Date: 22 January 1999
To: Bechtel Hanford, Inc. (technical representative)
From: TechLaw, Inc.
Project: 100-BC Areas - Full Protocol - Waste Sites 116-B-11, 116-B-13, 116-B-14
Subject: Radiochemistry - Data Package No. W02613-QES (SDG No. W02613)

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INTRODUCTION

This memo presents the results of data validation on Summary Data Package No. W02613-QES which was prepared by Quanterra Environmental Services (QES). 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
B0T092 (116-B-11)	11/19/98	Soil	C	See note 1
B0T093 (116-B-11)	11/19/98	Soil	C	See note 1
B0T094 (116-B-11)	11/19/98	Soil	C	See note 1
B0T095 (116-B-11)	11/19/98	Soil	C	See note 1
B0T096 (116-B-11)	11/19/98	Soil	C	See note 1
B0T097 (116-B-11)	11/19/98	Soil	C	See note 1
B0T0F6 (116-B-14)	11/23/98	Soil	C	See note 1
B0T0F7 (116-B-14)	11/23/98	Soil	C	See note 1
B0T0F8 (116-B-14)	11/23/98	Soil	C	See note 1
B0T0B5 (116-B-13)	11/23/98	Soil	C	See note 1
B0T0B6 (116-B-13)	11/23/98	Soil	C	See note 1
B0T0D2 (116-B-13)	11/23/98	Soil	C	See note 1

1 - Gamma spectroscopy; alpha spectroscopy; nickel-63; strontium-90.

Data validation was conducted in accordance with the BHI validation statement of work (BHI 1997) and the 100 Area Remedial Action Sampling and Analysis Plan (DOE/RL 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.

All holding times were acceptable.

- **Blanks**

Laboratory Blanks

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

Due to positive blank contamination, the plutonium-239/40 results in samples B0T0F8 (116-B-14) and B0T0D2 (116-B-13) were qualified as estimates and flagged "J".

Due to positive blank contamination, the uranium-238 (GEA) results in samples B0T0B5 (116-B-13), B0T0B6 (116-B-13), and B0T0D2 (116-B-13) were qualified as estimates and flagged "J".

All other blank results were acceptable.

- **Accuracy**

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

Due to an LCS recovery of 68%, all uranium-235 results were qualified as estimates and flagged "J".

Due to the lack of an LCS analysis, all plutonium-238 results were qualified as estimates and flagged "J".

Due to a matrix spike being substituted for the radiochemical tracer, all uranium-234, uranium-235 and uranium-238 (alpha spec) results 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 or equal to 30 percent, the results are acceptable. If either activities are less then five times the CRDL, a control limit (acceptable RPD) of less than or equal to two times the CRDL is used. If either the original or replicate value is below the CRDL, the applicable control limits (acceptable RPD) are less than or equal to two times the CRDL for soil samples. If the RPD is outside the applicable control limit (acceptable RPD), associated results are qualified as estimated detects or estimated non-detects.

Due to an RPD of 70%, all detected uranium-234 results were qualified as estimates and flagged "J".

Due to an RPD of 52%, all detected uranium-235 results were qualified as estimates and flagged "J".

Due to an RPD of 79%, all detected uranium-238 results were qualified as estimates and flagged "J".

All other duplicate results were acceptable.

Field Duplicate Samples

Two pair of field duplicate samples (samples B0T0B5 (116-B-13)/B0T0B6 (116-B-13) and B0T0F7 (116-B-14)/B0T0F8 (116-B-14)) were submitted to QES 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 following analytes and samples had reported MDAs above the TDL/MDA: Cesium-137 in sample B0T0D2, europium-152 in samples B0T0D2 (116-B-13), B0T0B5 (116-B-13), B0T0F8 (116-B-14), and B0T0F7 (116-B-14); europium-154 in sample B0T0F6 (116-B-14); europium-155 in samples B0T0F8 (116-B-14), B0T097 (116-B-11), B0T096 (116-B-11), B0T094 (116-B-11), and B0T093 (116-B-11). All other reported laboratory MDAs were at or below the analyte-specific TDL or contract specified MDA.

- **Completeness**

Data Package No. W02613-QES was submitted for validation and verified for completeness. The completion rate was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

Due to a matrix spike being substituted for the radiochemical tracer, all uranium-234, uranium-235 and uranium-238 (alpha spec) results were qualified as

estimates and flagged "J". Due to an RPD of 70%, all detected uranium-234 results were qualified as estimates and flagged "J". Due to an RPD of 52%, all detected uranium-235 results were qualified as estimates and flagged "J". Due to an RPD of 79%, all detected uranium-238 results were qualified as estimates and flagged "J". Due to an LCS recovery of 68%, all uranium-235 results were qualified as estimates and flagged "J". Due to the lack of an LCS analysis, all plutonium-238 results were qualified as estimates and flagged "J". Due to positive blank contamination, the plutonium-239/40 results in samples B0T0F8 (116-B-14) and B0T0D2 (116-B-13) were qualified as estimates and flagged "J". Due to positive blank contamination, the uranium-238 (GEA) results in samples B0T0B5 (116-B-13), B0T0B6 (116-B-13), and B0T0D2 (116-B-13) were qualified as estimates and flagged "J". Data flagged "J" is an estimate, but under the BHI validation SOW, the data may be usable for decision-making purposes. All other validated results are considered accurate within the standard error associated with the methods.

REFERENCES

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

DOE/RL-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 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: W02613	REVIEWER: TLI	DATE: 1/22/99	PAGE 1 OF 1
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Uranium-234, uranium-235, uranium-238 (alpha spec)	J	All	MS substituted for tracer
Plutonium-239/40	J	B0T0F8 (116-B-14) B0T0D2 (116-B-14)	Blank contamination
Uranium-238 (GEA)	J	B0T0B5 (116-B-14) B0T0B6 (116-B-14) B0T0D2 (116-B-14)	Blank contamination
Uraniun-235	J	All	LCS percent recovery
Plutonium-238	J	All	No LCS
Uranium-234, uranium-238 (alpha spec)	J	All	RPD
Uranium-235	J	B0T092 (116-B-11) B0T094 (116-B-11) B0T095 (116-B-11) B0T096 (116-B-11) B0T097 (116-B-11) B0T0F6 (116-B-14) B0T0F7 (116-B-14) B0T0B6 (116-B-13) B0T0D2 (116-B-13)	RPD

Appendix 3

Qualified Data Summary and Annotated Laboratory Reports

RADIOCHEMISTRY ANALYSIS, SOIL MATRIX, (PCi/G)

Project: BECHTEL-HANFORD																									
Laboratory: Quanterra																									
Case	SDG: W02613																								
Sample Number		B0T092		B0T093		B0T094		B0T095		B0T096		B0T097		B0T0F6		B0T0F7		B0T0F8		B0T0B5		B0T0B6		B0T0D2	
Unit		116-B-11		116-B-11		116-B-11		116-B-11		116-B-11		116-B-11		116-B-14		116-B-14		116-B-14		116-B-13		116-B-13		116-B-13	
Location		A1 (Deep)		A2 (Deep)		A3 (Deep)		B4 (Deep)		B5 (deep)		B6 (Deep)		A3 (Shallow)		A4 (Shallow)		A4 (Shallow)		A1 (Shallow)		A1 (Shallow)		A2 (Shallow)	
Remarks																		Duplicate				Duplicate			
Sample Date		11/19/98		11/19/98		11/19/98		11/19/98		11/19/98		11/19/98		11/23/98		11/23/98		11/23/98		11/23/98		11/23/98		11/23/98	
Radiochemistry	TDL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Americium-241	0.1	2.9		0.395		0.753		0.736		2.23		2.22		0.0675		0.0618		0.263		0.0595		0.034		0.0276	
Uranium-234	0.1	2.99	J	1.04	J	1.17	J	0.832	J	1.28	J	1.03	J	1.15	J	1.53	J	1.14	J	0.815	J	0.933	J	0.815	J
Uranium-235	0.1	0.13	J	0.0211	UJ	0.0665	J	0.0406	J	0.0461	J	0.0437	J	0.0561	J	0.0609	J	0.0317	UJ	0.0255	UJ	0.055	J	0.0368	J
Uranium-238	0.1	2.8	J	0.962	J	1.22	J	0.827	J	1.07	J	0.829	J	1.16	J	1.33	J	1.05	J	0.808	J	0.991	J	0.793	J
Plutonium-238	0.1	0.355	J	0.0147	UJ	0.0342	J	0.0162	UJ	0.186	J	0.244	J	0	UJ	-0.00114	UJ	0	UJ	0.0107	UJ	0.00329	UJ	-0.00116	UJ
Plutonium-239/240	0.1	11.3		1.37		1.6		1.75		6.04		6.98		0.37		0.00597	U	0.0381	J	0.0162	U	0.0151	U	0.0431	J
Americium-241 (GEA)	0.1	1.52		0.0167	U	0.0802	U	0.18		0.573		0.661		0.0414	U	0.00783	U	0.0149	U	-0.0011	U	-0.00953	U	0.051	
Cobalt-60	0.05	36.7		2.61		1.35		3.37		14.5		16.2		0.0462	U	0.0231	U	0.00737	U	0.0165	U	-0.000596	U	0.0123	U
Cesium-137DA	0.05	93.9		27		13.8		23.5		70.4		62.7		0.955		0.58		0.62		0.0492		0.0342	U	0.0793	
Europium-152	0.1	267		19.4		17.2		32.4		154		53.6		4.43		0.168		0.248		0.171	U	0.0434	U	0.255	U
Europium-154	0.1	40.3		2.33		2.39		3.93		18.2		6.38		0.191	U	0.0101	U	0.0239	U	0.043	U	0.0143	U	-0.0249	U
Europium-155	0.05	1.82		0.121	U	0.0833	U	0.17		0.798		0.365		0.0277	U	0.087		0.0615		0.00217	U	0.0137	U	0.0401	U
Uranium-238(GEA)	0.1	0.972		0.606		0.56		0.603		0.604		0.645		0.632		0.805		0.885		0.358	J	0.375	J	0.474	J
Strontium	1	4.06		2.56		1.4		2.44		3.94		2.53		1.55		0.121	U	0.14		0.105	U	0.0277	U	0.407	
Nickel-63	30	1570		179		154		261		870		1940		3.95	U	2.71	U	5.22	U	3.05	U	3.53	U	5.33	U

Quanterra

SAMPLE RESULTS

LAB NAME:	QUANTERRA, Richland	SDG: /RPT GRP:	W02613 / 6675
LAB SAMPLE ID:	81136201	MATRIX:	SOIL
CLIENT ID:	B0T092	DATE RECEIVED:	11/23/98 2:29:00 PM

ANALYTE	RESULT	Q	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA/IDL	REPORT UNIT	YIELD	METHOD NUMBER
~~HEXCHROME~~	~~1.23E+00~~		~~N/A~~	~~N/A~~	~~3.00E-02~~	~~mg/kg~~	~~N/A~~	~~EPA7196~~
AM-241	2.90E+00		3.3E-01	6.7E-01	2.54E-02	pCi/g	111.00%	RICHRC5080
U-234	2.99E+00	J	2.5E-01	5.4E-01	3.49E-02	pCi/g	79.80%	RICHRC5030
U-235	1.30E-01	J	5.2E-02	5.6E-02	2.61E-02	pCi/g	79.80%	RICHRC5030
U-238	2.80E+00	J	2.4E-01	5.1E-01	3.25E-02	pCi/g	79.80%	RICHRC5030
PU-238	3.55E-01	J	1.5E-01	1.8E-01	4.57E-02	pCi/g	25.20%	RICHRC5010
PU239/40	1.13E+01		8.7E-01	3.0E+00	9.02E-02	pCi/g	25.20%	RICHRC5010
AM-241	1.52E+00		2.4E-01	2.4E-01	2.24E-01	pCi/g	N/A	RICHRC5017
CO-60	3.67E+01		3.7E+00	3.7E+00	8.53E-02	pCi/g	N/A	RICHRC5017
CS-137	9.39E+01		9.4E+00	9.4E+00	1.84E-01	pCi/g	N/A	RICHRC5017
EU-152	2.67E+02		2.7E+01	2.7E+01	4.64E-01	pCi/g	N/A	RICHRC5017
EU-154	4.03E+01		4.1E+00	4.1E+00	3.14E-01	pCi/g	N/A	RICHRC5017
EU-155	1.82E+00		3.8E-01	3.8E-01	4.81E-01	pCi/g	N/A	RICHRC5017
U-238	9.72E-01		2.6E-01	2.6E-01	3.21E-01	pCi/g	N/A	RICHRC5017
STRONTIUM	4.06E+00		2.1E-01	1.2E+00	1.38E-01	pCi/g	54.90%	RICHRC5006
NI-63	1.57E+03		1.6E+01	1.8E+02	6.43E+00	pCi/g	75.80%	RICHRC5069

Number of Results: 16

RM
1/22/99

Result = IDL When Not Detected
(Q)ualifiers: U = Analyte result < MDA/IDL,
J = No U qualifier and result <

Quanterra Analytical Services, Inc
rptChemRadSample; v3.41

Quanterra

SAMPLE RESULTS

LAB NAME:	QUANTERRA, Richland	SDG: /RPT GRP:	W02613 / 6675
LAB SAMPLE ID:	81136202	MATRIX:	SOIL
CLIENT ID:	B0T093	DATE RECEIVED:	11/23/98 2:29:00 PM

ANALYTE	RESULT	Q	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA/IDL	REPORT UNIT	YIELD	METHOD NUMBER
~~HEXCHROME~~	~~1.12E+00~~		~~N/A~~	~~N/A~~	~~3.00E-02~~	~~mg/kg~~	~~N/A~~	~~EPA7196~~
AM-241	3.95E-01	J	1.5E-01	1.7E-01	3.68E-02	pCi/g	82.30%	RICHRC5080
U-234	1.04E+00	J	1.4E-01	2.2E-01	2.73E-02	pCi/g	85.40%	RICHRC5030
U-235	2.11E-02	U J	2.2E-02	2.2E-02	3.11E-02	pCi/g	85.40%	RICHRC5030
U-238	9.62E-01	~~K~~ J	1.4E-01	2.0E-01	3.51E-02	pCi/g	85.40%	RICHRC5030
PU-238	1.47E-02	U J	2.1E-02	2.1E-02	1.99E-02	pCi/g	61.70%	RICHRC5010
PU239/40	1.37E+00		2.0E-01	3.2E-01	3.35E-02	pCi/g	61.70%	RICHRC5010
AM-241	1.67E-02	U	1.2E-01	1.2E-01	1.99E-01	pCi/g	N/A	RICHRC5017
CO-60	2.61E+00		2.7E-01	2.7E-01	3.02E-02	pCi/g	N/A	RICHRC5017
CS-137	2.70E+01		2.7E+00	2.7E+00	6.11E-02	pCi/g	N/A	RICHRC5017
EU-152	1.94E+01		2.0E+00	2.0E+00	1.72E-01	pCi/g	N/A	RICHRC5017
EU-154	2.33E+00		2.8E-01	2.8E-01	1.11E-01	pCi/g	N/A	RICHRC5017
EU-155	1.21E-01	U	1.1E-01	1.1E-01	1.82E-01	pCi/g	N/A	RICHRC5017
U-238	6.06E-01		1.4E-01	1.4E-01	1.17E-01	pCi/g	N/A	RICHRC5017
STRONTIUM	2.56E+00		1.6E-01	7.9E-01	1.10E-01	pCi/g	56.50%	RICHRC5006
NI-63	1.79E+02		5.8E+00	2.6E+01	6.20E+00	pCi/g	77.90%	RICHRC5069

Number of Results: 16

RLM
1/22/99

Result = IDL When Not Detected
(Q)ualifiers: U = Analyte result < MDA/IDL,
J = No U qualifier and result <

Quanterra Analytical Services, Inc
rptChemRadSample; v3.41

Quanterra

SAMPLE RESULTS

LAB NAME:	QUANTERRA, Richland	SDG: /RPT GRP:	W02613 / 6675
LAB SAMPLE ID:	81136203	MATRIX:	SOIL
CLIENT ID:	B0T094	DATE RECEIVED:	11/23/98 2:29:00 PM

ANALYTE	RESULT	Q	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA/IDL	REPORT UNIT	YIELD	METHOD NUMBER
~~HEXCHROME~~	~~4.20E-02~~		~~N/A~~	~~N/A~~	~~3.00E-02~~	~~mg/kg~~	~~N/A~~	~~EPA7196~~
AM-241	7.53E-01	J	1.6E-01	2.2E-01	3.11E-02	pCi/g	88.70%	RICHRC5080
U-234	1.17E+00	J	1.6E-01	2.4E-01	2.37E-02	pCi/g	81.00%	RICHRC5030
U-235	6.65E-02	J	3.7E-02	3.9E-02	2.37E-02	pCi/g	81.00%	RICHRC5030
U-238	1.22E+00	J	1.6E-01	2.5E-01	2.08E-02	pCi/g	81.00%	RICHRC5030
PU-238	3.42E-02	J	2.8E-02	2.9E-02	2.32E-02	pCi/g	54.50%	RICHRC5010
PU239/40	1.60E+00		1.9E-01	3.3E-01	1.56E-02	pCi/g	54.50%	RICHRC5010
AM-241	8.02E-02	U	8.0E-02	8.0E-02	1.31E-01	pCi/g	N/A	RICHRC5017
CO-60	1.35E+00		1.4E-01	1.4E-01	2.51E-02	pCi/g	N/A	RICHRC5017
CS-137	1.38E+01		1.4E+00	1.4E+00	5.06E-02	pCi/g	N/A	RICHRC5017
EU-152	1.72E+01		1.7E+00	1.7E+00	1.29E-01	pCi/g	N/A	RICHRC5017
EU-154	2.39E+00		2.7E-01	2.7E-01	9.18E-02	pCi/g	N/A	RICHRC5017
EU-155	8.33E-02	U	8.5E-02	8.5E-02	1.43E-01	pCi/g	N/A	RICHRC5017
U-238	5.60E-01		1.1E-01	1.1E-01	8.96E-02	pCi/g	N/A	RICHRC5017
STRONTIUM	1.40E+00		1.3E-01	4.5E-01	1.34E-01	pCi/g	47.70%	RICHRC5006
NI-63	1.54E+02		5.9E+00	2.4E+01	6.95E+00	pCi/g	69.10%	RICHRC5069

Number of Results: 16

RPM
1/22/99

Result = IDL When Not Detected
(Q)ualifiers: U = Analyte result < MDA/IDL.
J = No U qualifier and result <

Quanterra Analytical Services, Inc
rptChemRadSample; v3.41

Quanterra

SAMPLE RESULTS

LAB NAME:	QUANTERRA, Richland	SDG: /RPT GRP:	W02613 / 6675
LAB SAMPLE ID:	81136204	MATRIX:	SOIL
CLIENT ID:	B0T095	DATE RECEIVED:	11/23/98 2:29:00 PM

ANALYTE	RESULT	Q	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA/IDL	REPORT UNIT	YIELD	METHOD NUMBER
~~HEXCHROME~~	~~7.49E-01~~		~~N/A~~	~~N/A~~	~~3.00E-02~~	~~mg/kg~~	~~N/A~~	~~EPA7196~~
AM-241	7.36E-01	J	1.6E-01	2.2E-01	3.70E-02	pCi/g	81.70%	RICHRC5080
U-234	8.32E-01	~~U~~ J	1.4E-01	2.0E-01	3.56E-02	pCi/g	76.40%	RICHRC5030
U-235	4.06E-02	~~U~~ J	3.2E-02	3.3E-02	2.99E-02	pCi/g	76.40%	RICHRC5030
U-238	8.27E-01	~~U~~ J	1.4E-01	2.0E-01	3.20E-02	pCi/g	76.40%	RICHRC5030
PU-238	1.62E-02	U J	2.5E-02	2.5E-02	4.02E-02	pCi/g	35.20%	RICHRC5010
PU239/40	1.75E+00		2.5E-01	4.2E-01	4.01E-02	pCi/g	35.20%	RICHRC5010
AM-241	1.80E-01		6.2E-02	6.2E-02	8.19E-02	pCi/g	N/A	RICHRC5017
CO-60	3.37E+00		3.5E-01	3.5E-01	3.24E-02	pCi/g	N/A	RICHRC5017
CS-137	2.35E+01		2.4E+00	2.4E+00	6.39E-02	pCi/g	N/A	RICHRC5017
EU-152	3.24E+01		3.3E+00	3.3E+00	1.72E-01	pCi/g	N/A	RICHRC5017
EU-154	3.93E+00		4.4E-01	4.4E-01	1.17E-01	pCi/g	N/A	RICHRC5017
EU-155	1.70E-01		1.1E-01	1.1E-01	1.64E-01	pCi/g	N/A	RICHRC5017
U-238	6.03E-01		1.3E-01	1.3E-01	1.21E-01	pCi/g	N/A	RICHRC5017
STRONTIUM	2.44E+00		1.5E-01	7.8E-01	1.24E-01	pCi/g	63.20%	RICHRC5006
NI-63	2.61E+02		8.2E+00	3.7E+01	8.41E+00	pCi/g	57.20%	RICHRC5069

Number of Results: 16

Result = IDL When Not Detected

(Q)ualifiers: U = Analyte result < MDA/IDL,
J = No U qualifier and result <

Quanterra Analytical Services, Inc
rptChemRadSample; v3.41

Quanterra

SAMPLE RESULTS

LAB NAME:	QUANTERRA, Richland	SDG: /RPT GRP:	W02613 / 6675
LAB SAMPLE ID:	81136205	MATRIX:	SOIL
CLIENT ID:	B0T096	DATE RECEIVED:	11/23/98 2:29:00 PM

ANALYTE	RESULT	Q	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA/IDL	REPORT UNIT	YIELD	METHOD NUMBER
~~HEXCHROME~~	~~1.00E+00~~		~~N/A~~	~~N/A~~	~~3.00E-02~~	~~mg/kg~~	~~N/A~~	~~EPA7196~~
AM-241	2.23E+00	J	2.6E-01	4.9E-01	2.80E-02	pCi/g	99.60%	RICHRC5080
U-234	1.28E+00	J	1.9E-01	2.9E-01	4.00E-02	pCi/g	62.10%	RICHRC5030
U-235	4.61E-02	~~U~~ J	3.6E-02	3.7E-02	3.08E-02	pCi/g	62.10%	RICHRC5030
U-238	1.07E+00	J	1.7E-01	2.5E-01	3.60E-02	pCi/g	62.10%	RICHRC5030
PU-238	1.86E-01	J	1.0E-01	1.1E-01	5.38E-02	pCi/g	23.70%	RICHRC5010
PU239/40	6.04E+00		5.7E-01	1.5E+00	7.14E-02	pCi/g	23.70%	RICHRC5010
AM-241	5.73E-01		2.9E-01	2.9E-01	4.47E-01	pCi/g	N/A	RICHRC5017
CO-60	1.45E+01		1.5E+00	1.5E+00	6.76E-02	pCi/g	N/A	RICHRC5017
CS-137	7.04E+01		7.0E+00	7.0E+00	1.44E-01	pCi/g	N/A	RICHRC5017
EU-152	1.54E+02		1.5E+01	1.5E+01	3.63E-01	pCi/g	N/A	RICHRC5017
EU-154	1.82E+01		1.9E+00	1.9E+00	2.47E-01	pCi/g	N/A	RICHRC5017
EU-155	7.98E-01	~~U~~	3.1E-01	3.1E-01	4.45E-01	pCi/g	N/A	RICHRC5017
U-238	6.04E-01		1.7E-01	1.7E-01	2.42E-01	pCi/g	N/A	RICHRC5017
STRONTIUM	3.94E+00		2.0E-01	1.2E+00	1.20E-01	pCi/g	56.50%	RICHRC5006
NI-63	8.70E+02		1.2E+01	1.0E+02	6.65E+00	pCi/g	72.40%	RICHRC5069

Number of Results: 16

pkc
1/22/99

Result = IDL When Not Detected
(Q)ualifiers: U = Analyte result < MDA/IDL,
J = No U qualifier and result <

Quanterra Analytical Services, Inc
rptChemRadSample; v3.41

Quanterra

SAMPLE RESULTS

LAB NAME:	QUANTERRA, Richland	SDG: /RPT GRP:	W02613 / 6675
LAB SAMPLE ID:	81136206	MATRIX:	SOIL
CLIENT ID:	B0T097	DATE RECEIVED:	11/23/98 2:29:00 PM

ANALYTE	RESULT	Q	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA/IDL	REPORT UNIT	YIELD	METHOD NUMBER
~~HEXCHROME~~	~~9.61E-01~~		~~N/A~~	~~N/A~~	~~3.00E-02~~	~~mg/kg~~	~~N/A~~	~~EPA7196~~
AM-241	2.22E+00	J	2.8E-01	5.2E-01	4.12E-02	pCi/g	90.90%	RICHRC5080
U-234	1.03E+00	J	1.6E-01	2.4E-01	2.99E-02	pCi/g	64.20%	RICHRC5030
U-235	4.37E-02	~~U~~ J	3.5E-02	3.6E-02	3.50E-02	pCi/g	64.20%	RICHRC5030
U-238	8.29E-01	~~U~~ J	1.5E-01	2.1E-01	3.50E-02	pCi/g	64.20%	RICHRC5030
PU-238	2.44E-01	J	7.5E-02	8.5E-02	2.85E-02	pCi/g	59.30%	RICHRC5010
PU239/40	6.98E+00		4.0E-01	1.2E+00	1.54E-02	pCi/g	59.30%	RICHRC5010
AM-241	6.61E-01		3.0E-01	3.0E-01	3.86E-01	pCi/g	N/A	RICHRC5017
CO-60	1.62E+01		1.6E+00	1.6E+00	5.10E-02	pCi/g	N/A	RICHRC5017
CS-137	6.27E+01		6.3E+00	6.3E+00	1.01E-01	pCi/g	N/A	RICHRC5017
EU-152	5.36E+01		5.4E+00	5.4E+00	2.53E-01	pCi/g	N/A	RICHRC5017
EU-154	6.38E+00		6.9E-01	6.9E-01	1.75E-01	pCi/g	N/A	RICHRC5017
EU-155	3.65E-01	ok	2.1E-01	2.1E-01	2.71E-01	pCi/g	N/A	RICHRC5017
U-238	6.45E-01		1.7E-01	1.7E-01	1.76E-01	pCi/g	N/A	RICHRC5017
STRONTIUM	2.53E+00		1.7E-01	7.5E-01	1.23E-01	pCi/g	48.90%	RICHRC5006
NI-63	1.94E+03		1.8E+01	2.3E+02	6.47E+00	pCi/g	75.00%	RICHRC5069

Number of Results: 16

1/22/99

Result = IDL When Not Detected

(Q)ualifiers: U = Analyte result < MDA/IDL.
J = No U qualifier and result <

Quanterra Analytical Services, Inc
rptChemRadSample: v3.41

Quanterra

SAMPLE RESULTS

LAB NAME:	QUANTERRA, Richland	SDG: /RPT GRP:	W02613 / 6675
LAB SAMPLE ID:	81136207	MATRIX:	SOIL
CLIENT ID:	B0T0F6	DATE RECEIVED:	11/23/98 2:29:00 PM

ANALYTE	RESULT	Q	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA/IDL	REPORT UNIT	YIELD	METHOD NUMBER
~~HEXCHROME~~	~~2.97E-01~~		~~N/A~~	~~N/A~~	~~3.00E-02~~	~~mg/kg~~	~~N/A~~	~~EPA7196~~
AM-241	6.75E-02	J	4.8E-02	4.9E-02	2.28E-02	pCi/g	101.60%	RICHRC5080
U-234	1.15E+00	J	1.6E-01	2.5E-01	3.56E-02	pCi/g	72.70%	RICHRC5030
U-235	5.61E-02	J	3.6E-02	3.8E-02	2.87E-02	pCi/g	72.70%	RICHRC5030
U-238	1.16E+00	J	1.6E-01	2.5E-01	3.56E-02	pCi/g	72.70%	RICHRC5030
PU-238	0.00E+00	U J	0.0E+00	1.4E-02	1.27E-02	pCi/g	72.20%	RICHRC5010
PU239/40	3.70E-01		8.3E-02	1.0E-01	1.88E-02	pCi/g	72.20%	RICHRC5010
AM-241	4.14E-02	U	5.1E-02	5.1E-02	8.65E-02	pCi/g	N/A	RICHRC5017
CO-60	4.62E-02	U	1.8E-02	1.8E-02	3.30E-02	pCi/g	N/A	RICHRC5017
CS-137	9.55E-01		1.1E-01	1.1E-01	3.05E-02	pCi/g	N/A	RICHRC5017
EU-152	4.43E+00		4.6E-01	4.6E-01	7.57E-02	pCi/g	N/A	RICHRC5017
EU-154	1.91E-01	U	9.1E-02	9.1E-02	1.07E-01	pCi/g	N/A	RICHRC5017
EU-155	2.77E-02	U	5.1E-02	5.1E-02	8.27E-02	pCi/g	N/A	RICHRC5017
U-238	6.32E-01		9.2E-02	9.2E-02	4.98E-02	pCi/g	N/A	RICHRC5017
STRONTIUM	1.55E+00		1.2E-01	5.2E-01	1.12E-01	pCi/g	59.70%	RICHRC5006
NI-63	3.95E+00	U	2.7E+00	8.0E+00	6.37E+00	pCi/g	75.50%	RICHRC5069

Number of Results: 16

pgm
1/22/99

Result = IDL When Not Detected
(Q)ualifiers: U = Analyte result < MDA/IDL.
J = No U qualifier and result <

Quanterra Analytical Services, Inc
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Quanterra

SAMPLE RESULTS

LAB NAME:	QUANTERRA, Richland	SDG: /RPT GRP:	W02613 / 6675
LAB SAMPLE ID:	81136208	MATRIX:	SOIL
CLIENT ID:	B0T0F7	DATE RECEIVED:	11/23/98 2:29:00 PM

ANALYTE	RESULT	Q	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA/IDL	REPORT UNIT	YIELD	METHOD NUMBER
~~HEXCHROME~~	~~1.72E-01~~		~~N/A~~	~~N/A~~	~~3.00E-02~~	~~mg/kg~~	~~N/A~~	~~EPA7196~~
AM-241	6.18E-02	J	5.1E-02	5.2E-02	3.77E-02	pCi/g	78.90%	RICHRC5080
U-234	1.53E+00	J	2.1E-01	3.0E-01	3.50E-02	pCi/g	59.10%	RICHRC5030
U-235	6.09E-02	J	4.2E-02	4.3E-02	3.74E-02	pCi/g	59.10%	RICHRC5030
U-238	1.33E+00	J	1.9E-01	2.7E-01	5.81E-02	pCi/g	59.10%	RICHRC5030
PU-238	-1.14E-03	U J	1.6E-03	1.6E-03	3.25E-02	pCi/g	57.70%	RICHRC5010
PU239/40	5.97E-03	U	1.4E-02	1.4E-02	3.25E-02	pCi/g	57.70%	RICHRC5010
AM-241	7.83E-03	U	3.7E-02	3.7E-02	5.88E-02	pCi/g	N/A	RICHRC5017
CO-60	2.31E-02	U	1.3E-02	1.3E-02	2.46E-02	pCi/g	N/A	RICHRC5017
CS-137	5.80E-01		6.8E-02	6.8E-02	2.37E-02	pCi/g	N/A	RICHRC5017
EU-152	1.68E-01		5.6E-02	5.6E-02	7.07E-02	pCi/g	N/A	RICHRC5017
EU-154	1.01E-02	U	4.2E-02	4.2E-02	7.34E-02	pCi/g	N/A	RICHRC5017
EU-155	8.70E-02		3.4E-02	3.4E-02	5.61E-02	pCi/g	N/A	RICHRC5017
U-238	8.05E-01		9.6E-02	9.6E-02	3.84E-02	pCi/g	N/A	RICHRC5017
STRONTIUM	1.21E-01	U	6.0E-02	7.0E-02	1.43E-01	pCi/g	52.30%	RICHRC5006
NI-63	2.71E+00	U	3.2E+00	8.7E+00	8.05E+00	pCi/g	68.60%	RICHRC5069

Number of Results: 16

1/22/99

Result = IDL When Not Detected

(Q)ualifiers: U = Analyte result < MDA/IDL.
J = No U qualifier and result <

Quanterra

SAMPLE RESULTS

LAB NAME:	QUANTERRA, Richland	SDG: /RPT GRP:	W02613 / 6675
LAB SAMPLE ID:	81136209	MATRIX:	SOIL
CLIENT ID:	B0T0F8	DATE RECEIVED:	11/23/98 2:29:00 PM

ANALYTE	RESULT	Q	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA/IDL	REPORT UNIT	YIELD	METHOD NUMBER
~~HEXCHROME~~	~~1.29E-01~~		~~N/A~~	~~N/A~~	~~3.00E-02~~	~~mg/kg~~	~~N/A~~	~~EPA7196~~
AM-241	2.63E-01	J	9.6E-02	1.1E-01	2.37E-02	pCi/g	93.40%	RICHRC5080
U-234	1.14E+00	J	1.7E-01	2.5E-01	3.39E-02	pCi/g	68.80%	RICHRC5030
U-235	3.17E-02	U J	3.0E-02	3.0E-02	4.00E-02	pCi/g	68.80%	RICHRC5030
U-238	1.05E+00	J	1.6E-01	2.4E-01	3.86E-02	pCi/g	68.80%	RICHRC5030
PU-238	0.00E+00	U J	0.0E+00	2.3E-02	2.06E-02	pCi/g	56.50%	RICHRC5010
PU239/40	3.81E-02		3.4E-02	3.5E-02	2.06E-02	pCi/g	56.50%	RICHRC5010
AM-241	1.49E-02	U	2.9E-02	2.9E-02	4.25E-02	pCi/g	N/A	RICHRC5017
CO-60	7.37E-03	U	1.6E-02	1.6E-02	2.79E-02	pCi/g	N/A	RICHRC5017
CS-137	6.20E-01		7.5E-02	7.5E-02	2.61E-02	pCi/g	N/A	RICHRC5017
EU-152	2.48E-01	U	6.7E-02	6.7E-02	8.44E-02	pCi/g	N/A	RICHRC5017
EU-154	2.39E-02	U	4.4E-02	4.4E-02	7.81E-02	pCi/g	N/A	RICHRC5017
EU-155	6.15E-02	U	3.5E-02	3.5E-02	5.93E-02	pCi/g	N/A	RICHRC5017
U-238	8.85E-01		1.1E-01	1.1E-01	4.49E-02	pCi/g	N/A	RICHRC5017
STRONTIUM	1.40E-01	J	5.8E-02	7.2E-02	1.28E-01	pCi/g	52.50%	RICHRC5006
NI-63	5.22E+00	U	2.8E+00	8.0E+00	6.45E+00	pCi/g	77.10%	RICHRC5069

Number of Results: 16

RK
1/22/99

Result = IDL When Not Detected
(Q)ualifiers: U = Analyte result < MDA/IDL,
J = No U qualifier and result <

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Quanterra Analytical Services, Inc
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Quanterra

SAMPLE RESULTS

LAB NAME:	QUANTERRA, Richland	SDG: /RPT GRP:	W02613 / 6675
LAB SAMPLE ID:	81136210	MATRIX:	SOIL
CLIENT ID:	B0T0B5	DATE RECEIVED:	11/23/98 2:29:00 PM

ANALYTE	RESULT	Q	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA/IDL	REPORT UNIT	YIELD	METHOD NUMBER
~~HEXCHROME~~	~~3.00E-02~~	~~U~~	~~N/A~~	~~N/A~~	~~3.00E-02~~	~~mg/kg~~	~~N/A~~	~~EPA7196~~
AM-241	5.95E-02	J	4.9E-02	5.0E-02	2.68E-02	pCi/g	78.60%	RICHRC5080
U-234	8.15E-01	~~U~~ J	1.7E-01	2.4E-01	4.80E-02	pCi/g	46.50%	RICHRC5030
U-235	2.55E-02	U J	3.1E-02	3.2E-02	4.10E-02	pCi/g	46.50%	RICHRC5030
U-238	8.08E-01	~~U~~ J	1.7E-01	2.3E-01	3.61E-02	pCi/g	46.50%	RICHRC5030
PU-238	1.07E-02	U J	1.7E-02	1.7E-02	3.02E-02	pCi/g	68.40%	RICHRC5010
PU239/40	1.62E-02	U	2.1E-02	2.1E-02	3.23E-02	pCi/g	68.40%	RICHRC5010
AM-241	-1.10E-03	U	1.5E-01	1.5E-01	2.54E-01	pCi/g	N/A	RICHRC5017
CO-60	1.65E-02	U	2.1E-02	2.1E-02	3.74E-02	pCi/g	N/A	RICHRC5017
CS-137	4.92E-02	J	2.9E-02	2.9E-02	3.23E-02	pCi/g	N/A	RICHRC5017
EU-152	1.71E-01	U	7.3E-02	7.3E-02	9.26E-02	pCi/g	N/A	RICHRC5017
EU-154	4.30E-02	U	6.1E-02	6.1E-02	1.09E-01	pCi/g	N/A	RICHRC5017
EU-155	2.17E-03	U	4.8E-02	4.8E-02	7.78E-02	pCi/g	N/A	RICHRC5017
U-238	3.58E-01	J	8.1E-02	8.1E-02	5.32E-02	pCi/g	N/A	RICHRC5017
STRONTIUM	1.05E-01	U	5.5E-02	6.3E-02	1.27E-01	pCi/g	47.20%	RICHRC5006
NI-63	3.05E+00	U	2.8E+00	7.6E+00	7.12E+00	pCi/g	80.10%	RICHRC5069

Number of Results: 16

RMC
1/22/99

Result = IDL When Not Detected
(Q)ualifiers: U = Analyte result < MDA/IDL,
J = No U qualifier and result <

Quanterra Analytical Services, Inc
rptChemRadSample: v3.41

Quanterra

SAMPLE RESULTS

LAB NAME:	QUANTERRA, Richland	SDG: /RPT GRP:	W02613 / 6675
LAB SAMPLE ID:	81136211	MATRIX:	SOIL
CLIENT ID:	B0T0B6	DATE RECEIVED:	11/23/98 2:29:00 PM

ANALYTE	RESULT	Q	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA/IDL	REPORT UNIT	YIELD	METHOD NUMBER
~~HEXCHROME~~	~~3.00E-02~~	~~U~~	~~N/A~~	~~N/A~~	~~3.00E-02~~	~~mg/kg~~	~~N/A~~	~~EPA7196~~
AM-241	3.40E-02	J	3.9E-02	4.0E-02	3.07E-02	pCi/g	69.80%	RICHRC5080
U-234	9.33E-01	~~U~~ J	1.6E-01	2.3E-01	4.21E-02	pCi/g	65.30%	RICHRC5030
U-235	5.50E-02	~~U~~ J	4.0E-02	4.1E-02	3.54E-02	pCi/g	65.30%	RICHRC5030
U-238	9.91E-01	~~U~~ J	1.7E-01	2.4E-01	3.79E-02	pCi/g	65.30%	RICHRC5030
PU-238	3.29E-03	U J	1.1E-02	1.1E-02	3.10E-02	pCi/g	74.70%	RICHRC5010
PU239/40	1.51E-02	U	1.9E-02	1.9E-02	2.73E-02	pCi/g	74.70%	RICHRC5010
AM-241	-9.53E-03	U	4.3E-02	4.3E-02	6.65E-02	pCi/g	N/A	RICHRC5017
CO-60	-5.96E-04	U	2.1E-02	2.1E-02	3.65E-02	pCi/g	N/A	RICHRC5017
CS-137	3.42E-02	U	2.1E-02	2.1E-02	3.67E-02	pCi/g	N/A	RICHRC5017
EU-152	4.34E-02	U	5.3E-02	5.3E-02	8.62E-02	pCi/g	N/A	RICHRC5017
EU-154	1.43E-02	U	6.5E-02	6.5E-02	1.13E-01	pCi/g	N/A	RICHRC5017
EU-155	1.37E-02	U	3.7E-02	3.7E-02	6.28E-02	pCi/g	N/A	RICHRC5017
U-238	3.75E-01	J	8.8E-02	8.8E-02	5.35E-02	pCi/g	N/A	RICHRC5017
STRONTIUM	2.77E-02	U	4.7E-02	4.8E-02	1.29E-01	pCi/g	50.30%	RICHRC5006
NI-63	3.53E+00	U	2.6E+00	7.4E+00	6.13E+00	pCi/g	82.20%	RICHRC5069

Number of Results: 16

1/22/99

Result = IDL When Not Detected

(Q)ualifiers: U = Analyte result < MDA/IDL,
J = No U qualifier and result <

Quanterra Analytical Services, Inc
rptChemRadSample; v3.41

Quanterra

SAMPLE RESULTS

LAB NAME:	QUANTERRA, Richland	SDG: /RPT GRP:	W02613 / 6675
LAB SAMPLE ID:	81136212	MATRIX:	SOIL
CLIENT ID:	B0T0D2	DATE RECEIVED:	11/23/98 2:29:00 PM

ANALYTE	RESULT	Q	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA/IDL	REPORT UNIT	YIELD	METHOD NUMBER
~~HEXCHROME~~	~~3.00E-02~~	~~U~~	~~N/A~~	~~N/A~~	~~3.00E-02~~	~~mg/kg~~	~~N/A~~	~~EPA7196~~
AM-241	2.76E-02	J	3.2E-02	3.2E-02	2.49E-02	pCi/g	84.60%	RICHRC5080
U-234	8.15E-01	~~U~~ J	1.3E-01	1.9E-01	3.19E-02	pCi/g	77.80%	RICHRC5030
U-235	3.68E-02	~~U~~ J	2.8E-02	2.9E-02	2.46E-02	pCi/g	77.80%	RICHRC5030
U-238	7.93E-01	~~U~~ J	1.3E-01	1.8E-01	3.33E-02	pCi/g	77.80%	RICHRC5030
PU-238	-1.16E-03	U J	1.6E-03	1.7E-03	3.32E-02	pCi/g	57.50%	RICHRC5010
PU239/40	4.31E-02		3.6E-02	3.6E-02	2.93E-02	pCi/g	57.50%	RICHRC5010
AM-241	5.10E-02	~~U~~	2.4E-02	2.4E-02	3.42E-02	pCi/g	N/A	RICHRC5017
CO-60	1.23E-02	U	2.4E-02	2.4E-02	4.22E-02	pCi/g	N/A	RICHRC5017
CS-137	7.93E-02	~~U~~	2.4E-02	2.4E-02	4.17E-02	pCi/g	N/A	RICHRC5017
EU-152	2.55E-01	U	7.5E-02	7.5E-02	9.90E-02	pCi/g	N/A	RICHRC5017
EU-154	-2.49E-02	U	6.9E-02	6.9E-02	1.17E-01	pCi/g	N/A	RICHRC5017
EU-155	4.01E-02	U	3.4E-02	3.4E-02	5.84E-02	pCi/g	N/A	RICHRC5017
U-238	4.74E-01	J	7.6E-02	7.6E-02	5.51E-02	pCi/g	N/A	RICHRC5017
STRONTIUM	4.07E-01	J	7.7E-02	1.5E-01	1.35E-01	pCi/g	56.90%	RICHRC5006
NI-63	5.33E+00	U	2.6E+00	7.2E+00	6.16E+00	pCi/g	85.70%	RICHRC5069

Number of Results: 16

RM
1/22/99

Result = IDL When Not Detected
(Q)ualifiers: U = Analyte result < MDA/IDL,
J = No U qualifier and result <

Quanterra Analytical Services, Inc
rptChemRadSample; v3.41

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

Quanterra

CERTIFICATE OF ANALYSIS

DEC 1998
RECEIVED
Data
Log In

Bechtel Hanford, Inc.
3350 George Washington Way
Richland, WA 99352

December 22, 1998

Attention: Joan Kessner

SAF Number	:	B99-002
Date First Sample Received	:	November 23, 1998
Number of Samples	:	12
Sample Type	:	Soil
SDG Number	:	W02613
Data Deliverable	:	21 Day Priority / 28 Day Summary

I. Introduction

On November 23, 1998, 12-priority soil samples were received by the Quanterra Environmental Services Richland Laboratory (QESRL) for a 21-day priority radiochemical and chemical analysis. Upon receipt, the samples were assigned the following laboratory ID numbers to correspond with the Bechtel Hanford, Inc. (BHI) specific IDs:

QESRL ID#	BHI ID#	MATRIX	DATE OF RECEIPT
81136201	B0T092	Soil	11/23/98
81136202	B0T093	Soil	11/23/98
81136203	B0T094	Soil	11/23/98
81136204	B0T095	Soil	11/23/98
81136205	B0T096	Soil	11/23/98
81136206	B0T097	Soil	11/23/98
81136207	B0T0F6	Soil	11/23/98
81136208	B0T0F7	Soil	11/23/98
81136209	B0T0F8	Soil	11/23/98
81136210	B0T0B5	Soil	11/23/98
81136211	B0T0B6	Soil	11/23/98
81136212	B0T0D2	Soil	11/23/98

II. Analytical Results/Methodology

The analytical results for this report are presented by laboratory sample ID. Each set of data includes sample identification information; analytical results and the appropriate associated statistical errors.

The requested analyses were:

Alpha Spectroscopy
Americium-241 by method RICH-RC-5080
Plutonium-238, -239/40 by method RICH-RC-5010
Uranium-234, -235, -238 by method RICH-RC-5030
Gamma Spectroscopy
Gamma Scan by method RICH-RC-5017
Gas Proportional Counting
Total Strontium by method RICH-RC-5006
Liquid Scintillation Counting
Nickel-63 by method RICH-RC-5069
Chemical Analyses
Chromium Hex by EPA method 7196

III. Quality Control

The analytical results for each analysis performed under SDG W02613 includes a minimum of two Laboratory Control Samples (LCS) and one method (reagent) blank. Any exceptions have been noted in the "Comments" section.

Quality control sample results are reported in the same units as sample results.

IV. Comments

Alpha Spectroscopy

Americium-241 by method RICH-RC-5080
The LCS, batch blank, sample duplicate (B0T094) and sample results are within contractual requirements. There was a matrix blank and spike analyzed with this sample batch and the results are within the contractual requirements.

Plutonium-238, -239/40 by method RICH-RC-5062
The LCS, batch blank, sample duplicate (B0T094) and sample results are within contractual requirements. There was a matrix blank and spike analyzed with this sample batch and the results are within the contractual requirements.

Uranium-234, -235, -238 by method RICH-RC-5030
Sample B0T092 had a spike vial added to it instead of a tracer vial. This sample was also analyzed as a duplicate sample. When evaluated as a matrix spike, sample B0T092 meets the MS evaluation criteria of the contract. The LCS, batch blank, and sample results are within contractual requirements.

Gamma Spectroscopy

Gamma Scan by method RICH-RC-5017
The LCS, batch blank, sample duplicate (B0T0D2) and sample results are within contractual requirements.

Gas Proportional Counting

Total Strontium by method RICH-RC-5006
The LCS, batch blank, sample duplicate (B0T092) and sample results are within contractual requirements.

Liquid Scintillation Counting

Nickel-63 by method RICH-RC-5069
The LCS, MS (B0T093), sample duplicate(B0T093),, batch blank and sample results are within contractual requirements.

Chemical Analyses

Chromium Hex by EPA method 7196
12 color blanks were analyzed between CCV4 and CCV5. Not enough color blank samples remained for a reanalysis. All the color blanks except one was insignificant. All of the QC was acceptable. The LCS, sample duplicate (B0T0HF8), batch blank, matrix spike (B0T0F8) and sample results are within contractual requirements.

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

Reviewed and approved:

Andy Kopriva
Project Manager

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

B99-002-02 | Page 1 of 1

Collector: Coffman/Fahlberg	Company Contact: R Coffman	Telephone No.: 373-6425	Project Coordinator: TRENT, SJ
Project Designation: 100 BC Areas - Full Protocol	Sampling Location: 116-B-11		SAF No.: B99-002
Ice Chest No.	Field Logbook No.: EL 1327-1		Method of Shipment
Shipped To: Quanterra Incorporated	Offsite Property No.		Bill of Lading/Air Bill No.

Price Code: RJN 11/23/98 ~~15 Days~~ 21 days

Data Turnaround

COA

POSSIBLE SAMPLE HAZARDS/REMARKS

Special Handling and/or Storage

SAMPLE ANALYSIS: SDK W02613

Preservation			Cool 4C	None	None	None	None	None	None	None	None	None	None
Type of Container			aG	aG	aG	aG	aG	aG	P	aG	aG	Marinelli
No. of Container(s)			0	0	1	0	0	0	1	1	1	1
Volume			60mL	60mL	60mL	60mL	60mL	60mL	20mL	60mL	60mL	500mL
			Chromium Hex - 7196	ICP Metals - 6010A (Add-on) (Lead)	ICP Metals - 6010A (SW-846) (Chromium, Lead)	Mercury - 7471 - (CV)	Nickel-63	Strontium-89,90 -- Total Sr	Activity Scan	Americium-241; Isotopic Plutonium; Isotopic Uranium	ICP Metals - 6010A (TAL)	See item (1) in Special Instructions
			811362				811362			811362		811362
Sample No.		Matrix *	Sample Date	Sample Time									
B0T092	01	Soil	11-19-98	0930	X		X	X	X	X	X	X	X
B0T093	02	Soil	11-19-98	0940	X		X	X	X	X	X	X	X
B0T094	03	Soil	11-19-98	0950	X		X	X	X	X	X	X	X

811361

CHAIN OF POSSESSION — Sign/Print Names

Relinquished By	Date/Time	Received By	Date/Time
Nielson/R. Nielson	1429 11/23/98	Heidelberg	1429 11-23-98
		Loomis	

SPECIAL INSTRUCTIONS

** The ERC contractor acknowleges the 24-hour holding time is not likely achievable for Hex Chrom by EPA 7196.

** Use a separate Chain of Custody for each waste site.

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

B0T092 = B0T0H52
B0T093 = B0T0H3
B0T094 = B0T0H4

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

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

Collector: Coffman/Fahlberg / Nielsen	Company Contact: R Coffman	Telephone No.: 373-6425	Project Coordinator: TRENT, SJ
Price Code: RJN 11/23/98	Data Turnaround: ~~15 Days~~ 21 days		
Project Designation: 100 BC Areas - Full Protocol	Sampling Location: 116-B-11		SAF No.: B99-002
Ice Chest No.	Field Logbook No.: EL 1327-1		Method of Shipment
Shipped To: Quanterra Incorporated	Offsite Property No.		Bill of Lading/Air Bill No.
			COA

POSSIBLE SAMPLE HAZARDS/REMARKS

Special Handling and/or Storage

SAMPLE ANALYSIS 811361

Preservation	Cool 4C	None	None	None	None	None	None	None	None	None
Type of Container	aG	aG	aG	aG	aG	aG	P	aG	aG	Marinelli
No. of Container(s)	0	0	~~0~~ 1	0	0	0	1	1	~~1~~ 0	1
Volume	60mL	60mL	60mL	60mL	60mL	60mL	20mL	60mL	60mL	500mL
	Chromium Hex - 7196 811362	ICP Metals - 6010A (Add-on) (Lead)	ICP Metals - 6010A (SW-846) (Chromium, Lead)	Mercury - 7471 - (CV)	Nickel-63 811362	Strontium-89,90 -- Total Sr	Activity Scan	Americium-241; Isotopic Plutonium; Isotopic Uranium 811362	ICP Metals - 6010A (TAL)	See item (1) in Special Instructions 811362

Sample No.	Matrix *	Sample Date	Sample Time	Chromium Hex - 7196	ICP Metals - 6010A (Add-on) (Lead)	ICP Metals - 6010A (SW-846) (Chromium, Lead)	Mercury - 7471 - (CV)	Nickel-63	Strontium-89,90 -- Total Sr	Activity Scan	Americium-241; Isotopic Plutonium; Isotopic Uranium	ICP Metals - 6010A (TAL)	See item (1) in Special Instructions
B0T095 04	Soil	11-19-98	0930	X		X	X	X	X	X	X		X
B0T096 05	Soil	11-19-98	0940	X		X	X	X	X	X	X		X
B0T097 06	Soil	11-19-98	09-60	X		X	X	X	X	X	X		X

CHAIN OF POSSESSION — Sign/Print Names

Relinquished By	Date/Time	Received By	Date/Time
R. Nielson / R. Nielson	11/23/98 1429	Heidelberg	11/23/98 1429
		2100 cpm	

SPECIAL INSTRUCTIONS

** The ERC contractor acknowleges the 24-hour holding time is not likely achievable for Hex Chrom by EPA 7196.

** Use a separate Chain of Custody for each waste site.

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

B0T095 - B0T0H5
B0T096 - B0T0H6
B0T097 - B0T0H8

Matrix *
Soil
Water
Vapor
Other Solid
Other Liquid

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

Bechtel Hanford Inc. | **CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST** | **B99-002-16** | Page 1 of 1

Collector Coffman/Fahlberg / Nielson	**Company Contact** R Coffman	**Telephone No.** 373-6425	**Project Coordinator** TRENT, SJ	**Data Turnaround** ~~15 Days~~ 21 Days 11/23/98 RUN
Project Designation 100 BC Areas - Full Protocol	**Sampling Location** 116-B-14		**SAF No.** B99-002	
Ice Chest No.	**Field Logbook No.** EL 1327-1		**Method of Shipment**	
Shipped To Quanterra Incorporated	**Offsite Property No.**		**Bill of Lading/Air Bill No.**	

POSSIBLE SAMPLE HAZARDS/REMARKS

Special Handling and/or Storage

SAMPLE ANALYSIS 811361

Preservation	Cool 4C	None	None	None	None	None	None	None	None	None
Type of Container	aG	aG	aG	aG	aG	aG	P	aG	aG	Marinelli
No. of Container(s)	0	0	~~0~~ 1	0	0	0	1	1	1	1
Volume	60mL	60mL	60mL	60mL	60mL	60mL	20mL	60mL	60mL	500mL
	Chromium Hex - 7196 811362	ICP Metals - 6010A (Add-on) (Lead)	ICP Metals - 6010A (SW-846) (Chromium, Lead)	Mercury - 7471 - (CV)	Nickel-63 811362	Strontium-89,90 -- Total Sr	Activity Scan	Americium-241; Isotopic Plutonium; Isotopic Uranium 811362	ICP Metals - 6010A (TAL)	See item (1) in Special Instructions 811362

Sample No.	Matrix *	Sample Date	Sample Time										
~~B0T0F5~~ RTC 11-11-98	~~Soil~~	MOVED TO	B99-002-	15									
B0T0F6 07	Soil	11/23/98	0930	X		X	X	X	X	X	X		X
B0T0F7 08	Soil	11/23/98	0950	X		X	X	X	X	X	X		X
B0T0F8 09	Soil	11/23/98	0950	X		X	X	X	X	X	X		X

CHAIN OF POSSESSION — **Sign/Print Names** 1429

Relinquished By	Date/Time	Received By	Date/Time
Nielson / R Nelson	11/23/98 1429	[signature]	11-23-98
		<100cpm	

SPECIAL INSTRUCTIONS

** The ERC contractor acknowleges the 24-hour holding time is not likely achievable for Hex Chrom by EPA 7196.

** Use a separate Chain of Custody for each waste site.

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

B0T0F6 — RCF B0T1T7
B0T0F7 > RCF B0T1T9
B0T0F8

Matrix *

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

LABORATORY SECTION — Received By — Title — Date/Time

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

Bechtel Hanford Inc.

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

B99-002-06

Collector: Coffman/Fahlberg / Nielson	Company Contact: R Coffman	Telephone No.: 373-6425	Project Coordinator: TRENT, SJ
Project Designation: 100 BC Areas - Full Protocol	Sampling Location: 116-B-~~11~~ 13		SAF No.: B99-002
Ice Chest No.	Field Logbook No.: EL 1327-1		Method of Shipment
Shipped To: Quanterra Incorporated	Offsite Property No.		Bill of Lading/Air Bill No.

Data Turnaround: ~~15 Days~~ 21 Days 11/23/98 RJN

POSSIBLE SAMPLE HAZARDS/REMARKS

Special Handling and/or Storage

SAMPLE ANALYSIS: 811361

Preservation	Cool 4C	None	None	None	None	None	None	None	None	None
Type of Container	aG	aG	aG	aG	aG	aG	P	aG	aG	Marinelli
No. of Container(s)	0	0	1 RS	0	0	0	1	1	1	1
Volume	60mL	60mL	60mL	60mL	60mL	60mL	20mL	60mL	60mL	500mL
	Chromium Hex - 7196	ICP Metals - 6010A (Add-on) (Lead)	ICP Metals - 6010A (SW-846) (Chromium, Lead)	Mercury - 7471 - (CV)	Nickel-63	Strontium-89,90 – Total Sr	Activity Scan	Americium-241; Isotopic Plutonium; Isotopic Uranium	ICP Metals - 6010A (TAL)	See item (1) in Special Instructions
	811362				811	362		811362		811362

Sample No.	Matrix *	Sample Date	Sample Time	Chromium Hex - 7196	ICP Metals - 6010A (Add-on) (Lead)	ICP Metals - 6010A (SW-846) (Chromium, Lead)	Mercury - 7471 - (CV)	Nickel-63	Strontium-89,90 – Total Sr	Activity Scan	Americium-241; Isotopic Plutonium; Isotopic Uranium	ICP Metals - 6010A (TAL)	See item (1) in Special Instructions
B0T0B4 11-18-98	Soil												
B0T0B5 10	Soil	11-23-98	0930	X		X	X	X	X	X	X	A-1	X
B0T0B6 11	Soil	11-23-98	0930	X		X	X	X	X	X	X	A-1	X
B0T0D2 12	soil	11-23-98	0945	X		X	X	X	X	X	X	A-2	X

CHAIN OF POSSESSION — Sign/Print Names

Relinquished By	Date/Time	Received By	Date/Time
R Nielson / R Nielson	11/23/98 1429	Heidelberg	11-23-98
		2100cpm	

SPECIAL INSTRUCTIONS

** The ERC contractor acknowleges the 24-hour holding time is not likely achievable for Hex Chrom by EPA 7196.

** Use a separate Chain of Custody for each waste site.

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

B0T0B5 } B0T1W3
B0T0B6 }
B0T0D2 = B0T1X0

Matrix *

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

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

Appendix 5

Data Validation Supporting Documentation

RADIOCHEMICAL DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	(C)	D	E
PROJECT: WS 116-B-14			DATA PACKAGE: W02613		
VALIDATOR: TLI		LAB: QES		DATE: 1/12/99	
CASE:			SDG: W02613		
ANALYSES PERFORMED					
☐ Gross Alpha/Beta	☒ Strontium-90	☐ Technetium-99	☒ Alpha Spectroscopy	☒ Gamma Spectroscopy	
☐ Total Uranium	☐ Radium-22	☐ Tritium	☒ Ni-63		

SAMPLES/MATRIX

B0T092, B0T093, B0T094, B0T095, B0T096
B0T097, B0T0F4, B0T0F7, B0T0F8, B0T0B5
B0T0B6, B0T0D2

soil

1. Completeness . . . . . ☒ N/A

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

Comments:

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

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

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

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

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

Comments:

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: Pu 239/40 Ni-63 U-234 GEA
J F4 + D2 ok J B5, B6, D2

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:

A-2 000035

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: U-235 68.4%
Pu-238 - NO LCS

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: Spike used instead of tracer on Uranium - Aspec
[redacted] J all

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: U234/5/8 - out Eu-154 out 155 out Co-60 Am-241 - ~~J all~~
all out + detected U ok ok ok - U - ~~J~~
J

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: ~~Am~~ ok

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: CS137 -D2 BU-152-D2,B5,F8,F7 154-F6 155-F8,97,96,94,93
are

Quanterra

DUPLICATE RESULTS

LAB NAME:	QUANTERRA, Richland	SDG: /RPT GRP:	W02613 / 6675
LAB SAMPLE ID:	D1136201	MATRIX:	SOIL
CLIENT ID:	B0T092	DATE RECEIVED:	11/23/98 2:29:00 P
ORIG LAB SAMPLE ID:	81136201		

ANALYTE	DUP RESULT	Q	COUNTING ERROR (2 s)	TOTAL ERROR (2 s)	MDA/ IDL	REPORT UNIT	YIELD	METHOD NUMBER	ORIG RESULT	RPD
U-234	1.44E+00		1.8E-01	2.9E-01	2.73E-02	pCi/g	75.00%	RICHRC5030	2.99E+00	69.87%
U-235	7.63E-02	J	4.1E-02	4.3E-02	2.20E-02	pCi/g	75.00%	RICHRC5030	1.30E-01	51.99%
U-238	1.22E+00		1.6E-01	2.6E-01	4.18E-02	pCi/g	75.00%	RICHRC5030	2.80E+00	78.99%
STRONTIUM	4.31E+00		2.1E-01	1.3E+00	1.23E-01	pCi/g	55.10%	RICHRC5006	4.06E+00	5.88%

Number of Results: 4

Result = IDL When Not Detecte

(Q)ualifiers: U = Analyte result < MDA/IDL,
J = No U qualifier and result < RDL.

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DUPLICATE RESULTS

LAB NAME:	QUANTERRA, Richland	SDG: /RPT GRP:	W02613 / 6675
LAB SAMPLE ID:	D1136212	MATRIX:	SOIL
CLIENT ID:	B0T0D2	DATE RECEIVED:	11/23/98 2:29:00 P
ORIG LAB SAMPLE ID:	81136212		

ANALYTE	DUP RESULT	Q	COUNTING ERROR (2 s)	TOTAL ERROR (2 s)	MDA/ IDL	REPORT UNIT	YIELD	METHOD NUMBER	ORIG RESULT	RPD
AM-241	-4.94E-02	U	1.4E-01	1.4E-01	2.28E-01	pCi/g	N/A	RICHRC5017	5.10E-02	3094.11%
CO-60	5.47E-03	U	1.9E-02	1.9E-02	3.37E-02	pCi/g	N/A	RICHRC5017	1.23E-02	77.14%
CS-137	8.93E-02	J	3.6E-02	3.6E-02	2.79E-02	pCi/g	N/A	RICHRC5017	7.93E-02	11.85%
EU-152	3.00E-01		7.1E-02	7.1E-02	6.88E-02	pCi/g	N/A	RICHRC5017	2.55E-01	15.88%
EU-154	3.91E-02	U	6.1E-02	6.1E-02	1.07E-01	pCi/g	N/A	RICHRC5017	-2.49E-02	899.98%
EU-155	2.05E-02	U	4.5E-02	4.5E-02	7.44E-02	pCi/g	N/A	RICHRC5017	4.01E-02	64.99%
U-238	5.08E-01		8.8E-02	8.8E-02	4.82E-02	pCi/g	N/A	RICHRC5017	4.74E-01	6.91%

Number of Results: 7

Result = IDL When Not Detecte

(Q)ualifiers: U = Analyte result < MDA/IDL,
J = No U qualifier and result < RDL.

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Quanterra

BLANK RESULTS

LAB NAME: QUANTERRA, Richland SDG /RPT GRP: W02613 / 6675

LAB SAMPLE ID: J113621B MATRIX: SOIL

ANALYTE	RESULT	Q	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA/IDL	REPORT UNIT	YIELD	METHOD NUMBER
HEXCHROME	0.00E+00	U	N/A	N/A	2.00E-03	mg/L	N/A	EPA7196
AM-241	0.00E+00	U	0.0E+00	3.5E-02	3.17E-02	pCi/g	66.30%	RICHRC5080
U-234	3.45E-03	U	8.3E-03	8.3E-03	1.88E-02	pCi/g	102.70%	RICHRC5030
U-235	2.79E-03	U	8.3E-03	8.3E-03	2.19E-02	pCi/g	102.70%	RICHRC5030
U-238	-1.32E-03	U	1.3E-03	1.3E-03	2.19E-02	pCi/g	102.70%	RICHRC5030
PU-238	-6.88E-04	U	1.4E-03	1.4E-03	3.46E-02	pCi/g	38.60%	RICHRC5010
PU239/40	4.95E-02		4.2E-02	4.3E-02	4.28E-02	pCi/g	38.60%	RICHRC5010
STRONTIUM	-1.90E-02	U	2.5E-02	2.6E-02	7.99E-02	pCi/g	94.60%	RICHRC5006
NI-63	6.05E+00	J	2.3E+00	6.6E+00	5.10E+00	pCi/g	94.40%	RICHRC5069

Number of Results: 9

Result = IDL When Not Detected

(Q)ualifiers: U = Analyte result < MDA/IDL,
J = No U qualifier and result < RDL

Quanterra

BLANK RESULTS

LAB NAME: QUANTERRA, Richland SDG /RPT GRP: W02613 / 6675

LAB SAMPLE ID: J113621X MATRIX: SOIL

ANALYTE	RESULT	Q	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA/IDL	REPORT UNIT	YIELD	METHOD NUMBER
AM-241	1.18E-02	U	2.6E-02	2.6E-02	5.14E-02	pCi/g	63.00%	RICHRC5080
PU-238	0.00E+00	U	0.0E+00	1.3E-02	1.17E-02	pCi/g	76.00%	RICHRC5010
PU239/40	2.93E-03	U	8.7E-03	8.7E-03	2.30E-02	pCi/g	76.00%	RICHRC5010
AM-241	-5.64E-03	U	2.0E-02	2.0E-02	3.28E-02	pCi/g	N/A	RICHRC5017
CO-60	2.11E-03	U	6.0E-03	6.0E-03	1.14E-02	pCi/g	N/A	RICHRC5017
CS-137	-2.43E-03	U	6.5E-03	6.5E-03	1.12E-02	pCi/g	N/A	RICHRC5017
EU-152	-1.35E-02	U	1.8E-02	1.8E-02	2.84E-02	pCi/g	N/A	RICHRC5017
EU-154	5.71E-03	U	1.7E-02	1.7E-02	3.21E-02	pCi/g	N/A	RICHRC5017
EU-155	1.20E-02	U	1.5E-02	1.5E-02	2.69E-02	pCi/g	N/A	RICHRC5017
U-238	9.99E-02		2.8E-02	2.8E-02	1.97E-02	pCi/g	N/A	RICHRC5017

Number of Results: 10

Result = IDL When Not Detected

(Q)ualifiers: U = Analyte result < MDA/IDL,
J = No U qualifier and result < RDL

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LABORATORY CONTROL SAMPLE

LAB NAME:	QUANTERRA, Richland	SDG: /RPT GRP:	W02613 / 6675
LAB SAMPLE ID:	J113621S	MATRIX:	SOIL

ANALYTE	RESULT	Q	COUNTING ERROR (2 s)	TOTAL ERROR (2 s)	MDA/ IDL	REPORT UNIT	YIELD	EXPECTED	RECOVERY
HEXCHROME	9.70E-01		N/A	N/A	2.00E-03	mg/L	N/A	1.00E+00	97.00%
AM-241	4.92E+00	J	4.1E-01	1.0E+00	3.03E-02	pCi/g	100.40%	4.52E+00	108.99%
U-234	1.48E+00		1.8E-01	3.0E-01	3.12E-02	pCi/g	87.50%	1.65E+00	90.10%
U-235	5.14E-02	J	3.3E-02	3.4E-02	2.63E-02	pCi/g	87.50%	7.51E-02	68.46%
U-238	1.48E+00		1.8E-01	3.0E-01	2.81E-02	pCi/g	87.50%	1.72E+00	85.78%
PU239/40	2.93E+00		2.7E-01	4.8E-01	2.58E-02	pCi/g	49.50%	3.38E+00	86.73%
STRONTIUM	5.98E+00		2.0E-01	2.0E+00	7.44E-02	pCi/g	94.30%	6.02E+00	99.28%
NI-63	5.40E+02		8.5E+00	6.6E+01	5.09E+00	pCi/g	94.30%	5.62E+02	96.06%

Number of Results: 8

SDG_NU	SAMP_NUM	METHOD_NAME	CON_ID	CON_LONG_NAM	VALUE_R	LAB_Q	VALIDATION_QU
W02613	B0T092	6010_METALS_IC	7439-92-1	Lead	15.6		
W02613	B0T092	7196_CR6	18540-29-9	Hexavalent Chromi	1.23		
W02613	B0T092	7471_HG_CVAA	7439-97-6	Mercury	3.1		J
W02613	B0T092	6010_METALS_IC	7440-47-3	Chromium	187	N	J
W02613	B0T093	6010_METALS_IC	7440-47-3	Chromium	76.9	N	J
W02613	B0T093	6010_METALS_IC	7439-92-1	Lead	4.2		
W02613	B0T093	7196_CR6	18540-29-9	Hexavalent Chromi	1.12		
W02613	B0T093	7471_HG_CVAA	7439-97-6	Mercury	0.17		J
W02613	B0T094	6010_METALS_IC	7440-47-3	Chromium	27.6	N	J
W02613	B0T094	7471_HG_CVAA	7439-97-6	Mercury	0.22		J
W02613	B0T094	6010_METALS_IC	7439-92-1	Lead	4.6		
W02613	B0T094	7196_CR6	18540-29-9	Hexavalent Chromi	0.042		
W02613	B0T095	6010_METALS_IC	7439-92-1	Lead	5.1		
W02613	B0T095	7471_HG_CVAA	7439-97-6	Mercury	0.22		J
W02613	B0T095	6010_METALS_IC	7440-47-3	Chromium	49.8	N	J
W02613	B0T095	7196_CR6	18540-29-9	Hexavalent Chromi	0.749		
W02613	B0T096	6010_METALS_IC	7439-92-1	Lead	6.3		
W02613	B0T096	7471_HG_CVAA	7439-97-6	Mercury	1.1		J
W02613	B0T096	7196_CR6	18540-29-9	Hexavalent Chromi	1		
W02613	B0T096	6010_METALS_IC	7440-47-3	Chromium	192	N	J
W02613	B0T097	6010_METALS_IC	7440-47-3	Chromium	132	N	J
W02613	B0T097	7196_CR6	18540-29-9	Hexavalent Chromi	0.961		
W02613	B0T097	6010_METALS_IC	7439-92-1	Lead	3.6		
W02613	B0T097	7471_HG_CVAA	7439-97-6	Mercury	1.2		J
W02613	B0T0B5	7196_CR6	18540-29-9	Hexavalent Chromi	0.03	U	
W02613	B0T0B5	6010_METALS_IC	7439-92-1	Lead	0.96		
W02613	B0T0B5	6010_METALS_IC	7440-47-3	Chromium	3	N	J
W02613	B0T0B5	7471_HG_CVAA	7439-97-6	Mercury	0.02	B	J
W02613	B0T0B6	7196_CR6	18540-29-9	Hexavalent Chromi	0.03	U	
W02613	B0T0B6	7471_HG_CVAA	7439-97-6	Mercury	0.017	U	R
W02613	B0T0B6	6010_METALS_IC	7439-92-1	Lead	1.1		
W02613	B0T0B6	6010_METALS_IC	7440-47-3	Chromium	2.5	N	J
W02613	B0T0D2	7196_CR6	18540-29-9	Hexavalent Chromi	0.03	U	
W02613	B0T0D2	6010_METALS_IC	7440-47-3	Chromium	4.1	N	J
W02613	B0T0D2	7471_HG_CVAA	7439-97-6	Mercury	0.02	B	J
W02613	B0T0D2	6010_METALS_IC	7439-92-1	Lead	1.5		
W02613	B0T0F6	7196_CR6	18540-29-9	Hexavalent Chromi	0.297		
W02613	B0T0F6	7471_HG_CVAA	7439-97-6	Mercury	0.02	B	J
W02613	B0T0F6	6010_METALS_IC	7439-92-1	Lead	20		
W02613	B0T0F6	6010_METALS_IC	7440-47-3	Chromium	33.6	N	J
W02613	B0T0F7	6010_METALS_IC	7439-92-1	Lead	4.1		
W02613	B0T0F7	7471_HG_CVAA	7439-97-6	Mercury	0.03	B	J
W02613	B0T0F7	6010_METALS_IC	7440-47-3	Chromium	10.7	N	J
W02613	B0T0F7	7196_CR6	18540-29-9	Hexavalent Chromi	0.172		
W02613	B0T0F8	7471_HG_CVAA	7439-97-6	Mercury	0.03	B	J
W02613	B0T0F8	6010_METALS_IC	7440-47-3	Chromium	15.2	N	J
W02613	B0T0F8	7196_CR6	18540-29-9	Hexavalent Chromi	0.129		
W02613	B0T0F8	6010_METALS_IC	7439-92-1	Lead	5.3		

SDG_NU	SAMP_NUM	METHOD_NAME	CON_ID	CON_LONG_NAM	VALUE_R	LAB_Q	VALIDATION_QU
W02613	B0T092	UISO_PLATE_AEA	15117-96-1	Uranium-235	0.13	J	J
W02613	B0T092	UISO_PLATE_AEA	U-238	Uranium-238	2.8		J
W02613	B0T092	UISO_PLATE_AEA	13966-29-5	Uranium-234	2.99		J
W02613	B0T093	UISO_PLATE_AEA	13966-29-5	Uranium-234	1.04		J
W02613	B0T093	UISO_PLATE_AEA	15117-96-1	Uranium-235	0.0211	U	J
W02613	B0T093	UISO_PLATE_AEA	U-238	Uranium-238	0.962	J	J
W02613	B0T094	UISO_PLATE_AEA	U-238	Uranium-238	1.22		J
W02613	B0T094	UISO_PLATE_AEA	13966-29-5	Uranium-234	1.17		J
W02613	B0T094	UISO_PLATE_AEA	15117-96-1	Uranium-235	0.0665	J	J
W02613	B0T095	UISO_PLATE_AEA	13966-29-5	Uranium-234	0.832	J	J
W02613	B0T095	UISO_PLATE_AEA	U-238	Uranium-238	0.827	J	J
W02613	B0T095	UISO_PLATE_AEA	15117-96-1	Uranium-235	0.0406	J	J
W02613	B0T096	UISO_PLATE_AEA	U-238	Uranium-238	1.07		J
W02613	B0T096	UISO_PLATE_AEA	15117-96-1	Uranium-235	0.0461	J	J
W02613	B0T096	UISO_PLATE_AEA	13966-29-5	Uranium-234	1.28		J
W02613	B0T097	UISO_PLATE_AEA	U-238	Uranium-238	0.829	J	J
W02613	B0T097	UISO_PLATE_AEA	15117-96-1	Uranium-235	0.0437	J	J
W02613	B0T097	UISO_PLATE_AEA	13966-29-5	Uranium-234	1.03		J
W02613	B0T0B5	UISO_PLATE_AEA	15117-96-1	Uranium-235	0.0255	U	J
W02613	B0T0B5	UISO_PLATE_AEA	13966-29-5	Uranium-234	0.815	J	J
W02613	B0T0B5	UISO_PLATE_AEA	U-238	Uranium-238	0.808	J	J
W02613	B0T0B6	UISO_PLATE_AEA	U-238	Uranium-238	0.991	J	J
W02613	B0T0B6	UISO_PLATE_AEA	13966-29-5	Uranium-234	0.933	J	J
W02613	B0T0B6	UISO_PLATE_AEA	15117-96-1	Uranium-235	0.055	J	J
W02613	B0T0D2	UISO_PLATE_AEA	U-238	Uranium-238	0.793	J	J
W02613	B0T0D2	UISO_PLATE_AEA	13966-29-5	Uranium-234	0.815	J	J
W02613	B0T0D2	UISO_PLATE_AEA	15117-96-1	Uranium-235	0.0368	J	J
W02613	B0T0F6	UISO_PLATE_AEA	15117-96-1	Uranium-235	0.0561	J	J
W02613	B0T0F6	UISO_PLATE_AEA	13966-29-5	Uranium-234	1.15		J
W02613	B0T0F6	UISO_PLATE_AEA	U-238	Uranium-238	1.16		J
W02613	B0T0F7	UISO_PLATE_AEA	U-238	Uranium-238	1.33		J
W02613	B0T0F7	UISO_PLATE_AEA	15117-96-1	Uranium-235	0.0609	J	J
W02613	B0T0F7	UISO_PLATE_AEA	13966-29-5	Uranium-234	1.53		J
W02613	B0T0F8	UISO_PLATE_AEA	13966-29-5	Uranium-234	1.14		J
W02613	B0T0F8	UISO_PLATE_AEA	U-238	Uranium-238	1.05		J
W02613	B0T0F8	UISO_PLATE_AEA	15117-96-1	Uranium-235	0.0317	U	J

SDG_NU	SAMP_NUM	METHOD_NAME	CON_ID	CON_LONG_NAM	VALUE_R	LAB_Q	VALIDATION_QU
W02613	B0T0D2	PUISO_PLATE_AE	PU-239/240	Plutonium-239/240	0.0431		J
W02613	B0T0F8	PUISO_PLATE_AE	PU-239/240	Plutonium-239/240	0.0381		J

SDG_NU	SAMP_NUM	METHOD_NAME	CON_ID	CON_LONG_NAM	VALUE_R	LAB_Q	VALIDATION_QU
W02613	B0T092	PUISO_PLATE_AE	13981-16-3	Plutonium-238	0.355		J
W02613	B0T093	PUISO_PLATE_AE	13981-16-3	Plutonium-238	0.0147	U	J
W02613	B0T094	PUISO_PLATE_AE	13981-16-3	Plutonium-238	0.0342		J
W02613	B0T095	PUISO_PLATE_AE	13981-16-3	Plutonium-238	0.0162	U	J
W02613	B0T096	PUISO_PLATE_AE	13981-16-3	Plutonium-238	0.186		J
W02613	B0T097	PUISO_PLATE_AE	13981-16-3	Plutonium-238	0.244		J
W02613	B0T0B5	PUISO_PLATE_AE	13981-16-3	Plutonium-238	0.0107	U	J
W02613	B0T0B6	PUISO_PLATE_AE	13981-16-3	Plutonium-238	0.00329	U	J
W02613	B0T0D2	PUISO_PLATE_AE	13981-16-3	Plutonium-238	-0.00116	U	J
W02613	B0T0F6	PUISO_PLATE_AE	13981-16-3	Plutonium-238	0	U	J
W02613	B0T0F7	PUISO_PLATE_AE	13981-16-3	Plutonium-238	-0.00114	U	J
W02613	B0T0F8	PUISO_PLATE_AE	13981-16-3	Plutonium-238	0	U	J

SDG_NU	SAMP_NUM	METHOD_NAME	CON_ID	CON_LONG_NAM	VALUE_R	LAB_Q	VALIDATION_QU
W02613	B0T0B5	GAMMA_GS	U-238	Uranium-238	0.358		J
W02613	B0T0B6	GAMMA_GS	U-238	Uranium-238	0.375		J
W02613	B0T0D2	GAMMA_GS	U-238	Uranium-238	0.474		J

Date: 22 January 1999
To: Bechtel Hanford Inc. (technical representative)
From: TechLaw, Inc.
Project: 100-BC Areas - Full Protocol - Waste Sites 116-B-11, 116-B-13, 116-B-14
Subject: Inorganics - Data Package No. W02613-QES (SDG No. W02613)

INTRODUCTION

This memo presents the results of data validation on Data Package No. W02613-QES prepared by Quanterra Environmental Services (QES). A list of samples validated along with the analyses reported and the method of analysis is provided in the following table.

Sample ID & Unit	Sample Date	Media	Validation	Analysis
B0T092 (116-B-11)	11/19/98	Soil	C	See note 1
B0T093 (116-B-11)	11/19/98	Soil	C	See note 1
B0T094 (116-B-11)	11/19/98	Soil	C	See note 1
B0T095 (116-B-11)	11/19/98	Soil	C	See note 1
B0T096 (116-B-11)	11/19/98	Soil	C	See note 1
B0T097 (116-B-11)	11/19/98	Soil	C	See note 1
B0T0F6 (116-B-14)	11/23/98	Soil	C	See note 1
B0T0F7 (116-B-14)	11/23/98	Soil	C	See note 1
B0T0F8 (116-B-14)	11/23/98	Soil	C	See note 1
B0T0B5 (116-B-13)	11/23/98	Soil	C	See note 1
B0T0B6 (116-B-13)	11/23/98	Soil	C	See note 1
B0T0D2 (116-B-13)	11/23/98	Soil	C	See note 1

1 - ICP metals (total chromium and lead); Mercury (7471); Chrome VI (7196)

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 time for ICP metals, mercury and chrome VI were assessed to ascertain whether the holding time requirements were met by the laboratory. The holding time requirements are as follows: Solid samples must be analyzed within six (6) months for ICP metals, 28 days for mercury and 30 days for chromium VI.

All holding times were acceptable.

- **Blanks**

Preparation Blanks

At least one preparation blank, 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.

- **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.

Due to a matrix spike recovery of -197.4%, all undetected mercury results (B0T0B6 (116-B-13)) were rejected and flagged "UR" and all detected mercury results (B0T092 (116-B-11), B0T093 (116-B-11), B0T094 (116-B-11), B0T095 (116-B-11), B0T096 (116-B-11), B0T097 (116-B-11), B0T0F6 (116-B-14), B0T0F7 (116-B-14), B0T0F8 (116-B-14), B0T0B5 (116-B-13), and B0T0D2 (116-B-13)) were qualified as estimates and flagged "J" .

Due to a matrix spike duplicate recovery of 148%, all mercury results in samples B0T092 (116-B-11), B0T093 (116-B-11), B0T094 (116-B-11), B0T095 (116-B-11), B0T096 (116-B-11), B0T097 (116-B-11), B0T0F6 (116-B-14), B0T0F7 (116-B-14), B0T0F8 (116-B-14), B0T0B5 (116-B-13), and B0T0D2 (116-B-13) were qualified as estimates and flagged "J".

Due to a matrix spike duplicate recovery of 66%, all chrome (total) results were qualified as estimates and flagged "J".

All other accuracy spike recovery results were acceptable.

- **Precision**

Laboratory Duplicate Samples

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

Due to a laboratory duplicate RPD outside QC limits (200%), all mercury results in samples B0T092 (116-B-11), B0T093 (116-B-11), B0T094 (116-B-11), B0T095 (116-B-11), B0T096 (116-B-11), and B0T097 (116-B-11), were qualified as estimates and flagged "J".

Due to a laboratory duplicate RPD outside QC limits (30.9%), all chrome (total) results were qualified as estimates and flagged "J".

All other laboratory duplicate recovery results were acceptable.

Field Duplicate Samples

Two pair of field duplicate samples (samples B0T0B5 (116-B-13)/B0T0B6 (116-B-13) and B0T0F7 (116-B-14)/B0T0F8 (116-B-14)) were submitted to QES for analysis. The duplicate sample results were compared using the validation guidelines for determining the RPD between a sample and its duplicate. The RPD for chrome (total) in sample duplicate pair B0T0F7 (116-B-14)/B0T0F8 (116-B-14) was outside QC limits. Under the BHI statement of work, no qualification is required. All other field duplicate results were acceptable.

- **Analytical Detection Levels**

Reported analytical detection levels are compared against the 100 Area Remedial Action Sampling and Analysis Plan target detection limits (TDLs) or the CRDL if no TDL was specified, to ensure that laboratory detection levels meet the required criteria. All reported laboratory detection levels met the analyte specific TDL or CRDL.

- **Completeness**

Data package No. W02613-QES (SDG No. W02613) was submitted for validation and verified for completeness. The completion percentage was 98%.

MAJOR DEFICIENCIES

Due to a matrix spike recovery of -197.4%, the mercury result in sample B0T0B6 (116-B-13), were rejected and flagged "UR". Rejected data is unusable and should not be reported.

MINOR DEFICIENCIES

Due to a matrix spike recovery of -197.4% and a matrix spike duplicate recovery of 148%, all detected mercury results (samples B0T092 (116-B-11), B0T093 (116-B-11), B0T094 (116-B-11), B0T095 (116-B-11), B0T096 (116-B-11), B0T097 (116-B-11), B0T0F6 (116-B-14), B0T0F7 (116-B-14), B0T0F8 (116-B-14), B0T0B5 (116-B-13), and B0T0D2 (116-B-13)) were qualified as estimates and flagged "J" . Due to a matrix spike duplicate recovery of 66%, all chrome (total) results were qualified as estimates and flagged "J". Due to a laboratory duplicate RPD outside QC limits (200%), all mercury results in samples B0T092 (116-B-11), B0T093 (116-B-11), B0T094 (116-B-11), B0T095 (116-B-11), B0T096 (116-B-11), and B0T097 (116-B-11), were qualified as estimates and flagged "J". Due to a laboratory duplicate RPD outside QC limits (30.9%), all chrome (total) results were qualified as estimates and flagged "J". Data flagged "J" is an estimate, but under the BHI validation SOW, the data may be usable for decision-making purposes. All other validated results are considered accurate within the standard error associated with the methods.

REFERENCES

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

DOE/RL-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: W02613	REVIEWER: TLI	DATE: 1/22/99	PAGE 1 OF 1
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Mercury	R	B0T0B6	MS recovery
Mercury	J	B0T092 (116-B-11) B0T093 (116-B-11) B0T094 (116-B-11) B0T095 (116-B-11) B0T096 (116-B-11) B0T097 (116-B-11) B0T0F6 (116-B-14) B0T0F7 (116-B-14) B0T0F8 (116-B-14) B0T0B5 (116-B-13) B0T0D2 (116-B-13)	MS/MSD recovery
Chromium (total)	J	All	MSD recovery
Mercury	J	B0T092 (116-B-11) B0T093 (116-B-11) B0T094 (116-B-11) B0T095 (116-B-11) B0T096 (116-B-11) B0T097 (116-B-11) B0T0F6 (116-B-14) B0T0F7 (116-B-14) B0T0F8 (116-B-14) B0T0B5 (116-B-13) B0T0D2 (116-B-13)	RPD
Chromium (total)	J	All	RPD

Appendix 3

Qualified Data Summary and Annotated Laboratory Reports

INORGANIC ANALYSIS, SOIL MATRIX, (MG/KG)

Project: BECHTEL-HANFORD
Laboratory: Quanterra
Case | SDG: W02613

Sample Number		B0T092		B0T093		B0T094		B0T095		B0T096		B0T097		B0T0F6		B0T0F7		B0T0F8		B0T0B5		B0T0B6		B0T0D2	
Location		A1 (Deep)		A2 (Deep)		A3 (Deep)		B4 (Deep)		B5 (deep)		B6 (Deep)		A3 (Shallow)		A4 (Shallow)		A4 (Shallow)		A1 (Shallow)		A1 (Shallow)		A2 (Shallow)	
Remarks																		Duplicate				Duplicate			
Sample Date		11/19/98		11/19/98		11/19/98		11/19/98		11/19/98		11/19/98		11/23/98		11/23/98		11/23/98		11/23/98		11/23/98		11/23/98	
Inorganics	TDL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Chromium VI	0.1	1.23		1.12		0.042		0.749		1		0.961		0.297		0.172		0.129		0.03	U	0.03	U	0.03	U
Mercury	0.05	3.1	J	0.17	J	0.22	J	0.22	J	1.1	J	1.2	J	0.02	J	0.03	J	0.03	J	0.02	J	0.017	UR	0.02	J
Chromium (Total)	0.5	187	J	76.9	J	27.6	J	49.8	J	192	J	132	J	33.6	J	10.7	J	15.2	J	3	J	2.5	J	4.1	J
Lead	2	15.6		4.2		4.6		5.1		6.3		3.6		20		4.1		5.3		0.96		1.1		1.5	

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

B0T092

Lab Name: QUANTERRA MO Contract: 550.186
Lab Code: ITMO Case No.: SAS No.: SDG No.: W02613
Matrix (soil/water): SOIL Lab Sample ID: 19515-001
Level (low/med): LOW Date Received: 11/23/98
% Solids: 93.8

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M	
7439-97-6	Mercury	3.1			CV	J
7440-47-3	Chromium	187		N	P	J
7439-92-1	Lead	15.6			P	

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

B0T093

Lab Name: QUANTERRA MO Contract: 550.186

Lab Code: ITMO Case No.: SAS No.: SDG No.: W02613

Matrix (soil/water): SOIL Lab Sample ID: 19515-002

Level (low/med): LOW Date Received: 11/23/98

% Solids: 95.7

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M	
7439-97-6	Mercury	0.17			CV	J
7440-47-3	Chromium	76.9		N	P	J
7439-92-1	Lead	4.2			P	

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

B0T094

Lab Name: QUANTERRA_MO Contract: 550.186

Lab Code: ITMO Case No.: SAS No.: SDG No.: W02613

Matrix (soil/water): SOIL Lab Sample ID: 19515-003

Level (low/med): LOW Date Received: 11/23/98

% Solids: 95.6

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7439-97-6	Mercury	0.22			CV
7440-47-3	Chromium	27.6		N	P
7439-92-1	Lead	4.6			P

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EPA SAMPLE NO.

B0T095

Lab Name: QUANTERRA MO Contract: 550.186
Lab Code: ITMO Case No.: SAS No.: SDG No.: W02613
Matrix (soil/water): SOIL Lab Sample ID: 19515-004
Level (low/med): LOW Date Received: 11/23/98
% Solids: 96.3

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7439-97-6	Mercury	0.22			CV
7440-47-3	Chromium	49.8		N	P
7439-92-1	Lead	5.1			P

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EPA SAMPLE NO.

B0T096

Lab Name: QUANTERRA_MO Contract: 550.186
Lab Code: ITMO Case No.: SAS No.: SDG No.: W02613
Matrix (soil/water): SOIL Lab Sample ID: 19515-005
Level (low/med): LOW Date Received: 11/23/98
% Solids: 96.1

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M	
7439-97-6	Mercury	1.1			CV	J
7440-47-3	Chromium	192		N	P	J
7439-92-1	Lead	6.3			P	

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EPA SAMPLE NO.

B0T097

Lab Name: QUANTERRA MO Contract: 550.186

Lab Code: ITMO Case No.: SAS No.: SDG No.: W02613

Matrix (soil/water): SOIL Lab Sample ID: 19515-006

Level (low/med): LOW Date Received: 11/23/98

% Solids: 95.6

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M	
7439-97-6	Mercury	1.2			CV	J
7440-47-3	Chromium	132		N	P	J
7439-92-1	Lead	3.6			P	

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EPA SAMPLE NO.

B0T0F6

Lab Name: QUANTERRA_MO Contract: 550.186
Lab Code: ITMO Case No.: SAS No.: SDG No.: W02613
Matrix (soil/water): SOIL Lab Sample ID: 19515-007
Level (low/med): LOW Date Received: 11/23/98
% Solids: 94.2

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M	
7439-97-6	Mercury	0.02	B		CV	J
7440-47-3	Chromium	33.6		N	P	J
7439-92-1	Lead	20.0			P	

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

B0T0F7

Lab Name: QUANTERRA MO Contract: 550.186

Lab Code: ITMO Case No.: SAS No.: SDG No.: W02613

Matrix (soil/water): SOIL Lab Sample ID: 19515-008

Level (low/med): LOW Date Received: 11/23/98

% Solids: 93.6

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M	
7439-97-6	Mercury	0.03	B		CV	J
7440-47-3	Chromium	10.7		N	P	J
7439-92-1	Lead	4.1			P	

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

B0T0F8

Lab Name: QUANTERRA_MO Contract: 550.186

Lab Code: ITMO Case No.: SAS No.: SDG No.: W02613

Matrix (soil/water): SOIL Lab Sample ID: 19515-009

Level (low/med): LOW Date Received: 11/23/98

% Solids: 92.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7439-97-6	Mercury	0.03	B		CV
7440-47-3	Chromium	15.2		N	P
7439-92-1	Lead	5.3			P

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

B0T0B5

Lab Name: QUANTERRA_MO Contract: 550.186

Lab Code: ITMO Case No.: SAS No.: SDG No.: W02613

Matrix (soil/water): SOIL Lab Sample ID: 19515-010

Level (low/med): LOW Date Received: 11/23/98

% Solids: 92.8

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M	
7439-97-6	Mercury	0.02	B		CV	J
7440-47-3	Chromium	3.0		N	P	J
7439-92-1	Lead	0.96			P	

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

B0T0B6

Lab Name: QUANTERRA MO Contract: 550.186

Lab Code: ITMO Case No.: SAS No.: SDG No.: W02613

Matrix (soil/water): SOIL Lab Sample ID: 19515-011

Level (low/med): LOW Date Received: 11/23/98

% Solids: 94.5

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M	
7439-97-6	Mercury	0.017 ~~0.02~~	U		CV	R
7440-47-3	Chromium	2.5		N	P	J
7439-92-1	Lead	1.1			P	

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

B0T0D2

Lab Name: QUANTERRA_MO Contract: 550.186
Lab Code: ITMO Case No.: SAS No.: SDG No.: W02613
Matrix (soil/water): SOIL Lab Sample ID: 19515-012
Level (low/med): LOW Date Received: 11/23/98
% Solids: 93.8

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M	
7439-97-6	Mercury	0.02	B		CV	J
7440-47-3	Chromium	4.1		N	P	J
7439-92-1	Lead	1.5			P	

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Comments:

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Quanterra

SAMPLE RESULTS

LAB NAME:	QUANTERRA, Richland	SDG: /RPT GRP:	W02613 / 6675
LAB SAMPLE ID:	81136201	MATRIX:	SOIL
CLIENT ID:	B0T092	DATE RECEIVED:	11/23/98 2:29:00 PM

ANALYTE	RESULT	Q	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA/IDL	REPORT UNIT	YIELD	METHOD NUMBER
HEXCHROME	1.23E+00		N/A	N/A	3.00E-02	mg/kg	N/A	EPA7196
~~AM-241~~	~~2.90E+00~~	~~J~~	~~3.3E-01~~	~~6.7E-01~~	~~2.54E-02~~	~~pCi/g~~	~~111.00%~~	~~RICHRC5080~~
U-234	2.99E+00		2.5E-01	5.4E-01	3.49E-02	pCi/g	79.80%	RICHRC5030
U-235	1.30E-01	J	5.2E-02	5.6E-02	2.61E-02	pCi/g	79.80%	RICHRC5030
U-238	2.80E+00		2.4E-01	5.1E-01	3.25E-02	pCi/g	79.80%	RICHRC5030
PU-238	3.55E-01		1.5E-01	1.8E-01	4.57E-02	pCi/g	25.20%	RICHRC5010
PU239/40	1.13E+01		8.7E-01	3.0E+00	9.02E-02	pCi/g	25.20%	RICHRC5010
AM-241	1.52E+00		2.4E-01	2.4E-01	2.24E-01	pCi/g	N/A	RICHRC5017
CO-60	3.67E+01		3.7E+00	3.7E+00	8.53E-02	pCi/g	N/A	RICHRC5017
CS-137	9.39E+01		9.4E+00	9.4E+00	1.84E-01	pCi/g	N/A	RICHRC5017
EU-152	2.67E+02		2.7E+01	2.7E+01	4.64E-01	pCi/g	N/A	RICHRC5017
EU-154	4.03E+01		4.1E+00	4.1E+00	3.14E-01	pCi/g	N/A	RICHRC5017
EU-155	1.82E+00		3.8E-01	3.8E-01	4.81E-01	pCi/g	N/A	RICHRC5017
U-238	9.72E-01		2.6E-01	2.6E-01	3.21E-01	pCi/g	N/A	RICHRC5017
STRONTIUM	4.06E+00		2.1E-01	1.2E+00	1.38E-01	pCi/g	54.90%	RICHRC5006
NI-63	1.57E+03		1.6E+01	1.8E+02	6.43E+00	pCi/g	75.80%	RICHRC5069

Number of Results: 16

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Result = IDL When Not Detected
(Q)ualifiers: U = Analyte result < MDA/IDL,
J = No U qualifier and result <

Quanterra Analytical Services, Inc
rptChemRadSample; v3.41

Quanterra

SAMPLE RESULTS

LAB NAME:	QUANTERRA, Richland	SDG: /RPT GRP:	W02613 / 6675
LAB SAMPLE ID:	81136202	MATRIX:	SOIL
CLIENT ID:	B0T093	DATE RECEIVED:	11/23/98 2:29:00 PM

ANALYTE	RESULT	Q	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA/IDL	REPORT UNIT	YIELD	METHOD NUMBER
HEXCHROME	1.12E+00		N/A	N/A	3.00E-02	mg/kg	N/A	EPA7196
~~AM-241~~	~~3.95E-01~~	~~J~~	~~1.5E-01~~	~~1.7E-01~~	~~3.68E-02~~	~~pCi/g~~	~~82.30%~~	~~RICHRC5080~~
U-234	1.04E+00		1.4E-01	2.2E-01	2.73E-02	pCi/g	85.40%	RICHRC5030
U-235	2.11E-02	U	2.2E-02	2.2E-02	3.11E-02	pCi/g	85.40%	RICHRC5030
U-238	9.62E-01	J	1.4E-01	2.0E-01	3.51E-02	pCi/g	85.40%	RICHRC5030
PU-238	1.47E-02	U	2.1E-02	2.1E-02	1.99E-02	pCi/g	61.70%	RICHRC5010
PU239/40	1.37E+00		2.0E-01	3.2E-01	3.35E-02	pCi/g	61.70%	RICHRC5010
AM-241	1.67E-02	U	1.2E-01	1.2E-01	1.99E-01	pCi/g	N/A	RICHRC5017
CO-60	2.61E+00		2.7E-01	2.7E-01	3.02E-02	pCi/g	N/A	RICHRC5017
CS-137	2.70E+01		2.7E+00	2.7E+00	6.11E-02	pCi/g	N/A	RICHRC5017
EU-152	1.94E+01		2.0E+00	2.0E+00	1.72E-01	pCi/g	N/A	RICHRC5017
EU-154	2.33E+00		2.8E-01	2.8E-01	1.11E-01	pCi/g	N/A	RICHRC5017
EU-155	1.21E-01	U	1.1E-01	1.1E-01	1.82E-01	pCi/g	N/A	RICHRC5017
U-238	6.06E-01		1.4E-01	1.4E-01	1.17E-01	pCi/g	N/A	RICHRC5017
STRONTIUM	2.56E+00		1.6E-01	7.9E-01	1.10E-01	pCi/g	56.50%	RICHRC5006
NI-63	1.79E+02		5.8E+00	2.6E+01	6.20E+00	pCi/g	77.90%	RICHRC5069

Number of Results: 16

1/15/99

Result = IDL When Not Detected

(Q)ualifiers: U = Analyte result < MDA/IDL,
J = No U qualifier and result <

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Quanterra

SAMPLE RESULTS

LAB NAME:	QUANTERRA, Richland	SDG: /RPT GRP:	W02613 / 6675
LAB SAMPLE ID:	81136203	MATRIX:	SOIL
CLIENT ID:	B0T094	DATE RECEIVED:	11/23/98 2:29:00 PM

ANALYTE	RESULT	Q	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA/IDL	REPORT UNIT	YIELD	METHOD NUMBER
HEXCHROME	4.20E-02		N/A	N/A	3.00E-02	mg/kg	N/A	EPA7196
~~AM-241~~	~~7.53E-01~~	~~J~~	~~1.6E-01~~	~~2.2E-01~~	~~3.11E-02~~	~~pCi/g~~	~~88.70%~~	~~RICHRC5080~~
U-234	1.17E+00		1.6E-01	2.4E-01	2.37E-02	pCi/g	81.00%	RICHRC5030
U-235	6.65E-02	J	3.7E-02	3.9E-02	2.37E-02	pCi/g	81.00%	RICHRC5030
U-238	1.22E+00		1.6E-01	2.5E-01	2.08E-02	pCi/g	81.00%	RICHRC5030
PU-238	3.42E-02		2.8E-02	2.9E-02	2.32E-02	pCi/g	54.50%	RICHRC5010
PU239/40	1.60E+00		1.9E-01	3.3E-01	1.56E-02	pCi/g	54.50%	RICHRC5010
AM-241	8.02E-02	U	8.0E-02	8.0E-02	1.31E-01	pCi/g	N/A	RICHRC5017
CO-60	1.35E+00		1.4E-01	1.4E-01	2.51E-02	pCi/g	N/A	RICHRC5017
CS-137	1.38E+01		1.4E+00	1.4E+00	5.06E-02	pCi/g	N/A	RICHRC5017
EU-152	1.72E+01		1.7E+00	1.7E+00	1.29E-01	pCi/g	N/A	RICHRC5017
EU-154	2.39E+00		2.7E-01	2.7E-01	9.18E-02	pCi/g	N/A	RICHRC5017
EU-155	8.33E-02	U	8.5E-02	8.5E-02	1.43E-01	pCi/g	N/A	RICHRC5017
U-238	5.60E-01		1.1E-01	1.1E-01	8.96E-02	pCi/g	N/A	RICHRC5017
STRONTIUM	1.40E+00		1.3E-01	4.5E-01	1.34E-01	pCi/g	47.70%	RICHRC5006
~~NI-63~~	~~1.54E+02~~		~~5.9E+00~~	~~2.4E+01~~	~~6.95E+00~~	~~pCi/g~~	~~69.10%~~	~~RICHRC5089~~

Number of Results: 16

pm
1/19/99

Result = IDL When Not Detected
(Q)ualifiers: U = Analyte result < MDA/IDL,
J = No U qualifier and result <

Quanterra Analytical Services, Inc
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Quanterra

SAMPLE RESULTS

LAB NAME:	QUANTERRA, Richland	SDG: /RPT GRP:	W02613 / 6675
LAB SAMPLE ID:	81136204	MATRIX:	SOIL
CLIENT ID:	B0T095	DATE RECEIVED:	11/23/98 2:29:00 PM

ANALYTE	RESULT	Q	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA/IDL	REPORT UNIT	YIELD	METHOD NUMBER
HEXCHROME	7.49E-01		N/A	N/A	3.00E-02	mg/kg	N/A	EPA7196
~~AM-241~~	~~7.36E-01~~	~~J~~	~~1.6E-01~~	~~2.2E-01~~	~~3.70E-02~~	~~pCi/g~~	~~81.70%~~	~~RICHRC5080~~
U-234	8.32E-01	J	1.4E-01	2.0E-01	3.56E-02	pCi/g	76.40%	RICHRC5030
U-235	4.06E-02	J	3.2E-02	3.3E-02	2.99E-02	pCi/g	76.40%	RICHRC5030
U-238	8.27E-01	J	1.4E-01	2.0E-01	3.20E-02	pCi/g	76.40%	RICHRC5030
PU-238	1.62E-02	U	2.5E-02	2.5E-02	4.02E-02	pCi/g	35.20%	RICHRC5010
PU239/40	1.75E+00		2.5E-01	4.2E-01	4.01E-02	pCi/g	35.20%	RICHRC5010
AM-241	1.80E-01		6.2E-02	6.2E-02	8.19E-02	pCi/g	N/A	RICHRC5017
CO-60	3.37E+00		3.5E-01	3.5E-01	3.24E-02	pCi/g	N/A	RICHRC5017
CS-137	2.35E+01		2.4E+00	2.4E+00	6.39E-02	pCi/g	N/A	RICHRC5017
EU-152	3.24E+01		3.3E+00	3.3E+00	1.72E-01	pCi/g	N/A	RICHRC5017
EU-154	3.93E+00		4.4E-01	4.4E-01	1.17E-01	pCi/g	N/A	RICHRC5017
EU-155	1.70E-01		1.1E-01	1.1E-01	1.64E-01	pCi/g	N/A	RICHRC5017
U-238	6.03E-01		1.3E-01	1.3E-01	1.21E-01	pCi/g	N/A	RICHRC5017
STRONTIUM	2.44E+00		1.5E-01	7.8E-01	1.24E-01	pCi/g	63.20%	RICHRC5006
NI-63	2.61E+02		8.2E+00	3.7E+01	8.41E+00	pCi/g	57.20%	RICHRC5069

Number of Results: 16

pm
1/19/99

Result = IDL When Not Detected
(Q)ualifiers: U = Analyte result < MDA/IDL,
J = No U qualifier and result <

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Quanterra

SAMPLE RESULTS

LAB NAME:	QUANTERRA, Richland	SDG: /RPT GRP:	W02613 / 6675
LAB SAMPLE ID:	81136205	MATRIX:	SOIL
CLIENT ID:	B0T096	DATE RECEIVED:	11/23/98 2:29:00 PM

ANALYTE	RESULT	Q	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA/IDL	REPORT UNIT	YIELD	METHOD NUMBER
HEXCHROME	1.00E+00		N/A	N/A	3.00E-02	mg/kg	N/A	EPA7196
~~AM-241~~	~~2.23E+00~~	~~J~~	~~2.6E-01~~	~~4.9E-01~~	~~2.80E-02~~	~~pCi/g~~	~~99.60%~~	~~RICHRC5080~~
U-234	1.28E+00		1.9E-01	2.9E-01	4.00E-02	pCi/g	62.10%	RICHRC5030
U-235	4.61E-02	J	3.6E-02	3.7E-02	3.08E-02	pCi/g	62.10%	RICHRC5030
U-238	1.07E+00		1.7E-01	2.5E-01	3.60E-02	pCi/g	62.10%	RICHRC5030
PU-238	1.86E-01		1.0E-01	1.1E-01	5.38E-02	pCi/g	23.70%	RICHRC5010
PU239/40	6.04E+00		5.7E-01	1.5E+00	7.14E-02	pCi/g	23.70%	RICHRC5010
AM-241	5.73E-01		2.9E-01	2.9E-01	4.47E-01	pCi/g	N/A	RICHRC5017
CO-60	1.45E+01		1.5E+00	1.5E+00	6.76E-02	pCi/g	N/A	RICHRC5017
CS-137	7.04E+01		7.0E+00	7.0E+00	1.44E-01	pCi/g	N/A	RICHRC5017
EU-152	1.54E+02		1.5E+01	1.5E+01	3.63E-01	pCi/g	N/A	RICHRC5017
EU-154	1.82E+01		1.9E+00	1.9E+00	2.47E-01	pCi/g	N/A	RICHRC5017
EU-155	7.98E-01	U	3.1E-01	3.1E-01	4.45E-01	pCi/g	N/A	RICHRC5017
U-238	6.04E-01		1.7E-01	1.7E-01	2.42E-01	pCi/g	N/A	RICHRC5017
STRONTIUM	3.94E+00		2.0E-01	1.2E+00	1.20E-01	pCi/g	56.50%	RICHRC5006
NI-63	8.70E+02		1.2E+01	1.0E+02	6.65E+00	pCi/g	72.40%	RICHRC5069

Number of Results: 16

RM
1/19/99

Result = IDL When Not Detected
(Q)ualifiers: U = Analyte result < MDA/IDL,
J = No U qualifier and result <

000028

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~~0010~~

Quanterra

SAMPLE RESULTS

LAB NAME:	QUANTERRA, Richland	SDG: /RPT GRP:	W02613 / 6675
LAB SAMPLE ID:	81136206	MATRIX:	SOIL
CLIENT ID:	B0T097	DATE RECEIVED:	11/23/98 2:29:00 PM

ANALYTE	RESULT	Q	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA/IDL	REPORT UNIT	YIELD	METHOD NUMBER
HEXCHROME	9.61E-01		N/A	N/A	3.00E-02	mg/kg	N/A	EPA7196
~~AM-241~~	~~2.22E+00~~	~~J~~	~~2.8E-01~~	~~5.2E-01~~	~~4.12E-02~~	~~pCi/g~~	~~90.90%~~	~~RICHRC5080~~
U-234	1.03E+00		1.6E-01	2.4E-01	2.99E-02	pCi/g	64.20%	RICHRC5030
U-235	4.37E-02	J	3.5E-02	3.6E-02	3.50E-02	pCi/g	64.20%	RICHRC5030
U-238	8.29E-01	J	1.5E-01	2.1E-01	3.50E-02	pCi/g	64.20%	RICHRC5030
PU-238	2.44E-01		7.5E-02	8.5E-02	2.85E-02	pCi/g	59.30%	RICHRC5010
PU239/40	6.98E+00		4.0E-01	1.2E+00	1.54E-02	pCi/g	59.30%	RICHRC5010
AM-241	6.61E-01		3.0E-01	3.0E-01	3.86E-01	pCi/g	N/A	RICHRC5017
CO-60	1.62E+01		1.6E+00	1.6E+00	5.10E-02	pCi/g	N/A	RICHRC5017
CS-137	6.27E+01		6.3E+00	6.3E+00	1.01E-01	pCi/g	N/A	RICHRC5017
EU-152	5.36E+01		5.4E+00	5.4E+00	2.53E-01	pCi/g	N/A	RICHRC5017
EU-154	6.38E+00		6.9E-01	6.9E-01	1.75E-01	pCi/g	N/A	RICHRC5017
EU-155	3.65E-01	U	2.1E-01	2.1E-01	2.71E-01	pCi/g	N/A	RICHRC5017
U-238	6.45E-01		1.7E-01	1.7E-01	1.76E-01	pCi/g	N/A	RICHRC5017
STRONTIUM	2.53E+00		1.7E-01	7.5E-01	1.23E-01	pCi/g	48.90%	RICHRC5006
NI-63	1.94E+03		1.8E+01	2.3E+02	6.47E+00	pCi/g	75.00%	RICHRC5069

Number of Results: 16

1/19/99

Result = IDL When Not Detected
(Q)ualifiers: U = Analyte result < MDA/IDL,
J = No U qualifier and result <

Quanterra Analytical Services, Inc
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Quanterra

SAMPLE RESULTS

LAB NAME:	QUANTERRA, Richland	SDG: /RPT GRP:	W02613 / 6675
LAB SAMPLE ID:	81136207	MATRIX:	SOIL
CLIENT ID:	B0T0F6	DATE RECEIVED:	11/23/98 2:29:00 PM

ANALYTE	RESULT	Q	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA/IDL	REPORT UNIT	YIELD	METHOD NUMBER
HEXCHROME	2.97E-01		N/A	N/A	3.00E-02	mg/kg	N/A	EPA7196
~~AM-241~~	~~6.75E-02~~	~~J~~	~~4.8E-02~~	~~4.9E-02~~	~~2.28E-02~~	~~pCi/g~~	~~101.60%~~	~~RICHRC5080~~
U-234	1.15E+00		1.6E-01	2.5E-01	3.56E-02	pCi/g	72.70%	RICHRC5030
U-235	5.61E-02	J	3.6E-02	3.8E-02	2.87E-02	pCi/g	72.70%	RICHRC5030
U-238	1.16E+00		1.6E-01	2.5E-01	3.56E-02	pCi/g	72.70%	RICHRC5030
PU-238	0.00E+00	U	0.0E+00	1.4E-02	1.27E-02	pCi/g	72.20%	RICHRC5010
PU239/40	3.70E-01		8.3E-02	1.0E-01	1.88E-02	pCi/g	72.20%	RICHRC5010
AM-241	4.14E-02	U	5.1E-02	5.1E-02	8.65E-02	pCi/g	N/A	RICHRC5017
CO-60	4.62E-02	U	1.8E-02	1.8E-02	3.30E-02	pCi/g	N/A	RICHRC5017
CS-137	9.55E-01		1.1E-01	1.1E-01	3.05E-02	pCi/g	N/A	RICHRC5017
EU-152	4.43E+00		4.6E-01	4.6E-01	7.57E-02	pCi/g	N/A	RICHRC5017
EU-154	1.91E-01	U	9.1E-02	9.1E-02	1.07E-01	pCi/g	N/A	RICHRC5017
EU-155	2.77E-02	U	5.1E-02	5.1E-02	8.27E-02	pCi/g	N/A	RICHRC5017
U-238	6.32E-01		9.2E-02	9.2E-02	4.98E-02	pCi/g	N/A	RICHRC5017
STRONTIUM	1.55E+00		1.2E-01	5.2E-01	1.12E-01	pCi/g	59.70%	RICHRC5006
NI-63	3.95E+00	U	2.7E+00	8.0E+00	6.37E+00	pCi/g	75.50%	RICHRC5069

Number of Results: 16

RHW
1/19/99

Result = IDL When Not Detected
(Q)ualifiers: U = Analyte result < MDA/IDL,
J = No U qualifier and result <

Quanterra Analytical Services, Inc
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Quanterra

SAMPLE RESULTS

LAB NAME:	QUANTERRA, Richland	SDG: /RPT GRP:	W02613 / 6675
LAB SAMPLE ID:	81136208	MATRIX:	SOIL
CLIENT ID:	B0T0F7	DATE RECEIVED:	11/23/98 2:29:00 PM

ANALYTE	RESULT	Q	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA/IDL	REPORT UNIT	YIELD	METHOD NUMBER
HEXCHROME	1.72E-01		N/A	N/A	3.00E-02	mg/kg	N/A	EPA7196
~~AM-241~~	~~6.18E-02~~	~~J~~	~~5.1E-02~~	~~5.2E-02~~	~~3.77E-02~~	~~pCi/g~~	~~78.90%~~	~~RICHRC5080~~
U-234	1.53E+00		2.1E-01	3.0E-01	3.50E-02	pCi/g	59.10%	RICHRC5030
U-235	6.09E-02	J	4.2E-02	4.3E-02	3.74E-02	pCi/g	59.10%	RICHRC5030
U-238	1.33E+00		1.9E-01	2.7E-01	5.81E-02	pCi/g	59.10%	RICHRC5030
PU-238	-1.14E-03	U	1.6E-03	1.6E-03	3.25E-02	pCi/g	57.70%	RICHRC5010
PU239/40	5.97E-03	U	1.4E-02	1.4E-02	3.25E-02	pCi/g	57.70%	RICHRC5010
AM-241	7.83E-03	U	3.7E-02	3.7E-02	5.88E-02	pCi/g	N/A	RICHRC5017
CO-60	2.31E-02	U	1.3E-02	1.3E-02	2.46E-02	pCi/g	N/A	RICHRC5017
CS-137	5.80E-01		6.8E-02	6.8E-02	2.37E-02	pCi/g	N/A	RICHRC5017
EU-152	1.68E-01	U	5.6E-02	5.6E-02	7.07E-02	pCi/g	N/A	RICHRC5017
EU-154	1.01E-02	U	4.2E-02	4.2E-02	7.34E-02	pCi/g	N/A	RICHRC5017
EU-155	8.70E-02	U	3.4E-02	3.4E-02	5.61E-02	pCi/g	N/A	RICHRC5017
U-238	8.05E-01		9.6E-02	9.6E-02	3.84E-02	pCi/g	N/A	~~RICHRC5017~~
STRONTIUM	1.21E-01	U	6.0E-02	7.0E-02	1.43E-01	pCi/g	52.30%	~~RICHRC5006~~
NI-63	2.71E+00	U	3.2E+00	8.7E+00	8.05E+00	pCi/g	68.60%	~~RICHRC5060~~

Number of Results: 16

RMC
1/19/99

Result = IDL When Not Detected
(Q)ualifiers: U = Analyte result < MDA/IDL,
J = No U qualifier and result <

Quanterra Analytical Services, Inc
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Quanterra

SAMPLE RESULTS

LAB NAME:	QUANTERRA, Richland	SDG: /RPT GRP:	W02613 / 6675
LAB SAMPLE ID:	81136209	MATRIX:	SOIL
CLIENT ID:	B0T0F8	DATE RECEIVED:	11/23/98 2:29:00 PM

ANALYTE	RESULT	Q	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA/IDL	REPORT UNIT	YIELD	METHOD NUMBER
HEXCHROME	1.29E-01		N/A	N/A	3.00E-02	mg/kg	N/A	EPA7196
~~AM-241~~	~~2.63E-01~~	~~J~~	~~9.6E-02~~	~~1.1E-01~~	~~2.37E-02~~	~~pCi/g~~	~~93.40%~~	~~RICHRC5080~~
U-234	1.14E+00		1.7E-01	2.5E-01	3.39E-02	pCi/g	68.80%	RICHRC5030
U-235	3.17E-02	U	3.0E-02	3.0E-02	4.00E-02	pCi/g	68.80%	RICHRC5030
U-238	1.05E+00		1.6E-01	2.4E-01	3.86E-02	pCi/g	68.80%	RICHRC5030
PU-238	0.00E+00	U	0.0E+00	2.3E-02	2.06E-02	pCi/g	56.50%	RICHRC5010
PU239/40	3.81E-02		3.4E-02	3.5E-02	2.06E-02	pCi/g	56.50%	RICHRC5010
AM-241	1.49E-02	U	2.9E-02	2.9E-02	4.25E-02	pCi/g	N/A	RICHRC5017
CO-60	7.37E-03	U	1.6E-02	1.6E-02	2.79E-02	pCi/g	N/A	RICHRC5017
CS-137	6.20E-01		7.5E-02	7.5E-02	2.61E-02	pCi/g	N/A	RICHRC5017
EU-152	2.48E-01	U	6.7E-02	6.7E-02	8.44E-02	pCi/g	N/A	RICHRC5017
EU-154	2.39E-02	U	4.4E-02	4.4E-02	7.81E-02	pCi/g	N/A	RICHRC5017
EU-155	6.15E-02	U	3.5E-02	3.5E-02	5.93E-02	pCi/g	N/A	RICHRC5017
U-238	8.85E-01		1.1E-01	1.1E-01	4.49E-02	pCi/g	N/A	RICHRC5017
STRONTIUM	1.40E-01	J	5.8E-02	7.2E-02	1.28E-01	pCi/g	52.50%	RICHRC5006
NI-63	5.22E+00	U	2.8E+00	8.0E+00	6.45E+00	pCi/g	77.10%	RICHRC5069

Number of Results: 16

RBL
1/19/99

Result = IDL When Not Detected
(Q)ualifiers: U = Analyte result < MDA/IDL,
J = No U qualifier and result <

Quanterra Analytical Services, Inc
rptChemRadSample; v3.41

Quanterra

SAMPLE RESULTS

LAB NAME:	QUANTERRA, Richland	SDG: /RPT GRP:	W02613 / 6675
LAB SAMPLE ID:	81136210	MATRIX:	SOIL
CLIENT ID:	B0T0B5	DATE RECEIVED:	11/23/98 2:29:00 PM

ANALYTE	RESULT	Q	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA/IDL	REPORT UNIT	YIELD	METHOD NUMBER
HEXCHROME	3.00E-02	U	N/A	N/A	3.00E-02	mg/kg	N/A	EPA7196
~~AM-241~~	~~5.95E-02~~	~~J~~	~~4.9E-02~~	~~5.0E-02~~	~~2.68E-02~~	~~pCi/g~~	~~78.60%~~	~~RICHRC5080~~
U-234	8.15E-01	J	1.7E-01	2.4E-01	4.80E-02	pCi/g	46.50%	RICHRC5030
U-235	2.55E-02	U	3.1E-02	3.2E-02	4.10E-02	pCi/g	46.50%	RICHRC5030
U-238	8.08E-01	J	1.7E-01	2.3E-01	3.61E-02	pCi/g	46.50%	RICHRC5030
PU-238	1.07E-02	U	1.7E-02	1.7E-02	3.02E-02	pCi/g	68.40%	RICHRC5010
PU239/40	1.62E-02	U	2.1E-02	2.1E-02	3.23E-02	pCi/g	68.40%	RICHRC5010
AM-241	-1.10E-03	U	1.5E-01	1.5E-01	2.54E-01	pCi/g	N/A	RICHRC5017
CO-60	1.65E-02	U	2.1E-02	2.1E-02	3.74E-02	pCi/g	N/A	RICHRC5017
CS-137	4.92E-02	J	2.9E-02	2.9E-02	3.23E-02	pCi/g	N/A	RICHRC5017
EU-152	1.71E-01	U	7.3E-02	7.3E-02	9.26E-02	pCi/g	N/A	RICHRC5017
EU-154	4.30E-02	U	6.1E-02	6.1E-02	1.09E-01	pCi/g	N/A	RICHRC5017
EU-155	2.17E-03	U	4.8E-02	4.8E-02	7.78E-02	pCi/g	N/A	RICHRC5017
U-238	3.58E-01		8.1E-02	8.1E-02	5.32E-02	pCi/g	N/A	RICHRC5017
STRONTIUM	1.05E-01	U	5.5E-02	6.3E-02	1.27E-01	pCi/g	47.20%	RICHRC5006
NI-63	3.05E+00	U	2.8E+00	7.6E+00	7.12E+00	pCi/g	80.10%	RICHRC5069

Number of Results: 16

1/19/99

Result = IDL When Not Detected
(Q)ualifiers: U = Analyte result < MDA/IDL,
J = No U qualifier and result <

000033

Quanterra Analytical Services, Inc
rptChemRadSample; v3.41

~~0015~~

Quanterra

SAMPLE RESULTS

LAB NAME:	QUANTERRA, Richland	SDG: /RPT GRP:	W02613 / 6675
LAB SAMPLE ID:	81136211	MATRIX:	SOIL
CLIENT ID:	B0T0B6	DATE RECEIVED:	11/23/98 2:29:00 PM

ANALYTE	RESULT	Q	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA/IDL	REPORT UNIT	YIELD	METHOD NUMBER
HEXCHROME	3.00E-02	U	N/A	N/A	3.00E-02	mg/kg	N/A	EPA7196
~~AM-241~~	~~3.40E-02~~	~~J~~	~~3.9E-02~~	~~4.0E-02~~	~~3.07E-02~~	~~pCi/g~~	~~69.80%~~	~~RICHRC5080~~
U-234	9.33E-01	J	1.6E-01	2.3E-01	4.21E-02	pCi/g	65.30%	RICHRC5030
U-235	5.50E-02	J	4.0E-02	4.1E-02	3.54E-02	pCi/g	65.30%	RICHRC5030
U-238	9.91E-01	J	1.7E-01	2.4E-01	3.79E-02	pCi/g	65.30%	RICHRC5030
PU-238	3.29E-03	U	1.1E-02	1.1E-02	3.10E-02	pCi/g	74.70%	RICHRC5010
PU239/40	1.51E-02	U	1.9E-02	1.9E-02	2.73E-02	pCi/g	74.70%	RICHRC5010
AM-241	-9.53E-03	U	4.3E-02	4.3E-02	6.65E-02	pCi/g	N/A	RICHRC5017
CO-60	-5.96E-04	U	2.1E-02	2.1E-02	3.65E-02	pCi/g	N/A	RICHRC5017
CS-137	3.42E-02	U	2.1E-02	2.1E-02	3.67E-02	pCi/g	N/A	RICHRC5017
EU-152	4.34E-02	U	5.3E-02	5.3E-02	8.62E-02	pCi/g	N/A	RICHRC5017
EU-154	1.43E-02	U	6.5E-02	6.5E-02	1.13E-01	pCi/g	N/A	RICHRC5017
EU-155	1.37E-02	U	3.7E-02	3.7E-02	6.28E-02	pCi/g	N/A	RICHRC5017
U-238	3.75E-01		8.8E-02	8.8E-02	5.35E-02	pCi/g	N/A	RICHRC5017
STRONTIUM	2.77E-02	U	4.7E-02	4.8E-02	1.29E-01	pCi/g	50.30%	RICHRC5006
NI-63	3.53E+00	U	2.6E+00	7.4E+00	6.13E+00	pCi/g	82.20%	RICHRC5069

Number of Results: 16

RPL
1/19/99

Result = IDL When Not Detected
(Q)ualifiers: U = Analyte result < MDA/IDL,
J = No U qualifier and result <

Quanterra Analytical Services, Inc
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Quanterra

SAMPLE RESULTS

LAB NAME:	QUANTERRA, Richland	SDG: /RPT GRP:	W02613 / 6675
LAB SAMPLE ID:	81136212	MATRIX:	SOIL
CLIENT ID:	B0T0D2	DATE RECEIVED:	11/23/98 2:29:00 PM

ANALYTE	RESULT	Q	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA/IDL	REPORT UNIT	YIELD	METHOD NUMBER
HEXCHROME	3.00E-02	U	N/A	N/A	3.00E-02	mg/kg	N/A	EPA7196
~~AM-241~~	~~2.76E-02~~	~~J~~	~~3.2E-02~~	~~3.2E-02~~	~~2.49E-02~~	~~pCi/g~~	~~84.60%~~	~~RICHRC5080~~
U-234	8.15E-01	J	1.3E-01	1.9E-01	3.19E-02	pCi/g	77.80%	RICHRC5030
U-235	3.68E-02	J	2.8E-02	2.9E-02	2.46E-02	pCi/g	77.80%	RICHRC5030
U-238	7.93E-01	J	1.3E-01	1.8E-01	3.33E-02	pCi/g	77.80%	RICHRC5030
PU-238	-1.16E-03	U	1.6E-03	1.7E-03	3.32E-02	pCi/g	57.50%	RICHRC5010
PU239/40	4.31E-02		3.6E-02	3.6E-02	2.93E-02	pCi/g	57.50%	RICHRC5010
AM-241	5.10E-02	U	2.4E-02	2.4E-02	3.42E-02	pCi/g	N/A	RICHRC5017
CO-60	1.23E-02	U	2.4E-02	2.4E-02	4.22E-02	pCi/g	N/A	RICHRC5017
CS-137	7.93E-02	U	2.4E-02	2.4E-02	4.17E-02	pCi/g	N/A	RICHRC5017
EU-152	2.55E-01	U	7.5E-02	7.5E-02	9.90E-02	pCi/g	N/A	RICHRC5017
EU-154	-2.49E-02	U	6.9E-02	6.9E-02	1.17E-01	pCi/g	N/A	RICHRC5017
EU-155	4.01E-02	U	3.4E-02	3.4E-02	5.84E-02	pCi/g	N/A	RICHRC5017
U-238	4.74E-01		7.6E-02	7.6E-02	5.51E-02	pCi/g	N/A	RICHRC5017
STRONTIUM	4.07E-01	J	7.7E-02	1.5E-01	1.35E-01	pCi/g	56.90%	RICHRC5006
NI-63	5.33E+00	U	2.6E+00	7.2E+00	6.16E+00	pCi/g	85.70%	RICHRC5069

Number of Results: 16

PM 1/19/99

Result = IDL When Not Detected
(Q)ualifiers: U = Analyte result < MDA/IDL,
J = No U qualifier and result <

Quanterra Analytical Services, Inc
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Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

Quanterra
Environmental Services

Quanterra Incorporated
13715 Rider Trail North
Earth City, Missouri 63045

314 298-8566 Telephone
314 298-8757 Fax

CASE NARRATIVE

Bechtel Hanford Incorporated
3350 George Washington Way
Richland, Washington 99352

December 21, 1998

Attention: Joan Kessner

DEC 1998
RECEIVED
Data
Log In

Project Number	:	550.186
SDG	:	W02613
Number of Samples	:	Twelve (12)
Sample Matrix	:	Soil
Data Deliverable	:	Summary
Date SDG Closed	:	November 23, 1998

II. Introduction

On November 23, 1998, a total of twelve "soil" samples were received by Quanterra, Richland and transferred to Quanterra, St. Louis for chemical analysis. There were no comments or nonconformances associated with the shipping or receiving of the samples. Upon receipt, the samples were given the following laboratory ID numbers to correspond with the specific client ID's:

St. Louis ID	BHI ID	SAF ID	Matrix	Date of Receipt
19515-001	B0T092	B99-001	SOIL	23-NOV-98
19515-002	B0T093	B99-001	SOIL	23-NOV-98
19515-003	B0T094	B99-001	SOIL	23-NOV-98
19515-004	B0T095	B99-001	SOIL	23-NOV-98
19515-005	B0T096	B99-001	SOIL	23-NOV-98
19515-006	B0T097	B99-001	SOIL	23-NOV-98
19515-007	B0T0F6	B99-001	SOIL	23-NOV-98
19515-008	B0T0F7	B99-001	SOIL	23-NOV-98
19515-009	B0T0F8	B99-001	SOIL	23-NOV-98
19515-010	B0T0B5	B99-001	SOIL	23-NOV-98
19515-011	B0T0B6	B99-001	SOIL	23-NOV-98
19515-012	B0T0D2	B99-001	SOIL	23-NOV-98

III. Analytical Results/ Methodology

The analytical results for this report are presented by analytical test. Each set of data includes sample identification information, analytical results and the appropriate detection limits.

Analyses requested: ICP Metals (Chromium and Lead) by EPA method 6010A.
Mercury by EPA method 7471

Deviation from Request: No Deviation from requested methods.

IV. Definitions

The following codes are used to denote laboratory quality control samples and can be found in the data summary section of this report:

QCBLK- Quality Control Blank, Method Blank
QCLCS- Quality Control Laboratory Control Sample, Blank Spike
MS- Matrix Spike.
MSD- Matrix Spike Duplicate.

V. Comments

General: There are no general comments.

Inorganics: A Laboratory Control Sample, Method Blank, Matrix Spike and Matrix Spike Duplicate were analyzed with each preparation batch per the protocol for this analysis.

The recovery of the Chromium matrix spike duplicate (66.3%) was less than 75% therefore all associated data was flagged with a "N". The recovery of the Chromium matrix spike (90.5%) met criteria. The recoveries of the Mercury matrix spikes were also not within the 75%-125% range but the data did not require flagging because the Mercury concentration was greater than 4 X the spiking level.

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

Reviewed and approved:

Shiela M. Louvier

Shiela M. Louvier
St. Louis Project Manager

Quanterra

CERTIFICATE OF ANALYSIS

DEC 1998
RECEIVED
Data
Log In

Bechtel Hanford, Inc.
3350 George Washington Way
Richland, WA 99352

December 22, 1998

Attention: Joan Kessner

SAF Number	:	B99-002
Date First Sample Received	:	November 23, 1998
Number of Samples	:	12
Sample Type	:	Soil
SDG Number	:	W02613
Data Deliverable	:	21 Day Priority / 28 Day Summary

I. Introduction

On November 23, 1998, 12-priority soil samples were received by the Quanterra Environmental Services Richland Laboratory (QESRL) for a 21-day priority radiochemical and chemical analysis. Upon receipt, the samples were assigned the following laboratory ID numbers to correspond with the Bechtel Hanford, Inc. (BHI) specific IDs:

QESRL ID#	BHI ID#	MATRIX	DATE OF RECEIPT
81136201	B0T092	Soil	11/23/98
81136202	B0T093	Soil	11/23/98
81136203	B0T094	Soil	11/23/98
81136204	B0T095	Soil	11/23/98
81136205	B0T096	Soil	11/23/98
81136206	B0T097	Soil	11/23/98
81136207	B0T0F6	Soil	11/23/98
81136208	B0T0F7	Soil	11/23/98
81136209	B0T0F8	Soil	11/23/98
81136210	B0T0B5	Soil	11/23/98
81136211	B0T0B6	Soil	11/23/98
81136212	B0T0D2	Soil	11/23/98

II. Analytical Results/Methodology

The analytical results for this report are presented by laboratory sample ID. Each set of data includes sample identification information; analytical results and the appropriate associated statistical errors.

The requested analyses were:

Alpha Spectroscopy
Americium-241 by method RICH-RC-5080
Plutonium-238, -239/40 by method RICH-RC-5010
Uranium-234, -235, -238 by method RICH-RC-5030
Gamma Spectroscopy
Gamma Scan by method RICH-RC-5017
Gas Proportional Counting
Total Strontium by method RICH-RC-5006
Liquid Scintillation Counting
Nickel-63 by method RICH-RC-5069
Chemical Analyses
Chromium Hex by EPA method 7196

III. Quality Control

The analytical results for each analysis performed under SDG W02613 includes a minimum of two Laboratory Control Samples (LCS) and one method (reagent) blank. Any exceptions have been noted in the "Comments" section.

Quality control sample results are reported in the same units as sample results.

IV. Comments

Alpha Spectroscopy

Americium-241 by method RICH-RC-5080
The LCS, batch blank, sample duplicate (B0T094) and sample results are within contractual requirements. There was a matrix blank and spike analyzed with this sample batch and the results are within the contractual requirements.

Plutonium-238, -239/40 by method RICH-RC-5062
The LCS, batch blank, sample duplicate (B0T094) and sample results are within contractual requirements. There was a matrix blank and spike analyzed with this sample batch and the results are within the contractual requirements.

Uranium-234, -235, -238 by method RICH-RC-5030
Sample B0T092 had a spike vial added to it instead of a tracer vial. This sample was also analyzed as a duplicate sample. When evaluated as a matrix spike, sample B0T092 meets the MS evaluation criteria of the contract. The LCS, batch blank, and sample results are within contractual requirements.

Gamma Spectroscopy

Gamma Scan by method RICH-RC-5017
The LCS, batch blank, sample duplicate (B0T0D2) and sample results are within contractual requirements.

Gas Proportional Counting

Total Strontium by method RICH-RC-5006
The LCS, batch blank, sample duplicate (B0T092) and sample results are within contractual requirements.

Liquid Scintillation Counting

Nickel-63 by method RICH-RC-5069
The LCS, MS (B0T093), sample duplicate(B0T093),, batch blank and sample results are within contractual requirements.

Chemical Analyses

Chromium Hex by EPA method 7196
12 color blanks were analyzed between CCV4 and CCV5. Not enough color blank samples remained for a reanalysis. All the color blanks except one was insignificant. All of the QC was acceptable. The LCS, sample duplicate (B0T0HF8), batch blank, matrix spike (B0T0F8) and sample results are within contractual requirements.

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

Reviewed and approved:

Andy Kopriva
Project Manager

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	B99-002-02	Page 1 of 1

Collector: Coffman/Fahlberg	Company Contact: R Coffman — Telephone No.: 373-6425	Project Coordinator: TRENT, SJ	Price Code: RJN 11/23/98 — Data Turnaround: ~~15 Days~~ 21 days
Project Designation: 100 BC Areas - Full Protocol	Sampling Location: 116-B-11	SAF No.: B99-002	
Ice Chest No.: 1	Field Logbook No.: EL 1327-1	Method of Shipment	
Shipped To: Quanterra Incorporated	Offsite Property No.	Bill of Lading/Air Bill No.	
		COA	

POSSIBLE SAMPLE HAZARDS/REMARKS

Special Handling and/or Storage

SAMPLE ANALYSIS

SDL W02613

811361

Preservation	Cool 4C	None	None	None	None	None	None	None	None	None
Type of Container	aG	aG	aG	aG	aG	aG	P	aG	aG	Marinelli
No. of Container(s)	0	0	1	0	0	0	1	1	0 + 1	1
Volume	60mL	60mL	60mL	60mL	60mL	60mL	20mL	60mL	60mL	500mL
SAMPLE ANALYSIS	Chromium Hex - 7196	ICP Metals - 6010A (Add-on) (Lead)	ICP Metals - 6010A (SW-846) (Chromium, Lead)	Mercury - 7471 - (CV)	Nickel-63	Strontium-89,90 -- Total Sr	Activity Scan	Americium-241, Isotopic Plutonium, Isotopic Uranium	ICP Metals - 6010A (TAL)	See item (1) in Special Instructions
	811362				811362			811362		811362

Sample No.	Matrix *	Sample Date	Sample Time	Chromium Hex - 7196	ICP Metals - 6010A (Add-on) (Lead)	ICP Metals - 6010A (SW-846) (Chromium, Lead)	Mercury - 7471 - (CV)	Nickel-63	Strontium-89,90 -- Total Sr	Activity Scan	Americium-241, Isotopic Plutonium, Isotopic Uranium	ICP Metals - 6010A (TAL)	See item (1) in Special Instructions
B0T092 01	Soil	11-19-98	0930	X		X	X	X	X	X	X		X
B0T093 02	Soil	11-19-98	0940	X		X	X	X	X	X	X		X
B0T094 03	Soil	11-19-98	0950	X		X	X	X	X	X	X		X
						100%	X1						

CHAIN OF POSSESSION — Sign/Print Names

Relinquished By	Date/Time	Received By	Date/Time
R. Nielson	1429 11/23/98	Heidelberg	1429 11-23-98
		Liddum	11-25-98 0830

SPECIAL INSTRUCTIONS

** The ERC contractor acknowleges the 24-hour holding time is not likely achievable for Hex Chrom by EPA 7196.

** Use a separate Chain of Custody for each waste site.

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

B0T092 = B0T0H2
B0T093 = B0T0H3
B0T094 = B0T0H4

Matrix *
Soil
Water
Vapor
Other Solid
Other Liquid

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

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	B99-002-03	Page 1 of 1

Collector: Coffman/Fahlberg / Nielson	Company Contact: R Coffman — Telephone No.: 373-6425	Project Coordinator: TRENT, SJ	Price Code: RJN 11/23/98 — Data Turnaround: ~~15 Days~~ 21 days
Project Designation: 100 BC Areas - Full Protocol	Sampling Location: 116-B-11	SAF No.: B99-002	
Ice Chest No.: 1	Field Logbook No.: EL 1327-1	Method of Shipment	
Shipped To: Quanterra Incorporated.	Offsite Property No.	Bill of Lading/Air Bill No.	
		COA	

POSSIBLE SAMPLE HAZARDS/REMARKS

Special Handling and/or Storage

Preservation	Cool 4C	None	None	None	None	None	None	None	None	None	None
Type of Container	aG	aG	aG	aG	aG	aG	P	aG	aG	Marinelli
No. of Container(s)	0	0	~~0~~ 1	0	0	0	1	1	~~1~~ 0	1
Volume	60mL	60mL	60mL	60mL	60mL	60mL	20mL	60mL	60mL	500mL
SAMPLE ANALYSIS	Chromium Hex - 7196	ICP Metals - 6010A (Add-on) (Lead)	ICP Metals - 6010A (SW-846) (Chromium, Lead)	Mercury - 7471 - (CV)	Nickel-63	Strontium-89,90 -- Total Sr	Activity Scan	Americium-241; Isotopic Plutonium; Isotopic Uranium	ICP Metals - 6010A (TAL)	See item (1) Special Instructions
811361	811362				811	362		811362		811362

Sample No.	Matrix *	Sample Date	Sample Time	Chromium Hex - 7196	ICP Metals - 6010A (Add-on) (Lead)	ICP Metals - 6010A (SW-846) (Chromium, Lead)	Mercury - 7471 - (CV)	Nickel-63	Strontium-89,90 -- Total Sr	Activity Scan	Americium-241; Isotopic Plutonium; Isotopic Uranium	ICP Metals - 6010A (TAL)	See item (1) Special Instructions
B0T095 04	Soil	11-19-98	0930	X		X	X	X	X	X	X		X
B0T096 05	Soil	11-19-98	0940	X		X	X	X	X	X	X		X
B0T097 06	Soil	11-19-98	09-50	X		X	X	X	X	X	X		X
						100%	X 1						

CHAIN OF POSSESSION — Sign/Print Names

Relinquished By	Date/Time	Received By	Date/Time
R. Nielson / R. Nielson	11/23/98 1429	Heidelberg	11/23/98 1429
		100cpm / Jeff Turn	11/25-98 0830

SPECIAL INSTRUCTIONS

** The ERC contractor acknowleges the 24-hour holding time is not likely achievable for Hex Chrom by EPA 7196.

** Use a separate Chain of Custody for each waste site.

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

B0T095 = B0T0H5
B0T096 = B0T0H6
B0T097 = B0T0H8

Matrix *
Soil
Water
Vapor
Other Solid
Other Liquid

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

000045

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	B99-002-16	Page 1 of

Collector: Coffman/Fahlberg / Nielson	Company Contact: R Coffman	Telephone No.: 373-6425	Project Coordinator: TRENT, SJ
Project Designation: 100 BC Areas - Full Protocol	Sampling Location: 116-B-14		SAF No.: B99-002
Ice Chest No.: 1	Field Logbook No.: EL 1327-1		Method of Shipment
Shipped To: Quanterra Incorporated	Offsite Property No.		Bill of Lading/Air Bill No.

Data Turnaround: ~~15 Days~~ 21 Days 11/23 RUN

POSSIBLE SAMPLE HAZARDS/REMARKS

Special Handling and/or Storage

SAMPLE ANALYSIS: 811361

Preservation	Cool 4C	None	None	None	None	None	None	None	None	None
Type of Container	aG	aG	aG	aG	aG	aG	P	aG	aG	Marinel
No. of Container(s)	0	0	1	0	0	0	1	1	1	1
Volume	60mL	60mL	60mL	60mL	60mL	60mL	20mL	60mL	60mL	500mL
	Chromium Hex - 7196	ICP Metals - 6010A (Add-on) (Lead)	ICP Metals - 6010A (SW-846) (Chromium, Lead)	Mercury - 7471 - (CV)	Nickel-63	Strontium-89,90 -- Total Sr	Activity Scan	Americium-241; Isotopic Plutonium; Isotopic Uranium	ICP Metals - 6010A (TAL)	See item (1) Special Instruction
	811362				811362			811362		811362

Sample No.	Matrix *	Sample Date	Sample Time	Chromium Hex - 7196	ICP Metals - 6010A (Add-on) (Lead)	ICP Metals - 6010A (SW-846) (Chromium, Lead)	Mercury - 7471 - (CV)	Nickel-63	Strontium-89,90 -- Total Sr	Activity Scan	Americium-241; Isotopic Plutonium; Isotopic Uranium	ICP Metals - 6010A (TAL)	See item (1) Special Instruction
~~B0T0F5~~ RTC 11-11-98	~~Soil~~	MOVED TO	B99-002-15										
B0T0F6 07	Soil	11/23/98	0930	X		X	X	X	X	X	X		X
B0T0F7 08	Soil	11/23/98	0950	X		X	X	X	X	X	X		X
B0T0F8 09	Soil	11/23/98	0950	X		X	X	X	X	X	X		X
						100%	X1						

CHAIN OF POSSESSION — Sign/Print Names 1429

Relinquished By	Date/Time	Received By	Date/Time
Nielson / Nielson	11/23/98 1429	[illegible]	11-23-98
		Joe Tem 2100 cpm	11-25-98 0830

SPECIAL INSTRUCTIONS

** The ERC contractor acknowleges the 24-hour holding time is not likely achievable for Hex Chrom by EPA 7196.

** Use a separate Chain of Custody for each waste site.

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

B0T0F6 — RCF B0T1T7
B0T0F7 > RCF B0T1T9
B0T0F8

Matrix *

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

LABORATORY SECTION: Received By — Title — Date/Time

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

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	B99-002-06	Page 1 of

Collector: Coffman/Fahlberg / Nielson	Company Contact: R Coffman	Telephone No.: 373-6425	Project Coordinator: TRENT, SJ	Data Turnaround: ~~15 Days~~ 21 Days 11/23/98 RJN
Project Designation: 100 BC Areas - Full Protocol	Sampling Location: 116-B-H- 13		SAF No.: B99-002	
Ice Chest No.: 1	Field Logbook No.: EL 1327-1		Method of Shipment	
Shipped To: Quanterra Incorporated	Offsite Property No.		Bill of Lading/Air Bill No.	

POSSIBLE SAMPLE HAZARDS/REMARKS

Special Handling and/or Storage

SAMPLE ANALYSIS 811361

Preservation	Cool 4C	None	None	None	None	None	None	None	None	None
Type of Container	aG	aG	aG	aG	aG	aG	P	aG	aG	Marinel
No. of Container(s)	0	0	~~1~~ 2 1 RS	0	0	0	1	1	1	1
Volume	60mL	60mL	60mL	60mL	60mL	60mL	20mL	60mL	60mL	500mL
	Chromium Hex - 7196	ICP Metals - 6010A (Add-on) (Lead)	ICP Metals - 6010A (SW-846) (Chromium, Lead)	Mercury - 7471 - (CV)	Nickel-63	Strontium-89,90 – Total Sr	Activity Scan	Americium-241; Isotopic Plutonium; Isotopic Uranium	ICP Metals - 6010A (TAL)	See item (1) Special Instructions
	811362				811	362		811362		811362

Sample No.	Matrix *	Sample Date	Sample Time	Chromium Hex - 7196	ICP Metals - 6010A (Add-on) (Lead)	ICP Metals - 6010A (SW-846) (Chromium, Lead)	Mercury - 7471 - (CV)	Nickel-63	Strontium-89,90 – Total Sr	Activity Scan	Americium-241; Isotopic Plutonium; Isotopic Uranium	ICP Metals - 6010A (TAL)	See item (1) Special Instructions
B0T0B4 11-12-98	Soil												
B0T0B5 10	Soil	11.23.98	0930	X		X	X	X	X	X	X	A-1	X
B0T0B6 11	Soil	11-23-98	0930	X		X	X	X	X	X	X	A-1	X
B0T0D2 12	soil	11-23-98	0945	X		X	X	X	X	X	X	A-2	X
						100%	X1						

CHAIN OF POSSESSION

Sign/Print Names	Date/Time	Sign/Print Names	Date/Time
Relinquished By: R Nielson / R Nielson	11/23/98 1429	Received By: Heidelberg	11-23-98
Relinquished By		Received By: 2100pm	11-23-98 0830
Relinquished By		Received By	
Relinquished By		Received By	

SPECIAL INSTRUCTIONS

** The ERC contractor acknowleges the 24-hour holding time is not likely achievable for Hex Chrom by EPA 7196.

** Use a separate Chain of Custody for each waste site.

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

B0T0B5 } B0T1W3
B0T0B6 }
B0T0D2 = B0T1X0

Matrix *

S	=	Soil
SE	=	Sediment
SO	=	Solid
SL	=	Sludge
W	=	Water
O	=	Oil
A	=	Air
DS	=	Drum Solids
DL	=	Drum Liquid
T	=	Tissue
WI	=	Wipe
L	=	Liquid
V	=	Vegetation
X	=	Other

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

Appendix 5

Data Validation Supporting Documentation

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: WS 116-B-14			DATA PACKAGE: W02613		
VALIDATOR: TLI		LAB: QES		DATE: 1/15/99	
CASE:			SDG: W02613		

ANALYSES PERFORMED

X CLP/ICP	☐ CLP/GFAA	☐ CLP/Hg	☐ CLP/Cyanide	☐	☐
X SW-846/ICP	☐ SW-846/GFAA	X SW-846/Hg	☐ SW-846 Cyanide	X Cr VI	☐

SAMPLES/MATRIX

B0T092, B0T093, B0T094, B0T095, B0T096, B0T097
B0T0F6, B0T0F7, B0T0F8, B0T0B5, B0T0B6
B0T0D2

Soil

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

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

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

Comments:

2. HOLDING TIMES

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

Comments:

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

3. INSTRUMENT PERFORMANCE AND CALIBRATIONS

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

Comments:

4. BLANKS

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

Comments: lead detected → all >5X blank

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: Hg — 197.4 ms 148.1 MSD J detects UR non-detects
Cr (total) 66.3 MSD J all

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: Hg - 200 Cr(total) 30.9

~~Hg 92, 93, 93 J~~ ~~92, 93, 94, 95, 96 J~~ all but Hg -J

~~Hg F1, F7, F8, B5, B6, B7 OK~~

Cr - J all

~~B5~~ F7/F8 Cr (total) out

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:

U.S. EPA - CLP

6A
MATRIX SPIKE DUPLICATES

EPA SAMPLE NO.

B0T092S

ab Name: QUANTERRA MO Contract: 550.186

ab Code: ITMO Case No.: SAS No.: SDG No.: W02613

atrix (soil/water): SOIL Level (low/med): LOW

Solids: 93.8

Percent recoveries:

Analyte	Control Limit	Matrix Spike (S)		Matrix Spike Duplicate (SD)		RPD	Q	M
Hg	20%			148.10		200.0		CV
Cr	20%	90.50		66.30		30.9		P
Pb	20%	97.40		91.80		5.9		P

FORM VI - IN

~~000055~~

U.S. EPA - CLP

5A
SPIKE SAMPLE RECOVERY

EPA SAMPLE NO.

B0T092S

Lab Name: QUANTERRA_MO Contract: 550.186

Lab Code: ITMO Case No.: SAS No.: SDG No.: W02613

Matrix (soil/water): SOIL Level (low/med): LOW

% Solids for Sample: 93.8

Concentration Units (ug/L or mg/kg dry weight): MG/KG

Analyte	Control Limit %R	Spiked Sample Result (SSR)	C	Sample Result (SR)	C	Spike Added (SA)	%R	Q	M
Mercury		2.7008		3.0561		0.18	-197.4		CV
Chromium	75-125	283.0416		186.5128		106.61	90.5		P
Lead	75-125	119.4158		15.5501		106.61	97.4		P

Comments:

FORM V (Part 1) - IN SW-846

~~000057~~

U.S. EPA - CLP

5A
SPIKE SAMPLE RECOVERY

EPA SAMPLE NO.

B0T092SD

ab Name: QUANTERRA_MO Contract: 550.186

ab Code: ITMO Case No.: SAS No.: SDG No.: W02613

atrix (soil/water): SOIL Level (low/med): LOW

Solids for Sample: 93.8

Concentration Units (ug/L or mg/kg dry weight): MG/KG

Analyte	Control Limit %R	Spiked Sample Result (SSR)	C	Sample Result (SR)	C	Spike Added (SA)	%R	Q	M
Mercury		3.3227		3.0561		0.18	148.1		CV
Chromium	75-125	257.2367		186.5128		106.61	66.3	N	P
Lead	75-125	113.4168		15.5501		106.61	91.8		P

omments:

FORM V (Part 1) - IN SW-846

~~000052~~

Bechtel Hanford, Inc.
3350 George Washington Way
Richland, WA 99352

Attn: BHI Sample Management
3190 George Washington Way
MSIN: H9-03
Phone: 375-9439
FAX: 372-9487

BHI Sample Management

Fax

To: Bruce Christian **From:** Jeanette Duncan

Fax: 375-5151 **Pages:**

Phone: **Date:** 1/20/98

Re: **CC:**

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

• **Comments:**

WO 2613 - IR Responses

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: 15 January 1999

Information Request

W02613 - Inorganics

The reported amount for mercury in sample B0T0B6 on page 43 ~~(0.002~~ 0.02 MG/KG) does not match the amount reported on page 40 (0.017 MG/KG). Which amount is correct.

Use 0.017 as value, other value is the result of rounding procedure used by the program.

Rich Mero 1-20-99

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: 15 January 1999

Information Request

W02613 - Inorganics

Mercury - samples B0T0F6, B0T0F7, B0T0F8, B0T0B5, [redacted]6 and B0T0D2

The MS is outside QC limits (-197%). The above samples were below the laboratory detection limit, not detected in the blank, but flagged with a B, not a U. I need to know why.

Lab reports these values as detected. "B" qualifier in this case means "below RDL but above detection limit."

Rich Weiss 1-20-99

Duncan, Jeanette M

From: Blumenkranz, David B
Sent: Friday, February 19, 1999 2:44 PM
To: Duncan, Jeanette M
Cc: Sturges, Mark H; Fancher, Jonathan D (Jon); Weiss, Richard L
Subject: Comments on Validation Package W02614-QES

Radiochemistry - Data Package W02614-QES:
Please indicate the site number in parenthesis after the sample number.
To the "Minor Deficiencies" section, please add "The following analytes and samples had reported MDAs above the TDL/MDA: europium-155 in sample B0T0B4 (116-B-11), and uranium-238 (GEA) in samples B0T0B0 (116-B-11), B0T0B4 (116-B-11), B0T0D5 (116-B-13), and B0T0H1 (116-B-14)."

If its o.k. w/ Claud, the project staff have would like to see the detection limit findings in the "Minor Deficiencies" section even though there's no qualification. I still have to address these detection limit deficiencies in the Data Quality Assessment.

Inorganics - Data Package W02614-QES:
Please indicate the site number in parenthesis after the sample number, e.g. B0T0D5 (116-B-13) and B0T0H1 (116-B-14).

Please refer comment responses to Rich while I'm out (Sorry Rich, you're the most qualified and the only one I could think of who wouldn't need to "come up to speed" in order to help the Remedial Action Project staff close out these data packages).

Thanks,
Dave

Bruce,

Per your discussion with Rich Weiss — please make this change on validation pkg W02613 also.

Jeanette
2/24/99

Duncan, Jeanette M

From: Blumenkranz, David B
Sent: Friday, February 19, 1999 2:06 PM
To: Duncan, Jeanette M

Jeanette,

Responses to my comments (on 2/16/99) on validation packages W02613-QES, W02606-QES, and H0324-RLN are acceptable. If its not a change order or out of scope, please ask the validator if its possible to add the applicable site number in parenthesis after each samples number like, "B0T0F3 (116-B-14)". This would make my life much easier. Hopefully, the validator can accomidate our request. I talked to Jon and we decided tha as long as Rich can review/approve the validation packages for me, the validator can use next week to implement these changes. I'll be looking at validation package W02614-QES will get back to you later today.

Thanx,
Dave

TRANSMISSION RESULT REPORT (FEB 25 '99 08:51AM)

BHI S&D MANAGEMENT 509 372 9487

(AUTO)

THE FOLLOWING FILE(S) ERASED

FILE	FILE TYPE	OPTION	TEL NO.	PAGE	RESULT
010	MEMORY TX		9708101	02/02	OK

ERRORS

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

Duncan, Jeanette M

From: Blumenkranz, David B
Sent: Friday, February 19, 1999 2:44 PM
To: Duncan, Jeanette M
Cc: Sturges, Mark H; Fancher, Jonathan D (Jon); Weiss, Richard L
Subject: Comments on Validation Package W02614-QES

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Please indicate the site number in parenthesis after the sample number.
To the "Minor Deficiencies" section, please add "The following analytes and samples had reported MDAs above the TDL/MDA: europium-155 in sample B0T0B4 (116-B-11), and uranium-238 (GEA) in samples B0T0B0 (116-B-11), B0T0B4 (116-B-11), B0T0D6 (116-B-13), and B0T0H1 (116-B-14)."

If its o.k. w/ Claud, the project staff have would like to see the detection limit findings in the "Minor Deficiencies" section even though there's no qualification. I still have to address these detection limit deficiencies in the Data Quality Assessment.

Inorganics - Data Package W02614-QES:
Please indicate the site number in parenthesis after the sample number, e.g. B0T0D6 (116-B-13) and B0T0H1 (116-B-14).

Please refer comment responses to Rich while I'm out (Sorry Rich, you're the most qualified and the only one I could think of who wouldn't need to "come up to speed" in order to help the Remedial Action Project staff close out these data packages).

Thanks,
Dave

Review Comment Record (RCR)

1. Date	2. Review No.
2/08/99	BHI/QA99002
3. Project	**4. Page**
116-B-14	Page 1 of 1

5. Document Number(s)/Title(s)	6. Program/Project/ Building Number	7. Reviewer	8. Organization/Group	9. Location/Phone
W02613 -QBS (SDG No. W02613)	100-BC Areas – Full Protocol - 116-B-14 Waste Site Soil Samples	Claude Stacey	BHI/QA	H0-16/372-9208

17. Comment Resolution Approval:

Organization Manager (Optional) — Date

18. Agreement with indicated comment disposition(s)

Reviewer/Point of Contact — Author/Originator

11. CLOSED

22 Feb-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	Radiochemistry and Inorganic: Page 1, the Project in the heading indicates the data package was for Waste Site 116-B-14; whereas, the chains of custody associated with the samples indicate the samples were from 116-B-11, 116-B-13, and 116-B-14 Waste Sites.		Corrected PBC	
2	Inorganic: The note at the end of the table indicates the ICP metals as being analyzed; whereas, only total chromium and lead analyses were performed. Should distinguish that the ICP metals were total chromium and lead, such as: ICP metals (Total Chromium and Lead); Mercury (7471); Chrome VI (7196)		Corrected PBC	
3	Inorganic: Page 011, under sample B0T0B6 the Hg value shows 0.017 whereas; the laboratory data sheet shows 0.02.		Lab sheet value due to rounds error. Form I corrected. PBC	✓
4	Radiochemistry: Page 011, there are several data points that are qualified as being less than the MDA; whereas, the laboratory data sheet indicate that the parted data are above the MDA/DL: Eu-155 for samples B0T096, B0T092, B0T0F7, and B0T0F8. Eu-152 for samples B0T0F7, and B0T0F8. Cs-137 for sample B0T0D2 and Am-241 for sample B0T0D2. Although the laboratory data sheets show a "U" qualification for these isotopes the values are above the MDA/DL; therefore, they should not be qualified "U" unless there is an explanation to justify "U" qualification.		The U qualifier is a spontaneous product from the laboratory computer software, the qualifiers have been removed. PBC	

Duncan, Jeanette M

From: Blumenkranz, David B
Sent: Tuesday, February 16, 1999 4:39 PM
To: Duncan, Jeanette M
Cc: Fancher, Jonathan D (Jon); Sturges, Mark H
Subject: Data Validation Packages

My comments as follows:

Inorganics - Data Package No. W02613-QES: No comments

Radiochemistry - Data Package No. W02613-QES: No comments

Inorganics - Data Package No. W02606-QES: No comments

Radiochemistry - Data Package No. W02606-QES: No comments

Inorganics - Data Package No. H0324-RLN: In "Minor Deficiencies" indicate that the IDL exceeded the TDL for Cr+6 results.

Radiochemistry - Data Package No. H0324-RLN: In "Minor Deficiencies" indicate that the MDA exceeded the TDL for U-238 (GEA) results and U-235 (GEA) in sample B0T6P4. Also, if the lab result is "U" for a particular isotope, isn't the MDA then an estimated best conservative guess concentration? If so, then go ahead and put the MDA in the data summary for Am-241, Co-60, Cs-137, U isotopes (GEA) and the Eu isotopes w/ a footnote to indicate the value in the table is the MDA because a result was not reported.

Semivolatiles - Data Package No. H0324-RLN: In "Minor Deficiencies" indicate that the reported detection limit exceeded the CRDL for B0P6P2, B0P6P3, B0P6P4, B0P6P5 and B0P6P6. Also, we should get the MS & MSD results for bis(2-ethylhexyl)phthalate so the the validator can finish the validation.

PCBs - Data Package No. H0324-RLN: Page numbers 2 & 3 have been transposed. In "Minor Deficiencies" indicate that the IDL exceeded the TDL for Aroclor-1221 results. (Is it spelled Aroclor or Arochlor?)

Thanx,
Dave

Review Comment Record (RCR)

1. Date	2. Review No.
2/08/99	BHI/QA99002
3. Project	**4. Page**
116-B-14	Page 1 of 1

5. Document Number(s)/Title(s)	6. Program/Project/ Building Number	7. Reviewer	8. Organization/Group	9. Location/Phone
W02613 –QES (SDG No. W02613)	100-BC Areas – Full Protocol - 116-B-14 Waste Site Soil Samples	Claude Stacey	BHI/QA	H0-16/372-9208

17. Comment Submittal Approval:

Organization Manager (Optional) _____ Date _____

10. Agreement with indicated comment disposition(s)

Reviewer/Point of Contact _____ Date _____

Author/Originator _____

11. CLOSED

Reviewer/Point of Contact _____ Date _____

Author/Originator _____

12. Item	13. Comment(s)/Discrepancy(s) (Provide technical justification for the comment and detailed recommendation of the action required to correct/ resolve the discrepancy/problem indicated.)	14. Hold Point	15. Disposition (Provide justification if NOT accepted.)	16. Status
1	Radiochemistry and Inorganic: Page 1, the Project in the heading indicates the data package was for Waste Site 116-B-14; whereas, the chains of custody associated with the samples indicate the samples were from 116-B-11, 116-B-13, and 116-B-14 Waste Sites.			
2	Inorganic: The note at the end of the table indicates the ICP metals as being analyzed; whereas, only total chromium and lead analyses were performed. Should distinguish that the ICP metals were total chromium and lead, such as: ICP metals (Total Chromium and Lead); Mercury (7471); Chrome VI (7196)			
3	Inorganic: Page 011, under sample B0T0B6 the Hg value shows 0.017 whereas; the laboratory data sheet shows 0.02.			
4	Radiochemistry: Page 011, there are several data points that are qualified as being less than the MDA; whereas, the laboratory data sheet indicate that the ported data are above the MDA/IDL: Eu-155 for samples B0T096, B0T097, B0T0F7, and B0T0F8. Eu-152 for samples B0T0F7, and B0T0F8. Cs-137 for sample B0T0D2 and Am-241 for sample B0T0D2. Although the laboratory data sheets show a "U" qualification for these isotopes the values are above the MDA/IDL; therefore, they should not be qualified "U" unless there is an explanation to justify "U" qualification.			

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

facsimile transmittal

To: Bruce Christian Fax: 375-5151

From: Jeanette Duncan Date: 2/18/99

Re: Validation Comment Pages: 5

CC: Disposition

❑ Quick Turn Priority Data ❑ Final Data Package

W02606
W02613
H0324

TRANSMISSION RESULT REPORT (FEB 18 '99 02:44PM)

BHI S&D MANAGEMENT 509 372 9487

(AUTO)

THE FOLLOWING FILE(S) ERASED

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ERRORS

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

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

facsimile transmittal

To: Bruce Christian Fax: 375-5151

From: Jeanette Duncan Date: 2/18/99

Re: Validation Comment Pages: 5

CC: Disposition

☐ Quick Turn Priority Data ☐ Final Data Package

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

facsimile transmittal

To: Claude Stacey Fax: 372-9447

From: Jeanette Duncan Date: 2/8/99

Re: Missing page 53 Pages:

CC: from W02613
inorganic validation

❑ Quick Turn / Priority Data ❑ Final Data Package

U.S. EPA - CLP

5A
SPIKE SAMPLE RECOVERY

EPA SAMPLE NO.

B0T092S

Lab Name: QUANTERRA_MO Contract: 550.186

Lab Code: ITMO Case No.: _____ SAS No.: _____ SDG No.: W02613

Matrix (soil/water): SOIL Level (low/med): LOW

% Solids for Sample: 93.8

Concentration Units (ug/L or mg/kg dry weight): MG/KG

Analyte	Control Limit %R	Spiked Sample Result (SSR)	C	Sample Result (SR)	C	Spike Added (SA)	%R	Q	M
Mercury		2.7008		3.0561		0.18	-197.4		CV
Chromium	75-125	283.0416		186.5128		106.61	90.5		P
Lead	75-125	119.4158		15.5501		106.61	97.4		P

Comments:

Post-it™ brand fax transmittal memo 7671 # of pages ▸ 1

To J. Duncan	From R Christian
Co.	Co.
Dept.	Phone #
Fax #	Fax #

D - IN SW-846

~~00065~~

TRANSMISSION RESULT REPORT (FEB 08 '99 10:55AM)

BHI S&D MANAGEMENT 509 372 9487

(AUTO)

THE FOLLOWING FILE(S) ERASED

FILE	FILE TYPE	OPTION	TEL NO.	PAGE	RESULT
072	MEMORY TX		3729447	02/02	OK

ERRORS

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

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

facsimile transmittal

To: Claude Stacey Fax: 372-9447

From: Jeanette Duncan Date: 2/8/99

Re: Missing page 53 Pages:

CC: from WO2613 inorganic validation

☐ Quick Turn / Priority Data ☐ Final Data Package

Duncan, Jeanette M

From: Blumenkranz, David B
Sent: Friday, February 19, 1999 9:03 AM
To: Duncan, Jeanette M
Subject: Calc. 0100B-CA-V0025

Sorry to be such a pain, but I found an error in the App. 3 of Calc. 0100B-CA-V0025

Typo: The Am-241 result for B0T0B6 should be 0.0340 in App. 3

Change made + incorporated 3/1/99

WD2613

TRANSMISSION RESULT REPORT (FEB 19 '99 11:12AM)

BHI S&D MANAGEMENT 509 372 9487

(AUTO)

THE FOLLOWING FILE(S) ERASED

FILE	FILE TYPE	OPTION	TEL NO.	PAGE	RESULT
065	MEMORY TX		3755151	02/02	OK

ERRORS

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

Bechtel Hanford, Inc.
3350 George Washington Way
Richland, WA 99352

Attn: BHI Sample Management
3190 George Washington Way
MSIN: H9-03
Phone: 376-9439
FAX: 372-9487

BHI Sample Management

Fax

To:	Bruce Christian	**From:**	Jeanette Duncan
Fax:	375-5151	**Pages:**	2
Phone:		**Date:**	2/19/99
Re:		**CC:**	

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

Bechtel Hanford, Inc.
3350 George Washington Way
Richland, WA 99352

Attn: BHI Sample Management
3190 George Washington Way
MSIN: H9-03
Phone: 375-9439
FAX: 372-9487

BHI Sample Management

Fax

To: Bruce Christian **From:** Jeanette Duncan

Fax: 375-5151 **Pages:** 2

Phone: **Date:** 2/19/99

Re: **CC:**

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

• **Comments:**

Another Comment on W02613 — Radiochemistry table (Am-241) has a typo.....

Review Comment Record (RCR)

1. Date	2. Review No.
2/08/99	BHI/QA99002
3. Project	**4. Page**
116-B-14	Page 1 of 1

5. Document Number(s)/Title(s)	6. Program/Project/ Building Number	7. Reviewer	8. Organization/Group	9. Location/Phone
W02613 -QES (SDG No. W02613)	100-BC Areas – Full Protocol - 116-B-14 Waste Site Soil Samples	Claude Stacey	BHI/QA	H0-16/372-9208

17. Comment Submittal Approval: 10. Agreement with indicated comment disposition(s) 11. CLOSED

Organization Manager (Optional) Date Reviewer/Point of Contact Date Reviewer/Point of Contact

Author/Originator Author/Originator

12. Item	13. Comment(s)/Discrepancy(s) (Provide technical justification for the comment and detailed recommendation of the action required to correct/ resolve the discrepancy/problem indicated.)	14. Hold Point	15. Disposition (Provide justification if NOT accepted.)	16. Status
1	Radiochemistry and Inorganic: Page 1, the Project in the heading indicates the data package was for Waste Site 116-B-14; whereas, the chains of custody associated with the samples indicate the samples were from 116-B-11, 116-B-13, and 116-B-14 Waste Sites.		Corrected RBC	
2	Inorganic: The note at the end of the table indicates the ICP metals as being analyzed; whereas, only total chromium and lead analyses were performed. Should distinguish that the ICP metals were total chromium and lead, such as: ICP metals (Total Chromium and Lead); Mercury (7471); Chrome VI (7196)		Corrected RBC	
3	Inorganic: Page 011, under sample B0T0B6 the Hg value shows 0.017 whereas; the laboratory data sheet shows 0.02.		Lab sheet value due to rounds error. Form I corrected. RBC	✓
4	Radiochemistry: Page 011, there are several data points that are qualified as being less than the MDA; whereas, the laboratory data sheet indicate that the ported data are above the MDA/IDL: Eu-155 for samples B0T096, B0T097, B0T0F7, and B0T0F8. Eu-152 for samples B0T0F7, and B0T0F8. Cs-137 for sample B0T0D2 and Am-241 for sample B0T0D2. Although the laboratory data sheets show a "U" qualification for these isotopes the values are above the MDA/IDL; therefore, they should not be qualified "U" unless there is an explanation to justify "U" qualification.		The U qualifier is a spontaneous product from the laboratory computer software. the qualifiers have been removed. RBC	

Date: 22 January 1999
To: Bechtel Hanford Inc. (technical representative)
From: TechLaw, Inc.
Project: 100-BC Areas - Full Protocol - Waste Sites 116-B-11, 116-B-13, 116-B-14
Subject: Inorganics - Data Package No. W02613-QES (SDG No. W02613)

INTRODUCTION

This memo presents the results of data validation on Data Package No. W02613-QES prepared by Quanterra Environmental Services (QES). 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
B0T092	11/19/98	Soil	C	See note 1
B0T093	11/19/98	Soil	C	See note 1
B0T094	11/19/98	Soil	C	See note 1
B0T095	11/19/98	Soil	C	See note 1
B0T096	11/19/98	Soil	C	See note 1
B0T097	11/19/98	Soil	C	See note 1
B0T0F6	11/23/98	Soil	C	See note 1
B0T0F7	11/23/98	Soil	C	See note 1
B0T0F8	11/23/98	Soil	C	See note 1
B0T0B5	11/23/98	Soil	C	See note 1
B0T0B6	11/23/98	Soil	C	See note 1
B0T0D2	11/23/98	Soil	C	See note 1

1 - ICP metals (total chromium and lead); Mercury (7471); Chrome VI (7196)

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:

RADIOCHEMISTRY ANALYSIS, SOIL MATRIX, (PCi/G)

Project: BECHTEL-HANFORD
Laboratory: Quanterra
Case SDG: W02613

Sample Number		B0T092		B0T093		B0T094		B0T095		B0T096		B0T097		B0T0F6		B0T0F7		B0T0F8		B0T0B5		B0T0B6		B0T0D2	
Location		A1 (Deep)		A2 (Deep)		A3 (Deep)		B4 (Deep)		B5 (deep)		B6 (Deep)		A3 (Shallow)		A4 (Shallow)		A4 (Shallow)		A1 (Shallow)		A1 (Shallow)		A2 (Shallow)	
Remarks																		Duplicate				Duplicate			
Sample Date		11/19/98		11/19/98		11/19/98		11/19/98		11/19/98		11/19/98		11/23/98		11/23/98		11/23/98		11/23/98		11/23/98		11/23/98	
Radiochemistry	TDL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Americium-241	0.1	2.9		0.395		0.753		0.736		2.23		2.22		0.0675		0.0618		0.263		0.0595		0.0304		0.0276	
Uranium-234	0.1	2.99	J	1.04	J	1.17	J	0.832	J	1.28	J	1.03	J	1.15	J	1.53	J	1.14	J	0.815	J	0.933	J	0.815	J
Uranium-235	0.1	0.13	J	0.0211	UJ	0.0665	J	0.0406	J	0.0461	J	0.0437	J	0.0561	J	0.0609	J	0.0317	UJ	0.0255	UJ	0.055	J	0.0368	J
Uranium-238	0.1	2.8	J	0.962	J	1.22	J	0.827	J	1.07	J	0.829	J	1.16	J	1.33	J	1.05	J	0.808	J	0.991	J	0.793	J
Plutonium-238	0.1	0.355	J	0.0147	UJ	0.0342	J	0.0162	UJ	0.186	J	0.244	J	0	UJ	-0.00114	UJ	0	UJ	0.0107	UJ	0.00329	UJ	-0.00116	UJ
Plutonium-239/240	0.1	11.3		1.37		1.6		1.75		6.04		6.98		0.37		0.00597	U	0.0381	J	0.0162	U	0.0151	U	0.0431	J
Americium-241 (GEA)	0.1	1.52		0.0167	U	0.0802	U	0.18		0.573		0.661		0.0414	U	0.00783	U	0.0149	U	-0.0011	U	-0.00953	U	0.051	
Cobalt-60	0.05	36.7		2.61		1.35		3.37		14.5		16.2		0.0462	U	0.0231	U	0.00737	U	0.0165	U	-0.000596	U	0.0123	U
Cesium-137DA	0.05	93.9		27		13.8		23.5		70.4		62.7		0.955		0.58		0.62		0.0492		0.0342	U	0.0793	
Europium-152	0.1	267		19.4		17.2		32.4		154		53.6		4.43		0.168		0.248		0.171	U	0.0434	U	0.255	U
Europium-154	0.1	40.3		2.33		2.39		3.93		18.2		6.38		0.191	U	0.0101	U	0.0239	U	0.043	U	0.0143	U	-0.0249	U
Europium-155	0.05	1.82		0.121	U	0.0833	U	0.17		0.798		0.365		0.0277	U	0.087		0.0615		0.00217	U	0.0137	U	0.0401	U
Uranium-238(GEA)	0.1	0.972		0.606		0.56		0.603		0.604		0.645		0.632		0.805		0.885		0.358	J	0.375	J	0.474	J
Strontium	1	4.06		2.56		1.4		2.44		3.94		2.53		1.55		0.121	U	0.14		0.105	U	0.0277	U	0.407	
Nickel-63	30	1570		179		154		261		870		1940		3.95	U	2.71	U	5.22	U	3.05	U	3.53	U	5.33	U

Quanterra

SAMPLE RESULTS

LAB NAME:	QUANTERRA, Richland	SDG: /RPT GRP:	W02613 / 6675
LAB SAMPLE ID:	81136201	MATRIX:	SOIL
CLIENT ID:	B0T092	DATE RECEIVED:	11/23/98 2:29:00 PM

ANALYTE	RESULT	Q	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA/IDL	REPORT UNIT	YIELD	METHOD NUMBER
~~HEXCHROME~~	~~1.23E+00~~		~~N/A~~	~~N/A~~	~~3.00E-02~~	~~mg/kg~~	~~N/A~~	~~EPA7196~~
AM-241	2.90E+00		3.3E-01	6.7E-01	2.54E-02	pCi/g	111.00%	RICHRC5080
U-234	2.99E+00	J	2.5E-01	5.4E-01	3.49E-02	pCi/g	79.80%	RICHRC5030
U-235	1.30E-01	J	5.2E-02	5.6E-02	2.61E-02	pCi/g	79.80%	RICHRC5030
U-238	2.80E+00	J	2.4E-01	5.1E-01	3.25E-02	pCi/g	79.80%	RICHRC5030
PU-238	3.55E-01	J	1.5E-01	1.8E-01	4.57E-02	pCi/g	25.20%	RICHRC5010
PU239/40	1.13E+01		8.7E-01	3.0E+00	9.02E-02	pCi/g	25.20%	RICHRC5010
AM-241	1.52E+00		2.4E-01	2.4E-01	2.24E-01	pCi/g	N/A	RICHRC5017
CO-60	3.67E+01		3.7E+00	3.7E+00	8.53E-02	pCi/g	N/A	RICHRC5017
CS-137	9.39E+01		9.4E+00	9.4E+00	1.84E-01	pCi/g	N/A	RICHRC5017
EU-152	2.67E+02		2.7E+01	2.7E+01	4.64E-01	pCi/g	N/A	RICHRC5017
EU-154	4.03E+01		4.1E+00	4.1E+00	3.14E-01	pCi/g	N/A	RICHRC5017
EU-155	1.82E+00		3.8E-01	3.8E-01	4.81E-01	pCi/g	N/A	RICHRC5017
U-238	9.72E-01		2.6E-01	2.6E-01	3.21E-01	pCi/g	N/A	RICHRC5017
STRONTIUM	4.06E+00		2.1E-01	1.2E+00	1.38E-01	pCi/g	54.90%	RICHRC5006
NI-63	1.57E+03		1.6E+01	1.8E+02	6.43E+00	pCi/g	75.80%	RICHRC5069

Number of Results: 16

RM
1/22/99

Result = IDL When Not Detected
(Q)ualifiers: U = Analyte result < MDA/IDL,
J = No U qualifier and result <

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Quanterra

SAMPLE RESULTS

LAB NAME:	QUANTERRA, Richland	SDG: /RPT GRP:	W02613 / 6675
LAB SAMPLE ID:	81136202	MATRIX:	SOIL
CLIENT ID:	B0T093	DATE RECEIVED:	11/23/98 2:29:00 PM

ANALYTE	RESULT	Q	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA/IDL	REPORT UNIT	YIELD	METHOD NUMBER
~~HEXCHROME~~	~~1.12E+00~~		~~N/A~~	~~N/A~~	~~3.00E-02~~	~~mg/kg~~	~~N/A~~	~~EPA7196~~
AM-241	3.95E-01	J	1.5E-01	1.7E-01	3.68E-02	pCi/g	82.30%	RICHRC5080
U-234	1.04E+00	J	1.4E-01	2.2E-01	2.73E-02	pCi/g	85.40%	RICHRC5030
U-235	2.11E-02	U J	2.2E-02	2.2E-02	3.11E-02	pCi/g	85.40%	RICHRC5030
U-238	9.62E-01	K/J J	1.4E-01	2.0E-01	3.51E-02	pCi/g	85.40%	RICHRC5030
PU-238	1.47E-02	U J	2.1E-02	2.1E-02	1.99E-02	pCi/g	61.70%	RICHRC5010
PU239/40	1.37E+00		2.0E-01	3.2E-01	3.35E-02	pCi/g	61.70%	RICHRC5010
AM-241	1.67E-02	U	1.2E-01	1.2E-01	1.99E-01	pCi/g	N/A	RICHRC5017
CO-60	2.61E+00		2.7E-01	2.7E-01	3.02E-02	pCi/g	N/A	RICHRC5017
CS-137	2.70E+01		2.7E+00	2.7E+00	6.11E-02	pCi/g	N/A	RICHRC5017
EU-152	1.94E+01		2.0E+00	2.0E+00	1.72E-01	pCi/g	N/A	RICHRC5017
EU-154	2.33E+00		2.8E-01	2.8E-01	1.11E-01	pCi/g	N/A	RICHRC5017
EU-155	1.21E-01	U	1.1E-01	1.1E-01	1.82E-01	pCi/g	N/A	RICHRC5017
U-238	6.06E-01		1.4E-01	1.4E-01	1.17E-01	pCi/g	N/A	RICHRC5017
STRONTIUM	2.56E+00		1.6E-01	7.9E-01	1.10E-01	pCi/g	56.50%	RICHRC5006
NI-63	1.79E+02		5.8E+00	2.6E+01	6.20E+00	pCi/g	77.90%	RICHRC5069

Number of Results: 16

RLM
1/22/99

Result = IDL When Not Detected
(Q)ualifiers: U = Analyte result < MDA/IDL,
J = No U qualifier and result <

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Quanterra

SAMPLE RESULTS

LAB NAME:	QUANTERRA, Richland	SDG: /RPT GRP:	W02613 / 6675
LAB SAMPLE ID:	81136203	MATRIX:	SOIL
CLIENT ID:	B0T094	DATE RECEIVED:	11/23/98 2:29:00 PM

ANALYTE	RESULT	Q	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA/IDL	REPORT UNIT	YIELD	METHOD NUMBER
~~HEXCHROME~~	~~4.20E-02~~		~~N/A~~	~~N/A~~	~~3.00E-02~~	~~mg/kg~~	~~N/A~~	~~EPA7196~~
AM-241	7.53E-01	J	1.6E-01	2.2E-01	3.11E-02	pCi/g	88.70%	RICHRC5080
U-234	1.17E+00	J	1.6E-01	2.4E-01	2.37E-02	pCi/g	81.00%	RICHRC5030
U-235	6.65E-02	J	3.7E-02	3.9E-02	2.37E-02	pCi/g	81.00%	RICHRC5030
U-238	1.22E+00	J	1.6E-01	2.5E-01	2.08E-02	pCi/g	81.00%	RICHRC5030
PU-238	3.42E-02	J	2.8E-02	2.9E-02	2.32E-02	pCi/g	54.50%	RICHRC5010
PU239/40	1.60E+00		1.9E-01	3.3E-01	1.56E-02	pCi/g	54.50%	RICHRC5010
AM-241	8.02E-02	U	8.0E-02	8.0E-02	1.31E-01	pCi/g	N/A	RICHRC5017
CO-60	1.35E+00		1.4E-01	1.4E-01	2.51E-02	pCi/g	N/A	RICHRC5017
CS-137	1.38E+01		1.4E+00	1.4E+00	5.06E-02	pCi/g	N/A	RICHRC5017
EU-152	1.72E+01		1.7E+00	1.7E+00	1.29E-01	pCi/g	N/A	RICHRC5017
EU-154	2.39E+00		2.7E-01	2.7E-01	9.18E-02	pCi/g	N/A	RICHRC5017
EU-155	8.33E-02	U	8.5E-02	8.5E-02	1.43E-01	pCi/g	N/A	RICHRC5017
U-238	5.60E-01		1.1E-01	1.1E-01	8.96E-02	pCi/g	N/A	RICHRC5017
STRONTIUM	1.40E+00		1.3E-01	4.5E-01	1.34E-01	pCi/g	47.70%	RICHRC5006
NI-63	1.54E+02		5.9E+00	2.4E+01	6.95E+00	pCi/g	69.10%	RICHRC5069

Number of Results: 16

RPM
1/22/99

Result = IDL When Not Detected
(Q)ualifiers: U = Analyte result < MDA/IDL.
J = No U qualifier and result <

Quanterra Analytical Services, Inc
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Quanterra

SAMPLE RESULTS

LAB NAME:	QUANTERRA, Richland	SDG: /RPT GRP:	W02613 / 6675
LAB SAMPLE ID:	81136204	MATRIX:	SOIL
CLIENT ID:	B0T095	DATE RECEIVED:	11/23/98 2:29:00 PM

ANALYTE	RESULT	Q	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA/IDL	REPORT UNIT	YIELD	METHOD NUMBER
~~HEXCHROME~~	~~7.49E-01~~		~~N/A~~	~~N/A~~	~~3.00E-02~~	~~mg/kg~~	~~N/A~~	~~EPA7196~~
AM-241	7.36E-01	J	1.6E-01	2.2E-01	3.70E-02	pCi/g	81.70%	RICHRC5080
U-234	8.32E-01	~~U~~ J	1.4E-01	2.0E-01	3.56E-02	pCi/g	76.40%	RICHRC5030
U-235	4.06E-02	~~U~~ J	3.2E-02	3.3E-02	2.99E-02	pCi/g	76.40%	RICHRC5030
U-238	8.27E-01	~~U~~ J	1.4E-01	2.0E-01	3.20E-02	pCi/g	76.40%	RICHRC5030
PU-238	1.62E-02	U J	2.5E-02	2.5E-02	4.02E-02	pCi/g	35.20%	RICHRC5010
PU239/40	1.75E+00		2.5E-01	4.2E-01	4.01E-02	pCi/g	35.20%	RICHRC5010
AM-241	1.80E-01		6.2E-02	6.2E-02	8.19E-02	pCi/g	N/A	RICHRC5017
CO-60	3.37E+00		3.5E-01	3.5E-01	3.24E-02	pCi/g	N/A	RICHRC5017
CS-137	2.35E+01		2.4E+00	2.4E+00	6.39E-02	pCi/g	N/A	RICHRC5017
EU-152	3.24E+01		3.3E+00	3.3E+00	1.72E-01	pCi/g	N/A	RICHRC5017
EU-154	3.93E+00		4.4E-01	4.4E-01	1.17E-01	pCi/g	N/A	RICHRC5017
EU-155	1.70E-01		1.1E-01	1.1E-01	1.64E-01	pCi/g	N/A	RICHRC5017
U-238	6.03E-01		1.3E-01	1.3E-01	1.21E-01	pCi/g	N/A	RICHRC5017
STRONTIUM	2.44E+00		1.5E-01	7.8E-01	1.24E-01	pCi/g	63.20%	RICHRC5006
NI-63	2.61E+02		8.2E+00	3.7E+01	8.41E+00	pCi/g	57.20%	RICHRC5069

Number of Results: 16

Result = IDL When Not Detected
(Q)ualifiers: U = Analyte result < MDA/IDL,
J = No U qualifier and result <

Quanterra Analytical Services, Inc
rptChemRadSample: v3.41

Quanterra

SAMPLE RESULTS

LAB NAME:	QUANTERRA, Richland	SDG: /RPT GRP:	W02613 / 6675
LAB SAMPLE ID:	81136205	MATRIX:	SOIL
CLIENT ID:	B0T096	DATE RECEIVED:	11/23/98 2:29:00 PM

ANALYTE	RESULT	Q	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA/IDL	REPORT UNIT	YIELD	METHOD NUMBER
~~HEXCHROME~~	~~1.00E+00~~		~~N/A~~	~~N/A~~	~~3.00E-02~~	~~mg/kg~~	~~N/A~~	~~EPA7196~~
AM-241	2.23E+00	J	2.6E-01	4.9E-01	2.80E-02	pCi/g	99.60%	RICHRC5080
U-234	1.28E+00	J	1.9E-01	2.9E-01	4.00E-02	pCi/g	62.10%	RICHRC5030
U-235	4.61E-02	J	3.6E-02	3.7E-02	3.08E-02	pCi/g	62.10%	RICHRC5030
U-238	1.07E+00	J	1.7E-01	2.5E-01	3.60E-02	pCi/g	62.10%	RICHRC5030
PU-238	1.86E-01	J	1.0E-01	1.1E-01	5.38E-02	pCi/g	23.70%	RICHRC5010
PU239/40	6.04E+00		5.7E-01	1.5E+00	7.14E-02	pCi/g	23.70%	RICHRC5010
AM-241	5.73E-01		2.9E-01	2.9E-01	4.47E-01	pCi/g	N/A	RICHRC5017
CO-60	1.45E+01		1.5E+00	1.5E+00	6.76E-02	pCi/g	N/A	RICHRC5017
CS-137	7.04E+01		7.0E+00	7.0E+00	1.44E-01	pCi/g	N/A	RICHRC5017
EU-152	1.54E+02		1.5E+01	1.5E+01	3.63E-01	pCi/g	N/A	RICHRC5017
EU-154	1.82E+01		1.9E+00	1.9E+00	2.47E-01	pCi/g	N/A	RICHRC5017
EU-155	7.98E-01		3.1E-01	3.1E-01	4.45E-01	pCi/g	N/A	RICHRC5017
U-238	6.04E-01		1.7E-01	1.7E-01	2.42E-01	pCi/g	N/A	RICHRC5017
STRONTIUM	3.94E+00		2.0E-01	1.2E+00	1.20E-01	pCi/g	56.50%	RICHRC5006
NI-63	8.70E+02		1.2E+01	1.0E+02	6.65E+00	pCi/g	72.40%	RICHRC5069

Number of Results: 16

1/22/99

Result = IDL When Not Detected

(Q)ualifiers: U = Analyte result < MDA/IDL,
J = No U qualifier and result <

Quanterra Analytical Services, Inc
rptChemRadSample; v3.41

Quanterra

SAMPLE RESULTS

LAB NAME:	QUANTERRA, Richland	SDG: /RPT GRP:	W02613 / 6675
LAB SAMPLE ID:	81136206	MATRIX:	SOIL
CLIENT ID:	B0T097	DATE RECEIVED:	11/23/98 2:29:00 PM

ANALYTE	RESULT	Q	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA/IDL	REPORT UNIT	YIELD	METHOD NUMBER
~~HEXCHROME~~	~~9.61E-01~~		~~N/A~~	~~N/A~~	~~3.00E-02~~	~~mg/kg~~	~~N/A~~	~~EPA7196~~
AM-241	2.22E+00	J	2.8E-01	5.2E-01	4.12E-02	pCi/g	90.90%	RICHRC5080
U-234	1.03E+00	J	1.6E-01	2.4E-01	2.99E-02	pCi/g	64.20%	RICHRC5030
U-235	4.37E-02	~~U~~ J	3.5E-02	3.6E-02	3.50E-02	pCi/g	64.20%	RICHRC5030
U-238	8.29E-01	~~U~~ J	1.5E-01	2.1E-01	3.50E-02	pCi/g	64.20%	RICHRC5030
PU-238	2.44E-01	J	7.5E-02	8.5E-02	2.85E-02	pCi/g	59.30%	RICHRC5010
PU239/40	6.98E+00		4.0E-01	1.2E+00	1.54E-02	pCi/g	59.30%	RICHRC5010
AM-241	6.61E-01		3.0E-01	3.0E-01	3.86E-01	pCi/g	N/A	RICHRC5017
CO-60	1.62E+01		1.6E+00	1.6E+00	5.10E-02	pCi/g	N/A	RICHRC5017
CS-137	6.27E+01		6.3E+00	6.3E+00	1.01E-01	pCi/g	N/A	RICHRC5017
EU-152	5.36E+01		5.4E+00	5.4E+00	2.53E-01	pCi/g	N/A	RICHRC5017
EU-154	6.38E+00		6.9E-01	6.9E-01	1.75E-01	pCi/g	N/A	RICHRC5017
EU-155	3.65E-01	~~U~~	2.1E-01	2.1E-01	2.71E-01	pCi/g	N/A	RICHRC5017
U-238	6.45E-01		1.7E-01	1.7E-01	1.76E-01	pCi/g	N/A	RICHRC5017
STRONTIUM	2.53E+00		1.7E-01	7.5E-01	1.23E-01	pCi/g	48.90%	RICHRC5006
NI-63	1.94E+03		1.8E+01	2.3E+02	6.47E+00	pCi/g	75.00%	RICHRC5069

Number of Results: 16

1/22/99

Result = IDL When Not Detected

(Q)ualifiers: U = Analyte result < MDA/IDL.
J = No U qualifier and result <

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~~001~~

Quanterra

SAMPLE RESULTS

LAB NAME:	QUANTERRA, Richland	SDG: /RPT GRP:	W02613 / 6675
LAB SAMPLE ID:	81136207	MATRIX:	SOIL
CLIENT ID:	B0T0F6	DATE RECEIVED:	11/23/98 2:29:00 PM

ANALYTE	RESULT	Q	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA/IDL	REPORT UNIT	YIELD	METHOD NUMBER
~~HEXCHROME~~	~~2.97E-01~~		~~N/A~~	~~N/A~~	~~3.00E-02~~	~~mg/kg~~	~~N/A~~	~~EPA7196~~
AM-241	6.75E-02	J	4.8E-02	4.9E-02	2.28E-02	pCi/g	101.60%	RICHRC5080
U-234	1.15E+00	J	1.6E-01	2.5E-01	3.56E-02	pCi/g	72.70%	RICHRC5030
U-235	5.61E-02	J	3.6E-02	3.8E-02	2.87E-02	pCi/g	72.70%	RICHRC5030
U-238	1.16E+00	J	1.6E-01	2.5E-01	3.56E-02	pCi/g	72.70%	RICHRC5030
PU-238	0.00E+00	U J	0.0E+00	1.4E-02	1.27E-02	pCi/g	72.20%	RICHRC5010
PU239/40	3.70E-01		8.3E-02	1.0E-01	1.88E-02	pCi/g	72.20%	RICHRC5010
AM-241	4.14E-02	U	5.1E-02	5.1E-02	8.65E-02	pCi/g	N/A	RICHRC5017
CO-60	4.62E-02	U	1.8E-02	1.8E-02	3.30E-02	pCi/g	N/A	RICHRC5017
CS-137	9.55E-01		1.1E-01	1.1E-01	3.05E-02	pCi/g	N/A	RICHRC5017
EU-152	4.43E+00		4.6E-01	4.6E-01	7.57E-02	pCi/g	N/A	RICHRC5017
EU-154	1.91E-01	U	9.1E-02	9.1E-02	1.07E-01	pCi/g	N/A	RICHRC5017
EU-155	2.77E-02	U	5.1E-02	5.1E-02	8.27E-02	pCi/g	N/A	RICHRC5017
U-238	6.32E-01		9.2E-02	9.2E-02	4.98E-02	pCi/g	N/A	RICHRC5017
STRONTIUM	1.55E+00		1.2E-01	5.2E-01	1.12E-01	pCi/g	59.70%	RICHRC5006
NI-63	3.95E+00	U	2.7E+00	8.0E+00	6.37E+00	pCi/g	75.50%	RICHRC5069

Number of Results: 16

pmc
1/22/99

Result = IDL When Not Detected
(Q)ualifiers: U = Analyte result < MDA/IDL,
J = No U qualifier and result <

Quanterra Analytical Services, Inc
rptChemRadSample; v3.41

Quanterra

SAMPLE RESULTS

LAB NAME:	QUANTERRA, Richland	SDG: /RPT GRP:	W02613 / 6675
LAB SAMPLE ID:	81136208	MATRIX:	SOIL
CLIENT ID:	B0T0F7	DATE RECEIVED:	11/23/98 2:29:00 PM

ANALYTE	RESULT	Q	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA/IDL	REPORT UNIT	YIELD	METHOD NUMBER
~~HEXCHROME~~	~~1.72E-01~~		~~N/A~~	~~N/A~~	~~3.00E-02~~	~~mg/kg~~	~~N/A~~	~~EPA7196~~
AM-241	6.18E-02	J	5.1E-02	5.2E-02	3.77E-02	pCi/g	78.90%	RICHRC5080
U-234	1.53E+00	J	2.1E-01	3.0E-01	3.50E-02	pCi/g	59.10%	RICHRC5030
U-235	6.09E-02	J	4.2E-02	4.3E-02	3.74E-02	pCi/g	59.10%	RICHRC5030
U-238	1.33E+00	J	1.9E-01	2.7E-01	5.81E-02	pCi/g	59.10%	RICHRC5030
PU-238	-1.14E-03	U J	1.6E-03	1.6E-03	3.25E-02	pCi/g	57.70%	RICHRC5010
PU239/40	5.97E-03	U	1.4E-02	1.4E-02	3.25E-02	pCi/g	57.70%	RICHRC5010
AM-241	7.83E-03	U	3.7E-02	3.7E-02	5.88E-02	pCi/g	N/A	RICHRC5017
CO-60	2.31E-02	U	1.3E-02	1.3E-02	2.46E-02	pCi/g	N/A	RICHRC5017
CS-137	5.80E-01		6.8E-02	6.8E-02	2.37E-02	pCi/g	N/A	RICHRC5017
EU-152	1.68E-01		5.6E-02	5.6E-02	7.07E-02	pCi/g	N/A	RICHRC5017
EU-154	1.01E-02	U	4.2E-02	4.2E-02	7.34E-02	pCi/g	N/A	RICHRC5017
EU-155	8.70E-02		3.4E-02	3.4E-02	5.61E-02	pCi/g	N/A	RICHRC5017
U-238	8.05E-01		9.6E-02	9.6E-02	3.84E-02	pCi/g	N/A	RICHRC5017
STRONTIUM	1.21E-01	U	6.0E-02	7.0E-02	1.43E-01	pCi/g	52.30%	RICHRC5006
NI-63	2.71E+00	U	3.2E+00	8.7E+00	8.05E+00	pCi/g	68.60%	RICHRC5069

Number of Results: 16

RK
1/22/99

Result = IDL When Not Detected
(Q)ualifiers: U = Analyte result < MDA/IDL
J = No U qualifier and result <

Quanterra

SAMPLE RESULTS

LAB NAME:	QUANTERRA, Richland	SDG: /RPT GRP:	W02613 / 6675
LAB SAMPLE ID:	81136209	MATRIX:	SOIL
CLIENT ID:	B0T0F8	DATE RECEIVED:	11/23/98 2:29:00 PM

ANALYTE	RESULT	Q	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA/IDL	REPORT UNIT	YIELD	METHOD NUMBER
~~HEXCHROME~~	~~1.29E-01~~		~~N/A~~	~~N/A~~	~~3.00E-02~~	~~mg/kg~~	~~N/A~~	~~EPA7196~~
AM-241	2.63E-01	J	9.6E-02	1.1E-01	2.37E-02	pCi/g	93.40%	RICHRC5080
U-234	1.14E+00	J	1.7E-01	2.5E-01	3.39E-02	pCi/g	68.80%	RICHRC5030
U-235	3.17E-02	U J	3.0E-02	3.0E-02	4.00E-02	pCi/g	68.80%	RICHRC5030
U-238	1.05E+00	J	1.6E-01	2.4E-01	3.86E-02	pCi/g	68.80%	RICHRC5030
PU-238	0.00E+00	U J	0.0E+00	2.3E-02	2.06E-02	pCi/g	56.50%	RICHRC5010
PU239/40	3.81E-02		3.4E-02	3.5E-02	2.06E-02	pCi/g	56.50%	RICHRC5010
AM-241	1.49E-02	U	2.9E-02	2.9E-02	4.25E-02	pCi/g	N/A	RICHRC5017
CO-60	7.37E-03	U	1.6E-02	1.6E-02	2.79E-02	pCi/g	N/A	RICHRC5017
CS-137	6.20E-01		7.5E-02	7.5E-02	2.61E-02	pCi/g	N/A	RICHRC5017
EU-152	2.48E-01	U	6.7E-02	6.7E-02	8.44E-02	pCi/g	N/A	RICHRC5017
EU-154	2.39E-02	U	4.4E-02	4.4E-02	7.81E-02	pCi/g	N/A	RICHRC5017
EU-155	6.15E-02	U	3.5E-02	3.5E-02	5.93E-02	pCi/g	N/A	RICHRC5017
U-238	8.85E-01		1.1E-01	1.1E-01	4.49E-02	pCi/g	N/A	RICHRC5017
STRONTIUM	1.40E-01	J	5.8E-02	7.2E-02	1.28E-01	pCi/g	52.50%	RICHRC5006
NI-63	5.22E+00	U	2.8E+00	8.0E+00	6.45E+00	pCi/g	77.10%	RICHRC5069

Number of Results: 16

RKW
1/22/99

Result = IDL When Not Detected
(Q)ualifiers: U = Analyte result < MDA/IDL.
J = No U qualifier and result <

000020

Quanterra Analytical Services, Inc
rptChemRadSample; v3.41

Quanterra

SAMPLE RESULTS

LAB NAME:	QUANTERRA, Richland	SDG: /RPT GRP:	W02613 / 6675
LAB SAMPLE ID:	81136210	MATRIX:	SOIL
CLIENT ID:	B0T0B5	DATE RECEIVED:	11/23/98 2:29:00 PM

ANALYTE	RESULT	Q	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA/IDL	REPORT UNIT	YIELD	METHOD NUMBER
~~HEXCHROME~~	~~3.00E-02~~	~~U~~	~~N/A~~	~~N/A~~	~~3.00E-02~~	~~mg/kg~~	~~N/A~~	~~EPA7196~~
AM-241	5.95E-02	J	4.9E-02	5.0E-02	2.68E-02	pCi/g	78.60%	RICHRC5080
U-234	8.15E-01	~~U~~ J	1.7E-01	2.4E-01	4.80E-02	pCi/g	46.50%	RICHRC5030
U-235	2.55E-02	U J	3.1E-02	3.2E-02	4.10E-02	pCi/g	46.50%	RICHRC5030
U-238	8.08E-01	~~U~~ J	1.7E-01	2.3E-01	3.61E-02	pCi/g	46.50%	RICHRC5030
PU-238	1.07E-02	U J	1.7E-02	1.7E-02	3.02E-02	pCi/g	68.40%	RICHRC5010
PU239/40	1.62E-02	U	2.1E-02	2.1E-02	3.23E-02	pCi/g	68.40%	RICHRC5010
AM-241	-1.10E-03	U	1.5E-01	1.5E-01	2.54E-01	pCi/g	N/A	RICHRC5017
CO-60	1.65E-02	U	2.1E-02	2.1E-02	3.74E-02	pCi/g	N/A	RICHRC5017
CS-137	4.92E-02	J	2.9E-02	2.9E-02	3.23E-02	pCi/g	N/A	RICHRC5017
EU-152	1.71E-01	U	7.3E-02	7.3E-02	9.26E-02	pCi/g	N/A	RICHRC5017
EU-154	4.30E-02	U	6.1E-02	6.1E-02	1.09E-01	pCi/g	N/A	RICHRC5017
EU-155	2.17E-03	U	4.8E-02	4.8E-02	7.78E-02	pCi/g	N/A	RICHRC5017
U-238	3.58E-01		8.1E-02	8.1E-02	5.32E-02	pCi/g	N/A	RICHRC5017
STRONTIUM	1.05E-01	U	5.5E-02	6.3E-02	1.27E-01	pCi/g	47.20%	RICHRC5006
NI-63	3.05E+00	U	2.8E+00	7.6E+00	7.12E+00	pCi/g	80.10%	RICHRC5069

Number of Results: 16

PWC
1/22/99

Quanterra

SAMPLE RESULTS

LAB NAME:	QUANTERRA, Richland	SDG: /RPT GRP:	W02613 / 6675
LAB SAMPLE ID:	81136211	MATRIX:	SOIL
CLIENT ID:	B0T0B6	DATE RECEIVED:	11/23/98 2:29:00 PM

ANALYTE	RESULT	Q	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA/IDL	REPORT UNIT	YIELD	METHOD NUMBER
~~HEXCHROME~~	~~3.00E-02~~	~~U~~	~~N/A~~	~~N/A~~	~~3.00E-02~~	~~mg/kg~~	~~N/A~~	~~EPA7196~~
AM-241	3.40E-02	J	3.9E-02	4.0E-02	3.07E-02	pCi/g	69.80%	RICHRC5080
U-234	9.33E-01	~~U~~ J	1.6E-01	2.3E-01	4.21E-02	pCi/g	65.30%	RICHRC5030
U-235	5.50E-02	~~U~~ J	4.0E-02	4.1E-02	3.54E-02	pCi/g	65.30%	RICHRC5030
U-238	9.91E-01	~~U~~ J	1.7E-01	2.4E-01	3.79E-02	pCi/g	65.30%	RICHRC5030
PU-238	3.29E-03	U J	1.1E-02	1.1E-02	3.10E-02	pCi/g	74.70%	RICHRC5010
PU239/40	1.51E-02	U	1.9E-02	1.9E-02	2.73E-02	pCi/g	74.70%	RICHRC5010
AM-241	-9.53E-03	U	4.3E-02	4.3E-02	6.65E-02	pCi/g	N/A	RICHRC5017
CO-60	-5.96E-04	U	2.1E-02	2.1E-02	3.65E-02	pCi/g	N/A	RICHRC5017
CS-137	3.42E-02	U	2.1E-02	2.1E-02	3.67E-02	pCi/g	N/A	RICHRC5017
EU-152	4.34E-02	U	5.3E-02	5.3E-02	8.62E-02	pCi/g	N/A	RICHRC5017
EU-154	1.43E-02	U	6.5E-02	6.5E-02	1.13E-01	pCi/g	N/A	RICHRC5017
EU-155	1.37E-02	U	3.7E-02	3.7E-02	6.28E-02	pCi/g	N/A	RICHRC5017
U-238	3.75E-01		8.8E-02	8.8E-02	5.35E-02	pCi/g	N/A	RICHRC5017
STRONTIUM	2.77E-02	U	4.7E-02	4.8E-02	1.29E-01	pCi/g	50.30%	RICHRC5006
NI-63	3.53E+00	U	2.6E+00	7.4E+00	6.13E+00	pCi/g	82.20%	RICHRC5069

Number of Results: 16

RM 1/22/99

Result = IDL When Not Detected

(Q)ualifiers: U = Analyte result < MDA/IDL.
J = No U qualifier and result <

Quanterra Analytical Services, Inc
rptChemRadSample; v3.41

Quanterra

SAMPLE RESULTS

LAB NAME:	QUANTERRA, Richland	SDG: /RPT GRP:	W02613 / 6675
LAB SAMPLE ID:	81136212	MATRIX:	SOIL
CLIENT ID:	B0T0D2	DATE RECEIVED:	11/23/98 2:29:00 PM

ANALYTE	RESULT	Q	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA/IDL	REPORT UNIT	YIELD	METHOD NUMBER
~~HEXCHROME~~	~~3.00E-02~~	~~U~~	~~N/A~~	~~N/A~~	~~3.00E-02~~	~~mg/kg~~	~~N/A~~	~~EPA7196~~
AM-241	2.76E-02	J	3.2E-02	3.2E-02	2.49E-02	pCi/g	84.60%	RICHRC5080
U-234	8.15E-01	J	1.3E-01	1.9E-01	3.19E-02	pCi/g	77.80%	RICHRC5030
U-235	3.68E-02	J	2.8E-02	2.9E-02	2.46E-02	pCi/g	77.80%	RICHRC5030
U-238	7.93E-01	J	1.3E-01	1.8E-01	3.33E-02	pCi/g	77.80%	RICHRC5030
PU-238	-1.16E-03	U J	1.6E-03	1.7E-03	3.32E-02	pCi/g	57.50%	RICHRC5010
PU239/40	4.31E-02		3.6E-02	3.6E-02	2.93E-02	pCi/g	57.50%	RICHRC5010
AM-241	5.10E-02		2.4E-02	2.4E-02	3.42E-02	pCi/g	N/A	RICHRC5017
CO-60	1.23E-02	U	2.4E-02	2.4E-02	4.22E-02	pCi/g	N/A	RICHRC5017
CS-137	7.93E-02		2.4E-02	2.4E-02	4.17E-02	pCi/g	N/A	RICHRC5017
EU-152	2.55E-01	U	7.5E-02	7.5E-02	9.90E-02	pCi/g	N/A	RICHRC5017
EU-154	-2.49E-02	U	6.9E-02	6.9E-02	1.17E-01	pCi/g	N/A	RICHRC5017
EU-155	4.01E-02	U	3.4E-02	3.4E-02	5.84E-02	pCi/g	N/A	RICHRC5017
U-238	4.74E-01		7.6E-02	7.6E-02	5.51E-02	pCi/g	N/A	RICHRC5017
STRONTIUM	4.07E-01	J	7.7E-02	1.5E-01	1.35E-01	pCi/g	56.90%	RICHRC5006
NI-63	5.33E+00	U	2.6E+00	7.2E+00	6.16E+00	pCi/g	85.70%	RICHRC5069

Number of Results: 16

RPB
1/22/99

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: 15 January 1999

Information Request

W02613 - Inorganics

Mercury - samples B0T0F6, B0T0F7, B0T0F8, B0T0B5, [redacted]6 and B0T0D2

The MS is outside QC limits (-197%). The above samples were below the laboratory detection limit, not detected in the blank, but flagged with a B, not a U. I need to know why.

Lab reports these values as detected. "B" qualifier in this case means "below RDL but above detection limit."

Rich Weiss 1-20-99

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: 15 January 1999

Information Request

W02613 - Inorganics

The reported amount for mercury in sample B0T0B6 on page 43 (~~0.002~~ 0.02 MG/KG) does not match the amount reported on page 40 (0.017 MG/KG). Which amount is correct.

Use 0.017 as value. Other value is the result of rounding procedure used by the program.

Rich Mero 1-20-99

W02613