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Date: 11 May 1999
 To: Bechtel Hanford, Inc. (technical representative)
 From: TechLaw, Inc.
 Project: 100-BC Areas - Full Protocol - Waste Site 116-B-1
 Subject: Radiochemistry - Data Package No. W02676-QES (SDG No. W02676)

INTRODUCTION

This memo presents the results of data validation on Summary Data Package No. W02676-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
BOTPF4	02/01/99	Soil	C	See note 1
BOTPF5	02/01/99	Soil	C	See note 1
BOTPF6	02/01/99	Soil	C	See note 1
BOTPF7	02/01/99	Soil	C	See note 1
BOTPF8	02/01/99	Soil	C	See note 1
BOTPF9	02/01/99	Soil	C	See note 1
BOTPH0	02/01/99	Soil	C	See note 1

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

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

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

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DATA QUALITY OBJECTIVES

- **Holding Times**

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

All holding times were acceptable.

- **Blanks**

Laboratory Blanks

Blank samples are analyzed to determine if positive results are due to laboratory reagent, sample container, or detector contamination. If blank analysis results indicate the presence of an analyte above the MDA, the following qualifiers are applied: All positive sample results less than five times the highest blank concentration are qualified as estimates and flagged "J"; sample results below the MDA are 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.

All blank results were acceptable.

- **Accuracy**

Accuracy is evaluated by analyzing distilled water or field samples spiked with known amounts of radionuclides. The sample activity as determined by analysis is compared to the known activity to assess accuracy. The acceptable laboratory control sample and matrix spike recovery range is 70% to 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 radiochemical tracer yields below 20%, plutonium-238 and plutonium-239/240 results in samples BOTPF4 and BOTPF5 were rejected and flagged "R".

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

All other accuracy results were acceptable.

- **Precision**

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

All duplicate results were acceptable.

Field Duplicate Samples

One pair of field duplicate samples (samples BOTPF9/BOTPH0) 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 uranium-235 and plutonium-239/240 were outside QC limits. Under the BHI statement of work, no qualification is required. All other field duplicate results were acceptable.

- **Detection Levels**

Reported analytical detection levels are compared against the 100 Area Remedial Action Sampling and Analysis Plan target detection limits (TDLs) or the contract specified MDA if no TDL was specified, to ensure that laboratory detection levels meet the required criteria. The reported detection limit exceeded the TDL for the following: Uranium-238DPH (GEA) in BOTPF5, BOTPF6, BOTPF7, BOTPF8 and BOTPH0. Under the BHI statement of work, no qualification is required. All other reported laboratory MDAs were at or below the analyte-specific TDL or contract specified MDA.

- **Completeness**

Data Package No. W02676 (SDG No. W02676) was submitted for validation and verified for completeness. The completion rate was 98%.

MAJOR DEFICIENCIES

Due to radiochemical tracer yields below 20%, plutonium-238 and plutonium-239/240 results in samples BOTPF4 and BOTPF5 were rejected and flagged "R". Rejected data is unusable and should not be reported.

MINOR DEFICIENCIES

Due to the lack of an LCS analysis, all plutonium-238 results were qualified as estimates and flagged "J". The reported detection limit exceeded the TDL for the following: cobalt-60 in BOTPF4; europium-154 in BOTPF4, BOTPF5, BOTPF8, BOTPF9 and BOTPH0; europium-155 in BOTPF9 and BOTPH0; and uranium-238DPH (GEA) BOTPF5, BOTPF6, BOTPF7, BOTPF8, BOTPF9 and BOTPH0. Under the BHI statement of work, no qualification is required.

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.

Appendix 1

Glossary of Data Reporting Qualifiers

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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.

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Appendix 2

Summary of Data Qualification

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DATA QUALIFICATION SUMMARY

SDG: W02676	REVIEWER: TLI	DATE: 5/11/99	PAGE <u>1</u> OF <u>1</u>
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Plutonium-238 Plutonium-239/240	R	B0TPF4, B0TPF5	Tracer recovery
Plutonium-238	J	All	No LCS

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Appendix 3

Qualified Data Summary and Annotated Laboratory Reports

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SAMPLE RESULTS

LAB NAME: QUANTERRA, Richland **SDG: /RPT GRP:** W02676 / 7052
LAB SAMPLE ID: 9CQGVA10 **MATRIX:** SOIL
CLIENT ID: B0TPF4 **DATE RECEIVED:** 2/3/99 2:38:00 PM

ANALYTE	RESULT	Q	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA/IDL	REPORT UNIT	YIELD	METHOD NUMBER
HEXCHROME	3.63E-01		N/A	N/A	3.00E-02	mg/kg	N/A	EPA7190 ✓
AM-241	2.29E-02	J	2.3E-02	2.3E-02	1.55E-02	pCi/g	90.60%	RICHRC5080
U-234	8.73E-01	J	1.3E-01	1.7E-01	2.70E-02	pCi/g	83.20%	RICHRC5030
U-235	2.95E-02	J	2.5E-02	2.5E-02	2.31E-02	pCi/g	83.20%	RICHRC5030
U-238	7.67E-01	J	1.2E-01	1.6E-01	2.52E-02	pCi/g	83.20%	RICHRC5030
PU-238	2.35E-02	UR	5.6E-02	5.7E-02	1.28E-01	pCi/g	11.60%	RICHRC5010
PU239/40	1.96E-01	UR	1.5E-01	1.5E-01	7.56E-02	pCi/g	11.60%	RICHRC5010
AM-241	-5.70E-03	U	7.9E-02	7.9E-02	1.33E-01	pCi/g	N/A	RICHRC5017
CO-60	7.61E-02		1.8E-02	1.8E-02	3.19E-02	pCi/g	N/A	RICHRC5017
CS-137	1.82E+00		1.9E-01	1.9E-01	3.17E-02	pCi/g	N/A	RICHRC5017
EU-152	6.58E+00		6.7E-01	6.7E-01	7.73E-02	pCi/g	N/A	RICHRC5017
EU-154	4.64E-01		8.8E-02	8.8E-02	1.14E-01	pCi/g	N/A	RICHRC5017
EU-155	5.75E-02	U	5.5E-02	5.5E-02	9.43E-02	pCi/g	N/A	RICHRC5017
U-238DHP	-2.20E-02	U	6.6E-01	6.6E-01	1.07E+00	pCi/g	N/A	RICHRC5017
STRONTIUM	1.45E+00		1.1E-01	4.4E-01	9.60E-02	pCi/g	68.70%	RICHRC5006
NI-63	2.81E+00	U	4.0E+00	1.3E+01	9.53E+00	pCi/g	100.00%	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 <

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SAMPLE RESULTS

LAB NAME: QUANTERRA, Richland **SDG: /RPT GRP:** W02676 / 7052
LAB SAMPLE ID: 9CQGVF10 **MATRIX:** SOIL
CLIENT ID: B0TPF5 **DATE RECEIVED:** 2/3/99 2:38:00 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	EPA719
AM-241	6.50E-02	J	5.0E-02	5.1E-02	4.34E-02	pCi/g	59.30%	RICHRC5080
U-234	1.09E+00		1.6E-01	2.1E-01	2.95E-02	pCi/g	75.80%	RICHRC5030
U-235	2.13E-02	U	2.2E-02	2.2E-02	2.53E-02	pCi/g	75.80%	RICHRC5030
U-238	8.34E-01	J	1.4E-01	1.7E-01	2.95E-02	pCi/g	75.80%	RICHRC5030
PU-238	-2.71E-03	U R	3.8E-03	3.9E-03	7.75E-02	pCi/g	18.20%	RICHRC5010
PU239/40	2.71E-01	A R	1.4E-01	1.5E-01	4.59E-02	pCi/g	18.20%	RICHRC5010
AM-241	4.37E-02	U	5.4E-02	5.4E-02	8.98E-02	pCi/g	N/A	RICHRC5017
CO-60	1.11E-01		2.7E-02	2.7E-02	2.13E-02	pCi/g	N/A	RICHRC5017
CS-137	3.04E+00		3.1E-01	3.1E-01	3.26E-02	pCi/g	N/A	RICHRC5017
EU-152	8.01E+00		8.2E-01	8.2E-01	8.13E-02	pCi/g	N/A	RICHRC5017
EU-154	4.87E-01	J	9.0E-02	9.0E-02	1.21E-01	pCi/g	N/A	RICHRC5017
EU-155	1.46E-02	U	5.4E-02	5.4E-02	9.19E-02	pCi/g	N/A	RICHRC5017
U-238DHP	6.13E-01	U	5.8E-01	5.8E-01	7.52E-01	pCi/g	N/A	RICHRC5017
STRONTIUM	1.34E+00		1.1E-01	4.2E-01	8.91E-02	pCi/g	68.30%	RICHRC5006
NI-63	-5.14E-01	U	3.4E+00	1.0E+01	8.03E+00	pCi/g	100.00%	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 <

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SAMPLE RESULTS

LAB NAME: QUANTERRA, Richland **SDG: /RPT GRP:** W02676 / 7052
LAB SAMPLE ID: 9CQGVG10 **MATRIX:** SOIL
CLIENT ID: B0TPF6 **DATE RECEIVED:** 2/3/99 2:38:00 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	EPA719
AM-241	-3.64E-04	U	7.3E-04	7.3E-04	1.83E-02	pCi/g	84.50%	RICHRC5080
U-234	8.42E-01	J	1.4E-01	1.8E-01	3.61E-02	pCi/g	79.10%	RICHRC5030
U-235	3.90E-02	J	3.1E-02	3.1E-02	3.11E-02	pCi/g	79.10%	RICHRC5030
U-238	8.36E-01	J	1.4E-01	1.8E-01	3.75E-02	pCi/g	79.10%	RICHRC5030
PU-238	-1.12E-03	UJ	2.2E-03	2.3E-03	5.65E-02	pCi/g	21.80%	RICHRC5010
PU239/40	2.69E-02	U	4.0E-02	4.0E-02	5.64E-02	pCi/g	21.80%	RICHRC5010
AM-241	2.12E-02	U	2.1E-02	2.1E-02	3.05E-02	pCi/g	N/A	RICHRC5017
CO-60	3.04E-02	<i>U</i>	1.2E-02	1.2E-02	2.27E-02	pCi/g	N/A	RICHRC5017
CS-137	3.64E-01		4.5E-02	4.5E-02	3.11E-02	pCi/g	N/A	RICHRC5017
EU-152	1.21E+00		1.4E-01	1.4E-01	5.04E-02	pCi/g	N/A	RICHRC5017
EU-154	6.39E-02	U	3.6E-02	3.6E-02	6.57E-02	pCi/g	N/A	RICHRC5017
EU-155	3.58E-02	U	2.9E-02	2.9E-02	4.86E-02	pCi/g	N/A	RICHRC5017
U-238DHP	1.02E-01	U	2.9E-01	2.9E-01	2.92E-01	pCi/g	N/A	RICHRC5017
STRONTIUM	1.55E+00		1.3E-01	5.0E-01	1.13E-01	pCi/g	65.20%	RICHRC5006
NI-63	-6.74E-01	U	3.4E+00	1.0E+01	8.42E+00	pCi/g	100.00%	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 <

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SAMPLE RESULTS

LAB NAME: QUANTERRA, Richland **SDG: /RPT GRP:** W02676 / 7052
LAB SAMPLE ID: 9CQGVJ10 **MATRIX:** SOIL
CLIENT ID: B0TPF7 **DATE RECEIVED:** 2/3/99 2:38:00 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	EPA7190
AM-241	4.80E-02	J	3.0E-02	3.1E-02	1.30E-02	pCi/g	78.70%	RICHRC5080
U-234	8.24E-01	J	1.3E-01	1.7E-01	3.26E-02	pCi/g	80.60%	RICHRC5030
U-235	3.03E-02	J	2.6E-02	2.6E-02	2.62E-02	pCi/g	80.60%	RICHRC5030
U-238	8.23E-01	J	1.3E-01	1.7E-01	3.50E-02	pCi/g	80.60%	RICHRC5030
PU-238	0.00E+00	U J	0.0E+00	2.2E-02	2.02E-02	pCi/g	43.40%	RICHRC5010
PU239/40	1.79E-01	J	7.3E-02	7.7E-02	2.02E-02	pCi/g	43.40%	RICHRC5010
AM-241	-5.38E-04	U	4.5E-02	4.5E-02	7.55E-02	pCi/g	N/A	RICHRC5017
CO-60	1.61E-01		3.2E-02	3.2E-02	2.03E-02	pCi/g	N/A	RICHRC5017
CS-137	2.70E+00		2.8E-01	2.8E-01	2.76E-02	pCi/g	N/A	RICHRC5017
EU-152	4.76E+00		4.9E-01	4.9E-01	6.99E-02	pCi/g	N/A	RICHRC5017
EU-154	3.57E-01		8.8E-02	8.8E-02	6.67E-02	pCi/g	N/A	RICHRC5017
EU-155	3.15E-02	U	4.4E-02	4.4E-02	7.53E-02	pCi/g	N/A	RICHRC5017
U-238DHP	5.64E-01	U	4.9E-01	4.9E-01	6.69E-01	pCi/g	N/A	RICHRC5017
STRONTIUM	6.32E-01	J	8.4E-02	2.2E-01	1.04E-01	pCi/g	67.50%	RICHRC5006
NI-63	-1.52E+00	U	3.3E+00	1.0E+01	7.86E+00	pCi/g	100.00%	RICHRC5069

Number of Results: 16

5/2/99


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

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SAMPLE RESULTS

LAB NAME: QUANTERRA, Richland **SDG: /RPT GRP:** W02676 / 7052
LAB SAMPLE ID: 9CQGVM10 **MATRIX:** SOIL
CLIENT ID: B0TPF8 **DATE RECEIVED:** 2/3/99 2:38:00 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	2.26E-02	J	2.0E-02	2.0E-02	1.22E-02	pCi/g	85.30%	RICHRC5080
U-234	1.26E+00		1.8E-01	2.5E-01	3.53E-02	pCi/g	63.50%	RICHRC5030
U-235	3.87E-02	J	3.2E-02	3.3E-02	3.02E-02	pCi/g	63.50%	RICHRC5030
U-238	1.06E+00		1.7E-01	2.2E-01	3.53E-02	pCi/g	63.50%	RICHRC5030
PU-238	0.00E+00	U	0.0E+00	3.6E-02	3.23E-02	pCi/g	25.90%	RICHRC5010
PU239/40	1.79E-01	J	9.2E-02	9.7E-02	3.23E-02	pCi/g	25.90%	RICHRC5010
AM-241	1.16E-02	U	6.8E-02	6.8E-02	1.13E-01	pCi/g	N/A	RICHRC5017
CO-60	1.96E-01		3.6E-02	3.6E-02	2.15E-02	pCi/g	N/A	RICHRC5017
CS-137	3.16E+00		3.2E-01	3.2E-01	3.11E-02	pCi/g	N/A	RICHRC5017
EU-152	5.40E+00		5.6E-01	5.6E-01	7.93E-02	pCi/g	N/A	RICHRC5017
EU-154	4.15E-01	J	9.3E-02	9.3E-02	1.08E-01	pCi/g	N/A	RICHRC5017
EU-155	1.31E-02	J	6.2E-02	6.2E-02	1.02E-01	pCi/g	N/A	RICHRC5017
U-238DHP	6.25E-01	U	5.8E-01	5.8E-01	9.72E-01	pCi/g	N/A	RICHRC5017
STRONTIUM	7.31E-01	J	8.8E-02	2.5E-01	9.88E-02	pCi/g	66.60%	RICHRC5006
NI-63	-1.08E+00	U	3.4E+00	1.1E+01	8.15E+00	pCi/g	100.00%	RICHRC5069

Number of Results: 16

Handwritten:
5/7/99

Result = IDL When Not Detected

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

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SAMPLE RESULTS

LAB NAME: QUANTERRA, Richland **SDG: /RPT GRP:** W02676 / 7052
LAB SAMPLE ID: 9CQGVR10 **MATRIX:** SOIL
CLIENT ID: B0TPF9 **DATE RECEIVED:** 2/3/99 2:38:00 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	2.04E-02	U	2.1E-02	2.1E-02	2.09E-02	pCi/g	78.80%	RICHRC5080
U-234	8.82E-01	J	1.4E-01	1.8E-01	3.18E-02	pCi/g	74.20%	RICHRC5030
U-235	3.85E-02	J	3.0E-02	3.0E-02	2.57E-02	pCi/g	74.20%	RICHRC5030
U-238	8.15E-01	J	1.4E-01	1.7E-01	3.01E-02	pCi/g	74.20%	RICHRC5030
PU-238	-1.96E-03	U J	2.8E-03	2.8E-03	5.59E-02	pCi/g	26.20%	RICHRC5010
PU239/40	6.11E-02	J	5.5E-02	5.6E-02	3.31E-02	pCi/g	26.20%	RICHRC5010
AM-241	-7.12E-02	U	6.5E-02	6.5E-02	1.07E-01	pCi/g	N/A	RICHRC5017
CO-60	1.55E-01		3.1E-02	3.1E-02	2.15E-02	pCi/g	N/A	RICHRC5017
CS-137	2.38E+00		2.4E-01	2.4E-01	2.98E-02	pCi/g	N/A	RICHRC5017
EU-152	4.50E+00		4.6E-01	4.6E-01	7.75E-02	pCi/g	N/A	RICHRC5017
EU-154	3.64E-01	✓	9.6E-02	9.6E-02	1.05E-01	pCi/g	N/A	RICHRC5017
EU-155	1.04E-01	✓	5.7E-02	5.7E-02	9.42E-02	pCi/g	N/A	RICHRC5017
U-238DHP	1.06E+00	✓	5.6E-01	5.6E-01	9.29E-01	pCi/g	N/A	RICHRC5017
STRONTIUM	2.78E-01	J	6.5E-02	1.1E-01	1.08E-01	pCi/g	57.10%	RICHRC5006
NI-63	2.54E+00	U	3.2E+00	1.0E+01	7.48E+00	pCi/g	100.00%	RICHRC5069

Number of Results: 16

5/7/99
mu

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

000016

SAMPLE RESULTS

LAB NAME: QUANTERRA, Richland **SDG: /RPT GRP:** W02676 / 7052
LAB SAMPLE ID: 9CQGVW10 **MATRIX:** SOIL
CLIENT ID: B0TPH0 **DATE RECEIVED:** 2/3/99 2:38:00 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	1.62E-02	U	1.9E-02	1.9E-02	2.22E-02	pCi/g	77.80%	RICHRC5080
U-234	9.63E-01	J	1.5E-01	1.9E-01	3.68E-02	pCi/g	80.60%	RICHRC5030
U-235	5.49E-02	J	3.6E-02	3.7E-02	3.23E-02	pCi/g	80.60%	RICHRC5030
U-238	8.14E-01	J	1.4E-01	1.7E-01	3.68E-02	pCi/g	80.60%	RICHRC5030
PU-238	-1.11E-03	UJ	2.2E-03	2.2E-03	5.56E-02	pCi/g	24.40%	RICHRC5010
PU239/40	1.09E-01	J	7.8E-02	8.0E-02	5.55E-02	pCi/g	24.40%	RICHRC5010
AM-241	-2.89E-02	U	6.9E-02	6.9E-02	1.15E-01	pCi/g	N/A	RICHRC5017
CO-60	1.61E-01		3.2E-02	3.2E-02	2.21E-02	pCi/g	N/A	RICHRC5017
CS-137	2.56E+00		2.6E-01	2.6E-01	3.25E-02	pCi/g	N/A	RICHRC5017
EU-152	5.27E+00		5.4E-01	5.4E-01	7.85E-02	pCi/g	N/A	RICHRC5017
EU-154	4.53E-01		8.7E-02	8.7E-02	1.11E-01	pCi/g	N/A	RICHRC5017
EU-155	2.91E-02	U	6.1E-02	6.1E-02	1.00E-01	pCi/g	N/A	RICHRC5017
U-238DHP	6.06E-01	U	5.9E-01	5.9E-01	9.82E-01	pCi/g	N/A	RICHRC5017
STRONTIUM	2.56E-01	J	7.1E-02	1.0E-01	1.35E-01	pCi/g	51.90%	RICHRC5006
NI-63	2.59E-01	U	2.8E+00	8.8E+00	6.61E+00	pCi/g	100.00%	RICHRC5069

Number of Results: 16

5/7/99
[Signature]

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

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Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

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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

March 3, 1999

Attention: Joan Kessner



Project Number	:	550.186
SDG	:	W02676
Number of Samples	:	Seven (7)
Sample Matrix	:	Soil
Data Deliverable	:	15/45 day
Date SDG Closed	:	February 3, 1999

II. Introduction

On February 3, 1999 a total of seven "soil" samples were received by Quanterra, Richland and transferred to Quanterra, St. Louis for chemical analysis. St. Louis received only the 125 ml containers listed on the chain of custody for the metals analysis. The rest of the sample containers remained in Richland for analysis there. Upon receipt, the samples were given the following laboratory ID numbers to correspond with the specific client ID's:

<u>St. Louis ID</u>	<u>BHI ID</u>	<u>SAF ID</u>	<u>Matrix</u>	<u>Date of Receipt</u>
20687-001	B0TPF4	B99-002	Soil	03-FEB-99
20687-002	B0TPF5	B99-002	Soil	03-FEB-99
20687-003	B0TPF6	B99-002	Soil	03-FEB-99
20687-004	B0TPF7	B99-002	Soil	03-FEB-99
20687-005	B0TPF8	B99-002	Soil	03-FEB-99
20687-006	B0TPF9	B99-002	Soil	03-FEB-99
20687-007	B0TPH0	B99-002	Soil	03-FEB-99

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.

Bechtel Hanford Incorporated
March 3, 1999
Project Number: 550.186
SDG: W02676
Page 2

III. Analytical Results/ Methodology (continued)

Analyses requested: ICP Metals - 6010A (SW 846){Chromium and Lead};
Mercury - 7471 - (CV)

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.

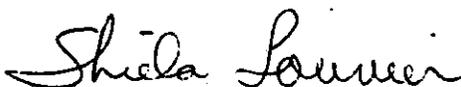
V. Comments

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

There were no comments or nonconformances associated with the shipping or receipt of the samples in this sample delivery group.

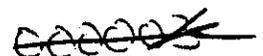
I certify that this Summary Package is in compliance with the SOW, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hard copy data package has been authorized by the Laboratory Manager or a designee, as verified by the following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

Reviewed and approved:



Sheila M. Louvier
St. Louis Project Manager

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CERTIFICATE OF ANALYSIS

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

March 23, 1999

Attention: Joan Kessner



SAF Number : B99-002
Date First Sample Received : February 3, 1999
Number of Samples : 7
Sample Type : Soil
SDG Number : W02676
Data Deliverable : 15 Day Priority / 28 Day Summary

I. Introduction

On February 3, 1999, 7 priority soil samples were received by the Quanterra Environmental Services Richland Laboratory (QESRL) for a 15-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:

<u>QESRL ID#</u>	<u>BHI ID#</u>	<u>MATRIX</u>	<u>DATE OF RECEIPT</u>
9CQGVMI0	B0TPF8	SOIL	2/3/99
9CQGVRI0	B0TPF9	SOIL	2/3/99
9CQGVW10	B0TPH0	SOIL	2/3/99
9CQGVA10	B0TPF4	SOIL	2/3/99
9CQGVF10	B0TPF5	SOIL	2/3/99
9CQGVG10	B0TPF6	SOIL	2/3/99
9CQGVJ10	B0TPF7	SOIL	2/3/99

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.

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Bechtel Hanford, Inc.
March 23, 1999
Page 2

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 W02676 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 (B0TPF6) and sample results are within contractual requirements.

Plutonium-238, -239/40 by method RICH-RC-5062

The LCS and batch blank, results are within contractual requirements. Samples B0TPF4, B0TPF5 and the duplicate of B0TPF6 all had recoveries below 20%. The whole batch was reanalyzed and the results did not improve. After consultation with BHI the data is reported.

Uranium-234, -235, -238 by method RICH-RC-5030

The LCS, batch blank, sample duplicate (B0TPF7) and sample results are within contractual requirements.

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Bechtel Hanford, Inc.
March 23, 1999
Page 3

Gamma Spectroscopy**Gamma Scan by method RICH-RC-5017**

The LCS, is within contractual requirements. The batch blank had U-238 detected, the blank was Ottawa sand which is known to contain trace amounts of U-238. Some of the samples had an MDA greater than the CRDL for various nuclides, in most cases the results are below the MDA.

Gas Proportional Counting**Total Strontium by method RICH-RC-5006**

The LCS, batch blank, sample duplicate (BOTPH0) and sample results are within contractual requirements.

Liquid Scintillation Counting**Nickel-63 by method RICH-RC-5069**

The LCS, batch blank, sample duplicate (BOTPF4) and sample results are within contractual requirements.

Chemical Analyses**Chromium Hex by EPA method 7196**

The LCS, batch blank, sample duplicate (BOTPF7) 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:



Doug Swenson
Project Manager

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Bechtel Hanford Inc.

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

B99-002-61

Page 1 of

Collector Fahlberg/Coffman	Company Contact R Coffman	Telephone No. 373-6425	Project Coordinator Trent, SJ	Price Code	Data Turn 15 D
Project Designation 100 BC Areas - Full Protocol	Sampling Location 100B/C		SAF No. B99-002		
Ice Chest No. SML-526	Field Logbook No. EL 1327-2		Method of Shipment Hand deliver - Great. Veh		
Shipped To Quanterra Incorporated	Offsite Property No. NA		Bill of Lading/Air Bill No. NA		
COA					

POSSIBLE SAMPLE HAZARDS/REMARKS	Preservation	None	Cool 4C	None	None	None					
	Type of Container	P	aG	aG	aG	Marinelli					
	No. of Container(s)	1	1	1	1	1					
	Special Handling and/or Storage	Volume	20mL	60mL	60mL	125mL	500mL				

SPE
W02676
SAMPLE ANALYSIS
J9B040128

Sample No.	Matrix *	Sample Date	Sample Time	Activity Scan	Chromium Hex - 7196	See item (1) in Special Instructions	PCP Metals - 6010A (SW-846) (Chromium, Lead); Mercury - 7471 - (CV)	See item (2) in Special Instructions				
BOTPF4 9CQ6-VA10	Soil	2.1.99	0920	X	X	X	X	X				BOTPH2
BOTPF5 9CQ6-VF10	Soil	2.1.99	0925	X	X	X	X	X				BOTPH3
BOTPF6 9CQ6-VG10	Soil	2.1.99	0930	X	X	X	X	X				BOTPH4
BOTPF7 9CQ6-VJ10	Soil	2.1.99	0935	X	X	X	X	X				BOTPH5

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CHAIN OF POSSESSION				SPECIAL INSTRUCTIONS				Matrix *
Relinquished By R. Fahlberg	Date/Time 1/30	Received By R. Nelson	Date/Time 2/3/99	(1) Americium-241; Isotopic Plutonium; Isotopic Uranium; Strontium-89,90 -- Total Sr; Nickel-63 (2) Gamma Spectroscopy (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155); Gamma Spec - Add-on (Americium-241, Uranium-238) R. Fahlberg unavailable to relinquish samples.				Soil Water Vapor Other Solid Other Liquid
Relinquished By M. [Signature]	Date/Time 2/10/99	Received By [Signature]	Date/Time 2/3/99					
Relinquished By	Date/Time	Received By	Date/Time					

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

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Bechtel Hanford Inc.

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

1899-002-62

Page 1 of

Collector
Fahlberg/Coffman

Company Contact
R Coffman

Telephone No.
373-6425

Project Coordinator
(RENT, SJ)

Price Code

Data Turnar

Project Designation
100 BC Areas - Full Protocol

Sampling Location
100B/C

SAF No.
1899-002

15 Da

Ice Chest No.
SML-526

Field Logbook No.
EL 1327-2

Method of Shipment

Hand delivered - Govt. Vel

Shipped To
Quanterra Incorporated

Offsite Property No.

N/A

Bill of Lading/Air Bill No.

N/A

COA

R E J N
2/15/99

POSSIBLE SAMPLE HAZARDS/REMARKS

Preservation

Cool 4C

None

Cool 4C

None

None

None

Type of Container

aG

P

aG

aG

aG

Marinelli

No. of Container(s)

0

1

1

1

1

1

Special Handling and/or Storage

Volume

60mL

20mL

60mL

60mL

125mL

500mL

SAMPLE ANALYSIS

Chromium
Hex - 7196

Activity Scav

Chromium
Hex - 7196

See item (1) in
Special
Instructions.

ICP Metals -
6010A (SW-
846)
(Chromium,
Lead,
Mercury -
7471 - (CV)

See item (2) in
Special
Instructions.

Sample No.

Matrix *

Sample Date

Sample Time

~~80T0C7~~

Soil - RIN 2/3/99

80T0F8 9CQGVM10

Soil

02/1/99 0940

80T0F9 9CQGVRI0

Soil

2-1-99 0918

80T0H0 9CQGVW10

Soil

2-1-99 0918

SPECIAL INSTRUCTIONS

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

R. Fahlberg unavailable to
relinquish samples.

Matrix *

- Soil
- Water
- Vapor
- Other Solid
- Other Liquid

CHAIN OF POSSESSION

Sign/Print Names

Relinquished By

Date/Time

Received By

Date/Time

LABORATORY SECTION

Received By

Title

Date/Time

FINAL SAMPLE DISPOSITION

Disposal Method

Disposed By

Date/Time

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Appendix 5
Data Validation Supporting Documentation

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RADIOCHEMICAL DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: 100- BC 116-B-2		DATA PACKAGE: W02676			
VALIDATOR: TLI		LAB: QES		DATE: 4/22/89	
CASE:			SDG: W02676		
ANALYSES PERFORMED					
<input type="checkbox"/> Gross Alpha/Beta	<input checked="" type="checkbox"/> Strontium-90	<input type="checkbox"/> Technetium-99	<input checked="" type="checkbox"/> Alpha Spectroscopy	<input checked="" type="checkbox"/> Gamma Spectroscopy	
<input type="checkbox"/> Total Uranium	<input type="checkbox"/> Radium-22	<input type="checkbox"/> Tritium	<input checked="" type="checkbox"/> Ni-63		
SAMPLES/MATRIX					
BOTPF4 BOTPF5 BOTPF6 BOTPF7					
BOTPF8 BOTPF9 BOTPH0					
soil					

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

Comments: _____

2. Initial Calibration N/A
 Instruments/detectors calibrated within one year of sample analysis? Yes No N/A
 Initial calibration acceptable? Yes No N/A
 Standards NIST traceable? Yes No N/A
 Standards Expired? Yes No N/A

Comments: _____

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

Comments: _____

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

Comments: U-239 GEA (12) F9 B7 E4 F5 E4 J

- 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: _____

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: 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: F4 11.6 (~~23~~ Pu238 + Pu239/40) FS 18.2 sure R

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: _____

ASH

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: BOTPHO dup of BOTPF9
U235 (32.7) PU 239/40 (52.7) - no qual req

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: CO-60 (F4) E 0154 (F4, F5, F8, F9, H0)
FU-155 (F9, H0) U-235 GFA (all but F4)

AGP

Date: 11 May 1999
To: Bechtel Hanford Inc. (technical representative)
From: TechLaw, Inc.
Project: 100-BC Areas - Full Protocol - Waste Site 116-B-1
Subject: Inorganics - Data Package No. W02676-QES (SDG No. W02676)

INTRODUCTION

This memo presents the results of data validation on Data Package No. W02676-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
BOTPF4	02/01/99	Soil	C	See note 1
BOTPF5	02/01/99	Soil	C	See note 1
BOTPF6	02/01/99	Soil	C	See note 1
BOTPF7	02/01/99	Soil	C	See note 1
BOTPF8	02/01/99	Soil	C	See note 1
BOTPF9	02/01/99	Soil	C	See note 1
BOTPHO	02/01/99	Soil	C	See note 1

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

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

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

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DATA QUALITY OBJECTIVES

- **Holding Times**

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

All holding times were acceptable.

- **Blanks**

Preparation Blanks

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

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

All preparation blank results were acceptable.

- **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

000002

below the IDL are rejected and flagged "UR". Samples with a spike recovery of 30% to 69% and a sample result less than the IDL are qualified "UJ". Samples with a spike recovery of greater than 130% or less than 70% and a sample result greater than the IDL are qualified as estimates and flagged "J". Finally, for samples with a spike recovery greater than 130% and a sample result less than the IDL, no qualification is required.

All matrix spike recovery results were acceptable.

- **Precision**

- Laboratory Duplicate Samples

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

- All laboratory duplicate results were acceptable.

- Field Duplicates

- One sample duplicate pair (BOTPF9/BOTPHO) was submitted for analysis. The samples were compared using the same criteria as for a laboratory duplicate.

- All field duplicate results were acceptable.

- **Analytical Detection Levels**

- Reported analytical detection levels are compared against the 100 Area Remedial Action Sampling and Analysis Plan 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. W02676-QES (SDG No. W02676) was submitted for validation and verified for completeness. The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

None found.

REFERENCES

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

DOE/RL-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

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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).

000006

Appendix 2

Summary of Data Qualification

000007

DATA QUALIFICATION SUMMARY

SDG: W02676	REVIEWER: TLI	DATE: 5/11/99	PAGE <u>1</u> OF <u>1</u>
COMMENTS: No qualifiers assigned			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON

000008

Appendix 3

Qualified Data Summary and Annotated Laboratory Reports

000009

Project: BECHTEL-HANFORD																
Laboratory: Quanterra																
Case		SDG: W02676														
Sample Number	BOTPF4		BOTPF5		BOTPF6		BOTPF7		BOTPF8		BOTPF9		BOTPH0			
Location	116-B-1		116-B-1		116-B-1		116-B-1		116-B-1		116-B-1		116-B-1			
Remarks	A1		A2		A3		B4		B5		B6		Duplicate (B6)			
Sample Date	2/1/99		2/1/99		2/1/99		2/1/99		2/1/99		2/1/99		2/1/99			
Inorganics	CRDL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	
Chromium (total)	0.5	18.6		15.7		14.1		13.6		16.7		15.2		15.7		
Lead	2	4.3		3.8		4.8		3.2		4.4		5		4.8		
Mercury	0.05	0.02		0.02		0.02	U	0.02		0.02		0.02		0.02		
Chromium VI	0.1	0.363		0.03	U	0.03	U									
				<i>2/15</i>		<i>2/12</i>		<i>2/12</i>		<i>2/12</i>		<i>2/12</i>		<i>2/12</i>		
				<i>6/22/99</i>		<i>6/22/99</i>										

Revised per telecon w/ R.L. WEISS 6/22/99

Steve J. Frank

000010

SAMPLE RESULTS

LAB NAME: QUANTERRA, Richland **SDG: /RPT GRP:** W02676 / 7052
LAB SAMPLE ID: 9CQGV10 **MATRIX:** SOIL
CLIENT ID: B0TPF4 **DATE RECEIVED:** 2/3/99 2:38:00 PM

ANALYTE	RESULT	Q	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA/IDL	REPORT UNIT	YIELD	METHOD NUMBER
HEXCHROME	3.63E-01		N/A	N/A	3.00E-02	mg/kg	N/A	EPA7196
AM-241	2.29E-02	J	2.3E-02	2.3E-02	1.55E-02	pCi/g	90.00%	RICHRC5000
U-234	8.73E-01	J	1.3E-01	1.7E-01	2.70E-02	pCi/g	83.20%	RICHRC5030
U-235	2.95E-02	J	2.5E-02	2.5E-02	2.31E-02	pCi/g	83.20%	RICHRC5030
U-238	7.67E-01	J	1.2E-01	1.6E-01	2.52E-02	pCi/g	83.20%	RICHRC5030
PU-238	2.35E-02	U	5.6E-02	5.7E-02	1.28E-01	pCi/g	11.60%	RICHRC5010
PU239/40	1.96E-01	J	1.5E-01	1.5E-01	7.56E-02	pCi/g	11.60%	RICHRC5010
AM-241	-5.70E-03	U	7.9E-02	7.9E-02	1.33E-01	pCi/g	N/A	RICHRC5017
CO-60	7.61E-02	U	1.8E-02	1.8E-02	3.19E-02	pCi/g	N/A	RICHRC5017
CS-137	1.82E+00		1.9E-01	1.9E-01	3.17E-02	pCi/g	N/A	RICHRC5017
EU-152	6.58E+00		6.7E-01	6.7E-01	7.73E-02	pCi/g	N/A	RICHRC5017
EU-154	4.64E-01	U	8.8E-02	8.8E-02	1.14E-01	pCi/g	N/A	RICHRC5017
EU-155	5.75E-02	U	5.5E-02	5.5E-02	9.43E-02	pCi/g	N/A	RICHRC5017
U-238DHP	-2.20E-02	U	6.6E-01	6.6E-01	1.07E+00	pCi/g	N/A	RICHRC5017
STRONTIUM	1.45E+00		1.1E-01	4.4E-01	9.60E-02	pCi/g	68.70%	RICHRC5006
NI-63	2.81E+00	U	4.0E+00	1.3E+01	9.53E+00	pCi/g	100.00%	RICHRC5009

Number of Results: 16

pc
5/7/99

Result = IDL When Not Detected

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

000012

Quanterra Analytical Services, Inc
rptChemRadSample; v3.41

SAMPLE RESULTS

LAB NAME: QUANTERRA, Richland **SDG: /RPT GRP:** W02676 / 7052
LAB SAMPLE ID: 9CQGVF10 **MATRIX:** SOIL
CLIENT ID: B0TPF5 **DATE RECEIVED:** 2/3/99 2:38:00 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	6.50E-02	J	5.0E-02	5.1E-02	4.34E-02	pCi/g	59.30%	RICHRC5060
U-234	1.09E+00		1.6E-01	2.1E-01	2.95E-02	pCi/g	75.80%	RICHRC5030
U-235	2.13E-02	U	2.2E-02	2.2E-02	2.53E-02	pCi/g	75.80%	RICHRC5030
U-238	8.34E-01	J	1.4E-01	1.7E-01	2.95E-02	pCi/g	75.80%	RICHRC5030
PU-238	-2.71E-03	U	3.8E-03	3.9E-03	7.75E-02	pCi/g	18.20%	RICHRC5010
PU239/40	2.71E-01	J	1.4E-01	1.5E-01	4.59E-02	pCi/g	18.20%	RICHRC5010
AM-241	4.37E-02	U	5.4E-02	5.4E-02	8.98E-02	pCi/g	N/A	RICHRC5017
CO-60	1.11E-01		2.7E-02	2.7E-02	2.13E-02	pCi/g	N/A	RICHRC5017
CS-137	3.04E+00		3.1E-01	3.1E-01	3.26E-02	pCi/g	N/A	RICHRC5017
EU-152	8.01E+00		8.2E-01	8.2E-01	8.13E-02	pCi/g	N/A	RICHRC5017
EU-154	4.87E-01	U	9.0E-02	9.0E-02	1.21E-01	pCi/g	N/A	RICHRC5017
EU-155	1.46E-02	U	5.4E-02	5.4E-02	9.19E-02	pCi/g	N/A	RICHRC5017
U-238DHP	6.13E-01	U	5.8E-01	5.8E-01	7.52E-01	pCi/g	N/A	RICHRC5017
STRONTIUM	1.34E+00		1.1E-01	4.2E-01	8.91E-02	pCi/g	68.30%	RICHRC5006
NI-63	-5.14E-01	U	3.4E+00	1.0E+01	8.03E+00	pCi/g	100.00%	RICHRC5069

Number of Results: 16

ju
5/2/89

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

SAMPLE RESULTS

LAB NAME: QUANTERRA, Richland **SDG: /RPT GRP:** W02676 / 7052
LAB SAMPLE ID: 9CQGVG10 **MATRIX:** SOIL
CLIENT ID: B0TPF6 **DATE RECEIVED:** 2/3/99 2:38:00 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	3.64E-04	U	7.3E-04	7.3E-04	1.83E-02	pCi/g	84.50%	RICHRC5080
U-234	8.42E-01	J	1.4E-01	1.8E-01	3.61E-02	pCi/g	79.10%	RICHRC5030
U-235	3.90E-02	J	3.1E-02	3.1E-02	3.11E-02	pCi/g	79.10%	RICHRC5030
U-238	8.36E-01	J	1.4E-01	1.8E-01	3.75E-02	pCi/g	79.10%	RICHRC5030
PU-238	-1.12E-03	U	2.2E-03	2.3E-03	5.65E-02	pCi/g	21.80%	RICHRC5010
PU239/40	2.69E-02	U	4.0E-02	4.0E-02	5.64E-02	pCi/g	21.80%	RICHRC5010
AM-241	2.12E-02	U	2.1E-02	2.1E-02	3.05E-02	pCi/g	N/A	RICHRC5017
CO-60	3.04E-02	U	1.2E-02	1.2E-02	2.27E-02	pCi/g	N/A	RICHRC5017
CS-137	3.64E-01		4.5E-02	4.5E-02	3.11E-02	pCi/g	N/A	RICHRC5017
EU-152	1.21E+00		1.4E-01	1.4E-01	5.04E-02	pCi/g	N/A	RICHRC5017
EU-154	6.39E-02	U	3.6E-02	3.6E-02	6.57E-02	pCi/g	N/A	RICHRC5017
EU-155	3.58E-02	U	2.9E-02	2.9E-02	4.86E-02	pCi/g	N/A	RICHRC5017
U-238DHP	1.02E-01	U	2.9E-01	2.9E-01	2.92E-01	pCi/g	N/A	RICHRC5017
STRONTIUM	1.55E+00		1.3E-01	5.0E-01	1.13E-01	pCi/g	65.20%	RICHRC5006
NI-63	-6.74E-01	U	3.4E+00	1.0E+01	8.42E+00	pCi/g	100.00%	RICHRC5069

Number of Results: 16

PLM
5/7/99

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

000020

SAMPLE RESULTS

LAB NAME: QUANTERRA, Richland **SDG: /RPT GRP:** W02676 / 7052
LAB SAMPLE ID: 9CQGVJ10 **MATRIX:** SOIL
CLIENT ID: B0TPF7 **DATE RECEIVED:** 2/3/99 2:38:00 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	4.80E-02	J	3.0E-02	3.1E-02	1.30E-02	pCi/g	78.70%	RICHRC5080
U-234	8.24E-01	J	1.3E-01	1.7E-01	3.26E-02	pCi/g	80.60%	RICHRC5030
U-235	3.03E-02	J	2.6E-02	2.6E-02	2.62E-02	pCi/g	80.60%	RICHRC5030
U-238	8.23E-01	J	1.3E-01	1.7E-01	3.50E-02	pCi/g	80.60%	RICHRC5030
PU-238	0.00E+00	U	0.0E+00	2.2E-02	2.02E-02	pCi/g	43.40%	RICHRC5010
PU239/40	1.79E-01	J	7.3E-02	7.7E-02	2.02E-02	pCi/g	43.40%	RICHRC5010
AM-241	-5.38E-04	U	4.5E-02	4.5E-02	7.55E-02	pCi/g	N/A	RICHRC5017
CO-60	1.61E-01		3.2E-02	3.2E-02	2.03E-02	pCi/g	N/A	RICHRC5017
CS-137	2.70E+00		2.8E-01	2.8E-01	2.76E-02	pCi/g	N/A	RICHRC5017
EU-152	4.76E+00		4.9E-01	4.9E-01	6.99E-02	pCi/g	N/A	RICHRC5017
EU-154	3.57E-01		8.8E-02	8.8E-02	6.67E-02	pCi/g	N/A	RICHRC5017
EU-155	3.15E-02	U	4.4E-02	4.4E-02	7.53E-02	pCi/g	N/A	RICHRC5017
U-238DHP	5.64E-01	U	4.9E-01	4.9E-01	6.69E-01	pCi/g	N/A	RICHRC5017
STRONTIUM	6.32E-01	J	8.4E-02	2.2E-01	1.04E-01	pCi/g	67.50%	RICHRC5006
NI-63	-1.52E+00	U	3.3E+00	1.0E+01	7.86E+00	pCi/g	100.00%	RICHRC5069

Number of Results: 16

gmc
5/7/99

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

000021

SAMPLE RESULTS

LAB NAME: QUANTERRA, Richland **SDG: /RPT GRP:** W02676 / 7052
LAB SAMPLE ID: 9CQGVM10 **MATRIX:** SOIL
CLIENT ID: B0TPF8 **DATE RECEIVED:** 2/3/99 2:38:00 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	2.26E-02	J	2.0E-02	2.0E-02	1.22E-02	pCi/g	85.30%	RICHRC5089
U-234	1.26E+00		1.8E-01	2.5E-01	3.53E-02	pCi/g	63.50%	RICHRC5030
U-235	3.87E-02	J	3.2E-02	3.3E-02	3.02E-02	pCi/g	63.50%	RICHRC5030
U-238	1.06E+00		1.7E-01	2.2E-01	3.53E-02	pCi/g	63.50%	RICHRC5030
PU-238	0.00E+00	U	0.0E+00	3.6E-02	3.23E-02	pCi/g	25.90%	RICHRC5010
PU239/40	1.79E-01	J	9.2E-02	9.7E-02	3.23E-02	pCi/g	25.90%	RICHRC5010
AM-241	1.16E-02	U	6.8E-02	6.8E-02	1.13E-01	pCi/g	N/A	RICHRC5017
CO-60	1.96E-01		3.6E-02	3.6E-02	2.15E-02	pCi/g	N/A	RICHRC5017
CS-137	3.16E+00		3.2E-01	3.2E-01	3.11E-02	pCi/g	N/A	RICHRC5017
EU-152	5.40E+00		5.6E-01	5.6E-01	7.93E-02	pCi/g	N/A	RICHRC5017
EU-154	4.15E-01	U	9.3E-02	9.3E-02	1.08E-01	pCi/g	N/A	RICHRC5017
EU-155	1.31E-02	U	6.2E-02	6.2E-02	1.02E-01	pCi/g	N/A	RICHRC5017
U-238DHP	6.25E-01	U	5.8E-01	5.8E-01	9.72E-01	pCi/g	N/A	RICHRC5017
STRONTIUM	7.31E-01	J	8.8E-02	2.5E-01	9.88E-02	pCi/g	66.60%	RICHRC5006
NI-63	-1.08E+00	U	3.4E+00	1.1E+01	8.15E+00	pCi/g	100.00%	RICHRC5069

Number of Results: 16

5/7/99

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

000022

SAMPLE RESULTS

LAB NAME: QUANTERRA, Richland **SDG: /RPT GRP:** W02676 / 7052
LAB SAMPLE ID: 9CQGV10 **MATRIX:** SOIL
CLIENT ID: B0TPF9 **DATE RECEIVED:** 2/3/99 2:38:00 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	2.04E-02	U	2.1E-02	2.1E-02	2.09E-02	pCi/g	76.80%	RICHRC5080
U-234	8.82E-01	J	1.4E-01	1.8E-01	3.18E-02	pCi/g	74.20%	RICHRC5030
U-235	3.85E-02	J	3.0E-02	3.0E-02	2.57E-02	pCi/g	74.20%	RICHRC5030
U-238	8.15E-01	J	1.4E-01	1.7E-01	3.01E-02	pCi/g	74.20%	RICHRC5030
PU-238	-1.96E-03	U	2.8E-03	2.8E-03	5.59E-02	pCi/g	26.20%	RICHRC5010
PU239/40	6.11E-02	J	5.5E-02	5.6E-02	3.31E-02	pCi/g	26.20%	RICHRC5010
AM-241	-7.12E-02	U	6.5E-02	6.5E-02	1.07E-01	pCi/g	N/A	RICHRC5017
CO-60	1.55E-01		3.1E-02	3.1E-02	2.15E-02	pCi/g	N/A	RICHRC5017
CS-137	2.38E+00		2.4E-01	2.4E-01	2.98E-02	pCi/g	N/A	RICHRC5017
EU-152	4.50E+00		4.6E-01	4.6E-01	7.75E-02	pCi/g	N/A	RICHRC5017
EU-154	3.64E-01	U	9.6E-02	9.6E-02	1.05E-01	pCi/g	N/A	RICHRC5017
EU-155	1.04E-01	U	5.7E-02	5.7E-02	9.42E-02	pCi/g	N/A	RICHRC5017
U-238DHP	1.06E+00	U	5.6E-01	5.6E-01	9.29E-01	pCi/g	N/A	RICHRC5017
STRONTIUM	2.78E-01	J	6.5E-02	1.1E-01	1.08E-01	pCi/g	57.10%	RICHRC5006
NI-63	2.54E+00	U	3.2E+00	1.0E+01	7.48E+00	pCi/g	100.00%	RICHRC5069

Number of Results: 16

m
5/7/99

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

000023

SAMPLE RESULTS

LAB NAME: QUANTERRA, Richland **SDG: /RPT GRP:** W02676 / 7052
LAB SAMPLE ID: 9CQGVW10 **MATRIX:** SOIL
CLIENT ID: BOTPH0 **DATE RECEIVED:** 2/3/99 2:38:00 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	1.62E-02	U	1.9E-02	1.9E-02	2.22E-02	pCi/g	77.80%	RICHRC5080
U-234	9.63E-01	J	1.5E-01	1.9E-01	3.68E-02	pCi/g	80.60%	RICHRC5030
U-235	5.49E-02	J	3.6E-02	3.7E-02	3.23E-02	pCi/g	80.60%	RICHRC5030
U-238	8.14E-01	J	1.4E-01	1.7E-01	3.68E-02	pCi/g	80.60%	RICHRC5030
PU-238	-1.11E-03	U	2.2E-03	2.2E-03	5.56E-02	pCi/g	24.40%	RICHRC5010
PU239/40	1.09E-01	J	7.8E-02	8.0E-02	5.55E-02	pCi/g	24.40%	RICHRC5010
AM-241	-2.89E-02	U	6.9E-02	6.9E-02	1.15E-01	pCi/g	N/A	RICHRC5017
CO-60	1.61E-01		3.2E-02	3.2E-02	2.21E-02	pCi/g	N/A	RICHRC5017
CS-137	2.56E+00		2.6E-01	2.6E-01	3.25E-02	pCi/g	N/A	RICHRC5017
EU-152	5.27E+00		5.4E-01	5.4E-01	7.85E-02	pCi/g	N/A	RICHRC5017
EU-154	4.53E-01	U	8.7E-02	8.7E-02	1.11E-01	pCi/g	N/A	RICHRC5017
EU-155	2.91E-02	U	6.1E-02	6.1E-02	1.00E-01	pCi/g	N/A	RICHRC5017
U-238DHP	6.06E-01	U	5.9E-01	5.9E-01	9.82E-01	pCi/g	N/A	RICHRC5017
STRONTIUM	2.56E-01	J	7.1E-02	1.0E-01	1.35E-01	pCi/g	51.90%	RICHRC5006
NI-63	2.59E-01	U	2.8E+00	8.8E+00	6.61E+00	pCi/g	100.00%	RICHRC5060

Number of Results: 16

per
5/7/99

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

000024

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

000025

Quanterra Incorporated
13715 Rider Trail North
Earth City, Missouri 63045

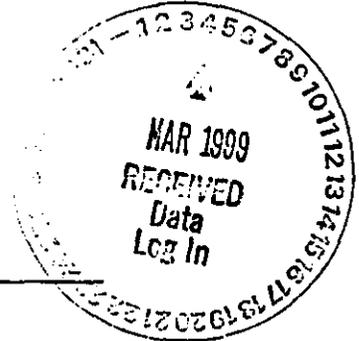
314 298-8566 Telephone
314 298-8757 Fax

CASE NARRATIVE

Bechtel Hanford Incorporated
3350 George Washington Way
Richland, Washington 99352

March 3, 1999

Attention: Joan Kessner



Project Number	:	550.186
SDG	:	W02676
Number of Samples	:	Seven (7)
Sample Matrix	:	Soil
Data Deliverable	:	15/45 day
Date SDG Closed	:	February 3, 1999

II. Introduction

On February 3, 1999 a total of seven "soil" samples were received by Quanterra, Richland and transferred to Quanterra, St. Louis for chemical analysis. St. Louis received only the 125 ml containers listed on the chain of custody for the metals analysis. The rest of the sample containers remained in Richland for analysis there. Upon receipt, the samples were given the following laboratory ID numbers to correspond with the specific client ID's:

<u>St. Louis ID</u>	<u>BHI ID</u>	<u>SAF ID</u>	<u>Matrix</u>	<u>Date of Receipt</u>
20687-001	B0TPF4	B99-002	Soil	03-FEB-99
20687-002	B0TPF5	B99-002	Soil	03-FEB-99
20687-003	B0TPF6	B99-002	Soil	03-FEB-99
20687-004	B0TPF7	B99-002	Soil	03-FEB-99
20687-005	B0TPF8	B99-002	Soil	03-FEB-99
20687-006	B0TPF9	B99-002	Soil	03-FEB-99
20687-007	B0TPH0	B99-002	Soil	03-FEB-99

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.

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Bechtel Hanford Incorporated
March 3, 1999
Project Number: 550.186
SDG: W02676
Page 2

III. Analytical Results/ Methodology (continued)

Analyses requested: ICP Metals - 6010A (SW 846){Chromium and Lead};
 Mercury - 7471 - (CV)

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

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

There were no comments or nonconformances associated with the shipping or receipt of the samples in this sample delivery group.

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
St. Louis Project Manager

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CERTIFICATE OF ANALYSIS

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

March 23, 1999

Attention: Joan Kessner



SAF Number	:	B99-002
Date First Sample Received	:	February 3, 1999
Number of Samples	:	7
Sample Type	:	Soil
SDG Number	:	W02676
Data Deliverable	:	15 Day Priority / 28 Day Summary

I. Introduction

On February 3, 1999, 7 priority soil samples were received by the Quanterra Environmental Services Richland Laboratory (QESRL) for a 15-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:

<u>QESRL ID#</u>	<u>BHI ID#</u>	<u>MATRIX</u>	<u>DATE OF RECEIPT</u>
9CQGV M10	B0TPF8	SOIL	2/3/99
9CQGV R10	B0TPF9	SOIL	2/3/99
9CQGV W10	B0TPH0	SOIL	2/3/99
9CQGV A10	B0TPF4	SOIL	2/3/99
9CQGV F10	B0TPF5	SOIL	2/3/99
9CQGV G10	B0TPF6	SOIL	2/3/99
9CQGV J10	B0TPF7	SOIL	2/3/99

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.

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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 W02676 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 (B0TPF6) and sample results are within contractual requirements.

Plutonium-238, -239/40 by method RICH-RC-5062

The LCS and batch blank, results are within contractual requirements. Samples B0TPF4, B0TPF5 and the duplicate of B0TPF6 all had recoveries below 20%. The whole batch was reanalyzed and the results did not improve. After consultation with BHI the data is reported.

Uranium-234, -235, -238 by method RICH-RC-5030

The LCS, batch blank, sample duplicate (B0TPF7) and sample results are within contractual requirements.

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Bechtel Hanford, Inc.

March 23, 1999

Page 3

Gamma Spectroscopy

Gamma Scan by method RICH-RC-5017

The LCS, is within contractual requirements. The batch blank had U-238 detected, the balk was Ottawa sand which is know to contain trace amounts of U-238. Some of the sampis had an MDA greater than the CRDL for various nuclides, in most cases the results are below the MDA.

Gas Proportional Counting

Total Strontium by method RICH-RC-5006

The LCS, batch blank, sample duplicate (BOTPH0) and sample results are within contractual requirements.

Liquid Scintillation Counting

Nickel-63 by method RICH-RC-5069

The LCS, batch blank, sample duplicate (BOTPF4) and sample results are within contractual requirements.

Chemical Analyses

Chromium Hex by EPA method 7196

The LCS, batch blank, sample duplicate (BOTPF7) 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:



Doug Swenson
Project Manager

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0004

Collector Fahlberg/Coffman	Company Contact R Coffman	Telephone No. 373-6425	Project Coordinator TRENT, SJ	Price Code	Data Turnarou 15 Day
Project Designation 100 BC Areas - Full Protocol	Sampling Location 100B/C	Field Logbook No. EL 1327-2	SAF No. B99-002		
Ice Chest No. SML-526	Offsite Property No. NA	Method of Shipment Hand deliver - Great. Velvit		Bill of Lading/Air Bill No. NA	
Shipped To Quanterra Incorporated				COA	

POSSIBLE SAMPLE HAZARDS/REMARKS	Preservation	None	Cool 4C	None	None	None					
	Type of Container	P	aG	aG	aG	Marinelli					
Special Handling and/or Storage	No. of Container(s)	1	1	1	1	1					
	Volume	20mL	60mL	60mL	125mL	500mL					

SAMPLE ANALYSIS				Activity Scan	Chromium Hex - 7196	See item (1) in Special Instructions	ICP Metals - 6010A (SW-846) (Chromium, Lead); Mercury - 7471 - (CV)	See item (2) in Special Instructions				
SPK W02676 J9B040128												
Sample No.	Matrix *	Sample Date	Sample Time									
BOTPF4 9CQ6VA10	Soil	2-1-99	0920	X	X	X	X	X				BOTPH2 A.
BOTPF5 9CQ6VF10	Soil	2-1-99	0925	X	X	X	X	X				BOTPH3 A.
BOTPF6 9CQ6VG10	Soil	2-1-99	0930	X	X	X	X	X				BOTPH4 A.
BOTPF7 9CQ6VJ10	Soil	2-1-99	0935	X	X	X	X	X				BOTPH5 B.

CHAIN OF POSSESSION				SPECIAL INSTRUCTIONS				Matrix *	
Relinquished By R. Fahlberg		Date/Time 1/28		Received By R. Nelson		Date/Time 2-3-99		(1) Americium-241; Isotopic Plutonium; Isotopic Uranium; Strontium-89,90 - Total Sr; Nickel-63 (2) Gamma Spectroscopy (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155); Gamma Spec - Add-on (Americium-241, Uranium-238) R. Fahlberg unavailable to relinquish samples.	Soil Water Vapor Other Solid Other Liquid
Relinquished By		Date/Time		Received By		Date/Time			
Relinquished By		Date/Time		Received By		Date/Time			
Relinquished By		Date/Time		Received By		Date/Time			
LABORATORY SECTION	Received By	Title				Date/Time			
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By				Date/Time			

000029

0044

Collector Fahlberg/Coffman	Company Contact R Coffman	Telephone No. 373-6425	Project Coordinator TRENT, SJ	Price Code	Data Turnaround 15 Days
Project Designation 100 BC Areas - Full Protocol	Sampling Location 100B/C	SAF No. B99-002			
Ice Chest No. SML-526	Field Logbook No. EL 1327-2	Method of Shipment Hand deliver - Govt. Vehicle			
Shipped To Quanterra Incorporated	Offsite Property No. N/A	Bill of Lading/Air Bill No. N/A			
COA KREIN 2/3/99					

POSSIBLE SAMPLE HAZARDS/REMARKS	Preservation	Cool 4C	None	Cool 4C	None	None	None
	Type of Container	aG	P	aG	aG	aG	Marinelli
No. of Container(s)	0	1	1	1	1	1	
Special Handling and/or Storage	Volume	60mL	20mL	60mL	60mL	125mL	500mL

SAMPLE ANALYSIS	Chromium Hex - 3196	Activity Scan	Chromium Hex - 7196	See item (1) in Special Instructions	NCP Metals - 6010A (SW-846) (Chromium, Lead, Mercury - 7471 - (CV)	See item (2) in Special Instructions
		X		X		

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Sample No.	Matrix *	Sample Date	Sample Time	Chromium Hex - 3196	Activity Scan	Chromium Hex - 7196	See item (1) in Special Instructions	NCP Metals - 6010A (SW-846) (Chromium, Lead, Mercury - 7471 - (CV)	See item (2) in Special Instructions
BOTOC7	Soil - RIN	2/3/99							
BOTPF8 9CQG-VM10	Soil	02/1/99	0940	X	X	X	X	X	X
BOTPF9 9CQG-VR10	Soil	2-1-99	0918	X	X	X	X	X	X
BOTPH0 9CQG-VW10	Soil	2-1-99	0918	X	X	X	X	X	X

CHAIN OF POSSESSION				SPECIAL INSTRUCTIONS				Matrix *
Relinquished By R. Fahlberg	Date/Time 1/23	Received By R. Nelson	Date/Time 2/3/99	(1) Americium-241; Isotopic Plutonium; Isotopic Uranium; Strontium-89,90 - Total Sr, Nickel-63 (2) Gamma Spectroscopy (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155); Gamma Spec - Add-on (Americium-241, Uranium-238) R. Fahlberg unavailable to relinquish samples.				Soil Water Vapor Other Solid Other Liquid
Relinquished By	Date/Time	Received By	Date/Time					
Relinquished By	Date/Time	Received By	Date/Time					
Relinquished By	Date/Time	Received By	Date/Time					

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

Appendix 5

Data Validation Supporting Documentation

000031

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT:	100-13C	116-134	DATA PACKAGE: W02476		
VALIDATOR:	TL	LAB: QES	DATE: 4/21/99		
CASE:			SDG: W02476		
ANALYSES PERFORMED					
<input checked="" type="checkbox"/> CLP/PCP	<input type="checkbox"/> CLP/GFAA	<input type="checkbox"/> CLP/Hg	<input type="checkbox"/> CLP/Cyanide	<input type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/> SW-846/PCP	<input type="checkbox"/> SW-846/GFAA	<input checked="" type="checkbox"/> SW-846/Hg	<input type="checkbox"/> SW-846 Cyanide	<input checked="" type="checkbox"/> CRVI	<input type="checkbox"/>
SAMPLES/MATRIX					
BOTPF4 BOTPFS BOTPF6 BOTPF7					
BOTPFS BOTPF9 BOTPK0					
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: CRVI IR ✓ CRVI

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: CAVI - IR CRVT

lead 0.3 -ok CRVT - 0.002 -ok

5. ACCURACY

Were spike samples analyzed? Yes No N/A

Are spike sample recoveries acceptable? Yes No N/A

Were laboratory control samples (LCS) analyzed? Yes No N/A

Are LCS recoveries acceptable? Yes No N/A

Comments: _____

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

6. PRECISION

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

Comments: _____

7. FURNACE AA QUALITY CONTROL

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

Comments: _____

8. REPORTED RESULTS AND DETECTION LIMITS

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

Comments: _____

Riches

Mark up -

Validator to

incorporate

these comments

SAMPLE RESULTS

LAB NAME: QUANTERRA, Richland **SDG: /RPT GRP:** W02676 / 7052
LAB SAMPLE ID: 9CQGVW10 **MATRIX:** SOIL
CLIENT ID: B0TPH0 **DATE RECEIVED:** 2/3/99 2:38:00 PM

ANALYTE	RESULT	Q	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA/IDL	REPORT UNIT	YIELD	METHOD NUMBER
HEXCHROME	8.00E+00	U	N/A	N/A	3.00E-02	mg/kg	N/A	EPA7196
AM-241	1.62E-02	U	1.9E-02	1.9E-02	2.22E-02	pCi/g	77.80%	RICHRC5086
U-234	9.63E-01	J	1.5E-01	1.9E-01	3.68E-02	pCi/g	80.60%	RICHRC5030
U-235	5.49E-02	J	3.6E-02	3.7E-02	3.23E-02	pCi/g	80.60%	RICHRC5030
U-238	8.14E-01	J	1.4E-01	1.7E-01	3.68E-02	pCi/g	80.60%	RICHRC5030
PU-238	-1.11E-03	U	2.2E-03	2.2E-03	5.56E-02	pCi/g	24.40%	RICHRC5010
PU239/40	1.09E-01		7.8E-02	8.0E-02	5.55E-02	pCi/g	24.40%	RICHRC5010
AM-241	-2.89E-02	U	6.9E-02	6.9E-02	1.15E-01	pCi/g	N/A	RICHRC5017
CO-60	1.61E-01		3.2E-02	3.2E-02	2.21E-02	pCi/g	N/A	RICHRC5017
CS-137	2.56E+00		2.6E-01	2.6E-01	3.25E-02	pCi/g	N/A	RICHRC5017
EU-152	5.27E+00		5.4E-01	5.4E-01	7.85E-02	pCi/g	N/A	RICHRC5017
EU-154	4.53E-01	U	8.7E-02	8.7E-02	1.11E-01	pCi/g	N/A	RICHRC5017
EU-155	2.91E-02	U	6.1E-02	6.1E-02	1.00E-01	pCi/g	N/A	RICHRC5017
U-238	6.03E-01		8.9E-02	8.9E-02	5.49E-02	pCi/g	N/A	RICHRC5017
U-238DHP	6.06E-01	U	5.9E-01	5.9E-01	9.82E-01	pCi/g	N/A	RICHRC5017
STRONTIUM	2.56E-01	J	7.1E-02	1.0E-01	1.35E-01	pCi/g	51.90%	RICHRC5006
NI-63	2.59E-01	U	2.8E+00	8.8E+00	6.61E+00	pCi/g	100.00%	RICHRC5009

Number of Results: 17

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5/7/99

SAMPLE RESULTS

LAB NAME: QUANTERRA, Richland **SDG: /RPT GRP:** W02676 / 7052
LAB SAMPLE ID: 9CQGVR10 **MATRIX:** SOIL
CLIENT ID: B0TPF9 **DATE RECEIVED:** 2/3/99 2:38:00 PM

ANALYTE	RESULT	Q	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA/IDL	REPORT UNIT	YIELD	METHOD NUMBER
HEXCHROME	8.99E+00	U	N/A	N/A	3.00E-02	mg/kg	N/A	EPA7196
AM-241	2.04E-02	U	2.1E-02	2.1E-02	2.09E-02	pCi/g	78.80%	RICHRC5080
U-234	8.82E-01	J	1.4E-01	1.8E-01	3.18E-02	pCi/g	74.20%	RICHRC5030
U-235	3.85E-02	J	3.0E-02	3.0E-02	2.57E-02	pCi/g	74.20%	RICHRC5030
U-238	8.15E-01	J	1.4E-01	1.7E-01	3.01E-02	pCi/g	74.20%	RICHRC5030
PU-238	-1.96E-03	U	2.8E-03	2.8E-03	5.59E-02	pCi/g	26.20%	RICHRC5010
PU239/40	6.11E-02	U	5.6E-02	5.6E-02	3.31E-02	pCi/g	26.20%	RICHRC5010
AM-241	-7.12E-02	U	6.5E-02	6.5E-02	1.07E-01	pCi/g	N/A	RICHRC5017
CO-60	1.55E-01		3.1E-02	3.1E-02	2.15E-02	pCi/g	N/A	RICHRC5017
CS-137	2.38E+00		2.4E-01	2.4E-01	2.98E-02	pCi/g	N/A	RICHRC5017
EU-152	4.50E+00		4.6E-01	4.6E-01	7.75E-02	pCi/g	N/A	RICHRC5017
EU-154	3.64E-01	U	9.6E-02	9.6E-02	1.05E-01	pCi/g	N/A	RICHRC5017
EU-155	1.04E-01	U	5.7E-02	5.7E-02	9.42E-02	pCi/g	N/A	RICHRC5017
U-238	6.20E-01		9.1E-02	9.1E-02	5.11E-02	pCi/g	N/A	RICHRC5017
U-238DHP	1.06E+00	U	5.6E-01	5.6E-01	9.29E-01	pCi/g	N/A	RICHRC5017
STRONTIUM	2.78E-01	J	6.5E-02	1.1E-01	1.08E-01	pCi/g	57.10%	RICHRC5006
NI-63	2.54E+00	U	3.2E+00	1.0E+01	7.48E+00	pCi/g	100.00%	RICHRC5069

Number of Results: 17

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5/7/99

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SAMPLE RESULTS

LAB NAME: QUANTERRA, Richland SDG: /RPT GRP: W02676 / 7052
 LAB SAMPLE ID: 9CQGV M10 MATRIX: SOIL
 CLIENT ID: BOTPF8 DATE RECEIVED: 2/3/99 2:38:00 PM

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	3.00E-02	mg/kg	N/A	EPA7196
AM-241	2.26E-02	J	2.0E-02	2.0E-02	1.22E-02	pCi/g	85.30%	RICHRC5089
U-234	1.26E+00		1.8E-01	2.5E-01	3.53E-02	pCi/g	63.50%	RICHRC5030
U-235	3.87E-02	J	3.2E-02	3.3E-02	3.02E-02	pCi/g	63.50%	RICHRC5030
U-238	1.06E+00		1.7E-01	2.2E-01	3.53E-02	pCi/g	63.50%	RICHRC5030
PU-238	0.00E+00	U	0.0E+00	3.6E-02	3.23E-02	pCi/g	25.90%	RICHRC5010
PU239/40	1.79E-01		9.2E-02	9.7E-02	3.23E-02	pCi/g	25.90%	RICHRC5010
AM-241	1.16E-02	U	6.8E-02	6.8E-02	1.13E-01	pCi/g	N/A	RICHRC5017
CO-60	1.96E-01		3.6E-02	3.6E-02	2.15E-02	pCi/g	N/A	RICHRC5017
CS-137	3.16E+00		3.2E-01	3.2E-01	3.11E-02	pCi/g	N/A	RICHRC5017
EU-152	5.40E+00		5.6E-01	5.6E-01	7.93E-02	pCi/g	N/A	RICHRC5017
EU-154	4.15E-01	U	9.3E-02	9.3E-02	1.08E-01	pCi/g	N/A	RICHRC5017
EU-155	1.31E-02	U	6.2E-02	6.2E-02	1.02E-01	pCi/g	N/A	RICHRC5017
U-238	5.11E-01		7.9E-02	7.9E-02	5.64E-02	pCi/g	N/A	RICHRC5017
U-238DHP	6.25E-01	U	5.8E-01	5.8E-01	9.72E-01	pCi/g	N/A	RICHRC5017
STRONTIUM	7.31E-01	J	8.8E-02	2.5E-01	9.88E-02	pCi/g	66.60%	RICHRC5006
NI-63	-1.08E+00	U	3.4E+00	1.1E+01	8.15E+00	pCi/g	100.00%	RICHRC5089

Number of Results: 17

DMW
5/7/99

ADJ

SAMPLE RESULTS

LAB NAME: QUANTERRA, Richland SDG: /RPT GRP: W02676 / 7052
 LAB SAMPLE ID: 9CQGVJ10 MATRIX: SOIL
 CLIENT ID: B0TPF7 DATE RECEIVED: 2/3/99 2:38:00 PM

ANALYTE	RESULT	Q	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA/IDL	REPORT UNIT	YIELD	METHOD NUMBER
HEXCHROME	-0.08E+00 0.03E	U	N/A N/A	N/A N/A	3.00E-02	mg/kg	N/A	EPA7196
AM-241	4.80E-02	J	3.0E-02	3.1E-02	1.30E-02	pCi/g	78.70%	RICHRC5089
U-234	8.24E-01	J	1.3E-01	1.7E-01	3.26E-02	pCi/g	80.60%	RICHRC5030
U-235	3.03E-02	J	2.6E-02	2.6E-02	2.62E-02	pCi/g	80.60%	RICHRC5030
U-238	8.23E-01	J	1.3E-01	1.7E-01	3.50E-02	pCi/g	80.60%	RICHRC5030
PU-238	0.00E+00	U	0.0E+00	2.2E-02	2.02E-02	pCi/g	43.40%	RICHRC5010
PU239/40	1.79E-01		7.3E-02	7.7E-02	2.02E-02	pCi/g	43.40%	RICHRC5010
AM-241	-5.38E-04	U	4.5E-02	4.5E-02	7.55E-02	pCi/g	N/A	RICHRC5017
CO-60	1.61E-01		3.2E-02	3.2E-02	2.03E-02	pCi/g	N/A	RICHRC5017
CS-137	2.70E+00		2.8E-01	2.8E-01	2.76E-02	pCi/g	N/A	RICHRC5017
EU-152	4.76E+00		4.9E-01	4.9E-01	6.99E-02	pCi/g	N/A	RICHRC5017
EU-154	3.57E-01		8.8E-02	8.8E-02	6.67E-02	pCi/g	N/A	RICHRC5017
EU-155	3.15E-02	U	4.4E-02	4.4E-02	7.53E-02	pCi/g	N/A	RICHRC5017
U-238	4.22E-01		7.3E-02	7.3E-02	4.76E-02	pCi/g	N/A	RICHRC5017
U-238DHP	5.64E-01	U	4.9E-01	4.9E-01	6.69E-01	pCi/g	N/A	RICHRC5017
STRONTIUM	6.32E-01	J	8.4E-02	2.2E-01	1.04E-01	pCi/g	67.50%	RICHRC5006
NI-63	-1.52E+00	U	3.3E+00	1.0E+01	7.86E+00	pCi/g	100.00%	RICHRC5069

Number of Results: 17

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SAMPLE RESULTS

LAB NAME: QUANTERRA, Richland SDG: /RPT GRP: W02676 / 7052
 LAB SAMPLE ID: 9CQGVG10 MATRIX: SOIL
 CLIENT ID: B0TPF6 DATE RECEIVED: 2/3/99 2:38:00 PM

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	3.00E-02	mg/kg	N/A	EPA7196
AM-241	3.64E-04	U	7.3E-04	7.3E-04	1.83E-02	pCi/g	84.50%	RICHRC5080
U-234	8.42E-01	J	1.4E-01	1.8E-01	3.61E-02	pCi/g	79.10%	RICHRC5030
U-235	3.90E-02	J	3.1E-02	3.1E-02	3.11E-02	pCi/g	79.10%	RICHRC5030
U-238	8.36E-01	J	1.4E-01	1.8E-01	3.75E-02	pCi/g	79.10%	RICHRC5030
PU-238	-1.12E-03	U	2.2E-03	2.3E-03	5.65E-02	pCi/g	21.80%	RICHRC5010
PU239/40	2.69E-02	U	4.0E-02	4.0E-02	5.64E-02	pCi/g	21.80%	RICHRC5010
AM-241	2.12E-02	U	2.1E-02	2.1E-02	3.05E-02	pCi/g	N/A	RICHRC5017
CO-60	3.04E-02	U	1.2E-02	1.2E-02	2.27E-02	pCi/g	N/A	RICHRC5017
CS-137	3.64E-01		4.5E-02	4.5E-02	3.11E-02	pCi/g	N/A	RICHRC5017
EU-152	1.21E+00		1.4E-01	1.4E-01	5.04E-02	pCi/g	N/A	RICHRC5017
EU-154	6.39E-02	U	3.6E-02	3.6E-02	6.57E-02	pCi/g	N/A	RICHRC5017
EU-155	3.58E-02	U	2.9E-02	2.9E-02	4.86E-02	pCi/g	N/A	RICHRC5017
U-238	4.88E-01		6.5E-02	6.5E-02	3.42E-02	pCi/g	N/A	RICHRC5017
U-238DHP	1.02E-01	U	2.9E-01	2.9E-01	2.92E-01	pCi/g	N/A	RICHRC5017
STRONTIUM	1.55E+00		1.3E-01	5.0E-01	1.13E-01	pCi/g	65.20%	RICHRC5006
NI-63	-6.74E-01	U	3.4E+00	1.0E+01	8.42E+00	pCi/g	100.00%	RICHRC5069

Number of Results: 17

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SAMPLE RESULTS

LAB NAME: QUANTERRA, Richland SDG: /RPT GRP: W02676 / 7052
 LAB SAMPLE ID: 9CQGVF10 MATRIX: SOIL
 CLIENT ID: B0TPF5 DATE RECEIVED: 2/3/99 2:38:00 PM

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	3.00E-02	mg/kg	N/A	EPA7196
AM-241	0.030 6.50E-02	U J	N/A 5.0E-02	N/A 5.1E-02	4.34E-02	pCi/g	59.30%	RICHRC5080
U-234	1.09E+00		1.6E-01	2.1E-01	2.95E-02	pCi/g	75.80%	RICHRC5030
U-235	2.13E-02	U	2.2E-02	2.2E-02	2.53E-02	pCi/g	75.80%	RICHRC5030
U-238	8.34E-01	J	1.4E-01	1.7E-01	2.95E-02	pCi/g	75.80%	RICHRC5030
PU-238	-2.71E-03	U	3.8E-03	3.9E-03	7.75E-02	pCi/g	18.20%	RICHRC5010
PU239/40	2.71E-01		1.4E-01	1.5E-01	4.59E-02	pCi/g	18.20%	RICHRC5010
AM-241	4.37E-02	U	5.4E-02	5.4E-02	8.98E-02	pCi/g	N/A	RICHRC5017
CO-60	1.11E-01		2.7E-02	2.7E-02	2.13E-02	pCi/g	N/A	RICHRC5017
CS-137	3.04E+00		3.1E-01	3.1E-01	3.26E-02	pCi/g	N/A	RICHRC5017
EU-152	8.01E+00		8.2E-01	8.2E-01	8.13E-02	pCi/g	N/A	RICHRC5017
EU-154	4.87E-01	U	9.0E-02	9.0E-02	1.21E-01	pCi/g	N/A	RICHRC5017
EU-155	1.46E-02	U	5.4E-02	5.4E-02	9.19E-02	pCi/g	N/A	RICHRC5017
U-238	4.43E-01		7.9E-02	7.9E-02	5.58E-02	pCi/g	N/A	RICHRC5017
U-238DHP	6.13E-01	U	5.8E-01	5.8E-01	7.52E-01	pCi/g	N/A	RICHRC5017
STRONTIUM	1.34E+00		1.1E-01	4.2E-01	8.91E-02	pCi/g	68.30%	RICHRC5006
NI-63	-5.14E-01	U	3.4E+00	1.0E+01	8.03E+00	pCi/g	100.00%	RICHRC5089

Number of Results: 17

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Project: BECHTEL-HANFORD																
Laboratory: Quanterra																
Case		SDG: W02676														
Sample Number	BOTPF4		BOTPF5		BOTPF6		BOTPF7		BOTPF8		BOTPF9		BOTPH0			
Location	116-B-1		116-B-1		116-B-1		116-B-1		116-B-1		116-B-1		116-B-1			
Remarks	A1		A2		A3		B4		B5		B6		Duplicate (B6)			
Sample Date	02/01/99		02/01/99		02/01/99		02/01/99		02/01/99		02/01/99		02/01/99			
Radiochemistry	CRDL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	
Americium-241	0.1	0.0229		0.065		-0.000364	U	0.048		0.0226		0.0204	U	0.0162	U	
Uranium-234	0.1	0.873		1.09		0.842		0.824		1.26		0.882		0.963		
Uranium-235	0.1	0.0295		0.0213	U	0.039		0.0303		0.0387		0.0385		0.0549		
Uranium-238	0.1	0.767		0.834		0.836		0.823		1.06		0.815		0.814		
Plutonium-238	0.1	0.0235	UR	-0.00271	UR	-0.00112	UJ	0	UJ	0	UJ	-0.00196	UJ	-0.00111	UJ	
Plutonium-239/40	0.1	0.196	R	0.271	R	0.0269	U	0.179		0.179		0.0811		0.109		
Americium-241 (GEA)	0.1	-0.0057	U	0.0437	U	0.0212	U	-0.000538	U	0.0116	U	-0.0712	U	-0.0289	U	
Cobalt 60	0.05	0.0761		0.111		0.0304		0.161		0.196		0.155		0.161		
Cesium 137	0.1	1.82		3.04		0.364		2.7		3.16		2.38		2.56		
Europium 152	0.1	6.58		8.01		1.21		4.76		5.4		4.5		5.27		
Europium 154	0.1	0.464		0.487		0.0639	U	0.357		0.415		0.364		0.453		
Europium 155	0.1	0.0575	U	0.0146	U	0.0358	U	0.0315	U	0.0131		0.104		0.0291	U	
Uranium 238 GEA	0.1	0.595	J	0.443	J	0.488	J	0.422	J	0.511	J	0.62		0.603		
Uranium 238DPH (GEA)	0.1	-0.022	U	0.013	U	0.162	U	0.504	U	0.025	U	1.06		0.000	U	
Strontium (total)	1	1.45		1.34		1.55		0.632		0.731		0.278		0.256		
Nickel-63	30	2.81	U	-0.514	U	-0.674	U	-1.52	U	-1.08	U	2.54	U	0.259	U	

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SAMPLE RESULTS

LAB NAME: QUANTERRA, Richland **SDG: /RPT GRP:** W02676 / 7052
LAB SAMPLE ID: 9CQGVW10 **MATRIX:** SOIL
CLIENT ID: B0TPH0 **DATE RECEIVED:** 2/3/99 2:38:00 PM

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	3.00E-02	mg/kg	N/A	EPA7196
AM-241	1.62E-02	U	1.9E-02	1.9E-02	2.22E-02	pCi/g	77.80%	RICHRC5080
U-234	9.63E-01	J	1.5E-01	1.9E-01	3.68E-02	pCi/g	80.60%	RICHRC5030
U-235	5.49E-02	J	3.6E-02	3.7E-02	3.23E-02	pCi/g	80.60%	RICHRC5030
U-238	8.14E-01	J	1.4E-01	1.7E-01	3.68E-02	pCi/g	80.60%	RICHRC5030
PU-238	-1.11E-03	U J	2.2E-03	2.2E-03	5.56E-02	pCi/g	24.40%	RICHRC5010
PU239/40	1.09E-01		7.8E-02	8.0E-02	5.55E-02	pCi/g	24.40%	RICHRC5010
AM-241	-2.89E-02	U	6.9E-02	6.9E-02	1.15E-01	pCi/g	N/A	RICHRC5017
CO-60	1.61E-01		3.2E-02	3.2E-02	2.21E-02	pCi/g	N/A	RICHRC5017
CS-137	2.56E+00		2.6E-01	2.6E-01	3.25E-02	pCi/g	N/A	RICHRC5017
EU-152	5.27E+00		5.4E-01	5.4E-01	7.85E-02	pCi/g	N/A	RICHRC5017
EU-154	4.53E-01	J	8.7E-02	8.7E-02	1.11E-01	pCi/g	N/A	RICHRC5017
EU-155	2.91E-02	U	6.1E-02	6.1E-02	1.00E-01	pCi/g	N/A	RICHRC5017
U-238	6.03E-01		8.9E-02	8.9E-02	5.49E-02	pCi/g	N/A	RICHRC5017
U-238DHP	6.06E-01	U	5.9E-01	5.9E-01	9.82E-01	pCi/g	N/A	RICHRC5017
STRONTIUM	2.56E-01	J	7.1E-02	1.0E-01	1.35E-01	pCi/g	51.90%	RICHRC5006
NI-63	2.59E-01	U	2.8E+00	8.8E+00	6.61E+00	pCi/g	100.00%	RICHRC5069

Number of Results: 17

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SAMPLE RESULTS

LAB NAME: QUANTERRA, Richland **SDG: /RPT GRP:** W02676 / 7052
LAB SAMPLE ID: 9CQGV10 **MATRIX:** SOIL
CLIENT ID: B0TPF9 **DATE RECEIVED:** 2/3/99 2:38:00 PM

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	3.00E-02	mg/kg	N/A	EPA7196/2
AM-241	2.04E-02	U	2.1E-02	2.1E-02	2.09E-02	pCi/g	78.80%	RICHRC5080
U-234	8.82E-01	J	1.4E-01	1.8E-01	3.18E-02	pCi/g	74.20%	RICHRC5030
U-235	3.85E-02	J	3.0E-02	3.0E-02	2.57E-02	pCi/g	74.20%	RICHRC5030
U-238	8.15E-01	J	1.4E-01	1.7E-01	3.01E-02	pCi/g	74.20%	RICHRC5030
PU-238	-1.96E-03	U J	2.8E-03	2.8E-03	5.59E-02	pCi/g	26.20%	RICHRC5010
PU239/40	6.11E-02		5.5E-02	5.6E-02	3.31E-02	pCi/g	26.20%	RICHRC5010
AM-241	-7.12E-02	U	6.5E-02	6.5E-02	1.07E-01	pCi/g	N/A	RICHRC5017
CO-60	1.55E-01		3.1E-02	3.1E-02	2.15E-02	pCi/g	N/A	RICHRC5017
CS-137	2.38E+00		2.4E-01	2.4E-01	2.98E-02	pCi/g	N/A	RICHRC5017
EU-152	4.50E+00		4.6E-01	4.6E-01	7.75E-02	pCi/g	N/A	RICHRC5017
EU-154	3.64E-01	U	9.6E-02	9.6E-02	1.05E-01	pCi/g	N/A	RICHRC5017
EU-155	1.04E-01	U	5.7E-02	5.7E-02	9.42E-02	pCi/g	N/A	RICHRC5017
U-238	6.20E-01		9.1E-02	9.1E-02	5.11E-02	pCi/g	N/A	RICHRC5017
U-238DHP	1.06E+00	U	5.6E-01	5.6E-01	9.29E-01	pCi/g	N/A	RICHRC5017
STRONTIUM	2.78E-01	J	6.5E-02	1.1E-01	1.08E-01	pCi/g	57.10%	RICHRC5006
NI-63	2.54E+00	U	3.2E+00	1.0E+01	7.48E+00	pCi/g	100.00%	RICHRC5069

Number of Results: 17

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

0070

SAMPLE RESULTS

LAB NAME: QUANTERRA, Richland SDG: /RPT GRP: W02676 / 7052
 LAB SAMPLE ID: 9CQGV M10 MATRIX: SOIL
 CLIENT ID: BOTPF8 DATE RECEIVED: 2/3/99 2:38:00 PM

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	3.00E-02	mg/kg	N/A	EPA7190
AM-241	2.26E-02	J	2.0E-02	2.0E-02	1.22E-02	pCi/g	85.30%	RICHRC5080
U-234	1.26E+00		1.8E-01	2.5E-01	3.53E-02	pCi/g	63.50%	RICHRC5030
U-235	3.87E-02	J	3.2E-02	3.3E-02	3.02E-02	pCi/g	63.50%	RICHRC5030
U-238	1.06E+00		1.7E-01	2.2E-01	3.53E-02	pCi/g	63.50%	RICHRC5030
PU-238	0.00E+00	U J	0.0E+00	3.6E-02	3.23E-02	pCi/g	25.90%	RICHRC5010
PU239/40	1.79E-01		9.2E-02	9.7E-02	3.23E-02	pCi/g	25.90%	RICHRC5010
AM-241	1.16E-02	U	6.8E-02	6.8E-02	1.13E-01	pCi/g	N/A	RICHRC5017
CO-60	1.96E-01		3.6E-02	3.6E-02	2.15E-02	pCi/g	N/A	RICHRC5017
CS-137	3.16E+00		3.2E-01	3.2E-01	3.11E-02	pCi/g	N/A	RICHRC5017
EU-152	5.40E+00		5.6E-01	5.6E-01	7.93E-02	pCi/g	N/A	RICHRC5017
EU-154	4.15E-01	J	9.3E-02	9.3E-02	1.08E-01	pCi/g	N/A	RICHRC5017
EU-155	1.31E-02	J	6.2E-02	6.2E-02	1.02E-01	pCi/g	N/A	RICHRC5017
U-238	5.11E-01	J	7.9E-02	7.9E-02	5.64E-02	pCi/g	N/A	RICHRC5017
U-238DHP	6.25E-01	U	5.8E-01	5.8E-01	9.72E-01	pCi/g	N/A	RICHRC5017
STRONTIUM	7.31E-01	J	8.8E-02	2.5E-01	9.88E-02	pCi/g	66.60%	RICHRC5006
NI-63	-1.08E+00	U	3.4E+00	1.1E+01	8.15E+00	pCi/g	100.00%	RICHRC5069

Number of Results: 17

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SAMPLE RESULTS

LAB NAME: QUANTERRA, Richland SDG: /RPT GRP: W02676 / 7052
 LAB SAMPLE ID: 9CQGVJ10 MATRIX: SOIL
 CLIENT ID: B0TPF7 DATE RECEIVED: 2/3/99 2:38:00 PM

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	3.00E-02	mg/kg	N/A	EPA7100
AM-241	4.80E-02	J	3.0E-02	3.1E-02	1.30E-02	pCi/g	78.70%	RICHRC5080
U-234	8.24E-01	J	1.3E-01	1.7E-01	3.26E-02	pCi/g	80.60%	RICHRC5030
U-235	3.03E-02	J	2.6E-02	2.6E-02	2.62E-02	pCi/g	80.60%	RICHRC5030
U-238	8.23E-01	J	1.3E-01	1.7E-01	3.50E-02	pCi/g	80.60%	RICHRC5030
PU-238	0.00E+00	U J	0.0E+00	2.2E-02	2.02E-02	pCi/g	43.40%	RICHRC5010
PU239/40	1.79E-01		7.3E-02	7.7E-02	2.02E-02	pCi/g	43.40%	RICHRC5010
AM-241	-5.38E-04	U	4.5E-02	4.5E-02	7.55E-02	pCi/g	N/A	RICHRC5017
CO-60	1.61E-01		3.2E-02	3.2E-02	2.03E-02	pCi/g	N/A	RICHRC5017
CS-137	2.70E+00		2.8E-01	2.8E-01	2.76E-02	pCi/g	N/A	RICHRC5017
EU-152	4.76E+00		4.9E-01	4.9E-01	6.99E-02	pCi/g	N/A	RICHRC5017
EU-154	3.57E-01		8.8E-02	8.8E-02	6.67E-02	pCi/g	N/A	RICHRC5017
EU-155	3.15E-02	U	4.4E-02	4.4E-02	7.53E-02	pCi/g	N/A	RICHRC5017
U-238	4.22E-01	J	7.3E-02	7.3E-02	4.76E-02	pCi/g	N/A	RICHRC5017
U-238DHP	5.04E-01	U	4.9E-01	4.9E-01	6.09E-01	pCi/g	N/A	RICHRC5017
STRONTIUM	6.32E-01	J	8.4E-02	2.2E-01	1.04E-01	pCi/g	67.50%	RICHRC5006
NI-63	-1.52E+00	U	3.3E+00	1.0E+01	7.86E+00	pCi/g	100.00%	RICHRC5069

Number of Results: 17

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5/7/99

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

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SAMPLE RESULTS

LAB NAME: QUANTERRA, Richland SDG: /RPT GRP: W02676 / 7052
 LAB SAMPLE ID: 9CQGVG10 MATRIX: SOIL
 CLIENT ID: BOTPF6 DATE RECEIVED: 2/3/99 2:38:00 PM

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	3.00E-02	mg/kg	N/A	EPA7130
AM-241	-3.64E-04	U	7.3E-04	7.3E-04	1.83E-02	pCi/g	84.50%	RICHRC5080
U-234	8.42E-01	J	1.4E-01	1.8E-01	3.61E-02	pCi/g	79.10%	RICHRC5030
U-235	3.90E-02	J	3.1E-02	3.1E-02	3.11E-02	pCi/g	79.10%	RICHRC5030
U-238	8.36E-01	J	1.4E-01	1.8E-01	3.75E-02	pCi/g	79.10%	RICHRC5030
PU-238	-1.12E-03	U J	2.2E-03	2.3E-03	5.65E-02	pCi/g	21.80%	RICHRC5010
PU239/40	2.69E-02	U	4.0E-02	4.0E-02	5.64E-02	pCi/g	21.80%	RICHRC5010
AM-241	2.12E-02	U	2.1E-02	2.1E-02	3.05E-02	pCi/g	N/A	RICHRC5017
CO-60	3.04E-02	J	1.2E-02	1.2E-02	2.27E-02	pCi/g	N/A	RICHRC5017
CS-137	3.64E-01		4.5E-02	4.5E-02	3.11E-02	pCi/g	N/A	RICHRC5017
EU-152	1.21E+00		1.4E-01	1.4E-01	5.04E-02	pCi/g	N/A	RICHRC5017
EU-154	6.39E-02	U	3.6E-02	3.6E-02	6.57E-02	pCi/g	N/A	RICHRC5017
EU-155	3.58E-02	U	2.9E-02	2.9E-02	4.86E-02	pCi/g	N/A	RICHRC5017
U-238	4.88E-01	J	6.5E-02	6.5E-02	3.42E-02	pCi/g	N/A	RICHRC5017
U-238DHP	1.02E-01	U	2.9E-01	2.9E-01	2.92E-01	pCi/g	N/A	RICHRC5017
STRONTIUM	1.55E+00		1.3E-01	5.0E-01	1.13E-01	pCi/g	65.20%	RICHRC5006
NI-63	-8.74E-01	U	3.4E+00	1.0E+01	8.42E+00	pCi/g	100.00%	RICHRC5069

Number of Results: 17

pm
5/7/99

0007

SAMPLE RESULTS

LAB NAME: QUANTERRA, Richland SDG: /RPT GRP: W02676 / 7052
 LAB SAMPLE ID: 9CQGVF10 MATRIX: SOIL
 CLIENT ID: B0TPF5 DATE RECEIVED: 2/3/99 2:38:00 PM

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	3.00E-02	mg/kg	N/A	EPA7196
AM-241	6.50E-02	J	5.0E-02	5.1E-02	4.34E-02	pCi/g	59.30%	RICHRC5080
U-234	1.09E+00		1.6E-01	2.1E-01	2.95E-02	pCi/g	75.80%	RICHRC5030
U-235	2.13E-02	U	2.2E-02	2.2E-02	2.53E-02	pCi/g	75.80%	RICHRC5030
U-238	8.34E-01	J	1.4E-01	1.7E-01	2.95E-02	pCi/g	75.80%	RICHRC5030
PU-238	-2.71E-03	UR	3.8E-03	3.9E-03	7.75E-02	pCi/g	18.20%	RICHRC5010
PU239/40	2.71E-01	R	1.4E-01	1.5E-01	4.59E-02	pCi/g	18.20%	RICHRC5010
AM-241	4.37E-02	U	5.4E-02	5.4E-02	8.98E-02	pCi/g	N/A	RICHRC5017
CO-60	1.11E-01		2.7E-02	2.7E-02	2.13E-02	pCi/g	N/A	RICHRC5017
CS-137	3.04E+00		3.1E-01	3.1E-01	3.26E-02	pCi/g	N/A	RICHRC5017
EU-152	8.01E+00		8.2E-01	8.2E-01	8.13E-02	pCi/g	N/A	RICHRC5017
EU-154	4.87E-01	J	9.0E-02	9.0E-02	1.21E-01	pCi/g	N/A	RICHRC5017
EU-155	1.46E-02	U	5.4E-02	5.4E-02	9.19E-02	pCi/g	N/A	RICHRC5017
U-238	4.43E-01	J	7.9E-02	7.9E-02	5.58E-02	pCi/g	N/A	RICHRC5017
U-238DHP	6.13E-01	U	5.8E-01	5.8E-01	7.52E-01	pCi/g	N/A	RICHRC5017
STRONTIUM	1.34E+00		1.1E-01	4.2E-01	8.91E-02	pCi/g	68.30%	RICHRC5006
NI-63	-5.14E-01	U	3.4E+00	1.0E+01	8.03E+00	pCi/g	100.00%	RICHRC5069

Number of Results: 17

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5/7/99

00016

SAMPLE RESULTS

LAB NAME: QUANTERRA, Richland SDG: /RPT GRP: W02676 / 7052
 LAB SAMPLE ID: 9CQGVA10 MATRIX: SOIL
 CLIENT ID: B0TPF4 DATE RECEIVED: 2/3/99 2:38:00 PM

ANALYTE	RESULT	Q	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA/IDL	REPORT UNIT	YIELD	METHOD NUMBER
HEXCHROME	3.83E-01		N/A	N/A	3.00E-02	mg/kg	N/A	EPA7198
AM-241	2.29E-02	J	2.3E-02	2.3E-02	1.55E-02	pCi/g	90.60%	RICHRC5080
U-234	8.73E-01	J	1.3E-01	1.7E-01	2.70E-02	pCi/g	83.20%	RICHRC5030
U-235	2.95E-02	J	2.5E-02	2.5E-02	2.31E-02	pCi/g	83.20%	RICHRC5030
U-238	7.67E-01	J	1.2E-01	1.6E-01	2.52E-02	pCi/g	83.20%	RICHRC5030
PU-238	2.35E-02	UR	5.6E-02	5.7E-02	1.28E-01	pCi/g	11.60%	RICHRC5010
PU239/40	1.96E-01	R	1.5E-01	1.5E-01	7.56E-02	pCi/g	11.60%	RICHRC5010
AM-241	-5.70E-03	U	7.9E-02	7.9E-02	1.33E-01	pCi/g	N/A	RICHRC5017
CO-60	7.61E-02	J	1.8E-02	1.8E-02	3.19E-02	pCi/g	N/A	RICHRC5017
CS-137	1.82E+00		1.9E-01	1.9E-01	3.17E-02	pCi/g	N/A	RICHRC5017
EU-152	6.58E+00		6.7E-01	6.7E-01	7.73E-02	pCi/g	N/A	RICHRC5017
EU-154	4.64E-01	J	8.8E-02	8.8E-02	1.14E-01	pCi/g	N/A	RICHRC5017
EU-155	5.75E-02	U	5.5E-02	5.5E-02	9.43E-02	pCi/g	N/A	RICHRC5017
U-238	5.95E-01	J	8.7E-02	8.7E-02	5.06E-02	pCi/g	N/A	RICHRC5017
U-238DHP	2.20E-02	U	6.6E-01	6.6E-01	1.07E+00	pCi/g	N/A	RICHRC5017
STRONTIUM	1.45E+00		1.1E-01	4.4E-01	9.60E-02	pCi/g	88.70%	RICHRC5006
NI-63	2.81E+00	U	4.0E+00	1.3E+01	9.53E+00	pCi/g	100.00%	RICHRC5069

Number of Results: 17

*RLW
679*

*RLW
5/7/99*

Result = IDL When Not Detected

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

Quanterra Analytical Services, Inc
rptChemRadSample; v3.41

000011

JOS

Duncan, Jeanette M

From: Weiss, Richard L
Sent: Thursday, June 17, 1999 11:11 AM
To: Blumenkranz, David B
Cc: Duncan, Jeanette M; Fancher, Jonathan D (Jon); 'Corbett, Dave'
Subject: RE: Data Packages W02676, 116-B-1 - open issues

Dave,

This response is primarily for Jeanette's files for this package, as we've already talked about these.

Most of the "0.02" values reported for Hg in this package were detects at the detection limit. The lab reports include the "B" qualifier indicating detection at concentrations below the CRQL. Note that the validator is not required to carry any lab applied "qualifiers" into the validation summary tables except "U".

The LCS "issue" for the rad package is for Pu-238, not U-238. All appropriate U-238 LCS materials were reported and were within acceptance criteria. Quanterra does not track or provide recovery data for this isotope in the LCS material they use for Pu-isotopic analysis.

No changes are required by the validator.

Rich Weiss

-----Original Message-----

From: Blumenkranz, David B
Sent: Monday, June 14, 1999 2:16 PM
To: Weiss, Richard L
Cc: Duncan, Jeanette M; Fancher, Jonathan D (Jon); 'Corbett, Dave'
Subject: Data Packages W02676, 116-B-1 - open issues
Importance: High

Rich,

These issues are still unresolved concerning W02676-QES, I was referred to you for solutions. The project is "bottle-necked" at this point due to this outstanding validation and we do have a PBCI for this site.

Concerning *Inorganics* - Data Package No. W02676-QES:

- The lab reports 0.02 for Hg consistently. I'm betting this is the detection limit of the analysis, but yet the data has no "U" qualification. Blank results were not included in App. 5 so I was not able to verify this.

Concerning *Radiochemistry* - Data Package No. W02676-QES:

- The validation reports a lack of U-238 LCS, verify that the lab did not run this analysis. If they did, please forward the info to the validator.

With regards to future validation efforts, please request that the lab blanks, LCS, MS and MSD sample results be added to App. 5 as well as the RPDs and %Rec reported by the lab. Although the validator provides a checklist for the RPD and %Rec., we need to know the specifics for our calcs and to fully review the validation package. Including this data in the validation report may increase the amount of paper, but it will also provide a more complete package and enable the reader to independently verify the validator's conclusions.

Thanx,
Dave Blumenkranz
2-9658

Duncan, Jeanette M

From: Blumenkranz, David B
Sent: Monday, June 14, 1999 2:16 PM
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Thanx,
Dave Blumenkranz
2-9658

Duncan, Jeanette M

From: Blumenkranz, David B
Sent: Tuesday, May 25, 1999 8:28 AM
To: Duncan, Jeanette M; Weiss, Richard L
Cc: Fancher, Jonathan D (Jon); 'Routt, Tina'; 'Corbett, Dave'; Sturges, Mark H
Subject: Data Packages W02676

Importance: High

Jeanette,

I have reviewed the Data Validation Packages for SDG W02676 and have the following comments:

Concerning *Inorganics - Data Package No. W02676-QES*:

- The lab reports 0.02 for Hg consistently. I'm betting this is the detection limit of the analysis, but yet the data has no "U" qualification. Blank results were not included in App. 5 so I was not able to verify this.
- The lab also reports "0.00E+00" for Cr+6. I find it hard to believe the lab can achieve a detection limits of absolute zero for any analyte. Could you and Rich look into this (check with the lab, I'm betting 3.00E-02 is the more appropriate result).
- With regards to the validation itself, please provide/request that the lab blanks, LCS, MS and MSD sample results be added to App. 5 as well as the form VII's (RPDs and %Rec).
- App. 4 is missing the lab narrative for the ICP analysis.
- Lets also give the validator the sample locations for the "remarks" fields in his summary table of App. 3. (see below)

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- Lets also give the validator the sample locations for the "remarks" fields in his summary table of App. 3. (see below)

Sample remarks (location node and field QA type) are as follows:

B0TPF4	A1
B0TPF5	A2
B0TPF6	A3
B0TPF7	B4
B0TPF8	B5
B0TPF9	B6
B0TPH0	Duplicate (B6)

Although the validator provides a checklist for the RPD and %Rec., we need to know the specifics for our calcs. Including this data in the validation report may increase the amount of paper, but it will also provide a more complete package and enable the reader to independently verify the validator's conclusions.

Thanx,
Dave Blumenkranz
2-9658

P.S. Dave & Tina,

This is the kind of nit-picking I do for the validation packages. I'm basically trying to make sure they can serve as legally defensible packages for the project. Rich Weiss and Claude Stacey will also review the package to confirm the validator's conclusions and ensure that the validation was properly performed. I have not seen a validation package to date that didn't need a little polishing. FYI

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B0TPF7	B4
B0TPF8	B5
B0TPF9	B6
B0TPH0	Duplicate (B6)

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FAX

TECHLAW, INC.

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

To: Jeanette Duncan

From: Bruce Christian

Pages: 1

Date: 23 April 1999

Information Request

W02676 - Radiochemistry/Hexchrome

I need the analysis date for hexavalent chromium.

Extracted 2-8-77
Analyzed 2-9-99

RFW 4-27-99

FAX

TECHLAW, INC.

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

To: Jeanette Duncan

From: Bruce Christian

Pages: 1

Date: 23 April 1999

Information Request

W02676 - Radiochemistry/Hexchrome

The blank for hexchrome reports both the result and the MDA/IDL as 0.002. Is the blank detected or undetected?

Blank is detect at 0.002

RJW 4-27-99

FAX

TECHLAW, INC.

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

To: Jeannette Duncan

From: Bruce Christian

Pages: 1

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