

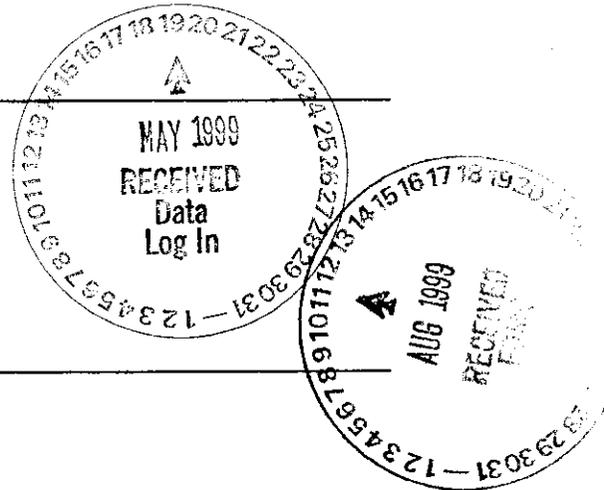
CERTIFICATE OF ANALYSIS

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

May 18, 1999

Attention: Joan Kessner

SAF Number	:	B99-024
Date First Sample Received	:	March 16, 1999
Number of Samples	:	Three
Sample Type	:	Other
SDG Number	:	W02715
Data Deliverable	:	45 Day Summary



I. Introduction

On March 16, 1999 the Quanterra Environmental Services Richland Laboratory (QESRL) received three other samples for a 45-day radiochemical 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>
9CRP0010	B0TW24	OTHER	3/16/99
9CRP0210	B0TW27	OTHER	3/16/99
9CRP0610	B0TW30	OTHER	3/16/99

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.

The requested analyses were: **Alpha Spectroscopy**
 Plutonium-238, -239/40 by method RICH-RC-5010
 Americium/Curium by method RICH-RC-5080/5003

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Gamma Spectroscopy
Gamma Scan by method RICH-RC-5017
Gas Proportional Counting
Gross Alpha, by method RICH-RC-5014
Gross Beta, by method RICH-RC-5014
Total Strontium by method RICH-RC-5006
Liquid Scintillation Counting
Nickel-63 by method RICH-RC-5069

III. Quality Control

The analytical results for each analysis performed under SDG W02715 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

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

The MDA is elevated due to high sample activity. Data is reported. Except as noted, the LCS, batch blank, sample duplicate (B0TW30) and sample results are within contractual requirements.

Americium/Curium by method RICH-RC-5080/5003

The yields for samples B0TW30 and B0TW27 were elevated due to high activity in the sample. The MDA was elevated also due to high activity in the samples. Except as noted, the LCS, batch blank, sample duplicate (B0TW30) and sample results are within contractual requirements.

Gamma Spectroscopy

Gamma Scan by method RICH-RC-5017

The MDA was elevated due to high activity in the samples. Except as noted, the LCS, batch blank, sample duplicate (B0TW27) and sample results are within contractual requirements.

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Gas Proportional Counting

Gross Alpha, by method RICH-RC-5014

The duplicates did not agree this is attributed to a non homogenous sample. The LCS is also out of limits and is attributed to the difficult matrix. Data is reported. Except as noted, the LCS, batch blank, sample duplicate (B0TW24) and sample results are within contractual requirements.

Gross Beta, by method RICH-RC-5014

The duplicates did not agree this is attributed to a non homogenous sample. Data is reported. Except as noted, the LCS, batch blank, sample duplicate (B0TW27) and sample results are within contractual requirements.

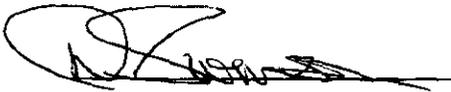
Liquid Scintillation Counting

Nickel-63 by method RICH-RC-5069

The LCS, batch blank, sample duplicate (B0TW24) 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

SAMPLE RESULTS

LAB NAME: QUANTERRA, Richland **SDG: /RPT GRP:** W02715 / 7782
LAB SAMPLE ID: 9CRP0010 **MATRIX:** OTHER
CLIENT ID: BOTW24A **DATE RECEIVED:** 3/16/99 12:20:00 PM

ANALYTE	RESULT	Q	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA/IDL	REPORT UNIT	YIELD	METHOD NUMBER
AM-241	2.10E+03		4.6E+01	2.5E+02	1.01E+00	pCi/g	106.00%	RICHRC5080
CM-242	0.00E+00	U	0.0E+00	7.5E-01	6.79E-01	pCi/g	106.00%	RICHRC5080
CM-244	0.00E+00	U	0.0E+00	7.5E-01	6.79E-01	pCi/g	106.00%	RICHRC5080
NP-237	7.47E-01	U	9.1E-01	9.3E-01	1.20E+00	pCi/g	100.00%	RICHRC5064
PU-238	6.71E+02		3.1E+01	9.0E+01	1.63E+00	pCi/g	59.80%	RICHRC5010
PU239/40	7.94E+03		1.1E+02	1.0E+03	9.63E-01	pCi/g	59.80%	RICHRC5010
CO-60	-2.83E+00	U	1.2E+01	1.2E+01	2.03E+01	pCi/g	N/A	RICHRC5017
CS-137	3.48E+00	U	1.2E+01	1.2E+01	2.02E+01	pCi/g	N/A	RICHRC5017
EU-152	2.09E+01	U	3.0E+01	3.0E+01	5.15E+01	pCi/g	N/A	RICHRC5017
EU-154	9.78E+00	U	3.4E+01	3.4E+01	6.02E+01	pCi/g	N/A	RICHRC5017
EU-155	1.93E+01	U	2.6E+01	2.6E+01	4.51E+01	pCi/g	N/A	RICHRC5017
ALPHA	6.01E+03		9.2E+01	7.0E+02	2.72E+00	pCi/g	100.00%	RICHRC5014
BETA	1.98E+02		1.2E+01	2.1E+01	8.88E+00	pCi/g	100.00%	RICHRC5014-B

Number of Results: 13

SAMPLE RESULTS

LAB NAME: QUANTERRA, Richland **SDG: /RPT GRP:** W02715 / 7782
LAB SAMPLE ID: 9CRP0210 **MATRIX:** OTHER
CLIENT ID: B0TW27 **DATE RECEIVED:** 3/16/99 12:20:00 PM

ANALYTE	RESULT	Q	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA/IDL	REPORT UNIT	YIELD	METHOD NUMBER
AM-241	9.67E+02		2.5E+01	1.1E+02	6.58E-01	pCi/g	106.70%	RICHRC5080
CM-242	0.00E+00	U	0.0E+00	4.9E-01	4.42E-01	pCi/g	106.70%	RICHRC5080
CM-244	0.00E+00	U	0.0E+00	4.9E-01	4.42E-01	pCi/g	106.70%	RICHRC5080
NP-237	3.35E-01	U	4.9E-01	5.0E-01	7.02E-01	pCi/g	100.00%	RICHRC5064
PU-238	1.81E+02		1.4E+01	2.8E+01	7.67E-01	pCi/g	50.10%	RICHRC5010
PU239/40	5.80E+03		8.1E+01	7.8E+02	7.66E-01	pCi/g	50.10%	RICHRC5010
CO-60	4.56E-01	U	4.4E-01	4.4E-01	8.49E-01	pCi/g	N/A	RICHRC5017
CS-137	9.42E-01	U	4.6E-01	4.6E-01	8.65E-01	pCi/g	N/A	RICHRC5017
EU-152	-9.10E-01	U	1.1E+00	1.1E+00	1.76E+00	pCi/g	N/A	RICHRC5017
EU-154	-1.44E-01	U	1.1E+00	1.1E+00	1.94E+00	pCi/g	N/A	RICHRC5017
EU-155	-2.75E-01	U	1.1E+00	1.1E+00	1.89E+00	pCi/g	N/A	RICHRC5017
ALPHA	6.09E+03		7.7E+01	6.9E+02	1.77E+00	pCi/g	100.00%	RICHRC5014
BETA	1.47E+02		8.6E+00	1.5E+01	5.77E+00	pCi/g	100.00%	RICHRC5014-B

Number of Results: 13

SAMPLE RESULTS

LAB NAME: QUANTERRA, Richland **SDG: /RPT GRP:** W02715 / 7782
LAB SAMPLE ID: 9CRP0610 **MATRIX:** OTHER
CLIENT ID: B0TW30 **DATE RECEIVED:** 3/16/99 12:20:00 PM

ANALYTE	RESULT	Q	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA/IDL	REPORT UNIT	YIELD	METHOD NUMBER
AM-241	3.27E+04		9.0E+02	4.0E+03	3.31E+01	pCi/g	89.70%	RICHRC5080
CM-242	5.20E+00	U	1.2E+01	1.2E+01	2.83E+01	pCi/g	89.70%	RICHRC5080
CM-244	5.70E+00	U	1.2E+01	1.2E+01	2.49E+01	pCi/g	89.70%	RICHRC5080
NP-237	-4.45E-01	U	8.9E-01	8.9E-01	2.23E+01	pCi/g	100.00%	RICHRC5064
PU-238	2.99E+03		2.7E+02	4.5E+02	2.82E+01	pCi/g	71.60%	RICHRC5010
PU239/40	1.66E+05		2.0E+03	2.0E+04	1.67E+01	pCi/g	71.60%	RICHRC5010
CO-60	2.46E+01	U	3.4E+01	3.4E+01	6.35E+01	pCi/g	N/A	RICHRC5017
CS-137	2.90E+02		6.8E+01	6.8E+01	5.34E+01	pCi/g	N/A	RICHRC5017
EU-152	-6.99E+01	U	8.6E+01	8.6E+01	1.41E+02	pCi/g	N/A	RICHRC5017
EU-154	-5.14E+01	U	8.7E+01	8.7E+01	1.47E+02	pCi/g	N/A	RICHRC5017
EU-155	-5.36E+01	U	6.0E+01	6.0E+01	1.00E+02	pCi/g	N/A	RICHRC5017
ALPHA	2.03E+05		2.5E+03	2.1E+04	7.89E+01	pCi/g	100.00%	RICHRC5014
BETA	4.79E+03		2.8E+02	4.8E+02	1.81E+02	pCi/g	100.00%	RICHRC5014-B

Number of Results: 13

DUPLICATE RESULTS

LAB NAME: QUANTERRA, Richland **SDG: /RPT GRP:** W02715 / 7782
LAB SAMPLE ID: CRP0218R **MATRIX:** OTHER
CLIENT ID: B0TW27 DUP **DATE RECEIVED:** 3/16/99 12:20:00 P
ORIG LAB SAMPLE ID: 9CRP0210

ANALYTE	DUP RESULT	Q	COUNTING ERROR (2 s)	TOTAL ERROR (2 s)	MDA/ IDL	REPORT UNIT	YIELD	METHOD NUMBER	ORIG RESULT	RPD
CO-60	3.18E-01	U	4.6E-01	4.6E-01	8.65E-01	pCi/g	N/A	RICHRC5017	4.56E-01	35.59%
CS-137	7.75E-01	U	4.9E-01	4.9E-01	9.05E-01	pCi/g	N/A	RICHRC5017	9.42E-01	19.47%
EU-152	-5.36E-02	U	1.0E+00	1.0E+00	1.71E+00	pCi/g	N/A	RICHRC5017	-9.10E-01	177.74%
EU-154	1.22E-01	U	1.3E+00	1.3E+00	2.29E+00	pCi/g	N/A	RICHRC5017	-1.44E-01	2458.14%
EU-155	-6.14E-01	U	9.2E-01	9.2E-01	1.55E+00	pCi/g	N/A	RICHRC5017	-2.75E-01	76.25%

Number of Results:

DUPLICATE RESULTS

LAB NAME: QUANTERRA, Richland SDG: /RPT GRP: W02715 / 7782
LAB SAMPLE ID: JCRP001R MATRIX: OTHER
CLIENT ID: B0TW24A DATE RECEIVED: 3/16/99 12:20:00 P
ORIG LAB SAMPLE ID: 9CRP0010

ANALYTE	DUP RESULT	Q	COUNTING ERROR (2 s)	TOTAL ERROR (2 s)	MDA/ IDL	REPORT UNIT	YIELD	METHOD NUMBER	ORIG RESULT	RPD
NP-237	7.76E-01	U	9.2E-01	9.4E-01	1.07E+00	pCi/g	100.00%	RICHRC5064	7.47E-01	3.76%
ALPHA	1.05E+04		1.2E+02	9.9E+02	2.83E+00	pCi/g	100.00%	RICHRC5014	6.01E+03	54.05%

Number of Results:

DUPLICATE RESULTS

LAB NAME: QUANTERRA, Richland SDG: /RPT GRP: W02715 / 7782
LAB SAMPLE ID: JCRP021R MATRIX: OTHER
CLIENT ID: B0TW27 DATE RECEIVED: 3/16/99 12:20:00 P
ORIG LAB SAMPLE ID: 9CRP0210

ANALYTE	DUP RESULT	Q	COUNTING ERROR (2 s)	TOTAL ERROR (2 s)	MDA/ IDL	REPORT UNIT	YIELD	METHOD NUMBER	ORIG RESULT	RPD
BETA	2.16E+02		1.1E+01	2.2E+01	5.95E+00	pCi/g	100.00%	RICHRC5014-B	1.47E+02	38.21%

Number of Results:

DUPLICATE RESULTS

LAB NAME: QUANTERRA, Richland **SDG: /RPT GRP:** W02715 / 7782
LAB SAMPLE ID: JCRP061R **MATRIX:** OTHER
CLIENT ID: B0TW30 **DATE RECEIVED:** 3/16/99 12:20:00 P
ORIG LAB SAMPLE ID: 9CRP0610

ANALYTE	DUP RESULT	Q	COUNTING ERROR (2 s)	TOTAL ERROR (2 s)	MDA/ IDL	REPORT UNIT	YIELD	METHOD NUMBER	ORIG RESULT	RPD
AM-241	2.75E+04		8.1E+02	3.4E+03	2.99E+01	pCi/g	96.10%	RICHRC5080	3.27E+04	17.19%
CM-242	-4.79E-01	U	9.6E-01	9.6E-01	2.41E+01	pCi/g	96.10%	RICHRC5080	5.20E+00	240.57%
CM-244	-1.92E+00	U	1.9E+00	1.9E+00	3.20E+01	pCi/g	96.10%	RICHRC5080	5.70E+00	402.68%
PU-238	3.75E+03		4.2E+02	6.8E+02	3.15E+01	pCi/g	39.10%	RICHRC5010	2.99E+03	22.54%
PU239/40	1.94E+05		3.0E+03	2.8E+04	4.68E+01	pCi/g	39.10%	RICHRC5010	1.66E+05	15.84%

Number of Results:

BLANK RESULTS

LAB NAME: QUANTERRA, Richland SDG /RPT GRP: W02715 / 7782

LAB SAMPLE ID: CT6DV11B MATRIX: OTHER

ANALYTE	RESULT	Q	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA/IDL	REPORT UNIT	YIELD	METHOD NUMBER
CO-60	1.32E-04	U	1.7E-02	1.7E-02	3.00E-02	pCi/g	N/A	RICHRC5017
CS-137	3.92E-03	U	1.7E-02	1.7E-02	3.04E-02	pCi/g	N/A	RICHRC5017
EU-152	-2.28E-04	U	4.1E-02	4.1E-02	7.03E-02	pCi/g	N/A	RICHRC5017
EU-154	-2.01E-02	U	5.5E-02	5.5E-02	9.41E-02	pCi/g	N/A	RICHRC5017
EU-155	1.33E-02	U	3.2E-02	3.2E-02	5.47E-02	pCi/g	N/A	RICHRC5017

Number of Results:

BLANK RESULTS

LAB NAME: QUANTERRA, Richland SDG /RPT GRP: W02715 / 7782
LAB SAMPLE ID: JCT6C21B MATRIX: OTHER

ANALYTE	RESULT	Q	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA/IDL	REPORT UNIT	YIELD	METHOD NUMBER
ALPHA	-2.79E-01	U	6.5E-01	6.5E-01	2.25E+00	pCi/g	100.00%	RICHRC5014

Number of Results:

BLANK RESULTS

LAB NAME: QUANTERRA, Richland SDG /RPT GRP: W02715 / 7782
LAB SAMPLE ID: JCT6C71B MATRIX: OTHER

ANALYTE	RESULT	Q	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA/IDL	REPORT UNIT	YIELD	METHOD NUMBER
BETA	8.02E-01	U	1.3E+00	1.3E+00	2.69E+00	pCi/g	100.00%	RICHRC5014-B

Number of Results:

BLANK RESULTS

LAB NAME: QUANTERRA, Richland SDG /RPT GRP: W02715 / 7782

LAB SAMPLE ID: JCT6CE1B MATRIX: OTHER

ANALYTE	RESULT	Q	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA/IDL	REPORT UNIT	YIELD	METHOD NUMBER
AM-241	2.31E-02	J	2.1E-02	2.1E-02	1.25E-02	pCi/g	90.50%	RICHRC5080
CM-242	-7.41E-04	U	1.0E-03	1.1E-03	2.11E-02	pCi/g	90.50%	RICHRC5080
CM-244	-7.41E-04	U	1.0E-03	1.1E-03	2.11E-02	pCi/g	90.50%	RICHRC5080

Number of Results:

BLANK RESULTS

LAB NAME: QUANTERRA, Richland SDG /RPT GRP: W02715 / 7782
LAB SAMPLE ID: JCT6CQ1B MATRIX: OTHER

ANALYTE	RESULT	Q	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA/IDL	REPORT UNIT	YIELD	METHOD NUMBER
PU-238	0.00E+00	U	0.0E+00	1.5E-02	1.36E-02	pCi/g	67.10%	RICHRC5010
PU239/40	2.97E-02	J	2.5E-02	2.5E-02	2.02E-02	pCi/g	67.10%	RICHRC5010

Number of Results:

BLANK RESULTS

LAB NAME: QUANTERRA, Richland SDG /RPT GRP: W02715 / 7782
LAB SAMPLE ID: JCT6DH1B MATRIX: OTHER

ANALYTE	RESULT	Q	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA/IDL	REPORT UNIT	YIELD	METHOD NUMBER
NP-237	0.00E+00	U	0.0E+00	0.0E+00	1.13E-02	pCi/g	100.00%	RICHRC5064

Number of Results:

LABORATORY CONTROL SAMPLE

LAB NAME: QUANTERRA, Richland SDG: /RPT GRP: W02715 / 7782
LAB SAMPLE ID: CT6DV12S MATRIX: OTHER

ANALYTE	RESULT	Q	COUNTING ERROR (2 s)	TOTAL ERROR (2 s)	MDA/ IDL	REPORT UNIT	YIELD	EXPECTED	RECOVERY
CO-60	8.89E-01		1.1E-01	1.1E-01	3.09E-02	pCi/g	N/A	7.74E-01	114.75%
CS-137	5.26E-01		7.5E-02	7.5E-02	4.09E-02	pCi/g	N/A	4.97E-01	105.89%
EU-152	1.72E+00		2.2E-01	2.2E-01	9.32E-02	pCi/g	N/A	1.54E+00	111.78%

Number of Results:

LABORATORY CONTROL SAMPLE

LAB NAME: QUANTERRA, Richland SDG: /RPT GRP: W02715 / 7782
LAB SAMPLE ID: JCT6C21S MATRIX: OTHER

ANALYTE	RESULT	Q	COUNTING ERROR (2 s)	TOTAL ERROR (2 s)	MDA/ IDL	REPORT UNIT	YIELD	EXPECTED	RECOVERY
ALPHA	5.38E+01		6.8E+00	9.0E+00	1.82E+00	pCi/g	100.00%	9.08E+01	59.20%

Number of Results:

LABORATORY CONTROL SAMPLE

LAB NAME: QUANTERRA, Richland SDG: /RPT GRP: W02715 / 7782
LAB SAMPLE ID: JCT6C71S MATRIX: OTHER

ANALYTE	RESULT	Q	COUNTING ERROR (2 s)	TOTAL ERROR (2 s)	MDA/ IDL	REPORT UNIT	YIELD	EXPECTED	RECOVERY
BETA	7.17E+01		4.1E+00	7.6E+00	2.66E+00	pCi/g	100.00%	6.78E+01	105.85%

Number of Results:

LABORATORY CONTROL SAMPLE

LAB NAME: QUANTERRA, Richland SDG: /RPT GRP: W02715 / 7782
LAB SAMPLE ID: JCT6CE1S MATRIX: OTHER

ANALYTE	RESULT	Q	COUNTING ERROR (2 s)	TOTAL ERROR (2 s)	MDA/ IDL	REPORT UNIT	YIELD	EXPECTED	RECOVERY
AM-241	1.64E+00		2.0E-01	2.9E-01	1.64E-02	pCi/g	66.40%	2.29E+00	71.79%

Number of Results:

LABORATORY CONTROL SAMPLE

LAB NAME: QUANTERRA, Richland SDG: /RPT GRP: W02715 / 7782
LAB SAMPLE ID: JCT6CQ1S MATRIX: OTHER

ANALYTE	RESULT	Q	COUNTING ERROR (2 s)	TOTAL ERROR (2 s)	MDA/ IDL	REPORT UNIT	YIELD	EXPECTED	RECOVERY
PU239/40	2.15E+00		2.1E-01	3.4E-01	2.06E-02	pCi/g	66.30%	2.25E+00	95.36%

Number of Results:

LABORATORY CONTROL SAMPLE

LAB NAME: QUANTERRA, Richland SDG: /RPT GRP: W02715 / 7782
LAB SAMPLE ID: JCT6DH1S MATRIX: OTHER

ANALYTE	RESULT	Q	COUNTING ERROR (2 s)	TOTAL ERROR (2 s)	MDA/ IDL	REPORT UNIT	YIELD	EXPECTED	RECOVERY
NP-237	6.63E-01	J	1.0E-01	1.8E-01	1.84E-02	pCi/g	100.00%	9.14E-01	72.57%

Number of Results:

MATRIX SPIKE RESULTS

LAB NAME: QUANTERRA, Richland SDG: /RPT GRP: W02715 / 7782
LAB SAMPLE ID: JCRP061W MATRIX: OTHER

ANALYTE	SPIKE RESULT* Q	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA/IDL	REPORT UNIT	SAMPLE RESULT	EXPECTED	RECOVERY
NP-237	8.22E+03	4.4E+02	1.9E+03	2.32E+01	pCi/g	-4.45E-01	8.14E+03	100.88%

Number of Results:

*Spike Result Corrected For Sample Result

Result = IDL When Not Detects

(Q)ualifiers: U = Analyte result < MDA/IDL,

J = No U qualifier and result < RDL.

Quanterra Analytical Services, Inc

rptChemRadMatrixSpike; v3.41

0024

Data Review Checklist
RADIOCHEMISTRY

Lot Number: 39C170189				
Client ID: BHI				
Due Date: 5-14-99				
QC Batch Number: 9090271			SDG Number:	
Method Test Parameter: Am / cm				
Matrix: Paint chips				
Review Item	Yes (✓)	No (✓)	N/A (✓)	2 nd Level Review (✓)
A. Calibration				
1. Is the calibration documentation included where applicable?			✓	
B. Sample Analysis				
1. Are the sample yields within acceptance criteria?	✓	✓		✓
2. Were all sample holding times met?	✓			✓
3. Is the sample Minimum Detectable Activity < the Contract Detection Limit?	✓	✓		✓
C. QC Samples				
1. Is the blank yield within acceptance criteria?	✓			✓
2. Is the Minimum Detectable Activity for the blank result ≤ the Contract Detection Limit?	✓			✓
3. Does the blank result meet the Contract criteria?	✓			✓
4. Is the blank result < the Contract Detection Limit?	✓			✓
5. Is the blank result > the Contract Detection Limit but the sample result < the Contract Detection Limit?			✓	
6. Is the LCS result within acceptance criteria?	✓			✓
7. Is the LCS yield within acceptance criteria?	✓			✓
8. Is the LCS Minimum Detectable Activity ≤ the Contract Detection Limit?	✓			✓
9. Do the MS/MSD results and yields meet acceptance criteria?			✓	
10. Do the duplicate sample results and yields meet acceptance criteria?	✓			✓
D. Other				
1. Are all Nonconformances included and noted? (1-NCM)	✓			✓
2. Are all required forms filled out?	✓			✓
3. Was the correct methodology used?	✓			✓
4. Was transcription checked? Jm 5-17-99	✓			✓
5. Were all calculations checked at a minimum frequency?	✓			✓
6. Were units checked?	✓			✓

Comments on any "No" response: 2 yields slightly elevated; 2 MDAs elevated - all due to elevated activity/matrix.
Data accepted.

First Level Review: Regenele Waddell
Second Level Review: [Signature]

Date: 5/18/99
Date: 5/18/99

0396

QUANTERRA LABORATORY NONCONFORMANCE MEMO (NCM)

PAGE 1 OF 2

LOG #: RD-99

Project ID: JQC 170189 BHI NCM Initiated by: W 5/18/99
 Sample Numbers: CRP00106, CRP02106, CRP06106, CRP06107X
 Tests: Am/CM
 Matrix: Paint Chips/other W02715

Analytical Area (check appropriate area):

- | | | | |
|--|--------------------------------|--|--|
| <input type="checkbox"/> Sample control | <input type="checkbox"/> GC | <input type="checkbox"/> Wet chemistry | <input checked="" type="checkbox"/> Data review |
| <input type="checkbox"/> Organic preparation | <input type="checkbox"/> HPLC | <input type="checkbox"/> Metals | <input checked="" type="checkbox"/> Radiochemistry |
| <input type="checkbox"/> Inorganic preparation | <input type="checkbox"/> GC/MS | <input type="checkbox"/> Reporting | <input type="checkbox"/> Bioassay |

Nonconformance (check appropriate area):

Holding Time Violations (exceeded by _____ days)

Category I: Laboratory Independent

- 1. Holding time expired in transit
- 2. Sample received > 48 hrs. or 1/2 holding time has expired
- 3. Test added by client after expiration

Category II: Laboratory Dependent

- 4. Instrument failure
- 5. Analyst error
- 6. Login error
- 7. Miscommunication
- 8. Other (complete description required)

Category III: Analysis Reruns (QA/QC)

- 9. Surrogates
- 10. Internal Standards
- 11. Spike Recoveries
- 12. Blank Contamination

Category IV: Analysis Reruns (Confirmation)

- 13. Second column
- 14. Contamination check
- 15. Confirmation of matrix effects
- 16. Other (complete description required)

Quality Assurance/Quality Control

- 17. QC data reported outside of controls
- 18. Incorrect procedure used
- 19. SOP intentionally modified with QA and Tech. approval
- 20. Invalid instrument calibration
- 21. Insufficient sample received for proper analysis

Incorrect or Incomplete Client Deliverable

- 22. Hardcopy deliverable error
- 23. Electronic deliverable error

Reported detection limits elevated due to:

- 24. Sample matrix CRP06106; CRP06107X
- 25. Insufficient sample volume
- 26. Other (complete description required)

27. Other (specify): Elevated yields due to high sample activity for

Comments/Explanation: CRP00106; CRP02106

Notification (check appropriate area):

Client notified by (name and date): _____

- in writing W
- by facsimile
- by telephone
- other (explain)

Client's name and response: _____

- process "as is"
- re-sample
- on hold until _____
- other (explain)

Project Manager (signature and date):

[Signature] 3/18/99

QUANTERRA LABORATORY NONCONFORMANCE MEMO (NCM)

PAGE 2 OF 2

LOG#: RD-99.

Corrective Action

Root Cause

Matrix

Initial and date:

JW 5/18/99

Corrective Action

Report w/ yields & NDAs achieved.

Initial and Date:

JW 5/18/99

Responsibility for performing CA assigned to:

Actions to prevent recurrence

NA

Initial and Date:

First Level Supervisor:

Reggie Waddell

Date:

5/18/99

Responsible Manager:

Pam Kenitz

Date:

5-19-99

Quality Assurance Review

Anomaly

Deficiency

Rerun

Further action required:

Assigned to:

QA signature:

Jodie Ca

Date:

5/19/99

Corrective Action Verification

Verified

Cannot Verify (specify reason):

NA

Nonconformance Memo Closure

QA signature/date:

Jodie Ca 5/19/99

0027

0395

QUANTERRA LABORATORY NONCONFORMANCE MEMO (NCM)

PAGE 1 OF 2

LOG #: RD-99

Project ID: <u>J9C170189 BHI</u> NCM Initiated by: <u>JW 5/18/99</u>		
Sample Numbers: <u>CRP00103, CRP06103, CRP06108 X</u>		
Tests: <u>PU-180</u>		
Matrix: <u>Soil/Paint chips</u> <u>W02715</u>		
Analytical Area (check appropriate area):		
<input type="checkbox"/> Sample control	<input type="checkbox"/> GC	
<input type="checkbox"/> Organic preparation	<input type="checkbox"/> HPLC	
<input type="checkbox"/> Inorganic preparation	<input type="checkbox"/> GC/MS	
<input type="checkbox"/> Wet chemistry	<input checked="" type="checkbox"/> Data review	
<input type="checkbox"/> Metals	<input checked="" type="checkbox"/> Radiochemistry	
<input type="checkbox"/> Reporting	<input type="checkbox"/> Bioassay	
Nonconformance (check appropriate area):		
Holding Time Violations (exceeded by _____ days)		
Category I: Laboratory Independent		
<input type="checkbox"/> 1. Holding time expired in transit	Quality Assurance/Quality Control	
<input type="checkbox"/> 2. Sample received > 48 hrs. or 1/2 holding time has expired		
<input type="checkbox"/> 3. Test added by client after expiration		
Category II: Laboratory Dependent		
<input type="checkbox"/> 4. Instrument failure		
<input type="checkbox"/> 5. Analyst error		
<input type="checkbox"/> 6. Login error	Incorrect or Incomplete Client Deliverable	
<input type="checkbox"/> 7. Miscommunication		
<input type="checkbox"/> 8. Other (complete description required)		
Category III: Analysis Reruns (QA/QC)		
<input type="checkbox"/> 9. Surrogates	Reported detection limits elevated due to:	
<input type="checkbox"/> 10. Internal Standards		
<input type="checkbox"/> 11. Spike Recoveries		
<input type="checkbox"/> 12. Blank Contamination	<input checked="" type="checkbox"/> 24. Sample matrix	
Category IV: Analysis Reruns (Confirmation)		
<input type="checkbox"/> 13. Second column	<input type="checkbox"/> 25. Insufficient sample volume	
<input type="checkbox"/> 14. Contamination check	<input type="checkbox"/> 26. Other (complete description required)	
<input type="checkbox"/> 15. Confirmation of matrix effects	<input type="checkbox"/> 27. Other (specify): _____	
<input type="checkbox"/> 16. Other (complete description required)	Comments/Explanation: _____	
Notification (check appropriate area):		
Client notified by (name and date): _____		
<input checked="" type="checkbox"/> in writing <u>UN</u>	<input type="checkbox"/> by facsimile	
<input type="checkbox"/> by telephone	<input checked="" type="checkbox"/> other (explain)	
Client's name and response: _____		
<input type="checkbox"/> process "as is"	<input type="checkbox"/> re-sample	
<input type="checkbox"/> on hold until _____	<input type="checkbox"/> other (explain)	
Project Manager (signature and date): <u>[Signature]</u> <u>5/18/99</u>		

QUANTERRA LABORATORY NONCONFORMANCE MEMO (NCM)

PAGE 2 OF 2

LOG#: RD-99-

Corrective Action

Root Cause

Matrix

Initial and date:

JW 5/18/99

Corrective Action

Activity exceeds MDA achieved; data accepted.

Initial and Date:

JW 5/18/99

Responsibility for performing CA assigned to:

Actions to prevent recurrence

N/A

Initial and Date:

First Level Supervisor:

Acqueline Waddell

Date:

5/18/99

Responsible Manager:

Pam Kunitz

Date:

5-19-99

Quality Assurance Review

Anomaly

Deficiency

Rerun

Further action required:

Assigned to:

Jodie Ca

QA signature:

Date:

5/19/99

Corrective Action Verification

Verified

Cannot Verify (specify reason):

N/A

Nonconformance Memo Closure

QA signature/date:

Jodie Ca 5/19/99

Data Review Checklist
RADIOCHEMISTRY

Lot Number: J9C170189				
Client ID: B+1				
Due Date: 5-14-99				
QC Batch Number: 9090274			SDG Number: 2715	
Method Test Parameter: Gamma				
Matrix: Paint Chips, Pipe				
Review Item	Yes (✓)	No (✓)	N/A (✓)	2 nd Level Review (✓)
A. Calibration				
1. Is the calibration documentation included where applicable?			✓	
B. Sample Analysis				
1. Are the sample yields within acceptance criteria?			✓	
2. Were all sample holding times met?			✓	
3. Is the sample Minimum Detectable Activity < the Contract Detection Limit?	Doc 5-11-99	✓		✓
C. QC Samples				
1. Is the blank yield within acceptance criteria?			✓	
2. Is the Minimum Detectable Activity for the blank result ≤ the Contract Detection Limit?	✓			✓
3. Does the blank result meet the Contract criteria?	✓			✓
4. Is the blank result < the Contract Detection Limit?	✓			✓
5. Is the blank result > the Contract Detection Limit but the sample result < the Contract Detection Limit?			✓	
6. Is the LCS result within acceptance criteria?	✓			✓
7. Is the LCS yield within acceptance criteria?			✓	
8. Is the LCS Minimum Detectable Activity ≤ the Contract Detection Limit?	✓			✓
9. Do the MS/MSD results and yields meet acceptance criteria?			✓	
10. Do the duplicate sample results and yields meet acceptance criteria?	✓			✓
D. Other				
1. Are all Nonconformances included and noted? 1 NCM	✓			✓
2. Are all required forms filled out?	✓			✓
3. Was the correct methodology used?	✓			✓
4. Was transcription checked?	✓			✓
5. Were all calculations checked at a minimum frequency?	✓			✓
6. Were units checked?	✓			✓

Comments on any "No" response: SEE NCM

First Level Review: [Signature]

Date: 5-11-99

Second Level Review: [Signature]

Date: 5/18/99

0397

QUANTERRA LABORATORY NONCONFORMANCE MEMO (NCM)

PAGE 1 OF 2

LOG #: RD-99

Project ID: J9C170189 NCM Initiated by: O'Connell
 Sample Numbers: 9090274
 Tests: Gamma
 Matrix: Paint Chips, Pipe W02715

Analytical Area (check appropriate area):

- | | | | |
|--|--------------------------------|--|--|
| <input type="checkbox"/> Sample control | <input type="checkbox"/> GC | <input type="checkbox"/> Wet chemistry | <input checked="" type="checkbox"/> Data review |
| <input type="checkbox"/> Organic preparation | <input type="checkbox"/> HPLC | <input type="checkbox"/> Metals | <input checked="" type="checkbox"/> Radiochemistry |
| <input type="checkbox"/> Inorganic preparation | <input type="checkbox"/> GC/MS | <input type="checkbox"/> Reporting | <input type="checkbox"/> Bioassay |

Nonconformance (check appropriate area):

Holding Time Violations (exceeded by _____ days)

Category I: Laboratory Independent

- 1. Holding time expired in transit
- 2. Sample received > 48 hrs. or 1/2 holding time has expired
- 3. Test added by client after expiration

Category II: Laboratory Dependent

- 4. Instrument failure
- 5. Analyst error
- 6. Login error
- 7. Miscommunication
- 8. Other (complete description required)

Category III: Analysis Reruns (QA/QC)

- 9. Surrogates
- 10. Internal Standards
- 11. Spike Recoveries
- 12. Blank Contamination

Category IV: Analysis Reruns (Confirmation)

- 13. Second column
- 14. Contamination check
- 15. Confirmation of matrix effects
- 16. Other (complete description required)

Quality Assurance/Quality Control

- 17. QC data reported outside of controls
- 18. Incorrect procedure used
- 19. SOP intentionally modified with QA and Tech. approval
- 20. Invalid instrument calibration
- 21. Insufficient sample received for proper analysis

Incorrect or Incomplete Client Deliverable

- 22. Hardcopy deliverable error
- 23. Electronic deliverable error

Reported detection limits elevated due to:

- 24. Sample matrix
- 25. Insufficient sample volume
- 26. Other (complete description required)
- 27. Other (specify): _____

Comments/Explanation: High activity

NECESSITATED REDUCED ALIQUOTS.

Notification (check appropriate area):

Client notified by (name and date):

- in writing CW
- by telephone
- by facsimile
- other (explain)

Client's name and response:

- process "as is"
- on hold until _____
- re-sample
- other (explain)

Project Manager (signature and date):

[Signature] 5/15/99

0032

QUANTERRA LABORATORY NONCONFORMANCE MEMO (NCM)

PAGE 2 OF 2

LOG#: RD-99-

Corrective Action

Root Cause

Initial and date: Dec 5-11-99

activity and matrix demanded digestion of 0.1 to 11g for various analysis. Fractions of digestate represented 0.06 to 4.5g. Reduced aliquots led to higher MDA's

Corrective Action

Initial and Date: Dec 5-11-99

Processes samples w/in safety limits. BLK, LCS & dup's OK. Data accepted

Responsibility for performing CA assigned to: _____

Actions to prevent recurrence

N/A

Initial and Date: _____

First Level Supervisor: [Signature]

Date: 5-11-99

Responsible Manager: [Signature]

Date: 5-19-99

Quality Assurance Review

Anomaly

Deficiency

Rerun

Further action required: _____

Assigned to: _____

QA signature: [Signature]

Date: 5/19/99

Corrective Action Verification

Verified

Cannot Verify (specify reason): _____

N/A

Nonconformance Memo Closure

QA signature/date: [Signature]

5/19/99

**Data Review Checklist
RADIOCHEMISTRY**

Lot Number: <u>39C170189</u>				
Client ID: <u>BNZ</u>				
Due Date: <u>5-14-99</u>				
QC Batch Number: <u>9090269</u>		SDG Number: <u>W02715</u>		
Method Test Parameter: <u>Alpha</u>				
Matrix: <u>Paint Chips</u>				
Review Item	Yes (✓)	No (✓)	N/A (✓)	2 nd Level Review (✓)
A. Calibration				
1. Is the calibration documentation included where applicable?			✓	
B. Sample Analysis				
1. Are the sample yields within acceptance criteria?			✓	
2. Were all sample holding times met?			✓	
3. Is the sample Minimum Detectable Activity < the Contract Detection Limit?	✓			✓
C. QC Samples				
1. Is the blank yield within acceptance criteria?			✓	
2. Is the Minimum Detectable Activity for the blank result ≤ the Contract Detection Limit?	✓			✓
3. Does the blank result meet the Contract criteria?	✓			✓
4. Is the blank result < the Contract Detection Limit?	✓			✓
5. Is the blank result > the Contract Detection Limit but the sample result < the Contract Detection Limit?			✓	
6. Is the LCS result within acceptance criteria?		✓		
7. Is the LCS yield within acceptance criteria?			✓	
8. Is the LCS Minimum Detectable Activity ≤ the Contract Detection Limit?	✓			✓
9. Do the MS/MSD results and yields meet acceptance criteria?			✓	
10. Do the duplicate sample results and yields meet acceptance criteria?		✓		
D. Other				
1. Are all Nonconformances included and noted? 1 NCM	✓			✓
2. Are all required forms filled out?	✓			✓
3. Was the correct methodology used?	✓			✓
4. Was transcription checked? Jm 4-29-99	✓			✓
5. Were all calculations checked at a minimum frequency?	✓			✓
6. Were units checked?	✓			✓

Comments on any "No" response: SEE NCM

First Level Review: [Signature]

Second Level Review: [Signature]

Date: 5-5-99

Date: 5/15/99

0400

QUANTERRA LABORATORY NONCONFORMANCE MEMO (NCM)

PAGE 1 OF 2

LOG #: RD-99-_____

Project ID: <u>J90170189</u>	NCM Initiated by: <u>DO Cline II</u>
Sample Numbers: <u>9090269</u>	
Tests: <u>alpha</u>	
Matrix: <u>Paint chips</u>	<u>W02715</u>

Analytical Area (check appropriate area):

- | | | | |
|--|--------------------------------|--|--|
| <input type="checkbox"/> Sample control | <input type="checkbox"/> GC | <input type="checkbox"/> Wet chemistry | <input checked="" type="checkbox"/> Data review |
| <input type="checkbox"/> Organic preparation | <input type="checkbox"/> HPLC | <input type="checkbox"/> Metals | <input checked="" type="checkbox"/> Radiochemistry |
| <input type="checkbox"/> Inorganic preparation | <input type="checkbox"/> GC/MS | <input type="checkbox"/> Reporting | <input type="checkbox"/> Bioassay |

Nonconformance (check appropriate area):

Holding Time Violations (exceeded by _____ days)

Category I: Laboratory Independent

- 1. Holding time expired in transit
- 2. Sample received > 48 hrs. or 1/2 holding time has expired
- 3. Test added by client after expiration

Category II: Laboratory Dependent

- 4. Instrument failure
- 5. Analyst error
- 6. Login error
- 7. Miscommunication
- 8. Other (complete description required)

Category III: Analysis Reruns (QA/QC)

- 9. Surrogates
- 10. Internal Standards
- 11. Spike Recoveries
- 12. Blank Contamination

Category IV: Analysis Reruns (Confirmation)

- 13. Second column
- 14. Contamination check
- 15. Confirmation of matrix effects
- 16. Other (complete description required)

Quality Assurance/Quality Control

- 17. QC data reported outside of controls
- 18. Incorrect procedure used
- 19. SOP intentionally modified with QA and Tech. approval
- 20. Invalid instrument calibration
- 21. Insufficient sample received for proper analysis

Incorrect or Incomplete Client Deliverable

- 22. Hardcopy deliverable error
- 23. Electronic deliverable error

Reported detection limits elevated due to:

- 24. Sample matrix
- 25. Insufficient sample volume
- 26. Other (complete description required)

27. Other (specify): DUPS OUT, LCS OUT

Comments/Explanation: _____

Notification (check appropriate area):

Client notified by (name and date): _____

- in writing CN
- by facsimile
- by telephone
- other (explain)

Client's name and response: _____

- process "as is"
- re-sample
- on hold until _____
- other (explain)

Project Manager (signature and date): [Signature] 5/18/19

0035

QUANTERRA LABORATORY NONCONFORMANCE MEMO (NCM)

PAGE 2 OF 2

LOG#: RD-99-_____

Corrective Action

Root Cause

Initial and date: 5-5-99

Dups: non homogeneity of sample
LCS: unknown

Corrective Action

Initial and Date: 5-5-99

~~RE-EXAMINE SAMPLE~~ 5-5-99 CLIENT CONTACTED AND ACCEPTS RESULTS per PM

Responsibility for performing CA assigned to: _____

Actions to prevent recurrence

N/A

Initial and Date: _____

First Level Supervisor: _____

[Signature]

Date: 5-5-99

Responsible Manager: _____

[Signature]

Date: 5-19-99

Quality Assurance Review

Anomaly

Deficiency

Rerun

Further action required: _____

Assigned to: _____

[Signature]

Date: 5/19/99

Corrective Action Verification

Verified

Cannot Verify (specify reason): _____

N/A

Nonconformance Memo Closure

QA signature/date: _____

[Signature] 5/19/99

0036

Data Review Checklist
RADIOCHEMISTRY

Lot Number: <u>39C170189</u>				
Client ID: <u>BH7</u>				
Due Date: <u>5-14-99</u>				
QC Batch Number: <u>9090270</u>			SDG Number:	
Method Test Parameter: <u>Beta</u>				
Matrix: <u>Paint chips</u>				
Review Item	Yes (✓)	No (✓)	N/A (✓)	2 nd Level Review (✓)
A. Calibration				
1. Is the calibration documentation included where applicable?			✓	
B. Sample Analysis				
1. Are the sample yields within acceptance criteria?			✓	
2. Were all sample holding times met?			✓	
3. Is the sample Minimum Detectable Activity < the Contract Detection Limit?	✓	✓		✓
C. QC Samples				
1. Is the blank yield within acceptance criteria?			✓	
2. Is the Minimum Detectable Activity for the blank result ≤ the Contract Detection Limit?	✓			✓
3. Does the blank result meet the Contract criteria?	✓			✓
4. Is the blank result < the Contract Detection Limit?	✓			✓
5. Is the blank result > the Contract Detection Limit but the sample result < the Contract Detection Limit?			✓	
6. Is the LCS result within acceptance criteria?	✓			✓
7. Is the LCS yield within acceptance criteria?			✓	
8. Is the LCS Minimum Detectable Activity ≤ the Contract Detection Limit?	✓			✓
9. Do the MS/MSD results and yields meet acceptance criteria?			✓	
10. Do the duplicate sample results and yields meet acceptance criteria?		✓		
D. Other				
1. Are all Nonconformances included and noted? 1 NCM	✓			✓
2. Are all required forms filled out?	✓			✓
3. Was the correct methodology used?	✓			✓
4. Was transcription checked? JM 4-29-99	✓			✓
5. Were all calculations checked at a minimum frequency?	✓			✓
6. Were units checked?	✓			✓

Comments on any "No" response: SEE NCM

First Level Review: [Signature] Date: 5-11-99

Second Level Review: [Signature] Date: 5/18/99

0398

QUANTERRA LABORATORY NONCONFORMANCE MEMO (NCM)

PAGE 1 OF 2

LOG #: RD-99-_____

Project ID: J9C170189 NCM Initiated by: D O'Connell
 Sample Numbers: 9090270
 Tests: Beta
 Matrix: Paint Chips W02715

Analytical Area (check appropriate area):

- | | | | |
|--|--------------------------------|--|--|
| <input type="checkbox"/> Sample control | <input type="checkbox"/> GC | <input type="checkbox"/> Wet chemistry | <input checked="" type="checkbox"/> Data review |
| <input type="checkbox"/> Organic preparation | <input type="checkbox"/> HPLC | <input type="checkbox"/> Metals | <input checked="" type="checkbox"/> Radiochemistry |
| <input type="checkbox"/> Inorganic preparation | <input type="checkbox"/> GC/MS | <input type="checkbox"/> Reporting | <input type="checkbox"/> Bioassay |

Nonconformance (check appropriate area):

- Holding Time Violations (exceeded by _____ days)*
- Category I: Laboratory Independent*
- 1. Holding time expired in transit
 - 2. Sample received > 48 hrs. or 1/2 holding time has expired
 - 3. Test added by client after expiration
- Category II: Laboratory Dependent*
- 4. Instrument failure
 - 5. Analyst error
 - 6. Login error
 - 7. Miscommunication
 - 8. Other (complete description required)
- Category III: Analysis Reruns (QA/QC)*
- 9. Surrogates
 - 10. Internal Standards
 - 11. Spike Recoveries
 - 12. Blank Contamination
- Category IV: Analysis Reruns (Confirmation)*
- 13. Second column
 - 14. Contamination check
 - 15. Confirmation of matrix effects
 - 16. Other (complete description required)

- Quality Assurance/Quality Control*
- 17. QC data reported outside of controls
 - 18. Incorrect procedure used
 - 19. SOP intentionally modified with QA and Tech. approval
 - 20. Invalid instrument calibration
 - 21. Insufficient sample received for proper analysis
- Incorrect or Incomplete Client Deliverable*
- 22. Hardcopy deliverable error
 - 23. Electronic deliverable error
- Reported detection limits elevated due to:*
- 24. Sample matrix
 - 25. Insufficient sample volume
 - 26. Other (complete description required)
 - 27. Other (specify): Dups out of tolerance

Comments/Explanation: _____

Notification (check appropriate area):

- | | |
|---|--|
| Client notified by (name and date): _____ | Client's name and response: _____ |
| <input checked="" type="checkbox"/> in writing <u>ON</u> | <input type="checkbox"/> process "as is" |
| <input type="checkbox"/> by telephone | <input type="checkbox"/> re-sample |
| <input type="checkbox"/> by facsimile | <input type="checkbox"/> on hold until _____ |
| <input checked="" type="checkbox"/> other (explain) _____ | <input type="checkbox"/> other (explain) _____ |

Project Manager (signature and date): [Signature] 3/15/99

QUANTERRA LABORATORY NONCONFORMANCE MEMO (NCM)

PAGE 2 OF 2

LOG#: RD-99-_____

Corrective Action

Root Cause

Initial and date: DEC 5-11-99

non-homogeneity of sample LEAD TO DUPs OUT OF TOLERANCE. SAMPLES SCREENED,
REVEAL HIGH α ACTIVITY, ALIQUOTS WERE PREPARED AND OF DILUTED DIGESTATE.

Corrective Action

Initial and Date: DEC 5-11-99

CRF06102: activity > MDA, ok. DUPs ACCEPTED DUE TO DIFFICULTY OF ATTAINING
HOMOGENEITY. BIK IS OK, LCS IS OK, MDA OK. DATA ACCEPTED.

Responsibility for performing CA assigned to: _____

Actions to prevent recurrence

Initial and Date: _____

N/A

First Level Supervisor: _____

Date: 5-11-99

Responsible Manager: _____

Date: 5-19-99

Quality Assurance Review

Anomaly

Deficiency

Rerun

Further action required: _____

Assigned to: _____

QA signature: _____

Date: 5/19/99

Corrective Action Verification

Verified

Cannot Verify (specify reason): _____

N/A

Nonconformance Memo Closure

QA signature/date: _____

Joelle Ca 5/19/99

**Data Review Checklist
RADIOCHEMISTRY**

Lot Number: 39C170189				
Client ID: BHZ				
Due Date: 5-14-99				
QC Batch Number: 9090273			SDG Number:	
Method Test Parameter: NP-237				
Matrix: Other (Paint Chips)				
Review Item	Yes (✓)	No (✓)	N/A (✓)	2 nd Level Review (✓)
A. Calibration				
1. Is the calibration documentation included where applicable?			✓	
B. Sample Analysis				
1. Are the sample yields within acceptance criteria?			✓	
2. Were all sample holding times met?			✓	
3. Is the sample Minimum Detectable Activity < the Contract Detection Limit?	✓			✓
C. QC Samples				
1. Is the blank yield within acceptance criteria?			✓	
2. Is the Minimum Detectable Activity for the blank result ≤ the Contract Detection Limit?	✓			✓
3. Does the blank result meet the Contract criteria?	✓			✓
4. Is the blank result < the Contract Detection Limit?	✓			✓
5. Is the blank result > the Contract Detection Limit but the sample result < the Contract Detection Limit?			✓	
6. Is the LCS result within acceptance criteria?	✓			✓
7. Is the LCS yield within acceptance criteria?			✓	
8. Is the LCS Minimum Detectable Activity ≤ the Contract Detection Limit?	✓			✓
9. Do the MS/MSD results and yields meet acceptance criteria?	✓			✓
10. Do the duplicate sample results and yields meet acceptance criteria?	✓			✓
D. Other				
1. Are all Nonconformances included and noted?			✓	
2. Are all required forms filled out?			✓	✓
3. Was the correct methodology used?			✓	✓
4. Was transcription checked?			✓	✓
5. Were all calculations checked at a minimum frequency?			✓	✓
6. Were units checked?			✓	✓

Comments on any "No" response: _____

First Level Review: Maguelini Waddell
 Second Level Review: [Signature]

Date: 5/18/99
 Date: 5/18/99

**CHAIN OF
CUSTODY FORMS**

J9C170189

Vol 5-27

Q-27347

29005

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

C.O.C. No.

Page 1 of 1

Collector N/A C. ELLOGE	Contact/Requestor R. A. Esch DAVE ENCKE	Telephone No. 373-346 / MSIN FAX 373-4314 -T6-12 372-1078
SAF No. N/A B99-024-02 ^{43 367}	Sample Origin 233-S Facility	Purchase Order/Charge Code N/A
Project Title 233-S Facility Samples	Logbook No. N/A EFL 1133-7	Ice Chest No. N/A GWS 130 Temp. N/A
Shipped To (Lab) 233-S Project Personnel	Method of Shipment N/A GOV. VEHICLE	Bill of Lading/Air Bill No. N/A
Protocol N/A	Data Turnaround N/A	Offsite Property No. N/A

Sample No.	Lab ID	*	Date	Time	No./Type Container	Sample Analysis	Preservative
B0TW24 A	S99M000079	S	3499	1005	1/60 mL glass	Return to 233-S Project, SEE ITEMS (1) & (2) CRPOO	None
B0TW27	N/A	S	3899	0750	duct coupon	Return to 233-S Project, SEE ITEM (1) CRPO2	None
B0TW30	N/A	S	3-399	1015	pipe	Return to 233-S Project, SEE ITEM (1) CRPO6	None
SDG-W02715							

POSSIBLE SAMPLE HAZARDS/REMARKS (List all known wastes) MSDS <input type="radio"/> Yes <input type="radio"/> No	SPECIAL INSTRUCTIONS	Hold Time
SPECIAL INSTRUCTIONS CONTINUED: SAMPLES OUT OF HIGH ALPHA CONTAMINATION AREA, OUTSIDE OF JARS SHOULD BE CONSIDERED CLEAN. NOT	This chain of custody form was generated as a record that the above samples were returned to the 233-S Project. ITEM #1 GEA, GROSS ALPHA, GROSS BETA, ISOTOPIC PU, Np-237, AND AM-241/CM-244 ITEM #2 ICP(TCLP), Hg (TCLP), AND PCB'S	REGULAR SAMPLE NO. IS FOR 222-S, SAMPLE NO. WITH "A" IS FOR QUANTERRA

Relinquished By Print Sign RL Chambers R. Chambers	Date/Time 3-16-99 1030	Received By Print Sign S. GALE S. GALE	Date/Time 3-16-99 1030	Matrix* S = Soil DS = Drum Solids SE = Sediment DL = Drum Liquids SO = Solid T = Tissue SL = Sludge WI = Wipe W = Water L = Liquid O = Oil V = Vegetation A = Air X = Other
Relinquished By S. GALE S. GALE	Date/Time 3-16-99 1220	Received By S. GALE S. GALE	Date/Time 3-16-99 1220	
Relinquished By	Date/Time	Received By L. O. O. O.	Date/Time	
Relinquished By	Date/Time	Received By	Date/Time	

FINAL SAMPLE DISPOSITION	Disposal Method (e.g., Return to customer, per lab procedure, used in process)	Disposed By	Date/Time
--------------------------	--	-------------	-----------

POTENTIAL HAZARDS

- HEALTH**
- Radiation presents minimal risk to transport workers, emergency response personnel, and the public during transportation accidents. Packaging durability is related to potential hazards of material.
 - Low-level radioactive material; very low radiation hazard to people.
 - Quantity of material presents low radiation hazard if released from package during accident.
 - Some radioactive materials cannot be detected by commonly available instruments.
 - Packages do not have RADIOACTIVE I, II, or III labels. Some may have EMPTY labels or may have the word "Radioactive" in the package marking.
 - If any radioactive contamination occurs, it will be extremely low level.

FIRE OR EXPLOSION

- Some of these materials may burn, but most do not ignite readily.
- Radioactivity does not change flammability or other properties of materials.

PUBLIC SAFETY

- CALL Emergency Response Telephone Number on Shipping Paper first. If Shipping Paper not available or no answer, refer to appropriate telephone number listed on the inside back cover.
- Priorities for rescue, life-saving, first aid, and control of fire and other hazards are higher than the priority for measuring radiation levels.
- Radiation Authority must be notified of accident conditions, and is usually responsible for radiological decisions.
- Isolate spill or leak area immediately for at least 25 to 50 meters (80 to 160 feet) in all directions.
- Stay upwind.
- Keep unauthorized personnel away.
- Detain or isolate uninjured persons or equipment suspected to be contaminated; delay decontamination and cleanup until instructions are received from Radiation Authority.

PROTECTIVE CLOTHING

- Positive pressure self-contained breathing apparatus (SCBA) and structural firefighters protective clothing will provide adequate protection.

EVACUATION

- Large Spill**
- Consider initial downwind evacuation for at least 100 meters (330 feet).
- Fire**
- When a large quantity of this material is involved in a major fire, consider an initial evacuation distance of 300 meters (1000 feet) in all directions.

EMERGENCY RESPONSE

- FIRE**
- Presence of radioactive material will not change effectiveness of fire control techniques.
 - Move containers from fire area if you can do it without risk.
 - Do not move damaged packages; move undamaged packages out of fire zone.
- Small Fires**
- Dry chemical, CO₂, water spray or regular foam.
- Large Fires**
- Water spray, fog (flooding amounts).

SPILL OR LEAK

- Do not touch damaged packages or spilled material.
- Liquid Spills**
- Cover with sand, earth or other noncombustible absorbent material.
 - Cover powder spill with plastic sheet or tarp to minimize spreading.

FIRST AID

- Medical problems take priority over radiological concerns.
- Use first aid treatment according to the nature of the injury.
- Do not delay care and transport of a seriously injured person.
- Apply artificial respiration if victim is not breathing.
- Administer oxygen if breathing is difficult.
- In case of contact with substance, immediately flush skin or eyes with running water for at least 20 minutes.
- Injured persons who contacted released material may be a minor contamination problem to contacted persons, equipment and facilities.
- Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves.

RADIOACTIVE MATERIAL, EXCEPTED PACKAGE-LIMITED QUANTITY OF MATERIAL, 7, UN 2910

THIS PACKAGE CONFORMS TO THE CONDITIONS AND LIMITATIONS SPECIFIED IN 49 CFR 173.421 FOR RADIOACTIVE MATERIAL, EXCEPTED PACKAGE-LIMITED QUANTITY OF MATERIAL, UN 2910

U.S. DEPARTMENT OF ENERGY, RICHLAND WA.
~~BY RUST FEDERAL SERVICES HANFORD~~
P.O. BOX 1970, 2355 STEVENS DRIVE
RICHLAND, WA 99352

WASTE MANAGEMENT, FEDERAL SERVICES,
NORTHWEST OPERATIONS

0045

HAVE

	BOTW24	BOTW27	BOTW30
A_m^{241}	$\Rightarrow 1.65 \times 10^{-7} \text{ Ci}$	$2.2 \times 10^{-7} \text{ Ci}$	$4.667 \times 10^{-8} \text{ Ci}$
P_U^{239}	$\Rightarrow 5.84 \times 10^{-7} \text{ Ci}$	$7.787 \times 10^{-7} \text{ Ci}$	$1.652 \times 10^{-7} \text{ Ci}$
P_U^{240}	$\Rightarrow 6.424 \times 10^{-7} \text{ Ci}$	$8.565 \times 10^{-7} \text{ Ci}$	$1.817 \times 10^{-7} \text{ Ci}$

TOTAL HAVE

$$A_m^{241} \quad 1.65 \times 10^{-7} \text{ Ci} + 2.2 \times 10^{-7} \text{ Ci} + 4.667 \times 10^{-8} \text{ Ci} \Rightarrow 4.316 \times 10^{-7} \text{ Ci}$$

$$P_U^{239} \quad 5.84 \times 10^{-7} \text{ Ci} + 7.787 \times 10^{-7} \text{ Ci} + 1.652 \times 10^{-7} \text{ Ci} \Rightarrow 1.527 \times 10^{-6} \text{ Ci}$$

$$P_U^{240} \quad 6.424 \times 10^{-7} \text{ Ci} + 8.565 \times 10^{-7} \text{ Ci} + 1.817 \times 10^{-7} \text{ Ci} \Rightarrow 1.68 \times 10^{-6} \text{ Ci}$$

$$\text{TOTAL Ci/PKG.} = 3.639 \times 10^{-6} \text{ Ci}$$

$$T \text{ Bq/PKG} = 1.347 \times 10^{-7}$$

<u>ALLOWED</u>	TYPE A	LTD QTY
ISOTOPE	A2	$A_2 (10^{-3}) \text{ SOLID}$
A_m^{241}	$5.41 \times 10^{-3} \text{ Ci}$	$5.41 \times 10^{-6} \text{ Ci}$
P_U^{239}	$5.41 \times 10^{-3} \text{ Ci}$	$5.41 \times 10^{-6} \text{ Ci}$
P_U^{240}	$5.41 \times 10^{-3} \text{ Ci}$	$5.41 \times 10^{-6} \text{ Ci}$

HAVE VS ALLOWED

$$\frac{4.316 \times 10^{-7} \text{ Ci}}{5.41 \times 10^{-6} \text{ Ci}} + \frac{1.527 \times 10^{-6} \text{ Ci}}{5.41 \times 10^{-6} \text{ Ci}} + \frac{1.68 \times 10^{-6} \text{ Ci}}{5.41 \times 10^{-6} \text{ Ci}} =$$

$$= 7.97 \times 10^{-2} + 2.82 \times 10^{-1} + 3.10 \times 10^{-1} = 0.67$$

0.67 < 1 \therefore LTD QTY67 < 100% \therefore LTD QTY

Estimated Total Curies per Sample per detected isotope

Sample Number	Pu-239	Pu-240	Am-241
B0TW24	5.840E-07	6.424E-07	1.650E-07
B0TW27	7.787E-07	8.565E-07	2.200E-07
B0TW30	1.652E-07	1.817E-07	4.667E-08

Per S. Trent / R. Weis's
EPC Sample Mount
using 222-3 laboratory
data from other
samples this location
and process information
3/15/99
DAS

1. SHIP FROM U.S. DEPT. OF ENERGY C/O
 Company BHE HANFORD
 Address 222-S 200 WEST AREA
 City, State, Zip RICHLAND, WA, 99352
 Contact DAVE ST. JOHN
 Phone 509 372-9588

RADIOACTIVE SHIPMENT RECORD 100128³
 Page of 2

Ship Prepaid Collect 4.
 Via Motor Air Psgr UPS
 Rail Air Cargo Site Carrier

SHIPMENT AUTHORIZATION NUMBER

2. SHIP TO
 Company QUANTERRA INC,
 Address 2800 GEORGE WASHINGTON WAY
 City, State, Zip RICHLAND, WA, 99352
 Attention Karen Ardenburg
 Phone 509 375-3131

Markings Applied:
 Radioactive - LSA
 Radioactive - SCO Type A
 Type B with trefoil
 LSA Descriptions:
 LSA-I
 LSA-II
 LSA-III
 SCO-I
 SCO-II

For Normal Form only Identify:
 Physical Form Liquid Gas
 Solid
 Chemical Form Elemental
 Metal Nitrate
 Oxide Mixture
 Other

5. HM Proper Shipping Name: _____ Radioactive Material.

<input type="checkbox"/>	excepted package - empty packaging	7	UN2910
<input type="checkbox"/>	excepted package - instruments or articles	7	UN2910
<input checked="" type="checkbox"/>	excepted package - limited quantity of material	7	UN2910
<input type="checkbox"/>	excepted package - articles manufactured from natural or depleted uranium or natural thorium	7	UN2910
<input type="checkbox"/>	Special Form, n.o.s.	7	UN2974
<input type="checkbox"/>	Low Specific Activity, n.o.s.	7	UN2912
<input type="checkbox"/>	n.o.s.	7	UN2982
<input type="checkbox"/>	Fissile, n.o.s.	7	UN2918
<input type="checkbox"/>	Surface Contaminated Object	7	UN2913

EMERGENCY RESPONSE
 Telephone 509 373 3800
 Emergency Response Guide 161

Labels Applied:
 Empty
 Radioactive White - I
 Radioactive Yellow - II
 Radioactive Yellow - III
 Subsidiary Hazard

Highway Route Controlled Quantity
 Exclusive Use Shipment with instructions
 Placards Applied
 If Rail Specify:
 Fissile Excepted, Grams < 15 gm
 Excepted Package Statement

Warning - Fissile Material Controlled Shipment. Do Not Load More Than NA Packages Per Vehicle. In Loading and Storage Areas, Keep at Least 20 Feet From Other Packages Bearing Radioactive Labels. 947 gm TOTAL IN PACKAGE 70g

PKT No	Model/Package	COG/Spec	Serial No	Seal No	Isotope	Quantity	Weight	
	POLY COOLER	STRONG TIGHT	GWS 130	TAPE	Am ²⁴¹ , Pu ²³⁹	NA	2.24 kg	
	SAMPLE JARS IN POLY BAGS, FIVE SAMPLE IN DOUBLE BAG							1.34 kg
	PACKED IN WET ICE							1.34 kg
(Shipper may describe package in detail on one of the unused lines above)						TOTALS	NA 2.24 kg 2.5 kg	

12. This is to certify that the above named materials are properly classified, described, packaged, marked and labeled, and are in proper condition for transportation according to the applicable regulations of the Department of Transportation.

Certifier's Signature [Signature] On behalf of DOE-RL Date 3/16/99 Organization ERC-AFS Complete Cost Code (Inc. End Function) R2335T200C

13. Surface Dose Rate of Package <0.005 or _____ mSv/hr <0.005 or _____ mSv/hr
 <0.5 or _____ mrem/hr (N+B Y) <0.5 or _____ mrem/hr (N+B Y)

Dose Rate @ 1 Meter from Surface of Package <0.005 or _____ mSv/hr <0.5 or _____ mrem/hr (N+B Y)

Smears of Outer Container:
 <0.41 Bq (22 dpm) B & Y /cm²
 <0.04 Bq (2.2 dpm) alpha /cm²
 <Tbl. 2-2 HSRGM Onsite Limits

TRUCK LOAD OR EXCLUSIVE USE:
 Surface <2 mSv/hr (200 mrem/hr)
 @ 2 meters <0.1 mSv/hr (10 mrem/hr)
 @ Cab or sleeper <0.02 mSv/hr (2 mrem/hr) (Using N+B Y)

Signature [Signature] Bldg. 2225 Survey No. 246859 Date 3/16/99

14. Vehicle Number 663 19584 DRIVER SIGNATURE [Signature] RECEIVER SIGNATURE [Signature] Date 3-16-99

15. OFFSITE AUTHORIZATION
 Shipment has been inspected and verified to be in compliance with DOT regulations.
 Authorized Signature [Signature] Printed Name M.A. SAMS Date 3-16-99

16. AUTHORIZATION FOR SHIPMENT
 AIR TRANSPORT CERTIFICATION NA
 CARGO AIRCRAFT Cargo Aircraft Only Labels Applied: Lid Qty <3 T.L.
 PASSENGER AIRCRAFT Research/Medical Diagnosis Human Medical Research
 Pkg. Dimensions (cm) NA

17. OFFSITE AUTHORIZATION
 Tracking No. RMBH 3355 Date Shipped 3-16-99 Routing CH2M Hill ETA 3-16-99
 Surveyed By NA Date NA Approved for Shipment Offsite [Signature] Date 3-16-99

Figure 1

SAMPLE CHECK-IN LIST

Date/Time Received: 3/16 1225 SG#: W02715
Work Order Number: JAC170.189 SAF #: B99-024
Shipping Container ID: GWS130 Chain of Custody #: una

- 1. Custody Seals on shipping container intact? Yes [] No []
- 2. Custody Seals dated and signed? Yes [] No []
- 3. Chain-of-Custody record present? Yes [] No []
- 4. Cooler temperature 30
- 5. Vermiculite/packing materials is Wet [] Dry []
- 6. Number of samples in shipping container: 3
- 7. Sample holding times exceeded? Yes [] No []

8. Samples have:
 tape hazard labels
 custody seals appropriate sample labels

9. Samples are:
 in good condition leaking
 broken have air bubbles

10. Where any anomalies identified in sample receipt? Yes [] No []

11. Description of anomalies (include sample numbers): _____

Sample Custodian/Laboratory: Heidelberg Date: 3/16/99
Telephoned To: _____ On _____ By _____

Client Sample Screening Results

20-Apr-99

4/20/99

CLIENT CODE ID	MATRIX	RECEIVED	DETECTOR	ACQ DATE	SAMPLE	MINUTES	CNTS A	NET CPM A	CNTS B	NET CPM B
BIII CRP00		4/19/99 10:56:00 AM	QUAD21B	4/19/99 12:28:17 PM	CRP00	30	279	9.21625	105	2.52
	LIQUID		Bkg:	4/17/99 5:34:54 AM	BKG	800	67	0.08375	784	0.98
Anl Date: 4/20/99	Tot Sa, Alq: 3.90E+00	, 1.00E+01	Alp; (Dpm/	2.96E+01	(uCi/ 5.21E-06	(pCi/ 1.33E+03	+ 7.3E+01	CAT	1.9E-02	Lab
Ppt mg: 2.5	Units: ml ✓	, ml	Bet; Alq): -6.39E-01	Sa): -1.12E-07	L g): -2.88E+01	+ 1.9E+01	I ✓	3.9E-03	Alq	L g
BIII CRP02		4/19/99 10:56:00 AM	QUAD21C	4/19/99 12:28:17 PM	CRP02	30	5866	195.4408333	1075	34.6870833
	LIQUID		Bkg:	4/17/99 5:34:54 AM	BKG	800	74	0.0925	917	1.14625
Anl Date: 4/20/99	Tot Sa, Alq: 4.00E+00	, 1.00E+01	Alp; (Dpm/	5.85E+02	(uCi/ 1.05E-04	(pCi/ 2.64E+04	+ 3.0E+02	CAT	9.5E-04	Lab
Ppt mg: 2.2	Units: ml ✓	, ml	Bet; Alq): -4.34E+01	Sa): -7.83E-06	L g): -1.96E+03	+ 7.8E+01	I ✓	4.0E-03	Alq	L g
BIII CRP06		4/19/99 10:56:00 AM	QUAD21D	4/19/99 12:28:17 PM	CRP06	30	1894	63.05333333	348	10.53375
	LIQUID		Bkg:	4/17/99 5:34:54 AM	BKG	800	64	0.08	853	1.06625
Anl Date: 4/20/99	Tot Sa, Alq: 3.86E+00	, 1.00E+01	Alp; (Dpm/	1.96E+02	(uCi/ 3.41E-05	(pCi/ 8.83E+03	+ 1.8E+02	CAT	2.8E-03	Lab
Ppt mg: 1.2	Units: ml ✓	, ml	Bet; Alq): -1.56E+01	Sa): -2.71E-06	L g): -7.03E+02	+ 4.9E+01	I ✓	3.9E-03	Alq	L g

CRP00 - use 75 ml for α emitters
 10 ml for β
 20 ml for β
DATE 4-23-99

CRP02 use 4 ml for α emitters
 8 ml for β

CRP06 use 12 ml for α emitter
 24 for β

0048

COC Signature Page

Batch #:	Initials/Date	Procedure #
W02715 9090271		
Released By	fw 3/31/99	RICHRC0009
Received	SK 4/28/99	RC5013
Released By	SK 5/4/99	n/a
Received	Ⓢ 5/10/99	RICHRC5080
Released By	Ⓢ 5/13/99	n/a
Received	Ⓢ 5/14/99	RICHRC5003
Released By	Ⓢ 5/14/99	n/a
Received	CS 5/14/99	RICHRC0008
Released By	CS 5/17/99	n/a
Received	JM 5-17-99	RICHRS 5003
Released By	JM 5-17-99	n/a
Received	JW 5/17/99	RICHRC0002/2
Released By	JW 5/18/99	n/a
Received		

RQC053

Quanterra Incorporated
RAD PREP BENCH WORKSHEET

Run Date: 3/31/99
Time: 11:52:02

<u>Prep</u>	<u>Sep1</u>	<u>Sep2</u>	Samples Covered
---	---	---	Labware Labeled
---	---	---	Verify Test/Container
---	---	---	Samples Ordered Sequentially
---	---	---	Logbooks Entered

 * QC BATCH: 9090271 *

Prep Dt/Tm/Person:	3/31/99	0
Sep1 Dt/Tm/Person:	0/00/00	00000
Sep2 Dt/Tm/Person:	0/00/00	00000
Cocktail Date/Time:	0/00/00	

W02715

SN: Americium-241 and Curium-242,243,244 by Alpha Spec
 7I: PuAmCm PrpRC5013/RC5019, SepRC5080(5003)/RC5010(5039)
 5I: RCH: HANFORD ANALYTICAL

<u>ANL DUE</u>	<u>LOT#,MSRUN#/ WORK ORDER</u>	<u>CLIENT MATRIX</u>	<u>INIT/ FINAL</u>	<u>DISH</u>	<u>GEOM</u>	<u>PPT1WT</u>	<u>pH</u>	<u>COUNT TIME</u>	<u>MID/AVE DATE/TIME</u>	<u>TRACER ID/ SPIKE ID</u>	<u>CRDL</u>	<u>UNITS</u>
5/14/99	J9C170189-001 CRP00-1-06	SOLID									1	pCi/g
5/14/99	J9C170189-002 CRP02-1-06	SOLID									1	pCi/g
5/14/99	J9C170189-003 CRP06-1-06	SOLID									1	pCi/g
5/14/99	J9C170189-003 CRP06-1-07X	SOLID		JCRP061R							1	pCi/g
0/00/00	J9C310000-271 CT6CE-1-01B	SOLID		JCT6CE1B							1	pCi/g
0/00/00	J9C310000-271 CT6CE-1-02C	SOLID		JCT6CE1S							1	pCi/g

NUMBER OF WORK ORDERS IN BATCH: 6

0050

COC Signature Page

W02715
Batch #: 9090272

	Initials/Date	Procedure #
Released By	JW 3/31/99	RICHRC0009
Received	SK 4/28/99	RC5013
Released By	SK 5/4/99 SK-4/2	n/a
Received	Ⓢ 5/10/99	RICHRC5080
Released By	Ⓢ 5/12/99	n/a
Received	Ⓢ 5/14/99	RICHRC5039
Released By	Ⓢ 5/14/99	n/a
Received	CS 5/14/99	RICHRC5008
Released By	CS 5/17/99	n/a
Received	JM 5-17-99	RICHRS 5003
Released By	JM 5-17-99	n/a
Received	JW 5/17/99	RICHRC0002/2
Released By	JW 5/18/99	n/a
Received		

RQC053

Quanterra Incorporated
RAD PREP BENCH WORKSHEET

Run Date: 3/31/99
Time: 11:54:05

<u>Prep</u>	<u>Sep1</u>	<u>Sep2</u>	
---	---	---	Samples Covered
---	---	---	Labware Labeled
---	---	---	Verify Test/Container
---	---	---	Samples Ordered Sequentially
---	---	---	Logbooks Entered

 * QC BATCH: 9090272 *

Prep Dt/Tm/Person: 3/31/99 0
 Sep1 Dt/Tm/Person: 0/00/00 00000
 Sep2 Dt/Tm/Person: 0/00/00 00000
 Cocktail Date/Time: 0/00/00

W02715

SO: Plutonium-238,239/40 by Alpha Spec
 7I: PuAmCm PrpRC5013/RC5019, SepRC5080 (5003)/RC5010 (5039)
 5I: RCH: HANFORD ANALYTICAL

<u>ANL</u>	<u>LOT#,MSRUN#/ DUE WORK ORDER</u>	<u>CLIENT</u>	<u>INIT/ MATRIX FINAL</u>	<u>DISH</u>	<u>GEOM</u>	<u>PPT1WT</u>	<u>pH</u>	<u>COUNT</u>	<u>MID/AVE</u>	<u>TRACER ID/ SPIKE ID</u>	<u>CRDL</u>	<u>UNITS</u>
								<u>TIME</u>	<u>DATE/TIME</u>			
5/14/99	J9C170189-001 CRP00-1-03		SOLID								1	pCi/g
5/14/99	J9C170189-002 CRP02-1-03		SOLID								1	pCi/g
5/14/99	J9C170189-003 CRP06-1-03		SOLID								1	pCi/g
5/14/99	J9C170189-003 CRP06-1-08X		SOLID		JCRP061R						1	pCi/g
0/00/00	J9C310000-272 CT6CQ-1-01B		SOLID		JCT6CQ1B						1	pCi/g
0/00/00	J9C310000-272 CT6CQ-1-02C		SOLID		JCT6CQ1S						1	pCi/g

NUMBER OF WORK ORDERS IN BATCH: 6

2500

COC Signature Page

W02715

Batch #:	Initials/Date	Procedure #
9090274		
Released By	<u>RW 3/31/99</u>	<u>RICHRC0009</u>
Received	<u>SK 4/28/99</u>	<u>RC5017</u>
Released By	<u>SK 4/27/99</u>	<u>n/a</u>
Received	<u>CM 4/29/99</u>	<u>RICHRC0007</u>
Released By	<u>CM 4/31/99</u>	<u>n/a</u>
Received	<u>DUC 5-3-99</u>	<u>RICHRC0002-2</u>
Released By	<u>DUC 5-11-99</u>	<u>n/a</u>
Received		
Released By		<u>n/a</u>
Received		
Released By		<u>n/a</u>
Received		
Released By		<u>n/a</u>
Received		

RQC053

Quanterra Incorporated
RAD PREP BENCH WORKSHEET

Run Date: 3/31/99
Time: 11:57:41

<u>Prep</u>	<u>Sep1</u>	<u>Sep2</u>	Samples Covered
---	---	---	Labware Labeled
---	---	---	Verify Test/Container
---	---	---	Samples Ordered Sequentially
---	---	---	Logbooks Entered

 * QC BATCH: 9090274 *
 *

Prep Dt/Tm/Person:	3/31/99	0
Sep1 Dt/Tm/Person:	0/00/00	000000
Sep2 Dt/Tm/Person:	0/00/00	000000
Cocktail Date/Time:	0/00/00	

W02715

TA: Gamma by HPGE
 AW: Gamma PrpRC5017
 SI: RCH: HANFORD ANALYTICAL

<u>ANL DUE</u>	<u>LOT#,MSRUN#/ WORK ORDER</u>	<u>CLIENT MATRIX</u>	<u>INIT/ FINAL</u>	<u>DISH</u>	<u>GEOM</u>	<u>PPT1WT</u>	<u>pH</u>	<u>COUNT TIME</u>	<u>MID/AVE DATE/TIME</u>	<u>TRACER ID/ SPIKE ID</u>	<u>CRDL</u>	<u>UNITS</u>
5/14/99	J9C170189-001 CRP00-1-04	SOLID									0.1	pCi/g
5/14/99	J9C170189-002 CRP02-1-04	SOLID									0.1	pCi/g
5/14/99	J9C170189-002 CRP02-1-08X	SOLID		JCRP021R							0.1	pCi/g
5/14/99	J9C170189-003 CRP06-1-04	SOLID									0.1	pCi/g
0/00/00	J9C310000-274 CT6DV-1-01B	SOLID		JCT6DV1B							0.1	pCi/g
0/00/00	J9C310000-274 CT6DV-1-02C	SOLID		JCT6DV1S							0.1	pCi/g

NUMBER OF WORK ORDERS IN BATCH: 6

405.

COC Signature Page

W02715

Batch #: 9090269

	Initials/Date	Procedure #
Released By	<u>RW 3/31/99</u>	<u>RICHRC0009</u>
Received	<u>SK 4/27/99</u> TR 4/28/99	<u>RC 5013</u> <u>RC 5014</u>
Released By	<u>SK 4/28/99</u>	<u>n/a</u>
Received	<u>(CR) 4/28/99</u>	<u>RICHRC0003 P.2</u>
Released By	<u>CS 4/29/99</u>	<u>n/a</u>
Received	<u>JM 4-29-99</u>	<u>RICH705004</u>
Released By	<u>JM 4-29-99</u>	<u>n/a</u>
Received	<u>Doc 4-29-99</u>	<u>RICHRC 0002-2</u>
Released By	<u>Doc 5-5-99</u>	<u>n/a</u>
Received		
Released By		<u>n/a</u>
Received		
Released By		<u>n/a</u>
Received		

RQC053

Quanterra Incorporated
RAD PREP BENCH WORKSHEET

Run Date: 3/31/99
Time: 11:47:32

<u>Prep</u>	<u>Sep1</u>	<u>Sep2</u>	Samples Covered
---	---	---	Labware Labeled
---	---	---	Verify Test/Container
---	---	---	Samples Ordered Sequentially
---	---	---	Logbooks Entered

 *
 * QC BATCH: 9090269 *
 *

Prep Dt/Tm/Person: 3/31/99 0
 Sep1 Dt/Tm/Person: 0/00/00 0000
 Sep2 Dt/Tm/Person: 0/00/00 0000
 Cocktail Date/Time: 0/00/00

W02715

S7: Gross Alpha by GPC using Am-241 curve
 AY: Gross Alpha PrpRC5013/5020
 5I: RCH: HANFORD ANALYTICAL

SOM
SK 4/26/99

<u>ANL DUE</u>	<u>LOT#,MSRUN#/ WORK ORDER</u>	<u>CLIENT MATRIX</u>	<u>INIT/ FINAL</u>	<u>DISH</u>	<u>GEOM</u>	<u>PPT1WT</u>	<u>pH</u>	<u>COUNT TIME</u>	<u>MID/AVE DATE/TIME</u>	<u>TRACER ID/ SPIKE ID</u>	<u>CRDL</u>	<u>UNITS</u>
5/14/99	J9C170189-001 CRP00-1-01	SOLID									10	pCi/g
5/14/99	J9C170189-001 CRP00-1-07X	SOLID		JCRP001R							10	pCi/g
5/14/99	J9C170189-002 CRP02-1-01	SOLID									10	pCi/g
5/14/99	J9C170189-003 CRP06-1-01	SOLID									10	pCi/g
0/00/00	J9C310000-269 CT6C2-1-01B	SOLID		JCT6C21B							10	pCi/g
0/00/00	J9C310000-269 CT6C2-1-02C	SOLID		JCT6C21S							10	pCi/g

NUMBER OF WORK ORDERS IN BATCH: 6

0056

COC Signature Page

Batch #:	Initials/Date	Procedure #
W02715 9090270		
Released By	<u>RD 3/31/99</u>	<u>RICHRC0009</u>
Received	<u>SK 4/27/99</u> <small>TAL 4/28/99</small>	<u>RC 5013</u> <u>RC 5014</u>
Released By	<u>SK 4/28/99</u>	<u>n/a</u>
Received	<u>(R) 4/28/99</u>	<u>RICHRC0003 P.2</u>
Released By	<u>CD 4/29/99</u>	<u>n/a</u>
Received	<u>JM 4-29-99</u>	<u>RICHRS 5004</u>
Released By	<u>JM 4-29-99</u>	<u>n/a</u>
Received	<u>DUC 4-29-99</u>	<u>RICHRC0002-2</u>
Released By	<u>DUC 5-11-99</u>	<u>n/a</u>
Received		
Released By		<u>n/a</u>
Received		
Released By		<u>n/a</u>
Received		

RQC053

Quanterra Incorporated
RAD PREP BENCH WORKSHEET

Run Date: 3/31/99
Time: 11:49:48

<u>Prep</u>	<u>Sep1</u>	<u>Sep2</u>	Samples Covered
_____	_____	_____	Labware Labeled
_____	_____	_____	Verify Test/Container
_____	_____	_____	Samples Ordered Sequentially
_____	_____	_____	Logbooks Entered

 * QC BATCH: 9090270 *
 *

Prep Dt/Tm/Person:	3/31/99	0
Sep1 Dt/Tm/Person:	0/00/00	0000
Sep2 Dt/Tm/Person:	0/00/00	0000
Cocktail Date/Time:	0/00/00	

W02715

S8: Gross Beta by GPC using Sr/Y-90 curve
 BB: Gross Beta PIPRC5013/5020
 51: RCH: HANFORD ANALYTICAL

ANL DUE	LOT#,MSRUN#/ WORK ORDER	CLIENT MATRIX	INIT/FINAL	DISH	GEOM	PPT1WT	pH	COUNT TIME	MID/AVE DATE/TIME	TRACER ID/ SPIKE ID	CRDL	UNITS
5/14/99	J9C170189-001 CRP00-1-02	SOLID									15	pCi/g
5/14/99	J9C170189-002 CRP02-1-02	SOLID									15	pCi/g
5/14/99	J9C170189-002 CRP02-1-07X	SOLID		JCRP021R							15	pCi/g
5/14/99	J9C170189-003 CRP06-1-02	SOLID									15	pCi/g
0/00/00	J9C310000-270 CT6C7-1-01B	SOLID		JCT6C71B							15	pCi/g
0/00/00	J9C310000-270 CT6C7-1-02C	SOLID		JCT6C71S							15	pCi/g

NUMBER OF WORK ORDERS IN BATCH: 6

U

COC Signature Page

W02715

Batch #: 9090273

	Initials/Date	Procedure #
Released By	<u>RLW 3/31/99</u>	<u>RICHRC 0009</u>
Received	<u>SK 4/28/99</u>	<u>RC 5013</u>
Released By	<u>SK 4/28/99</u>	<u>n/a</u>
Received	<u>RB 5/12/99</u>	<u>RICHRC 5004</u>
Released By	<u>RB 5/13/99</u>	<u>n/a</u>
Received	<u>RB 5/13/99</u>	<u>RICHRC 5003</u>
Released By	<u>RB 5/13/99</u>	<u>n/a</u>
Received	<u>CD 5/13/99</u>	<u>RICHRC 0008</u>
Released By	<u>CD 5/14/99</u>	<u>n/a</u>
Received	<u>JM 5-14-99</u>	<u>RICHRC 5003</u>
Released By	<u>JM 5-14-99</u>	<u>n/a</u>
Received	<u>JW 5/17/99</u>	<u>RICHRC 0002 1/2</u>
Released By	<u>JW 5/18/99</u>	<u>n/a</u>
Received	<u></u>	<u></u>

RQC053

Quanterra Incorporated
RAD PREP BENCH WORKSHEET

Run Date: 4/23/99
Time: 12:32:32

<u>Prep</u>	<u>Sep1</u>	<u>Sep2</u>	Samples Covered
_____	_____	_____	Labware Labeled
_____	_____	_____	Verify Test/Container
_____	_____	_____	Samples Ordered Sequentially
_____	_____	_____	Logbooks Entered

 * QC BATCH: 9090273 *

Prep Dt/Tm/Person: 3/31/99 0
 Sep1 Dt/Tm/Person: 0/00/00 00000
 Sep2 Dt/Tm/Person: 0/00/00 00000
 Cocktail Date/Time: 0/00/00

SW: Neptunium-237 by Alpha Spec
 9L: Np PrpRC5013/RC5019, SepRC5009(5003)
 5I: RCH: HANFORD ANALYTICAL

SK 4/22/99

<u>ANL DUE</u>	<u>LOT#,MSRUN#/ WORK ORDER</u>	<u>CLIENT MATRIX</u>	<u>INIT/ FINAL</u>	DISH	GEOM	PPT1WT	pH	COUNT TIME	MID/AVE DATE/TIME	TRACER ID/ SPIKE ID	CRDL	UNITS
5/14/99	J9C170189-001 CRP00-1-05	9113096 SOLID									1	pCi/g
5/14/99	J9C170189-001 CRP00-1-08X	9113096 SOLID		JCRP001R							1	pCi/g
5/14/99	J9C170189-002 CRP02-1-05	9113096 SOLID									1	pCi/g
5/14/99	J9C170189-003 CRP06-1-05	9113096 SOLID									1	pCi/g
5/14/99	J9C170189-003 CRP06-1-09S	9113096 SOLID		JCRP061W							1	pCi/g
0/00/00	J9C310000-273 CT6DH-1-01B	SOLID		JCT6DH1B							1	pCi/g
0/00/00	J9C310000-273 CT6DH-1-02C	SOLID		JCT6DH1S							1	pCi/g

NUMBER OF WORK ORDERS IN BATCH: 7

0900

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

May 6, 1999

Attention: Joan Kessner

Project Number	:	550.202	
SDG	:	W02715	
Number of Samples	:	One (1)	
Sample Matrix	:	Soil Other Solid	Daynes 5/10/99
Data Deliverable	:	Summary	
Date SDG Closed	:	March 16, 1999	

II. Introduction

Daynes 5/10/99
Other Solid

On March 16, 1999, one (1) "~~soil~~" sample was received by Quanterra, Richland and transferred to Quanterra, St. Louis for chemical analysis. The sample was received at a temperature of 2° C.

Upon receipt, the samples were given the following laboratory ID numbers to correspond with the specific client ID:

<u>St. Louis ID</u>	<u>BHI ID</u>	<u>SAF ID</u>	<u>Matrix</u>	<u>Date of Receipt</u>
20952-001	B0TW24A	B99-024	SOIL	16-MAR-99

Other Solid
Daynes 5/10/99

II. Analytical Results/ Methodology

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

Analyses requested: TCLP Metals - 1311/6010/7470
 PCB - 8082

Deviation from Request: Insufficient volume remained to perform the PCB analysis.

000002

Bechtel Hanford Incorporated
May 6, 1999
Project Number: 550.202
SDG: W02715
Page 2

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
DUP- Laboratory Duplicate
MS- Matrix Spike
MSD- Matrix Spike Duplicate.

V. Comments

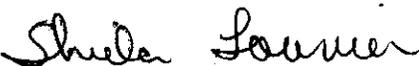
General: There are no general comments.

TCLP 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.

Samples 20952-001, 20952-001S and 20952-001SD were prepped 25 mls to 100 mls for both the ICP and Mercury digestions. The extraction blank, PBT196260, was prepped 25 mls to 100 mls for the Mercury digestion and undiluted for the ICP digestion.

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

000003

W02715

Quanterra March 24, 1999 01:38 pm
Account: 10722 Project: 550.202 Quanterra-Richland QAS No. 550.202 Rev. 3
Master Sample Login: 20952

Project Manager: S. Louvier

Reviewed by and Date: Shelia Louvier 3-24-99

Sample Header Template:

Sample No.	Client ID	C-Matrix	Date: Collected	Received	Due	Shipper	Rad Category	Rad Sample No.
#	Container Type	Analysis	Class	Preservative	Anal. Due Date	Hold Date Site	(Container Numbers:% Filled)	

20952-001 BOTW24A Soil 04-MAR-99 10:05 16-MAR-99 12:20 06-APR-99 AIRBORNE 3* R8357-001
SAF-B99-024 SAMPLE FROM HIGH ALPHA AREA OUTSIDE OF GLASS JAR MAY BE CONTAMINATED USE CAUTION!!!

1	GN - Glass Jar-60ML	EXTMETAL/TCLP/Q4	S	COLD	03-APR-99	01-APR-99 R12D	(435020:100)
1		HG/TCLP/Q4	S	COLD	03-APR-99	01-APR-99 R12D	(435020:100)
1		ICAP/TCLP/Q4	S	COLD	03-APR-99	31-AUG-99 R12D	(435020:100)
1		PCB/8082/Q4	S	COLD	03-APR-99	18-MAR-99 R12D	(435020:100)
1		PM/IT/Q4	S	COLD	03-APR-99	31-AUG-99 R12D	(435020:100)
1		RAD/CSCREEN/Q4	S	COLD	03-APR-99	12-SEP-99 R12D	(435020:100)

20952-001MS BOTW24A Soil 04-MAR-99 10:05 16-MAR-99 12:20 06-APR-99 AIRBORNE 3* R8357-001
SAF-B99-024 SAMPLE FROM HIGH ALPHA AREA OUTSIDE OF GLASS JAR MAY BE CONTAMINATED USE CAUTION!!!

1	GN - Glass Jar-60ML	EXTMETAL/TCLP/Q4	S	COLD	03-APR-99	01-APR-99 R12D	(435020:100)
1		HG/TCLP/Q4	S	COLD	03-APR-99	01-APR-99 R12D	(435020:100)
1		ICAP/TCLP/Q4	S	COLD	03-APR-99	31-AUG-99 R12D	(435020:100)
1		PCB/8082/Q4	S	COLD	03-APR-99	18-MAR-99 R12D	(435020:100)
1		RAD/CSCREEN/Q4	S	COLD	03-APR-99	12-SEP-99 R12D	(435020:100)

20952-001MSD BOTW24A Soil 04-MAR-99 10:05 16-MAR-99 12:20 06-APR-99 AIRBORNE 3* R8357-001
SAF-B99-024 SAMPLE FROM HIGH ALPHA AREA OUTSIDE OF GLASS JAR MY BE CONTAMINATED USE CAUTION!!!

1	GN - Glass Jar-60ML	EXTMETAL/TCLP/Q4	S	COLD	03-APR-99	01-APR-99 R12D	(435020:100)
1		HG/TCLP/Q4	S	COLD	03-APR-99	01-APR-99 R12D	(435020:100)
1		ICAP/TCLP/Q4	S	COLD	03-APR-99	31-AUG-99 R12D	(435020:100)
1		PCB/8082/Q4	S	COLD	03-APR-99	18-MAR-99 R12D	(435020:100)
1		RAD/CSCREEN/Q4	S	COLD	03-APR-99	12-SEP-99 R12D	(435020:100)

3*-Sample has not been rad screened.

000015

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

C.O.C. No. _____
 Page 1 of 1

Collector N/A C. ELLIOTT	Contact/Requestor R. A. Esch DAVE ENCKE	Telephone No. 373-3461 / MSIN 373-4314 FAX 372-1078
SAF No. N/A B99-024-02 ^{1/3 2679}	Sample Origin 233-S Facility	Purchase Order/Charge Code N/A
Project Title 233-S Facility Samples	Logbook No. N/A EFL 1133-7	Ice Chest No. N/A GWS 130 Temp. N/A
Shipped To (Lab) 233-S Project Personnel	Method of Shipment N/A GOV. VEHICLE	Bill of Lading/Air Bill No. N/A
Protocol N/A	Data Turnaround N/A	Offsite Property No. N/A

Sample No.	Lab ID	*	Date	Time	No./Type Container	Sample Analysis	Preservative
B0TW24	A	S	3-4-99	1005	1/60 mL glass	Return to 233-S Project, SEE ITEMS (1) & (2) 100%	None
B0TW27	N/A	S	3-8-99	0750	duct coupon	Return to 233-S Project, SEE ITEM (1) 0% retrieval	None
B0TW30	N/A	S	3-3-99	1015	pipe	Return to 233-S Project, SEE ITEM (1) ↓ ↓	None
SDG-W02715							

POSSIBLE SAMPLE HAZARDS/REMARKS (List all known wastes) MSDS Yes No

SPECIAL INSTRUCTIONS CONTINUED:
 SAMPLES OUT OF HIGH ALPHA CONTAMINATION AREA, OUTSIDE OF JARS SHOULD BE CONSIDERED CLEAN.
 NOT

SPECIAL INSTRUCTIONS Hold Time
 This chain of custody form was generated as a REGULAR SAMPLE NO. IS FOR 222-S, record that the above samples were returned to QUANTERRA the 233-S Project. SAMPLE NO. WITH "A" IS FOR
 ITEM #1 GEA, GROSS ALPHA, GROSS BETA, ISOTOPIC PU, Np-237, AND AM-241/Cm
 ITEM #2 ICP(TCLP), Hg (TCLP), AND PCB'S

Relinquished By Print Sign RL Chambers R. Chambers	Date/Time 3-16-99 1030	Received By Print Sign S. GALE S. GALE	Date/Time 3-16-99 1030	Matrix* S = Soil DS = Drum Solids SE = Sediment DL = Drum Liquids SO = Solid T = Tissue SL = Sludge WI = Wipe W = Water L = Liquid O = Oil V = Vegetation A = Air X = Other
Relinquished By S. GALE S. GALE	Date/Time 3-16-99 1220	Received By Bridlberg	Date/Time 3-16-99 1220	
Relinquished By 0	Date/Time	Received By M. B. Ligon	Date/Time 3-18-99 230	
Relinquished By 0	Date/Time	Received By	Date/Time	

FINAL SAMPLE DISPOSITION	Disposal Method (e.g., Return to customer, per lab procedure, used in process)	Disposed By	Date/Time
--------------------------	--	-------------	-----------

1. SHIP FROM U.S. DEPT. OF ENERGY C/O
 Company: 8 BETHLEHEM
 Address: 222-S 200 WEST AREA
 City, State, Zip: RICHLAND, WA, 99352
 Contact: DAVE ST. JOHN
 Phone: 509 372-9588

RADIOACTIVE SHIPMENT RECORD 1001283
Page 1 of 2

Ship Prepaid Collect 4.

Via Motor Air Psgr UPS
 Rail Air Cargo Site Carrier

SHIPMENT AUTHORIZATION NUMBER _____

2. SHIP TO
 Company: QUANTERRA INC,
 Address: 2800 GEORGE WASHINGTON WAY
 City, State, Zip: RICHLAND, WA, 99352
 Attention: Karen Ardenburg
 Phone: 509 375-3131

Markings Applied:
 Radioactive - LSA
 Radioactive - SCO
 Type A
 Type B with trefoil
 LSA Description:
 LSA-I
 LSA-II
 LSA-III
 SCO-I
 SCO-II

For Normal Form only Identify:
 Physical Form: Liquid Gas
 Solid
 Chemical Form: Elemental
 Metal Nitrate
 Oxide Mixture
 Other

5. HM Proper Shipping Name: _____ Radioactive Material:
 excepted package - empty packaging 7 UN2910
 excepted package - instruments or articles 7 UN2910
 excepted package - limited quantity of material 7 UN2910
 excepted package - articles manufactured from natural or depleted uranium or natural thorium 7 UN2910
 Special Form, n.o.s. 7 UN2974
 Low Specific Activity, n.o.s. 7 UN2912
 n.o.s. 7 UN2982
 Fissile, n.o.s. 7 UN2918
 Surface Contaminated Object 7 UN2913

EMERGENCY RESPONSE
 Telephone: 509 373 3800
 Emergency Response Guidebook: 16

Labels Applied:
 Empty
 Radioactive White
 Radioactive Yellow - II
 Radioactive Yellow - III
 Subsidiary Hazard

Highway Route Controlled Quantity
 Exclusive Use Shipment with instructions
 Placards Applied
 If Rail Specify _____
 Fissile Excepted, Grams: < 15gm
 Excepted Package Statement

Warning - Fissile Material Controlled Shipment. Do Not Load More Than NA Packages Per Vehicle. In Loading and Storage Areas: Keep at Least 20 Feet From Other Packages Bearing Radioactive Labels. 947gm TOTAL IN PACKAGE

No. Pkg	Model/Package	COU/Spec	Serial No.	Seal No.	Isotope	Net Weight	Gross Weight
1	POLY COOLER	STRONG TIGHT	GWS 130	TAPE	Am ²⁴¹ , Pu ²³⁹	NA	225kg
	SAMPLE JARS IN POLY BAGS				Pu ²⁴⁰		
	PACKED IN WET ICE						
TOTALS:						NA	225kg

(Shipper may describe package in detail on one of the unused lines above)

12. This is to certify that the above named materials are properly classified, described, packaged, marked and labeled, and are in proper condition for transportation according to the applicable regulations of the Department of Transportation.
 Certifier's Signature: Dave St. John On behalf of DOE-RL Date: 3/16/99 Organization: ERC AFS Complete Cost Code (Inc. End Function): R2335T200C

13. Surface Dose Rate of Package
 <0.005 or _____ mSv/hr
 <0.5 or _____ mrem/hr (N+B Y)
 Dose Rate @ 1 Meter from Surface of Package
 <0.005 or _____ mSv/hr
 <0.5 or _____ mrem/hr (N+B Y)
 Smears of Outer Container
 <0.41 Bq (22 dpm) B Y/cm²
 <0.04 Bq (2.2 dpm) a/cm²
 <Tbl. 2-2 HSRGM Onsite Limits
 TRUCK LOAD OR EXCLUSIVE USE
 Surface <2 mSv/hr (200 mrem/hr)
 @ 2 meters <0.1 mSv/hr (10 mrem/hr)
 @ Cab or sleeper <0.02 mSv/hr (2 mrem/hr) (Using N+B Y)

Additional Data and Instructions (inc. Readings on Internal Packaging):
 Signature: Karen Ardenburg Bldg: 2225 Survey No.: 746859 Date: 3/16/99

14. TRANSPORTER: Stuart Cole DRIVER SIGNATURE
 RECEIVER SIGNATURE: [Signature] Date: 3/16-99

15. OFFSITE AUTHORIZATION
 Shipment has been inspected and verified to be in compliance with DOT regulations.
 Authorized Signature: [Signature] Printed Name: M.A. Sams Date: 3-16-99

16. AUTHORIZATION FOR SHIPMENT
 AIR TRANSPORT CERTIFICATION: N/A
 CARGO AIRCRAFT: Cargo Aircraft Only Labels Applied
 PASSENGER AIRCRAFT: Ltd Qty Research/Medical Diagnosis Human Medical Research
 Pkg. Dimensions (cm): NA

17. OFFSITE AUTHORIZATION
 Tracking No: RMBH 3355 Date Shipped: 3-16-99 Routing: CH2M Hill ETA: 3-16-99
 Surveyed By: NA Date: NA Approved for Shipment Offsite: [Signature] Date: 3-16-99

Figure 1

SAMPLE CHECK-IN LIST

Date/Time Received: 3/16 1225 SG#: _____

Work Order Number: _____ SAF #: B99-024

Shipping Container ID: GWS130 Chain of Custody # una

- 1. Custody Seals on shipping container intact? Yes [] No []
- 2. Custody Seals dated and signed? Yes [] No []
- 3. Chain-of-Custody record present? Yes [] No []
- 4. Cooler temperature 30
- 5. Vermiculite/packing materials is Wet [] Dry []
- 6. Number of samples in shipping container: 3
- 7. Sample holding times exceeded? Yes [] No []

8. Samples have: <input checked="" type="checkbox"/> tape _____ hazard labels <input checked="" type="checkbox"/> custody seals _____ appropriate sample labels

9. Samples are: <input checked="" type="checkbox"/> in good condition _____ leaking <input type="checkbox"/> broken _____ have air bubbles
--

10. Where any anomalies identified in sample receipt? Yes [] No []

11. Description of anomalies (include sample numbers): _____

Sample Custodian/Laboratory: Hidellberg Date: 3/16/99

Telephoned To: _____ On _____ By _____

000009

POTENTIAL HAZARDS

HEALTH

- Radiation presents minimal risk to transport workers, emergency response personnel, and the public during transportation accidents. Packaging durability is related to potential hazards of material.
- Low-level radioactive material; very low radiation hazard to people.
- Quantity of material presents low radiation hazard if released from package during accident.
- Some radioactive materials cannot be detected by commonly available instruments.
- Packages do not have RADIOACTIVE I, II, or III labels. Some may have EMPTY labels or may have the word "Radioactive" in the package marking.
- If any radioactive contamination occurs, it will be extremely low level.

FIRE OR EXPLOSION

- Some of these materials may burn, but most do not ignite readily.
- Radioactivity does not change flammability or other properties of materials.

PUBLIC SAFETY

- CALL Emergency Response Telephone Number on Shipping Paper first. If Shipping Paper not available or no answer, refer to appropriate telephone number listed on the inside back cover.
- Priorities for rescue, life-saving, first aid, and control of fire and other hazards are higher than the priority for measuring radiation levels.
- Radiation Authority must be notified of accident conditions, and is usually responsible for radiological decisions.
- Isolate spill or leak area immediately for at least 25 to 50 meters (80 to 160 feet) in all directions.
- Stay upwind.
- Keep unauthorized personnel away.
- Detain or isolate uninjured persons or equipment suspected to be contaminated; delay decontamination and cleanup until instructions are received from Radiation Authority.

PROTECTIVE CLOTHING

- Positive pressure self-contained breathing apparatus (SCBA) and structural firefighters protective clothing will provide adequate protection.

EVACUATION

Large Spill

- Consider initial downwind evacuation for at least 100 meters (330 feet).

Fire

- When a large quantity of this material is involved in a major fire, consider an initial evacuation distance of 300 meters (1000 feet) in all directions.

EMERGENCY RESPONSE

FIRE

- Presence of radioactive material will not change effectiveness of fire control techniques.
- Move containers from fire area if you can do it without risk.
- Do not move damaged packages; move undamaged packages out of fire zone.

Small Fires

- Dry chemical, CO₂, water spray or regular foam.

Large Fires

- Water spray, fog (flooding amounts).

SPILL OR LEAK

- Do not touch damaged packages or spilled material.

Liquid Spills

- Cover with sand, earth or other noncombustible absorbent material.
- Cover powder spill with plastic sheet or tarp to minimize spreading.

FIRST AID

- Medical problems take priority over radiological concerns.
- Use first aid treatment according to the nature of the injury.
- Do not delay care and transport of a seriously injured person.
- Apply artificial respiration if victim is not breathing.
- Administer oxygen if breathing is difficult.
- In case of contact with substance, immediately flush skin or eyes with running water for at least 20 minutes.
- Injured persons who contacted released material may be a minor contamination problem to contacted persons, equipment and facilities.
- Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves.

RADIOACTIVE MATERIAL, EXCEPTED PACKAGE-LIMITED QUANTITY OF MATERIAL, 7, UN 2910

THIS PACKAGE CONFORMS TO THE CONDITIONS AND LIMITATIONS SPECIFIED IN 49 CFR 173.421 FOR RADIOACTIVE MATERIAL, EXCEPTED PACKAGE-LIMITED QUANTITY OF MATERIAL, UN 2910

U.S. DEPARTMENT OF ENERGY, RICHLAND WA.
~~BY RUST FEDERAL SERVICES HANFORD~~
P.O. BOX 1970, 2355 STEVENS DRIVE
RICHLAND, WA 99352

WASTE MANAGEMENT, FEDERAL SERVICES,
NORTHWEST OPERATIONS

000010

HAVE

	BOTW24	BOTW27	BOTW30
A_m^{241}	$\Rightarrow 1.65 \times 10^{-7} \text{ Ci}$	$2.2 \times 10^{-7} \text{ Ci}$	$4.667 \times 10^{-8} \text{ Ci}$
P_U^{239}	$\Rightarrow 5.84 \times 10^{-7} \text{ Ci}$	$7.787 \times 10^{-7} \text{ Ci}$	$1.652 \times 10^{-7} \text{ Ci}$
P_U^{240}	$\Rightarrow 6.424 \times 10^{-7} \text{ Ci}$	$8.565 \times 10^{-7} \text{ Ci}$	$1.817 \times 10^{-7} \text{ Ci}$

TOTAL HAVE

$$A_m^{241} \quad 1.65 \times 10^{-7} \text{ Ci} + 2.2 \times 10^{-7} \text{ Ci} + 4.667 \times 10^{-8} \text{ Ci} \Rightarrow 4.316 \times 10^{-7} \text{ Ci}$$

$$P_U^{239} \quad 5.84 \times 10^{-7} \text{ Ci} + 7.787 \times 10^{-7} \text{ Ci} + 1.652 \times 10^{-7} \text{ Ci} \Rightarrow 1.527 \times 10^{-6} \text{ Ci}$$

$$P_U^{240} \quad 6.424 \times 10^{-7} \text{ Ci} + 8.565 \times 10^{-7} \text{ Ci} + 1.817 \times 10^{-7} \text{ Ci} \Rightarrow 1.68 \times 10^{-6} \text{ Ci}$$

$$\text{TOTAL Ci/PKG.} = 3.639 \times 10^{-6} \text{ Ci}$$

$$T Bq/PKG = 1.347 \times 10^{-7}$$

<u>ALLOWED</u> ISOTOPE	TYPE A A2	LTD QTY A2 (10^3) SOLID
A_m^{241}	$5.41 \times 10^{-3} \text{ Ci}$	$5.41 \times 10^{-6} \text{ Ci}$
P_U^{239}	$5.41 \times 10^{-3} \text{ Ci}$	$5.41 \times 10^{-6} \text{ Ci}$
P_U^{240}	$5.41 \times 10^{-3} \text{ Ci}$	$5.41 \times 10^{-6} \text{ Ci}$

HAVE VS ALLOWED

$$\frac{4.316 \times 10^{-7} \text{ Ci}}{5.41 \times 10^{-6} \text{ Ci}} + \frac{1.527 \times 10^{-6} \text{ Ci}}{5.41 \times 10^{-6} \text{ Ci}} + \frac{1.68 \times 10^{-6} \text{ Ci}}{5.41 \times 10^{-6} \text{ Ci}} =$$

$$= 7.97 \times 10^{-2} + 2.82 \times 10^{-1} + 3.10 \times 10^{-1} = 0.67$$

0.67 < 1 \therefore LTD QTY67 < 100% \therefore LTD QTY

Estimated Total Curies per Sample per detected Isotope

Sample Number	Pu-239	Pu-240	Am-241
B0TW24	5.840E-07	6.424E-07	1.650E-07
B0TW27	7.787E-07	8.565E-07	2.200E-07
B0TW30	1.652E-07	1.817E-07	4.667E-08

Per S. Trent / R. Weiss
EPC Sample Mgmt
using 222-S laboratory
data from other
samples this location
and process information
3/15/99
DAS

000012

Login No.: 20952
W02715

**Condition Upon Receipt Variance Report
St. Louis Laboratory**

Client: Richard
Project No: 550.203
Shipper/No: Airtone 515 7267 775

Date: 3-18-99 Time: 0830
Initiated by: Mark B. J.
RFA/COC Numbers: 10312

Condition/Variance (Check all that apply):

1. <input type="checkbox"/> Sample received broken/leaking.	8. <input type="checkbox"/> Sample ID on container does not match sample ID on paperwork. Explain: _____
2. <input type="checkbox"/> Sample received without proper preservative. <input type="checkbox"/> Cooler temperature not within 4°C ± 2°C Record temperature: _____	9. <input type="checkbox"/> All coolers on airbill not received with shipment.
<input type="checkbox"/> pH _____	10. <input type="checkbox"/> Other (explain below): _____
<input type="checkbox"/> other: _____	
3. <input type="checkbox"/> Sample received in improper container.	
4. <input type="checkbox"/> Sample received without proper paperwork. Explain: _____	
5. <input type="checkbox"/> Paperwork received without sample.	
6. <input type="checkbox"/> No sample ID on sample container.	
7. <input type="checkbox"/> Custody tape disturbed/broken/missing/not tamper evident (circle all that apply).	

No variances were noted during sample receipt. Cooler Temperature Upon Receipt: 2°C

Temperature Variance Does Not Affect the Following Analyses: _____

Notes: Bothered table states contact APT prior to opening. See instructions on coc.

Delayed because St. Louis needed the SAF to get the FAT and to fend out what instructions were referenced.

Corrective Action:

Client's Name: _____ Informed verbally on: _____ By: _____

Client's Name: _____ Informed in writing on: _____ By: _____

Sample(s) processed "as is".

Comments: _____ If released, notify: _____

Sample(s) on hold until: _____

Sample Control Supervisor Review: (or designate) Mark B. J. Date: 3-18-99

Project Management Review: Sheela Luvani Date: 3-24-99

SIGNED ORIGINAL MUST BE RETAINED IN THE PROJECT FILE

Bechtel Hanford Incorporated
3350 George Washington Way
Richland, WA 99352

Project: 550.202

Sample Date : 03/04/99
Receipt Date : 03/16/99
Report Date : 04/28/99

Category : TCLP Metals
Matrix : SOLID

Client ID: B0TW24A

Quanterra ID : 20952-001

Analyte	Method	Extract Date	Prep Date	Analyses Date	Result	Units	Qual.	Detection Limit	Regulatory Level	Dilution
Mercury	EPA 7470	03/29/99	04/02/99	04/02/99	0.0062	MG/L		0.00080	0.20	4
Arsenic	EPA 6010	03/29/99	04/02/99	04/03/99	0.0072	MG/L	U	1.2	5.0	4
Barium	EPA 6010	03/29/99	04/02/99	04/03/99	0.29	MG/L	B	0.80	100	4
Cadmium	EPA 6010	03/29/99	04/02/99	04/03/99	2.9	MG/L		0.020	1.0	4
Chromium	EPA 6010	03/29/99	04/02/99	04/03/99	0.13	MG/L		0.040	5.0	4
Lead	EPA 6010	03/29/99	04/02/99	04/03/99	0.19	MG/L	B	0.40	5.0	4
Selenium	EPA 6010	03/29/99	04/02/99	04/03/99	0.0096	MG/L	U	1.0	1.0	4
Silver	EPA 6010	03/29/99	04/02/99	04/03/99	0.0036	MG/L	U	0.040	5.0	4

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Bechtel Hanford Incorporated
3350 George Washington Way
Richland, WA 99352

Project: 550.202

Sample Date : 03/04/99
Receipt Date : 03/16/99
Report Date : 04/28/99

Category : TCLP Metals
Matrix : SOLID

Client ID: B0TW24A

Quanterra ID : 20952-001MS

Analyte	Method	Extract Date	Prep Date	Analyses Date	Result	Units	Qual.	Detection Limit	Regulatory Level	Dilution
Mercury	EPA 7470	03/29/99	04/02/99	04/02/99	94	%REC				4
Arsenic	EPA 6010	03/29/99	04/02/99	04/03/99	102	%REC				4
Barium	EPA 6010	03/29/99	04/02/99	04/03/99	100	%REC				4
Cadmium	EPA 6010	03/29/99	04/02/99	04/03/99	96	%REC				4
Chromium	EPA 6010	03/29/99	04/02/99	04/03/99	96	%REC				4
Lead	EPA 6010	03/29/99	04/02/99	04/03/99	95	%REC				4
Selenium	EPA 6010	03/29/99	04/02/99	04/03/99	102	%REC				4
Silver	EPA 6010	03/29/99	04/02/99	04/03/99	99	%REC				4

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Bechtel Hanford Incorporated
3350 George Washington Way
Richland, WA 99352

Project: 550.202

Sample Date : 03/04/99
Receipt Date : 03/16/99
Report Date : 04/28/99

Category : TCLP Metals
Matrix : SOLID

Client ID: B0TW24A

Quanterra ID : 20952-001MSD

Analyte	Method	Extract Date	Prep Date	Analyses Date	Result	Units	Qual.	Detection Limit	Regulatory Level	Dilution
Mercury	EPA 7470	03/29/99	04/02/99	04/02/99	97	%REC				4
Arsenic	EPA 6010	03/29/99	04/02/99	04/03/99	100	%REC				4
Barium	EPA 6010	03/29/99	04/02/99	04/03/99	97	%REC				4
Cadmium	EPA 6010	03/29/99	04/02/99	04/03/99	92	%REC				4
Chromium	EPA 6010	03/29/99	04/02/99	04/03/99	93	%REC				4
Lead	EPA 6010	03/29/99	04/02/99	04/03/99	92	%REC				4
Selenium	EPA 6010	03/29/99	04/02/99	04/03/99	100	%REC				4
Silver	EPA 6010	03/29/99	04/02/99	04/03/99	96	%REC				4

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