0072033

VALIDATION SERVICES REQUEST	VSR No.: VSR06-012 Rev.: 0
Validator: EQM	Date Initiated: 7/10/2006
Project Coordinator(s): TRENT, SJ Client(s): ROHAY, VJ Project(s): CPP 200 Area SAF Number(s): F03-018	QAPP Number: SAP Number: Level of Validation (A, B, C, D, E): C Data Package(s): 222S20030369, 222S20030383 H2459
Validation Task Title: 216-Z-9 Trench Characterization Borehole - Soil	
Validation Procedure/Revision Number to be utilized in validation:	Chem: Rad:
Comments:	
Requested Validation Start Date: 7/10/2006	Requested Validation Completion Date: 7/31/2006

RECEIVED
JAN 22 2007
EDMC

A-6003-620 (03/03)

Project Hanford Management System
COMMENT RESOLUTION SHEET

Sheet 1 of 1 JPB 8/13/06

Document Number: SDG H2459 | Revision Number N/A | Date: Aug 3, 2006

Document Title:

Data Validation for ~~Strontium-90 Analysis 2225200300369 & 2225200300383~~ Tritium and Technetium-99 JPB 8/13/06

Reviewer:

Bill Thackaberry

Reviewers, if other than original:

Project/Organization:

FH/GRP/QA

Responsible Manager:

Dana Farwick

COMMENT(S)

Initials (If other than listed reviewer)	Section/ Step	Comments/Discrepancies	Basis	Recommendation	Resolution
	pg 1-8	Package lacks the data summary that has been provided in the past showing analyte, detection limit, result and qualifiers.	Provided in all packages reviewed in the last 4 years	Provide the table	Accepted, although requested table is not required by the data validation procedure JPB 8/13/06
	pgs 24 Sec 11	This section should not be N/A	it applies to level C	complete the individual lines (no and N/A answers)	Accepted JPB 8/13/06

Date: June 15, 2006
To: Fluor Hanford, Inc
From: Environmental Quality Management, Inc.
Project: 216-Z-9 Waste Site Vertical Borehole (Borehole C3426)
Subject: Data Validation for Tritium and Technetium-99 Analysis

INTRODUCTION

This memo presents the results of data validation on Data Package H2459, prepared by the Eberline Richmond laboratory. A list of samples validated along with the analyses reported and the method of analysis is provided in the following table.

Sample ID	Sample Date	Media	Validation Level	Analysis
B17N46-A	10/20/03	Soil	C	Technetium-99, Tritium
B17TM6-A	10/29/03	Soil	C	Technetium-99, Tritium

Data validation was conducted in accordance with HNF-20434, Rev. 0, *Data Validation Procedure for Radiochemical Analyses*, DOE/RL-2001-01, Rev. 0, Appendix B, *Plutonium/Organic-Rich Process Condensate/Process Waste Group Operable Unit Representative Sites Sampling and Analysis Plan*, and DOE/RL-2001-01, Rev. 0, Appendix E, *Sampling and Analysis Plan for Investigation of Dense, Nonaqueous-Phase Liquid Carbon Tetrachloride at the 216-Z-9 Trench.* Appendices 1 through 6 of this Data Validation Report provide additional information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers
Appendix 2. Summary of Data Qualification
Appendix 3. Annotated Laboratory Reports
Appendix 4. Laboratory Narrative and Chain-of-Custody Documentation
Appendix 5. Data Validation Supporting Documentation
Appendix 6. Additional Data Requested by Client

DATA QUALITY PARAMETERS

Holding Times

Holding times may be calculated from Chain-of-Custody forms to determine the validity of the results. Maximum holding times for tritium and technetium-99 analyses are specified as 6 months in DOE/RL-2001-01, App. B.

All holding times were met.

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

  All blank criteria were met. Neither tritium nor technetium-99 were detected in the blanks. The detection limits for the blanks were less than the MDA and less than the required detection limit.

- Field Blank

  No field blanks were submitted for analysis.

Accuracy

Accuracy is evaluated from laboratory control sample (LCS) or blank spike sample (BSS) batch samples and matrix spiked (MS) samples in the analytical batch. Measured activities are compared to the known added amounts. The acceptable LCS or BSS recovery range is 65-135%. Recoveries outside the above ranges result in associated sample results being qualified as estimates. Results are rejected for LCS/BSS recoveries of less than 30%. Tracer or carrier recoveries are not required for the liquid scintillation methods used for technetium-99 and tritium analyses.

An LCS was analyzed for each method and satisfied the above criteria. Matrix spikes were not run. However, a tracer was used in the technetium-99 method for every sample, LCS, and blank, and acceptable recoveries were obtained. In the tritium method, water serves as a chemically identical carrier for the tritium, and 100% recovery is achieved. These practices are acceptable alternatives to running matrix spikes.

Precision

- Laboratory Duplicates

  Analytical precision is expressed by the relative percent differences (RPD) between results for one of the samples in the batch and a duplicate determination of that sample. If both the activities measured for the sample and the duplicate are both greater than five times the required detection limit (RDL) and the RPD is less than 35%, no qualification is required. If either activity is less than five times the RDL,

the control limit is two times the RDL. If the RPD is outside the applicable control limit, associated results are qualified as estimated detects or estimated non-detects.

A duplicate was analyzed for each method, and the results were acceptable.

- Field Duplicate

No field duplicates were submitted for analysis.

Detection Levels

Reported analytical detection levels are compared against the RDLs in DOE/RL-2004-42 to ensure that laboratory detection levels meet the required criteria.

The MDA for the determination of technetium-99 in sample B17TM6-A was 16 pCi/g, slightly exceeding the RDL of 15 pCi/g. All other sample results were reported with MDAs equal to or less than the analyte-specific RDL. In accordance with the data validation instructions, no data was qualified.

Completeness

Data package H2459 was submitted for validation and verified for completeness. Completeness is based on the percentage of data requested by the client that were reported and determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None

MINOR DEFICIENCIES

The MDA for the determination of technetium-99 in sample B17TM6-A slightly exceeded the RDL.

REFERENCES

HNF-20434, Rev. 0, *Data Validation Procedure for Radiochemical Analyses*, Fluor Hanford, Inc., Richland, Washington (2004).

DOE/RL-2001-01, Rev. 0, Appendix B, *Plutonium/Organic-Rich Process Condensate/Process Waste Group Operable Unit Representative Sites Sampling and Analysis Plan*, U.S. Department of Energy, Richland, Washington (2004).

DOE/RL-2001-01, Rev. 0, Appendix E, *Sampling and Analysis Plan for Investigation of Dense, Nonaqueous-Phase Liquid Carbon Tetrachloride at the 216-Z-9 Trench*, U.S. Department of Energy, Richland, Washington (2004).

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers which may be applied by data validators in compliance with the data validation procedure 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 minor 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 minor QC deficiency identified during the data validation, the associated concentration is an estimated, but the data are usable for decision-making purposes.

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

Appendix 2

Summary of Data Qualification

DATA QUALIFICATION SUMMARY

SDG: H2459	REVIEWER: JRJ	DATE: 6/15/06	PAGE 1OF 1
COMMENTS: No results were qualified.			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON

Appendix 3

Annotated Laboratory Reports

TECHNETIUM-99 AND TRITIUM ANALYSIS, SOIL (PCI/G)

Project: FLUOR HANFORD							
Laboratory: Eberline							
Case:	SDG: H2459						
Sample Number		B17N46-A			B17TM6-A		
Remarks							
Sample Date		10/20/03			10/29/03		
Analysis Date		01/12/04			01/12/04		
Radionuclides	RTQL	Result	Q	MDA	Result	Q	MDA
Technetium-99	15	18		14	15.8	U	16
Tritium	400	-1.1	U	26	2.55	U	41

RTQL = required target quantitation limit
Q = validation qualifier; laboratory-applied non-detect qualifiers "U" have been included for clarity.
MDA = minimum detectable activity
GEA = gamma energy analysis
AEA = alpha energy analysis

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H2459

7662-001 B17N46-A

DATA SHEET

SDG	7662	Client/Case no	Hanford SDG H2459
Contact	Melissa C. Mannion	Contract	No. 630
Lab sample id	R312077-01	Client sample id	B17N46-A
Dept sample id	7662-001	Location/Matrix	Z-9 Trench, C3426 SOLID
Received	12/10/03	Collected/Weight	10/20/03 10:29 1.72 g
% solids	100.0	Custody/SAF No	F03-018-075 F03-018

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALIFIERS	TEST
Tritium	10028-17-8	-1.10	16	26	400	U	H
~~Carbon-14~~	~~14762-75-5~~	~~5.30~~	~~34~~	~~24~~	~~50~~	~~U~~	~~C~~
~~Nickel-63~~	~~13981-37-8~~	~~308~~	~~560~~	~~830~~	~~30~~	~~U~~	~~NI_L~~
Technetium 99	14133-76-7	18.0	5.2	14	15		TC
~~Iodine-129~~	~~15046-84-1~~	~~0.393~~	~~3.4~~	~~21~~	~~2.0~~	~~U~~	~~I~~
Selenium 79	15758-45-9	-21.3	14	24	10	U	SE_L
Protactinium 231	PA-231	0	3.5	-13	1.0	U	PA
Potassium 40	13966-00-2	U		300		U	GAM
Cobalt 60	10198-40-0	U		21	0.050	U	GAM
Cesium 137	10045-97-3	U		18	0.10	U	GAM
Radium 226	13982-63-3	U		43		U	GAM
Radium 228	15262-20-1	U		66		U	GAM
Europium 152	14683-23-9	U		38	0.10	U	GAM
Europium 154	15585-10-1	U		50	0.10	U	GAM
Europium 155	14391-16-3	U		70	0.10	U	GAM
Thorium 228	14274-82-9	U		32		U	GAM
Thorium 232	TH-232	U		66		U	GAM
Uranium 238	U-238	U		2100		U	GAM
Americium 241	14596-10-2	324000	900	370			GAM

219-Z-9 Trench Chara. Borehole-Soil

Note: Gamma data is in units of pCi/sample.

8/7/06

DATA SHEETS
Page 1
SUMMARY DATA SECTION
Page 11

Lab id	EBRLNE
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	01/31/04

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EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H2459

7662-002 B17TM6-A

DATA SHEET

SDG 7662	Client/Case no Hanford	SDG H2459	
Contact Melissa C. Mannion	Contract No. 630		
Lab sample id R312077-02	Client sample id B17TM6-A		
Dept sample id 7662-002	Location/Matrix Z-9 Trench, C3426	SOLID	
Received 12/10/03	Collected/Weight 10/29/03 08:56	0.19 g	
% solids 100.0	Custody/SAF No F03-018-076	F03-018	

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALIFIERS	TEST
Tritium	10028-17-8	2.55	24	41	400	U	H
~~Carbon 14~~	~~14762-75-5~~	~~13.7~~	~~23~~	~~39~~	~~50~~	~~U~~	~~C~~
~~Nickel 63~~	~~13981-37-8~~	~~378~~	~~560~~	~~220~~	~~30~~	~~U~~	~~NI_2~~
Technetium 99	14133-76-7	15.8	5.6	16	15	U	TC
~~Iodine 129~~	~~15046-84-1~~	~~7.26~~	~~19~~	~~43~~	~~2.0~~	~~U~~	~~I~~
Selenium 79	15758-45-9	-69.1	45	79	10	U	SE_L
Protactinium 231	PA-231	12.9	9.7	12	1.0		PA
Potassium 40	13966-00-2	U		230		U	GAM
Cobalt 60	10198-40-0	U		15	0.050	U	GAM
Cesium 137	10045-97-3	U		11	0.10	U	GAM
Radium 226	13982-63-3	U		35		U	GAM
Radium 228	15262-20-1	U		58		U	GAM
Europium 152	14683-23-9	U		31	0.10	U	GAM
Europium 154	15585-10-1	U		40	0.10	U	GAM
Europium 155	14391-16-3	U		32	0.10	U	GAM
Thorium 228	14274-82-9	U		32		U	GAM
Thorium 232	TH-232	U		58		U	GAM
Uranium 238	U-238	U		1300		U	GAM
Americium 241	14596-10-2	3480	160	130			GAM

219-Z-9 Trench Chara. Borehole-Soil

Note: Gamma data is in units of pCi/sample.

OK 8/1/06

Lab id	EBRLNE
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	01/31/04

DATA SHEETS
Page 2
SUMMARY DATA SECTION
Page 12

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Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

EBERLINE SERVICES

RICHMOND, CA LABORATORY
SAMPLE RECEIPT CHECKLIST

Client: FLR Date/Time received 1000 12-10-03

CoC No. F03-018-075,076

Container I.D. No. SAWS-107 Requested TAT (Days) 45 P.O. Received Yes [ ] No [ ]

INSPECTION

1. Custody seals on shipping container intact? Yes [✓] No [ ] N/A [ ]
2. Custody seals on shipping container dated & signed? Yes [✓] No [ ] N/A [ ]
3. Custody seals on sample containers intact? Yes [ ] No [ ] N/A [✓]
4. Custody seals on sample containers dated & signed? Yes [ ] No [ ] N/A [✓]
5. Packing material is: Wet [ ] Dry [✓]
6. Number of samples in shipping container: 2
7. Number of containers per sample: 1 (Or see CoC ____)
8. Samples are in correct container Yes [✓] No [ ]
9. Paperwork agrees with samples? Yes [✓] No [ ]
10. Samples have: Tape [✓] Hazard labels [✓] Rad labels [✓] Appropriate sample labels [✓]
11. Samples are: In good condition [✓] Leaking [ ] Broken Container [ ] Missing [ ]
12. Samples are: Preserved [ ] Not preserved [✓] pH ____ Preservative ____
13. Describe any anomalies: ____
14. Was P.M. notified of any anomalies? Yes [ ] No [ ] Date ____
15. Received by [signature] Date: 12-10-03 Time: 1000

Customer Sample No.	cpm	mR/hr	wipe	Customer Sample No.	cpm	mR/hr	wipe
B17N46-A	<40						
B17T46-A	<40						

Ion Chamber Ser. No. ____ Calibration date ____

Alpha Meter Ser. No. ____ Calibration date ____

Beta/Gamma Meter Ser. No. 166261 Calibration date 2-14-03

Form SCP-01.2, 08-04-03

"over 50 years of quality nuclear services"

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1.0 GENERAL

Fluor Hanford Inc. (FH) Sample Delivery Group H2459 was composed of two soil samples designated under SAF No. F03-018 with a Project Designation of: 216-Z-9 Trench Characterization Borehole – Soil.

Due to limited sample volume and high alpha activity (from Am-241) in samples B17N46-A and B17TM6-A the sample aliquots taken were small and thus the analytical results have high MDAs.

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

2.0 ANALYSIS NOTES

2.1 Tritium Analyses

The LCS and method blank were not scaled to the nominal aliquot. No problems were encountered during the course of the analyses.

2.2 Carbon-14 Analyses

The LCS and method blank were not scaled to the nominal aliquot. No problems were encountered during the course of the analyses.

2.3 Nickel-63 Analyses

The LCS and method blank were not scaled to the nominal aliquot. No problems were encountered during the course of the analyses.

2.4 Selenium-79 Analyses

The method blank was not scaled to the nominal aliquot. A LCS was not performed. The laboratory has no Se-79 activity available to perform an LCS. No other problems were encountered during the course of the analyses.

2.5 Iodine-129 Analyses

The LCS and method blank were not scaled to the nominal aliquot. No problems were encountered during the course of the analyses.

2.6 Technetium-99 Analyses

The LCS and method blank were not scaled to the nominal aliquot. No problems were encountered during the course of the analyses.

000002

2.7 Protactinium-231 Analyses

The LCS and method blank were not scaled to the nominal aliquot. No problems were encountered during the course of the analyses.

Please note Pa-231 has neither an assigned CAS No. or FEAD Reference for the electronic data deliverable.

2.8 Gamma Spectroscopy Analyses

Due to limited sample volume samples B17N46-A and B17TM6-A were counted as received (1.0 sample). The gamma spectroscopy data is reported in units of pCi/sample. A sample duplicate was not performed. No other problems were encountered during the course of the analyses.

Case Narrative Certification Statement

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

Mel Mann — 1/31/4

Melissa C. Mannion
Senior Program Manager

Date

000403

FLUOR Hanford Inc.	CENTRAL PLATEAU CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	F03-018-076	Page 1 of 1
Collector J.S. Pope	Company Contact Steve Trent / Telephone No. 373-5689	Project Coordinator TRENT, SJ	Price Code 8N / Data Turnaround 45 Days
Project Designation 216-Z-9 Trench Characterization Borehole - Soil	Sampling Location Z-9 Trench C3426 H2459 (7662)	SAF No. F03-018	Air Quality ☐
Ice Chest No. SAWS-107	Field Logbook No. / COA 119152ES10	Method of Shipment Federal Express	
Shipped To EBERLINE SERVICES (Formerly TMA)	Offsite Property No.	Bill of Lading/Air Bill No. 842 265470763	

POSSIBLE SAMPLE HAZARDS/REMARKS

High Alpha content/Free phase CCL4 detected

Special Handling and/or Storage

Preservation	None									
Type of Container	G									
No. of Container(s)	1									
Volume	50mg									
SAMPLE ANALYSIS	See item (1) in Special Instructions.									

Sample No.	Matrix *	Sample Date	Sample Time									
B17TM6-A	SOIL	10/29/03	0856	Y								

CHAIN OF POSSESSION	Sign/Print Names		
Relinquished By/Removed From: RLCh[illegible]	Date/Time 12-8-03 1030	Received By/Stored In: JGHogan / JGHogan	Date/Time 1130 12-8-03
Relinquished By/Removed From: JGHOGAN / JGHogan	Date/Time 1300 12-8-03	Received By/Stored In: FED EX	Date/Time
Relinquished By/Removed From: FED EX	Date/Time	Received By/Stored In: [illegible]	Date/Time 12-10-03 1000
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time

SPECIAL INSTRUCTIONS

(1) Gamma Spec - Radium (Radium-226, Radium-228); Carbon-14; Technetium-99; Iodine-129; Nickel-63; Selenium-79; Isotopic Protactinium (Protactinium-231); Tritium - H3

Matrix *

S=Soil
SD=Sediment
SL=Sludge
W=Water
O=Oil
A=Air
BS=Bulk Solids
BL=Bulk Liquids
T=Tissue
BT=Biota
L=Liquid
V=Vegetation
X=Other

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

A-6003-818(03/03)

000040

FLUOR Hanford Inc.	CENTRAL PLATEAU CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		F03-018-075	Page 1 of 1
Collector J.S. Pope	Company Contact Steve Trent	Telephone No. 373-5689	Project Coordinator TRENT, SJ	Price Code 8N / Air Quality ☐ / Data Turnaround 45 Days
Project Designation 216-Z-9 Trench Characterization Borehole - Soil	Sampling Location Z-9 Trench C3426 43.5-46' H2459		SAF No. F03-018	
Ice Chest No. SHWS-107	Field Logbook No.	COA 118478ES10 (7662)	Method of Shipment Federal Express	
Shipped To EBERLINE SERVICES (Formerly TMA)	Offsite Property No.		Bill of Lading/Air Bill No. 842265470 0763	

POSSIBLE SAMPLE HAZARDS/REMARKS

High Alpha content

Special Handling and/or Storage

Preservation	None										
Type of Container	G										
No. of Container(s)	1										
Volume	2g										

SAMPLE ANALYSIS

Sample No.	Matrix *	Sample Date	Sample Time	See Item (1) in Special Instructions									
B17H46-A	SOIL	10/20/03	1029	X									

CHAIN OF POSSESSION	Date/Time	Sign/Print Name	Date/Time
Relinquished By/Removed From: RL Chambers	12-8-03 1030	Received By/Stored In: JG Hogan	12-8-03 1830
Relinquished By/Removed From: JG Hogan	12-8-03 1500	Received By/Stored In: FED EX	
Relinquished By/Removed From: FED EX		Received By/Stored In:	12-10-03 1000
Relinquished By/Removed From		Received By/Stored In	
Relinquished By/Removed From		Received By/Stored In	
Relinquished By/Removed From		Received By/Stored In	

SPECIAL INSTRUCTIONS

(1) Gamma Spec - Radium [Radium-226, Radium-228]; Carbon-14; Technetium-99; Iodine-129; Nickel-63; Selenium-79, Isotope Protactinium (Protactinium-231); Tritium - H3

Matrix *
S-Soil
SE-Sediment
SO-Solid
SL-Sludge
W-Water
O-Oil
A-Air
DS-Drum Solids
DL-Drum Liquids
T-Tissue
WI-Wipe
L-Liquid
V-Vegetation
B-Other

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

A-6003-618(03/03)

17

0001041

EBERLINE SERVICES

RICHMOND, CA LABORATORY
SAMPLE RECEIPT CHECKLIST

Client: FLR Date/Time received 1000 12-10-03

CoC No. F03-018-075,076

Container I.D. No. SAVS 107 Requested TAT (Days) 45 P.O. Received Yes [ ] No [ ]

INSPECTION

1. Custody seals on shipping container intact? Yes [✓] No [ ] N/A [ ]
2. Custody seals on shipping container dated & signed? Yes [✓] No [ ] N/A [ ]
3. Custody seals on sample containers intact? Yes [ ] No [ ] N/A [✓]
4. Custody seals on sample containers dated & signed? Yes [ ] No [ ] N/A [✓]
5. Packing material is: Wet [ ] Dry [✓]
6. Number of samples in shipping container: 2
7. Number of containers per sample: 1 (Or see CoC ____)
8. Samples are in correct container Yes [✓] No [ ]
9. Paperwork agrees with samples? Yes [✓] No [ ]
10. Samples have: Tape [✓] Hazard labels [ ] Red labels [✓] Appropriate sample labels [✓]
11. Samples are: In good condition [✓] Leaking [ ] Broken Container [ ] Missing [ ]
12. Samples are: Preserved [ ] Not preserved [✓] pH ____ Preservative ____
13. Describe any anomalies: ____
14. Was P.M. notified of any anomalies? Yes [ ] No [ ] Date ____
15. Received by [signature] Date: 12-10-03 Time: 1000

Customer Sample No.	cpm	mR/hr	wipe	Customer Sample No.	cpm	mR/hr	wipe
B17N46-A	<40						
B17TMC-A	<40						

Ion Chamber Ser. No. ____ Calibration date ____

Alpha Meter Ser. No. ____ Calibration date ____

Beta/Gamma Meter Ser. No. 166261 Calibration date 2-14-03

Form SCP-01.2, 06-04-03 *"over 50 years of quality nuclear services"*

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?

Appendix 5

Data Validation Supporting Documentation

APPENDIX A

RADIOCHEMICAL DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: 216-Z-9 Vertical Borehole			DATA PACKAGE: H2459		
VALIDATOR: TR Jewett		LAB: Eberline Richmond		DATE: 6/15/06	
			SDG:		
ANALYSES PERFORMED					
			Technetium	Technetium-99	Tritium
SAMPLES/MATRIX					
B17N46-A	Soil				
B17TM6-A	Soil				

1. Completeness ☐ N/A

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

Comments:

2. Initial Calibration (Levels D, E) ☑ N/A

Instruments/detectors calibrated? Yes No N/A

Initial calibration acceptable? Yes No N/A

Standards NIST traceable? Yes No N/A

Standards Expired? Yes No N/A

Calculation check acceptable? Yes No N/A

Comments:

3. Continuing Calibration (Levels D, E) ☑ N/A

Calibration checked within required frequency? Yes No N/A
Calibration check acceptable? Yes No N/A
Calibration check standards traceable? Yes No N/A
Calibration check standards expired? Yes No N/A
Calculation check acceptable? Yes No N/A
Comments:

4. Background Counts (Levels D, E) ☑ N/A

Background Counts checked within required frequency? Yes No N/A
Background Counts acceptable? Yes No N/A
Calculation check acceptable? Yes No N/A
Comments:

5. Blanks (Levels B, C, D, E) ☐ N/A

Method blank analyzed within required frequency? 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? (Levels D, E) Yes No N/A
Comments:

6. Laboratory Control Samples or Blank Spike Samples (Levels C, D, E) ☐ N/A

LCS /BSS analyzed within required frequency? Yes No N/A
LCS/BSS recoveries acceptable? Yes No N/A
LCS/BSS traceable? (Levels D,E) Yes No N/A
LCS/BSS expired? (Levels D,E) Yes No N/A
LCS/BSS levels correct? (Levels D,E) Yes No N/A
Transcription/Calculation Errors? (Levels D, E) Yes No N/A
Comments:

7. Chemical Carrier Recovery (Levels C, D, E) ~~N/A~~ 6/15/06

Chemical carrier added? Yes No N/A
Chemical recovery acceptable? Yes No N/A
Chemical carrier traceable? (Levels D, E) Yes No N/A

A-3

Chemical carrier expired? (Levels D, E) ..... Yes No (N/A)
Transcription/Calculation errors? (Levels D, E) ..... Yes No (N/A)
Comments: Water as carrier in tritium analysis.

8. Tracer Recovery (Levels C, D, E) ..... ☐ N/A

Tracer added? ..... (Yes) No N/A
Tracer recovery acceptable? ..... (Yes) No N/A
Tracer traceable? (Levels D, E) ..... Yes No (N/A)
Tracer expired? (Levels D, E) ..... Yes No (N/A)
Transcription/Calculation errors? (Levels D, E) ..... Yes No (N/A)
Comments:

9. Matrix Spikes (Levels C, D, E) ..... ☐ N/A

Matrix spike analyzed? ..... JPA 6/21/06 Yes (No) N/A
Spike recoveries acceptable? ..... TPB 6/29/06 Yes (No) N/A
Spike source traceable? (Levels D, E) ..... Yes No (N/A)
Spike source expired? Levels D, E) ..... Yes No (N/A)
Transcription/Calculation Errors? (Levels D, E) ..... Yes No (N/A)
Comments: For Tc-99, Tc-99m tracer was used instead of MS, and acceptable recoveries were obtained.
For 3H, H_2O works as carrier, and was used ~~not~~ instead of MS.
TPB 6/21/06
No flags required for any results.

A-4

10. Duplicates (Levels C, D, E) ☐ N/A

Duplicates Analyzed at required frequency? Yes No N/A

RPD Values Acceptable? Yes No N/A

Transcription/Calculation Errors? (Levels D, E) Yes No N/A

Comments:

11. Field QC Samples (Levels C, D E) ~~☐ N/A~~ 8/7/06

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~~ 8/7/06

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:

12. Holding Times (All levels)

Are sample holding times acceptable? Yes No N/A

Comments:

13. Results and Detection Limits (All Levels) ☐ N/A

- Results reported for all required sample analyses? Yes No N/A
- Results supported in raw data? (Levels D, E) Yes No N/A
- Results Acceptable? (Levels D, E) Yes No N/A
- Transcription/Calculation errors? (Levels D, E) Yes No N/A
- MDA's meet required detection limits? Yes No N/A
- Transcription/calculation errors? (Levels D, E) Yes No N/A
- Comments: MDA Co-Tc-99 in ~~B17TM6-A was~~ JTJ 6/15/06
  B17TM6-A was 16 pCi/g vs 15 pCi/g RDL.

Comments:

Appendix 6

Additional Documentation Requested
(Quality Control Data)

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H2459

7662-004

Method Blank

METHOD BLANK

SDG	7662	Client/Case no	Hanford SDG H2459
Contact	Melissa C. Mannion	Contract	No. 630
Lab sample id	R312077-04	Client sample id	Method Blank
Dept sample id	7662-004	Material/Matrix	SOLID
		SAF No	F03-018

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALIFIERS	TEST
Tritium	10028-17-8	0.173	0.62	1.0	400	U	H
Carbon 14	14762-75-5	-0.331	0.59	1.0	50	U	C
Nickel 63	13981-37-8	-0.018	0.52	0.88	30	U	NI_L
Technetium 99	14133-76-7	-0.236	0.18	0.69	15	U	TC
Iodine 129	15046-84-1	-0.001	0.25	0.57	2.0	U	I
Selenium 79	15758-45-9	-0.861	0.85	1.5	10	U	SE_L
Protactinium 231	PA-231	-0.002	0.007	0.016	1.0	U	PA
Potassium 40	13966-00-2	U		28		U	GAM
Cobalt 60	10198-40-0	U		2.3	0.050	U	GAM
Cesium 137	10045-97-3	U		1.9	0.10	U	GAM
Radium 226	13982-63-3	U		4.1		U	GAM
Radium 228	15262-20-1	U		9.6		U	GAM
Europium 152	14683-23-9	U		5.4	0.10	U	GAM
Europium 154	15585-10-1	U		6.9	0.10	U	GAM
Europium 155	14391-16-3	U		4.0	0.10	U	GAM
Thorium 228	14274-82-9	U		5.2		U	GAM
Thorium 232	TH-232	U		9.6		U	GAM
Uranium 235	15117-96-1	U		6.4		U	GAM
Uranium 238	U-238	U		270		U	GAM
Americium 241	14596-10-2	U		4.4		U	GAM

219-Z-9 Trench Chara. Borehole-Soil

QC-BLANK #46352

Lab id	EBRLNE
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	01/31/04

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Page 8

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EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H2459

7662-003

Lab Control Sample

LAB CONTROL SAMPLE

SDG 7662
Contact Melissa C. Marnion

Client/Case no Hanford SDG H2459
Contract No. 630

Lab sample id R312077-03
Dept sample id 7662-003

Client sample id Lab Control Sample
Material/Matrix SOLID
SAF No F03-018

ANALYTE	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST	ADDED pCi/g	2σ ERR pCi/g	REC %	3σ LMTS (TOTAL)	PROTOCOL LIMITS
Tritium	230	3.3	1.1	400		H	251	10	92	85-115	80-120
Carbon 14	616	12	3.1	50		C	638	26	97	84-116	80-120
Nickel 63	130	2.3	0.92	30		NI_L	136	5.4	96	84-116	80-120
Technetium 99	120	2.8	0.54	15		TC	120	4.8	100	83-117	80-120
Iodine 129	135	1.3	1.6	2.0		I	127	5.1	106	83-117	80-120
Protactinium 231	8.69	0.44	0.017	1.0		PA	9.98	0.40	87	89-111	80-120
Cobalt 60	240	13	8.7	0.050		GAM	262	10	92	77-123	80-120
Cesium 137	258	12	9.5	0.10		GAM	274	11	96	77-123	80-120

219-Z-9 Trench Chara. Borehole-Soil

QC-LCS #46351

Lab id EBERLNR
Protocol Hanford
Version Ver 1.0
Form DVD-LCS
Version 3.06
Report date 01/31/06

LAB CONTROL SAMPLES
Page 1
SUMMARY DATA SECTION
Page 9

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EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP N2459

7662-005 B17N46-A

DUPLICATE

SDG 7662		Client/Case no Hanford	SDG N2459
Contact Melissa C. Mannion		Contract No. 630	
DUPLICATE	ORIGINAL		
Lab sample id R312077-05	Lab sample id R312077-01	Client sample id B17N46-A	
Dept sample id 7662-005	Dept sample id 7662-001	Location/Matrix Z-9 Trench, C3626	SOLID
	Received 12/10/03	Collected/Weight 10/20/03 10:29	1.72 g
% solids 100.0	% solids 100.0	Custody/SAF No F03-018-075	F03-018

ANALYTE	DUPLICATE pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST	ORIGINAL pCi/g	2σ ERR (COUNT)	MDA pCi/g	QUALI-FIERS	RPD %	3σ TOT	PROT LIMIT
Tritium	12.6	14	23	400	U	H	-1.10	16	26	U	-		
Carbon 14	-1.62	13	22	50	U	C	5.38	14	24	U	-		
Nickel 63	425	530	870	30	U	NI_L	308	560	930	U	-		
Technetium 99	23.2	6.1	16	15		TC	18.0	5.2	14		25	62	
Iodine 129	0.562	7.4	17	2.0	U	I	-0.393	9.4	21	U	-		
Selenium 79	-19.6	13	22	10	U	SE_L	-21.3	14	24	U	-		
Protactinium 231	0	10	21	1.0	U	PA	0	3.5	13	U	-		

219-Z-9 Trench Chara. Borehole-Soil

QC-DUP#1 46353

Notes: Gamma data is in units of pCi/sample.

DUPLICATES
Page 1
SUMMARY DATA SECTION
Page 10

Lab id EBRLME
Protocol Hanford
Version Ver 1.0
Form DVD-DUP
Version 3.06
Report date 01/31/04

000014

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H2459

Test TC Matrix SOLID
SDG 7662
Contact Melissa C. Hannion

LAB METHOD SUMMARY

TECHNETIUM 99 IN SOIL
BETA COUNTING

Client Hanford
Contract No. 630
Contract SDG H2459

RESULTS

LAB SAMPLE ID	RAW TEST	SUF-FIX	PLANCHET	CLIENT SAMPLE ID	Technetium 99
Preparation batch 7080-164					
R312077-01			7662-001	B17N46-A	18.0
R312077-02			7662-002	B17TN6-A	15.8 U
R312077-03			7662-003	LCS (QC ID=46351)	ok
R312077-04			7662-004	BLK (QC ID=46352)	U
R312077-05			7662-005	Duplicate (R312077-01)	ok

Nominal values and limits from method RDLs (pCi/g) 15
219-2-9 Trench Chara. Borehole-Soil

METHOD PERFORMANCE

LAB SAMPLE ID	RAW TEST	SUF-FIX	CLIENT SAMPLE ID	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 7080-164 2σ prep error 10.0 % Reference Lab Notebook 7080 pg. 164																
R312077-01			B17N46-A	14	0.0455			79	50				91	01/15/04	01/19	GRB-203
R312077-02			B17TN6-A	16	0.0325			94	50				83	01/15/04	01/20	GRB-222
R312077-03			LCS (QC ID=46351)	0.54	1.00			94	50					01/15/04	01/19	GRB-230
R312077-04			BLK (QC ID=46352)	0.69	1.00			76	50					01/15/04	01/20	GRB-223
R312077-05			Duplicate (R312077-01) (QC ID=46353)	16	0.0428			76	50				92	01/15/04	01/20	GRB-224
Nominal values and limits from method				15	1.00			20-105	50				180			

PROCEDURES	REFERENCE	
	TC99_TR_SEP_LSC	
	CP-021	Preparation of Tc-99m Tracer, rev 2
	CP-002	Q.C. Preparation, rev 4
	CP-003	Addition of Carriers and Tracers, rev 5
	CP-431	Technetium-99 Purification of Soil or Resin by Extraction Chromatography, rev 0
	CP-008	Heavy Element Electroplating, rev 7

AVERAGES ± 2 SD FOR 5 SAMPLES
MDA 9.4 ± 16
YIELD 84 ± 19

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Lab id EBERLNF
Protocol Hanford
Version Ver 1.0
Form DVO-LMS
Version 3.06
Report date 01/31/04

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EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H2459

Test H Matrix SOLID
SDG 7662
Contact Melissa C. Mannion

LAB METHOD SUMMARY

TRITIUM IN SOIL
LIQUID SCINTILLATION COUNTING

Client Hanford
Contract No. 630
Contract SDG H2459

RESULTS

LAB SAMPLE ID	RAW TEST	SUF-FIX	PLANCHET	CLIENT SAMPLE ID	Tritium	
Preparation batch 7080-164						
R312077-01			7662-001	B17N46-A	U	
R312077-02			7662-002	B17TN6-A	U	
R312077-03			7662-003	LCS (QC ID=46351)	ok	
R312077-04			7662-004	BLK (QC ID=46352)	U	
R312077-05			7662-005	Duplicate (R312077-01)	-	U

Nominal values and limits from method RDLs (pCi/g) 400
219-Z-9 Trench Chara. Borehole-Soil

METHOD PERFORMANCE

LAB SAMPLE ID	RAW TEST	SUF-FIX	CLIENT SAMPLE ID	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 7080-164			2σ prep error 10.0 %	Reference Lab Notebook 7080 pg. 164												
R312077-01			B17N46-A	26	0.0411			100		120			82	01/09/04	01/10	LSC-004
R312077-02			B17TN6-A	41	0.0255			100		120			73	01/09/04	01/10	LSC-004
R312077-03			LCS (QC ID=46351)	1.1	1.00			100		120				01/09/04	01/10	LSC-004
R312077-04			BLK (QC ID=46352)	1.0	1.00			100		120				01/09/04	01/09	LSC-004
R312077-05			Duplicate (R312077-01) (QC ID=46353)	23	0.0450			100		120			82	01/09/04	01/10	LSC-004
Nominal values and limits from method				400	1.00					25			180			

PROCEDURES REFERENCE TRITIUM_COX_LSC
CP-251 Tritium/Carbon-14 Oxidation, rev 5

AVERAGES ± 2 SD FOR 5 SAMPLES
MDA 18 ± 35
YIELD 100 ± 0

Lab id EBRLNE
Protocol Hanford
Version Ver 1.0
Form DVD-1.NS
Version 3.06
Report date 01/31/04

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Project Hanford Management System
COMMENT RESOLUTION SHEET

Sheet 1 of 1 8/7/06

Document Number: SDG H2459 | **Revision Number** N/A | **Date:** Aug 3, 2006

Document Title:

Data Validation for ~~Strontium-90 Analysis 222520030369 & 222520030383~~ Tritium and Technetium-99 8/7/06

Reviewer:

Bill Thackaberry

Reviewers, if other than original:

Project/Organization:

FH/GRP/QA

Responsible Manager:

Dana Farwick

COMMENT(S)

Initials (if other than lead reviewer)	Section/ Step	Comments/Discrepancies	Basis	Recommendation	Resolution
	pg 1-8	Package lacks the data summary that has been provided in the past showing analyte, detection limit, result and qualifiers.	Provided in all packages reviewed in the last 4 years	Provide the table	Rejected. Requested table is not required by the data validation procedure* 8/7/06
	pgs 24 Sec 11	This section should not be N/A	it applies to level C	complete the individual lines (no and N/A answers)	Accepted. 8/7/06
			*All information requested table is already in Attachment 2 and 3 of the data validation report as written. 8/7/06		

AUG 2006 RECEIVED

A-6002-913 (10/01)

Date: June 15, 2006
To: Fluor Hanford, Inc
From: Environmental Quality Management, Inc.
Project: 216-Z-9 Waste Site Vertical Borehole (Borehole C3426)
Subject: Data Validation for Tritium and Technetium-99 Analysis

INTRODUCTION

This memo presents the results of data validation on Data Package H2459, prepared by the Eberline Richmond laboratory. A list of samples validated along with the analyses reported and the method of analysis is provided in the following table.

Sample ID	Sample Date	Media	Validation Level	Analysis
B17N46-A	10/20/03	Soil	C	Technetium-99, Tritium
B17TM6-A	10/29/03	Soil	C	Technetium-99, Tritium

Data validation was conducted in accordance with HNF-20434, Rev. 0, *Data Validation Procedure for Radiochemical Analyses*, DOE/RL-2001-01, Rev. 0, Appendix B, *Plutonium/Organic-Rich Process Condensate/Process Waste Group Operable Unit Representative Sites Sampling and Analysis Plan*, and DOE/RL-2001-01, Rev. 0, Appendix E, *Sampling and Analysis Plan for Investigation of Dense, Nonaqueous-Phase Liquid Carbon Tetrachloride at the 216-Z-9 Trench*. Appendices 1 through 6 of this Data Validation Report provide additional information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers
Appendix 2. Summary of Data Qualification
Appendix 3. Annotated Laboratory Reports
Appendix 4. Laboratory Narrative and Chain-of-Custody Documentation
Appendix 5. Data Validation Supporting Documentation
Appendix 6. Additional Data Requested by Client

AUG 2006
RECEIVED

DATA QUALITY PARAMETERS

Holding Times

Holding times may be calculated from Chain-of-Custody forms to determine the validity of the results. Maximum holding times for tritium and technetium-99 analyses are specified as 6 months in DOE/RL-2001-01, App. B.

All holding times were met.

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

  All blank criteria were met. Neither tritium nor technetium-99 were detected in the blanks. The detection limits for the blanks were less than the MDA and less than the required detection limit.

- Field Blank

  No field blanks were submitted for analysis.

Accuracy

Accuracy is evaluated from laboratory control sample (LCS) or blank spike sample (BSS) batch samples and matrix spiked (MS) samples in the analytical batch. Measured activities are compared to the known added amounts. The acceptable LCS or BSS recovery range is 65-135%. Recoveries outside the above ranges result in associated sample results being qualified as estimates. Results are rejected for LCS/BSS recoveries of less than 30%. Tracer or carrier recoveries are not required for the liquid scintillation methods used for technetium-99 and tritium analyses.

An LCS was analyzed for each method and satisfied the above criteria. Matrix spikes were not run. However, a tracer was used in the technetium-99 method for every sample, LCS, and blank, and acceptable recoveries were obtained. In the tritium method, water serves as a chemically identical carrier for the tritium, and 100% recovery is achieved. These practices are acceptable alternatives to running matrix spikes.

Precision

- Laboratory Duplicates

  Analytical precision is expressed by the relative percent differences (RPD) between results for one of the samples in the batch and a duplicate determination of that sample. If both the activities measured for the sample and the duplicate are both greater than five times the required detection limit (RDL) and the RPD is less than 35%, no qualification is required. If either activity is less than five times the RDL,

the control limit is two times the RDL. If the RPD is outside the applicable control limit, associated results are qualified as estimated detects or estimated non-detects.

A duplicate was analyzed for each method, and the results were acceptable.

- Field Duplicate

No field duplicates were submitted for analysis.

Detection Levels

Reported analytical detection levels are compared against the RDLs in DOE/RL-2004-42 to ensure that laboratory detection levels meet the required criteria.

The MDA for the determination of technetium-99 in sample B17TM6-A was 16 pCi/g, slightly exceeding the RDL of 15 pCi/g. All other sample results were reported with MDAs equal to or less than the analyte-specific RDL. In accordance with the data validation instructions, no data was qualified.

Completeness

Data package H2459 was submitted for validation and verified for completeness. Completeness is based on the percentage of data requested by the client that were reported and determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None

MINOR DEFICIENCIES

The MDA for the determination of technetium-99 in sample B17TM6-A slightly exceeded the RDL.

REFERENCES

HNF-20434, Rev. 0, *Data Validation Procedure for Radiochemical Analyses,* Fluor Hanford, Inc., Richland, Washington (2004).

DOE/RL-2001-01, Rev. 0, Appendix B, *Plutonium/Organic-Rich Process Condensate/Process Waste Group Operable Unit Representative Sites Sampling and Analysis Plan,* U.S. Department of Energy, Richland, Washington (2004).

DOE/RL-2001-01, Rev. 0, Appendix E, *Sampling and Analysis Plan for Investigation of Dense, Nonaqueous-Phase Liquid Carbon Tetrachloride at the 216-Z-9 Trench*, U.S. Department of Energy, Richland, Washington (2004).

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers which may be applied by data validators in compliance with the data validation procedure 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 minor 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 minor QC deficiency identified during the data validation, the associated concentration is an estimated, but the data are usable for decision-making purposes.

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

Appendix 2

Summary of Data Qualification

DATA QUALIFICATION SUMMARY

SDG: H2459	REVIEWER: JRJ	DATE: 6/15/06	PAGE 1OF 1
COMMENTS: No results were qualified.			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON

Appendix 3

Annotated Laboratory Reports

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H2459

7662-001 B17N46-A

DATA SHEET

SDG	7662	Client/Case no	Hanford SDG H2459
Contact	Melissa C. Mannion	Contract	No. 630
Lab sample id	R312077-01	Client sample id	B17N46-A
Dept sample id	7662-001	Location/Matrix	Z-9 Trench. C3426 SOLID
Received	12/10/03	Collected/Weight	10/20/03 10:29 1.72 g
% solids	100.0	Custody/SAF No	F03-018-075 F03-018

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Tritium	10028-17-8	-1.10	16	26	400	U	H
~~Carbon 14~~	~~14762-75-5~~	~~-5.30~~	~~14~~	~~84~~	~~50~~	~~U~~	~~C~~
~~Nickel 63~~	~~13981-37-8~~	~~308~~	~~560~~	~~920~~	~~30~~	~~U~~	~~NI-L~~
Technetium 99	14133-76-7	18.0	5.2	14	15		TC
~~Iodine 129~~	~~15046-84-1~~	~~-0.393~~	~~9.4~~	~~21~~	~~1.0~~	~~U~~	~~I~~
Selenium 79	15758-45-9	-21.3	14	24	10	U	SE-L
Protactinium 231	PA-231	0	3.5	-13	1.0	U	PA
Potassium 40	13966-00-2	U		300		U	GAM
Cobalt 60	10198-40-0	U		21	0.050	U	GAM
Cesium 137	10045-97-3	U		18	0.10	U	GAM
Radium 226	13982-63-3	U		43		U	GAM
Radium 228	15262-20-1	U		66		U	GAM
Europium 152	14683-23-9	U		38	0.10	U	GAM
Europium 154	15585-10-1	U		50	0.10	U	GAM
Europium 155	14391-26-3	U		70	0.10	U	GAM
Thorium 228	14274-82-9	U		32		U	GAM
Thorium 232	TH-232	U		66		U	GAM
Uranium 238	U-238	U		2100		U	GAM
Americium 241	14596-10-2	324000	900	370			GAM

219-Z-9 Trench Chara. Borehole-Soil

Note: Gamma data is in units of pCi/sample.

8/17/06

DATA SHEETS
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SUMMARY DATA SECTION
Page 11

Lab id	EBRLNE
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	01/31/04

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EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H2459

7662-002 B17TM6-A

DATA SHEET

SDG	7662	Client/Case no	Hanford	SDG H2459	
Contact	Melissa C. Mannion	Contract	No. 630		
Lab sample id	R312077-02	Client sample id	B17TM6-A		
Dept sample id	7662-002	Location/Matrix	Z-9 Trench, C3426	SOLID	
Received	12/10/03	Collected/Weight	10/29/03 08:56	0.19 g	
% solids	100.0	Custody/SAF No	F03-018-076	F03-018	

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALIFIERS	TEST
Tritium	10028-17-8	2.55	24	41	400	U	H
~~Carbon 14~~	~~14762-75-5~~	~~13.7~~	~~23~~	~~39~~	~~50~~	~~U~~	~~C~~
~~Nickel 63~~	~~13981-37-8~~	~~370~~	~~560~~	~~230~~	~~30~~	~~U~~	~~NI_D~~
Technetium 99	14133-76-7	15.8	5.6	16	15	U	TC
~~Iodine 129~~	~~15046-84-1~~	~~7.26~~	~~19~~	~~42~~	~~2.0~~	~~U~~	~~I~~
Selenium 79	15758-45-9	-69.1	45	79	10	U	SE_L
Protactinium 231	PA-231	12.9	9.7	12	1.0		PA
Potassium 40	13966-00-2	U		230		U	GAM
Cobalt 60	10198-40-0	U		15	0.050	U	GAM
Cesium 137	10045-97-3	U		11	0.10	U	GAM
Radium 226	13982-63-3	U		35		U	GAM
Radium 228	15262-20-1	U		58		U	GAM
Europium 152	14683-23-9	U		31	0.10	U	GAM
Europium 154	15585-10-1	U		40	0.10	U	GAM
Europium 155	14391-16-3	U		31	0.10	U	GAM
Thorium 228	14274-82-9	U		32		U	GAM
Thorium 232	TH-232	U		58		U	GAM
Uranium 238	U-238	U		1300		U	GAM
Americium 241	14596-10-2	3480	160	130			GAM

219-Z-9 Trench Chara. Borehole-Soil

Note: Gamma data is in units of pCi/sample.

DATA SHEETS
Page 2
SUMMARY DATA SECTION
Page 12

Lab id	EBRLNE
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	01/31/04

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?

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

EBERLINE SERVICES

RICHMOND, CA LABORATORY
SAMPLE RECEIPT CHECKLIST

Client: FLR Date/Time received 1000 12-10-03

CoC No. F03-018-075,076

Container I.D. No. SAWS 107 Requested TAT (Days) 45 P.O. Received Yes [ ] No [ ]

INSPECTION

1. Custody seals on shipping container intact? Yes [✓] No [ ] N/A [ ]
2. Custody seals on shipping container dated & signed? Yes [✓] No [ ] N/A [ ]
3. Custody seals on sample containers intact? Yes [ ] No [ ] N/A [✓]
4. Custody seals on sample containers dated & signed? Yes [ ] No [ ] N/A [✓]
5. Packing material is: Wet [ ] Dry [✓]
6. Number of samples in shipping container: 2
7. Number of containers per sample: 1 (Or see CoC ____)
8. Samples are in correct container Yes [✓] No [ ]
9. Paperwork agrees with samples? Yes [✓] No [ ]
10. Samples have: Tape [✓] Hazard labels [✓] Red labels [✓] Appropriate sample labels [✓]
11. Samples are: In good condition [✓] Leaking [ ] Broken Container [ ] Missing [ ]
12. Samples are: Preserved [ ] Not preserved [✓] pH ____ Preservative ____
13. Describe any anomalies: ____
14. Was P.M. notified of any anomalies? Yes [ ] No [ ] Date ____
15. Received by [signature] Date: 12-10-03 Time: 1000

Customer Sample No.	cpm	mR/hr	wipe	Customer Sample No.	cpm	mR/hr	wipe
B17N46-A	<40						
B17TM6-A	<40						

Ion Chamber Ser. No. ____ Calibration date ____

Alpha Meter Ser. No. ____ Calibration date ____

Beta/Gamma Meter Ser. No. 166261 Calibration date 2-14-03

Form SCP-01.2, 08-04-03

"over 50 years of quality nuclear services"

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1.0 GENERAL

Fluor Hanford Inc. (FH) Sample Delivery Group H2459 was composed of two soil samples designated under SAF No. F03-018 with a Project Designation of: 216-Z-9 Trench Characterization Borehole – Soil.

Due to limited sample volume and high alpha activity (from Am-241) in samples B17N46-A and B17TM6-A the sample aliquots taken were small and thus the analytical results have high MDAs.

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

2.0 ANALYSIS NOTES

2.1 Tritium Analyses

The LCS and method blank were not scaled to the nominal aliquot. No problems were encountered during the course of the analyses.

2.2 Carbon-14 Analyses

The LCS and method blank were not scaled to the nominal aliquot. No problems were encountered during the course of the analyses.

2.3 Nickel-63 Analyses

The LCS and method blank were not scaled to the nominal aliquot. No problems were encountered during the course of the analyses.

2.4 Selenium-79 Analyses

The method blank was not scaled to the nominal aliquot. A LCS was not performed. The laboratory has no Se-79 activity available to perform an LCS. No other problems were encountered during the course of the analyses.

2.5 Iodine-129 Analyses

The LCS and method blank were not scaled to the nominal aliquot. No problems were encountered during the course of the analyses.

2.6 Technetium-99 Analyses

The LCS and method blank were not scaled to the nominal aliquot. No problems were encountered during the course of the analyses.

000002

2.7 Protactinium-231 Analyses

The LCS and method blank were not scaled to the nominal aliquot. No problems were encountered during the course of the analyses.

Please note Pa-231 has neither an assigned CAS No. or FEAD Reference for the electronic data deliverable.

2.8 Gamma Spectroscopy Analyses

Due to limited sample volume samples B17N46-A and B17TM6-A were counted as received (1.0 sample). The gamma spectroscopy data is reported in units of pCi/sample. A sample duplicate was not performed. No other problems were encountered during the course of the analyses.

Case Narrative Certification Statement

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

Mel Mann
Melissa C. Mannion
Senior Program Manager

1/31/4
Date

000403

FLUOR Hanford Inc.	CENTRAL PLATEAU CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	F03-018-076	Page 1 of 1
Collector J.S. Popp	Company Contact Steve Trent / Telephone No. 373-5689	Project Coordinator TRENT, SJ	Price Code 8N / Data Turnaround 45 Days
Project Designation 216-Z-9 Trench Characterization Borehole - Soil	Sampling Location Z-9 Trench C3426 H2459 (7662)	SAF No. F03-018	Air Quality ☐
Ice Chest No. SAWS-107	Field Logbook No. / COA 119152ES10	Method of Shipment Federal Express	
Shipped To EBERLINE SERVICES (Formerly TMA)	Offsite Property No.	Bill of Lading/Air Bill No. 842265470763	

POSSIBLE SAMPLE HAZARDS/REMARKS

High Alpha content/Free phase CCL4 detected

Special Handling and/or Storage

Preservation	None										
Type of Container	G										
No. of Container(s)	1										
Volume	50mg										
SAMPLE ANALYSIS	See item (1) in Special Instructions										

Sample No.	Matrix *	Sample Date	Sample Time										
B17TM6-A	SOIL	10/29/03	0856	Y									

CHAIN OF POSSESSION	Date/Time	Sign/Print Names: Received By/Stored In	Date/Time
Relinquished By/Removed From: RLCh	12-8-03 1030	Received By/Stored In: JG Hogan / J Hogan	1130 12-8-03
Relinquished By/Removed From: JG Hogan / J Hogan	12-8-03 1300	Received By/Stored In: FED EX	
Relinquished By/Removed From: FED EX		Received By/Stored In: [illegible]	12-10-03 1000
Relinquished By/Removed From		Received By/Stored In	
Relinquished By/Removed From		Received By/Stored In	
Relinquished By/Removed From		Received By/Stored In	

SPECIAL INSTRUCTIONS

(1) Gamma Spec - Radium (Radium-226, Radium-228); Carbon-14; Technetium-99; Iodine-129; Nickel-63; Selenium-79; Isotopic Protactinium (Protactinium-231); Tritium - H3

Matrix *

S=Soil
SE=Sediment
SO=Solid
B=Sludge
W=Water
O=Oil
A=Air
OS=Other Solids
OL=Other Liquids
F=Tissue
WI=Wipe
L=Liquid
V=Vegetation
X=Other

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

A-6003-618(03/03)

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FLUOR Hanford Inc.	CENTRAL PLATEAU CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	F03-018-075	Page 1 of 1
Collector J.S. Pope	Company Contact Steve Trent / Telephone No. 373-5689	Project Coordinator TRENT, SJ	Price Code 8N / Data Turnaround 45 Days
Project Designation 216-Z-9 Trench Characterization Borehole - Soil	Sampling Location Z-9 Trench C3426 43.5-46' H2459	SAF No. F03-018	Air Quality ☐
Ice Chest No. SHWS-107	Field Logbook No. / COA 118478ES10 (7462)	Method of Shipment Federal Express	
Shipped To EBERLINE SERVICES (Formerly TMA)	Offsite Property No.	Bill of Lading/Air Bill No. 842265470 0763	

POSSIBLE SAMPLE HAZARDS/REMARKS

High Alpha content

Special Handling and/or Storage

Preservation	None										
Type of Container	O										
No. of Container(s)	1										
Volume	2g										
SAMPLE ANALYSIS	See Item (1) in Special Instructions										

Sample No.	Matrix *	Sample Date	Sample Time										
B17N46-A	SOIL	10/20/03	1029	X									

CHAIN OF POSSESSION	Date/Time	Sign/Print Names: Received By/Stored In	Date/Time
Relinquished By/Removed From: RC Thompson	12-8-03 1030	Received By/Stored In: JG Hogan	12-8-03 1830
Relinquished By/Removed From: JG Hogan	12-8-03 1500	Received By/Stored In: FEDEX	
Relinquished By/Removed From: FEDEX		Received By/Stored In: [illegible]	12-10-03 1000
Relinquished By/Removed From		Received By/Stored In	
Relinquished By/Removed From		Received By/Stored In	
Relinquished By/Removed From		Received By/Stored In	

SPECIAL INSTRUCTIONS

(1) Gamma Spec - Radium (Radium-226, Radium-228), Carbon-14; Technetium-99; Iodine-129; Nickel-63; Selenium-79, Isotopic Protactinium (Protactinium-231); Tritium - H3

Matrix *
S-Soil
SD-Sediment
SO-Solid
SL-Sludge
W-Water
O-Oil
A-Air
DS-Drum Solids
DL-Drum Liquids
T-Tissue
WI-Wipe
L-Liquid
V-Vegetation
X-Other

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

A-6003-618(03/03)

17

00 00 41

EBERLINE SERVICES

RICHMOND, CA LABORATORY
SAMPLE RECEIPT CHECKLIST

Client: FLR Date/Time received 1000 12-10-03

CoC No. F03-018-075,076

Container I.D. No. SAVS 107 Requested TAT (Days) 45 P.O. Received Yes [ ] No [ ]

INSPECTION

1. Custody seals on shipping container intact? Yes [✓] No [ ] N/A [ ]
2. Custody seals on shipping container dated & signed? Yes [✓] No [ ] N/A [ ]
3. Custody seals on sample containers intact? Yes [ ] No [ ] N/A [✓]
4. Custody seals on sample containers dated & signed? Yes [ ] No [ ] N/A [✓]
5. Packing material is: Wet [ ] Dry [✓]
6. Number of samples in shipping container: 2
7. Number of containers per sample: 1 (Or see CoC ____)
8. Samples are in correct container Yes [✓] No [ ]
9. Paperwork agrees with samples? Yes [✓] No [ ]
10. Samples have: Tape [✓] Hazard labels [ ] Red labels [✓] Appropriate sample labels [✓]
11. Samples are: In good condition [✓] Leaking [ ] Broken Container [ ] Missing [ ]
12. Samples are: Preserved [ ] Not preserved [✓] pH ____ Preservative ____
13. Describe any anomalies: ____
14. Was P.M. notified of any anomalies? Yes [ ] No [ ] Date ____
15. Received by [signature] Date: 12-10-03 Time: 1000

Customer Sample No.	cpm	mR/hr	wipe	Customer Sample No.	cpm	mR/hr	wipe
B17N46-A	<40						
B17T46-A	<40						

Ion Chamber Ser. No. ____ Calibration date ____

Alpha Meter Ser. No. ____ Calibration date ____

Beta/Gamma Meter Ser. No. 166261 Calibration date 2-14-03

Form SCP-01.2, 08-04-03 *"over 50 years of quality nuclear services"*

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Appendix 5

Data Validation Supporting Documentation

APPENDIX A

RADIOCHEMICAL DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: 216-Z-9 Vertical Borehole			DATA PACKAGE: H2459		
VALIDATOR: TR Jewett		LAB: Eberline, Richmond		DATE: 6/15/06	
			SDG:		
ANALYSES PERFORMED					
			Technetium	Technetium-99	Tritium
SAMPLES/MATRIX					
B17N46-A	Soil				
B17TM6-A	Soil				

1. Completeness ..... ☐ N/A

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

Comments:

2. Initial Calibration (Levels D, E) ..... ☑ N/A

Instruments/detectors calibrated? ..... Yes No N/A

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

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

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

Calculation check acceptable? ..... Yes No N/A

Comments:

3. Continuing Calibration (Levels D, E) ☑ N/A

Calibration checked within required frequency? Yes No N/A
Calibration check acceptable? Yes No N/A
Calibration check standards traceable? Yes No N/A
Calibration check standards expired? Yes No N/A
Calculation check acceptable? Yes No N/A
Comments:

4. Background Counts (Levels D, E) ☑ N/A

Background Counts checked within required frequency? Yes No N/A
Background Counts acceptable? Yes No N/A
Calculation check acceptable? Yes No N/A
Comments:

5. Blanks (Levels B, C, D, E) ..... ☐ N/A

Method blank analyzed within required frequency? ..... 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? (Levels D, E) ..... Yes No N/A
Comments: _____

6. Laboratory Control Samples or Blank Spike Samples (Levels C, D, E) ..... ☐ N/A

LCS /BSS analyzed within required frequency? ..... Yes No N/A
LCS/BSS recoveries acceptable? ..... Yes No N/A
LCS/BSS traceable? (Levels D,E) ..... Yes No N/A
LCS/BSS expired? (Levels D,E) ..... Yes No N/A
LCS/BSS levels correct? (Levels D,E) ..... Yes No N/A
Transcription/Calculation Errors? (Levels D, E) ..... Yes No N/A
Comments: _____

7. Chemical Carrier Recovery (Levels C, D, E) ..... ~~N/A~~ 6/15/06

Chemical carrier added? ..... Yes No N/A
Chemical recovery acceptable? ..... Yes No N/A
Chemical carrier traceable? (Levels D, E) ..... Yes No N/A

A-3

Chemical carrier expired? (Levels D, E) ..... Yes No N/A
Transcription/Calculation errors? (Levels D, E) ..... Yes No N/A
Comments: Water as carrier in tritium analysis.

8. Tracer Recovery (Levels C, D, E) ..... ☐ N/A

Tracer added? ..... Yes No N/A
Tracer recovery acceptable? ..... Yes No N/A
Tracer traceable? (Levels D, E) ..... Yes No N/A
Tracer expired? (Levels D, E) ..... Yes No N/A
Transcription/Calculation errors? (Levels D, E) ..... Yes No N/A
Comments:

9. Matrix Spikes (Levels C, D, E) ..... ☐ N/A

Matrix spike analyzed? ..... Yes No N/A
Spike recoveries acceptable? ..... Yes No N/A
Spike source traceable? (Levels D, E) ..... Yes No N/A
Spike source expired? Levels D, E) ..... Yes No N/A
Transcription/Calculation Errors? (Levels D, E) ..... Yes No N/A
Comments: For Tc-99, Tc-99m tracer was used instead of MS, and acceptable recoveries were obtained.
For ^3H, H_2O works as carrier, and was used ~~not~~ instead of MS.

No flags required for any results.

A-4

10. Duplicates (Levels C, D, E) ☐ N/A

Duplicates Analyzed at required frequency? Yes No N/A
RPD Values Acceptable? Yes No N/A
Transcription/Calculation Errors? (Levels D, E) Yes No N/A
Comments:

11. Field QC Samples (Levels C, D E) ☒ N/A 8/7/06

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 8/7/06
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:

12. Holding Times (All levels)

Are sample holding times acceptable? Yes No N/A
Comments:

13. Results and Detection Limits (All Levels) ☐ N/A

Results reported for all required sample analyses? (Yes) No N/A

Results supported in raw data?(Levels D, E) Yes No (N/A)

Results Acceptable? (Levels D, E) Yes No (N/A)

Transcription/Calculation errors? (Levels D, E) Yes No (N/A)

MDA's meet required detection limits? Yes (No) N/A

Transcription/calculation errors? (Levels D, E) Yes No (N/A)

Comments: MDA for Tc-99 in ~~B17TM6-A was~~ JJ 6/15/06
B17TM6-A was 16 pCi/g vs 15 pCi/g RDL.

A-6

Comments:

Appendix 6

Additional Documentation Requested
(Quality Control Data)

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H2459

7662-004

Method Blank

METHOD BLANK

SDG	7662	Client/Case no	Hanford — SDG H2459
Contact	Melissa C. Mannion	Contract	No. 630
Lab sample id	R312077-04	Client sample id	Method Blank
Dept sample id	7662-004	Material/Matrix	SOLID
		SAF No	F03-018

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALIFIERS	TEST
Tritium	10028-17-8	0.173	0.62	1.0	400	U	H
Carbon 14	14762-75-5	-0.331	0.59	1.0	50	U	C
Nickel 63	13981-37-8	-0.018	0.52	0.88	30	U	NI_L
Technetium 99	14133-76-7	-0.236	0.18	0.69	15	U	TC
Iodine 129	15046-84-1	-0.001	0.25	0.57	2.0	U	I
Selenium 79	15758-45-9	-0.861	0.85	1.5	10	U	SE_L
Protactinium 231	PA-231	-0.002	0.007	0.016	1.0	U	PA
Potassium 40	13966-00-2	U		28		U	GAM
Cobalt 60	10198-40-0	U		2.3	0.050	U	GAM
Cesium 137	10045-97-3	U		1.9	0.10	U	GAM
Radium 226	13982-63-3	U		4.1		U	GAM
Radium 228	15262-20-1	U		9.6		U	GAM
Europium 152	14683-23-9	U		5.4	0.10	U	GAM
Europium 154	15585-10-1	U		6.9	0.10	U	GAM
Europium 155	14391-16-3	U		4.0	0.10	U	GAM
Thorium 228	14274-82-9	U		5.2		U	GAM
Thorium 232	TH-232	U		9.6		U	GAM
Uranium 235	15117-96-1	U		6.4		U	GAM
Uranium 238	U-238	U		270		U	GAM
Americium 241	14596-10-2	U		4.4		U	GAM

219-Z-9 Trench Chara. Borehole-Soil

QC-BLANK #46352

METHOD BLANKS
Page 1
SUMMARY DATA SECTION
Page 8

Lab id	EBRLNE
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	01/31/04

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EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H2459

7662-003

Lab Control Sample

LAB CONTROL SAMPLE

SDG 7662
Contact Melissa C. Mannion

Client/Case no Hanford SDG H2459
Contract No. 630

Lab sample id 8312077-03
Dept sample id 7662-003

Client sample id Lab Control Sample
Material/Matrix SOLID
SAF No F03-018

ANALYTE	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST	ADDED pCi/g	2σ ERR pCi/g	REC %	3σ LMTS (TOTAL)	PROTOCOL LIMITS
Tritium	230	3.3	1.1	400		H	251	10	92	85-115	80-120
Carbon 14	616	12	3.1	50		C	638	26	97	84-116	80-120
Nickel 63	130	2.3	0.92	30		NI_L	136	5.4	96	84-116	80-120
Technetium 99	120	2.8	0.54	15		TC	120	4.8	100	83-117	80-120
Iodine 129	135	1.3	1.6	2.0		I	127	5.1	106	83-117	80-120
Protactinium 231	8.69	0.44	0.017	1.0		PA	9.98	0.40	87	89-111	80-120
Cobalt 60	240	13	8.7	0.050		GAM	262	10	92	77-123	80-120
Cesium 137	258	12	9.5	0.10		GAM	274	11	94	77-123	80-120

219-Z-9 Trench Chara. Borehole-Soil

QC-LCS #46351

Lab id EBRLMF
Protocol Hanford
Version Ver. 1.0
Form DVP-LCS
Version 3.06
Report date 01/31/04

LAB CONTROL SAMPLES
Page 1
SUMMARY DATA SECTION
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EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H2659

7662-005 B17N46-A

DUPLICATE

SDG 7662		Client/Case no Hanford	SDG H2659
Contact Melissa C. Mannion		Contract No. 630	
DUPLICATE	ORIGINAL		
Lab sample id R312077-05	Lab sample id R312077-01	Client sample id B17N46-A	
Dept sample id 7662-005	Dept sample id 7662-001	Location/Matrix Z-9 Trench, C3426	SOLID
	Received 12/10/03	Collected/Weight 10/20/03 10:29	1.72 g
% solids 100.0	% solids 100.0	Custody/SAF No F03-018-075	F03-018

ANALYTE	DUPLICATE pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST	ORIGINAL pCi/g	2σ ERR (COUNT)	MDA pCi/g	QUALI-FIERS	RPD %	3σ PROT TOT LIMIT
Tritium	12.6	14	23	400	U	H	-1.10	16	26	U	-	
Carbon 14	-1.62	13	22	50	U	C	5.38	14	24	U	-	
Nickel 63	425	530	870	30	U	NI_L	308	560	930	U	-	
Technetium 99	23.2	6.1	16	15		TC	18.0	5.2	14		25	62
Iodine 129	0.542	7.6	17	2.0	U	I	-0.393	9.4	21	U	-	
Selenium 79	-19.6	13	22	10	U	SE_L	-21.3	14	24	U	-	
Protactinium 231	0	10	21	1.0	U	PA	0	3.5	13	U	-	

219-Z-9 Trench Chara. Borehole-Soil

QC-DUP#1 46353

Note: Gamma data is in units of pCi/sample.

DUPLICATES
Page 1
SUMMARY DATA SECTION
Page 10

Lab id EBERLNE
Protocol Hanford
Version Ver 1.0
Form DVO-DUP
Version 3.06
Report date 01/31/04

000014

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP M2459

Test TC Matrix SOLID
SDG 7662
Contact Melissa C. Mannion

LAB METHOD SUMMARY

TECHNETIUM 99 IN SOIL
BETA COUNTING

Client Hanford
Contract No. 630
Contract SDG M2459

RESULTS

LAB SAMPLE ID	RAW TEST	SUF-FIX	PLANCHET	CLIENT SAMPLE ID	Technetium 99	
Preparation batch 7080-164						
R312077-01			7662-001	B17N46-A	18.0	
R312077-02			7662-002	B17TN6-A	15.8	U
R312077-03			7662-003	LCS (QC ID=46351)	ok	
R312077-04			7662-004	BLK (QC ID=46352)	U	
R312077-05			7662-005	Duplicate (R312077-01)	ok	
Nominal values and limits from method 219-Z-9 Trench Chara. Borehole-Soil				RDLs (pCi/g)	15	

METHOD PERFORMANCE

LAB SAMPLE ID	RAW TEST	SUF-FIX	CLIENT SAMPLE ID	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 7080-164			2σ prep error 10.0 % Reference Lab Notebook 7080 pg. 164													
R312077-01			B17N46-A	14	0.0455			79		50			91	01/15/04	01/19	GRB-203
R312077-02			B17TN6-A	16	0.0325			94		50			83	01/15/04	01/20	GRB-222
R312077-03			LCS (QC ID=46351)	0.54	1.00			94		50				01/15/04	01/19	GRB-230
R312077-04			BLK (QC ID=46352)	0.69	1.00			76		50				01/15/04	01/20	GRB-223
R312077-05			Duplicate (R312077-01) (QC ID=46353)	16	0.0428			76		50			92	01/15/04	01/20	GRB-224
Nominal values and limits from method				15	1.00			20-105		50			180			

PROCEDURES	REFERENCE	TC99_TR_SEP_LSC
	CP-021	Preparation of Tc-99m Tracer, rev 2
	CP-002	Q.C. Preparation, rev 4
	CP-003	Addition of Carriers and Tracers, rev 5
	CP-431	Technetium-99 Purification of Soil or Resin by Extraction Chromatography, rev 0
	CP-008	Heavy Element Electroplating, rev 7

AVERAGES ± 2 SD FOR 5 SAMPLES
MDA 9.4 ± 16
YIELD 84 ± 19

Lab id EBERLNE
Protocol Hanford
Version Ver 1.0
Form DVD-LMS
Version 3.06
Report date 01/31/06

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EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP N2459

Test H Matrix SOLID
SDG 7662
Contact Melissa C. Mannion

LAB METHOD SUMMARY

TRITIUM IN SOIL
LIQUID SCINTILLATION COUNTING

Client Hanford
Contract No. 630
Contract SDG N2459

RESULTS

LAB SAMPLE ID	RAW TEST	SUF-FIX	PLANCHET	CLIENT SAMPLE ID	Tritium	
Preparation batch 7080-164						
R312077-01			7662-001	B17N46-A	U	
R312077-02			7662-002	B17TN6-A	U	
R312077-03			7662-003	LCS (QC ID=46351)	ok	
R312077-04			7662-004	BLK (QC ID=46352)	U	
R312077-05			7662-005	Duplicate (R312077-01)	-	U

Nominal values and limits from method RDLs (pCi/g) 400
219-Z-9 Trench Chara. Borehole-Soil

METHOD PERFORMANCE

LAB SAMPLE ID	RAW TEST	SUF-FIX	CLIENT SAMPLE ID	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 7080-164			2σ prep error 10.0 %	Reference Lab Notebook 7080 pg. 164												
R312077-01			B17N46-A	26	0.0411			100		120			82	01/09/04	01/10	LSC-004
R312077-02			B17TN6-A	41	0.0255			100		120			73	01/09/04	01/10	LSC-004
R312077-03			LCS (QC ID=46351)	1.1	1.00			100		120				01/09/04	01/10	LSC-004
R312077-04			BLK (QC ID=46352)	1.0	1.00			100		120				01/09/04	01/09	LSC-004
R312077-05			Duplicate (R312077-01) (QC ID=46353)	23	0.0450			100		120			82	01/09/04	01/10	LSC-004
Nominal values and limits from method				400	1.00					25			180			

PROCEDURES REFERENCE TRITIUM_COX_LSC
CP-251 Tritium/Carbon-14 Oxidation, rev 5

AVERAGES ± 2 SD FOR 5 SAMPLES
MDA 18 ± 35
YIELD 100 ± 0

Lab id EBERLNF
Protocol Hanford
Version Ver 1.0
Form DVD-LMS
Version 3.06
Report date 01/31/04

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