field Logbook No.: EL-1511	Method of Shipment: Federal Express	
Shipped To: ~~TMA~~/RECRA BW 8-25-99	Offsite Property No.: ~~AF~~ A99023Ø RE 8-26-99	Bill of Lading/Air Bill No.: 4235 7952 8750	
		COA: B20CW1 671C	

POSSIBLE SAMPLE HAZARDS/REMARKS											
	Preservation	None	None	None	None	None	Cool 4C	None	Cool 4C	None	Cool 4C
	Type of Container	aG	aG	aG	aG	aG	aG	aG	aG	aG	aG
	No. of Container(s)	1	1	1	1	1	1	1	1	1	1
Special Handling and/or Storage	Volume	60mL	60mL	60mL	60mL	120mL	250mL	250mL	500mL	500mL	1000mL
SAMPLE ANALYSIS		Isotopic Uranium	Neptunium-237	Nickel-63	Technetium-99	Tritium - H3	VOA - 8260A (TCL); VOA - 8260A (Add-On) (1-Propanol, Ethanol)	pH (Soil) - 9045	Semi-VOA - 8270A (TCL); TPH-Diesel Range - WTPH-D; PCBs - 8082	See item (1) in Special Instructions	See item (2) in Special Instructions

Sample No.	Matrix *	Sample Date	Sample Time										
B0W6B1	Soil	8/25/99	11:18						X	X	X	X	X
											Bow5M1		

CHAIN OF POSSESSION	Sign/Print Names		
Relinquished By: Brent Porter	Date/Time: 8/25/99/1410	Received By: Refer JB	Date/Time: 8/25/99/1410
Relinquished By: Ref 1.B	Date/Time: 8-26-99 0800	Received By: R. Fahlman / R. Fahlman	Date/Time: 8-26-99 0800
Relinquished By: R. Fahlman / R. Fahlman	Date/Time: 8-26-99 1800	Received By: Fed Ex	Date/Time:
Relinquished By: Fed Ex	Date/Time: 8-27-99/0930	Received By: D. Spaid	Date/Time: 8-27-99/0930

SPECIAL INSTRUCTIONS

See chain of custody comments on SAF B99-078.

(1) ICP Metals - 6010A (Supertrace) (Arsenic, Barium, Beryllium, Cadmium, Chromium, Copper, Lead, Nickel, Selenium, Silver, Vanadium, Zinc); Mercury - 7471 - (CV); Chromium Hex - 7196

(2) NO2/NO3 - 353.1; IC Anions - 300.0 (Chloride, Fluoride, Nitrate, Nitrite, Phosphate, Sulfate); Sulfides - 9030; Ammonia - 350.3; Total Cyanide - 9010

collector not available to sign COC

Matrix *

Soil
Water
Vapor
Other Solid
Other Liquid

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

106 00023

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	B99-078-80	Page 1 of 1

Collector: Bowers/Porter/Nielson	Company Contact: Chris Cearlock — Telephone No.: 372-9574	Project Coordinator: TRENT, SJ	Price Code: 8N — Data Turnaround: 45 Days
Project Designation: 200 Area Source characterization - 200-CW-1 OU	Sampling Location: GP-2 <15' bgs 12.5'-13.5'	SAF No.: B99-078	
Ice Chest No.: ERC-96-051	Field Logbook No.: EL-1511	Method of Shipment: Federal Express	
Shipped To: ~~TMA~~/RECRA 8-26-99	Offsite Property No.: A990230	Bill of Lading/Air Bill No.: 4235 7952 8750	
		COA: B20CW1 671C	

POSSIBLE SAMPLE HAZARDS/REMARKS											
	Preservation	None	None	Cool 4C	None	Cool 4C	None	Cool 4C	None		
	Type of Container	aG	aG	aG	aG	aG	aG	aG	aG		
	No. of Container(s)	1	1	1	1	1	1	1	1		
Special Handling and/or Storage	Volume	60mL	60mL	250mL	250mL	500mL	500mL	1000mL	1000mL		
SAMPLE ANALYSIS		Isotopic Uranium	Neptunium-237	VOA - 8260A (TCL); VOA - 8260A (Add-On) (1-Propanol, Ethanol)	pH (Soil) - 9045	Semi-VOA - 8270A (TCL); TPH-Diesel Range - WTPH-D; PCBs - 8082	See item (1) in Special Instructions.	See item (2) in Special Instructions.	See item (3) in Special Instructions.		
Sample No.	Matrix *	Sample Date	Sample Time								
B0W693	Soil	8/25/99	09:09			X	X	X	X	X		B0W3M0

CHAIN OF POSSESSION	Sign/Print Names		
Relinquished By: Brent Porter — Date/Time: 8/25/99/1410	Received By: Peter JB — Date/Time: 8/25/99/1410		
Relinquished By: RF JB — Date/Time: 8.26.99 0800	Received By: R. Felly/R.F. Felly — Date/Time: 0800 8.26.99		
Relinquished By: R. Felly/R.F. Felly — Date/Time: 1400 8.26.99	Received By: Fed Ex — Date/Time:		
Relinquished By: Fed Ex — Date/Time: 8.27.99/0930	Received By: [signature] — Date/Time: 8.27.99/0930		
LABORATORY SECTION	Received By	Title	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

SPECIAL INSTRUCTIONS

See chain of custody comments on SAF B99-078.

(1) ICP Metals - 6010A (Supertrace) (Arsenic, Barium, Beryllium, Cadmium, Chromium, Copper, Lead, Nickel, Selenium, Silver, Vanadium, Zinc); Mercury - 7471 - (CV); Chromium Hex - 7196
(2) NO2/NO3 - 353.1; IC Anions - 300.0 (Chloride, Fluoride, Nitrate, Nitrite, Phosphate, Sulfate); Sulfides - 9030; Ammonia - 350.3; Total Cyanide - 9010
(3) *Gamma Spectroscopy* (*Cesium*-137, Cobalt-60, *Europium*-152, *Europium*-154, Europium-155); Gamma Spec - Add-on (Americium-241); Strontium-89,90 -- Total Sr; Total Uranium (Uranium); Isotopic Plutonium; Isotopic Thorium (Thorium-232); Americium-241

collector not available to sign COC

Matrix *
Soil
Water
Vapor
Other Solid
Other Liquid

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	B99-078-85	Page 1 of 21

Collector: Bowers/Porter/Nielson	Company Contact: Chris Cearlock	Telephone No.: 372-9574	Project Coordinator: TRENT, SJ
Price Code: 8N	Data Turnaround: 45 Days		
Project Designation: 200 Area Source characterization - 200-CW-1 OU	Sampling Location: GP-2 >15' bgs 17.5 - 18.5	SAF No.: B99-078	
Ice Chest No.: ERC 96.051	Field Logbook No.: EL-1511	Method of Shipment: Federal Express	
Shipped To: ~~TMA~~/RECRA	Offsite Property No.: A990230	Bill of Lading/Air Bill No.: 4235 7952 8750	
		COA: B20W1 + B20CW1 671C	

POSSIBLE SAMPLE HAZARDS/REMARKS

Special Handling and/or Storage

SAMPLE ANALYSIS	Isotopic Uranium	Neptunium-237	Nickel-63	Technetium-99	Tritium - H3	VOA - 8260A (TCL); VOA - 8260A (Add-On) (1-Propanol, Ethanol)	pH (Soil) - 9045	Semi-VOA - 8270A (TCL); TPH-Diesel Range - WTPH-D; PCBs - 8082	See item (1) in Special Instructions	See item (2) in Special Instructions
Preservation	None	None	None	None	None	Cool 4C	None	Cool 4C	None	Cool 4C
Type of Container	sG	sG	sG	sG	sG	sG	sG	sG	sG	sG
No. of Container(s)	1	1	1	1	1	1	1	1	1	1
Volume	60mL	60mL	60mL	60mL	120mL	250mL	250mL	500mL	500mL	1000mL

Sample No.	Matrix *	Sample Date	Sample Time	Isotopic Uranium	Neptunium-237	Nickel-63	Technetium-99	Tritium - H3	VOA - 8260A (TCL); VOA - 8260A (Add-On) (1-Propanol, Ethanol)	pH (Soil) - 9045	Semi-VOA - 8270A (TCL); TPH-Diesel Range - WTPH-D; PCBs - 8082	See item (1) in Special Instructions	See item (2) in Special Instructions
B0W698	Soil	8/25/99	10:32						X	X	X	X	X
												B0W5M1	

CHAIN OF POSSESSION — Sign/Print Names

Relinquished By	Date/Time	Received By	Date/Time
Brent Porter	8/25/99 1440	Peter JB	8/25/99 1440
R.F. J.B.	8.26.99 0800	R.Fahlberg / R.Fahlberg	8.26.99 0800
R.Fahlberg / R.Fahlberg	8.26.99 1400	Fed Ex	
Fed Ex	8.27.99 0930	D.Johnson	8.27.99 0930

SPECIAL INSTRUCTIONS

See chain of custody comments on SAF B99-078.

(1) ICP Metals - 6010A (Supertrace) (Arsenic, Barium, Beryllium, Cadmium, Chromium, Copper, Lead, Nickel, Selenium, Silver, Vanadium, Zinc); Mercury - 7471 - (CV); Chromium Hex - 7196

(2) NO2/NO3 - 353.1; IC Anions - 300.0 (Chloride, Fluoride, Nitrate, Nitrite, Phosphate, Sulfate); Sulfides - 9030; Ammonia - 350.3; Total Cyanide - 9010

collector not available to sign COC

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

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

000025

Appendix 5

Data Validation Supporting Documentation

GC/MS ORGANIC DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E

PROJECT: 200-CW-1		DATA PACKAGE: H0506
VALIDATOR: TLI	LAB: RECRA	DATE: 12/20/99
CASE:		SDG: H0506

ANALYSES PERFORMED

☐ CLP Volatiles	☐ SW-846 8240 (cap column)	☐ SW-846 8260 (packed column)	☐ CLP Semivolatiles	☒ SW-846 8270 (cap column)	☐ SW-846 (packed column)
☐	☐	☐	☐	☐	☐

SAMPLES/MATRIX	BOW692	BOW693	BOW694	BOW697
	BOW698	BOW699	BOW680	BOW681
				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:

GC/MS ORGANIC DATA VALIDATION CHECKLIST

3. INSTRUMENT TUNING AND CALIBRATION

Is the GC/MS tuning/performance check acceptable? . . . . . Yes No N/A

Are initial calibrations acceptable? . . . . . Yes No N/A

Are continuing calibrations acceptable? . . . . . Yes No N/A

Comments:

4. BLANKS

Were laboratory blanks analyzed? . . . . . Yes No N/A

Are laboratory 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:

5. ACCURACY

Were surrogates/System Monitoring Compounds analyzed? . . . . . Yes No N/A

Are surrogate/System Monitoring Compound recoveries acceptable? Yes No N/A

Were MS/MSD samples analyzed? . . . . . Yes No N/A

Are MS/MSD results acceptable? . . . . . Yes No N/A

Comments: 6 over — J all

GC/MS ORGANIC DATA VALIDATION CHECKLIST

6. PRECISION

Are MS/MSD RPD 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. SYSTEM PERFORMANCE

Were internal standards analyzed? . . . . . Yes No N/A
Are internal standard areas acceptable? . . . . . Yes No N/A
Are internal standard retention times acceptable? . . . . . 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
Has the laboratory properly identified and coded all TIC? . . . Yes No N/A
Comments: all analytes in all sample ova

Date: 21 January 2000
To: Bechtel Hanford Inc. (technical representative)
From: TechLaw, Inc.
Project: 200 Area Source Characterization - 200-CW-1 Operable Unit
Subject: PCBs - Data Package No. H0506-RLN (SDG No. H0506)

INTRODUCTION

This memo presents the results of data validation on Summary Data Package No. H0506-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	Media	Validation	Analysis
B0W6B0	8/25/99	Soil	C	PCBs by 8082
B0W6B1	8/25/99	Soil	C	PCBs by 8082
B0W692	8/25/99	Soil	C	PCBs by 8082
B0W693	8/25/99	Soil	C	PCBs by 8082
B0W694	8/25/99	Soil	C	PCBs by 8082
B0W697	8/25/99	Soil	C	PCBs by 8082
B0W698	8/25/99	Soil	C	PCBs by 8082
B0W699	8/25/99	Soil	C	PCBs by 8082

Data validation was conducted in accordance with the BHI validation statement of work and the *200-CW-1 Operable Unit RI/FS Work Plan and 216-B-3 RCRA TSD Unit Sampling Plan*, DOE/RL-99-07, Draft B. 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".

All holding times were met.

- **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.

- **Accuracy**

<u>Matrix Spike</u>

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 70-130%. 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 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. The RPD for soil samples is ≤30% for soils. 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 matrix spike/matrix spike duplicate results were acceptable.

- **Analytical Detection Levels**

Reported analytical detection levels are compared against the CRDL to ensure that laboratory detection levels meet the required criteria. All reported laboratory detection levels met the analyte specific PQL.

- **Completeness**

  Data Package No. H0506-RLN (SDG No. H0506) 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-99-07, Draft B, *200-CW-1 Operable Unit RI/FS Work Plan and 216-B-3 RCRA TSD Unit Sampling Plan*.

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: H0506	REVIEWER: TLI	DATE: 1/21/00	PAGE_1_OF_1_
COMMENTS: No qualifiers assigned			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON

Appendix 3

Qualified Data Summary and Annotated Laboratory Reports

PCB ANALYSIS, SOIL MATRIX, (UG/KG)

Project: BECHTEL-HANFORD																	
Laboratory: Recra LabNet																	
Case	SDG: H0506																
Sample Number		B0W6B0		B0W6B1		B0W692		B0W693		B0W694		B0W697		B0W698		B0W699	
Location		GP-2		GP-2		GP-2		GP-2		GP-2		GP-2		GP-2		GP-2	
Sample Date		08/25/99		08/25/99		08/25/99		08/25/99		08/25/99		08/25/99		08/25/99		08/25/99	
PCB	CRDL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Aroclor-1016	100	34	U	35	U	37	U	37	U	49	U	36	U	35	U	35	U
Aroclor-1221	100	69	U	70	U	74	U	74	U	98	U	73	U	69	U	70	U
Aroclor-1232	100	34	U	35	U	37	U	37	U	49	U	36	U	35	U	35	U
Aroclor-1242	100	34	U	35	U	37	U	37	U	49	U	36	U	35	U	35	U
Aroclor-1248	100	34	U	35	U	37	U	37	U	49	U	36	U	35	U	35	U
Aroclor-1254	100	34	U	35	U	37	U	37	U	49	U	36	U	35	U	35	U
Aroclor-1260	100	34	U	35	U	37	U	37	U	49	U	36	U	35	U	35	U

000010

Recra LabNet - Lionville Laboratory

PCBs by GC

Report Date: 09/28/99 15:57

RFW Batch Number: 9908L906 Client: TNU-HANFORD B99-078 Work Order: 10985001001 Page: 1

004

	Cust ID:	B0W6B0	B0W699	B0W699	B0W699	B0W697	B0W694
Sample Information	RFW#:	001	002	002 MS	002 MSD	003	004
	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	88 %	95 %	100 %	105 %	98 %	100 %
	Decachlorobiphenyl	86 %	89 %	92 %	98 %	90 %	94 %
		fl	fl	fl	fl	fl	fl
Aroclor-1016		34 U	35 U	35 U	35 U	36 U	49 U
Aroclor-1221		69 U	70 U	70 U	70 U	73 U	98 U
Aroclor-1232		34 U	35 U	35 U	35 U	36 U	49 U
Aroclor-1242		34 U	35 U	35 U	35 U	36 U	49 U
Aroclor-1248		34 U	35 U	35 U	35 U	36 U	49 U
Aroclor-1254		34 U	35 U	79 %	73 %	36 U	49 U
Aroclor-1260		34 U	35 U	35 U	35 U	36 U	49 U

	Cust ID:	B0W692	B0W6B1	B0W693	B0W698	PBLKUH	PBLKUH BS
Sample Information	RFW#:	005	006	007	008	99LE1087-MB1	99LE1087-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	78 %	102 %	72 %	98 %	100 %	90 %
	Decachlorobiphenyl	71 %	97 %	72 %	93 %	92 %	82 %
		fl	fl	fl	fl	fl	fl
Aroclor-1016		37 U	35 U	37 U	35 U	33 U	33 U
Aroclor-1221		74 U	70 U	74 U	69 U	67 U	67 U
Aroclor-1232		37 U	35 U	37 U	35 U	33 U	33 U
Aroclor-1242		37 U	35 U	37 U	35 U	33 U	33 U
Aroclor-1248		37 U	35 U	37 U	35 U	33 U	33 U
Aroclor-1254		37 U	35 U	37 U	35 U	33 U	65 %
Aroclor-1260		37 U	35 U	37 U	35 U	33 U	33 U

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

1/7/00

000041

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

RECRA
ENVIRONMENTAL
INC.

Chemical and Environmental Measurement Information

Recra LabNet Philadelphia
Analytical Report

Client: TNU-HANFORD B99-078
RFW#: 9908L906
SDG/SAF#: H0506/B99-078

W.O.#: 10985-001-001-9999-00
Date Received: 08-27-99

PCB

The set of samples consisted of eight (8) soil samples collected on 08-25-99.

The samples and their associated QC samples were extracted on 09-07-99 and analyzed according to Recra OPs based on SW846, 3rd Edition procedures on 09-23,24-99. The extraction procedure was based on method 3540 and the extracts were analyzed based on method 8082 for Aroclors only.

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-custody.
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 a 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.

by J. Michael Taylor
Vice President
Philadelphia Analytical Laboratory

09-30-99
Date

OCT 1999
RECEIVED
Data
Log In

pef\r:\group\data\pest\08L-906.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.

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

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	B99-078-87	Page 1 of 21

Collector: Bowers/Porter/Nielson	Company Contact: Chris Cearlock	Telephone No.: 372-9574	Project Coordinator: TRENT, SJ
Price Code: 8N	Data Turnaround: 45 Days		
Project Designation: 200 Area Source characterization - 200-CW-1 OU	Sampling Location: GP-2 >15' bgs 22'-23'	SAF No.: B99-078	
Ice Chest No.: GWS 130	Field Logbook No.: EL-1511	Method of Shipment: Federal Express	
Shipped To: TMA/RECRA	Offsite Property No.: A990230	Bill of Lading/Air Bill No.: 4235 7952 8749	
		COA: B20CW1-671C	

POSSIBLE SAMPLE HAZARDS/REMARKS

Special Handling and/or Storage

SAMPLE ANALYSIS	Isotopic Uranium	Neptunium-237	Nickel-63	Technetium-99	Tritium - H3	VOA - 8260A (TCL); VOA - 8260A (Add-On) (1-Propanol, Ethanol)	pH (Soil) - 9045	Semi-VOA - 8270A (TCL); TPH-Diesel Range - WTPH-D; PCBs - 8082	See item (1) in Special Instructions.	See item (2) in Special Instructions.
Preservation	None	None	None	None	None	Cool 4C	None	Cool 4C	None	Cool 4C
Type of Container	sG	sG	sG	sG	sG	sG	sG	sG	sG	sG
No. of Container(s)	1	1	1	1	1	1	1	1	1	1
Volume	60mL	60mL	60mL	60mL	120mL	250mL	250mL	500mL	500mL	1000mL

Sample No.	Matrix *	Sample Date	Sample Time	Isotopic Uranium	Neptunium-237	Nickel-63	Technetium-99	Tritium - H3	VOA - 8260A (TCL); VOA - 8260A (Add-On) (1-Propanol, Ethanol)	pH (Soil) - 9045	Semi-VOA - 8270A (TCL); TPH-Diesel Range - WTPH-D; PCBs - 8082	See item (1) in Special Instructions.	See item (2) in Special Instructions.
B0W6B0	Soil	8/25/99	11:03						X	X	X	X	X
												BOWSMI	

CHAIN OF POSSESSION — Sign/Print Names

Relinquished By	Date/Time	Received By	Date/Time
[illegible]	8/25/99/1410	Peter JB	8/25/99/1410
RF61B	8/26/99 11:00	CTRICE/Chris	8/26/99 11:00
CTRICE/Chris	8/26/99 14:00	FEDEX	
FedEx	8.27.99/0930	D. Smith	8.27.99/0930

SPECIAL INSTRUCTIONS

See chain of custody comments on SAF B99-078.

COLLECTOR UNAVAILABLE TO SIGN COC

(1) ICP Metals - 6010A (Superfrate) (Arsenic, Barium, Beryllium, Cadmium, Chromium, Copper, Lead, Nickel, Selenium, Silver, Vanadium, Zinc); Mercury - 7471 - (CV); Chromium Hex - 7196

(2) NO2/NO3 - 353.1; IC Anions - 300.0 (Chloride, Fluoride, Nitrate, Nitrite, Phosphate, Sulfate); Sulfides - 9030; Total Cyanide - 9010

4235 7952 8750 4.2

4235 7952 8749 5.1

4476545 931 3.8

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

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

000044

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	B99-078-86	Page 1 of 1 BD 8-25-99

Collector: Bowers/Porter/Nielson	Company Contact: Chris Cearlock	Telephone No.: 372-9574	Project Coordinator: TRENT, SJ
Price Code: 8N	Data Turnaround: 45 Days		
Project Designation: 200 Area Source characterization - 200-CW-1 OU	Sampling Location: GP-2 >15' bgs 20'-21'	SAF No.: B99-078	
Ice Chest No.: GWS 130	Field Logbook No.: EL-1511	Method of Shipment: Federal Express	
Shipped To: ~~TMA~~/RECRA 8-25-99	Offsite Property No.: 1499023Ø	Bill of Lading/Air Bill No.: 4235 7952 8749	
		COA: B20CW1 671C	

POSSIBLE SAMPLE HAZARDS/REMARKS											
	Preservation	None	None	None	None	None	Cool 4C	None	Cool 4C	None	Cool 4C
	Type of Container	sG	sG	sG	sG	sG	sG	sG	sG	sG	sG
Special Handling and/or Storage	No. of Container(s)	1	1	1	1	1	1	1	1	1	1
	Volume	60mL	60mL	60mL	60mL	120mL	250mL	250mL	500mL	500mL	1000mL
SAMPLE ANALYSIS		Isotopic Uranium	Neptunium-237	Nickel-63	Technetium-99	Tritium - H3	VOA - 8260A (TCL); VOA - 8260A (Add-On) (1-Propanol, Ethanol)	pH (Soil) - 9045	Semi-VOA - 8270A (TCL); TPH-Diesel Range - WTPH-D; PCBs - 8082	See item (1) in Special Instructions.	See item (2) in Special Instructions.
Sample No.	Matrix * / Sample Date / Sample Time										
B0W699	Soil / 8/25/99 / 10:51						X	X	X	X	X
										Dows	M2

CHAIN OF POSSESSION	Sign/Print Names	Date/Time
Relinquished By: Brent Porter		8/25/99/1410
Received By: Peter JB		8/25/99/1410
Relinquished By: RFB LB		8/26/99 11:00
Received By: CTRICE/Chris		8/26/99 11:00
Relinquished By: CTRICE/Chris		8/26/99 14:00
Received By: FEDEX		
Relinquished By: Geo Ex		8-27-99/0930
Received By: D. Smith		8-27-99/0930

SPECIAL INSTRUCTIONS

See chain of custody comments on SAF B99-078.

COLLECTOR UNAVAILABLE TO SIGN COC

(1) ICP Metals - 6010A (Supertrace) (Arsenic, Barium, Beryllium, Cadmium, Chromium, Copper, Lead, Nickel, Selenium, Silver, Vanadium, Zinc); Mercury - 7471 - (CV); Chromium Hex - 7196

(2) NO2/NO3 - 353.1; IC Anions - 300.0 (Chloride, Fluoride, Nitrate, Nitrite, Phosphate, Sulfate); Sulfides - 9030; Ammonia - 350.3; Total Cyanide - 9010

Matrix *

Soil
Water
Vapor
Other Solid
Other Liquid

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

2 000013

008

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	B99-078-84	Page 1 of 1

Collector: Bowers/Porter/Nielson	Company Contact: Chris Cearlock	Telephone No.: 372-9574	Project Coordinator: TRENT, SJ
Price Code: 8N	Data Turnaround: 45 Days		
Project Designation: 200 Area Source characterization - 200-CW-1 OU	Sampling Location: GP-2 >15' bgs 15-16'	SAF No.: B99-078	
Ice Chest No.: GWS 130	Field Logbook No.: EL-1511	Method of Shipment: Federal Express	
Shipped To: TMA/RECRA	Offsite Property No.: A990230	Bill of Lading/Air Bill No.: 4235 7952 8749	
		COA B20CW1 671C	

POSSIBLE SAMPLE HAZARDS/REMARKS											
	Preservation	None	None	None	None	None	Cool 4C	None	Cool 4C	None	Cool 4C
	Type of Container	sG	sG	sG	sG	sG	sG	sG	sG	sG	sG
	No. of Container(s)	1	1	1	1	1	1	1	1	1	1
Special Handling and/or Storage	Volume	60mL	60mL	60mL	60mL	120mL	250mL	250mL	500mL	500mL	1000mL
SAMPLE ANALYSIS		Isotopic Uranium	Neptunium-237	Nickel-63	Technetium-99	Tritium - H3	VOA - 8260A (TCL); VOA - 8260A (Add-On) (1-Propanol, Ethanol)	pH (Soil) - 9045	Semi-VOA - 8270A (TCL); TPH-Diesel Range - WTPH-D; PCBs - 8082	See item (1) in Special Instructions.	See item (2) in Special Instructions.
Sample No.	Matrix * / Sample Date / Sample Time										
B0W697	Soil / 8/25/99 / 10:04						X	X	X	X	X
										Dup 141	

CHAIN OF POSSESSION	Sign/Print Names		
Relinquished By: Brent Porter	Date/Time: 8/25/99/1410	Received By: Peter JB	Date/Time: 8/25/99/1410
Relinquished By: RFG IB	Date/Time: 8/26/99 11:00	Received By: CTRICE/Ctrice	Date/Time: 8/26/99 11:00
Relinquished By: CTRICE/Ctrice	Date/Time: 8/26/99 14:00	Received By: FEDEX	Date/Time:
Relinquished By: Fed Ex	Date/Time: 8/27/99/0930	Received By: D Armstrong	Date/Time: 8/27/99/0930
LABORATORY SECTION	Received By	Title	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

SPECIAL INSTRUCTIONS

See chain of custody comments on SAF B99-078.

COLLECTOR UNAVAILABLE TO SIGN COC

(1) ICP Metals - 6010A (Supertrace) (Arsenic, Barium, Beryllium, Cadmium, Chromium, Copper, Lead, Nickel, Selenium, Silver, Vanadium, Zinc); Mercury - 7471 - (CV); Chromium Hex - 7196

(2) NO2/NO3 - 353.1; IC Anions - 300.0 (Chloride, Fluoride, Nitrate, Nitrite, Phosphate, Sulfate); Sulfides - 9030; Ammonia - 350.3; Total Cyanide - 9010

Matrix *
Soil
Water
Vapor
Other Solid
Other Liquid

B

00000026

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	B99-078-81	Page 1 of 1

Collector: Bowers/Porter/Nielson	Company Contact: Chris Cearlock	Telephone No.: 372-9574	Project Coordinator: TRENT, SJ
Price Code: 8N	Data Turnaround: 45 Days		
Project Designation: 200 Area Source characterization - 200-CW-1 OU	Sampling Location: GP-2 <15' bgs 14'-15'	SAF No.: B99-078	
Ice Chest No.: EICG-96059	Field Logbook No.: EL-1511	Method of Shipment: Federal Express	
Shipped To: ~~TMA~~/RECRA 0700 8-25-99	Offsite Property No.: N/A	Bill of Lading/Air Bill No.: N/A	
		COA: B2OCW1 6716	

POSSIBLE SAMPLE HAZARDS/REMARKS											
	Preservation	None	None	Cool 4C	None	Cool 4C	None	Cool 4C	None		
	Type of Container	sG	sG	sG	sG	sG	sG	sG	sG		
Special Handling and/or Storage	No. of Container(s)	1	1	1	1	1	1	1	1		
	Volume	60mL	60mL	250mL	250mL	500mL	500mL	1000mL	1000mL		
SAMPLE ANALYSIS		Isotopic Uranium	Neptunium-237	VOA - 8260A (TCL); VOA - 8260A (Add-On) [1-Propanol, Ethanol]	pH (Soil) - 9045	Semi-VOA - 8270A (TCL); TPH-Diesel Range - WTPH-D; PCBs - 8082	See item (1) in Special Instructions.	See item (2) in Special Instructions.	See item (3) in Special Instructions.		

Sample No.	Matrix *	Sample Date	Sample Time										
B0W694	Soil	8/25/99	09:26			X	X	X	X	X		B0W692	

CHAIN OF POSSESSION	Sign/Print Names		
Relinquished By: Brent Porter	Date/Time: 8/25/99/1410	Received By: Peter JB	Date/Time: 8/25/99/1410
Relinquished By: Bof 1-B	Date/Time: 8-26-99 0800	Received By: R. Fahlberg / R Fahlberg	Date/Time: 8-26-99 0800
Relinquished By: R Fahlberg / R Fahlberg	Date/Time: 8-26-99 1400	Received By: FedEx	Date/Time:
Relinquished By: FedEx	Date/Time: 8-27-99/0930	Received By: [signature]	Date/Time: 8-27-99/0930

SPECIAL INSTRUCTIONS

See chain of custody comments on SAF B99-078.

(1) ICP Metals - 6010A (Supertrace) [Arsenic, Barium, Beryllium, Cadmium, Chromium, Copper, Lead, Nickel, Selenium, Silver, Vanadium, Zinc]; Mercury - 7471 - (CV); Chromium Hex - 7196
(2) NO2/NO3 - 353.1; IC Anions - 300.0 [Chloride, Fluoride, Nitrate, Nitrite, Phosphate, Sulfate]; Sulfides - 9030; Ammonia - 350.3; Total Cyanide - 9010
(3) Gamma Spectroscopy [Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155]; Gamma Spec - Add-on [Americium-241]; Strontium-89,90 -- Total Sr; Total Uranium [Uranium]; Isotopic Plutonium; Isotopic Thorium [Thorium-232]; Americium-241

COLLECTOR UNAVAILABLE TO SIGN COC.

Matrix *
Soil
Water
Vapor
Other Solid
Other Liquid

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

24 000027

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	B99-078-79	Page 1 of 1

Collector Bowers/Porter/Nielson	Company Contact Chris Cearlock	Telephone No. 372-9574	Project Coordinator TRENT, SJ
Project Designation 200 Area Source characterization - 200-CW-1 OU	Sampling Location GP-2 <15' bgs 10'-11'		SAF No. B99-078
Ice Chest No. ERC 96 059	Field Logbook No. EL-1511		Method of Shipment Federal Express
Shipped To ~~TMA~~/RECRA B10 8-25-99	Offsite Property No. N/A		Bill of Lading/Air Bill No. N/A
			COA B20CW1-671C

Price Code 8N

Data Turnaround 45 Days

011

POSSIBLE SAMPLE HAZARDS/REMARKS

Special Handling and/or Storage

Preservation	None	None	Cool 4C	None	Cool 4C	None	Cool 4C	None		
Type of Container	sG	sG	sG	sG	sG	sG	sG	sG		
No. of Container(s)	1	1	1	1	1	1	1	1		
Volume	60mL	60mL	250mL	250mL	500mL	500mL	1000mL	1000mL		
SAMPLE ANALYSIS	Isotopic Uranium	Neptunium-237	VOA - 8260A (TCL); VOA - 8260A (Add-On) [1-Propanol, Ethanol]	pH (Soil) - 9045	Semi-VOA - 8270A (TCL); TPH-Diesel Range - WTPH-D, PCBs - 8082	See item (1) in Special Instructions.	See item (2) in Special Instructions.	See item (3) in Special Instructions.		

Sample No.	Matrix *	Sample Date	Sample Time										
80W692	Soil	8/25/99	08:45			X	X	X	X	X		DOW569	

CHAIN OF POSSESSION — Sign/Print Names

Relinquished By	Date/Time	Received By	Date/Time
Brent Porter	8/25/99/1410	Peter JB	8/25/99/1410
Peter J-B	8-26-99 0800	R. Fohlberg / R. Fohlberg	8-26-99 0800
R. Fohlberg / R. Fohlberg	8-26-99 1400	FED EX	
FED EX	8-27-99/0930	D. Amaro	8-27-99/0930

SPECIAL INSTRUCTIONS

See chain of custody comments on SAF B99-078.

(1) ICP Metals - 6010A (Supertrace) [Arsenic, Barium, Beryllium, Cadmium, Chromium, Copper, Lead, Nickel, Selenium, Silver, Vanadium, Zinc]; Mercury - 7471 - (CV); Chromium Hex - 7196
(2) NO2/NO3 - 353.1; IC Anions - 300.0 [Chloride, Fluoride, Nitrate, Nitrite, Phosphate, Sulfate]; Sulfides - 9030; Ammonia - 350.3; Total Cyanide - 9010
(3) Gamma Spectroscopy [Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155]; Gamma Spec - Add-on [Americium-241]; Strontium-89,90 -- Total Sr; Total Uranium [Uranium]; Isotopic Plutonium; Isotopic Thorium [Thorium-232]; Americium-241

COLLECTOR UNAVAILABLE TO SIGN COC.

Matrix *
Soil
Water
Vapor
Other Solid
Other Liquid

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

000028

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	B99-078-88	Page 1 of 1

Collector: Bowers/Porter/Nielson	Company Contact: Chris Cearlock — Telephone No.: 372-9574	Project Coordinator: TRENT, SJ	Price Code: 8N — Data Turnaround: 45 Days
Project Designation: 200 Area Source characterization - 200-CW-1 OU	Sampling Location: GP-2 >15' bgs 24'-25'	SAF No.: B99-078	
Ice Chest No.: ERC 96-051	Field Logbook No.: EL-1511	Method of Shipment: Federal Express	
Shipped To: ~~TMA~~/RECRA	Offsite Property No.: NA A990230	Bill of Lading/Air Bill No.: 4235 7952 8750	
	RE 8-26-99	COA B20CW1 671C	

POSSIBLE SAMPLE HAZARDS/REMARKS											
	Preservation	None	None	None	None	None	Cool 4C	None	Cool 4C	None	Cool 4C
	Type of Container	sG	sG	sG	sG	sG	sG	sG	sG	sG	sG
Special Handling and/or Storage	No. of Container(s)	1	1	1	1	1	1	1	1	1	1
	Volume	60mL	60mL	60mL	60mL	120mL	250mL	250mL	500mL	500mL	1000mL
SAMPLE ANALYSIS		Isotopic Uranium	Neptunium-237	Nickel-63	Technetium-99	Tritium - H3	VOA - 8260A (TCL); VOA - 8260A (Add-On) (1-Propanol, Ethanol)	pH (Soil) - 9045	Semi-VOA - 8270A (TCL); TPH-Diesel Range - WTPH-D; PCBs - 8082	See item (1) in Special Instructions.	See item (2) in Special Instructions.
Sample No.	Matrix * / Sample Date / Sample Time										
B0W6B1	Soil / 8/25/99 / 11:18						X	X	X	X	X
									Bowsm		

CHAIN OF POSSESSION	Sign/Print Names		
Relinquished By: Brent Porter — Date/Time: 8/25/99/1410	Received By: Refer JB — Date/Time: 8/25/99/1410		
Relinquished By: Ref J.B — Date/Time: 8-26-99 0800	Received By: R. Fahlberg / R. Fahlberg — Date/Time: 8-26-99 0800		
Relinquished By: R. Fahlberg / R. Fahlberg — Date/Time: 8-26-99 1400	Received By: Fed Ex — Date/Time:		
Relinquished By: Fed Ex — Date/Time: 8-27-99/0930	Received By: [signature] — Date/Time: 8-27-99/0930		
LABORATORY SECTION	Received By	Title	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

SPECIAL INSTRUCTIONS

See chain of custody comments on SAF B99-078.

(1) ICP Metals - 6010A (Supertrace) (Arsenic, Barium, Beryllium, Cadmium, Chromium, Copper, Lead, Nickel, Selenium, Silver, Vanadium, Zinc); Mercury - 7471 - (CV); Chromium Hex - 7196

(2) NO2/NO3 - 353.1; IC Anions - 300.0 (Chloride, Fluoride, Nitrate, Nitrite, Phosphate, Sulfate); Sulfides - 9030; Ammonia - 350.3; Total Cyanide - 9010

collector not available to sign COC

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

000019

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	B99-078-80	Page 1 of 1

Collector Bowers/Porter/Nielson	Company Contact Chris Cearlock	Telephone No. 372-9574	Project Coordinator TRENT, SJ
Project Designation 200 Area Source characterization - 200-CW-1 OU	Sampling Location GP-2 <15' bgs 12.5'-13.1'		SAF No. B99-078
Ice Chest No. ERC-96-051	Field Logbook No. EL-1511		Method of Shipment Federal Express
Shipped To ~~TMA~~/RECRA 8-26-99	Offsite Property No. A990230		Bill of Lading/Air Bill No. 4235 7952 8750
			COA B20CW1 671C

Price Code 8N

Data Turnaround 45 Days

POSSIBLE SAMPLE HAZARDS/REMARKS

Special Handling and/or Storage

Preservation	None	None	Cool 4C	None	Cool 4C	None	Cool 4C	None		
Type of Container	sG	sG	sG	sG	sG	sG	sG	sG		
No. of Container(s)	1	1	1	1	1	1	1	1		
Volume	60mL	60mL	250mL	250mL	500mL	500mL	1000mL	1000mL		
SAMPLE ANALYSIS	Isotopic Uranium	Neptunium-237	VOA - 8260A (TCL); VOA - 8260A (Add-On) (1-Propanol, Ethanol)	pH (Soil) - 9045	Semi-VOA - 8270A (TCL); TPH-Diesel Range - WTPH-D; PCBs - 8082	See item (1) in Special Instructions.	See item (2) in Special Instructions.	See item (3) in Special Instructions.		

Sample No.	Matrix *	Sample Date	Sample Time										
B0W693	Soil	8/25/99	09:09			X	X	X	X	X		Bowers	

CHAIN OF POSSESSION — Sign/Print Names

Relinquished By	Date/Time	Received By	Date/Time
Brent Porter	8/25/99/1410	Peter JB	8/25/99/1410
Peter JB	8-26-99 0800	R. Felling / R. Felling	8-26-99 0800
R. Felling / R. Felling	8-26-99 1400	Fed Ex	
Fed Ex	8-27-99/0930	[illegible]	8-27-99/0930

SPECIAL INSTRUCTIONS

See chain of custody comments on SAF B99-078.

(1) ICP Metals - 6010A (Supertrace) (Arsenic, Barium, Beryllium, Cadmium, Chromium, Copper, Lead, Nickel, Selenium, Silver, Vanadium, Zinc); Mercury - 7471 - (CV); Chromium Hex - 7196
(2) NO2/NO3 - 353.1; IC Anions - 300.0 (Chloride, Fluoride, Nitrate, Nitrite, Phosphate, Sulfate); Sulfides - 9030; Ammonia - 350.3; Total Cyanide - 9010
(3) Gamma Spectroscopy (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155); Gamma Spec - Add-on (Americium-241); Strontium-89,90 -- Total Sr; Total Uranium (Uranium); Isotopic Plutonium; Isotopic Thorium (Thorium-232); Americium-241

collector not available to sign COC

Matrix *
Soil
Water
Vapor
Other Solid
Other Liquid

LABORATORY SECTION — Received By — Title — Date/Time

FINAL SAMPLE DISPOSITION — Disposal Method — Disposed By — Date/Time

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	B99-078-85	Page 1 of 21

Collector: Bowers/Porter/Nielson	Company Contact: Chris Cearlock	Telephone No.: 372-9574	Project Coordinator: TRENT, SJ
Project Designation: 200 Area Source characterization - 200-CW-1 OU	Sampling Location: GP-2 >15' bgs 17.5 - 18.5		SAF No.: B99-078
Ice Chest No.: ERC 96-051	Field Logbook No.: EL-1511		Method of Shipment: Federal Express
Shipped To: ~~IMA~~ RECRA	Offsite Property No.: A990230		Bill of Lading/Air Bill No.: 4235 7952 8750
			COA: B20CW1 + B20CW1 67IC

Price Code: 8N

Data Turnaround: 45 Days

POSSIBLE SAMPLE HAZARDS/REMARKS										
Preservation	None	None	None	None	None	Cool 4C	None	Cool 4C	None	Cool 4C
Type of Container	sG	sG	sG	sG	sG	sG	sG	sG	sG	sG
No. of Container(s)	1	1	1	1	1	1	1	1	1	1
Volume	60mL	60mL	60mL	60mL	120mL	250mL	250mL	500mL	500mL	1000mL
SAMPLE ANALYSIS	Isotopic Uranium	Neptunium-237	Nickel-63	Technetium-99	Tritium - H3	VOA - 8260A (TCL); VOA - 8260A (Add-On) [1-Propanol, Ethanol]	pH (Soil) - 9045	Semi-VOA - 8270A (TCL); TPH-Diesel Range - WTPH-D; PCBs - 8082	See item (1) in Special Instructions.	See item (2) in Special Instructions.

Special Handling and/or Storage

Sample No.	Matrix *	Sample Date	Sample Time										
B0W698	Soil	8/25/99	10:32						X	X	X	X	X
												00051	

08

120001

CHAIN OF POSSESSION	Sign/Print Names	Date/Time
Relinquished By: Brent Porter	Received By: Peter JB	8/25/99 1440
Relinquished By: Peter J.B	Received By: R.Fahlberg / R.Fahlberg	8-26-99 0800
Relinquished By: R.Fahlberg / R.Fahlberg	Received By: Fed Ex	8-26-99 1400
Relinquished By: Fed Ex	Received By: D. Johnson	8-27-99 0930

SPECIAL INSTRUCTIONS

See chain of custody comments on SAF B99-078.

(1) ICP Metals - 6010A (Supertrace) [Arsenic, Barium, Beryllium, Cadmium, Chromium, Copper, Lead, Nickel, Selenium, Silver, Vanadium, Zinc]; Mercury - 7471 - (CV); Chromium Hex - 7196

(2) NO2/NO3 - 353.1; IC Anions - 300.0 (Chloride, Fluoride, Nitrate, Nitrite, Phosphate, Sulfate); Sulfides - 9030; Ammonia - 350.3; Total Cyanide - 9010

collector not available to sign cox

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

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

014

Appendix 5

Data Validation Supporting Documentation

PESTICIDE/PCB DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: 200-CW-1			DATA PACKAGE: H0506		
VALIDATOR: TLI		LAB: Recra		DATE: 12/20/99	
CASE:			SDG: H050		
ANALYSES PERFORMED					
☐ CLP3/90	☐ SW-846 8080	☐ SW-846 8081	☒ 8082	☐	☐
SAMPLES/MATRIX B0W680 B0W699 B0W697 B0W694					
B0W692 B0W681 B0W693 B0W688					

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? . . . . . Yes No N/A

Are laboratory 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:

5. ACCURACY

Were surrogates analyzed? . . . . . Yes No N/A

Are surrogate recoveries acceptable? . . . . . Yes No N/A

Were MS/MSD samples analyzed? . . . . . Yes No N/A

Are MS/MSD results acceptable? . . . . . Yes No N/A

Were LCS samples analyzed? . . . . . Yes No N/A

Are LCS results acceptable? . . . . . Yes No 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:

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:

Date: 21 January 2000
To: Bechtel Hanford Inc. (technical representative)
From: TechLaw, Inc.
Project: 200 Area Source Characterization - 200-CW-1 Operable Unit
Subject: Inorganics - Data Package No. H0506-RLN (SDG No. H0506)

INTRODUCTION

This memo presents the results of data validation on Data Package No. H0506-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	Media	Validation	Analysis
B0W6B0	8/25/99	Soil	C	See note 1
B0W6B1	8/25/99	Soil	C	See note 1
B0W692	8/25/99	Soil	C	See note 1
B0W693	8/25/99	Soil	C	See note 1
B0W694	8/25/99	Soil	C	See note 1
B0W697	8/25/99	Soil	C	See note 1
B0W698	8/25/99	Soil	C	See note 1
B0W699	8/25/99	Soil	C	See note 1

1- ICP metals by 6010B; mercury by 7471A.

Data validation was conducted in accordance with the BHI validation statement of work and the *200-CW-1 Operable Unit RI/FS Work Plan and 216-B-3 RCRA TSD Unit Sampling Plan*, DOE/RL-99-07, Draft B. 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 for mercury and ICP 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 ICP metals and 28 days for mercury.

All holding times were acceptable.

- **Blanks**

Preparation Blanks

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

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

All preparation blank results were acceptable.

- **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 25% 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.

Due to a matrix spike recovery of 66%, all nickel results were qualified as estimates and flagged "J".

Due to a matrix spike percent recovery of 54%, all antimony results were qualified as estimates and flagged "J".

All other 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".

Due to an RPD of 94%, all nickel results were qualified as estimates and flagged "J".

All other laboratory duplicate results were acceptable.

- **Analytical Detection Levels**

Reported analytical detection levels are compared against the to ensure that laboratory detection levels meet the required criteria. All reported laboratory detection levels met the analyte specific PQL.

- **Completeness**

Data package No. H0506 was submitted for validation and verified for completeness. The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

Due to a matrix spike recovery of 66%, all nickel results were qualified as estimates and flagged "J". Due to a matrix spike percent recovery of 54%, all antimony results were qualified as estimates and flagged "J". Due to an RPD of 94%, all nickel results were qualified as estimates and flagged "J". Data flagged "J" is an estimate, but under the BHI validation SOW, the data may be usable for decision-making purposes. All other validated results are considered accurate within the standard error associated with the methods.

REFERENCES

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

DOE/RL-99-07, Draft B, *200-CW-1 Operable Unit RI/FS Work Plan and 216-B-3 RCRA TSD Unit Sampling Plan*.

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: H0506	REVIEWER: TLI	DATE: 1/21/00	PAGE 1 OF 1
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Nickel	J	All	MS recovery
Antimony	J	All	MS recovery
Nickel	J	All	RPD

Appendix 3

Qualified Data Summary and Annotated Laboratory Reports

INORGANIC ANALYSIS, SOIL MATRIX, MG/KG

Project: BECHTEL-HANFORD																	
Laboratory: Recra LabNet																	
Case	SDG: H0506																
Sample Number		B0W692		B0W693		B0W694		B0W697		B0W698		B0W699		B0W6B0		B0W6B1	
Location		GP-2		GP-2		GP-2		GP-2		GP-2		GP-2		GP-2		GP-2	
Remarks																	
Sample Date		08/25/99		08/25/99		08/25/99		08/25/99		08/25/99		08/25/99		08/25/99		08/25/99	
Inorganics	CRDL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Silver	2	0.11	U	0.10	U	0.13	U	0.09	U	0.08	U	0.08	U	0.09	U	0.08	U
Arsenic	1	1.9		2.0		7.6		3.0		2.5		2.9		1.7		3.2	
Barium	1	73.7		73.2		115		80.3		38.6		55.3		47.7		44.3	
Beryllium	0.2	0.13		0.19		0.21		0.18		0.13		0.18		0.12		0.15	
Cadmium	0.04	0.51		0.50		1.7		0.22		0.08		0.07		0.09		0.08	
Chromium	1	8.3		8.4		24.3		5.9		3.6		4.8		6.3		5.5	
Copper	2	15.3		15.2		58.8		14.7		13.2		12.3		10.4		12.3	
Mercury	0.05	0.02	U	0.02		0.24		0.02	U	0.01	U	0.02	U	0.02	U	0.01	U
Nickel	4	7.4	J	8.4	J	11.3	J	8.7	J	7.3	J	6.5	J	15.9	J	6.7	J
Lead	20	5.5		5.7		35.5		4.5		2.8		3.5		2.7		2.9	
Antimony		0.24	J	0.52	J	1.0	J	0.30	J	0.40	J	0.40	J	0.25	J	0.26	J
Selenium	20	0.25	U	0.35	U	1.5		0.36	U	0.34	U	0.32	U	0.31	U	0.33	U
Thallium		0.74		0.58		1.7		0.68		0.74		0.68		0.81		0.76	
Vanadium	3	56.5		54.7		60.4		47.3		45.5		37.7		27.7		40.5	
Zinc	2	82.1		82.4		204		50.1		38.3		37.9		28.2		35.0	

000010

Recra LabNet - Lionville

INORGANICS DATA SUMMARY REPORT 11/11/99

CLIENT: TNU-HANFORD B99-078

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

RECRA LOT #: 9908L906

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
-001	B0W6B0	Silver, Total	0.09 u	MG/KG	0.09	1.0
		Arsenic, Total	1.7	MG/KG	0.28	1.0
		Barium, Total	47.7	MG/KG	0.03	1.0
		Beryllium, Total	0.12	MG/KG	0.009	1.0
		Cadmium, Total	0.09	MG/KG	0.03	1.0
		Chromium, Total	6.3	MG/KG	0.07	1.0
		Copper, Total	10.4	MG/KG	0.10	1.0
		Mercury, Total	0.02 u	MG/KG	0.02	1.0
		Nickel, Total	15.9 J	MG/KG	0.10	1.0
		Lead, Total	2.7	MG/KG	0.18	1.0
		Antimony, Total	0.25 J	MG/KG	0.21	1.0
		Selenium, Total	0.31 u	MG/KG	0.31	1.0
		Thallium, Total	0.81	MG/KG	0.45	1.0
		Vanadium, Total	27.7	MG/KG	0.05	1.0
		Zinc, Total	28.2	MG/KG	0.07	1.0
-002	B0W699	Silver, Total	0.08 u	MG/KG	0.08	1.0
		Arsenic, Total	2.9	MG/KG	0.29	1.0
		Barium, Total	55.3	MG/KG	0.03	1.0
		Beryllium, Total	0.18	MG/KG	0.008	1.0
		Cadmium, Total	0.07	MG/KG	0.03	1.0
		Chromium, Total	4.8	MG/KG	0.07	1.0
		Copper, Total	12.3	MG/KG	0.10	1.0
		Mercury, Total	0.02 u	MG/KG	0.02	1.0
		Nickel, Total	6.5 J	MG/KG	0.10	1.0
		Lead, Total	3.5	MG/KG	0.18	1.0
		Antimony, Total	0.40 J	MG/KG	0.22	1.0
		Selenium, Total	0.32 u	MG/KG	0.32	1.0
		Thallium, Total	0.68	MG/KG	0.46	1.0
		Vanadium, Total	37.7	MG/KG	0.05	1.0
		Zinc, Total	37.9	MG/KG	0.07	1.0

1/7/00

Recra LabNet - Lionville

INORGANICS DATA SUMMARY REPORT 11/11/99

CLIENT: TNU-HANFORD B99-078 RECRA LOT #: 9908L906

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

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
-003	B0W697	Silver, Total	0.09 u	MG/KG	0.09	1.0
		Arsenic, Total	3.0	MG/KG	0.32	1.0
		Barium, Total	80.3	MG/KG	0.03	1.0
		Beryllium, Total	0.18	MG/KG	0.009	1.0
		Cadmium, Total	0.22	MG/KG	0.03	1.0
		Chromium, Total	5.9	MG/KG	0.08	1.0
		Copper, Total	14.7	MG/KG	0.12	1.0
		Mercury, Total	0.02 u	MG/KG	0.02	1.0
		Nickel, Total	8.7 J	MG/KG	0.12	1.0
		Lead, Total	4.5	MG/KG	0.21	1.0
		Antimony, Total	0.30 J	MG/KG	0.24	1.0
		Selenium, Total	0.36 u	MG/KG	0.36	1.0
		Thallium, Total	0.68	MG/KG	0.52	1.0
		Vanadium, Total	47.3	MG/KG	0.06	1.0
		Zinc, Total	50.1	MG/KG	0.08	1.0
-004	B0W694	Silver, Total	0.13 u	MG/KG	0.13	1.0
		Arsenic, Total	7.6	MG/KG	0.45	1.0
		Barium, Total	115	MG/KG	0.04	1.0
		Beryllium, Total	0.21	MG/KG	0.01	1.0
		Cadmium, Total	1.7	MG/KG	0.04	1.0
		Chromium, Total	24.3	MG/KG	0.11	1.0
		Copper, Total	58.8	MG/KG	0.16	1.0
		Mercury, Total	0.24	MG/KG	0.02	1.0
		Nickel, Total	11.3 J	MG/KG	0.16	1.0
		Lead, Total	35.5	MG/KG	0.29	1.0
		Antimony, Total	1.0 J	MG/KG	0.34	1.0
		Selenium, Total	1.5	MG/KG	0.51	1.0
		Thallium, Total	1.7	MG/KG	0.73	1.0
		Vanadium, Total	60.4	MG/KG	0.08	1.0
		Zinc, Total	204	MG/KG	0.11	1.0

1/7/00

Recra LabNet - Lionville

INORGANICS DATA SUMMARY REPORT 11/11/99

CLIENT: TWU-HANFORD B99-078 RECRA LOT #: 9908L906

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

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
-005	B0W692	Silver, Total	0.11 u	MG/KG	0.11	1.0
		Arsenic, Total	1.9	MG/KG	0.23	1.0
		Barium, Total	73.7	MG/KG	0.02	1.0
		Beryllium, Total	0.13	MG/KG	0.01	1.0
		Cadmium, Total	0.51	MG/KG	0.02	1.0
		Chromium, Total	8.3	MG/KG	0.05	1.0
		Copper, Total	15.3	MG/KG	0.08	1.0
		Mercury, Total	0.02 u	MG/KG	0.02	1.0
		Nickel, Total	7.4 J	MG/KG	0.08	1.0
		Lead, Total	5.5	MG/KG	0.14	1.0
		Antimony, Total	0.24 J	MG/KG	0.17	1.0
		Selenium, Total	0.25 u	MG/KG	0.25	1.0
		Thallium, Total	0.74	MG/KG	0.36	1.0
		Vanadium, Total	56.5	MG/KG	0.04	1.0
		Zinc, Total	82.1	MG/KG	0.05	1.0
-006	B0W6B1	Silver, Total	0.08 u	MG/KG	0.08	1.0
		Arsenic, Total	3.2	MG/KG	0.29	1.0
		Barium, Total	44.3	MG/KG	0.03	1.0
		Beryllium, Total	0.15	MG/KG	0.008	1.0
		Cadmium, Total	0.08	MG/KG	0.03	1.0
		Chromium, Total	5.5	MG/KG	0.07	1.0
		Copper, Total	12.3	MG/KG	0.11	1.0
		Mercury, Total	0.01 u	MG/KG	0.01	1.0
		Nickel, Total	6.7 J	MG/KG	0.11	1.0
		Lead, Total	2.9	MG/KG	0.19	1.0
		Antimony, Total	0.26 J	MG/KG	0.22	1.0
		Selenium, Total	0.33 u	MG/KG	0.33	1.0
		Thallium, Total	0.76	MG/KG	0.47	1.0
		Vanadium, Total	40.5	MG/KG	0.05	1.0
		Zinc, Total	35.0	MG/KG	0.07	1.0

pr
1/7/00

007

Recra LabNet - Lionville

INORGANICS DATA SUMMARY REPORT 11/11/99

CLIENT: TMU-HANFORD B99-078

RECRA LOT #: 9908L906

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

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
-007	B0W693	Silver, Total	0.10 u	MG/KG	0.10	1.0
		Arsenic, Total	2.0	MG/KG	0.32	1.0
		Barium, Total	73.2	MG/KG	0.03	1.0
		Beryllium, Total	0.19	MG/KG	0.01	1.0
		Cadmium, Total	0.50	MG/KG	0.03	1.0
		Chromium, Total	8.4	MG/KG	0.08	1.0
		Copper, Total	15.2	MG/KG	0.12	1.0
		Mercury, Total	0.02	MG/KG	0.01	1.0
		Nickel, Total	8.4 J	MG/KG	0.12	1.0
		Lead, Total	5.7	MG/KG	0.20	1.0
		Antimony, Total	0.52 J	MG/KG	0.24	1.0
		Selenium, Total	0.35 u	MG/KG	0.35	1.0
		Thallium, Total	0.58	MG/KG	0.51	1.0
		Vanadium, Total	54.7	MG/KG	0.06	1.0
		Zinc, Total	82.4	MG/KG	0.08	1.0
-008	B0W698	Silver, Total	0.08 u	MG/KG	0.08	1.0
		Arsenic, Total	2.5	MG/KG	0.30	1.0
		Barium, Total	38.6	MG/KG	0.03	1.0
		Beryllium, Total	0.13	MG/KG	0.008	1.0
		Cadmium, Total	0.08	MG/KG	0.03	1.0
		Chromium, Total	3.6	MG/KG	0.07	1.0
		Copper, Total	13.2	MG/KG	0.11	1.0
		Mercury, Total	0.01 u	MG/KG	0.01	1.0
		Nickel, Total	7.3 J	MG/KG	0.11	1.0
		Lead, Total	2.8	MG/KG	0.19	1.0
		Antimony, Total	0.40 J	MG/KG	0.23	1.0
		Selenium, Total	0.34 u	MG/KG	0.34	1.0
		Thallium, Total	0.74	MG/KG	0.48	1.0
		Vanadium, Total	45.5	MG/KG	0.05	1.0
		Zinc, Total	38.3	MG/KG	0.07	1.0

1/7/00

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

RECRA
ENVIRONMENTAL
INC.
Chemical and Environmental Measurement Information

Recra LabNet Philadelphia
Analytical Report

Client : TNU-HANFORD B99-078
RFW# : 9908L906
SDG/SAF# : B99-078/H0506

W.O.# : 10985-001-001-9999-00
Date Received: 08-27-99

REVISION

METALS CASE NARRATIVE

This package has been revised to include the addition of Antimony and Thallium.

1. This narrative covers the analyses of 8 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. All cooler temperatures have been recorded on the Chain of Custody.

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

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

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

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

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

10. The matrix spike (MS) recoveries for 2 analytes were outside the 75-125% control limits. Refer to the Inorganics Accuracy Report.

The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage. All pages of this report are integral parts of the analytical data. Therefore, this report should only be reproduced in its entirety of 027 pages.

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

11. For analytes where the ICP MS is out-of-control, a post-digestion MS (PDS) and serial dilution are performed. A PDS was prepared at the following concentration level:

Sample ID	Element	PDS Concentration (ppb)	PDS % Recovery
B0W6B0	Nickel	500	105.6
	Antimony	500	103.6

12. The duplicate analyses for 5 analytes were outside the 20% Relative Percent Difference (RPD) control limits. Refer to the Inorganics Precision Report.

13. 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.

J. Michael Taylor
Vice President
Philadelphia Analytical Laboratory

11-11-99
Date

mld/m08-906r

Bechtel Hanford Inc.

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

B99-078-87

Collector: Bowers/Porter/Nielson	Company Contact: Chris Cearlock	Telephone No.: 372-9574	Project Coordinator: TRENT, SJ
Price Code: 8N	Data Turnaround: 45 Days		
Project Designation: 200 Area Source characterization - 200-CW-1 OU	Sampling Location: GP-2 >15' bgs 22'-23'		SAF No.: B99-078
Ice Chest No.: GWS 130	Field Logbook No.: EL-1511		Method of Shipment: Federal Express
Shipped To: TMA/RECRA 8.25.99	Offsite Property No.: A990230		Bill of Lading/Air Bill No.: 4235 7952 8749
			COA: B20CW1-671C

POSSIBLE SAMPLE HAZARDS/REMARKS

Special Handling and/or Storage

SAMPLE ANALYSIS												
Preservation				None	None	None	None	None	Cool 4C	None	Cool 4C	None	Cool 4C
Type of Container				sG	sG	sG	sG	sG	sG	sG	sG	sG	sG
No. of Container(s)				1	1	1	1	1	1	1	1	1	1
Volume				60mL	60mL	60mL	60mL	120mL	250mL	250mL	500mL	500mL	1000mL
				Isotopic Uranium	Neptunium-237	Nickel-63	Technetium-99	Tritium - H3	VOA - 8260A (TCL); VOA - 8260A (Add-On) (1-Propanol, Ethanol)	pH (Soil) - 9045	Semi-VOA - 8270A (TCL); TPH-Diesel Range - WTPH-D; PCBs - 8082	See item (1) in Special Instructions.	See item (2) in Special Instructions.
Sample No.	Matrix *	Sample Date	Sample Time										
B0W6B0	Soil	8/25/99	11:03						X	X	X	X	X
												Dow5M1	

SPECIAL INSTRUCTIONS

See chain of custody comments on SAF B99-078.

COLLECTOR UNAVAILABLE RESIGN COC

(1) ICP Metals - 6010A (Supertrace) (Arsenic, Barium, Beryllium, Cadmium, Chromium, Copper, Lead, Nickel, Selenium, Silver, Vanadium, Zinc); Mercury - 7471 - (CV); Chromium Hex - 7196

(2) NO2/NO3 - 353.1; IC Anions - 300.0 (Chloride, Fluoride, Nitrate, Nitrite, Phosphate, Sulfate); Sulfides - 9030; Total Cyanide - 9010

4235 7952 8758 4.2

4235 7952 8749 5.1

4476 5459 31 3.8

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

CHAIN OF POSSESSION	Sign/Print Names		
Relinquished By: Brent Porter	Date/Time: 8/25/99/1400	Received By: Peter JB	Date/Time: 8/25/99/1400
Relinquished By: RF61B	Date/Time: 8/26/99 11:00	Received By: CTRICE/Chris	Date/Time: 8/26/99 11:00
Relinquished By: CTRICE/Chris	Date/Time: 8/26/99 14:00	Received By: FEDEX	Date/Time:
Relinquished By: Fed Ex	Date/Time: 8.27.99/0930	Received By: D. Smith	Date/Time: 8.27.99/0930

Title

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

10000028

8/27/99

8/27/99

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	B99-078-86	Page 1 of 1

Collector: Bowers/Porter/Nielson	Company Contact: Chris Cearlock — Telephone No.: 372-9574	Project Coordinator: TRENT, SJ	Price Code: 8N — Data Turnaround: 45 Days
Project Designation: 200 Area Source characterization - 200-CW-1 OU	Sampling Location: GP-2 >15' bgs 20'-21'	SAF No.: B99-078	
Ice Chest No.: GWS 130	Field Logbook No.: EL-1511	Method of Shipment: Federal Express	
Shipped To: TMA/RECRA	Offsite Property No.: A990230	Bill of Lading/Air Bill No.: 4235 7952 8749	
		COA: B20CW1 671C	

POSSIBLE SAMPLE HAZARDS/REMARKS

Special Handling and/or Storage

Preservation	None	None	None	None	None	Cool 4C	None	Cool 4C	None	Cool 4C
Type of Container	sG	sG	sG	sG	sG	sG	sG	sG	sG	sG
No. of Container(s)	1	1	1	1	1	1	1	1	1	1
Volume	60mL	60mL	60mL	60mL	120mL	250mL	250mL	500mL	500mL	1000mL
SAMPLE ANALYSIS	Isotopic Uranium	Neptunium-237	Nickel-63	Technetium-99	Tritium - H3	VOA - 8260A (TCL); VOA - 8260A (Add-On) (1-Propanol, Ethanol)	pH (Soil) - 9045	Semi-VOA - 8270A (TCL), TPH-Diesel Range - WTPH-D, PCBs - 8082	See item (1) in Special Instructions.	See item (2) in Special Instructions

Sample No.	Matrix *	Sample Date	Sample Time	Isotopic Uranium	Neptunium-237	Nickel-63	Technetium-99	Tritium - H3	VOA - 8260A (TCL); VOA - 8260A (Add-On) (1-Propanol, Ethanol)	pH (Soil) - 9045	Semi-VOA - 8270A (TCL), TPH-Diesel Range - WTPH-D, PCBs - 8082	See item (1) in Special Instructions.	See item (2) in Special Instructions
B0W699	Soil	8/25/99	10:51						X	X	X	X	X
												Bowers	M

CHAIN OF POSSESSION — Sign/Print Names

Relinquished By	Date/Time	Received By	Date/Time
Brent Porter	8/25/99/1410	Peter JB	8/25/99/1410
RFB LB	8/26/99 11:00	CTRICE/Chris	8/26/99 11:00
CTRICE/Chris	8/26/99 14:00	FEDEX	
Fed Ex	8.27.99/0930	D. Smith	8.27.99/0930

SPECIAL INSTRUCTIONS

See chain of custody comments on SAF B99-078.

COLLECTOR UNAVAILABLE TO SIGN COC

(1) ICP Metals - 6010A (Supertrace) (Arsenic, Barium, Beryllium, Cadmium, Chromium, Copper, Lead, Nickel, Selenium, Silver, Vanadium, Zinc); Mercury - 7471 - (CV); Chromium Hex - 7196

(2) NO2/NO3 - 353.1; IC Anions - 300.0 (Chloride, Fluoride, Nitrate, Nitrite, Phosphate, Sulfate); Sulfides - 9030; Ammonia - 350.3; Total Cyanide - 9010

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

LABORATORY SECTION — Received By — Title — Date/Time

FINAL SAMPLE DISPOSITION — Disposal Method — Disposed By — Date/Time

B20000019

B20 9-27-99

Bechtel Hanford Inc.

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

B99-078-84

Page 1 of 1

Collector: Bowers/Porter/Nielson	Company Contact: Chris Cearlock	Telephone No.: 372-9574	Project Coordinator: TRENT, SJ
Price Code: 8N	Data Turnaround: 45 Days		
Project Designation: 200 Area Source characterization - 200-CW-1 OU	Sampling Location: GP-2 >15' bgs 15-16'	SAF No.: B99-078	
Ice Chest No.: GWS 130	Field Logbook No.: EL-1511	Method of Shipment: Federal Express	
Shipped To: ~~TMA/RECRA~~	Offsite Property No.: A990230	Bill of Lading/Air Bill No.: 4235 7952 8749	
		COA B20CW1 671C	

POSSIBLE SAMPLE HAZARDS/REMARKS											
	Preservation	None	None	None	None	None	Cool 4C	None	Cool 4C	None	Cool 4C
	Type of Container	sG	sG	sG	sG	sG	sG	sG	sG	sG	sG
	No. of Container(s)	1	1	1	1	1	1	1	1	1	1
Special Handling and/or Storage	Volume	60mL	60mL	60mL	60mL	120mL	250mL	250mL	500mL	500mL	1000mL
SAMPLE ANALYSIS		Isotopic Uranium	Neptunium-237	Nickel-63	Technetium-99	Tritium - H3	VOA - 8260A (TCL), VOA - 8260A (Add-On) (1-Propanol, Ethanol)	pH (Soil) - 9045	Semi-VOA - 8270A (TCL), TPH-Diesel Range - WTPH-D, PCBs - 8082	See item (1) in Special Instructions	See item (2) in Special Instructions
Sample No.	Matrix * / Sample Date / Sample Time										
B0W697	Soil / 8/25/99 / 10:04						X	X	X	X	X
										Dup #1	

CHAIN OF POSSESSION	Sign/Print Names		
Relinquished By: Brent Porter	Date/Time: 8/25/99/1410	Received By: Peter JB	Date/Time: 8/25/99/1410
Relinquished By: RFG 1B	Date/Time: 8/26/99 11:00	Received By: CTRICE/Chrice	Date/Time: 8/26/99 11:00
Relinquished By: CTRICE/Chrice	Date/Time: 8/26/99 14:00	Received By: FEDEX	Date/Time:
Relinquished By: Fed Ex	Date/Time: 8/27/99/0930	Received By: D. Johnson	Date/Time: 8/27/99/0930
LABORATORY SECTION	Received By:	Title:	Date/Time:
FINAL SAMPLE DISPOSITION	Disposal Method:	Disposed By:	Date/Time:

SPECIAL INSTRUCTIONS

See chain of custody comments on SAF B99-078.

COLLECTOR UNAVAILABLE TO SIGN COC

(1) ICP Metals - 6010A (Supertrace) (Arsenic, Barium, Beryllium, Cadmium, Chromium, Copper, Lead, Nickel, Selenium, Silver, Vanadium, Zinc); Mercury - 7471 - (CV); Chromium Hex - 7196

(2) NO2/NO3 - 353.1; IC Anions - 300.0 (Chloride, Fluoride, Nitrate, Nitrite, Phosphate, Sulfate); Sulfides - 9030; Ammonia - 350.3; Total Cyanide - 9010

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

0200003

0210

Bechtel Hanford Inc.

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

B99-078-81

Collector: Bowers/Porter/Nielson	Company Contact: Chris Cearlock	Telephone No.: 372-9574	Project Coordinator: TRENT, SJ
Price Code: 8N	Data Turnaround: 45 Days		
Project Designation: 200 Area Source characterization - 200-CW-1 OU	Sampling Location: GP-2 <15' bgs 14'-15'		SAF No.: B99-078
Ice Chest No.: EIC6-96059	Field Logbook No.: EL-1511		Method of Shipment: Federal Express
Shipped To: ~~TMA~~/RECRA D 8-25-99	Offsite Property No.: N/A		Bill of Lading/Air Bill No.: N/A
			COA: B20CW1 671C

POSSIBLE SAMPLE HAZARDS/REMARKS

Special Handling and/or Storage

Preservation	None	None	Cool 4C	None	Cool 4C	None	Cool 4C	None		
Type of Container	sG	sG	sG	sG	sG	sG	sG	sG		
No. of Container(s)	1	1	1	1	1	1	1	1		
Volume	60mL	60mL	250mL	250mL	500mL	500mL	1000mL	1000mL		
SAMPLE ANALYSIS	Isotopic Uranium	Neptunium-237	VOA - 8260A (TCL); VOA - 8260A (Add-On) (1-Propanol, Ethanol)	pH (Soil) - 9045	Semi-VOA - 8270A (TCL); TPH-Diesel Range - WTPH-D; PCBs - 8082	See item (1) in Special Instructions.	See item (2) in Special Instructions.	See item (3) in Special Instructions.		
Sample No. / Matrix * / Sample Date / Sample Time										
B0W694 / Soil / 8/25/99 / 09:26			X	X	X	X	X	X	Dow	Y2

CHAIN OF POSSESSION — Sign/Print Names

Relinquished By	Date/Time	Received By	Date/Time
Brent Porter	8/25/99/1410	Peter JB	8/25/99/1410
Relinquished By: B of L 1-B	Date/Time: 8-26-99 0800	Received By: R Fellows / R Fellows	Date/Time: 8-26-99 0800
Relinquished By: R Fellows / R Fellows	Date/Time: 8-26-99 1400	Received By: FedEx	Date/Time
Relinquished By: FedEx	Date/Time: 8-27-99/0930	Received By: D Smith	Date/Time: 8-27-99/0930

SPECIAL INSTRUCTIONS

See chain of custody comments on SAF B99-078.

(1) ICP Metals - 6010A (Supertrace) (Arsenic, Barium, Beryllium, Cadmium, Chromium, Copper, Lead, Nickel, Selenium, Silver, Vanadium, Zinc); Mercury - 7471 - (CV); Chromium Hex - 7196
(2) NO2/NO3 - 353.1; IC Anions - 300.0 (Chloride, Fluoride, Nitrate, Nitrite, Phosphate, Sulfate); Sulfides - 9030; Ammonia - 350.3; Total Cyanide - 9010
(3) Gamma Spectroscopy (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155); Gamma Spec - Add-on (Americium-241); Strontium-89,90 -- Total Sr; Total Uranium (Uranium); Isotopic Plutonium; Isotopic Thorium (Thorium-232); Americium-241

COLLECTOR UNAVAILABLE TO SIGN COC.

Matrix *
Soil
Water
Vapor
Other Solid
Other Liquid

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

04 000021

Bechtel Hanford Inc.

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

B99-078-79

Collector: Bowers/Porter/Nielson	Company Contact: Chris Cearlock	Telephone No.: 372-9574	Project Coordinator: TRENT, SJ
Price Code: 8N	Data Turnaround: 45 Days		
Project Designation: 200 Area Source characterization - 200-CW-1 OU	Sampling Location: GP-2 <15' bgs 10'-11'		SAF No.: B99-078
Ice Chest No.: ERC 96 059	Field Logbook No.: EL-1511		Method of Shipment: Federal Express
Shipped To: ~~TMA~~/RECRA B30 8-25-99	Offsite Property No.: N/A		Bill of Lading/Air Bill No.: N/A
			COA: B20CW1-671C

POSSIBLE SAMPLE HAZARDS/REMARKS											
	Preservation	None	None	Cool 4C	None	Cool 4C	None	Cool 4C	None		
	Type of Container	sG	sG	sG	sG	sG	sG	sG	sG		
	No. of Container(s)	1	1	1	1	1	1	1	1		
Special Handling and/or Storage	Volume	60mL	60mL	250mL	250mL	500mL	500mL	1000mL	1000mL		
SAMPLE ANALYSIS		Isotopic Uranium	Neptunium-237	VOA - 8260A (TCL); VOA - 8260A (Add-On) [1-Propanol, Ethanol]	pH (Soil) - 9045	Semi-VOA - 8270A (TCL); TPH-Diesel Range - ; WTPH-D; PCBs - 8082	See item (1) in Special Instructions.	See item (2) in Special Instructions.	See item (3) in Special Instructions		

Sample No.	Matrix *	Sample Date	Sample Time										
B0W692	Soil	8/25/99	08:45			X	X	X	X	X		D0W569	

05 000022

CHAIN OF POSSESSION — Sign/Print Names

Relinquished By	Date/Time	Received By	Date/Time
Brent Porter	8/25/99/1410	Refer JB	8/25/99/1410
Ref JB	8.26.99 0800	R. Fobelly / R. Fobelly	8.26.99 0800
R. Fobelly / R. Fobelly	8.26.99 1400	FED Ex	
FED Ex	8.27.99/0930	D. Amaro	8.27.99/0930

SPECIAL INSTRUCTIONS

See chain of custody comments on SAF B99-078.

(1) ICP Metals - 6010A (Supertrace) (Arsenic, Barium, Beryllium, Cadmium, Chromium, Copper, Lead, Nickel, Selenium, Silver, Vanadium, Zinc); Mercury - 7471 - (CV); Chromium Hex - 7196
(2) NO2/NO3 - 353.1; IC Anions - 300.0 (Chloride, Fluoride, Nitrate, Nitrite, Phosphate, Sulfate); Sulfides - 9030; Ammonia - 350.3; Total Cyanide - 9010
(3) Gamma Spectroscopy (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155); Gamma Spec - Add-on (Americium-241); Strontium-89,90 -- Total Sr; Total Uranium (Uranium); Isotopic Plutonium; Isotopic Thorium (Thorium-232); Americium-241

COLLECTOR UNAVAILABLE TO SIGN COC.

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

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

Bechtel Hanford Inc.

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

B99-078-88

Collector: Bowers/Porter/Nielson	Company Contact: Chris Cearlock	Telephone No.: 372-9574	Project Coordinator: TRENT, SJ
Project Designation: 200 Area Source characterization - 200-CW-1 OU	Sampling Location: GP-2 >15' bgs 24'-25'		SAF No.: B99-078
Ice Chest No.: EBC 96-051	Field Logbook No.: EL-1511		Method of Shipment: Federal Express
Shipped To: ~~TMA/RECRA~~ 8.25.99	Offsite Property No.: ~~NA~~ A990230 RE 8-26-99		Bill of Lading/Air Bill No.: 4235 7952 8750
			COA B20CW1 671C

Price Code: 8N

Data Turnaround: 45 Days

POSSIBLE SAMPLE HAZARDS/REMARKS

Special Handling and/or Storage

Preservation	None	None	None	None	None	Cool 4C	None	Cool 4C	None	Cool 4C
Type of Container	aG	aG	aG	aG	aG	aG	aG	aG	aG	aG
No. of Container(s)	1	1	1	1	1	1	1	1	1	1
Volume	60mL	60mL	60mL	60mL	120mL	250mL	250mL	500mL	500mL	1000mL
SAMPLE ANALYSIS	Isotopic Uranium	Neptunium-237	Nickel-63	Technetium-99	Tritium - H3	VOA - 8260A (TCL); VOA - 8260A (Add-On) (1-Propanol, Ethanol)	pH (Soil) - 9045	Semi-VOA - 8270A (TCL); TPH-Diesel Range - WTPH-D; PCBs - 8082	See item (1) in Special Instructions	See item (2) in Special Instructions
Sample No. / Matrix * / Sample Date / Sample Time										
B0W6B1 / Soil / 8/25/99 / 11:18						X	X	X	X	X
								Bow-M		

CHAIN OF POSSESSION	Sign/Print Names	Date/Time
Relinquished By: Brent Porter		8/25/99/1410
Received By: Refer JB		8/25/99/1410
Relinquished By: Ref 1.B		8.26.99 0800
Received By: R. Fobley / R. Fahlman		8.26.99 0800
Relinquished By: R. Fobley / R. Fahlman		8-26-99 1400
Received By: Fed Ex		
Relinquished By: Fed Ex		8.27.99/0930
Received By: [signature]		8.27.99/0930

SPECIAL INSTRUCTIONS

See chain of custody comments on SAF B99-078.

(1) ICP Metals - 6010A (Supertrace) [Arsenic, Barium, Beryllium, Cadmium, Chromium, Copper, Lead, Nickel, Selenium, Silver, Vanadium, Zinc]; Mercury - 7471 - (CV); Chromium Hex - 7196

(2) NO2/NO3 - 353.1; IC Anions - 300.0 [Chloride, Fluoride, Nitrate, Nitrite, Phosphate, Sulfate]; Sulfides - 9030; Ammonia - 350.3; Total Cyanide - 9010

collector not available to sign COC

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

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

06 000023

Bechtel Hanford Inc.

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

B99-078-80

Collector: Bowers/Porter/Nielson	Company Contact: Chris Cearlock	Telephone No.: 372-9574	Project Coordinator: TRENT, SJ
Price Code: 8N	Data Turnaround: 45 Days		
Project Designation: 200 Area Source characterization - 200-CW-1 OU	Sampling Location: GP-2 <15' bgs 12.5'-13.5'	SAF No.: B99-078	
Ice Chest No.: ERC-96-051	Field Logbook No.: EL-1511	Method of Shipment: Federal Express	
Shipped To: ~~TMA~~/RECRA ~~DOE-RL~~	Offsite Property No.: A990230	Bill of Lading/Air Bill No.: 4235 7952 8750	
		COA: B20CW1 671C	

POSSIBLE SAMPLE HAZARDS/REMARKS

Special Handling and/or Storage

Preservation	None	None	Cool 4C	None	Cool 4C	None	Cool 4C	None		
Type of Container	sG	sG	sG	sG	sG	sG	sG	sG		
No. of Container(s)	1	1	1	1	1	1	1	1		
Volume	60mL	60mL	250mL	250mL	500mL	500mL	1000mL	1000mL		
SAMPLE ANALYSIS	Isotopic Uranium	Neptunium-237	VOA - 8260A (TCL); VOA - 8260A (Add-On) (1-Propanol, Ethanol)	pH (Soil) - 9045	Semi-VOA - 8270A (TCL); TPH-Diesel Range - ; WTPH-D; PCBs - 8082	See item (1) in Special Instructions.	See item (2) in Special Instructions.	See item (3) in Special Instructions.		

Sample No.	Matrix *	Sample Date	Sample Time										
B0W693	Soil	8/25/99	09:09			X	X	X	X	X		Bowers	40

07 000023

CHAIN OF POSSESSION — Sign/Print Names

Relinquished By	Date/Time	Received By	Date/Time
Brent Porter	8/25/99/1410	Peter JB	8/25/99/1410
Peter JB	8.26.99 0800	R. Felly / R. Felly	8.26.99 0800
R. Felly / R. Felly	8.26.99 1400	Fed Ex	
Fed Ex	8.27.99/0930	[signature]	8.27.99/0930

SPECIAL INSTRUCTIONS

See chain of custody comments on SAF B99-078.

(1) ICP Metals - 6010A (Supertrace) (Arsenic, Barium, Beryllium, Cadmium, Chromium, Copper, Lead, Nickel, Selenium, Silver, Vanadium, Zinc); Mercury - 7471 - (CV); Chromium Hex - 7196
(2) NO2/NO3 - 353.1; IC Anions - 300.0 (Chloride, Fluoride, Nitrate, Nitrite, Phosphate, Sulfate); Sulfides - 9030; Ammonia - 350.3; Total Cyanide - 9010
(3) Gamma Spectroscopy (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155); Gamma Spec - Add-on (Americium-241); Strontium-89,90 -- Total Sr; Total Uranium (Uranium); Isotopic Plutonium; Isotopic Thorium (Thorium-232); Americium-241

collector not available to sign COC

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

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

SAF #

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

B99-078-85

8 21 8-25-99

Collector: Bowers/Porter/Nielson	Company Contact: Chris Cearlock	Telephone No.: 372-9574	Project Coordinator: TRENT, SJ
Price Code: 8N	Data Turnaround: 45 Days		
Project Designation: 200 Area Source characterization - 200-CW-1 OU	Sampling Location: GP-2 >15' bgs 17.5 - 18.5		SAF No.: B99-078
Ice Chest No.: ERC 96-051	Field Logbook No.: EL-1511		Method of Shipment: Federal Express
Shipped To: ~~IMA~~/RECRA 8 21 8-25-99	Offsite Property No.: A990230		Bill of Lading/Air Bill No.: 4235 7952 8750
			COA BZ0GW + BZ0CW1 671C

POSSIBLE SAMPLE HAZARDS/REMARKS

Special Handling and/or Storage

Preservation	None	None	None	None	None	Cool 4C	None	Cool 4C	None	Cool 4C
Type of Container	sG	sG	sG	sG	sG	sG	sG	sG	sG	sG
No. of Container(s)	1	1	1	1	1	1	1	1	1	1
Volume	60mL	60mL	60mL	60mL	120mL	250mL	250mL	500mL	500mL	1000mL
SAMPLE ANALYSIS	Isotopic Uranium	Neptunium-237	Nickel-63	Technetium-99	Tritium - H3	VOA - 8260A (TCL), VOA - 8260A (Add-On) [1-Propanol, Ethanol]	pH (Soil) - 9045	Semi-VOA - 8270A (TCL); TPH-Diesel Range - WTPH-D; PCBs - 8082	See item (1) in Special Instructions.	See item (2) in Special Instructions.

Sample No.	Matrix *	Sample Date	Sample Time										
B0W698	Soil	8/25/99	10:32						X	X	X	X	X
												00025	

08

00025

CHAIN OF POSSESSION	Sign/Print Names	Date/Time
Relinquished By	Brent Porter	8/25/99 1410
Received By	Peter IB	8/25/99 1410
Relinquished By	Peter I.B	8-26-99 0800
Received By	R. Fahlberg / R. Fahlberg	8-26-99 0800
Relinquished By	R. Fahlberg / R. Fahlberg	8-26-99 1400
Received By	Fed Ex	
Relinquished By	Fed Ex	8-27-99 0930
Received By	D. Ajmitz	8-27-99 0930

SPECIAL INSTRUCTIONS

See chain of custody comments on SAF B99-078.

(1) ICP Metals - 6010A (Supertrace) [Arsenic, Barium, Beryllium, Cadmium, Chromium, Copper, Lead, Nickel, Selenium, Silver, Vanadium, Zinc]; Mercury - 7471 - (CV); Chromium Hex - 7196

(2) NO2/NO3 - 353.1; IC Anions - 300.0 [Chloride, Fluoride, Nitrate, Nitrite, Phosphate, Sulfate]; Sulfides - 9030; Ammonia - 350.3; Total Cyanide - 9010

collector not available to sign coc

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

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

2 of 2

Appendix 5

Data Validation Supporting Documentation

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: 200-CW-1			DATA PACKAGE: H0506		
VALIDATOR: TLI		LAB: RCCRA		DATE: 12/20/99	
CASE:			SDG: H0506		
ANALYSES PERFORMED					
☐ CLP/ICP	☐ CLP/GFAA	☐ CLP/Hg	☐ CLP/Cyanide	☐	☐
☑ SW-846/ICP	☐ SW-846/GFAA	☑ SW-846/Hg	☐ SW-846 Cyanide	☐	☐
SAMPLES/MATRIX	B0W692	B0W693	B0W694	B0W697	
	B0W698	B0W699	B0W680	B0W681	
					soil

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

Is technical verification documentation present? . . . . . Yes No (N/A)

Is a case narrative present? . . . . . (Yes) No N/A

Comments:

2. HOLDING TIMES

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

Comments:

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

3. INSTRUMENT PERFORMANCE AND CALIBRATIONS

Were initial calibrations performed on all instruments? . . . . Yes No N/A
Are initial calibrations acceptable? . . . . . Yes No N/A
Are ICP interference checks acceptable? . . . . . Yes No N/A
Were ICV and CCV checks performed on all instruments? . . . . . Yes No N/A
Are ICV and CCV checks acceptable? . . . . . Yes No N/A

Comments:

4. BLANKS

Were ICB and CCB checks performed for all applicable analyses? Yes No N/A
Are ICB and CCB results acceptable? . . . . . Yes No N/A
Were preparation blanks analyzed? . . . . . Yes No N/A
Are preparation blank results acceptable? . . . . . Yes No N/A
Were field/trip blanks analyzed? . . . . . Yes No N/A
Are field/trip blank results acceptable? . . . . . Yes No N/A

Comments:

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: J nickel 66.3%
J antimony 54%

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: nickel J 94 % RPD

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:

Recra LabNet - Lionville

INORGANICS ACCURACY REPORT 11/11/99

CLIENT: TNU-HANFORD B99-078

RECRA LOT #: 9908L906

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

SAMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	INITIAL RESULT	SPIKED AMOUNT	%RECOV	DILUTION FACTOR(SPK)
-001	B0W6B0	Silver, Total	4.5	0.09u	4.9	91.8	1.0
		Arsenic, Total	159	1.7	166	94.6	1.0
		Barium, Total	205	47.7	166	94.6	1.0
		Beryllium, Total	4.5	0.12	4.9	89.4	1.0
		Cadmium, Total	3.9	0.09	4.2	90.7	1.0
		Chromium, Total	20.3	6.3	16.6	84.3	1.0
		Copper, Total	30.3	10.4	20.8	95.7	1.0
		Mercury, Total	0.16	0.02u	0.16	100	1.0
		Nickel, Total	43.5	15.9	41.6	66.3	1.0
		Lead, Total	41.7	2.7	41.6	93.8	1.0
		Antimony, Total	22.7	0.25	41.6	54.0	1.0
		Selenium, Total	154	0.31u	166	92.7	1.0
		Thallium, Total	160	0.81	166	95.7	1.0
		Vanadium, Total	68.3	27.7	41.6	97.6	1.0
		Zinc, Total	65.4	28.2	41.6	89.4	1.0

AHR

Recra LabNet - Lionville

INORGANICS PRECISION REPORT 11/11/99

CLIENT: TMU-HANFORD B99-078 RECRA LOT #: 9908L906

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

SAMPLE	SITE ID	ANALYTE	INITIAL RESULT	REPLICATE	RPD	DILUTION FACTOR(REP)
-001REP	B0W6B0	Silver, Total	0.09u	0.08u	NC	1.0
		Arsenic, Total	1.7	1.8	5.7	1.0
		Barium, Total	47.7	45.8	4.1	1.0
		Beryllium, Total	0.12	0.15	20.9	1.0
		Cadmium, Total	0.09	0.05	52.2	1.0
		Chromium, Total	6.3	5.1	21.1	1.0
		Copper, Total	10.4	10.6	1.9	1.0
		Mercury, Total	0.02u	0.01u	NC	1.0
		Nickel, Total	15.9	5.7	94.4	1.0
		Lead, Total	2.7	2.5	7.7	1.0
		Antimony, Total	0.25	0.24	3.8	1.0
		Selenium, Total	0.31u	0.33u	NC	1.0
		Thallium, Total	0.81	0.65	21.5	1.0
		Vanadium, Total	27.7	23.4	16.8	1.0
		Zinc, Total	28.2	27.7	1.8	1.0

OHZ

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

facsimile transmittal

To: Bruce Christian Fax: 375-5151

From: Jeanette Duncan Date: 2/3/99

Re: Pages:

CC:

☐ Quick Turn / Priority Data ☐ Final Data Package

Bruce — Here are the tables that Rich just talked to you about on 200-CW-1

Jeanette

File with Claudes comments— validator provided wrong project data requirements.

200-CW-1

Table A2-2. Analytical Performance Requirements - Deep Zone Soils. (2 Pages)

Data Type	Analytical Method	Analyte	Preliminary Action Level		Detection Limit Requirements		Accuracy Required	Precision Required
					MDL	PQL		
Chem	EPA 8260	Acetone	175	80	0.05	0.01	70-130	±30
Organic Chemicals, in mg/kg								
Data Type	Analytical Method	Analyte	Preliminary Action Level		Detection Limit Requirements		Accuracy Required	Precision Required
			Meth C[b]	Meth B	MDL	PQL		
Chem	EPA 8260	1-Butanol (butyl alcohol)	350	160	0.4	1	70-130	±30
Chem	EPA 8260	2-butanone (MEK)	105	48	0.005	0.01	70-130	±30
Chem	EPA 8260 as TIC	Butylated hydroxy toluene	N/A	N/A	N/A	N/A	N/A	N/A
Chem	EPA 8260	Carbon tetrachloride	0.337	0.0337	0.001	0.005	70-130	±30
Chem	EPA 8260	Chloroform (trichloromethane)	7.17	0.717	0.001	0.005	70-130	±30
Chem	EPA 8260 as TIC	Decane	N/A	N/A	N/A	N/A	N/A	N/A
Chem	EPA 8260	Dichloromethane (methylene chloride)	0.5	0.5	0.002	0.005	70-130	±30
Chem	EPA 8260 as TIC	Ethanol	N/A	N/A	N/A	N/A	70-130	±30
Chem	EPA 8260	Halogenated hydrocarbons	N/A	N/A	0.002	0.005	70-130	±30
Chem	EPA 8260 as TIC	Propanol (isopropyl alcohol)	N/A	N/A	N/A	N/A	N/A	N/A
Chem	EPA 8260	Toluene	100	100	0.001	0.005	70-130	±30
Chem	EPA 8270	Tributyl phosphate	N/A	N/A	0.4	4	70-130	±30
Chem	EPA 8260	1,1,1-trichloroethane	20	20	0.001	0.005	70-130	±30
Chem	EPA 8260	1,1,2-trichloroethane	0.3	0.0768	0.001	0.005	70-130	±30
Chem	EPA 8080/8082	Polychlorinated biphenyls (PCBs)	66[g]	0.5[g]	0.01	0.1	70-130	±30
Chem	NWTPH-Dx modified for kerosene range	Kerosene, normal paraffin hydrocarbon, paraffin, hydrocarbons, shell E-2342 (napthalene and paraffin), soltrol-170 ($C_{10}H_{22}$ to $C_{16}H_{34}$), purified kerosene, diesel fuel	N/A	N/A	0.5	5	70-130	±30

NOTE: Detection limits in this table are based on optimal conditions. Interferences and different matrices may significantly degrade the values shown.

Dangerous waste generation is not expected at this OU (a contained-in determination is expected for listed waste hydrazine). If generated, the concentrations of any underlying hazardous constituents will be evaluated against applicable regulatory requirements.

α = alpha analysis
γ = gamma analysis
N/A = not applicable

[a] AmAEA, PuAEA, UAEA, NpAEA, ThAEA - chemical separation, electro/microprecipitation deposition, alpha energy analysis via Si barrier detector.
[b] Method C values are based on MTCA industrial standards.
[c] Based on Hanford Site background values.
[d] First value shown is via routine ICP, second value via "trace" ICP or graphite furnace atomic absorption.
[e] The RESRAD model for the 100 Area remedial design/remedial action or 100-N Area corrective measures study predicts that this constituent will not reach groundwater in 1000 years. It is anticipated that the same will be true in the 200 Areas.
[f] Based on Federal ambient water quality criteria and assumed dilution-attenuation factor of 2.
[g] *The lead value is based on the IEUBK model from EPA (EPA 1994c).*
[h] Ammonia dissolves in the environment and is assumed to not reach groundwater.
[i] Method is from EPA (1984).
[j] There are no preliminary action levels for radionuclides at this time. They will be developed in the remedial investigation/feasibility study
GeLi = lithium-drifted germanium detector
HPGe = high-purity germanium
KPA = kinetic phosphorescence analysis

200-CW-1

Table A2-2. Analytical Performance Requirements - Deep Zone Soils. (2 Pages)

Data Type	Analytical Method	Analyte	Preliminary Action Level	Detection Limit Requirements		Accuracy Required	Precision Required
				MDL	PQL		
Radionuclides, in pCi/g							
Rad, α	GeLi/HPGe AmAEA[a]	Americium-241	[j]	0.1 0.1	1 1	80-120 70-130	±30 ±30
Rad, γ	GeLi/HPGe	Cesium-137	[j]	0.05	0.1	80-120	±30
Rad, γ	GeLi/HPGe	Cobalt-60	[j]	0.05	0.1	80-120	±30
Rad, γ	GeLi//HPGe	Europium-152	[j]	0.1	0.2	80-120	±30
Rad, γ	GeLi/HPGe	Europium-154	[j]	0.1	0.2	80-120	±30
Rad, γ	GeLi/HPGe	Europium-155	[j]	0.05	0.1	80-120	±30
Rad, α	NpAEA[a]	Neptunium-237	[j]	0.1	1	70-130	±30
Rad	Chem Separation Liq Scintillation	Nickel-63	[j]	5	30	70-130	±30
Rad, α	PuAEA[a]	Plutonium-238	[j]	0.1	1	70-130	±30
Rad, α	PuAEA[a]	Plutonium-239/240	[j]	0.1	1	70-130	±30
Rad	RADSr	Radiogenic strontium	[j]	0.2	1	70-130	±30
Rad	Chem Separation Liq Scintillation	Technetium-99	[j]	5	15	70-130	±30
Rad	Distillation Liq Separation	Tritium	[j]	5	400	70-130	±30
Rad, α	ThAEA[a]	Thorium-232	[j]	0.1	1	70-130	±30
Rad	KPA	Total uranium	[j]	0.2 mg/kg	1 mg/kg	70-130	±30
Rad, α	UAEA[a]	Uranium-233/234	[j]	0.1	1	70-130	±30
Rad		Uranium-235/236	[j]	0.1	1	70-130	±30
Rad		Uranium-238	[j]	0.1	1	70-130	±30
Inorganic Chemicals, in mg/kg							
Data Type	Analytical Method	Analyte	Preliminary Action Level		Detection Limit Requirements		Accuracy Required	Precision Required
			Meth C[b]	Meth B	MDL	PQL		
Chem	EPA 6010	Arsenic	6.5[c]	6.5[c]	2.5/0.2[d]	10/1[d]	70-130	±30
Chem	EPA 6010	Barium	245[e]	132[c,e]	0.1	1	70-130	±30
Chem	EPA 6010	Beryllium	1.51[c]	1.51[c]	0.03	0.2	70-130	±30
Chem	EPA 6010	Cadmium	0.17[c,f]	0.17[c,f]	0.3/0.02[d]	0.8/0.04[d]	70-130	±30
Chem	EPA 6010	Chromium (III)	36[e]	36[e]	0.4	1	70-130	±30
Chem	EPA 7196	Hexavalent chromium	8.0[f]	17.5[f]	0.1	0.7	70-130	±30
Chem	EPA 6010	Copper	130[e]	59.2[e]	0.5	2	70-130	±30
Chem	EPA 6010	Lead	353[c,g]	353[c,g]	3	20	70-130	± 30
Chem	EPA 7471	Mercury	0.33[c,e]	0.33[c,e]	0.005	0.05	70-130	±30
Chem	EPA 6010	Nickel	70[e]	32[e]	1	4	70-130	±30
Chem	EPA 6010	Selenium	5[e]	5[e]	5	20	70-130	±30
Chem	EPA 6010	Silver	10[e]	8[e]	0.7	2	70-130	±30
Chem	EPA 6010	Vanadium	24.5[e]	11.2[e]	0.5	3	70-130	±30
Chem	EPA 6010	Zinc	500[e]	480[e]	0.5	2	70-130	±30
Chem	EPA 305.1	Ammonia	59,500[h]	27,200[h]	0.2	0.5	70-130	±30
Chem	EPA 9010	Cyanide	2.6[f]	2.6[f]	0.25	1	70-130	±30
Chem	EPA 300.0	Fluoride	200	96	0.2	1	70-130	±30
Chem	IC 300 modified and 353.1[i]	Nitrate	4,400	4,400	0.02	0.2	70-130	±30
Chem	IC 300 modified and 353.1[i]	Nitrite	330	330	0.2	1	70-130	±30
Chem	EPA 300.0	Sulfate	25,000	25,000	2	10	70-130	±30
Chem	EPA 300.0	Phosphate	N/A[e]	N/A[e]	0.6	6	70-130	±30
Chem	EPA 300.0	Chloride	25,000	25,000	0.2	2	70-130	±30
Chem	EPA 9030	Sulfide	N/A	N/A	4	20	70-130	±30
Chem	EPA 9045	pH	N/A	N/A	N/A	N/A	70-130	±30

Review Comment Record (RCR)

1. Date	2. Review No.
2/03/00	BHI/QA0013
3. Project	4. Page
200-CW-1	Page 1 of 1

5. Document Number(s)/Title(s)	6. Program/Project/ Building Number	7. Reviewer	8. Organization/Group	9. Location/Phone
SDG No. H0506	200 Area Source Characterization – 200-CW-1 Operable Unit	Claude Stacey	BHI/QA	H0-16/372-9208

17. Comment Submittal Approval:

Organization Manager (Optional) _____ Date _____

10. Agreement with indicated comment disposition(s)

Reviewer/Point of Contact _____ Date _____

Author/Originator _____

11. CLOSED

Reviewer/Point of Contact _____ Date _____

Author/Originator _____

12. Item	13. Comment(s)/Discrepancy(s) (Provide technical justification for the comment and detailed recommendation of the action required to correct/ resolve the discrepancy/problem indicated.)	14. Hold Point	15. Disposition (Provide justification if NOT accepted.)	16. Status
	General Comment: None of the packages had the supporting documentation for the qualifiers. The validation procedures calls to include submittal of copies data validation supporting documentation as part of the validation package. This would include missed hold time information, out of criteria matrix spike, duplication data, LCS data, etc.			
1	PCB: Page 010, indicates the CRDL to be 0.1 with the heading indicating the units to be UG/KG. The CRDL for PCB should be 100 UG/KG. This would also change the conclusion that the laboratory exceeded the detection limits on page 003 and 004.			
2	PCB: Page 002, Matrix Spike indicates the control limits to be 50 to 150%; whereas, the project document (DOE?RL 99-07) specifies the control limits to be 70 to 130%.			
3	PCB: Page 003, Precision indicates the specified RPD to be 35%; whereas, the project documents (DOE/RL 99-07) specifies the RPD acceptance limit to be ±30%.			
4	Radiochemistry: Page 003 top of page for accuracy specifies the matrix spike recovery range is 70 to 130%. This should read matrix spike recovery range is 70 to 130% or 80 to 120%, since the isotopes determined by GeLi/HPGe recovery range is 80 to 120 % as specified in the project documents.			
5	Radiochemistry: Page 003 indicates that Np to be qualified as "J" because			

Review Comment Record (RCR)

1. Date	2. Review No.
2/03/00	BHI/QA0013
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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
	the tracer recovery was 23%; however, above it states the acceptable range for tracer recovery is 20 to 105%. It would appear that tracer for Np falls in this range and should not be qualified.			
6	Radiochemistry: Page 003, Precision indicates acceptable RPD to be 35%; whereas, project documents has acceptance for precision to be 30%.			
7	Radiochemistry: Page 11 the required detection limits for Co-60, Eu-152 and 154 are in different then those specified by the project. Co-60 should be 0.1, Eu-152 and 154 should be 0.2. With these changes the isotopes listed on pages 004 and 005 will need reviewed.			
8	Wet Chemistry: Page 002, Accuracy has the matrix recovery acceptance limits as 75 to 125%; whereas, the project requirements are 70 to 130% recovery.			
9	Wet Chemistry: Page 003, Precision has the RPD limits as ±35%; whereas, the project requirements are ±30% RPD.			
10	Wet Chemistry: Page 010 does not indicate a CRDL for Cr-VI. Project PQL for Cr-VI is 0.7 MG/KG. This would make the laboratory DL for sample B0W694 above the project PQL.			
11	Volatiles: The detection limits listed on page 011 do not meet the project PQL on the majority of the compounds.			
12	Semi-Volatiles: Page 001 in the table listing the samples under sample ID it list a sample B0W6B7, this should be B0W697.			
	Semi-Volatiles: Again the accuracy and precision acceptance criteria do not reflect project requirements.			
	Semi-Volatiles: Project documents call for the determination of tri-butyl phosphate; however, it was no analyzed for by the laboratory and no mention of the lack of tri-butyl phosphate in the validation package.			
	Inorganics: Again the accuracy and precision acceptance criteria do not reflect project requirements.			
	Inorganics: Page 010 the heading at the top of the page indicates the units for the data is in UG/KG; whereas, the laboratory data sheets indicate the data is in MG/KG.			
	Inorganics: The validation report indicates the laboratory detection limit for mercury was exceeded for six of the samples. Reviewing the laboratory			

Review Comment Record (RCR)

1. Date	2. Review No.
2/03/00	BHI/QA0013
3. Project	**4. Page**
200-CW-1	Page 3 of 1

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
	detection limits of 0.02 would indicate that they met the projects PQL of 0.05.			
	Inorganic: Page 010 most of the CRDL listed are not what the project required.			
	It would appear that the validator either do not have the project specific data requirements or the wrong project data requirements were used for the validation.			

Validation Package Review – 200-CW-1 Packages - RL Weiss

Package H0509 – No comments

Package H0534 – No comments

Package H0590 – No comments except

Semivolatile, Pg. 4 & 5, "Analytical Detection Levels"; Wording should be that all non-detects failed to meet detection limits specified by the CRDL. See wording in similar sections of H0506 & H0534.

already corrected – corrections on

RCW 5/10/2000

Review Comment Record (RCR)

1. Date	2. Review No.
2/03/00	BHI/QA0013
3. Project	**4. Page**
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5. Document Number(s)/Title(s)	6. Program/Project/ Building Number	7. Reviewer	8. Organization/Group	9. Location/Phone
SDG No. H0506	200 Area Source Characterization – 200-CW-1 Operable Unit	Claude Stacey	BHI/QA	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 — Author/Originator

Date

Reviewer/Point of Contact — Author/Originator

12. Item	13. Comment(s)/Discrepancy(s) (Provide technical justification for the comment and detailed recommendation of the action required to correct/ resolve the discrepancy/problem indicated.)	14. Hold Point	15. Disposition (Provide justification if NOT accepted.)	16. Status
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1	PCB: Page 010, indicates the CRDL to be 0.1 with the heading indicating the units to be UG/KG. The CRDL for PCB should be 100 UG/KG. This would also change the conclusion that the laboratory exceeded the detection limits on page 003 and 004.		Corrected	
2	PCB: Page 002, Matrix Spike indicates the control limits to be 50 to 150%; whereas, the project document (DOE?RL 99-07) specifies the control limits to be 70 to 130%.		Corrected per new guidelines	
3	PCB: Page 003, Precision indicates the specified RPD to be 35%; whereas, the project documents (DOE/RL 99-07) specifies the RPD acceptance limit to be ±30%.		Corrected per new guidelines	
4	Radiochemistry: Page 003 top of page for accuracy specifies the matrix spike recovery range is 70 to 130%. This should read matrix spike recovery range is 70 to 130% or 80 to 120%, since the isotopes determined by GeLi/HPGe recovery range is 80 to 120 % as specified in the project documents.		Corrected per new guidelines	
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2/03/00	BHI/QA0013
3. Project	**4. Page**
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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
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7	Radiochemistry: Page 11 the required detection limits for Co-60, Eu-152 and 154 are in different then those specified by the project. Co-60 should be 0.1, Eu-152 and 154 should be 0.2. With these changes the isotopes listed on pages 004 and 005 will need reviewed.		corrected per new guidelines	—
8	Wet Chemistry: Page 002, Accuracy has the matrix recovery acceptance limits as 75 to 125%; whereas, the project requirements are 70 to 130% recovery.		corrected per new guidelines	—
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12	Semi-Volatiles: Page 001 in the table listing the samples under sample ID it list a sample B0W6B7, this should be B0W697.		corrected	
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	Semi-Volatiles: Project documents call for the determination of tri-butyl phosphate; however, it was no analyzed for by the laboratory and no mention of the lack of tri-butyl phosphate in the validation package.		Rich Wiess resolution	
	Inorganics: Again the accuracy and precision acceptance criteria do not reflect project requirements.		corrected per new guidelines	—
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3. Project	**4. Page**
200-CW-1	Page 3 of 1

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200-CW-1	Page 1 of 3

5. Document Number(s)/Title(s)	6. Program/Project/ Building Number	7. Reviewer	8. Organization/Group	9. Location/Phone
SDG No. H0506	200 Area Source Characterization – 200-CW-1 Operable Unit	Claude Stacey	BHI/QA	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: 3/15/00 — 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
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✓1	PCB: Page 010, indicates the CRDL to be 0.1 with the heading indicating the units to be UG/KG. The CRDL for PCB should be 100 UG/KG. This would also change the conclusion that the laboratory exceeded the detection limits on page 003 and 004.		Corrected	
✓2	PCB: Page 002, Matrix Spike indicates the control limits to be 50 to 150%; whereas, the project document (DOE?RL 99-07) specifies the control limits to be 70 to 130%.		Corrected per new guidelines	
✓3	PCB: Page 003, Precision indicates the specified RPD to be 35%; whereas, the project documents (DOE/RL 99-07) specifies the RPD acceptance limit to be ±30%.		Corrected per new guidelines	
✓4	Radiochemistry: Page 003 top of page for accuracy specifies the matrix spike recovery range is 70 to 130%. This should read matrix spike recovery range is 70 to 130% or 80 to 120%, since the isotopes determined by GeLi/HPGe recovery range is 80 to 120 % as specified in the project documents.		Corrected per new guidelines	
✓5	Radiochemistry: Page 003 indicates that Np to be qualified as "J" because		KE 2/11/00	

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200-CW-1	Page 2 of 3

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15	Inorganics: Again the accuracy and precision acceptance criteria do not reflect project requirements.		corrected per new guidelines	—
* 16	Inorganics: Page 010 the heading at the top of the page indicates the units for the data is in UG/KG; whereas, the laboratory data sheets indicate the data is in MG/KG.		corrected OK Not Corrected (G)	
17	Inorganics: The validation report indicates the laboratory detection limit for mercury was exceeded for six of the samples. Reviewing the laboratory			

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2/03/00	BHI/QA0013
3. Project	**4. Page**
200-CW-1	Page 3 of 3

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	detection limits of 0.02 would indicate that they met the projects PQL of 0.05.		Corrected	
	Inorganic: Page 010 most of the CRDL listed are not what the project required.		corrected per new guideline	
	It would appear that the validator either do not have the project specific data requirements or the wrong project data requirements were used for the validation.			

New Item's

PCB's, pg 04, Completeness indicates Data Package No H0534-RLN. ✓
this should be Data Package H0506-RLN.

* Inorganic: - Item 16 on page 2 of RCR was not corrected. ✓

FAX

TECHLAW, INC.

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

To: Jeanette Duncan

From: Bruce Christian

Pages: 1

Date: 10 January 2000

Information Request

110506 - Rad

Two americium-241 samples (B0W692 and B0WB30) were prepared and analyzed 7 days after the rest of the SDG and will be qualified as estimates and flagged "J"

784#Kloov/#Vxlwh#56

Ulfkodqg/#ZD#__685
83_06:80899:
83_06:808484# + ld§,

To: Jeanette Duncan

From: Bruce Christian

Pages: 1

Date: 10 January 2000

Information Request

110506 - Rad

The chain of custody for all 8 samples calls for isotopic uranium and total uranium, but the lab only analyzed B0W694 for isotopic uranium. The sample summary call for both. Was a change made or did the lab make a mistake.

FAX

TECHLAW, INC.

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

To: Jeanette Duncan

From: Bruce Christian

Pages: 1

Date: 5 January 2000

Information Request

H0506 - Rad

Due to the LCS not being conducted with the SDG (or prepared with them), the total uranium results in all samples will be qualified as estimates and flagged "J".

FAX

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

To: Jeanette Duncan

From: Bruce Christian

Pages: 1

Date: 5 January 2000

Information Request

H0506 - Rad

Due to the LCS not being conducted with the SDG (or prepared with them), the total uranium results in all samples will be qualified as estimates and flagged "J".

FAX

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

To: Jeanette Duncan

From: Bruce Christian

Pages: 1

Date: 5 January 2000

Information Request

H0506 - Rad

Due to the LCS and blank analysis not being conducted with the SDG (or prepared with them), the americium-241(aspec) results in samples B0W692 and B0W6B0 will be qualified as estimates and flagged "J".

FAX

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

To: Jeanette Duncan

From: Bruce Christian

Pages: 1

Date: 5 January 2000

Information Request

H0506 - Rad

Due to the LCS and blank analysis not being conducted with the SDG (or prepared with them), the americium-241(aspec) results in samples B0W692 and B0W6B0 will be qualified as estimates and flagged "J".

Duncan, Jeanette M

From: Todd, Mary E
Sent: Wednesday, March 15, 2000 1:18 PM
To: Duncan, Jeanette M
Subject: validation reports

Jeanette,

We do not have any comments on the validation packages. We will support the comments from Rich.

Thanks

Mary & Chris

FAX

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

To: Jeanette Duncan

From: Bruce Christian

Pages: 1

Date: 20 December 1999

Information Request

H0534 & H0505-PCB 502

What values do you want me to use for CRDLs??
~~No indication of a matrixspike for 3H & C-14~~

DL Requirements table attached

RJM 1-18-00

Table A2-2. Analytical Performance Requirements - Deep Zone Soils. (2 Pages)

Data Type	Analytical Method	Analyte	Preliminary Action Level	Detection Limit Requirements		Accuracy Required	Precision Required
				MDL	PQL		
Radionuclides, in pCi/g							
Rad, α	GeLi/HPGe AmAEA[a]	Americium-241	[j]	0.1 0.1	1 1	80-120 70-130	±30 ±30
Rad, γ	GeLi/HPGe	Cesium-137	[j]	0.05	0.1	80-120	±30
Rad, γ	GeLi/HPGe	Cobalt-60	[j]	0.05	0.1	80-120	±30
Rad, γ	GeLi/HPGe	Europium-152	[j]	0.1	0.2	80-120	±30
Rad, γ	GeLi/HPGe	Europium-154	[j]	0.1	0.2	80-120	±30
Rad, γ	GeLi/HPGe	Europium-155	[j]	0.05	0.1	80-120	±30
Rad, α	NpAEA[a]	Neptunium-237	[j]	0.1	1	70-130	±30
Rad	Chem Separation Liq Scintillation	Nickel-63	[j]	5	30	70-130	±30
Rad, α	PuAEA[a]	Plutonium-238	[j]	0.1	1	70-130	±30
Rad, α	PuAEA[a]	Plutonium-239/240	[j]	0.1	1	70-130	±30
Rad	RADSr	Radiogenic strontium	[j]	0.2	1	70-130	±30
Rad	Chem Separation Liq Scintillation	Technetium-99	[j]	5	15	70-130	±30
Rad	Distillation Liq Separation	Tritium	[j]	5	400	70-130	±30
Rad, α	ThAEA[a]	Thorium-232	[j]	0.1	1	70-130	±30
Rad	KPA	Total uranium	[j]	0.2 mg/kg	1 mg/kg	70-130	±30
Rad, α	UAEA[a]	Uranium-233/234	[j]	0.1	1	70-130	±30
Rad		Uranium-235/236	[j]	0.1	1	70-130	±30
Rad		Uranium-238	[j]	0.1	1	70-130	±30
Inorganic Chemicals, in mg/kg							
Data Type	Analytical Method	Analyte	Preliminary Action Level		Detection Limit Requirements		Accuracy Required	Precision Required
			Meth C[b]	Meth B	MDL	PQL		
Chem	EPA 6010	Arsenic	6.5[c]	6.5[c]	2.5/0.2[d]	10/1[d]	70-130	±30
Chem	EPA 6010	Barium	245[e]	132[d,e]	0.1	1	70-130	±30
Chem	EPA 6010	Beryllium	1.51[f]	1.51[f]	0.03	0.2	70-130	±30
Chem	EPA 6010	Cadmium	0.17[c,f]	0.17[c,f]	0.3/0.02[d]	0.8/0.04[d]	70-130	±30
Chem	EPA 6010	Chromium (III)	36[g]	36[g]	0.4	1	70-130	±30
Chem	EPA 7196	Hexavalent chromium	8.0[i]	17.5[f]	0.1	0.7	70-130	±30
Chem	EPA 6010	Copper	130[g]	59.2[g]	0.5	2	70-130	±30
Chem	EPA 6010	Lead	353[c,g]	353[c,g]	3	20	70-130	± 30
Chem	EPA 7471	Mercury	0.33[c,g]	0.33[c,g]	0.005	0.05	70-130	±30
Chem	EPA 6010	Nickel	70[g]	32[g]	1	4	70-130	±30
Chem	EPA 6010	Selenium	5[g]	5[g]	5	20	70-130	±30
Chem	EPA 6010	Silver	10[g]	8[g]	0.7	2	70-130	±30
Chem	EPA 6010	Vanadium	24.5[g]	11.2[g]	0.5	3	70-130	±30
Chem	EPA 6010	Zinc	500[g]	480[g]	0.5	2	70-130	±30
Chem	EPA 305.1	Ammonia	59,500[h]	27,200[h]	0.2	0.5	70-130	±30
Chem	EPA 9010	Cyanide	2.6[i]	2.6[i]	0.25	1	70-130	±30
Chem	EPA 300.0	Fluoride	200	96	0.2	1	70-130	±30
Chem	IC 300 modified and 353.1[i]	Nitrate	4,400	4,400	0.02	0.2	70-130	±30
Chem	IC 300 modified and 353.1[i]	Nitrite	330	330	0.2	1	70-130	±30
Chem	EPA 300.0	Sulfate	25,000	25,000	2	10	70-130	±30
Chem	EPA 300.0	Phosphate	N/A[e]	N/A[e]	0.6	6	70-130	±30
Chem	EPA 300.0	Chloride	25,000	25,000	0.2	2	70-130	±30
Chem	EPA 9030	Sulfide	N/A	N/A	4	20	70-130	±30
Chem	EPA 9045	pH	N/A	N/A	N/A	N/A	70-130	±30

Table A2-2. Analytical Performance Requirements - Deep Zone Soils. (2 Pages)

Data Type	Analytical Method	Analyte	Preliminary Action Level		Detection Limit Requirements		Accuracy Required	Precision Required
					MDL	PQL		
Chem	EPA 8260	Acetone	175	80	0.05	0.01	70-130	±30
Organic Chemicals, in mg/kg								
Data Type	Analytical Method	Analyte	Preliminary Action Level		Detection Limit Requirements		Accuracy Required	Precision Required
			Meth C[a]	Meth B	MDL	PQL		
Chem	EPA 8260	1-Butanol (butyl alcohol)	350	160	0.4	1	70-130	±30
Chem	EPA 8260	2-butanone (MEK)	105	48	0.005	0.01	70-130	±30
Chem	EPA 8260 as TIC	Butylated hydroxy toluene	N/A	N/A	N/A	N/A	N/A	N/A
Chem	EPA 8260	Carbon tetrachloride	0.337	0.0337	0.001	0.005	70-130	±30
Chem	EPA 8260	Chloroform (trichloromethane)	7.17	0.717	0.001	0.005	70-130	±30
Chem	EPA 8260 as TIC	Decane	N/A	N/A	N/A	N/A	N/A	N/A
Chem	EPA 8260	Dichloromethane (methylene chloride)	0.5	0.5	0.002	0.005	70-130	±30
Chem	EPA 8260 as TIC	Ethanol	N/A	N/A	N/A	N/A	70-130	±30
Chem	EPA 8260	Halogenated hydrocarbons	N/A	N/A	0.002	0.005	70-130	±30
Chem	EPA 8260 as TIC	Propanol (isopropyl alcohol)	N/A	N/A	N/A	N/A	N/A	N/A
Chem	EPA 8260	Toluene	100	100	0.001	0.005	70-130	±30
Chem	EPA 8270	Tributyl phosphate	N/A	N/A	0.4	4	70-130	±30
Chem	EPA 8260	1,1,1-trichloroethane	20	20	0.001	0.005	70-130	±30
Chem	EPA 8260	1,1,2-trichloroethane	0.3	0.0768	0.001	0.005	70-130	±30
Chem	EPA 8080/8082	Polychlorinated biphenyls (PCBs)	66[e]	0.5[g]	0.01	0.1	70-130	±30
Chem	NWTPH-Dx modified for kerosene range	Kerosene, normal paraffin hydrocarbon, paraffin, hydrocarbons, shell E-2342 (napthalene and paraffin), soltrol-170 ($C_{10}H_{22}$ to $C_{16}H_{34}$), purified kerosene, diesel fuel	N/A	N/A	0.5	5	70-130	±30

NOTE: Detection limits in this table are based on optimal conditions. Interferences and different matrices may significantly degrade the values shown.
Dangerous waste generation is not expected at this OU (a contained-in determination is expected for listed waste hydrazine). If generated, the concentrations of any underlying hazardous constituents will be evaluated against applicable regulatory requirements.
α = alpha analysis
γ = gamma analysis
N/A = not applicable
[a] AmAEA, PuAEA, UAEA, NpAEA, ThAEA - chemical separation, electro/microprecipitation deposition, alpha energy analysis via Si barrier detector.
[b] Method C values are based on MTCA industrial standards.
[c] Based on Hanford Site background values.
[d] First value shown is via routine ICP, second value via "trace" ICP or graphite furnace atomic absorption.
[e] The RESRAD model for the 100 Area remedial design/remedial action or 100-N Area corrective measures study predicts that this constituent will not reach groundwater in 1000 years. It is anticipated that the same will be true in the 200 Areas.
[f] Based on Federal ambient water quality criteria and assumed dilution-attenuation factor of 2.
[g] The lead value is based on the IEUBK model from EPA (EPA 1994c).
[h] Ammonia dissolves in the environment and is assumed to not reach groundwater.
[i] Method is from EPA (1984).
[j] There are no preliminary action levels for radionuclides at this time. They will be developed in the remedial investigation/feasibility study
GeLi = lithium-drifted germanium detector
HPGe = high-purity germanium
KPA = kinetic phosphorescence analysis

Data Package	IR	
H0472	Rad MS *	
H0475	Rad MS *	
H0473	Rad MS *	
H0538	Rad MS *	
	Rad - New Form 1s list liquid versus solid matrix	
H0542	Rad MS *	
H0544	Rad MS *	
	Metals - Case narrative states that only 1 sample was	
	analyzed (two were analyzed)	
H0551	Rad MS *	
H0514	CR VI - Method of analysis not identified	
H0506	Samples not listed in VSR	
	Rad MS *	
	Alcohols - Surrogate not run? ◻	
H0534	Samples not listed in VSR	
	Was nickel, 3H and TC-99 analysis to be conducted	
	on samples BR0, BR1, BR2, BR4?	
	Rad MS *	
	PCBs - What do you want for CRDLs	
	alcohols - no surrogate?	
	MS/MSD for VOA	

L BR0, BR1, BR2 + BR4 - Case narrative ~~gives~~ states that the associated MS/MSD is the one for the other samples in the SDG - But they were not run together.

Bruce
Proceed with validation for all "Rad MS" issues identified above (*) and with missing alcohol surrogates (◻) identified above

Robert Weiss
1-4-00

FAX

TECHLAW, INC.

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

To: Jeanette Duncan

From: Bruce Christian

Pages: 1

Date: 20 December 1999

Information Request

H0506

The samples are not listed in the VSR.

Duncan, Jeanette M

From: Kessner, Joan H
Sent: Wednesday, December 22, 1999 7:54 AM
To: 'orlette'
Cc: Duncan, Jeanette M
Subject: validation help

Orlette---
Good morning. I need some help answering our validators questions (usually Rich does this and knows if the requests make sense or not----so if the requests are of a "goat" nature just consider the source.....)

- H0544 (metals): The case narrative states incorrectly that only one sample was analyzed. Please correct the case narrative and resubmit. (One thing our other lab has started to do is put a revised call out in the case narrative discussing what change was made and why----is that something you could do when these kind of questions come up?? From our perspective it is really helpful.)
- H0506 (alcohols): No surrogate information is present. Were surrogates run? (Guidelines call for them.....this is what my validator thinks I don't have a clue.)
- H0534 (alcohols): No surrogate information is present.....
- H0534 (voa): The case narrative for samples BOWBR0, BOWBR2 and BOWBR4 states that the MS/MSD is associated with a different lot number (the other samples in the SDG). This is unlikely since the analysis were conducted several days apart (see pages 11 and 13). Are the analysis dates wrong or the other MS/MSD data?? I have not a clue about this.....

I hope this makes senses. Please let me know when you think we will get the answers.....
Have a great holiday!!
Joan

FAX

TECHLAW, INC.

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

To: Jeanette Duncan

From: Bruce Christian

Pages: 1

Date: 17 December 1999

Information Request

110506

The samples are not listed in the VSR.

784#Kloov/#Vxlwh#56

Ulfkodqg/#ZD#__685
83_06:80899:
83_06:808484#+Id§,

To: Jeanette Duncan

From: Bruce Christian

Pages: 1

Date: 10 January 2000

Information Request

H0506 - Rad

The chain of custody for all 8 samples calls for isotopic uranium and total uranium, but the lab only analyzed B0W694 for isotopic uranium. The sample summary call for both. Was a change made or did the lab make a mistake.

Lab was instructed to hold U-ISO analyses pending reporting of U-Total Results. U-ISO was only requested for B0W694 in this SDG other U-ISO requests will be cancelled

KLW 1-18-00

784#Kloov/#Vxlwh#56

Ulfkodqg/#ZD#__685
83_06:80899:
83_06:808484#+id§,

To: Jeanette Duncan

From: Bruce Christian

Pages: 1

Date: 10 January 2000

Information Request

H0506 - Rad

The chain of custody for all 8 samples calls for isotopic uranium and total uranium, but the lab only analyzed B0W694 for isotopic uranium. The sample summary call for both. Was a change made or did the lab make a mistake.

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

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

BHI Sample Management

Fax

To:	Bruce Christian	**From:**	Jeanette Duncan
Fax:	375-5151	**Pages:**	3
Phone:		**Date:**	12/20/99
Re:		**CC:**	

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

• **Comments:**

Bruce — this should take care of the missing QC info from sample summary on H0506 + H0534. Let me know if it doesn't — Jeanette

Note - 100 sample taken at Gable Mt. Test Pits (need some additional QA/QC samples)

Sample ID	Type	Location
B0W679	EQ	GP-3
B0W8W0	EQ	GP-8
B0W9P1	EQ	GP-12
B0WCP8	EQ	B8758
B0WLM4	EQ	BP-3
B0WLM3	EQ	BP-1
B0WNX3	EQ	TP-2
B0WNX1	EQ	TP-1
B0WNX7	EQ	BP-7
B0WNX9	EQ	BP-9
B0X487	EQ	B8757

QA 1 in 20 or 5%
two collocates per waste site
one per borehole

Sample ID	Type	Location
B0W680	TB	GP-3
B0W8W1	TB	GP-8
B0W9P0	TB	GP-12
B0WCP9	TB	B8758
B0WLM5	TB	BP-3
B0WLM2	TB	BP-1
B0WNW6	TB	BP-7
B0WNW8	TB	BP-9
B0WNX0	TB	TP-1
B0WNX2	TB	TP-2
B0X3V9	TB	B8757

Sample ID	Type	Split of	Location
B0W5P8	SPLIT	B0W5P7	GP-3
B0W8B1	SPLIT	B0W894	GP-8
B0W9H9	SPLIT	B0W9K0	GP-12
B0WBR3	SPLIT	B0WBR2	B8758
B0WKVC	SPLIT	B0WKX1	BP-3
B0WKT9	SPLIT	B0WKV1	BP-1
B0WMM8	SPLIT	B0WMH1	TP-3
B0WMM6	SPLIT	B0WMD1	TP-1
B0WMM2	SPLIT	B0WMX1	BP-7

B0WMM4	SPLIT	B0WN01	BP-9
B0XN26	SPLIT	B0XN21	B8757

Sample ID	Type	Dup of	Location
B0W681	DUP	B0W5P7	GP-3
B0W895	DUP	B0W894	GP-8
B0W9K1	DUP	B0W9K0	GP-12
B0WBR7	DUP	B0WBR6	B8758
B0WKX2	DUP	B0WKX1	BP-1
B0WKV2	DUP	B0WKV1	BP-1
B0WMX2	DUP	B0WMH1	TP-3
B0WN02	DUP	B0WMD1	TP-1
B0WMD2	DUP	B0WMX1	BP-7
B0WMH2	DUP	B0WN01	BP-9
B0~~XN22~~ WN22	DUP	B0~~XN21~~ WN21	B8757

B0W5L6, 7

TRANSMISSION RESULT REPORT (DEC 20 '99 02:14PM)

BHI S&D MANAGEMENT 509 372 9487

(AUTO)

THE FOLLOWING FILE(S) ERASED

FILE	FILE TYPE	OPTION	TEL NO.	PAGE	RESULT
097	MEMORY TX		3755151	03/03	OK

ERRORS

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

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

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

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Re:

CC:

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