H1486

0057398

Date: 10 February 2002
To: Bechtel Hanford Inc. (technical representative)
From: TechLaw, Inc.
Project: 200-TW-1&2 - Soil Sampling
Subject: Radiochemistry - Data Package No. H1486-ES (SDG No. H1486)

INTRODUCTION

This memo presents the results of data validation on Data Package No. H1486-ES prepared by Eberline Services (ES). A list of samples validated along with the analyses reported and the method of analysis is provided in the following table.

Sample ID	Sample Date	Media	Validation	Analysis
B12ML4	8/26/01	Soil	C	See note 1
B12ML5	8/27/01	Soil	C	See note 1
B12ML6	8/27/01	Soil	C	See note 1

1-Tritium; carbon-14; nickel-63; total strontium; americium-241; technetium-99; isotopic uranium, plutonium and thorium; neptunium-237; gamma spectroscopy; total uranium.

Data validation was conducted in accordance with the BHI validation statement of work and the *200-TW-1 Scavenged Waste Group Operable Unit and 200-TW-2 Tank Waste Group Operable Unit RI/FS Work Plan*, DOE/RL-2000-38, Rev. 0, February 2001. Appendices 1 through 6 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
Appendix 6. Additional Data Requested by Client

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DATA QUALITY PARAMETERS

- **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.

All holding times were acceptable.

- **Method 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"; sample results above the MDA and greater than five times the highest blank concentration are not qualified.

All blank results were acceptable although the target required quantitation limits (TRQLs) were exceeded for 17 of the 29 analytes.

Field Blank

No field blanks were submitted for analysis.

- **Accuracy**

Accuracy is evaluated from laboratory control sample (LCS) or samples and spiked samples from the analytical batch. Measured activities are compared to the known added amounts. The acceptable LCS and matrix spike (MS) recovery range is 70-130%. In addition, samples may be spiked with a radiochemical tracer to assist in isolating the radioisotope of interest with the yield of the tracer being used in calculating sample activity. The acceptable range for tracer recovery is 20% to 105%. Spike sample results outside the above ranges result in associated sample results being qualified as estimates, or not qualified, depending on the activity of the individual sample. Results are rejected for LCS/BSS recoveries of less than 30%, tracer recoveries of less than 20%, and tracer recoveries of greater than 115% for detected results.

Due to the lack of a matrix spike analysis, all carbon-14 and total uranium results were qualified as estimates and flagged "J".

All other accuracy results were acceptable.

- **Laboratory Duplicates**

Analytical precision is expressed by the relative percent differences (RPD) between the recoveries of duplicate matrix spike analyses performed on a sample in the analytical batch. Precision may alternatively be assessed using unspiked duplicate analyses performed on a sample in the analytical batch. If both sample and replicate activities (concentrations) are greater than five times the TRQL and the RPD is less than 35%, no qualification is required. If either activity (concentration) is less than five times the TRQL, the RPD control limit is less than or equal to two times the TRQL. 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 50%, all thorium-228 results were qualified as estimates and flagged "J".

Due to an RPD of 38%, all thorium-230 results were qualified as estimates and flagged "J".

All other duplicate results were acceptable.

<u>Field Duplicate</u>

No field duplicates were submitted for analysis.

- **Detection Levels**

Reported analytical detection levels are compared against 200-TW-1 Scavenged Waste Group Operable Unit and 200-TW-2 Tank Waste Group Operable Unit RI/FS Work Plan, DOE/RL-2000-38, Rev. 0, February 2001 TRQLs to ensure that laboratory detection levels meet the required criteria. Twenty-nine of eighty-seven analytes were reported above their TRQL. Under the BHI statement of work, no qualification is required. All other reported laboratory MDAs were at or below the analyte-specific TRQL.

- **Completeness**

Data package No. H1486-ES was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

Due to the lack of a matrix spike analysis, all carbon-14 and total uranium results were qualified as estimates and flagged "J". Due to an RPD of 50%, all thorium-228 results were qualified as estimates and flagged "J". Due to an RPD of 38%, all thorium-230 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.

Twenty-nine of eighty-seven analytes were reported above their TRQL. 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-2000-38, Rev. 0, *200-TW-1 Scavenged Waste Group Operable Unit and 200-TW-2 Tank Waste Group Operable Unit RI/FS Work Plan*, February 2001.

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 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 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 major 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 major QC deficiency.

Appendix 2

Summary of Data Qualification

DATA QUALIFICATION SUMMARY

SDG: H1486	REVIEWER: TLI	DATE: 2/10/02	PAGE_1_OF_1_
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Thorium-228 Thorium-230	J	All	RPD
Total uranium Carbon-14	J	All	No matrix spike

Appendix 3

Qualified Data Summary and Annotated Laboratory Reports

RADIOCHEMISTRY ANALYSIS, SOIL MATRIX, (PCi/G)

Project: BECHTEL-HANFORD																	
Laboratory: Eberline Services																	
Case	SDG: H1486																
Sample Number		B12ML4		B12ML5		B12ML6											
Remarks																	
Sample Date		08/26/01		08/27/01		08/27/01											
Radiochemistry	CRDL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Tritium	400	0.872	U	0.120	U	0.328											
Carbon-14	50	3.15	UJ	1.86	UJ	1.67	UJ										
Nickel-63	30	585	U*	6.40	U*	-0.545	U										
Total Strontium	1	5710000		128000		98.3											
Americium-241	1	770		21.8		0.133	U										
Technetium-99	15	1.56		0.098	U	-0.034	U										
Thorium-228		6.78	UJ	0.767	UJ	0.564	J										
Thorium-230		108	J	-3.99	UJ	0.397	UJ										
Thorium-232	1	0	U*	0.380	U*	0.860											
Total Uranium (ug/g)	1	139	J	346	J	24.2	J										
Uranium-233	1	46.9	U*	117		8.11											
Uranium-235	1	0	U*	3.77	U*	0.586											
Uranium-238	1	26.8	U*	108		7.50											
Neptunium-237	1	3.71	U*	0	U*	-0.065	U										
Plutonium-238	1	140		4.12	U*	0	U										
Plutonium-239/240	1	25800		1360		1.56											
Potassium-40		572		16.4		U	U										
Cobalt 60	0.05	U	U*	U	U*	U	U*										
Cesium 137	0.1	67300		6190		5910											
Radium-226	0.1	U	U*	U	U*	U	U*										
Radium-228	0.2	U	U*	U	U*	U	U*										
Europium 152	0.1	U	U*	U	U*	U	U*										
Europium 154	0.1	U	U*	U	U*	U	U*										
Europium 155	0.1	U	U*	U	U*	U	U*										
Thorium-228(gamma)		U	U	U	U	U	U										
Thorium-232(gamma)		U	U	U	U	U	U										
Uranium-238(gamma)		U	U	140		U	U										
Uranium-235(gamma)		U	U	U	U	U	U										
Americium-241 (gamma)		U	U	U	U	U	U										

* - TRQL exceeded

Laboratory applied non-detect qualifiers "U" have been included in this table to minimize miss-interpretation of results. All other qualifiers shown were applied during validation.

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H1486

R109001-01 B12ML4

DATA SHEET

SDG	7073	Client/Case no	Hanford	SDG H1486	
Contact	Melissa C. Mannion	Contract	No. 630		
Lab sample id	R109001-01	Client sample id	B12ML4		
Dept sample id	7073-001	Location/Matrix	B-7/200 E	SOLID	
Received	08/31/01	Collected/Weight	08/26/01 23:45	275.3 g	
% solids	90.8	Custody/SAF No	B01-058-249	B01-058	

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Tritium	10028-17-8	0.872	1.1	1.8	400	U	H
Carbon 14	14762-75-5	3.15	2.5	4.0	50	U J	C
Nickel 63	13981-37-8	585	640	1100	30	U	NI_L
Total Strontium	SR-RAD	5710000	10000	230	1.0		SR
Americium 241	14596-10-2	770	260	140	1.0		AM
Technetium 99	14133-76-7	1.56	0.46	1.3	15		TC
Thorium 228	14274-82-9	6.78	27	52		U J	TH
Thorium 230	14269-63-7	108	81	83	1.0	J	TH
Thorium 232	TH-232	0	14	52	1.0	U	TH
Total Uranium (ug/g)	7440-61-1	139	15	0.28	0.10	J	U_T
Uranium 233	U-233/234	46.9	40	51	1.0	U	U
Uranium 235	15117-96-1	0	16	62	1.0	U	U
Uranium 238	U-238	26.8	27	51	1.0	U	U
Neptunium 237	13994-20-2	3.71	15	28	1.0	U	NP
Plutonium 238	13981-16-3	140	71	90	1.0		PU
Plutonium 239/240	PU-239/240	25800	2100	89	1.0		PU
Potassium 40	13966-00-2	572	190	130			GAM
Cobalt 60	10198-40-0	U		35	0.050	U	GAM
Cesium 137	10045-97-3	67300	380	130	0.10		GAM
Radium 226	13982-63-3	U		170	0.10	U	GAM
Radium 228	15262-20-1	U		200	0.20	U	GAM
Europium 152	14683-23-9	U		390	0.10	U	GAM
Europium 154	15585-10-1	U		98	0.10	U	GAM
Europium 155	14391-16-3	U		490	0.10	U	GAM
Thorium 228	14274-82-9	U		230		U	GAM
Thorium 232	TH-232	U		200		U	GAM
Uranium 235	15117-96-1	U		670		U	GAM
Uranium 238	U-238	U		5700		U	GAM

200-TW-1 & 2 - Soil Sampling

2/10/02

Lab id	TMANC
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	11/14/01

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H1486

R109001-01 B12ML4

DATA SHEET, cont

SDG	7073	Client/Case no	Hanford SDG H1486
Contact	Melissa C. Mannion	Contract	No. 630
Lab sample id	R109001-01	Client sample id	B12ML4
Dept sample id	7073-001	Location/Matrix	B-7/200 E SOLID
Received	08/31/01	Collected/Weight	08/26/01 23:45 275.3 g
% solids	90.8	Custody/SAF No	B01-058-249 B01-058

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Americium 241	14596-10-2	U		790		U	GAM

200-TW-1 & 2 - Soil Sampling

2/10/02

Lab id	TMANC
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	11/14/01

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H1486

R109001-02 B12ML5

DATA SHEET

SDG	7073	Client/Case no	Hanford	SDG H1486	
Contact	Melissa C. Mannion	Contract	No. 630		
Lab sample id	R109001-02	Client sample id	B12ML5		
Dept sample id	7073-002	Location/Matrix	B-7/200 E	SOLID	
Received	08/31/01	Collected/Weight	08/27/01 01:15	273.6 g	
% solids	94.8	Custody/SAF No	B01-058-250	B01-058	

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALIFIERS	TEST
Tritium	10028-17-8	0.120	0.24	0.40	400	U	H
Carbon 14	14762-75-5	1.86	2.8	4.6	50	U J	C
Nickel 63	13981-37-8	6.40	63	110	30	U	NI_L
Total Strontium	SR-RAD	128000	560	19	1.0		SR
Americium 241	14596-10-2	21.8	15	14	1.0		AM
Technetium 99	14133-76-7	0.098	0.35	1.0	15	U	TC
Thorium 228	14274-82-9	0.767	3.5	6.2		U J	TH
Thorium 230	14269-63-7	-3.99	3.8	8.2	1.0	U J	TH
Thorium 232	TH-232	0.380	1.1	2.1	1.0	U	TH
Total Uranium (ug/g)	7440-61-1	346	41	2.8	0.10	J	U_T
Uranium 233	U-233/234	117	19	6.0	1.0		U
Uranium 235	15117-96-1	3.77	3.0	5.8	1.0	U	U
Uranium 238	U-238	108	18	4.8	1.0		U
Neptunium 237	13994-20-2	0	4.2	16	1.0	U	NP
Plutonium 238	13981-16-3	4.12	5.5	11	1.0	U	PU
Plutonium 239/240	PU-239/240	1360	140	10	1.0		PU
Potassium 40	13966-00-2	16.4	7.1	5.0			GAM
Cobalt 60	10198-40-0	U		0.92	0.050	U	GAM
Cesium 137	10045-97-3	6190	19	4.9	0.10		GAM
Radium 226	13982-63-3	U		6.3	0.10	U	GAM
Radium 228	15262-20-1	U		5.8	0.20	U	GAM
Europium 152	14683-23-9	U		15	0.10	U	GAM
Europium 154	15585-10-1	U		3.1	0.10	U	GAM
Europium 155	14391-16-3	U		14	0.10	U	GAM
Thorium 228	14274-82-9	U		7.3		U	GAM
Thorium 232	TH-232	U		5.8		U	GAM
Uranium 235	15117-96-1	U		21		U	GAM
Uranium 238	U-238	140	130	160		U	GAM

200-TW-1 & 2 - Soil Sampling

2/10/02

Lab id	TMANC
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	11/14/01

DATA SHEET, cont

SDG	7073	Client/Case no	Hanford	SDG H1486
Contact	Melissa C. Mannion	Contract	No. 630	
Lab sample id	R109001-02	Client sample id	B12ML5	
Dept sample id	7073-002	Location/Matrix	B-7/200 E	SOLID
Received	08/31/01	Collected/Weight	08/27/01 01:15	273.6 g
% solids	94.8	Custody/SAF No	B01-058-250	B01-058

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Americium 241	14596-10-2	U		19		U	GAM

200-TW-1 & 2 - Soil Sampling

2/10/02

Lab id	TMANC
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	11/14/01

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H1486

R109001-03 B12ML6

DATA SHEET

SDG	7073	Client/Case no	Hanford	SDG H1486	
Contact	Melissa C. Mannion	Contract	No. 630		
Lab sample id	R109001-03	Client sample id	B12ML6		
Dept sample id	7073-003	Location/Matrix	B-7/200 E	SOLID	
Received	08/31/01	Collected/Weight	08/27/01 04:30	280.3 g	
% solids	88.5	Custody/SAF No	B01-058-251	B01-058	

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALIFIERS	TEST
Tritium	10028-17-8	0.328	0.13	0.20	400		H
Carbon 14	14762-75-5	1.67	2.4	3.9	50	U J	C
Nickel 63	13981-37-8	-0.545	3.1	5.2	30	U	NI_L
Total Strontium	SR-RAD	98.3	3.6	1.1	1.0		SR
Americium 241	14596-10-2	0.133	0.27	0.51	1.0	U	AM
Technetium 99	14133-76-7	-0.034	0.27	0.61	15	U	TC
Thorium 228	14274-82-9	0.564	0.27	0.25		J	TH
Thorium 230	14269-63-7	0.397	0.33	0.44	1.0	U J	TH
Thorium 232	TH-232	0.860	0.33	0.25	1.0		TH
Total Uranium (ug/g)	7440-61-1	24.2	2.9	0.28	0.10	J	U_T
Uranium 233	U-233/234	8.11	1.2	0.33	1.0		U
Uranium 235	15117-96-1	0.586	0.30	0.28	1.0		U
Uranium 238	U-238	7.50	1.1	0.29	1.0		U
Neptunium 237	13994-20-2	-0.065	0.13	0.50	1.0	U	NP
Plutonium 238	13981-16-3	0	0.12	0.46	1.0	U	PU
Plutonium 239/240	PU-239/240	1.56	0.61	0.46	1.0		PU
Potassium 40	13966-00-2	U		20		U	GAM
Cobalt 60	10198-40-0	U		0.99	0.050	U	GAM
Cesium 137	10045-97-3	5910	32	6.6	0.10		GAM
Radium 226	13982-63-3	U		8.9	0.10	U	GAM
Radium 228	15262-20-1	U		5.1	0.20	U	GAM
Europium 152	14683-23-9	U		22	0.10	U	GAM
Europium 154	15585-10-1	U		3.4	0.10	U	GAM
Europium 155	14391-16-3	U		8.9	0.10	U	GAM
Thorium 228	14274-82-9	U		9.9		U	GAM
Thorium 232	TH-232	U		5.1		U	GAM
Uranium 235	15117-96-1	U		16		U	GAM
Uranium 238	U-238	U		170		U	GAM

200-TW-1 & 2 - Soil Sampling

2/10/02

Lab id	TMANC
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	11/14/01

DATA SHEET, cont

SDG	7073	Client/Case no	Hanford	SDG H1486
Contact	Melissa C. Mannion	Contract	No. 630	
Lab sample id	R109001-03	Client sample id	B12ML6	
Dept sample id	7073-003	Location/Matrix	B-7/200 E	SOLID
Received	08/31/01	Collected/Weight	08/27/01 04:30	280.3 g
% solids	88.5	Custody/SAF No	B01-058-251	B01-058

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Americium 241	14596-10-2	U		4.6		U	GAM

200-TW-1 & 2 - Soil Sampling

pa 2/10/02

Lab id	TMANC
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	11/14/01

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

1.0 GENERAL

Bechtel Hanford Inc. (BHI) Sample Delivery Group H1486 was composed of three solid (soil) samples designated under SAF No. B01-058 with a Project Designation of: 200-TW-1 & -2 – Soil Sampling.

The samples were received as stated on the Chain-of-Custody documents. Any discrepancies are noted on the Eberline Services Sample Receipt Checklist. The results were transmitted to BHI via e-Fax on November 8 and 14, 2001.

2.0 ANALYSIS NOTES

2.1 Isotopic Plutonium Analyses

No problems were encountered during the course of the analyses.

2.2 Total Strontium Analyses

No problems were encountered during the course of the analyses.

2.3 Nickel-63 Analyses

No problems were encountered during the course of the analyses.

2.4 Americium-241 Analyses

Due to Pu-239 on the Am-241 planchets for samples B12ML4 and B12ML5, the samples had to be reworked in chemistry to remove the Pu. The results from the reworked samples are reported herein. No other problems were encountered during the course of the analyses.

2.5 Gamma Spectroscopy Analyses

No problems were encountered during the course of the analyses.

2.6 Isotopic Thorium Analyses

No problems were encountered during the course of the analyses.

2.7 Technetium-99 Analyses

No problems were encountered during the course of the analyses.

2.8 Neptunium-237 Analyses

Due to a low yield Np-237 sample B12ML4 was reanalyzed with new QC samples. Sample B12ML4 was batched with Np-237 reanalysis samples from SDG H1486 (7070). No other problems were encountered during the course of the analyses.

2.9 Carbon-14 Analyses

No problems were encountered during the course of the analyses.

2.10 Isotopic Uranium Analyses

No problems were encountered during the course of the analyses.

2.11 Total Uranium Analyses

There was contamination in the method blank (0.32 μg/g). The activity was above the RDL (0.1 μg/g) for total uranium, but less than 5-times the MDA (0.28 μg/g). No other problems were encountered during the course of the analyses.

2.12 Tritium Analyses

The H3 matrix spike had a percent recovery (79%) below the 3σ limits (87 to 113%) and was slightly below the laboratory protocol limits (80 to 120%), but within BHI's limits (60 to 140%). 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."

Melissa Mannion

Melissa C. Mannion
Program Manager

11/21/01

Date

Bechtel Hanford Inc.

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

Collector: Thomas G./Watson D.	Company Contact: Todd, M.E.	Telephone No.: (509) 372-9631	Project Coordinator: TRENT, SJ
Project Designation: 200-TW-1 & 2 - Soil Sampling	Sampling Location: B-7A/200 E	H1486 (7073)	SAF No.: B01-058
Chest No.: VIKING S/N 09/00 080019	Field Logbook No.: EL-1518-1	COA: B20TW2-A44C ~~B20TW2674C~~ JT	Method of Shipment: Fed EX
Shipped To: ~~Severn Trent Incorporated~~ RT 8.29.01 TMA	Offsite Property No.: RSR 106558 8/27/01		Bill of Lading/Air Bill No.: NA

Price Code: 8N — Air Quality ☐ — Data Turnaround: 45 Days

POSSIBLE SAMPLE HAZARDS/REMARKS
FIELD RADIOLOGICAL INSTRUMENTS INDICATE 20CPMA, 1MR B, <0.5MR X } ON CONTACT

Samples stored in Ref.# 1B at the 3728 Shipping Facility on 8/27/01. Collector not available to relinquish samples on 8/30/01 for shipment. RT 8.30.01

SAMPLE ANALYSIS

Preservation	Cool 4C	Cool 4C	Cool 4C	Cool 4C	Cool 4C	Cool 4C	None	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	120mL	60mL	60mL	250mL	60mL	250mL	250mL	60mL		
	See item (1) in Special Instructions.	Mercury - 7470 - (CV) DTW 08/15/01	Chromium Hex - 7196	See item (2) in Special Instructions.	VOA - 8260A (TCL)	See item (3) in Special Instructions. DTW 08/15/01	See item (4) in Special Instructions.	Activity Scan		

Sample No.	Matrix *	Sample Date	Sample Time									Tie TO
B12MK3	SOIL	8/27/01	0430			X				X	X	B12MK3

CHAIN OF POSSESSION — Sign/Print Names

Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
DS WATSON [signature]	08/27/01 0745	REF. 1B	08/27/01 0745
Ref 1B 3728	0430 8.30.01	R Thorell	0430 8.30.01
R Thorell	8.30.01	FED EX	8-30-01
Fed Ex	8-31-01 10:00	JR Corso	8-31-01 10:00

SPECIAL INSTRUCTIONS

(1) ~~ICP Metals - 6010A (TAL) (Cadmium, Chromium, Copper, Nickel, Silver); ICP Metals - 6010A (Add-on) (Lead)~~
(2) ~~IC Anions - 300.0 (Chloride, Fluoride, Nitrogen in Nitrate, Nitrogen in Nitrite, Phosphate, Sulfate); Ammonia - 350.1; NO2/NO3 - 353.2; Total Cyanide - 9010; TOC - 9060; pH (Soil) - 9045~~
(3) ~~Semi-VOA - 8270A (Add-On) (Tributyl phosphate); TPH Diesel Range - WTPH-D~~
(4) Gamma Spectroscopy (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155); Gamma Spec - Add-on (Radium-226, Radium-228); Isotopic Plutonium; Isotopic Thorium (Thorium-232); Americium-241; Carbon-14; Neptunium-237; Nickel-63; Strontium-89,90 – Total Sr; Technetium-99; Total Uranium; Tritium - H3; Isotopic Uranium

10/31/00 m SS

Matrix: S=Soil, SD=Sediment, SO=Solid, SI=Sludge, W=Water, O=Oil, A=Air, DS=Drum, DL=Drum, 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

BHI-EE-011 (10/99)

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		B01-058-250	Page 1 of 1
Collector: Thomas G./Watson D.	Company Contact: Todd, M.E.	Telephone No.: (509) 372-9631	Project Coordinator: TRENT, SJ	Price Code: 8N; Data Turnaround: 45 Days
Project Designation: 200-TW-1 & 2 - Soil Sampling	Sampling Location: B-7A/200 E	H1486 (7073)	SAF No.: B01-058	Air Quality ☐
Ice Chest No.: Viking S/N 09 00 050019	Field Logbook No.: EL-1518-1	COA: B20TW2444C ~~B20TW2674C~~ BT	Method of Shipment: Fed EX	
Shipped To: ~~Severn Trent Incorporated~~ RT 8.30.01 TMA	Offsite Property No.: RSR 106558 8/27/01		Bill of Lading/Air Bill No.: NR	

POSSIBLE SAMPLE HAZARDS/REMARKS
FIELD RADIOLOGICAL INSTRUMENTS INDICATE 100cpm/d, 20mR/h, <0.5mRY } ON CONTACT

Samples stored in Ref. TW1&2 at the 3728 Shipping Facility on 8/27/01.
Collector not available to relinquish samples on 8/30/01 for shipment. RT 8-30-01 SIS

Preservation	Cool 4C	Cool 4C	Cool 4C	Cool 4C	Cool 4C	Cool 4C	None	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	120mL	60mL	60mL	250mL	60mL	250mL	250mL	60mL	
	See item (1) in Special Instructions.	Mercury - 7470 - (CV)	Chromium Hex - 7196	See item (2) in Special Instructions.	VOA - 8260A (TCL)	See item (3) in Special Instructions.	See item (4) in Special Instructions.	Asthmatic Scan	Tie to

Sample No.	Matrix *	Sample Date	Sample Time									
B12ML5	SOIL	8/27/01	0115			X				X	X	B12MK2

CHAIN OF POSSESSION		Sign/Print Names	
Relinquished By/Removed From: OS Watson [signature]	Date/Time: 08/27/01 0645	Received By/Stored In: REF TW1&2	Date/Time: 08/27/01 0645
Relinquished By/Removed From: Ref TW1&2	Date/Time: 0830 8.30.01	Received By/Stored In: R.T. R Thorey	Date/Time: 0830 8.30.01
Relinquished By/Removed From: R.T. R Thorey	Date/Time: 0850 8.30.01	Received By/Stored In: FEDEX	Date/Time: 8-30-01
Relinquished By/Removed From: Fed Ex	Date/Time: 8-31-01 10:00	Received By/Stored In: [signature] J R Cerra	Date/Time: 8-31-01 10:00
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) ~~ICP Metals - 6010A (TAL) (Cadmium, Chromium, Copper, Nickel, Silver); ICP Metals - 6010A (Add-on) (Lead)~~
(2) ~~IC Anions - 300.0 (Chloride, Fluoride, Nitrogen in Nitrate, Nitrogen in Nitrite, Phosphate, Sulfate); Ammonia - 350.1; NO2/NO3 - 353.1; Total Cyanide - 9010; TOC - 9060; pH (Soil) - 9045~~
(3) ~~Semi-VOA - 8270A (Add-On) (Tributyl phosphate); TPH Diesel Range - WTPH-D~~
(4) Gamma Spectroscopy (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155); Gamma Spec - Add-on (Radium-226, Radium-228); Isotopic Plutonium; Isotopic Thorium (Thorium-232); Americium-241; Carbon-14; Neptunium-237; Nickel-63; Strontium-89,90 -- Total Sr; Technetium-99; Total Uranium; Tritium - H3; Isotopic Uranium

Matrix: S=Soil, SS=Sediment, SO=Solid, SL=Sludge, W=Water, O=Oil, A=Air, DS=Drum, DL=Drum, 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

BHI-EE-011 (10/99)

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	B01-058-249	Page 1 of 1
Collector: Thomas G./Watson D.	Company Contact: Todd, M.E. — Telephone No.: (509) 372-9631	Project Coordinator: TRENT, SJ	Price Code: 8N — Data Turnaround: 45 Days
Project Designation: 200-TW-1 & 2 - Soil Sampling	Sampling Location: B-7A/200 E H1486 (7073)	SAF No.: B01-058	Air Quality ☐
Ice Chest No.: Viking S/N 09/0005009	Field Logbook No.: EL-1518-1 — COA B20TW2A4U4C ~~B20TW2G4G~~ BT	Method of Shipment: Fed EX	
Shipped To: RT8.3001 ~~Severn Trent Incorporated - Richland~~ TMA	Offsite Property No.: RSR 106508 8/27/01	Bill of Lading/Air Bill No.: N/A	

POSSIBLE SAMPLE HAZARDS/REMARKS

1500 mR/h
800 cpm &
100 mR/h } ON CONTACT

Samples stored in Ref. TWL2 at the 3728 Shipping Facility on 8/27/01. Collector not available to relinquish samples on 8/30/01 for shipment. RT 8.3001

SAMPLE ANALYSIS

Preservation	Cool 4C	Cool 4C	Cool 4C	Cool 4C	Cool 4C	Cool 4C	None	None		
Type of Container	sG	sG	~~P~~ PGQ	sG	sG	sG	sG	~~P~~ PGQ		
No. of Container(s)	1	1	8	1	1	1	1	8		
Volume	120mL	60mL	60mL	250mL	60mL	250mL	250mL	60mL		
	See Item (1) in Special Instructions.	Mercury - 7470 - (CV) 10/15/01	Chromium Hex - 7196	See Item (2) in Special Instructions.	VOA - 8260A (TCL)	See Item (3) in Special Instructions. 10/15/01	See Item (4) in Special Instructions.	Aniline Scan		

Sample No.	Matrix *	Sample Date	Sample Time								
B12ML4	SOIL	8/26/01	2345			X			X	X	B12MK1

CHAIN OF POSSESSION — Sign/Print Names

Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
BT-4 Bay/RSR	08/27/01 0845	REF TWL2	08/27/01 0845
R.L. TWL2	0830 8.30.01	R Thore	0830 8.30.01
R.L. R Thore	0830 8.30.01	FEDEX	8-30-01
FedEx	8-31-01 10:00	[illegible] - JR Gorsu	8-31-01 10:00

SPECIAL INSTRUCTIONS

(1) ~~ICP Metals - 6010A (TAL) (Cadmium, Chromium, Copper, Nickel, Silver); ICP Metals - 6010A (Add-on) (Lead)~~
(2) ~~IC Anions - 300.0 (Chloride, Fluoride, Nitrogen in Nitrate, Nitrogen in Nitrite, Phosphate, Sulfate); Ammonia - 350.1; NO2&NO3 - 353.1; Total Cyanide - 9010; TOC - 9060; pH (Soil) - 9045~~
(3) ~~Semi-VOA - 8270A (Add-On) (Tributyl phosphate); TPH-Diesel Range - WTPH-D~~
(4) Gamma Spectroscopy (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155); Gamma Spec - Add-on (Radium-226, Radium-228); Isotopic Plutonium; Isotopic Thorium (Thorium-232); Americium-241; Carbon-14; Neptunium-237; Nickel-63; Strontium-89,90 -- Total Sr; Technetium-99; Total Uranium; Tritium - H3; Isotopic Uranium

10/15/01

Matrix *
S=Soil
SD=Sediment
SL=Sludge
W=Water
O=Oil
A=Air
DW=Drum W
DL=Drum L
T=Tissue
Wp=Wipe
L=Liquid
V=Vegetable
X=Other

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

From: Melissa Mannion

Appendix 5

Data Validation Supporting Documentation

APPENDIX A

RADIOCHEMICAL DATA VALIDATION CHECKLIST

RADIOCHEMICAL DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: 200+w1+2			DATA PACKAGE: H1486		
VALIDATOR: TCI		LAB: ES		DATE: 2/10/02	
CASE:			SDG: H1486		
ANALYSES PERFORMED					
Gross Alpha/Beta	Strontium-90	Technetium-99	Alpha Spectroscopy	Gamma Spectroscopy	
Total Uranium	Radium-22	Tritium	Ni-63	C14	
SAMPLES/MATRIX					
B12ML4	B12ML5	B12ML6			
					Saul

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: _____

Appendix A – Radiochemical Data Validation Checklist

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: 17 of 29 are MDA

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

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

Appendix A – Radiochemical Data Validation Checklist

Chemical carrier expired? (Levels D, E) ..... Yes No N/A

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

Comments: _____

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: NO Ur(tot) or C14 J all

Appendix A – Radiochemical Data Validation Checklist

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: Th 228 + 230 RPDs

11. Field QC Samples (Levels C, D E) ..... ☐ 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:

12. Holding Times (All levels)

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

Comments:

Appendix A – Radiochemical Data Validation Checklist

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: 24 out

Appendix 6

Additional Documentation Requested by Client

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H1486

R108152-04 Method Blank

METHOD BLANK

SDG	7073	Client/Case no	Hanford SDG H1486
Contact	Melissa C. Mannion	Contract	No. 630
Lab sample id	R108152-04	Client sample id	Method Blank
Dept sample id	7070-004	Material/Matrix	SOLID
		SAF No	B01-058

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Tritium	10028-17-8	N.A.			400		H
Carbon 14	14762-75-5	N.A.			50		C
Nickel 63	13981-37-8	N.A.			30		NI_L
Total Strontium	SR-RAD	N.A.			1.0		SR
Technetium 99	14133-76-7	N.A.			15		TC
Thorium 228	14274-82-9	N.A.					TH
Thorium 230	14269-63-7	N.A.			1.0		TH
Thorium 232	TH-232	N.A.			1.0		TH
Total Uranium (ug/g)	7440-61-1	N.A.			0.10		U_T
Uranium 233	U-233/234	N.A.			1.0		U
Uranium 235	15117-96-1	N.A.			1.0		U
Uranium 238	U-238	N.A.			1.0		U
Neptunium 237	13994-20-2	48.0	48	72	1.0	U	NP
Potassium 40	13966-00-2	N.A.					GAM
Cobalt 60	10198-40-0	N.A.			0.050		GAM
Cesium 137	10045-97-3	N.A.			0.10		GAM
Radium 226	13982-63-3	N.A.			0.10		GAM
Radium 228	15262-20-1	N.A.			0.20		GAM
Europium 152	14683-23-9	N.A.			0.10		GAM
Europium 154	15585-10-1	N.A.			0.10		GAM
Europium 155	14391-16-3	N.A.			0.10		GAM
Thorium 228	14274-82-9	N.A.					GAM
Thorium 232	TH-232	N.A.					GAM
Uranium 235	15117-96-1	N.A.					GAM
Uranium 238	U-238	N.A.					GAM
Americium 241	14596-10-2	N.A.					GAM

200-TW-1 & 2 - Soil Sampling

Lab id	TMANC
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	11/14/01

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H1486

R108152-11 Method Blank

METHOD BLANK

SDG	7073	Client/Case no	Hanford SDG H1486
Contact	Melissa C. Mannion	Contract	No. 630
Lab sample id	R108152-11	Client sample id	Method Blank
Dept sample id	7070-011	Material/Matrix	SOLID
		SAF No	B01-058

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Neptunium 237	13994-20-2	145	290	440	1.0	U	NP

200-TW-1 & 2 - Soil Sampling

QC-BLANK 40179

Lab id	TMANC
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	11/14/01

020023

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H1486

R109001-05

Method Blank

METHOD BLANK

SDG	7073	Client/Case no	Hanford SDG H1486
Contact	Melissa C. Mannion	Contract	No. 630
Lab sample id	R109001-05	Client sample id	Method Blank
Dept sample id	7073-005	Material/Matrix	SOLID
		SAF No	B01-058

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALIFIERS	TEST
Tritium	10028-17-8	0	3.4	6.0	400	UX	H
Carbon 14	14762-75-5	0.782	2.8	4.7	50	U	C
Nickel 63	13981-37-8	64.3	630	1100	30	U	NI_L
Total Strontium	SR-RAD	177	140	210	1.0	U	SR
Americium 241	14596-10-2	-5.39	8.1	10	1.0	U	AM
Technetium 99	14133-76-7	0.015	0.70	2.4	15	U	TC
Thorium 228	14274-82-9	24.3	49	78		U	TH
Thorium 230	14269-63-7	-56.6	49	99	1.0	U	TH
Thorium 232	TH-232	0	16	62	1.0	U	TH
Total Uranium (ug/g)	7440-61-1	0.320	0.13	0.28	0.10		U_T
Uranium 233	U-233/234	0	18	69	1.0	U	U
Uranium 235	15117-96-1	0	22	84	1.0	U	U
Uranium 238	U-238	0	18	69	1.0	U	U
Neptunium 237	13994-20-2	0	80	190	1.0	U	NP
Plutonium 238	13981-16-3	-1.16	7.0	16	1.0	U	PU
Plutonium 239/240	PU-239/240	3.48	7.0	14	1.0	U	PU
Potassium 40	13966-00-2	U		17		U	GAM
Cobalt 60	10198-40-0	U		1.8	0.050	U	GAM
Cesium 137	10045-97-3	U		1.2	0.10	U	GAM
Radium 226	13982-63-3	U		2.1	0.10	U	GAM
Radium 228	15262-20-1	U		5.1	0.20	U	GAM
Europium 152	14683-23-9	U		2.2	0.10	U	GAM
Europium 154	15585-10-1	U		3.3	0.10	U	GAM
Europium 155	14391-16-3	U		1.2	0.10	U	GAM
Thorium 228	14274-82-9	U		1.0		U	GAM
Thorium 232	TH-232	U		5.1		U	GAM
Uranium 235	15117-96-1	U		1.9		U	GAM
Uranium 238	U-238	U		170		U	GAM
Americium 241	14596-10-2	U		0.65		U	GAM

200-TW-1 & 2 - Soil Sampling

Lab id	TMANC
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	11/14/01

000073

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H1486

R108152-03

Lab Control Sample

LAB CONTROL SAMPLE

SDG 7073
Contact Melissa C. Mannion

Client/Case no Hanford SDG H1486
Case no No. 630

Lab sample id R108152-03
Dept sample id 7070-003

Client sample id Lab Control Sample
Material/Matrix SOLID
SAF No B01-058

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	N.A.			400		H					80-120
Carbon 14	N.A.			50		C					80-120
Nickel 63	N.A.			30		NI_L					80-120
Total Strontium	N.A.			1.0		SR					80-120
Technetium 99	N.A.			15		TC					80-120
Thorium 230	N.A.			1.0		TH					80-120
Total Uranium (ug/g)	N.A.			0.10		U_T					80-120
Uranium 233	N.A.			1.0		U					80-120
Uranium 235	N.A.			1.0		U					80-120
Uranium 238	N.A.			1.0		U					80-120
Neptunium 237	10900	950	54	1.0		NP	11900	480	92	85-115	80-120
Cobalt 60	N.A.			0.050		GAM					80-120
Cesium 137	N.A.			0.10		GAM					80-120

200-TW-1 & 2 - Soil Sampling

QC-LCS 39876

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-LCS
Version 3.06
Report date 11/14/01

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H1486

R108152-10

Lab Control Sample

LAB CONTROL SAMPLE

SDG 7073
Contact Melissa C. Mannion

Client/Case no Hanford SDG H1486
Case no No. 630

Lab sample id R108152-10
Dept sample id 7070-010

Client sample id Lab Control Sample
Material/Matrix SOLID
SAF No B01-058

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
Neptunium 237	106000	8100	430	1.0		NP	106000	4200	100	85-115	80-120

200-TW-1 & 2 - Soil Sampling

QC-LCS 40178

Lab id TNANC
Protocol Hanford
Version Ver 1.0
Form DVD-LCS
Version 3.06
Report date 11/14/01

000025

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H1486

R109001-04

Lab Control Sample

LAB CONTROL SAMPLE

SDG 7073

Contact Melissa C. Mannion

Client/Case no Hanford SDG H1486

Case no No. 630

Lab sample id R109001-04

Dept sample id 7073-004

Client sample id Lab Control Sample

Material/Matrix SOLID

SAF No B01-058

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	478	12	5.9	400		H	492	20	97	84-116	80-120
Carbon 14	9820	200	28	50		C	11300	450	87	85-115	80-120
Nickel 63	130000	2300	1000	30		NI_L	132000	5300	98	84-116	80-120
Total Strontium	24500	870	240	1.0		SR	22900	920	107	82-118	80-120
Americium 241	10500	1000	100	1.0		AM	10500	420	100	83-117	80-120
Technetium 99	670	7.5	2.0	15		TC	655	26	102	83-117	80-120
Thorium 230	11900	820	86	1.0		TH	11200	450	106	85-115	80-120
Total Uranium (ug/g)	1860	210	2.8	0.10		U_T	1810	72	103	77-123	80-120
Uranium 233	8430	730	290	1.0		U	9660	390	87	86-114	80-120
Uranium 235	6940	640	50	1.0		U	7850	310	88	85-115	80-120
Uranium 238	9610	810	270	1.0		U	10500	420	92	85-115	80-120
Neptunium 237	10400	1100	200	1.0		NP	11900	480	87	84-116	80-120
Plutonium 238	13400	390	13	1.0		PU	13600	540	99	90-110	80-120
Plutonium 239/240	14600	420	9.3	1.0		PU	14500	580	101	89-111	80-120
Cobalt 60	141	4.5	1.8	0.050		GAM	150	6.0	94	78-122	80-120
Cesium 137	168	3.8	2.0	0.10		GAM	172	6.9	98	77-123	80-120

200-TW-1 & 2 - Soil Sampling

QC-LCS 39951

Lab id THANC

Protocol Hanford

Version Ver 1.0

Form DVD-LCS

Version 3.06

Report date 11/14/01

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H1486

R109001-06 B12ML6

DUPLICATE

SDG	7073			Client/Case no	Hanford SDG H1486
Contact	Melissa C. Mannion			Case no	No. 630
	DUPLICATE		ORIGINAL		
Lab sample id	R109001-06	Lab sample id	R109001-03	Client sample id	B12ML6
Dept sample id	7073-006	Dept sample id	7073-003	Location/Matrix	B-7/200 E SOLID
		Received	08/31/01	Collected/Weight	08/27/01 04:30 280.3 g
% solids	88.5	% solids	88.5	Custody/SAF No	801-058-251 801-058

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	0.247	0.13	0.20	400	J	H	0.328	0.13	0.20	J	28	98
Carbon 14	1.04	2.3	3.9	50	U	C	1.67	2.4	3.9	U	-	
Nickel 63	1.49	3.2	5.4	30	U	NI_L	-0.545	3.1	5.2	U	-	
Total Strontium	95.4	3.6	1.1	1.0		SR	98.3	3.6	1.1		3	23
Americium 241	0.163	0.16	0.31	1.0	U	AM	0.133	0.27	0.51	U	-	
Technetium 99	-0.302	0.27	1.2	15	U	TC	-0.034	0.27	0.61	U	-	
Thorium 228	0.940	0.33	0.25			TH	0.564	0.27	0.25		50	86
Thorium 230	0.582	0.39	0.40	1.0	J	TH	0.397	0.33	0.44	U	38	157
Thorium 232	0.937	0.33	0.25	1.0	J	TH	0.860	0.33	0.25	J	9	79
Total Uranium (ug/g)	24.1	2.8	0.28	0.10		U_T	24.2	2.9	0.28		0	31
Uranium 233	7.90	1.3	0.39	1.0		U	8.11	1.2	0.33		3	35
Uranium 235	0.246	0.20	0.38	1.0	U	U	0.586	0.30	0.28	J	82	130
Uranium 238	6.80	1.2	0.31	1.0		U	7.50	1.1	0.29		10	36
Neptunium 237	0.070	0.14	0.21	1.0	U	NP	-0.065	0.13	0.50	U	-	
Plutonium 238	0	0.10	0.40	1.0	U	PU	0	0.12	0.46	U	-	
Plutonium 239/240	1.46	0.53	0.40	1.0		PU	1.56	0.61	0.46		7	81
Potassium 40	19.2	9.1	7.4			GAM	U		20	U	4	171
Cobalt 60	U		0.67	0.050	U	GAM	U		0.99	U	-	
Cesium 137	6520	25	5.0	0.10		GAM	5910	32	6.6		10	32
Radium 226	U		7.1	0.10	U	GAM	U		8.9	U	-	
Radium 228	U		3.4	0.20	U	GAM	U		5.1	U	-	
Europium 152	U		17	0.10	U	GAM	U		22	U	-	
Europium 154	U		2.5	0.10	U	GAM	U		3.4	U	-	
Europium 155	U		8.3	0.10	U	GAM	U		8.9	U	-	
Thorium 228	U		7.1		U	GAM	U		9.9	U	-	
Thorium 232	U		3.4		U	GAM	U		5.1	U	-	
Uranium 235	U		14		U	GAM	U		16	U	-	
Uranium 238	U		100		U	GAM	U		170	U	-	

200-TW-1 & 2 - Soil Sampling

Lab id	TMANC
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DUP
Version	3.06
Report date	11/14/01

000027

DUPLICATE, cont.

SDG	7073			Client/Case no	Hanford SDG H1486
Contact	Melissa C. Mannion			Case no	No. 630
	DUPLICATE		ORIGINAL		
Lab sample id	R109001-06	Lab sample id	R109001-03	Client sample id	B12ML6
Dept sample id	7073-006	Dept sample id	7073-003	Location/Matrix	B-7/200 E SOLID
		Received	08/31/01	Collected/Weight	08/27/01 04:30 280.3 g
% solids	88.5	% solids	88.5	Custody/SAF No	B01-058-251 B01-058

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
Americium 241	U		10		U	GAM	U		4.6	U	-		

200-TW-1 & 2 - Soil Sampling

QC-DUP#3 39953

Lab id THANC
Protocol Hanford
Version Ver 1.0
Form DVD-DUP
Version 3.06
Report date 11/14/01

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H1486

R109001-07 B12NL6

MATRIX SPIKE

SDG	7073			Client/Case no	Hanford SDG H1486
Contact	Melissa C. Mannion			Case no	No. 630
	MATRIX SPIKE		ORIGINAL		
Lab sample id	R109001-07	Lab sample id	R109001-03	Client sample id	B12NL6
Dept sample id	7073-007	Dept sample id	7073-003	Location/Matrix	B-7/200 E SOLID
		Received	08/31/01	Collected/Weight	08/27/01 04:30 280.3 g
% solids	88.5	% solids	88.5	Custody/SAF No	B01-058-251 B01-058

ANALYTE	SPIKE pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST	ADDED pCi/g	2σ ERR pCi/g	ORIGINAL pCi/g	2σ ERR (COUNT)	REC %	3σ LMTS (TOTAL)	PROTOCOL LIMITS
Tritium	83.2	0.84	0.19	400	JX	H	105	4.2	0.328	0.13	79	87-113	60-140

200-TW-1 & 2 - Soil Sampling

QC-MS#3 39954

MATRIX SPIKES
Page 1
SUMMARY DATA SECTION
Page 20

000029

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-MS
Version 3.06
Report date 11/14/01