Date: 19 July 1999
To: Bechtel Hanford, Inc. (technical representative)
From: TechLaw, Inc.
Project: 100-BC Areas - Full Protocol - Waste Site 116-B-4
Subject: Radiochemistry - Data Package No. H0401-TNU (SDG No. H0401)

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INTRODUCTION

This memo presents the results of data validation on Summary Data Package No. H0401-TNU which was prepared by Thermo NUtech (TNU). A list of samples validated along with the analyses reported and the requested analytes is provided in the following table.

Sample ID	Sample Date	Media	Validation	Analysis
B0VF62	05/06/99	Soil	C	See note 1
B0VF63	05/06/99	Soil	C	See note 1
B0VF64	05/06/99	Soil	C	See note 1
B0VF65	05/06/99	Soil	C	See note 1
B0VF66	05/06/99	Soil	C	See note 1
B0VF67	05/06/99	Soil	C	See note 1

1 - Gamma spectroscopy; alpha spectroscopy (isotopic uranium, isotopic plutonium and americium-241); total strontium; nickel-63.

Data validation was conducted in accordance with the BHI validation statement of work and the 100 Area Remedial Action Sampling and Analysis Plan (DOE/RL May 1998). Appendices 1 through 5 provide the following information as indicated below:

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

DATA QUALITY OBJECTIVES

- **Holding Times**

Holding times are calculated from Chain-of-Custody forms to determine the validity of the results. The maximum holding time for radiochemical analysis is 6 months with liquid scintillation requiring analysis within 7 days of distillation.

All holding times were acceptable.

- **Blanks**

Laboratory Blanks

Blank samples are analyzed to determine if positive results are due to laboratory reagent, sample container, or detector contamination. If blank analysis results indicate the presence of an analyte above the MDA, the following qualifiers are applied: All positive sample results less than five times the highest blank concentration are qualified as estimates and flagged "J"; sample results below the MDA are qualified as undetected and flagged "U"; sample results above the MDA and greater than five times the highest blank concentration are not qualified.

Due to the blank analysis being conducted three days after sample analysis, plutonium-228 and plutonium-239/240 results in samples B0VF62, B0VF64, B0VF65, B0VF66 and B0VF67 were qualified as estimates and flagged "J".

Due to the blank analysis being conducted four days after sample analysis, all gamma spectroscopy results in all samples were qualified as estimates and flagged "J".

Due to the blank analysis being conducted four days after sample analysis, americium-241 results in all samples were qualified as estimates and flagged "J".

All other blank results were acceptable.

<u>Equipment Blanks</u>

One equipment blank (B0VF65) was submitted for analysis. Uranium-234, uranium-238 (alpha spec), potassium-40, radium-226, radium-228, thorium-228 and thorium-232 were detected in the equipment blank. Under the BHI statement of work, no qualification is required.

- **Accuracy**

Accuracy is evaluated by analyzing distilled water or field samples spiked with known amounts of radionuclides. The sample activity as determined by analysis is compared to the known activity to assess accuracy. The acceptable laboratory control sample and matrix spike recovery range is either 70-130% or ±3 sigma. In addition, samples may be spiked with a radiochemical tracer to assist in isolating the radioisotope of interest with the yield of the tracer being used in calculating sample activity. The acceptable range for tracer recovery is 20% to 105%. Spike sample results outside the above ranges result in associated sample results being qualified as estimates, rejected, or not qualified, depending on the activity of the individual sample.

Due to the LCS analysis being conducted two days after sample analysis, americium-241 results in all samples were qualified as estimates and flagged "J".

Due to the LCS analysis being conducted three days after sample analysis, plutonium-228 and plutonium-239/240 results in samples B0VF62, B0VF64, B0VF65, B0VF66 and B0VF67 were qualified as estimates and flagged "J".

All accuracy results were acceptable.

- **Precision**

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

Due to the duplicate analysis being conducted three days after sample analysis, plutonium-228 and plutonium-239/240 results in samples B0VF62, B0VF64, B0VF65, B0VF66 and B0VF67 were qualified as estimates and flagged "J".

Due to the duplicate analysis being conducted two days after sample analysis, gamma spectroscopy results in all samples were qualified as estimates and flagged "J".

All duplicate results were acceptable.

Field Duplicate Samples

One pair of field duplicate samples (samples B0VF63/B0VF64) were submitted to TNU for analysis. The duplicate sample results were compared using the validation guidelines for determining the RPD between a sample and its duplicate. All field duplicate results were acceptable.

- **Detection Levels**

Reported analytical detection levels are compared against the 100 Area Remedial Action Sampling and Analysis Plan target detection limits (TDLs) or the contract specified MDA if no TDL was specified, to ensure that laboratory detection levels meet the required criteria. The reported dection limit exceeded the TDL for uranium-238 (GEA) in all samples. Under the BHI statement of work, no qualification is required. All other reported laboratory MDAs were at or below the analyte-specific TDL or contract specified MDA.

- **Completeness**

Data Package No. H0401 (SDG No. H0401) was submitted for validation and verified for completeness. The completion rate was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

Minor defieciencies included the following:

- Due to the blank analysis being conducted three days after sample analysis, plutonium-228 and plutonium-239/240 results in samples B0VF62, B0VF64, B0VF65, B0VF66 and B0VF67 were qualified as estimates and flagged "J".

- Due to the blank analysis being conducted four days after sample analysis, all gamma spectroscopy results in all samples were qualified as estimates and flagged "J".

- Due to the blank analysis being conducted four days after sample analysis, americium-241 results in all samples were qualified as estimates and flagged "J".

- Due to the LCS analysis being conducted two days after sample analysis, americium-241 results in all samples were qualified as estimates and flagged "J".

- Due to the LCS analysis being conducted three days after sample analysis, plutonium-228 and plutonium-239/240 results in samples B0VF62, B0VF64, B0VF65, B0VF66 and B0VF67 were qualified as estimates and flagged "J".

- Due to the duplicate analysis being conducted three days after sample analysis, plutonium-228 and plutonium-239/240 results in samples B0VF62, B0VF64, B0VF65, B0VF66 and B0VF67 were qualified as estimates and flagged "J".

- Due to the duplicate analysis being conducted two days after sample analysis, gamma spectroscopy results in all samples were qualified as estimates and flagged "J".

Data flagged 'J' is an estimate, but under the BHI validation SOW, the data may be usable for decision-making purposes. All other validated results are considered accurate within the standard error associated with the methods.

The reported dection limit exceeded the TDL for uranium-238 (GEA) in all samples and europium-155 in samples B0VF62, B0VF64 and B0VF65. Under the BHI statement of work, no qualification is required.

REFERENCES

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

DOE/RL-96-22, Rev. 1, *100 Area Remedial Action Sampling and Analysis Plan*, U.S. Department of Energy, May 1998.

Appendix 1

Glossary of Data Reporting Qualifiers

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

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

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

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

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

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

Appendix 2

Summary of Data Qualification

DATA QUALIFICATION SUMMARY

SDG: H0401	REVIEWER: TLI	DATE: 7/19/99	PAGE_1_OF_1_
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Pu-238 and Pu-239/40	J	B0VF62, B0VF64, B0VF65, B0VF66, B0VF67	Blank not analyzed with the samples
Pu-238 and Pu-239/40	J	B0VF62, B0VF64, B0VF65, B0VF66, B0VF67	LCS not analyzed with the samples
Pu-238 and Pu-239/40	J	B0VF62, B0VF64, B0VF65, B0VF66, B0VF67	Duplicate not analyzed with the samples
All gamma spectroscopy analytes	J	All	Blank not analyzed with the samples
All gamma spectroscopy analytes	J	All	Duplicate not analyzed with the samples
Americium-241	J	All	Blank not analyzed with the samples
Americium-241	J	All	LCS not analyzed with the samples

Appendix 3

Qualified Data Summary and Annotated Laboratory Reports

RADIOCHEMISTRY ANALYSIS, SOIL MATRIX, (PCi/G)

Project: BECHTEL-HANFORD																							
Laboratory: TNU																							
Case	SDG: H0401																						
Sample Number		B0VF62		B0VF63		B0VF64		B0VF65		B0VF66		B0VF67											
Location		116-B-4		116-B-4		116-B-4		116-B-4		116-B-4		116-B-4											
Remarks		A1		A2		Duplicate		Equip. Blank		A3		A4											
Sample Date		05/06/99		05/06/99		05/06/99		05/06/99		05/06/99		05/06/99											
Radiochemistry	CRDL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q								
Uranium-234	0.1	0.480		0.459		0.593		0.174		0.466		0.378											
Uranium-235	0.1	0.022	U	0.056	U	0.046	U	0.012	U	0.011	U	0.012	U										
Uranium-238	0.1	0.632		0.340		0.452		0.195		0.484		0.534											
Plutonium-238	0.1	0.021	UJ	-0.003	U	0.003	UJ	0.003	UJ	0.027	UJ	0.367	J										
Plutonium-239/40	0.1	0.007	UJ	0.008	U	-0.003	UJ	0	UJ	0.030	UJ	0.353	J										
Nickel-63	30	0.511	U	-1.25	U	0.142	U	-0.392	U	-0.822	U	0.454	U										
Americium-241	0.1	0.014	UJ	0	UJ	-0.009	UJ	-0.005	UJ	0.016	UJ	0.011	UJ										
Strontium (total)	1	0.042	U	-0.095	U	-0.023	U	-0.102	U	0.030	U	-0.016	U										
Potassium-40		12.0	J	12.1	J	12.4	J	4.33	J	12.1	J	12.8	J										
Cobalt 60	0.05	U	UJ	U	UJ	U	UJ	U	UJ	U	UJ	U	UJ										
Cesium 137	0.1	0.032	J	0.011	UJ	U	UJ	U	UJ	0.034	J	0.049	J										
Europium 152	0.1	U	UJ	U	UJ	U	UJ	U	UJ	U	UJ	U	UJ										
Europium 154	0.1	U	UJ	U	UJ	U	UJ	U	UJ	U	UJ	U	UJ										
Europium 155	0.05	U	UJ	U	UJ	U	UJ	U	UJ	U	UJ	U	UJ										
Radium-226		0.494	J	0.467	J	0.487	J	0.171	J	0.472	J	0.527	J										
Radium-228		0.649	J	0.687	J	0.709	J	0.180	J	0.697	J	0.724	J										
Thorium-228		0.805	J	0.785	J	0.686	J	0.185	J	0.644	J	0.701	J										
Thorium-232		0.649	J	0.687	J	0.709	J	0.180	J	0.697	J	0.724	J										
Americium-241 (GEA)	0.1	U	UJ	U	UJ	U	UJ	U	UJ	U	UJ	U	UJ										
Uranium-238 (GEA)	0.1	U	UJ	U	UJ	U	UJ	U	UJ	U	UJ	U	UJ										
Uranium-235 (GEA)	0.1	U	UJ	U	UJ	U	UJ	U	UJ	U	UJ	U	UJ										

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SAMPLE DELIVERY GROUP H0401

N905047-01 B0VF62

DATA SHEET

SDG	7122	Client/Case no	Hanford SDG-H0401
Contact	L.A. Johnson	Case no	TRB-SBB-207925
Lab sample id	N905047-01	Client sample id	B0VF62
Dept sample id	7122-001	Location/Matrix	100 B/C 116-B-4 Shallow SOLID
Received	05/11/99	Collected	05/06/99 09:30
% solids	92.3	Custody/SAF No	B99-002-94 B99-002

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALIFIERS	TEST
Uranium 233/234	U-233/234	0.480	0.13	0.068	1.0	J	U
Uranium 235	15117-96-1	0.022	0.022	0.082	1.0	U	U
Uranium 238	U-238	0.632	0.15	0.068	1.0	J	U
Plutonium 238	13981-16-3	0.021	0.014	0.027	1.0	U J	PU
Plutonium 239/240	PU-239/240	0.007	0.007	0.027	1.0	U J	PU
Nickel 63	13981-37-8	0.511	1.9	3.2	30	U	NI_L
Americium 241	14596-10-2	0.014	0.028	0.035	1.0	U J	AM
Total Strontium	SR-RAD	0.042	0.15	0.20	1.0	U	SR
Potassium 40	13966-00-2	12.0	0.49	0.26		J	GAM
Cobalt 60	10198-40-0	U		0.024	0.050	U	GAM
Cesium 137	10045-97-3	0.032	0.021	0.026	0.10	~~U~~	GAM
Europium 152	14683-23-9	U		0.056	0.10	U	GAM
Europium 154	15585-10-1	U		0.074	0.10	U	GAM
Europium 155	14391-16-3	U		0.056	0.10	U	GAM
Radium 226	13982-63-3	0.494	0.038	0.036	0.10		GAM
Radium 228	15262-20-1	0.649	0.094	0.098	0.20		GAM
Thorium 228	14274-82-9	0.805	0.041	0.040			GAM
Thorium 232	TH-232	0.649	0.094	0.098			GAM
Americium 241	14596-10-2	U		0.081		U	GAM
Uranium 238	U-238	U		2.8		U	GAM
Uranium 235	15117-96-1	U		0.091		U	GAM

100 BC Areas-Full Protocol

7/16/99

Lab id	TMANC
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	07/12/99

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SAMPLE DELIVERY GROUP H0401

N905047-02 B0VF63

DATA SHEET

SDG	7122	Client/Case no	Hanford SDG-H0401
Contact	L.A. Johnson	Case no	TRB-SBB-207925
Lab sample id	N905047-02	Client sample id	B0VF63
Dept sample id	7122-002	Location/Matrix	SOLID
Received	05/11/99	Collected	05/06/99 09:37
% solids	93.8	Custody/SAF No	B99-002-94 B99-002

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALIFIERS	TEST
Uranium 233/234	U-233/234	0.459	0.13	0.070	1.0	J	U
Uranium 235	15117-96-1	0.056	0.045	0.085	1.0	U	U
Uranium 238	U-238	0.340	0.11	0.070	1.0	J	U
Plutonium 238	13981-16-3	-0.003	0.010	0.028	1.0	U	PU
Plutonium 239/240	PU-239/240	0.008	0.015	0.032	1.0	U	PU
Nickel 63	13981-37-8	-1.25	1.8	3.0	30	U	NI_L
Americium 241	14596-10-2	0	0.018	0.035	1.0	U J	AM
Total Strontium	SR-RAD	-0.095	0.13	0.18	1.0	U	SR
Potassium 40	13966-00-2	12.1	0.31	0.12		J	GAM
Cobalt 60	10198-40-0	U		0.013	0.050	U	GAM
Cesium 137	10045-97-3	0.011	0.009	0.012	0.10	U	GAM
Europium 152	14683-23-9	U		0.031	0.10	U	GAM
Europium 154	15585-10-1	U		0.042	0.10	U	GAM
Europium 155	14391-16-3	U		0.045	0.10	U	GAM
Radium 226	13982-63-3	0.467	0.027	0.025	0.10		GAM
Radium 228	15262-20-1	0.687	0.056	0.053	0.20		GAM
Thorium 228	14274-82-9	0.785	0.025	0.024			GAM
Thorium 232	TH-232	0.687	0.056	0.053			GAM
Americium 241	14596-10-2	U		0.041		U	GAM
Uranium 238	U-238	U		1.6		U	GAM
Uranium 235	15117-96-1	U		0.054		U	GAM

100 BC Areas-Full Protocol

7/16/99

Lab id	TMANC
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	07/12/99

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SAMPLE DELIVERY GROUP H0401

N905047-03 B0VF64

DATA SHEET

SDG	7122	Client/Case no	Hanford SDG-H0401
Contact	L.A. Johnson	Case no	TRB-SBB-207925
Lab sample id	N905047-03	Client sample id	B0VF64
Dept sample id	7122-003	Location/Matrix	SOLID
Received	05/11/99	Collected	05/06/99 09:37
% solids	93.3	Custody/SAF No	B99-002-94 B99-002

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALIFIERS	TEST
Uranium 233/234	U-233/234	0.593	0.16	0.072	1.0	J	U
Uranium 235	15117-96-1	0.046	0.046	0.087	1.0	U	U
Uranium 238	U-238	0.452	0.14	0.072	1.0	J	U
Plutonium 238	13981-16-3	0.003	0.026	0.047	1.0	U J	PU
Plutonium 239/240	PU-239/240	-0.003	0.019	0.043	1.0	U J	PU
Nickel 63	13981-37-8	0.142	1.7	2.9	30	U	NI_L
Americium 241	14596-10-2	-0.009	0.019	0.045	1.0	U J	AM
Total Strontium	SR-RAD	-0.023	0.15	0.19	1.0	U	SR
Potassium 40	13966-00-2	12.4	0.54	0.27		J	GAM
Cobalt 60	10198-40-0	U		0.027	0.050	U	GAM
Cesium 137	10045-97-3	U		0.024	0.10	U	GAM
Europium 152	14683-23-9	U		0.050	0.10	U	GAM
Europium 154	15585-10-1	U		0.091	0.10	U	GAM
Europium 155	14391-16-3	U		0.075	0.10	U	GAM
Radium 226	13982-63-3	0.487	0.053	0.048	0.10		GAM
Radium 228	15262-20-1	0.709	0.12	0.12	0.20		GAM
Thorium 228	14274-82-9	0.686	0.028	0.025			GAM
Thorium 232	TH-232	0.709	0.12	0.12			GAM
Americium 241	14596-10-2	U		0.030		U	GAM
Uranium 238	U-238	U		3.5		U	GAM
Uranium 235	15117-96-1	U		0.081		U	GAM

100 BC Areas-Full Protocol

RPM 7/12/99

Lab id	TMANC
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	07/12/99

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SAMPLE DELIVERY GROUP H0401

N905047-04 B0VF65

DATA SHEET

SDG	7122	Client/Case no	Hanford SDG-H0401
Contact	L.A. Johnson	Case no	TRB-SBB-207925
Lab sample id	N905047-04	Client sample id	B0VF65
Dept sample id	7122-004	Location/Matrix	SOLID
Received	05/11/99	Collected	05/06/99 08:00
% solids	100.0	Custody/SAF No	B99-002-94 B99-002

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALIFIERS	TEST
Uranium 233/234	U-233/234	0.174	0.084	0.078	1.0	J	U
Uranium 235	15117-96-1	0.012	0.025	0.095	1.0	U	U
Uranium 238	U-238	0.195	0.084	0.078	1.0	J	U
Plutonium 238	13981-16-3	0.003	0.024	0.046	1.0	U J	PU
Plutonium 239/240	PU-239/240	0	0.012	0.033	1.0	U J	PU
Nickel 63	13981-37-8	-0.392	1.4	2.3	30	U	NI_L
Americium 241	14596-10-2	-0.005	0.018	0.044	1.0	U J	AM
Total Strontium	SR-RAD	-0.102	0.13	0.19	1.0	U	SR
Potassium 40	13966-00-2	4.33	0.28	0.13		J	GAM
Cobalt 60	10198-40-0	U		0.016	0.050	U	GAM
Cesium 137	10045-97-3	U		0.014	0.10	U	GAM
Europium 152	14683-23-9	U		0.037	0.10	U	GAM
Europium 154	15585-10-1	U		0.050	0.10	U	GAM
Europium 155	14391-16-3	U		0.038	0.10	U	GAM
Radium 226	13982-63-3	0.171	0.028	0.028	0.10		GAM
Radium 228	15262-20-1	0.180	0.068	0.069	0.20	UJ	GAM
Thorium 228	14274-82-9	0.185	0.017	0.017			GAM
Thorium 232	TH-232	0.180	0.068	0.069			GAM
Americium 241	14596-10-2	U		0.057		U	GAM
Uranium 238	U-238	U		1.9		U	GAM
Uranium 235	15117-96-1	U		0.061		U	GAM

100 BC Areas-Full Protocol

ORR 7/14/99

Lab id	TMANC
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	07/12/99

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SAMPLE DELIVERY GROUP H0401

N905047-05

B0VF66

DATA SHEET

SDG	7122	Client/Case no	Hanford SDG-H0401
Contact	L.A. Johnson	Case no	TRB-SBB-207925
Lab sample id	N905047-05	Client sample id	B0VF66
Dept sample id	7122-005	Location/Matrix	SOLID
Received	05/11/99	Collected	05/06/99 10:00
% solids	92.8	Custody/SAF No	B99-002-95 B99-002

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALIFIERS	TEST
Uranium 233/234	U-233/234	0.466	0.13	0.070	1.0	J	U
Uranium 235	15117-96-1	0.011	0.022	0.085	1.0	U	U
Uranium 238	U-238	0.484	0.13	0.070	1.0	J	U
Plutonium 238	13981-16-3	0.027	0.024	0.028	1.0	U J	PU
Plutonium 239/240	PU-239/240	0.030	0.024	0.033	1.0	U J	PU
Nickel 63	13981-37-8	-0.822	2.3	3.9	30	U	NI_L
Americium 241	14596-10-2	0.016	0.031	0.050	1.0	U J	AM
Total Strontium	SR-RAD	0.030	0.12	0.17	1.0	U	SR
Potassium 40	13966-00-2	12.1	0.33	0.14		J	GAM
Cobalt 60	10198-40-0	U		0.014	0.050	U	GAM
Cesium 137	10045-97-3	0.034	0.013	0.015	0.10	J	GAM
Europium 152	14683-23-9	U		0.034	0.10	U	GAM
Europium 154	15585-10-1	U		0.048	0.10	U	GAM
Europium 155	14391-16-3	U		0.055	0.10	U	GAM
Radium 226	13982-63-3	0.472	0.030	0.027	0.10		GAM
Radium 228	15262-20-1	0.697	0.073	0.068	0.20		GAM
Thorium 228	14274-82-9	0.644	0.020	0.018			GAM
Thorium 232	TH-232	0.697	0.073	0.068			GAM
Americium 241	14596-10-2	U		0.046		U	GAM
Uranium 238	U-238	U		1.8		U	GAM
Uranium 235	15117-96-1	U		0.081		U	GAM

100 BC Areas-Full Protocol

RBC
7/16/99

Lab id	TMANC
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	07/12/99

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0401

N905047-06 B0VF67

DATA SHEET

SDG	7122	Client/Case no	Hanford SDG-H0401
Contact	L.A. Johnson	Case no	TRB-SBB-207925
Lab sample id	N905047-06	Client sample id	B0VF67
Dept sample id	7122-006	Location/Matrix	SOLID
Received	05/11/99	Collected	05/06/99 10:10
% solids	97.5	Custody/SAF No	B99-002-95 B99-002

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALIFIERS	TEST
Uranium 233/234	U-233/234	0.378	0.12	0.074	1.0	J	U
Uranium 235	15117-96-1	0.012	0.024	0.090	1.0	U	U
Uranium 238	U-238	0.534	0.14	0.074	1.0	J	U
Plutonium 238	13981-16-3	0.367	0.076	0.025	1.0	~~J~~ J	PU
Plutonium 239/240	PU-239/240	0.353	0.069	0.025	1.0	~~J~~ J	PU
Nickel 63	13981-37-8	0.454	1.8	3.0	30	U	NI_L
Americium 241	14596-10-2	0.011	0.033	0.053	1.0	U J	AM
Total Strontium	SR-RAD	-0.016	0.14	0.18	1.0	U	SR
Potassium 40	13966-00-2	12.8	0.45	0.20		J	GAM
Cobalt 60	10198-40-0	U		0.023	0.050	U	GAM
Cesium 137	10045-97-3	0.049	0.018	0.022	0.10	~~J~~	GAM
Europium 152	14683-23-9	U		0.046	0.10	U	GAM
Europium 154	15585-10-1	U		0.081	0.10	U	GAM
Europium 155	14391-16-3	U		0.043	0.10	U	GAM
Radium 226	13982-63-3	0.527	0.041	0.039	0.10		GAM
Radium 228	15262-20-1	0.724	0.10	0.098	0.20		GAM
Thorium 228	14274-82-9	0.701	0.024	0.023			GAM
Thorium 232	TH-232	0.724	0.10	0.098			GAM
Americium 241	14596-10-2	U		0.027		U	GAM
Uranium 238	U-238	U		2.9		U	GAM
Uranium 235	15117-96-1	U		0.072		U	GAM

100 BC Areas-Full Protocol

RBC
7/16/98

Lab id	TMANC
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	07/12/99

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

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

June 16, 1999

JUN 1999
RECEIVED
Data
Log In

Ms. Joan Kessner
3190 George Washington Way
Richland, WA 99352
MSIN: H9-03

Reference: P.O. #TRB-SBB-207925
Thermo Nutech N9-05-047-7122, SDG H0401

Dear Ms. Kessner:

Enclosed is the data report for six solid samples designated under SAF No. B99-002 received at Thermo Nutech on May 11, 1999. The samples were analyzed according to the accompanying chain-of-custody documents.

Please call if you have any questions concerning this report.

Sincerely,

Terrie A. Higgins
Program Manager

TAH/kcj

Enclosure: Data Package

Case Narrative

1.0 GENERAL

Bechtel Hanford Inc. Sample Delivery Group H0402 is comprised of six solid (soil) samples designated under SAF No. B99-002 with a Project Designation of: 100 BC Areas-Full Protocol.

The samples were received as stated on the Chain-of-Custody documents. Any discrepancies are noted on the TNU Sample Receipt Checklist. Preliminary results for Isotopic Uranium, Isotopic Plutonium, Total Strontium and Gamma Scan were forwarded to Hanford via fax on June 5, 1999.

2.0 ANALYSIS NOTES

2.1 Nickel-63 Analyses

No problems were encountered during the processing of the samples.

2.2 Total Strontium Analyses

No problems were encountered during the processing of the samples.

2.3 Isotopic Plutonium Analyses

The analysis was repeated due to a failed Laboratory Control Sample. No problem problems were encountered during the second processing of the samples.

2.4 Gamma Scan Analyses

No problems were encountered during the processing of the samples.

2.5 Isotopic Uranium Analyses

No problems were encountered during the processing of the samples.

2.6 Americium-241 Analyses

The analysis was repeated due to a failed Laboratory Control Sample. No problem problems were encountered during the second processing of the samples.

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

B99-002-94

Collector Fahlberg/Kerkow	Company Contact R Coffman Telephone No. 373-6425	Project Coordinator TRENT, SJ	Price Code Data Turnaroun 15 Days
Project Designation 100 BC Areas - Full Protocol	Sampling Location 100 B/C 116-B-4 Shallow	SAF No. B99-002	
Ice Chest No. ~~SAL 45~~ ERC 96016	Field Logbook No. EL 1327-3	Method of Shipment FED EX.	
Shipped To TMA/~~REGRA~~ R.E 5/6/99	Offsite Property No. A990135	Bill of Lading/Air Bill No. 4235795258 10	
		COA R/6B/12600	

POSSIBLE SAMPLE HAZARDS/REMARKS

Special Handling and/or Storage

Preservation	None	None	Cool 4C	None	None						
Type of Container	P	aG	aG	aG	aG						
No. of Container(s)	1	1	1	1	1						
Volume	20mL	60mL	125mL	250mL	1000mL						

SAMPLE ANALYSIS

Sample No.	Matrix *	Sample Date	Sample Time	Activity Scan	See item (1) in Special Instructions.	Chromium Hex - 7196	ICP Metals - 6010A (SW-846) (Chromium, Lead); Mercury - 7471 - (CV)	See item (2) in Special Instructions.					
B0VF62	Soil	5-6-99	0930	X	X			X				tie to B0VD80	
B0VF63	Soil	5-6-99	0937	X	X			X					B0VD81
B0VF64	Soil	5-6-99	0937	X	X			X					B0VD81
B0VF65	Soil	5-6-99	0800	X	X			X					EB

CHAIN OF POSSESSION — Sign/Print Names

Relinquished By	Date/Time	Received By	Date/Time
R. Fahlberg / R Fahlberg	1620 5-6-99	Ref 1-C	1620 5-6-99
REF 1-C	51099 1020	S GALE	51099 1020
S GALE	51099 1100	FED EX	5/10/99
Fed EX	5/11/99 10:10	TNT M. Goldenberg	5/11/99 10:10

SPECIAL INSTRUCTIONS

(1) Americium-241; Isotopic Plutonium; Isotopic Uranium; Strontium-89,90 -- Total Sr; Nickel-63
(2) Gamma Spectroscopy (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155); Gamma Spec - Add-on (Americium-241, Uranium-238)

NOTE; COLLECTOR UNAVAILABLE TO SIGN COC

Matrix *
Soil
Water
Vapor
Other Solid
Other Liquid

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

000020

Bechtel Hanford Inc.

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

B99-002-95

Collector Fahlberg/Kerkow	Company Contact R Coffman	Telephone No. 373-6425	Project Coordinator TRENT, SJ
Price Code	Data Turnaround 15 Days		
Project Designation 100 BC Areas - Full Protocol	Sampling Location 100 B/C 116-B-4 Shallow		SAF No. B99-002
Ice Chest No. ~~SAL 43~~ / ~~ERC96 016~~	Field Logbook No. EL 1327-3		Method of Shipment FED EX
Shipped To ~~TMA/REGRA~~ TCF 5-6-99	Offsite Property No. A990135		Bill of Lading/Air Bill No. 923579525810
			COA R16B112600

POSSIBLE SAMPLE HAZARDS/REMARKS											
	Preservation	None	None	Cool 4C	None	None					
	Type of Container	P	aG	aG	aG	aG					
	No. of Container(s)	1	1	1	1	1					
Special Handling and/or Storage	Volume	20mL	60mL	125mL	250mL	1000mL					
SAMPLE ANALYSIS		Activity Scan	See item (1) in Special Instructions.	Chromium Hex - 7196	ICP Metals - 6010A (SW-846) (Chromium, Lead); Mercury - 7471 - (CV)	See item (2) in Special Instructions.					
Sample No.	Matrix *	Sample Date	Sample Time								
B0VF66	Soil	5-6-99	1000	X*	X*			X*			Hit to B0VD8
B0VF67	Soil	5-6-99	1010	X*	X*			X*			B0VD9

CHAIN OF POSSESSION — Sign/Print Names

Relinquished By	Date/Time	Received By	Date/Time
R. Fahlberg / R. Fahlberg	1620 5-6-99	REF I-C	5-6-99 1620
REF I-C	5/10/99 1020	S GALE	5/10/99 1020
S GALE	5/10/99 1100	FED EX	5/10/99
Fed Ex	5/11/99 10:10	TNU M. Goldenberg	5/11/99 10:10

SPECIAL INSTRUCTIONS

(1) Americium-241; Isotopic Plutonium; Isotopic Uranium; Strontium-89,90 -- Total Sr; Nickel-63

(2) Gamma Spectroscopy (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155); Gamma Spec - Add-on (Americium-241, Uranium-238)

NOTE: COLLECTOR UNAVAILABLE TO SIGN COC.

Matrix *
Soil
Water
Vapor
Other Solid
Other Liquid

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

520000

Appendix 5

Data Validation Supporting Documentation

RADIOCHEMICAL DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E

PROJECT:		DATA PACKAGE: H0401
VALIDATOR: TLI	LAB: TNU	DATE: 6/23/89
CASE:		SDG: H0401

ANALYSES PERFORMED

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

SAMPLES/MATRIX Soil

BOUF62 BOUF63 BOUF64 BOUF65 BOUF66
BOUF67

1. Completeness . . . . . ☐ N/A

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

Comments:

2. Initial Calibration . . . . . ☒ N/A

Instruments/detectors calibrated within one year of sample analysis? . . . . . Yes No N/A

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

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

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

Comments:

A-1

3. Continuing Calibration . . . . . ☒ N/A

Calibration checked within one week of sample analysis? . . . Yes No N/A
Calibration check acceptable? . . . . . Yes No N/A
Calibration check standards NIST traceable? . . . . . Yes No N/A
Calibration check standards expired? . . . . . Yes No N/A

Comments:

4. Blanks . . . . . ☐ N/A

Method blank analyzed? . . . . . Yes No N/A
Method blank results acceptable? . . . . . Yes No N/A
Analytes detected in method blank? . . . . . Yes No N/A
Field blank(s) analyzed? . . . . . Yes No N/A
Field blank results acceptable? . . . . . Yes No N/A
Analytes detected in field blank(s)? . . . . . Yes No N/A
Transcription/Calculation Errors? . . . . . Yes No N/A

Comments: No blank for radium or thorium (all isotopes) (IR) (dont report U's) J/UJ
Eg blank U-234 + 238 (Aspec) K-40, RA - 226 + 228 th 228 232 in blank
~~Blank~~ pu 228 + 239/40, gamma spec AM 241 - blank not w/sample J/UJ

5. Matrix Spikes . . . . . ☒ N/A

Matrix spike analyzed? . . . . . Yes No N/A
Spike recoveries acceptable? . . . . . Yes No N/A
Spike source traceable? . . . . . Yes No N/A
Spike source expired? . . . . . Yes No N/A
Transcription/Calculation Errors? . . . . . Yes No N/A

Comments: IR — N/A

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

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

Comments: AM241 pu 238 - 239/40 LCS not w/samples J/UJ

7. Chemical Recovery . . . . . ☐ N/A

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

Comments:

8. Duplicates . . . . . ☐ N/A

Duplicates Analyzed? . . . . . Yes No N/A
RPD Values Acceptable? . . . . . Yes No N/A
Transcription/Calculation Errors? . . . . . Yes No N/A

Comments: CS-137 - K w/in T/- 2x RDL
pu 238 + 239/40 + gamma spec - dup not w/samples J/UJ

9. Field QC Samples . . . . . ☐ N/A

Field duplicate sample(s) analyzed? . . . . . Yes No N/A
Field duplicate RPD values acceptable? . . . . . Yes No N/A
Field split sample(s) analyzed? . . . . . Yes No N/A
Field split RPD values acceptable? . . . . . Yes No N/A
Performance audit sample(s) analyzed? . . . . . Yes No N/A
Performance audit sample results acceptable? . . . . . Yes No N/A

Comments:

10. Holding Times

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

Comments:

11. Results and Detection Limits (Levels D & E) . . . . . ☐ N/A

Results reported for all required sample analyses? . . . . . Yes No N/A
Results supported in raw data? . . . . . Yes No N/A
Results Acceptable? . . . . . Yes No N/A
Transcription/Calculation errors? . . . . . Yes No N/A
MDA's meet required detection limits? . . . . . Yes No N/A
Transcription/calculation errors? . . . . . Yes No N/A

Comments: U-238 (GEA) all over MDA/TPL
Eu-152 62, 64 & 66

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0401

N905047-08 Method Blank

METHOD BLANK

SDG	7122	Client/Case no	Hanford SDG-H0401
Contact	L.A. Johnson	Case no	TRB-SEB-207925
Lab sample id	N905047-08	Client sample id	Method Blank
Dept sample id	7122-008	Material/Matrix	SOLID
		SAF No	B99-002

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Uranium 233/234	U-233/234	0.012	0.024	0.090	1.0	U	U
Uranium 235	15117-96-1	0	0.029	0.11	1.0	U	U
Uranium 238	U-238	0	0.024	0.090	1.0	U	U
Nickel 63	13981-37-8	-0.635	1.4	2.3	30	U	NI_L
Total Strontium	SR-RAD	-0.050	0.15	0.20	1.0	U	SR
Potassium 40	13966-00-2	U		0.14		U	GAM
Cobalt 60	10198-40-0	U		0.014	0.050	U	GAM
Cesium 137	10045-97-3	U		0.010	0.10	U	GAM
Europium 152	14683-23-9	U		0.025	0.10	U	GAM
Europium 154	15585-10-1	U		0.036	0.10	U	GAM
Europium 155	14391-16-3	U		0.016	0.10	U	GAM
Americium 241	14596-10-2	U		0.008		U	GAM
Uranium 238	U-238	U		1.6		U	GAM
Uranium 235	15117-96-1	U		0.027		U	GAM

100 BC Areas-Full Protocol

QC-BLANK 30758

Lab id	TMANC
Protocol	Hanford
Version	Ver 1.0
Form	DVD-D8
Version	3.06
Report date	07/12/99

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0401

N905047-11 Method Blank

METHOD BLANK

SDG	7122	Client/Case no	Hanford SDG-H0401
Contact	L.A. Johnson	Case no	TRB-SBB-207925
Lab sample id	N905047-11	Client sample id	Method Blank
Dept sample id	7122-011	Material/Matrix	SOLID
		SAF No	B99-002

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Plutonium 238	13981-16-3	0.002	0.019	0.037	1.0	U	PU
Plutonium 239/240	PU-239/240	0.005	0.019	0.037	1.0	U	PU
Americium 241	14596-10-2	0.007	0.033	0.066	1.0	U	AM

100 BC Areas-Full Protocol

QC-BLANK 30830

Lab id	TMANC
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	07/12/99

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0401

N905047-07

Lab Control Sample

LAB CONTROL SAMPLE

SDG 7122

Contact L.A. Johnson

Client/Case no Hanford SDG-H0401

Case no TRB-SDB-207925

Lab sample id N905047-07

Dept sample id 7122-007

Client sample id Lab Control Sample

Material/Matrix SOLID

SAF No B99-002

ANALYTE	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALIFIERS	TEST	ADDED pCi/g	2σ ERR pCi/g	REC %	3σ LMTS (TOTAL)	PROTOCOL LIMITS
Uranium 233/234	4.38	0.60	0.31	1.0		U	4.95	0.20	88	80-120	80-120
Uranium 235	3.80	0.56	0.094	1.0		U	4.04	0.16	94	77-123	80-120
Uranium 238	4.49	0.61	0.29	1.0		U	5.10	0.20	88	80-120	80-120
Nickel 63	138	3.5	2.3	30		NI_L	134	5.4	103	83-117	
Total Strontium	5.65	0.33	0.18	1.0		SR	5.71	0.23	99	82-118	
Potassium 40	U		0.15		U	GAM					
Cobalt 60	0.212	0.020	0.014	0.050		GAM	0.227	0.009	93	74-126	80-120
Cesium 137	0.249	0.018	0.016	0.10		GAM	0.260	0.010	96	75-125	80-120
Europium 152	U		0.029	0.10	U	GAM					
Europium 154	U		0.033	0.10	U	GAM					
Europium 155	U		0.025	0.10	U	GAM					
Americium 241	U		0.030		U	GAM					
Uranium 236	U		1.6		U	GAM					
Uranium 235	U		0.041		U	GAM					

100 BC Areas-Full Protocol

QC-LCS 30757

Lab id TMANC

Protocol Hanford

Version Ver 1.0

Form DVD-LCS

Version 3.06

Report date 07/12/99

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0401

N905047-10

Lab Control Sample

LAB CONTROL SAMPLE

SDG 7122

Contact L.A. Johnson

Client/Case no Hanford SDG-H0401

Case no TRB-SRB-207925

Lab sample id N905047-10

Dept sample id 7122-010

Client sample id Lab Control Sample

Material/Matrix SOLID

SAF No. B99-002

ANALYTE	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST	ADDED pCi/g	2σ ERR pCi/g	REC %	3σ LMTS (TOTAL)	PROTOCOL LIMITS
Plutonium 238	9.46	0.60	0.032	1.0		PU	10.1	0.40	94	87-113	80-120
Plutonium 239/240	11.3	0.70	0.029	1.0		PU	11.9	0.48	95	87-113	80-120
Americium 241	10.1	0.93	0.050	1.0		AM	10.5	0.42	96	84-116	80-120

100 BC Areas-Full Protocol

QC-LCS 30829

Lab id TMANC

Protocol Hanford

Version Ver 1.0

Form DVD-LCS

Version 3.06

Report date 07/12/99

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0401

N905047-09 B0VF62

DUPLICATE

SDG 7122		Client/Case no Hanford	SDG-H0401
Contact L.A. Johnson		Case no TRB-SBB-207925	
DUPLICATE	ORIGINAL		
Lab sample id N905047-09	Lab sample id N905047-01	Client sample id B0VF62	
Dept sample id 7122-009	Dept sample id 7122-001	Location/Matrix 100 B/C 116-B-4 Shallow	SOLID
	Received 05/11/99	Collected 05/06/99 09:30	
% solids 92.3	% solids 92.3	Custody/SAF No B99-002-94	B99-002

ANALYTE	DUPLICATE pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST	ORIGINAL pCi/g	2σ ERR (COUNT)	MDA pCi/g	QUALI-FIERS	RPD %	3σ PROT TOT LIMIT
Uranium 233/234	0.588	0.17	0.085	1.0	J	U	0.480	0.13	0.068	J	20	61
Uranium 235	0.040	0.054	0.10	1.0	U	U	0.022	0.022	0.082	U	-	
Uranium 238	0.555	0.16	0.085	1.0	J	U	0.632	0.15	0.068	J	13	56
Nickel 63	-0.531	1.8	3.1	30	U	NI_L	0.511	1.9	3.2	U	-	
Total Strontium	0.166	0.13	0.17	1.0	U	SR	0.042	0.15	0.20	U	-	
Potassium 40	12.6	0.31	0.12			GAM	12.0	0.49	0.26		5	33
Cobalt 60	U		0.013	0.050	U	GAM	U		0.024	U	-	
Cesium 137	0.060	0.015	0.016	0.10	J	GAM	0.032	0.021	0.026	J	61	90
Europium 152	U		0.032	0.10	U	GAM	U		0.056	U	-	
Europium 154	U		0.043	0.10	U	GAM	U		0.074	U	-	
Europium 155	U		0.035	0.10	U	GAM	U		0.056	U	-	
Radium 226	0.479	0.026	0.023	0.10		GAM	0.494	0.038	0.036		3	35
Radium 228	0.727	0.060	0.055	0.20		GAM	0.649	0.094	0.098		11	40
Thorium 228	0.823	0.028	0.026			GAM	0.805	0.061	0.040		2	33
Thorium 232	0.727	0.060	0.055			GAM	0.649	0.094	0.098		11	40
Americium 241	U		0.042		U	GAM	U		0.081	U	-	
Uranium 238	U		1.7		U	GAM	U		2.8	U	-	
Uranium 235	U		0.050		U	GAM	U		0.091	U	-	

100 BC Areas-Full Protocol

QC-DUP#1 30759

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-DUP
Version 3.06
Report date 07/12/99

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0401

N905047-12

B0VF62

DUPLICATE

SDG 7122		Client/Case no Hanford	SDG-H0401
Contact L.A. Johnson		Case no TRB-SBB-207925	
DUPLICATE	ORIGINAL		
Lab sample id N905047-12	Lab sample id N905047-01	Client sample id B0VF62	
Dept sample id 7122-012	Dept sample id 7122-001	Location/Matrix 100 B/C 116-B-4 Shallow	SOLID
	Received 05/11/99	Collected 05/06/99 09:30	
	% solids 92.3	Custody/SAF No B99-002-94	B99-002

ANALYTE	DUPLICATE pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST	ORIGINAL pCi/g	2σ ERR (COUNT)	MDA pCi/g	QUALI-FIERS	RPD %	3σ TOT	PROT LIMIT
Plutonium 238	-0.005	0.011	0.033	1.0	U	PU	0.021	0.014	0.027	U	-		
Plutonium 239/240	0.011	0.016	0.029	1.0	U	PU	0.007	0.007	0.027	U	-		
Americium 241	0	0.018	0.043	1.0	U	AM	0.014	0.028	0.035	U	-		

100 BC Areas-Full Protocol

QC-DUP#1 30831

Lab id	TMARC
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DUP
Version	2.06
Report date	07/12/99

Date: 19 July 1999
To: Bechtel Hanford Inc. (technical representative)
From: TechLaw, Inc.
Project: 100-BC Areas - Full Protocol - Waste Site 116-B-4
Subject: Inorganics - Data Package No. H0401-RLN (SDG No. H0401)

INTRODUCTION

This memo presents the results of data validation on Data Package No. H0401-RLN prepared by RECRA LabNet (RLN). A list of samples validated along with the analyses reported and the method of analysis is provided in the following table.

Sample ID	Sample Date	Media	Validation	Analysis
B0VF62	5/6/99	Soil	C	See note 1
B0VF63	5/6/99	Soil	C	See note 1
B0VF64	5/6/99	Soil	C	See note 1
B0VF65	5/6/99	Soil	C	See note 1
B0VF66	5/6/99	Soil	C	See note 1
B0VF67	5/6/99	Soil	C	See note 1

1 - ICP metals by 6010A (lead and total chromium); hexavalent chromium by 7196; mercury by 7471

Data validation was conducted in accordance with the BHI validation statement of work and the 100 Area Remedial Action Sampling and Analysis Plan (DOE/RL May 1998). Appendices 1 through 5 provide the following information as indicated below:

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

DATA QUALITY OBJECTIVES

- **Holding Times**

Analytical holding times for metals are assessed to ascertain whether the holding time requirements were met by the laboratory. The holding time requirements are as follows: Soil samples must be analyzed within six (6) months for lead & total chromium; 30 days for chrome VI; and 28 days for mercury.

All holding times were acceptable.

- **Blanks**

Preparation Blanks

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

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

All preparation blank results were acceptable although the target detection limit (TDL) for lead and chromium VI was exceeded.

Equipment Blanks

One equipment blank (B0VF65) was submitted for analysis. No analytes were detected in the equipment blank.

- **Accuracy**

Matrix Spike

Matrix spike analyses are used to assess the analytical accuracy of the reported data and the effect of the matrix on the ability to accurately quantify sample concentrations. Matrix spike recoveries must fall within the range of 70% to 130%. Samples with a spike recovery of less than 30% and a sample result below the IDL are rejected and flagged "UR". Samples with a spike recovery of 30% to 69% and a sample result less than the IDL are qualified "UJ". Samples with a spike recovery of greater than 130% or less than 70% and a sample result greater than the IDL are qualified as estimates and flagged "J". Finally, for samples with a spike recovery greater than 130% and a sample result less than the IDL, no qualification is required.

All matrix spike recovery results were acceptable.

- **Precision**

Laboratory Duplicate Samples

Laboratory duplicate sample analyses are used to measure laboratory precision and sample homogeneity. Results must be within RPD limits of plus or minus 30% for solid samples. If RPD values are out of specification and the sample concentration is greater than five times the CRDL, all associated sample results are qualified as estimated and flagged "J". If RPD values are plus or minus two times the CRDL and the sample concentration is less than five times the CRDL, all associated sample results are qualified as estimated and flagged "J/UJ". The performance criteria for aqueous laboratory duplicates are an RPD less than 30% for positive sample results greater than five times the CRDL or plus or minus the CRDL for positive sample results less than five times the CRDL. Sample results outside the criteria are qualified as estimates and flagged "J/UJ".

All laboratory duplicate results were acceptable.

Field Duplicates

One sample duplicate pair (B0VF63/B0VF64) was submitted for analysis. The samples were compared using the same criteria as for a laboratory duplicate.

All field duplicate results were acceptable.

- **Analytical Detection Levels**

Reported analytical detection levels are compared against the 100 Area Remedial Action Sampling and Analysis Plan TDLs or the CRDL if no TDL was specified, to ensure that laboratory detection levels meet the required criteria. The following had reported detection limits above their TDL: Lead in sample B0VF65 and chromium VI in all samples. Under the BHI statement of work, no qualification is required. All other reported laboratory detection levels met the analyte specific TDL or CRDL.

- **Completeness**

Data package No. H0401-RLN (SDG No. H0401) was submitted for validation and verified for completeness. The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

The following had reported detection limits above their TDL: Lead in sample BOVF65 and chromium VI in all samples. Under the BHI statement of work, no qualification is required.

REFERENCES

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

DOE/RL-96-22, Rev. 1, *100 Area Remedial Action Sampling and Analysis Plan*, U.S. Department of Energy, May 1998.

Interoffice Memorandum 056910, Joan Kessner to Distribution, *Hexavalent Chromium Analytical Holding Time*, 4 March 1998.

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers which may be applied by data validators in compliance with BHI validation SOW are as follows:

U - Indicates the compound or analyte was analyzed for and not detected in the sample. The value reported is the sample quantitation limit corrected for sample dilution and moisture content by the laboratory.

UJ - Indicates the compound or analyte was analyzed for and not detected in the sample. Due to a QC deficiency identified during the data validation, the associated quantitation limit is an estimate.

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

BJ - Applied to inorganic analyses only. Indicates the analyte concentration was greater than the IDL but less than the CRDL and is considered an estimated value.

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

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

NJ - Indicates presumptive evidence of a compound at an estimated value. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).

N - Indicates presumptive evidence of a compound. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).

Appendix 2

Summary of Data Qualification

DATA QUALIFICATION SUMMARY

SDG: H0401	REVIEWER: TLI	DATE: 7/19/99	PAGE_1_OF_1_
COMMENTS: No qualifiers assigned			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON

Appendix 3

Qualified Data Summary and Annotated Laboratory Reports

INORGANIC ANALYSIS, SOIL MATRIX, MG/KG

Project: BECHTEL-HANFORD																						
Laboratory: RECRA LabNet																						
Case	SDG: H0401																					
Sample Number		B0VF62		B0VF63		B0VF64		B0VF65		B0VF66		B0VF67										
Location		116-B-4		116-B-4		116-B-4		116-B-4		116-B-4		116-B-4										
Remarks		A1		A2		Duplicate		Equip. Blank		A3		A4										
Sample Date		5/6/99		5/6/99		5/6/99		5/6/99		5/6/99		5/6/99										
Inorganics	CRDL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q							
Chromium (total)	0.5	9.9		8.1		8.5		0.29	U	7.2		7.5										
Mercury	0.05	0.02	U	0.02	U	0.01	U	0.02	U	0.02	U	0.02										
Lead	2	4.9		4.8		5.8		3.4	U	3.5		4.4										
Chromium VI	0.1	0.42	U	0.43	U	0.43	U	0.40	U	0.43	U	0.41	U									

000010

Recra LabNet - Lionville

INORGANICS DATA SUMMARY REPORT 05/14/99

CLIENT: TNU-HANFORD B99-002 RECRA LOT #: 9905L933

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

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
-001	B0VF62	% Solids	95.1	%	0.01	1.0
		Chromium VI	0.42 u	MG/KG	0.42	1.0
-002	B0VF63	% Solids	93.1	%	0.01	1.0
		Chromium VI	0.43 u	MG/KG	0.43	1.0
-003	B0VF64	% Solids	92.8	%	0.01	1.0
		Chromium VI	0.43 u	MG/KG	0.43	1.0
-004	B0VF65	% Solids	100	%	0.01	1.0
		Chromium VI	0.40 u	MG/KG	0.40	1.0
-005	B0VF66	% Solids	93.4	%	0.01	1.0
		Chromium VI	0.43 u	MG/KG	0.43	1.0
-006	B0VF67	% Solids	98.3	%	0.01	1.0
		Chromium VI	0.41 u	MG/KG	0.41	1.0

Cd 23/99

Recra LabNet - Lionville

INORGANICS DATA SUMMARY REPORT 05/27/99

CLIENT: TNU-HANFORD B99-002

RECRA LOT #: 9905L933

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

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
-001	B0VF62	Chromium, Total	9.9	MG/KG	0.36	1.0
		Mercury, Total	0.02 u	MG/KG	0.02	1.0
		Lead, Total	4.9	MG/KG	4.2	1.0
-002	B0VF63	Chromium, Total	8.1	MG/KG	0.37	1.0
		Mercury, Total	0.02 u	MG/KG	0.02	1.0
		Lead, Total	4.8	MG/KG	4.2	1.0
-003	B0VF64	Chromium, Total	8.5	MG/KG	0.37	1.0
		Mercury, Total	0.01 u	MG/KG	0.01	1.0
		Lead, Total	5.8	MG/KG	4.3	1.0
-004	B0VF65	Chromium, Total	0.29 u	MG/KG	0.29	1.0
		Mercury, Total	0.02 u	MG/KG	0.02	1.0
		Lead, Total	3.4 u	MG/KG	3.4	1.0
-005	B0VF66	Chromium, Total	7.2	MG/KG	0.29	1.0
		Mercury, Total	0.02 u	MG/KG	0.02	1.0
		Lead, Total	3.5	MG/KG	3.4	1.0
-006	B0VF67	Chromium, Total	7.5	MG/KG	0.24	1.0
		Mercury, Total	0.02	MG/KG	0.02	1.0
		Lead, Total	4.4	MG/KG	2.8	1.0

pr 6/23/99

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Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

RECRA LabNet
a division of Recra Environmental, Inc.
Virtual Laboratories Everywhere

JUN 1999
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Data
Log In

Recra LabNet Philadelphia
Analytical Report

Client : TNU-HANFORD B99-002
RFW# : 9905L933
SDG/SAF# : H0401/B99-002

W.O.# : 10985-001-001-9999-00
Date Received: 05-11-99

METALS CASE NARRATIVE

1. This narrative covers the analyses of 6 soil samples.

2. The samples were prepared and analyzed in accordance with methods checked on the attached glossary.

3. All analyses were performed within the required holding times.

4. The cooler temperature has been recorded on the Chain of Custody.

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

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

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

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

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

10. All matrix spike (MS) recoveries were within the 75-125% control limits. Refer to the Inorganics Accuracy Report.

11. All duplicate analyses were within the 20% Relative Percent Difference (RPD) control limits. Refer to the Inorganics Precision Report.

The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage. All pages of this report are integral parts of the analytical data. Therefore, this report should only be reproduced in its entirety of 14 pages.

12. For the purposes of this report, the data has been reported to the Instrument Detection Limit (IDL). Values between the IDL and the Practical Quantitation Limit (PQL) are acquired in a region of less-certain quantification.

Pat E

J. Michael Taylor
Vice President
Philadelphia Analytical Laboratory

5-27-99
Date

mld/m05-933

RECRA LabNet
a division of Recra Environmental, Inc.
Virtual Laboratories Everywhere

JUN 1999
RECEIVED
Data
Log In

Recra LabNet Philadelphia
Analytical Report

Client : TNU-HANFORD B99-002
RFW# : 9905L933
SDG# : H0401
SAF# : B99-002

W.O. # : 10985-001-001-9999-00
Date Received: 05-11-99

INORGANIC CASE NARRATIVE

1. This narrative covers the analyses of 6 soil samples.
2. The samples were prepared and analyzed in accordance with the methods indicated on the attached glossary.
3. Sample holding times as required by the method and/or contract were met.
4. The cooler temperature was recorded on the chain-of-custody.
5. The method blank for Chromium VI was within method criteria.
6. The Laboratory Control Samples (LCS) for Chromium VI were within the laboratory control limits.
7. The matrix spike recoveries for Chromium VI were within the 75-125% control limits.
8. The replicate analysis for Chromium VI was within the 20% Relative Percent Difference (RPD) control limit.
9. Results for solid samples are reported on a dry weight basis.

Pat E

J. Michael Taylor
Vice President
Philadelphia Analytical Laboratory

5-27-99
Date

njp\i05-933

The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage. All pages of this report are integral parts of the analytical data. Therefore, this report should only be reproduced in its entirety of 12 pages.

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

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	B99-002-95	Page 1 of 1

Collector: Fahlberg/Kerkow	Company Contact: R Coffman	Telephone No.: 373-6425	Project Coordinator: TRENT, SJ
Price Code	Data Turnaround: 15 Days		
Project Designation: 100 BC Areas - Full Protocol	Sampling Location: 100 B/C 116-B-4 Shallow		SAF No.: B99-002
Ice Chest No.: ERC-FS-002	Field Logbook No.: EL 1327-3		Method of Shipment: FED EX
Shipped To: ~~TMA~~/RECRA R.F. 5-6-99	Offsite Property No.: A990134		Bill of Lading/Air Bill No.: 4235795258 09
			COA ~~RH6~~ R16B112600

POSSIBLE SAMPLE HAZARDS/REMARKS											
	Preservation	None	None	Cool 4C	None	None					
	Type of Container	P	aG	aG	aG	aG					
Special Handling and/or Storage	No. of Container(s)	1	1	1	1	1					
	Volume	20mL	60mL	125mL	250mL	1000mL					
SAMPLE ANALYSIS		Activity Scan	See item (1) in Special Instructions.	Chromium Hex - 7196	ICP Metals - 6010A (SW-846) (Chromium, Lead); Mercury - 7471 - (CV)	See item (2) in Special Instructions.					

Sample No.	Matrix *	Sample Date	Sample Time										
B0VF66	Soil	5-6-99	1000			X	X					tiete	B0VD89
B0VF67	Soil	5-6-99	1010			X	X						B0VD94

CHAIN OF POSSESSION	Sign/Print Names		
Relinquished By: R. Fahlberg / R. Fahlberg	Date/Time: 1620 5-6-99	Received By: Ref 1-C	Date/Time: 1620 5-6-99
Relinquished By: REF 1-C	Date/Time: 5/099 1020	Received By: SJGALE	Date/Time: 5/099 1020
Relinquished By: SJGALE	Date/Time: 5/099 1100	Received By: FED EX	Date/Time:
Relinquished By: Fed ex	Date/Time:	Received By:	Date/Time:

SPECIAL INSTRUCTIONS

(1) Americium-241; Isotopic Plutonium; Isotopic Uranium; Strontium-89,90 – Total Sr; Nickel-63
(2) Gamma Spectroscopy (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155); Gamma Spec - Add-on (Americium-241, Uranium-238)

NOTE: COLLECTOR UNAVAILABLE TO SIGN COC.

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

LABORATORY SECTION	Received By	Title	Date/Time
	Fisher		5/11/99 0900
FINAL SAMPLE	Disposal Method	Disposed By	Date/Time

A10034

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	B99-002-94	Page 1 of 1

Collector Fahlberg/Kerkow	Company Contact R Coffman	Telephone No. 373-6425	Project Coordinator TRENT, SJ
Project Designation 100 BC Areas - Full Protocol	Sampling Location 100 B/C 116-B-4 Shallow		SAF No. B99-002
Ice Chest No. ERC FS 002	Field Logbook No. EL 1327-3		Method of Shipment FED EX.
Shipped To ~~TMA~~/RECRA RF 5·6·99	Offsite Property No. A990134		Bill of Lading/Air Bill No. 423579525809
			COA R16B112600

Price Code: 933

Data Turnaround: 15 Days

POSSIBLE SAMPLE HAZARDS/REMARKS											
	Preservation	None	None	Cool 4C	None	None					
	Type of Container	P	aG	aG	aG	aG					
Special Handling and/or Storage	No. of Container(s)	1	1	1	1	1					
	Volume	20mL	60mL	125mL	250mL	1000mL					
SAMPLE ANALYSIS		Activity Scan	See item (1) in Special Instructions.	Chromium Hex - 7196	ICP Metals - 6010A (SW-846) (Chromium, Lead); Mercury - 7471 - (CV)	See item (2) in Special Instructions.					

Sample No.	Matrix *	Sample Date	Sample Time										
B0VF62	Soil	5·6·99	0930			X	X					tie to Bor080	
B0VF63	Soil	5·6·99	0937			X	X					Bor081	
B0VF64	Soil	5·6·99	0937			X	X					Bor081	
B0VF65	Soil	5·6·99	0800			X	X						FB

CHAIN OF POSSESSION	Sign/Print Names		
Relinquished By R. Fahlberg / R Fahlberg	Date/Time 1620 5·6·99	Received By Ref 1-C	Date/Time 5·6·99 5·6·99
Relinquished By REF 1-C	Date/Time 51099 1020	Received By SJGALE	Date/Time 51099 1020
Relinquished By SJGALE	Date/Time 51099 1100	Received By FED EX.	Date/Time
Relinquished By Fedex	Date/Time	Received By	Date/Time

SPECIAL INSTRUCTIONS

(1) Americium-241; Isotopic Plutonium; Isotopic Uranium; Strontium-89,90 -- Total Sr; Nickel-63
(2) Gamma Spectroscopy (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155); Gamma Spec - Add-on (Americium-241, Uranium-238)

NOTE: COLLECTOR UNAVAILABLE TO SIGN COC.

Matrix *
Soil
Water
Vapor
Other Solid
Other Liquid

2.3

LABORATORY SECTION	Received By	Title	Date/Time
	Fedex		5/11/99 0900
FINAL SAMPLE	Disposal Method	Disposed By	Date/Time

000038

Appendix 5

Data Validation Supporting Documentation

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: 100-BC 11C-B-4			DATA PACKAGE: H0401		
VALIDATOR: +LI		LAB: RECRA LabBlue		DATE: 6/24/95	
CASE:			SDG: H0401		
ANALYSES PERFORMED					
☐ CLP/ICP	☐ CLP/GFAA	☐ CLP/Hg	☐ CLP/Cyanide	☐	☐
☒ SW-846/ICP	☐ SW-846/GFAA	☒ SW-846/Hg	☐ SW-846 Cyanide	☒ 7196 Hex chrome	☐
SAMPLES/MATRIX Soil					
B0UF62 B0UF63 B0UF64 B0UF65					
B0UF66 B0UF67					

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

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

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

Comments:

2. HOLDING TIMES

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

Comments:

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

3. INSTRUMENT PERFORMANCE AND CALIBRATIONS

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

4. BLANKS

Were ICB and CCB checks performed for all applicable analyses? Yes No N/A
Are ICB and CCB results acceptable? . . . . . Yes No N/A
Were preparation blanks analyzed? . . . . . Yes No N/A
Are preparation blank results acceptable? . . . . . Yes ~~No~~ N/A
Were field/trip blanks analyzed? . . . . . Yes No N/A
Are field/trip blank results acceptable? . . . . . Yes No N/A
Comments: lead blank U but at ~~greater~~ ~~than~~ 2x the TDL
CR VI " " " " ~~[illegible]~~ ~~[illegible]~~ 4x the TDL

BOUFGS - all U lead & CR VI above TDL

5. ACCURACY

Were spike samples analyzed? . . . . . Yes No N/A
Are spike sample recoveries acceptable? . . . . . Yes No ~~N/A~~
Were laboratory control samples (LCS) analyzed? . . . . . Yes No N/A
Are LCS recoveries acceptable? . . . . . Yes No N/A
Comments:

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

6. PRECISION

Were laboratory duplicates analyzed? . . . . . Yes No N/A
Are laboratory duplicate samples RPD values acceptable? . . . . Yes No N/A
Were ICP serial dilution samples analyzed? . . . . . Yes No N/A
Are ICP serial dilution %D values acceptable? . . . . . Yes No N/A
Are field duplicate RPD values acceptable? . . . . . Yes No N/A
Are field split RPD values acceptable? . . . . . Yes No N/A

Comments:

7. FURNACE AA QUALITY CONTROL

Were duplicate injections performed as required? . . . . . Yes No N/A
Are duplicate injection %RSD values acceptable? . . . . . Yes No N/A
Were analytical spikes performed as required? . . . . . Yes No N/A
Are analytical spike recoveries acceptable? . . . . . Yes No N/A
Was MSA performed as required? . . . . . Yes No N/A
Are MSA results acceptable? . . . . . Yes No N/A

Comments:

8. REPORTED RESULTS AND DETECTION LIMITS

Are results reported for all requested analyses? . . . . . Yes No N/A
Are all results supported in the raw data? . . . . . Yes No N/A
Are results calculated properly? . . . . . Yes No N/A
Do results meet the CRDLs? . . . . . Yes No N/A

Comments: ~~GS CR total~~ GS - lead only
CR VI all over

Recra LabNet - Lionville

INORGANICS METHOD BLANK DATA SUMMARY PAGE 05/27/99

CLIENT: TNU-HANFORD B99-002 RECRA LOT #: 9905L933

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

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
BLANK1	99L0295-MB1	Chromium, Total	0.35 u	MG/KG	0.35	1.0
		Lead, Total	4.1 u	MG/KG	4.1	1.0
BLANK1	99C0145-MB1	Mercury, Total	0.02 u	MG/KG	0.02	1.0

Recra LabNet - Lionville

INORGANICS ACCURACY REPORT 05/27/99

CLIENT: TNU-HANFORD B99-002

RECRA LOT #: 9905L933

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

SAMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	INITIAL RESULT	SPIKED AMOUNT	%RECOV	DILUTION FACTOR(SPK)
-001	B0VF62	Chromium, Total	26.9	9.9	20.8	81.7	1.0
		Mercury, Total	0.19	0.02u	0.18	107.4	1.0
		Lead, Total	52.0	4.9	52.0	90.6	1.0

~~007~~

Recra LabNet - Lionville

INORGANICS PRECISION REPORT 05/27/99

CLIENT: TNU-HANFORD B99-002 RECRA LOT #: 9905L933

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

SAMPLE	SITE ID	ANALYTE	INITIAL RESULT	REPLICATE	RPD	DILUTION FACTOR(REP)
-001REP	B0VF62	Chromium, Total	9.9	8.6	14.1	1.0
		Mercury, Total	0.02u	0.02u	NC	1.0
		Lead, Total	4.9	4.9	0.00	1.0

008

Recra LabNet - Lionville

INORGANICS METHOD BLANK DATA SUMMARY PAGE 05/14/99

IENT: TNU-HANFORD B99-002 RECRA LOT #: 9905L933

RK ORDER: 10985-001-001-9999-00

MPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
ANK10	99LVI038-MB1	Chromium VI	0.40 u	MG/KG	0.40	1.0

005 K2

Recra LabNet - Lionville

INORGANICS ACCURACY REPORT 05/14/99

CLIENT: TNU-HANFORD B99-002

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

RECRA LOT #: 9905L933

SAMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	INITIAL RESULT	SPIKED AMOUNT	%RECOV	DILUTION FACTOR(SPK)
-006	B0VF67	Soluble Chromium VI	4.2	0.41u	4.1	105.4	1.0
		Insoluble Chromium VI	1230	0.41u	1190	103.7	100
BLANK10	99LVI038-MB1	Soluble Chromium VI	3.7	0.40u	4.0	93.1	1.0
		Insoluble Chromium VI	1290	0.40u	1160	110.6	100

Recra LabNet - Lionville

INORGANICS PRECISION REPORT 05/14/99

LIENT: TNU-HANFORD B99-002 RECRA LOT #: 9905L933

ORK ORDER: 10985-001-001-9999-00

AMPLE	SITE ID	ANALYTE	INITIAL RESULT	REPLICATE	RPD	DILUTION FACTOR(REP)
001REP	B0VF62	% Solids	95.1	95.5	0.48	1.0
006REP	B0VF67	Chromium VI	0.41u	0.41u	NC	1.0

Duncan, Jeanette M

From: Blumenkranz, David B
Sent: Thursday, August 12, 1999 9:37 AM
To: 'Routt, Tina/RLO'; Duncan, Jeanette M
Subject: RE: Validation Report

Tina,

I did not have time to check it that thoroughly and now the report has gone final. We will just have to live with it. Good work on your part.

Jeanette,

Please ask Bruce to be more careful next time.

-----Original Message-----
From: Routt, Tina/RLO [mailto:troutt@CH2M.com]
Sent: Thursday, August 12, 1999 8:49 AM
To: Blumenkranz, David/RLO-HAN
Subject: Validation Report

Dave -

In going through the validator's report for B-4, he mentioned that the MDAs were below TDL for all analyte COCs. But, when I went through and did my own comparison, I found that Eu-155 MDAs were higher than the SAP TDL for a few cases. The analyte is undetected in all cases, so it is not likely a problem, but I'm trying to understand the process. Is the validator using some other TDL than the one listed in the SAP?

Thanks,

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

Bruce -
Rich wants you to revise H0401
per the above issue.
Jeanette - ~~[illegible]~~ Correct

Review Comment Record (RCR)

1. Date	2. Review No.
7/26/99	BHI/QA99009
3. Project	**4. Page**
116-B-4	Page 1 of 1

5. Document Number(s)/Title(s)	6. Program/Project/ Building Number	7. Reviewer	8. Organization/Group	9. Location/Phone
H0401-TNU (SDG No. H0401)	100-BC Areas – Full Protocol - 116-B-4	Claude Stacey	BHI/QA	H0-16/372-9208

17. Comment Submittal Approval:

10. Agreement with indicated comment disposition(s)

11. CLOSED

Organization Manager (Optional)

Date

Reviewer/Point of Contact

Author/Originator

Date

Reviewer/Point of Contact

Author/Originator

12. Item	13. Comment(s)/Discrepancy(s) (Provide technical justification for the comment and detailed recommendation of the action required to correct/ resolve the discrepancy/problem indicated.)	14. Hold Point	15. Disposition (Provide justification if NOT accepted.)	16. Status
1	Inorganic: No Comments			
2	Radiochemistry: Page 2, 1st paragraph under Blanks states ". . . sample results below the MDA are elevated to the MDA and qualified as undetected . . ." This is not what's being done and the sentence needs to be changed to ". . . sample results below the MDA are qualified as undetected . . ."		Corrected pre 7/29/99	
3				
4				

Review Comment Record (RCR)

1. Date	2. Review No.
7/26/99	BHI/QA99009
3. Project	**4. Page**
116-B-4	Page 1 of 1

5. Document Number(s)/Title(s)	6. Program/Project/ Building Number	7. Reviewer	8. Organization/Group	9. Location/Phone
H0401-TNU (SDG No. H0401)	100-BC Areas – Full Protocol - 116-B-4	Claude Stacey	BHI/QA	H0-16/372-9208

17. Comment Submittal Approval:

Organization Manager (Optional) — Date

10. Agreement with indicated comment disposition(s)

Reviewer/Point of Contact — Date

Author/Originator

11. CLOSED

7/29/99 — Date

Reviewer/Point of Contact

Author/Originator

12. Item	13. Comment(s)/Discrepancy(s) (Provide technical justification for the comment and detailed recommendation of the action required to correct/ resolve the discrepancy/problem indicated.)	14. Hold Point	15. Disposition (Provide justification if NOT accepted.)	16. Status
1	Inorganic: No Comments			
2	Radiochemistry: Page 2, 1st paragraph under Blanks states "... sample results below the MDA are elevated to the MDA and qualified as undetected ..." This is not what's being done and the sentence needs to be changed to "... sample results below the MDA are qualified as undetected ..."		Corrected pre 7/29/99	
3				
4				

FAX

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

To: Jeanette Duncan

From: Bruce Christian

Pages: 1

Date: 9 July 1999

Information Request

110401 - Radiochemistry

The new strontium, uranium, plutonium Method Summaries indicate that for several samples preparation was conducted prior to analysis. Can you verify if this is accurate?

See attached - Rad Report re - Reported to address above issue

JMD
7-14-99

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

Facsimile Cover Sheet

Date: 7/12/99

TO: Company Name: BHI

Individual: JOAN KESSNER

Fax Number:

Telephone #:

FROM: Teerie

Number of pages being sent (including this page): 49

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

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

Operator Name:

Comments: JOAN.

Revised Report for

SDG 404

Sorry.
Teerie

TMA/RICHMOND
SAMPLE DELIVERY GROUP H0401

SDG	7122
Contact	L.A. Johnson

Client	Hanford
Contract	TRB-SBB-207925
Case no	SDG-H0401

SUMMARY DATA SECTION

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Prepared by

Reviewed by

Lab id	TMANC
Protocol	Hanford
Version	Ver 1.0
Form	DVD-TOC
Version	3.06
Report date	07/12/99

TMA/RICHMOND
SAMPLE DELIVERY GROUP H0401

REPORT GUIDE

SDG 7122
Contact L.A. Johnson

Client Hanford
Contract TRB-SBB-207925
Case no SDG-H0401

ABOUT THE DATA SUMMARY SECTION

The Data Summary Section of a Data Package has all data, in several useful orders, necessary for first level, routine review of the data package for a Sample Delivery Group (SDG). This section follows the Data Package Narrative, which has an overview of the data package and a discussion of special problems. It is followed by the Raw Data Section, which has full details.

The Data Summary Section has several groups of reports:

SAMPLE SUMMARIES

The Sample and QC Summary Reports show all samples, including QC samples, reported in one SDG. These reports cross-reference client and lab sample identifiers.

PREPARATION BATCH SUMMARY

The Preparation Batch Summary Report shows all preparation batches (lab groupings reflecting how work was organized) relevant to the reported SDG with information necessary to check the completeness and consistency of the SDG.

WORK SUMMARY

The Work Summary Report shows all samples and work done on them relevant to the reported SDG.

METHOD BLANKS

The Method Blank Reports, one for each Method Blank relevant to the SDG, show all results and primary supporting information for the blanks.

LAB CONTROL SAMPLES

The Lab Control Sample Reports, one for each Lab Control Sample relevant to the SDG, show all results, recoveries and primary supporting information for these QC samples.

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-RG
Version 3.06
Report date 07/12/99

TMA/RICHMOND
SAMPLE DELIVERY GROUP H0401

GUIDE, cont.

SDG 7122
Contact L.A. Johnson

Client Hanford
Contract TRB-SBB-207925
Case no SDG-H0401

ABOUT THE DATA SUMMARY SECTION

DUPLICATES

The Duplicate Reports, one for each Duplicate and Original sample pair relevant to the SDG, show all results, differences and primary supporting information for these QC samples.

MATRIX SPIKES

The Matrix Spike Reports, one for each Spiked and Original sample pair relevant to the SDG, show all results, recoveries and primary supporting information for these QC samples.

DATA SHEETS

The Data Sheet Reports, one for each client sample in the SDG, show all results and primary supporting information for these samples.

METHOD SUMMARIES

The Method Summary Reports, one for each test used in the SDG, show all results, QC and method performance data for one analyte on one or two pages. (A test is a short code for the method used to do certain work to the client's specification.)

REPORT GUIDES

The Report Guides, one for each of the above groups of reports, have documentation on how to read the associated reports.

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-RG
Version 3.06
Report date 07/12/99

TMA/RICHMOND

SAMPLE DELIVERY GROUP R0401

SAMPLE SUMMARY

SDG 7122
Contact L.A. Johnson

Client Hanford
Contract TRB-SBB-207925
Case no SDG-H0401

CLIENT SAMPLE ID	LOCATION	MATRIX	LEVEL	LAB SAMPLE ID	SAF NO	CHAIN OF CUSTODY	COLLECTED
B0VF62	100 B/C 116-B-4 Shallow	SOLID		N905047-01	B99-002	B99-002-94	05/06/99 09:30
B0VF63		SOLID		N905047-02	B99-002	B99-002-94	05/06/99 09:37
B0VF64		SOLID		N905047-03	B99-002	B99-002-94	05/06/99 09:37
B0VF65		SOLID		N905047-04	B99-002	B99-002-94	05/06/99 08:00
B0VF66		SOLID		N905047-05	B99-002	B99-002-95	05/06/99 10:00
B0VF67		SOLID		N905047-06	B99-002	B99-002-95	05/06/99 10:10
Method Blank		SOLID		N905047-08	B99-002		
Method Blank		SOLID		N905047-11	B99-002		
Lab Control Sample		SOLID		N905047-07	B99-002		
Lab Control Sample		SOLID		N905047-10	B99-002		
Duplicate (N905047-01)	100 B/C 116-B-4 Shallow	SOLID		N905047-09	B99-002		05/06/99 09:30
Duplicate (N905047-01)	100 B/C 116-B-4 Shallow	SOLID		N905047-12	B99-002		05/06/99 09:30

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-CS
Version 1.06
Report date 07/12/99

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0401

QC SUMMARY

SDG 7122
Contact L.A. Johnson

Client Hanford
Contract TRB-SBD-207925
Case no SDG-H0401

QC BATCH	CHAIN OF CUSTODY	CLIENT SAMPLE ID	MATRIX	% SOLIDS	SAMPLE AMOUNT	BASIS AMOUNT	DAYS SINCE RECEIVED	DAYS SINCE COLL	LAB SAMPLE ID	DEPARTMENT SAMPLE ID
7122	B99-002-94	B0VF62	SOLID	92.3			05/11/99	5	N905047-01	7122-001
		B0VF63	SOLID	93.8			05/11/99	5	N905047-02	7122-002
		B0VF64	SOLID	93.3			05/11/99	5	N905047-03	7122-003
		B0VF65	SOLID	100.0			05/11/99	5	N905047-04	7122-004
	B99-002-95	B0VF66	SOLID	92.8			05/11/99	5	N905047-05	7122-005
		B0VF67	SOLID	97.5			05/11/99	5	N905047-06	7122-006
		Method Blank	SOLID						N905047-08	7122-008
		Method Blank	SOLID						N905047-11	7122-011
		Lab Control Sample	SOLID						N905047-07	7122-007
		Lab Control Sample	SOLID						N905047-10	7122-010
		Duplicate (N905047-01)	SOLID	92.3			05/11/99	5	N905047-09	7122-009
		Duplicate (N905047-01)	SOLID				05/11/99	5	N905047-12	7122-012

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-09
Version 3.06
Report date 07/12/99

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0401

SDG 7122
Contact L.A. Johnson

PREP BATCH SUMMARY

Client Hanford
Contract TRB-SBB-207925
Case no SDG-H0401

TEST	MATRIX	METHOD	PREPARATION BATCH	ERROR 2σ %	PLANCHETS ANALYZED CLIENT	MORE	RE	BLANK	LCS	DUP/ORIG	MS/ORIG	QUALIFIERS
Alpha Spectroscopy												
AM	SOLID	Americium 241 in Soil	6880-072	5.0	6			1	1	1/1		
PU	SOLID	Plutonium, Isotopic in Solids	6880-072	5.0	6			1	1	1/1		
U	SOLID	Uranium, Isotopic in Soil	6880-072	5.0	6			1	1	1/1		
Beta Counting												
SR	SOLID	Total Strontium in Soil	6880-072	10.0	6			1	1	1/1		
Gamma Spectroscopy												
GAM	SOLID	Gamma Scan	6880-072	15.0	6			1	1	1/1		
Liquid Scintillation Counting												
NI_L	SOLID	Nickel 63 in Soil	6880-072	10.0	6			1	1	1/1		

Duplicates and Matrix Spikes are those with original (Client) sample in this Sample Delivery Group.
Blank and LCS planchets are those in the same preparation batch as some Client, Duplicate or Spike sample.

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-PBS
Version 1.06
Report date 07/12/99

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0401

WORK SUMMARY

SDG 7122
Contact L.A. Johnson

Client Hanford
Contract TRB-SPB-207925
Case no SDG-H0401

CLIENT SAMPLE ID / LOCATION / CUSTODY	SAF No	MATRIX	LAB SAMPLE ID / COLLECTED / RECEIVED	FLANCHET	TEST	SUF-FIX	ANALYZED	REVIEWED	BY	METHOD
B0VF62			N905047-01	7122-001	AM	A1	06/08/99	06/14/99	TAH	Americium 241 in Soil
100 B/C 116-B-4	Shallow	SOLID	05/06/99	7122-001	GAM		05/18/99	06/14/99	TAH	Gamma Scan
B99-002-94	B99-002		05/11/99	7122-001	NI_L		05/21/99	06/16/99	TAH	Nickel 63 in Soil
				7122-001	PU	A1	05/29/99	06/14/99	TAH	Plutonium, Isotopic in Solids
				7122-001	SR		05/20/99	06/14/99	TAH	Total Strontium in Soil
				7122-001	U		05/19/99	05/20/99	TAH	Uranium, Isotopic in Soil
B0VF63			N905047-02	7122-002	AM	A1	06/08/99	06/14/99	TAH	Americium 241 in Soil
		SOLID	05/06/99	7122-002	GAM		05/18/99	06/14/99	TAH	Gamma Scan
B99-002-94	B99-002		05/11/99	7122-002	NI_L		05/21/99	06/16/99	TAH	Nickel 63 in Soil
				7122-002	PU	A1	06/01/99	06/14/99	TAH	Plutonium, Isotopic in Solids
				7122-002	SR		05/20/99	06/14/99	TAH	Total Strontium in Soil
				7122-002	U		05/19/99	05/20/99	TAH	Uranium, Isotopic in Soil
B0VF64			N905047-03	7122-003	AM	A1	06/08/99	06/14/99	TAH	Americium 241 in Soil
		SOLID	05/06/99	7122-003	GAM		05/18/99	06/14/99	TAH	Gamma Scan
B99-002-94	B99-002		05/11/99	7122-003	NI_L		05/21/99	06/16/99	TAH	Nickel 63 in Soil
				7122-003	PU	A1	05/29/99	06/14/99	TAH	Plutonium, Isotopic in Solids
				7122-003	SR		05/20/99	06/14/99	TAH	Total Strontium in Soil
				7122-003	U		05/19/99	05/20/99	TAH	Uranium, Isotopic in Soil
B0VF65			N905047-04	7122-004	AM	A1	06/08/99	06/14/99	TAH	Americium 241 in Soil
		SOLID	05/06/99	7122-004	GAM		05/18/99	06/14/99	TAH	Gamma Scan
B99-002-94	B99-002		05/11/99	7122-004	NI_L		05/21/99	06/16/99	TAH	Nickel 63 in Soil
				7122-004	PU	A1	05/29/99	06/14/99	TAH	Plutonium, Isotopic in Solids
				7122-004	SR		05/20/99	06/14/99	TAH	Total Strontium in Soil
				7122-004	U		05/19/99	05/20/99	TAH	Uranium, Isotopic in Soil
B0VF66			N905047-05	7122-005	AM	A1	06/08/99	06/14/99	TAH	Americium 241 in Soil
		SOLID	05/06/99	7122-005	GAM		05/18/99	06/14/99	TAH	Gamma Scan
B99-002-95	B99-002		05/11/99	7122-005	NI_L		05/21/99	06/16/99	TAH	Nickel 63 in Soil
				7122-005	PU	A1	05/29/99	06/14/99	TAH	Plutonium, Isotopic in Solids
				7122-005	SR		05/20/99	06/14/99	TAH	Total Strontium in Soil
				7122-005	U		05/19/99	05/20/99	TAH	Uranium, Isotopic in Soil

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-CMS
Version 3.06
Report date 07/12/99

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0401

SDG 7122
Contact L.A. Johnson

WORK SUMMARY, cont.

Client Hanford
Contract TRR-SBB-207925
Case no SDG-H0401

CLIENT SAMPLE ID / LOCATION / CUSTODY	SAF No	MATRIX	LAB SAMPLE ID / COLLECTED / RECEIVED	PLANCHET	TEST	SUF-FIX	ANALYZED	REVIEWED	BY	METHOD
B0VF67			N905047-06	7122-006	AM	A1	06/08/99	06/14/99	TAH	Americium 241 in Soil
		SOLID	05/06/99	7122-006	GAM		05/18/99	06/14/99	TAH	Gamma Scan
B99-002-95	B99-002		05/11/99	7122-006	NI_L		05/21/99	06/16/99	TAH	Nickel 63 in Soil
				7122-006	PU	A1	05/29/99	06/14/99	TAH	Plutonium, Isotopic in Solids
				7122-006	SR		05/20/99	06/14/99	TAH	Total Strontium in Soil
				7122-006	U		05/19/99	05/20/99	TAH	Uranium, Isotopic in Soil
Method Blank			N905047-08	7122-008	GAM		05/22/99	06/14/99	TAH	Gamma Scan
		SOLID		7122-008	NI_L		05/22/99	06/16/99	TAH	Nickel 63 in Soil
	B99-002			7122-008	SR		05/20/99	06/14/99	TAH	Total Strontium in Soil
				7122-008	U		05/19/99	05/20/99	TAH	Uranium, Isotopic in Soil
Method Blank			N905047-11	7122-011	AM		06/12/99	06/14/99	TAH	Americium 241 in Soil
		SOLID		7122-011	PU		06/02/99	06/14/99	TAH	Plutonium, Isotopic in Solids
	B99-002									
Lab Control Sample			N905047-07	7122-007	GAM		05/18/99	06/14/99	TAH	Gamma Scan
		SOLID		7122-007	NI_L		05/21/99	06/16/99	TAH	Nickel 63 in Soil
	B99-002			7122-007	SR		05/20/99	06/14/99	TAH	Total Strontium in Soil
				7122-007	U		05/19/99	05/20/99	TAH	Uranium, Isotopic in Soil
Lab Control Sample			N905047-10	7122-010	AM		06/10/99	06/14/99	TAH	Americium 241 in Soil
		SOLID		7122-010	PU		06/02/99	06/14/99	TAH	Plutonium, Isotopic in Solids
	B99-002									
Duplicate (N905047-01)			N905047-09	7122-009	GAM		05/22/99	06/14/99	TAH	Gamma Scan
00 B/C 116-B-4 Shallow		SOLID	05/06/99	7122-009	NI_L		05/22/99	06/16/99	TAH	Nickel 63 in Soil
	B99-002		05/11/99	7122-009	SR		05/20/99	06/14/99	TAH	Total Strontium in Soil
				7122-009	U		05/19/99	05/20/99	TAH	Uranium, Isotopic in Soil
Duplicate (N905047-01)			N905047-12	7122-012	AM		06/08/99	06/14/99	TAH	Americium 241 in Soil
00 B/C 116-B-4 Shallow		SOLID	05/06/99	7122-012	PU		06/02/99	06/14/99	TAH	Plutonium, Isotopic in Solids
	B99-002		05/11/99							

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVP-CWS
Version 3.06
Report date 07/12/99

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0401

SDG 7122
Contact L.A. Johnson

WORK SUMMARY, cont.

Client Hanford
Contract TRB-SEB-207925
Case no SDG-H0401

COUNTS OF TESTS BY SAMPLE TYPE

TEST	SAP No	METHOD	REFERENCE	CLIENT	MORE	RE	BLANK	LCS	DUP	SPIKE	TOTAL
AM	B99-002	Americium 241 in Soil	AM/CMPLATE	6			1	1	1		9
GAM	B99-002	Gamma Scan	GAMMAHI	6			1	1	1		9
NI_L	B99-002	Nickel 63 in Soil	NI63LSC	6			1	1	1		9
PU	B99-002	Plutonium, Isotopic in Solids	PUPLATE	6			1	1	1		9
SR	B99-002	Total Strontium in Soil		6			1	1	1		9
U	B99-002	Uranium, Isotopic in Soil	UPLATE	6			1	1	1		9
TOTALS				36			6	6	6		54

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-CWS
Version 3.06
Report date 07/12/99

TMA/RICHMOND
SAMPLE DELIVERY GROUP H0401

N905047-08 Method Blank

METHOD BLANK

SDG	7122	Client/Case no	Hanford SDG-H0401
Contact	L.A. Johnson	Case no	TRB-SEB-207925
Lab sample id	N905047-08	Client sample id	Method Blank
Dept sample id	7122-008	Material/Matrix	SOLID
		SAF No	B99-002

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Uranium 233/234	U-233/234	0.012	0.024	0.090	1.0	U	U
Uranium 235	15117-96-1	0	0.029	0.11	1.0	U	U
Uranium 238	U-238	0	0.024	0.090	1.0	U	U
Nickel 63	13981-37-8	-0.635	1.4	2.3	30	U	NI_L
Total Strontium	SR-RAD	-0.050	0.15	0.20	1.0	U	SR
Potassium 40	13966-00-2	U		0.14		U	GAM
Cobalt 60	10198-40-0	U		0.014	0.050	U	GAM
Cesium 137	10045-97-3	U		0.010	0.10	U	GAM
Europium 152	14683-23-9	U		0.025	0.10	U	GAM
Europium 154	15585-10-1	U		0.036	0.10	U	GAM
Europium 155	14391-16-3	U		0.016	0.10	U	GAM
Americium 241	14596-10-2	U		0.008		U	GAM
Uranium 238	U-238	U		1.6		U	GAM
Uranium 235	15117-96-1	U		0.027		U	GAM

100 BC Areas-Full Protocol

QC-BLANK 30758

Lab id	TMANC
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	07/12/99

TMA/RICHMOND
SAMPLE DELIVERY GROUP H0401

N905047-11

Method Blank

METHOD BLANK

SDG	7122	Client/Case no	Hanford SDG-H0401
Contact	L.A. Johnson	Case no	TRB-SBB-207925
Lab sample id	N905047-11	Client sample id	Method Blank
Dept sample id	7122-011	Material/Matrix	SOLID
		SAF No	B99-002

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Plutonium 238	13981-16-3	0.002	0.019	0.037	1.0	U	PU
Plutonium 239/240	PU-239/240	0.005	0.019	0.037	1.0	U	PU
Americium 241	14596-10-2	0.007	0.033	0.066	1.0	U	AM

100 BC Areas-Full Protocol

QC-BLANK 30830

Lab id	TMANC
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	07/12/99

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0401

N905047-07

Lab Control Sample

LAB CONTROL SAMPLE

SDG 7122

Contact L.A. Johnson

Client/Case no Hanford SDG-H0401

Case no TRB-SRB-207925

Lab sample id N905047-07

Dept sample id 7122-007

Client sample id Lab Control Sample

Material/Matrix SOLID

SAF No B99-002

ANALYTE	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST	ADDED pCi/g	2σ ERR pCi/g	REC %	3σ LMTS (TOTAL)	PROTOCOL LIMITS
Uranium 233/234	4.38	0.60	0.31	1.0		U	4.95	0.20	88	80-120	80-120
Uranium 235	3.80	0.56	0.094	1.0		U	4.04	0.16	94	77-123	80-120
Uranium 238	4.49	0.61	0.29	1.0		U	5.10	0.20	88	80-120	80-120
Nickel 63	138	3.5	2.3	30		NI_L	134	5.4	103	83-117	
Total Strontium	5.65	0.33	0.18	1.0		SR	5.71	0.23	99	82-118	
Potassium 40	U		0.15		U	GAM					
Cobalt 60	0.212	0.020	0.014	0.050		GAM	0.227	0.009	93	74-126	80-120
Cesium 137	0.249	0.019	0.016	0.10		GAM	0.260	0.010	96	75-125	80-120
Europium 152	U		0.029	0.10	U	GAM					
Europium 154	U		0.033	0.10	U	GAM					
Europium 155	U		0.025	0.10	U	GAM					
Americium 241	U		0.030		U	GAM					
Uranium 238	U		1.6		U	GAM					
Uranium 235	U		0.041		U	GAM					

100 BC Areas-Full Protocol

QC-LCS 30757

Lab id TMARC

Protocol Hanford

Version Ver 1.0

Form DVD-LCS

Version 3.06

Report date 07/12/99

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0401

N905047-10

Lab Control Sample

LAB CONTROL SAMPLE

SDG 7122
Contact L.A. Johnson

Client/Case no Hanford SDG-H0401
Case no TRB-SBB-207925

Lab sample id N905047-10
Dept sample id 7122-010

Client sample id Lab Control Sample
Material/Matrix SOLID
SAF No B99-002

ANALYTE	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST	ADDED pCi/g	2σ ERR pCi/g	REC %	3σ LMTS (TOTAL)	PROTOCOL LIMITS
Plutonium 238	9.46	0.60	0.032	1.0		PU	10.1	0.40	94	87-113	80-120
Plutonium 239/240	11.3	0.70	0.029	1.0		PU	11.9	0.48	95	87-113	80-120
Americium 241	10.1	0.93	0.050	1.0		AM	10.5	0.42	96	84-116	80-120

100 BC Areas-Full Protocol

QC-LCS 30829

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-LCS
Version 3.06
Report date 07/12/99

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0401

N905047-09 B0VF62

DUPLICATE

SDG	7122			Client/Case no	Hanford SDG-H0401
Contact	L.A. Johnson			Case no	TRB-SBB-207925
	DUPLICATE		ORIGINAL		
Lab sample id	N905047-09	Lab sample id	N905047-01	Client sample id	B0VF62
Dept sample id	7122-009	Dept sample id	7122-001	Location/Matrix	100 B/C 116-B-4 Shallow SOLID
		Received	05/11/99	Collected	05/06/99 09:30
% solids	92.3	% solids	92.3	Custody/SAF No	B99-002-94 B99-002

ANALYTE	DUPLICATE pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST	ORIGINAL pCi/g	2σ ERR (COUNT)	MDA pCi/g	QUALI-FIERS	RPD %	3σ PROT TOT LIMIT
Uranium 233/234	0.588	0.17	0.085	1.0	J	U	0.480	0.13	0.068	J	20	61
Uranium 235	0.040	0.054	0.10	1.0	U	U	0.022	0.022	0.082	U	-	
Uranium 238	0.555	0.16	0.085	1.0	J	U	0.632	0.16	0.068	J	13	56
Nickel 63	-0.531	1.8	3.1	30	U	NI_L	0.511	1.9	3.2	U	-	
Total Strontium	0.166	0.13	0.17	1.0	U	SR	0.042	0.15	0.20	U	-	
Potassium 40	12.6	0.31	0.12			GAM	12.0	0.49	0.26		5	33
Cobalt 60	U		0.013	0.050	U	GAM	U		0.024	U	-	
Cesium 137	0.060	0.015	0.016	0.10	J	GAM	0.032	0.021	0.026	J	61	90
Europium 152	U		0.032	0.10	U	GAM	U		0.056	U	-	
Europium 154	U		0.043	0.10	U	GAM	U		0.074	U	-	
Europium 155	U		0.035	0.10	U	GAM	U		0.056	U	-	
Radium 226	0.479	0.026	0.023	0.10		GAM	0.494	0.038	0.036		3	35
Radium 228	0.727	0.060	0.055	0.20		GAM	0.649	0.094	0.098		11	40
Thorium 228	0.823	0.028	0.026			GAM	0.805	0.041	0.040		2	33
Thorium 232	0.727	0.060	0.055			GAM	0.649	0.094	0.098		11	40
Americium 241	U		0.042		U	GAM	U		0.081	U	-	
Uranium 236	U		1.7		U	GAM	U		2.8	U	-	
Uranium 235	U		0.050		U	GAM	U		0.091	U	-	

100 BC Areas-Full Protocol

QC-DUP#1 30759

Lab id	TMANC
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DUP
Version	1.06
Report date	07/12/99

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0401

N905047-12

B0VF62

DUPLICATE

SDG	7122	Client/Case no	Hanford SDG-H0401
Contact	L.A. Johnson	Case no	TRB-SBB-207925
DUPLICATE		ORIGINAL	
Lab sample id	N905047-12	Lab sample id	N905047-01
Dept sample id	7122-012	Dept sample id	7122-001
		Received	05/11/99
		% solids	92.3
		Client sample id	B0VF62
		Location/Matrix	100 B/C 116-B-4 Shallow SOLID
		Collected	05/06/99 09:30
		Custody/SAF No	B99-002-94 B99-002

ANALYTE	DUPLICATE pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST	ORIGINAL pCi/g	2σ ERR (COUNT)	MDA pCi/g	QUALI-FIERS	RPD %	3σ TOT	PROT LIMIT
Plutonium 238	-0.005	0.011	0.033	1.0	U	PU	0.021	0.014	0.027	U	-		
Plutonium 239/240	0.011	0.016	0.029	1.0	U	PU	0.007	0.007	0.027	U	-		
Americium 241	0	0.018	0.042	1.0	U	AM	0.014	0.028	0.035	U	-		

100 BC Areas-Full Protocol

QC-DUPW1 30831

Lab id	TMANC
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DUP
Version	2.06
Report date	07/12/99

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0401

N905047-01 B0VF62

DATA SHEET

SDG	7122	Client/Case no	Hanford SDG-H0401
Contact	L.A. Johnson	Case no	TRB-SBB-207925
Lab sample id	N905047-01	Client sample id	B0VF62
Dept sample id	7122-001	Location/Matrix	100 B/C 116-B-4 Shallow SOLID
Received	05/11/99	Collected	05/06/99 09:30
% solids	92.3	Custody/SAF No	B99-002-94 B99-002

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Uranium 233/234	U-233/234	0.480	0.13	0.068	1.0	J	U
Uranium 235	15117-96-1	0.022	0.022	0.082	1.0	U	U
Uranium 238	U-238	0.632	0.15	0.068	1.0	J	U
Plutonium 238	13981-16-3	0.021	0.014	0.027	1.0	U	PU
Plutonium 239/240	PU-239/240	0.007	0.007	0.027	1.0	U	PU
Nickel 63	13981-37-8	0.511	1.9	3.2	30	U	NI_L
Americium 241	14596-10-2	0.014	0.028	0.035	1.0	U	AM
Total Strontium	SR-RAD	0.042	0.15	0.20	1.0	U	SR
Potassium 40	13966-00-2	12.0	0.49	0.26			GAM
Cobalt 60	10198-40-0	U		0.024	0.050	U	GAM
Cesium 137	10045-97-3	0.032	0.021	0.026	0.10	J	GAM
Europium 152	14683-23-9	U		0.056	0.10	U	GAM
Europium 154	15585-10-1	U		0.074	0.10	U	GAM
Europium 155	14391-16-3	U		0.056	0.10	U	GAM
Radium 226	13982-63-3	0.494	0.038	0.036	0.10		GAM
Radium 228	15262-20-1	0.649	0.094	0.098	0.20		GAM
Thorium 228	14274-82-9	0.805	0.041	0.040			GAM
Thorium 232	TH-232	0.649	0.094	0.098			GAM
Americium 241	14596-10-2	U		0.081		U	GAM
Uranium 238	U-238	U		2.8		U	GAM
Uranium 235	15117-96-1	U		0.091		U	GAM

100 BC Areas-Full Protocol

Lab id	TMANC
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	07/12/99

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0401

N905047-02

B0VF63

DATA SHEET

SDG	7122	Client/Case no	Hanford SDG-H0401
Contact	L.A. Johnson	Case no	TRB-SBB-207925
Lab sample id	N905047-02	Client sample id	B0VF63
Dept sample id	7122-002	Location/Matrix	SOLID
Received	05/11/99	Collected	05/06/99 09:37
% solids	93.8	Custody/SAF No	B99-002-94 B99-002

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Uranium 233/234	U-233/234	0.459	0.13	0.070	1.0	J	U
Uranium 235	15117-96-1	0.056	0.045	0.085	1.0	U	U
Uranium 238	U-238	0.340	0.11	0.070	1.0	J	U
Plutonium 238	13981-16-3	-0.003	0.010	0.028	1.0	U	PU
Plutonium 239/240	PU-239/240	0.008	0.015	0.032	1.0	U	PU
Nickel 63	13981-37-8	-1.25	1.8	3.0	30	U	NI_L
Americium 241	14596-10-2	0	0.018	0.035	1.0	U	AM
Total Strontium	SR-RAD	-0.095	0.13	0.18	1.0	U	SR
Potassium 40	13966-00-2	12.1	0.31	0.12			GAM
Cobalt 60	10198-40-0	U		0.013	0.050	U	GAM
Cesium 137	10045-97-3	0.011	0.009	0.012	0.10	U	GAM
Europium 152	14683-23-9	U		0.031	0.10	U	GAM
Europium 154	15585-10-1	U		0.042	0.10	U	GAM
Europium 155	14391-16-3	U		0.045	0.10	U	GAM
Radium 226	13982-63-3	0.467	0.027	0.025	0.10		GAM
Radium 228	15262-20-1	0.687	0.056	0.053	0.20		GAM
Thorium 228	14274-82-9	0.785	0.025	0.024			GAM
Thorium 232	TH-232	0.687	0.056	0.053			GAM
Americium 241	14596-10-2	U		0.041		U	GAM
Uranium 238	U-238	U		1.6		U	GAM
Uranium 235	15117-96-1	U		0.054		U	GAM

100 BC Areas-Full Protocol

Lab id	TMANC
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	07/12/99

TMA/RICHMOND
SAMPLE DELIVERY GROUP H0401

N905047-03 B0VF64

DATA SHEET

SDG	7122	Client/Case no	Hanford SDG-H0401
Contact	L.A. Johnson	Case no	TRB-SBB-207925
Lab sample id	N905047-03	Client sample id	B0VF64
Dept sample id	7122-003	Location/Matrix	SOLID
Received	05/11/99	Collected	05/06/99 09:37
% solids	93.3	Custody/SAF No	B99-002-94 B99-002

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALIFIERS	TEST
Uranium 233/234	U-233/234	0.593	0.16	0.072	1.0	J	U
Uranium 235	15117-96-1	0.046	0.046	0.087	1.0	U	U
Uranium 238	U-238	0.452	0.14	0.072	1.0	J	U
Plutonium 238	13981-16-3	0.003	0.026	0.047	1.0	U	PU
Plutonium 239/240	PU-239/240	-0.003	0.019	0.043	1.0	U	PU
Nickel 63	13981-37-8	0.142	1.7	2.9	30	U	NI_L
Americium 241	14596-10-2	-0.009	0.019	0.045	1.0	U	AM
Total Strontium	SR-RAD	-0.023	0.15	0.19	1.0	U	SR
Potassium 40	13966-00-2	12.4	0.54	0.27			GAM
Cobalt 60	10198-40-0	U		0.027	0.050	U	GAM
Cesium 137	10045-97-3	U		0.024	0.10	U	GAM
Europium 152	14683-23-9	U		0.050	0.10	U	GAM
Europium 154	15585-10-1	U		0.091	0.10	U	GAM
Europium 155	14391-16-3	U		0.075	0.10	U	GAM
Radium 226	13982-63-3	0.487	0.053	0.048	0.10		GAM
Radium 228	15262-20-1	0.709	0.12	0.12	0.20		GAM
Thorium 228	14274-82-9	0.686	0.028	0.025			GAM
Thorium 232	TH-232	0.709	0.12	0.12			GAM
Americium 241	14596-10-2	U		0.030		U	GAM
Uranium 238	U-238	U		3.5		U	GAM
Uranium 235	15117-96-1	U		0.081		U	GAM

100 BC Areas-Full Protocol

Lab id	TMANC
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	07/12/99

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0401

N905047-04 B0VF65

DATA SHEET

SDG	7122	Client/Case no	Hanford SDG-H0401
Contact	L.A. Johnson	Case no	TRB-SBB-207925
Lab sample id	N905047-04	Client sample id	B0VF65
Dept sample id	7122-004	Location/Matrix	SOLID
Received	05/11/99	Collected	05/06/99 08:00
% solids	100.0	Custody/SAF No	B99-002-94 B99-002

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Uranium 233/234	U-233/234	0.174	0.084	0.078	1.0	J	U
Uranium 235	15117-96-1	0.012	0.025	0.095	1.0	U	U
Uranium 238	U-238	0.195	0.084	0.078	1.0	J	U
Plutonium 238	13981-16-3	0.003	0.024	0.046	1.0	U	PU
Plutonium 239/240	PU-239/240	0	0.012	0.033	1.0	U	PU
Nickel 63	13981-37-8	-0.392	1.4	2.3	30	U	NI_L
Americium 241	14596-10-2	-0.005	0.018	0.044	1.0	U	AM
Total Strontium	SR-RAD	-0.102	0.13	0.19	1.0	U	SR
Potassium 40	13966-00-2	4.33	0.28	0.13			GAM
Cobalt 60	10198-40-0	U		0.016	0.050	U	GAM
Cesium 137	10045-97-3	U		0.014	0.10	U	GAM
Europium 152	14683-23-9	U		0.037	0.10	U	GAM
Europium 154	15585-10-1	U		0.050	0.10	U	GAM
Europium 155	14391-16-3	U		0.038	0.10	U	GAM
Radium 226	13982-63-3	0.171	0.028	0.028	0.10		GAM
Radium 228	15262-20-1	0.180	0.068	0.069	0.20	J	GAM
Thorium 228	14274-82-9	0.185	0.017	0.017			GAM
Thorium 232	TH-232	0.180	0.068	0.069			GAM
Americium 241	14596-10-2	U		0.057		U	GAM
Uranium 238	U-238	U		1.9		U	GAM
Uranium 235	15117-96-1	U		0.061		U	GAM

100 BC Areas-Full Protocol

Lab id	TMANC
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	07/12/99

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0401

N905047-05 B0VF66

DATA SHEET

SDG	7122	Client/Case no	Hanford SDG-H0401
Contact	L.A. Johnson	Case no	TRB-SBB-207925
Lab sample id	N905047-05	Client sample id	B0VF66
Dept sample id	7122-005	Location/Matrix	SOLID
Received	05/11/99	Collected	05/06/99 10:00
% solids	92.8	Custody/SAF No	B99-002-95 B99-002

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Uranium 233/234	U-233/234	0.466	0.13	0.070	1.0	J	U
Uranium 235	15117-96-1	0.011	0.022	0.085	1.0	U	U
Uranium 238	U-238	0.484	0.13	0.070	1.0	J	U
Plutonium 238	13981-16-3	0.027	0.024	0.028	1.0	U	PU
Plutonium 239/240	PU-239/240	0.030	0.024	0.033	1.0	U	PU
Nickel 63	13981-37-8	-0.822	2.3	3.9	30	U	NI_L
Americium 241	14596-10-2	0.016	0.031	0.050	1.0	U	AM
Total Strontium	SR-RAD	0.030	0.12	0.17	1.0	U	SR
Potassium 40	13966-00-2	12.1	0.33	0.14			GAM
Cobalt 60	10198-40-0	U		0.014	0.050	U	GAM
Cesium 137	10045-97-3	0.034	0.013	0.015	0.10	J	GAM
Europium 152	14683-23-9	U		0.034	0.10	U	GAM
Europium 154	15585-10-1	U		0.048	0.10	U	GAM
Europium 155	14391-16-3	U		0.055	0.10	U	GAM
Radium 226	13982-63-3	0.472	0.030	0.027	0.10		GAM
Radium 228	15262-20-1	0.697	0.073	0.068	0.20		GAM
Thorium 228	14274-82-9	0.644	0.020	0.018			GAM
Thorium 232	TH-232	0.697	0.073	0.068			GAM
Americium 241	14596-10-2	U		0.046		U	GAM
Uranium 238	U-238	U		1.8		U	GAM
Uranium 235	15117-96-1	U		0.081		U	GAM

100 BC Areas-Full Protocol

Lab id	TMANC
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	07/12/99

TMA/RICHMOND
SAMPLE DELIVERY GROUP H0401

N905047-06 B0VF67

DATA SHEET

SDG	7122	Client/Case no	Hanford SDG-H0401
Contact	L.A. Johnson	Case no	TRB-SBB-207925
Lab sample id	N905047-06	Client sample id	B0VF67
Dept sample id	7122-006	Location/Matrix	SOLID
Received	05/11/99	Collected	05/06/99 10:10
% solids	97.5	Custody/SAF No	B99-002-95 B99-002

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Uranium 233/234	U-233/234	0.378	0.12	0.074	1.0	J	U
Uranium 235	15117-96-1	0.012	0.024	0.090	1.0	U	U
Uranium 238	U-238	0.534	0.14	0.074	1.0	J	U
Plutonium 238	13981-16-3	0.367	0.076	0.025	1.0	J	PU
Plutonium 239/240	PU-239/240	0.353	0.069	0.025	1.0	J	PU
Nickel 63	13981-37-8	0.454	1.8	3.0	30	U	NI_L
Americium 241	14596-10-2	0.011	0.033	0.053	1.0	U	AM
Total Strontium	SR-RAD	-0.016	0.14	0.18	1.0	U	SR
Potassium 40	13966-00-2	12.8	0.45	0.20			GAM
Cobalt 60	10198-40-0	U		0.023	0.050	U	GAM
Cesium 137	10045-97-3	0.049	0.018	0.022	0.10	J	GAM
Europium 152	14683-23-9	U		0.046	0.10	U	GAM
Europium 154	15585-10-1	U		0.081	0.10	U	GAM
Europium 155	14391-16-3	U		0.043	0.10	U	GAM
Radium 226	13982-63-3	0.527	0.041	0.039	0.10		GAM
Radium 228	15262-20-1	0.724	0.10	0.098	0.20		GAM
Thorium 228	14274-82-9	0.701	0.024	0.023			GAM
Thorium 232	TH-232	0.724	0.10	0.098			GAM
Americium 241	14596-10-2	U		0.027		U	GAM
Uranium 238	U-238	U		2.9		U	GAM
Uranium 235	15117-96-1	U		0.072		U	GAM

100 BC Areas-Full Protocol

Lab id	TMANC
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	07/12/99

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0401

METHOD SUMMARY

AMERICIUM 241 IN SOIL

ALPHA SPECTROSCOPY

Test AM Matrix SOLID
SDG 7122
Contact L.A. Johnson

Client Hanford
Contract TRB-SRB-207925
Case no SDG-H0401

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF-FIX	PLANCHET	Americium 241	
Preparation batch 6880-072						
B0VF62	N905047-01		A1	7122-001	U	
B0VF63	N905047-02		A1	7122-002	U	
B0VF64	N905047-03		A1	7122-003	U	
B0VF65	N905047-04		A1	7122-004	U	
B0VF66	N905047-05		A1	7122-005	U	
B0VF67	N905047-06		A1	7122-006	U	
BLK (QC ID-30830)	N905047-11			7122-011	U	
LCS (QC ID-30829)	N905047-10			7122-010	ok	
Duplicate (N905047-01)	N905047-12			7122-012	-	U

Nominal values and limits from method RDLs (pCi/g) 1.0
100 BC Areas-Full Protocol

METHOD PERFORMANCE

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF-FIX	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 6880-072 2σ prep error 5.0 % Reference Lab Notebook 6880 pg.72																
B0VF62	N905047-01		A1	0.035	0.500			79		691			33	06/08/99	06/08	SS-002
B0VF63	N905047-02		A1	0.035	0.500			76		691			33	06/08/99	06/08	SS-004
B0VF64	N905047-03		A1	0.045	0.500			72		691			33	06/08/99	06/08	SS-005
B0VF65	N905047-04		A1	0.044	0.500			73		691			33	06/08/99	06/08	SS-006
B0VF66	N905047-05		A1	0.050	0.500			66		691			33	06/08/99	06/08	SS-008
B0VF67	N905047-06		A1	0.053	0.500			63		689			33	06/08/99	06/08	SS-009
BLK (QC ID-30830)	N905047-11			0.066	0.500			95		815				06/08/99	06/12	SS-033
LCS (QC ID-30829)	N905047-10			0.050	0.500			89		396				06/08/99	06/10	SS-035
Duplicate (N905047-01) (QC ID-30831)	N905047-12			0.043	0.500			78		691			33	06/08/99	06/08	SS-012
Nominal values and limits from method				1.0	0.500			20-105		700	100		180			

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-CMS
Version 3.06
Report date 07/12/99

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0401

METHOD SUMMARY, cont.

AMERICIUM 241 IN SOIL

ALPHA SPECTROSCOPY

Test AM Matrix SOLID
SDG 7122
Contact L.A. Johnson

Client Hanford
Contract TRP-SBP-207925
Case no SDG-H0401

PROCEDURES	REFERENCE	AM/CMPLATE
	EP-060	Soil Preparation, rev 0
	EP-070	Soil Dissolution, rev 0
	EP-940	Plutonium Purification, rev 0
	EP-950	Americium-Curium Purification, rev 0
	EP-008	Heavy Elements Electroplating, rev 0

AVERAGES ± 2 SD	MDA	0.047	±	0.019
FOR 9 SAMPLES	YIELD	77	±	20

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-CMS
Version 3.06
Report date 07/12/99

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0401

METHOD SUMMARY

PLUTONIUM, ISOTOPIC IN SOLIDS

ALPHA SPECTROSCOPY

Test PU Matrix SOLID
SDG 7122
Contact L.A. Johnson

Client Hanford
Contract TRB-SBB-207925
Case no SDG-H0401

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF-FIX	PLANCHET	Plutonium 238	Plutonium 239/240
Preparation batch 6880-072						
B0VF62	N905047-01		A1	7122-001	U	U
B0VF63	N905047-02		A1	7122-002	U	U
B0VF64	N905047-03		A1	7122-003	U	U
B0VF65	N905047-04		A1	7122-004	U	U
B0VF66	N905047-05		A1	7122-005	U	U
B0VF67	N905047-06		A1	7122-006	0.367 J	0.353 J
BLK (QC ID-30830)	N905047-11			7122-011	U	U
LCS (QC ID-30829)	N905047-10			7122-010	ok	ok
Duplicate (N905047-01)	N905047-12			7122-012	- U	- U
Nominal values and limits from method 100 BC Areas-Full Protocol				RDLs (pCi/g)	1.0	1.0

METHOD PERFORMANCE

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF-FIX	MAX MDA pCi/g	ALIQ g	PREP FAC	DILU-TION	YIELD %	EFF %	COUNT min	FWHM keV	DRIFT KeV	DAYS HELD	PREPARED	ANAL-YZED	DETECTOR
Preparation batch 6880-072 2σ prep error 5.0 % Reference Lab Notebook 6880 pg.72																
B0VF62	N905047-01		A1	0.027	0.500			78		839			23	05/29/99	05/29	SS-007
B0VF63	N905047-02		A1	0.032	0.500			91		1010			26	05/29/99	06/01	SS-014
B0VF64	N905047-03		A1	0.047	0.500			89		839			23	05/29/99	05/29	SS-009
B0VF65	N905047-04		A1	0.046	0.500			90		839			23	05/29/99	05/29	SS-010
B0VF66	N905047-05		A1	0.033	0.500			96		839			23	05/29/99	05/29	SS-011
B0VF67	N905047-06		A1	0.025	0.500			82		849			23	05/29/99	05/29	SS-056
BLK (QC ID-30830)	N905047-11			0.037	0.500			95		1005				05/29/99	06/02	SS-057
LCS (QC ID-30829)	N905047-10			0.032	0.500			89		1005				05/29/99	06/02	SS-056
Duplicate (N905047-01) (QC ID-30831)	N905047-12			0.033	0.500			87		1005			27	05/29/99	06/02	SS-058
Nominal values and limits from method				1.0	0.500			20-105		10	100		180			

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-CMS
Version 3.06
Report date 07/12/99

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0401

METHOD SUMMARY, cont.

PLUTONIUM, ISOTOPIC IN SOLIDS

ALPHA SPECTROSCOPY

Test PU Matrix SOLID
SDG 7122
Contact L.A. Johnson

Client Hanford
Contract TRB-SBB-207925
Case no SDG-H0401

PROCEDURES	REFERENCE	PUPLATE
	EP-060	Soil Preparation, rev 0
	EP-070	Soil Dissolution, rev 0
	EP-940	Plutonium Purification, rev 0
	EP-008'	Heavy Elements Electroplating, rev 0

AVERAGES ± 2 SD	MDA	0.015 ± 0.015
FOR 9 SAMPLES	YIELD	89 ± 11

Lab id TMARC
Protocol Hanford
Version Ver 1.0
Form DVD-CMS
Version 3.06
Report date 07/12/99

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0401

METHOD SUMMARY

URANIUM, ISOTOPIC IN SOIL

ALPHA SPECTROSCOPY

Test U Matrix SOLID
SDG 7122
Contact L.A. Johnson

Client Hanford
Contract TRB-SBB-207925
Case no SDG-H0401

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF-FIX	PLANCHET	1: Uranium 233/234	2: Uranium 235	3: Uranium 238	RESULT RATIOS (%) 1-3	2σ	2-3	2σ
Preparation batch 6880-072											
B0VF62	N905047-01			7122-001	0.480 J	U	0.632 J	76	27	3	4
B0VF63	N905047-02			7122-002	0.459 J	U	0.340 J	135	58	16	14
B0VF64	N905047-03			7122-003	0.593 J	U	0.452 J	121	54	10	11
B0VF65	N905047-04			7122-004	0.174 J	U	0.195 J	89	58	6	13
B0VF66	N905047-05			7122-005	0.466 J	U	0.484 J	96	37	2	5
B0VF67	N905047-06			7122-006	0.378 J	U	0.534 J	71	29	2	5
BLK (QC ID=30758)	N905047-08			7122-008	U	U	U				
LCS (QC ID=30757)	N905047-07			7122-007	ok	ok	ok				
Duplicate (N905047-01)	N905047-09			7122-009	ok J	- U	ok J	106	43	7	10
Nominal values and limits from method			RDLs (pCi/g)		1.0	1.0	1.0	100		4	
100 BC Areas-Full Protocol								Averages 101		7	

METHOD PERFORMANCE

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF-FIX	MAX MDA pCi/g	ALIQ g	PREP FAC	DILU-TION	YIELD %	EFF %	COUNT min	FWHM KeV	DRIFT KeV	DAYS HELD	PREPARED	ANAL-YZED	DETECTOR
Preparation batch 6880-072 2σ prep error 5.0 % Reference Lab Notebook 6880 pg.72																
B0VF62	N905047-01			0.082	1.00			85		160			13	05/19/99	05/19	SS-001
B0VF63	N905047-02			0.085	1.00			79		160			13	05/19/99	05/19	SS-004
B0VF64	N905047-03			0.087	1.00			78		160			13	05/19/99	05/19	SS-005
B0VF65	N905047-04			0.095	1.00			72		160			13	05/19/99	05/19	SS-006
B0VF66	N905047-05			0.085	1.00			82		160			13	05/19/99	05/19	SS-008
B0VF67	N905047-06			0.090	1.00			78		160			13	05/19/99	05/19	SS-009
BLK (QC ID=30758)	N905047-08			0.11	1.00			65		160				05/19/99	05/19	SS-011
LCS (QC ID=30757)	N905047-07			0.31	1.00			73		160				05/19/99	05/19	SS-010
Duplicate (N905047-01) (QC ID=30759)	N905047-09			0.10	1.00			68		160			13	05/19/99	05/19	SS-012
Nominal values and limits from method				1.0	1.00			30-105		150	100		180			

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-CMS
Version 2.06
Report date 07/12/99

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0401

METHOD SUMMARY, cont.

URANIUM, ISOTOPIC IN SOIL

ALPHA SPECTROSCOPY

Test U Matrix SOLID
SDG 7122
Contact L.A. Johnson

Client Hanford
Contract TRB-SDB-207925
Case no SDG-H0401

PROCEDURES	REFERENCE	UPLATE
	EP-060	Soil Preparation, rev 0
	EP-070	Soil Dissolution, rev 0
	EP-910	Uranium Purification, rev 0
	EP-008	Heavy Elements Electroplating, rev 0

AVERAGES ± 2 SD	MDA	0.12 ± 0.15
FOR 5 SAMPLES	YIELD	76 ± 13

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-CMS
Version 3.06
Report date 07/12/99

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0401

METHOD SUMMARY

TOTAL STRONTIUM IN SOIL

BETA COUNTING

Test SR Matrix SOLID
SDG 7122
Contact L.A. Johnson

Client Hanford
Contract TRB-SBB-207925
Case no SDG-H0401

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAN TEST	SUP-FIX	PLANCHET	Total Strontium
Preparation batch 6880-072					
B0VF62	N905047-01			7122-001	U
B0VF63	N905047-02			7122-002	U
B0VF64	N905047-03			7122-003	U
B0VF65	N905047-04			7122-004	U
B0VF66	N905047-05			7122-005	U
B0VF67	N905047-06			7122-006	U
BLK (QC ID=30758)	N905047-08			7122-008	U
LCS (QC ID=30757)	N905047-07			7122-007	ok
Duplicate (N905047-01)	N905047-09			7122-009	- U

Nominal values and limits from method RDLs (pCi/g) 1.0
100 BC Areas-Full Protocol

METHOD PERFORMANCE

CLIENT SAMPLE ID	LAB SAMPLE ID	RAN TEST	SUP-FIX	MAX MDA pCi/g	ALIQ g	PREP FAC	DILU-TION	YIELD %	EFF %	COUNT min	PHOTOPEAK keV	DRIFT KeV	DAYS HELD	PREPARED	ANAL-YZED	DETECTOR
Preparation batch 6880-072 2σ prep error 10.0 % Reference Lab Notebook 6880 pg.72																
B0VF62	N905047-01			0.20	1.00			83		400			14	05/20/99	05/20	GRB-231
B0VF63	N905047-02			0.18	1.00			91		400			14	05/20/99	05/20	GRB-232
B0VF64	N905047-03			0.19	1.00			91		400			14	05/20/99	05/20	GRB-201
B0VF65	N905047-04			0.19	1.00			84		400			14	05/20/99	05/20	GRB-202
B0VF66	N905047-05			0.17	1.00			93		400			14	05/20/99	05/20	GRB-203
B0VF67	N905047-06			0.18	1.00			92		400			14	05/20/99	05/20	GRB-204
BLK (QC ID=30758)	N905047-08			0.20	1.00			83		400				05/20/99	05/20	GRB-206
LCS (QC ID=30757)	N905047-07			0.18	1.00			68		200				05/20/99	05/20	GRB-203
Duplicate (N905047-01) (QC ID=30759)	N905047-09			0.17	1.00			94		400			14	05/20/99	05/20	GRB-207
Nominal values and limits from method				1.0	1.00					100			180			

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-CMS
Version 3.06
Report date 07/12/99

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0401

METHOD SUMMARY, cont.

TOTAL STRONTIUM IN SOIL

BETA COUNTING

Test SR	Matrix SOLID
SDG 7122	
Contact L.A. Johnson	

Client Hanford	
Contract TRB-SBB-207925	
Case no SDG-H0401	

PROCEDURES	RP-500	Strontium - Initial Separation, rev 0
	RP-519	Strontium-89,90 Demounting and Yttrium Purification, rev 0

AVERAGES ± 2 SD	MDA 0.18	± 0.021
FOR 9 SAMPLES	YIELD 87	± 16

Lab id	TMANC
Protocol	Hanford
Version	Ver 1.0
Form	DVD-CMS
Version	3.06
Report date	07/12/99

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0401

METHOD SUMMARY

GAMMA SCAN

GAMMA SPECTROSCOPY

Test GAM Matrix SOLID
SDG 7122
Contact L.A. Johnson

Client Hanford
Contract TRR-SBB-207925
Case no SDG-H0401

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF-FIX	PLANCHET	Cobalt 60	Cesium 137
Preparation batch 6880-072						
B0VF62	N905047-01			7122-001	U	0.032 J
B0VF63	N905047-02			7122-002	U	U
B0VF64	N905047-03			7122-003	U	U
B0VF65	N905047-04			7122-004	U	U
B0VF66	N905047-05			7122-005	U	0.034 J
B0VF67	N905047-06			7122-006	U	0.049 J
BLK (QC ID=30758)	N905047-08			7122-008	U	U
LCS (QC ID=30757)	N905047-07			7122-007	ok	ok
Duplicate (N905047-01)	N905047-09			7122-009	- U	ok J
Nominal values and limits from method 100 BC Areas-Full Protocol				RDLs (pCi/g)	0.050	0.10

METHOD PERFORMANCE

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF-FIX	MAX MDA pCi/g	ALIQ g	PREP FAC	DILU-TION	YIELD %	EFF %	COUNT min	FWHM keV	DRIFT KeV	DAYS HELD	PREPARED	ANAL-YZED	DETECTOR
Preparation batch 6880-072 2σ prep error 15.0 % Reference Lab Notebook 6880 pg.72																
B0VF62	N905047-01			0.048	794					431			12	05/14/99	05/18	02,03,00
B0VF63	N905047-02			0.034	740					431			12	05/14/99	05/18	02,04,00
B0VF64	N905047-03			0.074	743					408			12	05/14/99	05/18	02,01,00
B0VF65	N905047-04			0.033	816					409			12	05/14/99	05/18	02,03,00
B0VF66	N905047-05			0.038	666					409			12	05/14/99	05/18	02,04,00
B0VF67	N905047-06			0.065	800					527			12	05/14/99	05/18	02,01,00
BLK (QC ID=30758)	N905047-08			0.023	750					401				05/14/99	05/22	01,01,00
LCS (QC ID=30757)	N905047-07			0.026	750					527				05/14/99	05/18	01,03,00
Duplicate (N905047-01) (QC ID=30759)	N905047-09			0.035	794					401			16	05/14/99	05/22	02,04,00
Nominal values and limits from method				0.050	891					200			180			

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-CMS
Version 2.06
Report date 07/12/99

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0401

METHOD SUMMARY, cont.

GAMMA SCAN

GAMMA SPECTROSCOPY

Test GAM Matrix SOLID
SDG 7122
Contact L.A. Johnson

Client Hanford
Contract TRB-SBB-207928
Case no SDG-H0401

PROCEDURES	REFERENCE	GAMMAMI
	EP-060	Soil Preparation, rev 0
	EP-100	Ge(Li) Preparation for Environmental Samples, rev 0

AVERAGES ± 2 SD FOR 9 SAMPLES
MDA 0.042 ± 0.035
YIELD ____ ± ____

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-CMS
Version 3.06
Report date 07/12/99

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0401

METHOD SUMMARY

NICKEL 63 IN SOIL

LIQUID SCINTILLATION COUNTING

Test NI L Matrix SOLID
SDG 7122
Contact L.A. Johnson

Client Hanford
Contract TRB-SBB-207925
Case no SDG-H0401

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF-FIX	PLANCHET	Nickel 63	
Preparation batch 6880-072						
B0VF62	N905047-01			7122-001	U	
B0VF63	N905047-02			7122-002	U	
B0VF64	N905047-03			7122-003	U	
B0VF65	N905047-04			7122-004	U	
B0VF66	N905047-05			7122-005	U	
B0VF67	N905047-06			7122-006	U	
BLK (QC ID=30758)	N905047-08			7122-008	U	
LCS (QC ID=30757)	N905047-07			7122-007	ok	
Duplicate (N905047-01)	N905047-09			7122-009	-	U

Nominal values and limits from method RDLs (pCi/g) 30
100 BC Areas-Full Protocol

METHOD PERFORMANCE

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF-FIX	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 6880-072 2σ prep error 10.0 % Reference Lab Notebook 6880 pg.72																
B0VF62	N905047-01			3.2	0.500			71		100			15	05/21/99	05/21	LSC-004
B0VF63	N905047-02			3.0	0.500			72		100			15	05/21/99	05/21	LSC-004
B0VF64	N905047-03			2.9	0.500			74		100			15	05/21/99	05/21	LSC-004
B0VF65	N905047-04			2.3	0.500			95		100			15	05/21/99	05/21	LSC-004
B0VF66	N905047-05			3.9	0.500			56		100			15	05/21/99	05/21	LSC-004
B0VF67	N905047-06			3.0	0.500			74		100			15	05/21/99	05/21	LSC-004
BLK (QC ID=30758)	N905047-08			2.3	0.500			95		100				05/21/99	05/22	LSC-004
LCS (QC ID=30757)	N905047-07			2.3	0.500			95		100				05/21/99	05/21	LSC-004
Duplicate (N905047-01) (QC ID=30759)	N905047-09			3.1	0.500			70		100			16	05/21/99	05/22	LSC-004
Nominal values and limits from method				30	0.500					10			180			

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-CMS
Version 3.06
Report date 07/12/99

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0401

METHOD SUMMARY, cont.

NICKEL 63 IN SOIL

LIQUID SCINTILLATION COUNTING

Test NI L Matrix SOLID
SDG 7122
Contact L.A. Johnson

Client Hanford
Contract TRB-SBB-207925
Case no SDG-H0401

PROCEDURES	REFERENCE	NI63LSC
	EP-060	Soil Preparation, rev 0
	EP-431	Nickel-63 Purification, rev 0

AVERAGES ± 2 SD	MDA 2.9	± 1.1
FOR 9 SAMPLES	YIELD 78	± 28

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-CMS
Version 3.06
Report date 07/12/99

TMA/RICHMOND
SAMPLE DELIVERY GROUP H0401

REPORT GUIDE

SDG 7122
Contact L.A. Johnson

Client Hanford
Contract TRB-SBB-207925
Case no SDG-H0401

SAMPLE SUMMARY

The Sample and QC Summary Reports show all samples, including QC samples, reported in one Sample Delivery Group (SDG).

The Sample Summary Report fully identifies client samples and gives the corresponding lab sample identification. The QC Summary Report shows at the sample level how the lab organized the samples into batches and generated QC samples. The Preparation Batch and Method Summary Reports show this at the analysis level.

The following notes apply to these reports:

* LAB SAMPLE ID is the lab's primary identification for a sample.

* DEPARTMENT SAMPLE ID is an alternate lab id, for example one assigned by a radiochemistry department in a lab.

* CLIENT SAMPLE ID is the client's primary identification for a sample. It includes any sample preparation done by the client that is necessary to identify the sample.

* QC BATCH is a lab assigned code that groups samples to be processed and QCed together. These samples should have similar matrices.

  QC BATCH is not necessarily the same as SDG, which reflects samples received and reported together.

* All Lab Control Samples, Method Blanks, Duplicates and Matrix Spikes are shown that QC any of the samples. Due to possible reanalyses, not all results for all these QC samples may be relevant to the SDG. The Lab Control Sample, Method Blank, Duplicate, Matrix Spike and Method Summary Reports detail these relationships.

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Version Ver 1.0
Form DVD-RG
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Report date 07/12/99

TMA/RICHMOND
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Contact L.A. Johnson

REPORT GUIDE

Client Hanford
Contract TRB-SBB-207925
Case no SDG-H0401

PREPARATION BATCH SUMMARY

The Preparation Batch Summary Report shows all preparation batches in one Sample Delivery Group (SDG) with information necessary to check the completeness and consistency of the SDG.

The following notes apply to this report:

* The preparation batches are shown in the same order as the Method Summary Reports are printed.
* Only analyses of planchets relevant to the SDG are included.
* Each preparation batch should have at least one Method Blank and LCS in it to validate client sample results.
* The QUALIFIERS shown are all qualifiers other than U, J, B, L and H that occur on any analysis in the preparation batch. The Method Summary Report has these qualifiers on a per sample basis.

  These qualifiers should be reviewed as follows:

  X Some data has been manually entered or modified. Transcription errors are possible.

  P One or more results are 'preliminary'. The data is not ready for final reporting.

  2 There were two or more results for one analyte on one planchet imported at one time. The results in DVD may not be the same as on the raw data sheets.

  Other lab defined qualifiers may occur. In general, these should be addressed in the SDG narrative.

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Form DVD-RG
Version 3.06
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Contact L.A. Johnson

Client Hanford
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WORK SUMMARY

The Work Summary Report shows all samples, including QC samples, and all relevant analyses in one Sample Delivery Group (SDG). This report is often useful as supporting documentation for an invoice.

The following notes apply to this report:

* TEST is a code for the method used to measure associated analytes. Results and related information for each analyte are on the Data Sheet Report. In special cases, a test code used in the summary data section is not the same as in associated raw data. In this case, both codes are shown on the Work Summary.

* SUFFIX is the lab's code to distinguish multiple analyses (recounts, reworks, reanalyses) of a fraction of the sample. The suffix indicates which result is being reported. An empty suffix normally identifies the first attempt to analyze the sample.

* The LAB SAMPLE ID, TEST and SUFFIX uniquely identify all supporting data for a result. The Method Summary Report for each TEST has method performance data, such as yield, for each lab sample id and suffix and procedures used in the method.

* PLANCHET is an alternate lab identifier for work done for one test. It, combined with the TEST and SUFFIX, may be the best link to raw data.

* For QC samples, only analyses that directly QC some regular sample are shown. The Lab Control Sample, Method Blank, Duplicate, Matrix Spike and Method Summary Reports detail these relationships.

* The SAS (Special Analytical Services) Number is a client or lab assigned code that reflects special processing for samples, such as rapid turn around. Counts of tests done are lists by SAS number since it is likely to affect prices.

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Protocol Hanford
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Form DVD-RG
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Contact L.A. Johnson

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DATA SHEET

The Data Sheet Report shows all results and primary supporting information for one client sample or Method Blank. This report corresponds to both the CLP Inorganics and Organics Data Sheet.

The following notes apply to this report:

* TEST is a code for the method used to measure an analyte. If the TEST is empty, no data is available; the analyte was not analyzed for.

* The LAB SAMPLE ID and TEST uniquely identify work within the Summary Data Section of a Data Package. The Work Summary and Method Summary Reports further identify raw data that underlies this work.

  The Method Summary Report for each TEST has method performance data, such as yield, for each Lab Sample ID and a list of procedures used in the method.

* ERRORs can be labeled TOTAL or COUNT. TOTAL implies a preparation (non-counting method) error has been added, as square root of sum of squares, to the counting error denoted by COUNT. The preparation errors, which may vary by preparation batch, are shown on the Method Summary Report.

* A RESULT can be 'N.R.' (Not Reported). This means the lab did this work but chooses not to report it now, possibly because it was reported at another time.

* When reporting a Method Blank, a RESULT can be 'N.A.' (Not Applicable). This means there is no reported client sample work in the same preparation batch as the Blank's result. This is likely to occur when the Method Blank is associated with reanalyses of selected work for a few samples in the SDG.

The following qualifiers are defined by the DVD system:

U The RESULT is less than the MDA (Minimum Detectable Activity).

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Contact L.A. Johnson

GUIDE, cont.

Client Hanford
Contract TRB-SBB-207925
Case no SDG-H0401

DATA SHEET

If the MDA is blank, the ERROR is used as the limit.

J The RESULT is less than the RDL (Required Detection Limit) and no U qualifier is assigned.

B A Method Blank associated with this sample had a result without a U flag and, after correcting for possibly different aliquots, that result is greater than or equal to the MDA for this sample.

Normally, B is not assigned if U is. When method blank subtraction is shown on this report, B flags are assigned based on the unsubtracted values while U's are assigned based on the subtracted ones. Both flags can be assigned in this case.

For each sample result, all Method Blank results in the same preparation batch are compared. The Method Summary Report documents this and other QC relationships.

L Some Lab Control Sample that QC's this sample had a low recovery. The lab can disable assignment of this qualifier.

H Similar to 'L' except the recovery was high.

P The RESULT is 'preliminary'.

X Some data necessary to compute the RESULT, ERROR or MDA was manually entered or modified.

2 There were two or more results available for this analyte. The reported result may not be the same as in the raw data.

Other qualifiers are lab defined. Definitions should be in the SDG narrative.

The following values are underlined to indicate possible problems:

* An MDA is underlined if it is bigger than its RDL.

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DATA SHEET

* An ERROR is underlined if the 1.645 sigma counting error is bigger than both the MDA and the RESULT, implying that the MDA may not be a good estimate of the 'real' minimum detectable activity.

* A negative RESULT is underlined if it is less than the negative of its 2 sigma counting ERROR.

* When reporting a Method Blank, a RESULT is underlined if greater than its MDA. If the MDA is blank, the 2 sigma counting error is used in the comparison.

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Contact L.A. Johnson

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Client Hanford
Contract TRB-SBB-207925
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LAB CONTROL SAMPLE

The Lab Control Sample Report shows all results, recoveries and primary supporting information for one Lab Control Sample.

The following notes apply to this report:

* All fields in common with the Data Sheet Report have similar usage. Refer to its Report Guide for details.

* An amount ADDED is the lab's value for the actual amount spiked into this sample with its ERROR an estimate of the error of this amount.

  An amount added is underlined if its ratio to the corresponding RDL is outside protocol specified limits.

* REC (Recovery) is RESULT divided by ADDED expressed as a percent.

* The first, computed limits for the recovery reflect:

  1. The error of RESULT, including that introduced by rounding the result prior to printing.

     If the limits are labeled (TOTAL), they include preparation error in the result. If labeled (COUNT), they do not.

  2. The error of ADDED.

  3. A lab specified, per analyte bias. The bias changes the center of the computed limits.

* The second limits are protocol defined upper and lower QC limits for the recovery.

* The recovery is underlined if it is outside either of these ranges.

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DUPLICATE

The Duplicate Report shows all results, differences and primary supporting information for one Duplicate and associated Original sample.

The following notes apply to this report:

* All fields in common with the Data Sheet Report have similar usage. This applies both to the Duplicate and Original sample data. Refer to the Data Sheet Report Guide for details.

  If the Duplicate has data for a TEST and the lab did not do this test to the Original, the Original's RESULTs are underlined.

* The RPD (Relative Percent Difference) is the absolute value of the difference of the RESULTs divided by their average expressed as a percent.

  If both RESULTs are less than their MDAs, no RPD is computed and a '-' is printed.

  For an analyte, if the lab did work for both samples but has data for only one, the MDA from the sample with data is used as the other's result in the RPD.

* The first, computed limit is the sum, as square root of sum of squares, of the errors of the results divided by the average result as a percent, hence the relative error of the difference rather than the error of the relative difference. The errors include those introduced by rounding the RESULTs prior to printing.

  If this limit is labeled TOT, it includes the preparation error in the RESULTs. If labeled CNT, it does not.

  This value reported for this limit is at most 999.

* The second limit for the RPD is the larger of:

  1. A fixed percentage specified in the protocol.

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2. A protocol factor (typically 2) times the average MDA as a percent of the average result. This limit applies when the results are close to the MDAs.

* The RPD is underlined if it is greater than either limit.

* If specified by the lab, the second limit column is replaced by the Difference Error Ratio (DER), which is the absolute value of the difference of the results divided by the quadratic sum of their one sigma errors, the same errors as used in the first limit.

  Except for differences due to rounding, the DER is the same as the RPD divided by the first RPD limit with the limit scaled to 1 sigma.

* The DER is underlined if it is greater than the sigma factor, typically 2 or 3, shown in the header for the first RPD limit.

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MATRIX SPIKE

The Matrix Spike Report shows all results, recoveries and primary supporting information for one Matrix Spike and associated Original sample.

The following notes apply to this report:

* All fields in common with the Data Sheet Report have similar usage. This applies both to the Spiked and Original sample data. Refer to the Data Sheet Report Guide for details.

  If the Spike has data for a TEST and the lab did not do this test to the Original, the Original's RESULTs are underlined.

* An amount ADDED is the lab's value for the actual amount spiked into the Spike sample with its ERROR an estimate of the error of this amount.

  An amount is underlined if its ratio to the corresponding RDL is outside protocol specified limits.

* REC (Recovery) is the Spike RESULT minus the Original RESULT divided by ADDED expressed as a percent.

* The first, computed limits for the recovery reflect:

  1. The errors of the two RESULTs, including those introduced by rounding them prior to printing.

     If the limits are labeled (TOTAL), they include preparation error in the result. If labeled (COUNT), they do not.

  2. The error of ADDED.

  3. A lab specified, per analyte bias. The bias changes the center of the computed limits.

* The second limits are protocol defined upper and lower QC limits

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Contact L.A. Johnson

GUIDE, cont.

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MATRIX SPIKE

for the recovery.

These limits are left blank if the Original RESULT is more than a protocol defined factor (typically 4) times ADDED. This is a way of accounting for that when the spike is small compared to the amount in the original sample, the recovery is unreliable.

* The recovery is underlined (out of spec) if it is outside either of these ranges.

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METHOD SUMMARY

The Method Summary Report has two tables. One shows up to five results measured using one method. The other has performance data for the method. There is one report for each TEST, as used on the Data Sheet Report.

The following notes apply to this report:

* Each table is subdivided into sections, one for each preparation batch. A preparation batch is a group of aliquots prepared at roughly the same time in one work area of the lab using the same method.

  There should be Lab Control Sample and Method Blank results in each preparation batch since this close correspondence makes the QC meaningful. Depending on lab policy, Duplicates need not occur in each batch since they QC sample dependencies such as matrix effects.

* The RAW TEST column shows the test code used in the raw data to identify a particular analysis if it is different than the test code in the header of the report. This occurs in special cases due to method specific details about how the lab labels work.

  The Lab Sample or Planchet ID combined with the (Raw) Test Code and Suffix uniquely identify the raw data for each analysis.

* If a result is less than both its MDA and RDL, it is replaced by just 'U' on this report. If it is greater than or equal to the RDL but less than the MDA, the result is shown with a 'U' flag.

  The J and X flags are as on the data sheet.

* Non-U results for Method Blanks are underlined to indicate possible contamination of other samples in the preparation batch. The Method Blank Report has supporting data.

* Lab Control Sample and Matrix Spike results are shown as: ok, No data, LOW or HIGH, with the last two underlined. 'No data'

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means no amount ADDED was specified. 'LOW' and 'HIGH' correspond to when the recovery is underlined on the Lab Control Sample or Matrix Spike Report. See these reports for supporting data.

* Duplicate sample results are shown as: ok, No data, or OUT, with the last two underlined. 'No data' means there was no original sample data found for this duplicate. 'OUT' corresponds to when the RPD is underlined on the Duplicate Report. See this report for supporting data.

* If the MDA column is labeled 'MAX MDA', there was more than one result measured by the reported method and the MDA shown is the largest MDA. If not all these results have the same RDL, the MAX MDA reflects only those results with RDL equal to the smallest one.

  MDAs are underlined if greater than the printed RDL.

* Aliquots are underlined if less than the nominal value specified for the method.

* Prepareation factors are underlined if greater than the nominal value specified for the method.

* Dilution factors are underlined if greater than the nominal value specified for the method.

* Residues are underlined if outside the range specified for the method. Residues are not printed if yields are.

* Yields, which may be gravimetric, radiometric or some type of recovery depending on the method, are underlined if outside the range specified for the method.

* Efficiencies are underlined if outside the range specified for the method. Efficiencies are detector and geometry dependent so this test is only approximate.

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* Count times are underlined if less than the nominal value specified for the method.

* Resolutions (as FWHM; Full Width at Half Max) are underlined if greater than the method specified limit.

* Tracer drifts are underlined if their absolute values are greater than the method specified limit. Tracer drifts are not printed if percent moistures are.

* Days Held are underlined if greater than the holding time specified in the protocol.

* Analysis dates are underlined if before their planchet's preparation date or, if a limit is specified, too far after it.

For some methods, ratios as percentages and error estimates for them are computed for pairs of results. A ratio column header like '1÷3' means the ratio of the first result column and the third result column.

Ratios are not computed for Lab Control Sample, Method Blank or Matrix Spike results since their matrices are not necessarily similar to client samples'.

The error estimate for a ratio of results from one planchet reflects only counting errors since other errors should be correlated. For a ratio involving different planchets, if QC limits are computed based on total errors, the error for the ratio allows for the preparation errors for the planchets.

The ratio is underlined (out of spec) if the absolute value of its difference from the nominal value is greater than its error estimate. If no nominal value is specified, this test is not done.

For Gross Alpha or Gross Beta results, there may be a column showing the sum of other Alpha or Beta emitters. This sum includes all relevant

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TMA/RICHMOND
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Contact L.A. Johnson

Client Hanford
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METHOD SUMMARY

results in the DVD database, whether reported or not. Results in the sum are weighted by a particles/decay value specified by the lab for each relevant analyte. Results less than their MDA are not included. No sums are computed for Lab Control, Method Blank or Matrix Spike samples since their various planchets may not be physically related.

If a ratio of total isotopic to Gross Alpha or Beta is shown, the error for the ratio reflects both the error in the Gross result and the sum, as square root of sum of squares, of the errors in the isotopic results.

For total elemental uranium or thorium results, there may be a column showing the total weight computed from associated isotopic results. Ignoring results less than their MDAs, this is a weighted sum of the isotopic results. The weights depend on the molecular weight and half-life of each isotope so as to convert activities (decays) to weight (atoms).

If a ratio of total computed to measured elemental uranium or thorium is shown, the error for the ratio reflects the errors in all the measurements.

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TMA/RICHMOND

SAMPLE DELIVERY GROUP H0401

N905047-08 Method Blank

METHOD BLANK

SDG	7122	Client/Case no	Hanford SDG-H0401
Contact	L.A. Johnson	Case no	TRB-SBB-207925
Lab sample id	N905047-08	Client sample id	Method Blank
Dept sample id	7122-008	Material/Matrix	SOLID
		SAF No	B99-002

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALIFIERS	TEST
Uranium 233/234	U-233/234	0.012	0.024	0.090	1.0	U	U
Uranium 235	15117-96-1	0	0.029	0.11	1.0	U	U
Uranium 238	U-238	0	0.024	0.090	1.0	U	U
Nickel 63	13981-37-8	-0.635	1.4	2.3	30	U	NI_L
Total Strontium	SR-RAD	-0.050	0.15	0.20	1.0	U	SR
Potassium 40	13966-00-2	U		0.14		U	GAM
Cobalt 60	10198-40-0	U		0.014	0.050	U	GAM
Cesium 137	10045-97-3	U		0.010	0.10	U	GAM
Europium 152	14683-23-9	U		0.025	0.10	U	GAM
Europium 154	15585-10-1	U		0.036	0.10	U	GAM
Europium 155	14391-16-3	U		0.016	0.10	U	GAM
Americium 241	14596-10-2	U		0.008		U	GAM
Uranium 238	U-238	U		1.6		U	GAM
Uranium 235	15117-96-1	U		0.027		U	GAM

100 BC Areas-Full Protocol

QC-BLANK 30758

Lab id	TMANC
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	07/08/99

TMA / RICHMOND

SAMPLE DELIVERY GROUP H0401

N905047-11 Method Blank

METHOD BLANK

SDG	7122	Client/Case no	Hanford SDG-H0401
Contact	L.A. Johnson	Case no	TRB-SBB-207925
Lab sample id	N905047-11	Client sample id	Method Blank
Dept sample id	7122-011	Material/Matrix	SOLID
		SAF No	B99-002

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Plutonium 238	13981-16-3	0.002	0.019	0.037	1.0	U	PU
Plutonium 239/240	PU-239/240	0.005	0.019	0.037	1.0	U	PU
Americium 241	14596-10-2	0.007	0.033	0.066	1.0	U	AM

100 BC Areas-Full Protocol

QC-BLANK 30830

Lab id	TMANC
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	07/08/99

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0401

N905047-07

Lab Control Sample

LAB CONTROL SAMPLE

SDG 7122
Contact L.A. Johnson

Client/Case no Hanford SDG-H0401
Case no TRB-SBB-207925

Lab sample id N905047-07
Dept sample id 7122-007

Client sample id Lab Control Sample
Material/Matrix SOLID
SAF No B99-002

ANALYTE	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALIFIERS	TEST	ADDED pCi/g	2σ ERR pCi/g	REC %	3σ LMTS (TOTAL)	PROTOCOL LIMITS
Uranium 233/234	4.38	0.60	0.31	1.0		U	4.95	0.20	88	80-120	80-120
Uranium 235	3.80	0.56	0.094	1.0		U	4.04	0.16	94	77-123	80-120
Uranium 238	4.49	0.61	0.29	1.0		U	5.10	0.20	88	80-120	80-120
Nickel 63	138	3.5	2.3	30		NI_L	134	5.4	103	83-117	
Total Strontium	5.65	0.33	0.18	1.0		SR	5.71	0.22	99	82-118	
Potassium 40	U		0.16		U	GAM					
Cobalt 60	0.212	0.020	0.014	0.050		GAM	0.227	0.009	93	74-126	80-120
Cesium 137	0.245	0.019	0.016	0.10		GAM	0.260	0.010	96	75-125	80-120
Europium 152	U		0.029	0.10	U	GAM					
Europium 154	U		0.033	0.10	U	GAM					
Europium 155	U		0.025	0.10	U	GAM					
Americium 241	U		0.030		U	GAM					
Uranium 233	U		1.8		U	GAM					
Uranium 236	U		0.041		U	GAM					

100 BC Areas-Full Protocol

QC-LCS 30757

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-LCS
Version 3.06
Report date 07/08/99

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0401

N905047-10

Lab Control Sample

LAB CONTROL SAMPLE

SDG 7122
Contact L.A. Johnson

Client/Case no Hanford SDG-H0401
Case no TRB-SBB-207925

Lab sample id N905047-10
Dept sample id 7122-010

Client sample id Lab Control Sample
Material/Matrix SOLID
SAF No B99-002

ANALYTE	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST	ADDED pCi/g	2σ ERR pCi/g	REC %	3σ LMTS (TOTAL)	PROTOCOL LIMITS
Plutonium 238	9.46	0.60	0.032	1.0		PU	10.1	0.40	94	87-113	80-120
Plutonium 239/240	11.3	0.70	0.029	1.0		PU	11.9	0.48	95	87-113	80-120
Americium 241	10.1	0.93	0.050	1.0		AM	10.5	0.42	96	84-116	80-120

100 SC Areas-Full Protocol

QC-LCS 30829

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-LCS
Version 3.06
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TMA/RICHMOND

SAMPLE DELIVERY GROUP H0401

Test PU Matrix SOLID
SDG 7122
Contact L.A. Johnson

METHOD SUMMARY

PLUTONIUM, ISOTOPIC IN SOLIDS
ALPHA SPECTROSCOPY

Client Hanford
Contract TRB-SBB-207925
Case no SDG-H0401

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF-FIX	PLANCHET	Plutonium 238	Plutonium 239/240
Preparation batch 6880-072						
BOVF62	N905047-01		A1	7122-001	U	U
BOVF63	N905047-02		A1	7122-002	U	U
BOVF64	N905047-03		A1	7122-003	U	U
BOVF65	N905047-04		A1	7122-004	U	U
BOVF66	N905047-05		A1	7122-005	U	U
BOVF67	N905047-06		A1	7122-006	0.367 J	0.353 J
BLK (QC ID=30830)	N905047-11			7122-011	U	U
LCS (QC ID=30829)	N905047-10			7122-010	ok	ok
Duplicate (N905047-01)	N905047-12			7122-012	- U	- U
Nominal values and limits from method				RDLs (pCi/g)	1.0	1.0

100 BC Areas-Full Protocol

METHOD PERFORMANCE

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF-FIX	MAX MDA pCi/g	ALIQ g	PREP FAC	DILU-TION	YIELD %	EFF %	COUNT min	FWHM kcV	DRIFT KcV	DAYS HELD	PREPARED	ANAL-YZED	DETECTOR
Preparation batch 6880-072 2σ prep error 5.0 % Reference Lab Notebook 6880 pg.72																
BOVF62	N905047-01		A1	0.027	0.500			78		839			23	05/29/99	05/28	SS-007
BOVF63	N905047-02		A1	0.032	0.500			91		1010			26	05/29/99	06/01	SS-014
BOVF64	N905047-03		A1	0.047	0.500			89		839			23	05/29/99	05/28	SS-009
BOVF65	N905047-04		A1	0.048	0.500			90		839			23	05/29/99	05/28	SS-010
BOVF66	N905047-05		A1	0.033	0.500			96		839			23	05/29/99	05/28	SS-011
BOVF67	N905047-06		A1	0.025	0.500			82		849			23	05/29/99	05/28	SS-056
BLK (QC ID=30830)	N905047-11			0.037	0.500			95		1005				05/29/99	06/01	SS-057
LCS (QC ID-30829)	N905047-10			0.032	0.500			89		1005				05/29/99	06/01	SS-056
Duplicate (N905047-01) (QC ID-30831)	N905047-12			0.033	0.500			87		1005			26	05/29/99	06/01	SS-058
Nominal values and limits from method				1.0	1.00			20-105		10	100		180			

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-CMS
Version 3.06
Report date 07/08/99

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0401

METHOD SUMMARY

URANIUM, ISOTOPIC IN SOIL

ALPHA SPECTROSCOPY

Test U Matrix SOLID
SDG 7122
Contact L.A. Johnson

Client Hanford
Contract TRB-SBB-207925
Case no SDG-H0401

RESULTS

LIENT SAMPLE ID	LAB SAMPLE ID	RAN TEST	SUF-FIX	PLANCHET	1: Uranium 233/234	2: Uranium 235	3: Uranium 238	RESULT RATIOS (%) 1-3	2σ	2-3	2σ
iparation batch 6880-072											
/F62	N905047-01			7122-001	0.480 J	U	0.632 J	76	27	3	4
/F63	N905047-02			7122-002	0.459 J	U	0.340 J	135	58	16	14
/F64	N905047-03			7122-003	0.593 J	U	0.452 J	131	54	10	11
VF65	N905047-04			7122-004	0.174 J	U	0.195 J	89	58	6	13
VF66	N905047-05			7122-005	0.466 J	U	0.484 J	96	37	2	5
VF67	N905047-06			7122-006	0.378 J	U	0.534 J	71	29	2	5
K (QC ID=30758)	N905047-08			7122-008	U	U	U				
S (QC ID=30757)	N905047-07			7122-007	ok	ok	ok				
plicate (N905047-01)	N905047-09			7122-009	ok J	- U	ok J	106	43	7	10
minal values and limits from method				RDLs (pCi/g)	1.0	1.0	1.0	100		4	
0 BC Areas-Full Protocol								Averages 101		7	

METHOD PERFORMANCE

LIENT SAMPLE ID	LAB SAMPLE ID	RAN TEST	SUF-FIX	MAX MDA pCi/g	ALIQ g	PREP FAC	DILU-TION	YIELD %	EFF %	COUNT min	PWHM keV	DRIFT KeV	DAYS HELD	PREPARED	ANAL-YZED	DETECTOR
reparation batch 6880-072 2σ prep error 5.0 % Reference Lab Notebook 6880 pg.72																
0VF62	N905047-01			0.082	1.00			85		160			13	05/19/99	05/19	SS-001
0VF63	N905047-02			0.085	1.00			79		160			13	05/19/99	05/19	SS-004
0VF64	N905047-03			0.087	1.00			78		160			13	05/19/99	05/19	SS-005
0VF65	N905047-04			0.096	1.00			72		160			13	05/19/99	05/19	SS-006
0VF66	N905047-05			0.085	1.00			82		160			13	05/19/99	05/19	SS-008
0VF67	N905047-06			0.090	1.00			78		160			13	05/19/99	05/19	SS-009
LK (QC ID=30758)	N905047-08			0.11	1.00			65		160				05/19/99	05/19	SS-011
CS (QC ID=30757)	N905047-07			0.31	1.00			73		160				05/19/99	05/19	SS-010
uplicate (N905047-01) (QC ID=30759)	N905047-09			0.10	1.00			68		160			13	05/19/99	05/19	SS-012
Nominal values and limits from method				1.0	1.00			30-105		160	100		180			

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-CMS
Version 3.06
Report date 07/08/99

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0401

METHOD SUMMARY

TOTAL STRONTIUM IN SOIL

BETA COUNTING

Test SR Matrix SOLID
SDG 7122
Contact L.A. Johnson

Client Hanford
Contract TRB-SBB-207935
Case no SDG-H0401

ESULTS

IENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF-FIX	PLANCHET	Total Strontium
eparation batch 6880-072					
VF62	N905047-01			7122-001	U
VF63	N905047-02			7122-002	U
VF64	N905047-03			7122-003	U
VF65	N905047-04			7122-004	U
VF66	N905047-05			7122-005	U
VF67	N905047-06			7122-006	U
K (QC ID=30758)	N905047-08			7122-008	U
S (QC ID=30757)	N905047-07			7122-007	ok
plicate (N905047-01)	N905047-09			7122-009	- U

minal values and limits from method RDLs (pCi/g) 1.0
00 BC Areas-Full Protocol

IETHOD PERFORMANCE

LIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF-FIX	MAX MDA pCi/g	ALIQ g	PREP FAC	DILU-TION	YIELD %	EFF %	COUNT min	FWHM keV	DRIFT KeV	DAYS HELD	PREPARED	ANAL-YZED	DETECTOR
reparation batch 6880-072 2s prep error 10.0 % Reference Lab Notebook 6880 pg.72																
0VF62	N905047-01			0.20	1.00			83		400			14	05/20/99	05/19	GRB-231
0VF63	N905047-02			0.18	1.00			91		400			14	05/20/99	05/19	GRB-232
0VF64	N905047-03			0.19	1.00			91		400			14	05/20/99	05/19	GRB-201
0VF65	N905047-04			0.19	1.00			84		400			14	05/20/99	05/19	GRB-202
0VF66	N905047-05			0.17	1.00			93		400			14	05/20/99	05/19	GRB-203
0VF67	N905047-06			0.18	1.00			92		400			14	05/20/99	05/19	GRB-204
LK (QC ID=30758)	N905047-08			0.20	1.00			83		400				05/20/99	05/19	GRB-206
CS (QC ID=30757)	N905047-07			0.18	1.00			68		200				05/20/99	05/19	GRB-203
Duplicate (N905047-01) (QC ID=30759)	N905047-09			0.17	1.00			94		400			14	05/20/99	05/19	GRB-207
Nominal values and limits from method				1.0	1.00					100			180			

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-CMS
Version 1.06
Report date 07/08/99

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0401

METHOD SUMMARY

GAMMA SCAN

GAMMA SPECTROSCOPY

Test CAM Matrix SOLID
SDG 7122
Contact L.A. Johnson

Client Hanford
Contract TRB-SBB-207925
Case no SDG-H0401

ESULTS

ENT SAMPLE ID	LAB SAMPLE ID	RAN TEST	SUF-FIX	PLANCHET	Cobalt 60	Cesium 137
paration batch 6880-072						
VF62	N905047-01			7122-001	U	0.032 J
VF63	N905047-02			7122-002	U	U
VF64	N905047-03			7122-003	U	U
VF65	N905047-04			7122-004	U	U
VF66	N905047-05			7122-005	U	0.034 J
VF67	N905047-06			7122-006	U	0.049 J
K (QC ID-30758)	N905047-08			7122-008	U	U
S (QC ID-30757)	N905047-07			7122-007	ok	ok
plicate (N905047-01)	N905047-09			7122-009	- U	ok J
minal values and limits from method				RDLs (pCi/g)	0.050	0.10

0 BC Areas-Full Protocol

ETHOD PERFORMANCE

IENT SAMPLE ID	LAB SAMPLE ID	RAN TEST	SUF-FIX	MAX MDA pCi/g	ALIQ g	PREP FAC	DILU-TION	YIELD %	EFF %	COUNT min	FWHM keV	DRIFT KeV	DAYS HELD	PREPARED	ANAL-YZED	DETECTOR
eparation batch 6880-072 2σ prep error 15.0 % Reference Lab Notebook 6880 pg.72																
VF62	N905047-01			0.048	794					431			12		05/18/99	02,03,00
VF63	N905047-02			0.034	740					431			12		05/18/99	02,04,00
VF64	N905047-03			0.074	743					408			12		05/18/99	02,01,00
VF65	N905047-04			0.033	816					409			12		05/18/99	02,03,00
VF66	N905047-05			0.038	666					403			12		05/18/99	02,04,00
VF67	N905047-06			0.065	800					527			12		05/18/99	02,01,00
LK (QC ID=30758)	N905047-08			0.023	750					401					05/22/99	01,01,00
CS (QC ID=30757)	N905047-07			0.026	750					527					05/18/99	01,03,00
uplicate (N905047-01) (QC ID=30759)	N905047-09			0.038	794					401			16		05/22/99	02,04,00
ominal values and limits from method				0.050	750					100			180			

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-CMS
Version 3.06
Report date 07/08/99

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0401

Test NI L Matrix SOLID
SDG 7122
Contact L.A. Johnson

METHOD SUMMARY

NICKEL 63 IN SOIL
LIQUID SCINTILLATION COUNTING

Client Hanford
Contract TRB-SBD-207925
Case no SDG-H0401

ESULTS

IENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF-FIX	PLANCHET	Nickel 63	
eparation batch 6880-072						
VF62	N905047-01			7122-001	U	
VF63	N905047-02			7122-002	U	
VF64	N905047-03			7122-003	U	
VF65	N905047-04			7122-004	U	
VF66	N905047-05			7122-005	U	
VF67	N905047-06			7122-006	U	
LK (QC ID=30758)	N905047-08			7122-008	U	
CS (QC ID=30757)	N905047-07			7122-007	ok	
uplicate (N905047-01)	N905047-09			7122-009	-	U

ominal values and limits from method RDLs (pCi/g) 30
00 BC Areas-Full Protocol

ETHOD PERFORMANCE

LIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF-FIX	MDA pCi/g	ALIQ g	PREP FAC	DILU-TION	YIELD %	EFF %	COUNT min	FWHM keV	DRIFT KeV	DAYS HELD	PREPARED	ANAL-YZED	DETECTOR
reparation batch 6880-072 2σ prep error 10.0 % Reference Lab Notebook 6880 pg.72																
0VF62	N905047-01			3.2	0.500			71		100			15	05/21/99	05/21	LSC-004
0VF63	N905047-02			3.0	0.500			72		100			15	05/21/99	05/21	LSC-004
0VF64	N905047-03			2.9	0.500			74		100			15	05/21/99	05/21	LSC-004
0VF65	N905047-04			2.3	0.500			95		100			15	05/21/99	05/21	LSC-004
0VF66	N905047-05			3.9	0.500			56		100			15	05/21/99	05/21	LSC-004
0VF67	N905047-06			3.0	0.500			74		100			15	05/21/99	05/21	LSC-004
BLK (QC ID=30758)	N905047-08			2.3	0.500			95		100				05/21/99	05/22	LSC-004
LCS (QC ID=30757)	N905047-07			2.3	0.500			95		100				05/21/99	05/21	LSC-004
Duplicate (N905047-01) (QC ID=30759)	N905047-09			3.1	0.500			70		100			16	05/21/99	05/22	LSC-004
Nominal values and limits from method				30	0.500					10			180			

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-CMS
Version 3.06
Report date 07/08/99

DORIS AYRES
RM 33, SIGMA I
3190 GEORGE WASHINGTON WAY
PHONE: (509)372-9576
FAX: (509)372-9487

BHI SAMPLE MANAGEMENT

Fax

To: Bruce Christian	**From:** Doris Ayres
Fax: 375-5151	**Pages:** 11
Phone	**Date:** 7-8-99
Re:	**CC:**

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

Call Rich if you have any questions.

Doris

TRANSMISSION RESULT REPORT (JUL 08 '99 01:23PM)

BHI S&D MANAGEMENT 509 372 9487

(AUTO)

THE FOLLOWING FILE(S) ERASED

FILE	FILE TYPE	OPTION	TEL NO.	PAGE	RESULT
060	MEMORY TX		93755151	11/11	OK

ERRORS

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

DORIS AYRES
RM 33, SIGMA I
3190 GEORGE WASHINGTON WAY
PHONE: (509)372-9576
FAX: (509)372-9487

BHI SAMPLE MANAGEMENT

Fax

To: Bruce Christian **From:** Doris Ayres

Fax: 375-5151 **Pages:** 11

Phone **Date:** 7-8-99

Re: **CC:**

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

FAX

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

To: Jeanette Duncan

From: Bruce Christian

Pages: 1

Date: 30 June 1999

Information Request

H0401 - Radiochemistry

Blank analysis for gamma spectroscopy. Can you verify that the lab could not detect U-238 at any less than 1200 pCi/g (12000x the detection limit), or the other gamma spec analytes which are all way above the TDL.

See replacement sheet

RLN 7-8-99

FAX

TECHLAW, INC.

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

To: Jeanette Duncan

From: Bruce Christian

Pages: 1

Date: 30 June 1999

Information Request

H0401 - Radiochemistry

Blank analysis for gamma spectroscopy. Can you verify that the lab could not detect U-238 at any less than 1200 pCi/g (12000x the detection limit), or the other gamma spec analytes which are all way above the TDL.

Duncan, Jeanette M

From: Weiss, Richard L
Sent: Tuesday, July 20, 1999 3:10 PM
To: Duncan, Jeanette M
Subject: Review of H0399 & H0401 Validation Packages

Jeanette,

Here are my comments on review of these data packages;

H0399 - Inorganic: No comments

H0399 - Radiochemistry: Page 3, Field Duplicates; Wrong lab (QES) identified.

H0401 - Inorganic: Page 2, Blanks, last line; misspelled "chromium".
Page 4, MDLs; Sample B0VF65 incorrectly identified as missed Cr DL.

H0401 - Radiochemistry: Page 4, Field Duplicates; Wrong lab (QES) identified.
Page 8, Comments; "No qualifiers assigned" not appropriate.

Rev 7/29/99

Rich

Duncan, Jeanette M

From: Blumenkranz, David B
Sent: Tuesday, July 27, 1999 9:18 AM
To: Weiss, Richard L
Cc: Sturges, Mark H; Duncan, Jeanette M; 'Routt, Tina'
Subject: Data Validation Packages H0401-TNU/RLN and H0399-TNU/RLN

Importance: High

RW 7/27/99

Comments/questions on Data Validation Packages H0401-TNU/RLN and H0399-TNU/RLN:

- The summary table on page 10 needs to match the lab data in terms of significant figures, unless the validator has determined that the lab measurement is not accurate and the result required truncation or rounding.
- **Question for Rich:** The discussion of RPDs on p. 3 states, "If either activities are less then five times the CRDL a control limit of less than or equal to two times the CRDL is used for soil samples...If either the original or replicate value is below the CRDL, the applicable control limits are less than or equal to...two times the CRDL for soil samples. If the RPD is outside the applicable control limit, the associated results are qualified..." I sounds like the control limit is a concentration based number, but the RPD is in percent, therefore, this description sounds like we're comparing apple and oranges. Can we ask for a clearer description or provide the validator some more concise verbiage? The equivalent situation is found in the inorganics data package as well.
- **Another Question for Rich:** Lab qualifiers were not carried forward onto the summary table on p. 10, is this correct? I though that unless they were negated by the validation, the data should have qualifiers assigned by the lab.

Please contact me ASAP concerning this message. This is a priority validation and supports PBCI activities.

Dave Blumenkranz
2-9658

Duncan, Jeanette M

From: Blumenkranz, David B
Sent: Tuesday, July 27, 1999 3:31 PM
To: Duncan, Jeanette M
Cc: Sturges, Mark H; 'Routt, Tina'; Weiss, Richard L
Subject: RE: Data Validation Packages H0401-TNU/RLN and H0399-TNU/RLN

Importance: High

Rich has resolved these comments (see original message) to my satisfaction except for the following, concerning all data validation packages:

Please ask the validator to include all relevant lab QA/QC (MS/MSD, blank, LCS and percent recovery sheets) in attachment 5 so that the data validation will be completely stand-alone and verifiable.

Thanks,
Dave

-----Original Message-----
From: Blumenkranz, David B
Sent: Tuesday, July 27, 1999 9:18 AM
To: Weiss, Richard L
Cc: Sturges, Mark H; Duncan, Jeanette M; 'Routt, Tina'
Subject: Data Validation Packages H0401-TNU/RLN and H0399-TNU/RLN
Importance: High

Comments/questions on Data Validation Packages H0401-TNU/RLN and H0399-TNU/RLN:

- *The summary table on page 10 needs to match the lab data in terms of significant figures, unless the validator has* determined that the lab measurement is not accurate and the result required truncation or rounding.
- **Question for Rich:** The discussion of RPDs on p. 3 states, "If either activities are less then five times the CRDL a control limit of less than or equal to two times the CRDL is used for soil samples...If either the original or replicate value is below the CRDL, the applicable control limits are less than or equal to...two times the CRDL for soil samples. If the RPD is outside the applicable control limit, the associated results are qualified..." I sounds like the control limit is a concentration based number, but the RPD is in percent, therefore, this description sounds like we're comparing apple and oranges. Can we ask for a clearer description or provide the validator some more concise verbiage? The equivalent situation is found in the inorganics data package as well.
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Please contact me ASAP concerning this message. This is a priority validation and supports PBCI activities.

Dave Blumenkranz
2-9658

Duncan, Jeanette M

From: Blumenkranz, David B
Sent: Tuesday, July 27, 1999 9:18 AM
To: Weiss, Richard L
Cc: Sturges, Mark H; Duncan, Jeanette M; 'Routt, Tina'
Subject: Data Validation Packages H0401-TNU/RLN and H0399-TNU/RLN

Importance: High

Comments/questions on Data Validation Packages H0401-TNU/RLN and H0399-TNU/RLN:

- The summary table on page 10 needs to match the lab data in terms of significant figures, unless the validator has determined that the lab measurement is not accurate and the result required truncation or rounding.
- **Question for Rich:** The discussion of RPDs on p. 3 states, "If either activities are less then five times the CRDL a control limit of less than or equal to two times the CRDL is used for soil samples...If either the original or replicate value is below the CRDL, the applicable control limits are less than or equal to...two times the CRDL for soil samples. If the RPD is outside the applicable control limit, the associated results are qualified..." I sounds like the control limit is a concentration based number, but the RPD is in percent, therefore, this description sounds like we're comparing apple and oranges. Can we ask for a clearer description or provide the validator some more concise verbiage? The equivalent situation is found in the inorganics data package as well.
- **Another Question for Rich:** Lab qualifiers were not carried forward onto the summary table on p. 10, is this correct? I though that unless they were negated by the validation, the data should have qualifiers assigned by the lab.

Please contact me ASAP concerning this message. This is a priority validation and supports PBCI activities.

Dave Blumenkranz
2-9658

Review Comment Record (RCR)

1. Date	2. Review No.
7/26/99	BHI/QA99009
3. Project	**4. Page**
116-B-4	Page 1 of 1

5. Document Number(s)/Title(s)	6. Program/Project/ Building Number	7. Reviewer	8. Organization/Group	9. Location/Phone
H0401-TNU (SDG No. H0401)	100-BC Areas – Full Protocol - 116-B-4	Claude Stacey	BHI/QA	H0-16/372-9208

17. *Comment Submittal Approval:*

Organization Manager (Optional) _____ Date _____

10. Agreement with indicated comment disposition(s)

Reviewer/Point of Contact _____ Date _____

Author/Originator _____

11. CLOSED

Reviewer/Point of Contact _____

Author/Originator _____

12. Item	13. Comment(s)/Discrepancy(s) (Provide technical justification for the comment and detailed recommendation of the action required to correct/ resolve the discrepancy/problem indicated.)	14. Hold Point	15. Disposition (Provide justification if NOT accepted.)	16. Status
1	Inorganic: No Comments			
2	Radiochemistry: Page 2, 1st paragraph under Blanks states "... sample results below the MDA are elevated to the MDA and qualified as undetected ..." This is not what's being done and the sentence needs to be changed to "... sample results below the MDA are qualified as undetected ..."			
3				
4				

Duncan, Jeanette M

From: Weiss, Richard L
Sent: Tuesday, July 20, 1999 3:10 PM
To: Duncan, Jeanette M
Subject: Review of H0399 & H0401 Validation Packages

Jeanette,

Here are my comments on review of these data packages;

H0399 - Inorganic: No comments

H0399 - Radiochemistry: Page 3, Field Duplicates; Wrong lab (QES) identified.

H0401 - Inorganic: Page 2, Blanks, last line; misspelled "chromium".
Page 4, MDLs; Sample B0VF65 incorrectly identified as missed Cr DL.

H0401 - Radiochemistry: Page 4, Field Duplicates; Wrong lab (QES) identified.
Page 8, Comments; "No qualifiers assigned" not appropriate.

Rich

FAX

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

To: Jeanette Duncan

From: Bruce Christian

Pages: 1

Date: 23 June 1999

Information Request

H0401 - Radiochemistry

Is there any method blank data for radium-226, radium-228, thorium-228 and thorium-232?

The lab does not report "non-detect" values for thes isotopes via GEA. ~~Values we~~ No detectable quantities of these isotopes we found in the method blank

RZW 6-28-99

FAX

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

To: Jeanette Duncan

From: Bruce Christian

Pages: 1

Date: 23 June 1999

Information Request

H0401 - Radiochemistry

Was a matrix spike analyzed for ni-63?

Ni-63 uses chemical yield measurment, no matrix spikes required. Yield summaries found on pg 31 of Data Summary

R L Weiss 6-28-99

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To: Jeanette Duncan

From: Bruce Christian

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Date: 23 June 1999

Information Request

H0401 - Radiochemistry

Was a matrix spike analyzed for ni-63?

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Information Request

H0401 - Radiochemistry

Is there any method blank data for radium-226, radium-228, thorium-228 and thorium-232?