

0031449

### CERTIFICATE OF ANALYSIS

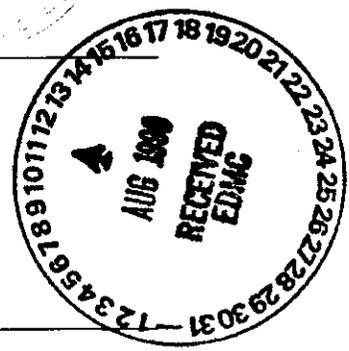
Bechtel Hanford, Inc.  
3350 George Washington Way  
Richland, WA 99352

April 8, 1999

Attention: Joan Kessner



SAF Number	:	B99-005
Date First Sample Received	:	February 18, 1999
Number of Samples	:	1
Sample Type	:	Soil
SDG Number	:	W02686
Data Deliverable	:	15 Day Priority / 28 Day Summary



#### I. Introduction

On February 18, 1999, 1-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>
9CQX9810	B0TV51	Soil	2/18/99

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

0002

Bechtel Hanford, Inc.  
April 8, 1999  
Page 2

---

**Gas Proportional Counting**  
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 W02686 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 LCS, batch blank, sample duplicate (B0TV51) and sample results are within contractual requirements.

#### **Gamma Spectroscopy**

Gamma Scan by method RICH-RC-5017

The LCS, batch blank, are within contractual requirements. The sample and it's duplicate (B0TV51) did not agree within specifications for Eu-155, Ra-226 and Ra-228 this is attributed to the matrix and the data is reported.

#### **Gas Proportional Counting**

Total Strontium by method RICH-RC-5006

The LCS, batch blank, sample duplicate (B0TV51) and sample results are within contractual requirements.

#### **Liquid Scintillation Counting**

Nickel-63 by method RICH-RC-5069

The original analysis failed and was reanalyzed the reanalysis data is reported. The LCS, batch blank, sample duplicate (B0TV51) and sample results are within contractual requirements.

Bechtel Hanford, Inc.

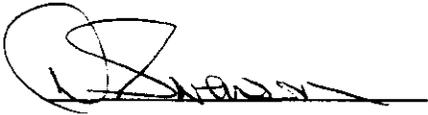
April 8, 1999

Page 3

---

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:** W02686 / 7477  
**LAB SAMPLE ID:** 9CQX9810      **MATRIX:** SOIL  
**CLIENT ID:** B0TV51      **DATE RECEIVED:** 2/18/99 3:16:00 PM

ANALYTE	RESULT	Q	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA/IDL	REPORT UNIT	YIELD	METHOD NUMBER
PU-238	3.28E-02		2.9E-02	3.0E-02	1.78E-02	pCi/g	62.80%	RICHRC5010
PU239/40	1.08E+00		1.7E-01	2.2E-01	2.64E-02	pCi/g	62.80%	RICHRC5010
AM-241	-2.15E-02	U	1.2E-01	1.2E-01	1.96E-01	pCi/g	N/A	RICHRC5017
CO-60	1.73E+00		1.8E-01	1.8E-01	2.88E-02	pCi/g	N/A	RICHRC5017
CS-137	1.71E+01		1.7E+00	1.7E+00	6.07E-02	pCi/g	N/A	RICHRC5017
EU-152	2.67E+01		2.7E+00	2.7E+00	1.63E-01	pCi/g	N/A	RICHRC5017
EU-154	3.39E+00		3.7E-01	3.7E-01	1.02E-01	pCi/g	N/A	RICHRC5017
EU-155	2.10E-01	U	1.2E-01	1.2E-01	2.00E-01	pCi/g	N/A	RICHRC5017
RA-226	3.33E-01	U	1.0E-01	1.0E-01	1.17E-01	pCi/g	N/A	RICHRC5017
RA-228	5.87E-01	U	1.7E-01	1.7E-01	2.16E-01	pCi/g	N/A	RICHRC5017
U-238DHP	-2.28E-01	U	1.0E+00	1.0E+00	1.65E+00	pCi/g	N/A	RICHRC5017
STRONTIUM	1.86E+00		3.0E-01	5.1E-01	4.03E-01	pCi/g	83.20%	RICHRC5006

Number of Results: 12

### SAMPLE RESULTS

LAB NAME: QUANTERRA, Richland SDG: /RPT GRP: W02686 / 7477  
LAB SAMPLE ID: 9CQX9820 MATRIX: SOIL  
CLIENT ID: B0TV51 DATE RECEIVED: 2/18/99 3:16:00 PM

---

ANALYTE	RESULT	Q	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA/IDL	REPORT UNIT	YIELD	METHOD NUMBER
NI-63	1.82E+02		5.7E+00	2.6E+01	6.22E+00	pCi/g	82.30%	RICHRC5069

---

Number of Results:

**Quanterra Data Review Checklist  
RADIOCHEMISTRY**

Work Order number (s): <u>J9B190106</u>				
Client ID: <u>BNI</u>				
Due Date: <u>3-5-99</u>				
Lab Sample Number or SDG: <u>9054300</u>				
Method Test Parameters: <u>Gamma</u>				
Matrix: <u>Soil</u>				
Review Item	Yes (✓)	No (✓)	N/A (✓)	2 <sup>nd</sup> Level Review (✓)
<b>A. Calibration</b>				
1. Is the calibration documentation included where applicable?			✓	
<b>B. Sample Analysis</b>				
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?	✓	✓		✓
<b>C. QC Samples</b>				
1. Is the blank yield within acceptance criteria?			✓	
2. Is the Minimum Detectable Activity for the blank result ≤ the Contract Detection Limit?	✓			/
3. Is the blank result < 1/2 the Contract Detection Limit?	✓			/
4. Is the blank > 1/2 the Contract Detection Limit but < 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. MS/MSD results and yield meet acceptance criteria?			✓	
10. Duplicate sample results and yield meet acceptance criteria?	✓	✓		/
<b>D. Other</b>				
1. Are all Nonconformances included and noted? <u>(1-NCR)</u>	✓			/
2. Are all required forms filed out?	/			/
3. Correct methodology used?	✓			/
4. Transcription checked?	✓			/
5. Were all calculations checked at a minimum frequency?	/			/
6. Units checked?	✓			/

Comments on any "No" response: See NCR for NDCs: dup RPD (EU155 only).

First Level Review: Jacqueline Waddell  
 Second Level Review: [Signature]  
 Form #: LS-038,2/96, Rev.4

Date: 3/14/99  
 Date: 3/22/99

Transfer COG, CS131, EU152, EU154, EU155,  
R226, R228, U238, AM241

255

# QUANTERRA LABORATORY NONCONFORMANCE MEMO (NCM)

PAGE 1 OF 2

LOG #: RD-99- \_\_\_\_\_

Project ID: <u>JQB1901016</u>	NCM Initiated by: <u>JW3/14/99</u>
Sample Numbers: <u>CQX98101, CQX98108X</u>	
Tests: <u>Gamma</u>	
Matrix: <u>SO11</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): dup RPD out of limits for EU155 only
- Comments/Explanation: \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_

**Notification (check appropriate area):**

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

Project Manager (signature and date): [Signature] 4/1/99

0019A

QUANTERRA LABORATORY NONCONFORMANCE MEMO (NCM)

PAGE 2 OF 2

LOG#: RD-99-

Corrective Action

Root Cause

Initial and date: JW 3/14/99

MDAs elevated for Eu155, Razu: Razu due to sample matrix for both sample and duplicate. RPD for Eu155 out of limits - unknown

Corrective Action

Initial and Date: JW 3/14/99

Report results w/MDAs achieved. Since all other isotopes are within RPD limits - data accepted.

Responsibility for performing CA assigned to: \_\_\_\_\_

Actions to prevent recurrence

Initial and Date: \_\_\_\_\_

First Level Supervisor: Acqueline Waddell

Date: 3/14/99

Responsible Manager: Swenson For VHT

Date: 4/6/99

Quality Assurance Review

Anomaly

Deficiency

Rerun

Further action required: \_\_\_\_\_

Assigned to: \_\_\_\_\_

QA signature: Swagan

Date: 4/8/99

Corrective Action Verification

Verified

Cannot Verify (specify reason): N/A

Nonconformance Memo Closure

QA signature/date: Swagan 4/8/99

0019B

**Quantara Data Review Checklist**  
**RADIOCHEMISTRY**

Work Order number (if): <u>598190106</u>				
Client ID: <u>BNI</u>				
Due Date: <u>3-5-99</u>				
Lab Sample Number or SDG: <u>9054301</u>				
Method Test Parameters: <u>TOTAL SR</u>				
Metric: <u>SOIL</u>				
Review Item	Yes (✓)	No (✗)	N/A (✓)	2 <sup>nd</sup> Level Review (✓)
<b>A. Calibration</b>				
1. Is the calibration documentation included where applicable?			✓	
<b>B. Sample Analysis</b>				
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?	✓			✓
<b>C. QC Samples</b>				
1. Is the blank yield within acceptance criteria	✓			✓
2. Is the Minimum Detectable Activity for the blank result ≤ the Contract Detection Limit?	✓			✓
3. Is the blank result < 1/2 the Contract Detection Limit?	✓			✓
4. Is the blank > 1/2 the Contract Detection Limit but < 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. MS/MSD results and yield meet acceptance criteria?			✓	
10. Duplicate sample results and yield meet acceptance criteria?	✓			✓
<b>D. Other</b>				
1. Are all Nonconformances included and noted?				✓
2. Are all required forms filed out?	✓			✓
3. Correct methodology used?	✓			✓
4. Transcription checked?			✓	✓
5. Were all calculations checked at a minimum frequency?			✓	✓
6. Units checked?	✓			✓

Comments on any "No" response: \_\_\_\_\_

First Level Review: Michelle Winkler Date: 3/9/99

Second Level Review: [Signature] Date: 3/22/99

Form #: LS-038.2/96, Rev. 4

**Quanterra Data Review Checklist  
RADIOCHEMISTRY**

Work Order number(s): 398190106				
Client ID: BHI				
Due Date: 3-5-99				
Lab Sample Number or SDG: 9081399      19054297      WP2686				
Method Test Parameters: Nickel 63				
Matrix: Soil				
Review Item	Yes (✓)	No (✓)	N/A (✓)	2 <sup>nd</sup> Level Review (✓)
<b>A. Calibration</b>				
1. Is the calibration documentation included where applicable?			✓	
<b>B. Sample Analysis</b>				
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?	✓			✓
<b>C. QC Samples</b>				
1. Is the blank yield within acceptance criteria?	✓			✓
2. Is the Minimum Detectable Activity for the blank result ≤ the Contract Detection Limit?	✓			✓
3. Is the blank result < 1/2 the Contract Detection Limit?	✓			✓
4. Is the blank > 1/2 the Contract Detection Limit but < 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. MS/MSD results and yield meet acceptance criteria?	✓			✓
10. Duplicate sample results and yield meet acceptance criteria?	✓			✓
<b>D. Other</b>				
1. Are all Nonconformances included and noted?			✓	
2. Are all required forms filed out?				✓
3. Correct methodology used?	✓			✓
4. Transcription checked?	✓			✓
5. Were all calculations checked at a minimum frequency?				✓
6. Units checked?	✓			✓

Comments on any "No" response: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

First Level Review: Christine Waddell  
 Second Level Review: [Signature]  
 Form #: LS-038.2/96, Rev.4

Date: 4/6/99  
 Date: 4/8/99

*Transfer Reanalysis Results*

# CHAIN OF CUSTODY FORMS

Bechtel Hanford Inc.		<b>CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST</b>				B99-005-019		Page 1 of 1	
Collector Stankovich/Jacques / <i>Nielson</i>		Company Contact Mike Stankovich		Telephone No. (509) 531-7620		Project Coordinator Trent, SJ		Price Code	
Project Designation 100 D Areas - Full Protocol		Sampling Location 116-DR-9		SAF No. B99-005		Data Turnaround <b>15 Days</b>			
Ice Chest No.		Field Logbook No. EL-1339-5		Method of Shipment Hand Delivered/Govt. Vehicle					
Shipped To Quanterra Incorporated		Offsite Property No. NA		Bill of Lading/Air Bill No. NA					
				COA					

<b>POSSIBLE SAMPLE HAZARDS/REMARKS</b> Possible Radioactive & PCB Contamination  <b>Special Handling and/or Storage</b> Cool 4C	<b>Preservation</b>	None	None	None	None	None	Cool 4C	None			
	<b>Type of Container</b>	P	aG	aG	aG	aG	aG	P			
	<b>No. of Container(s)</b>	1	1	1	1	1	1	1			
	<b>Volume</b>	20mL	60mL	60mL	60mL	60mL	120mL	1000mL			

<i>SDU</i> <i>W02686</i> <b>SAMPLE ANALYSIS</b> <i>JAB190106</i>				Activity Scan	See item (1) in Special Instructions.	Isotopic Plutonium	Nickel-63	Strontium-89,90 - Total Sr	Pest/PCBs - 8080 (TCL)	See item (2) in Special Instructions.		
				Sample No.	Matrix *	Sample Date	Sample Time					
B0TV51	<i>CQX98</i>	Soil	<i>2/18/99</i>	<i>0910</i>	X	X	X	X	X	X	<i>A1</i>	

<b>CHAIN OF POSSESSION</b>				<b>SPECIAL INSTRUCTIONS</b>						Matrix *	
Relinquished By <i>R. Nelson</i> / <i>R. Nelson</i> Date/Time <i>2/18/99</i>				COA = R116D9 2F00 Lab & R116D9 2600 Shippers						Soil	
Received By <i>R. Nelson</i> Date/Time <i>2-18-99</i>				(1) ICP Metals - 6010A (Supertrace) (Arsenic, Barium, Cadmium, Chromium, Lead, Silver)						Water	
Relinquished By <i>J. Stankovich</i> Date/Time <i>2/18/99</i>				(2) Gamma Spectroscopy (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155); Gamma Spec - Add-on (Americium-241, Uranium-238)						Vapor	
Received By <i>J. Stankovich</i> Date/Time <i>2/18/99</i>										Other Solid	
Relinquished By										Other Liquid	
Received By											

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

11720

Post-It* Fax Note	7671	Date	2/11/99	# of pages	
To	Douglas Jacques	From	David Brehm		
Co/Dept		Co.	RCF		
Phone #		Phone #	373-9731		
Fax #	373-1395	Fax #			

### GAMMA-RAY ENERGY ANALYSIS REPORT

Thermo Hanford Inc.  
Radiological Counting Facility      THI - RCF

Project: 116-D-9      Other Solid  
Customer ID: BOTPK7  
RCF ID: 5383

Sample time, date 2/3/99 0740  
Analysis date 2/8/99

*BOTV51  
BOTV14  
BOTVJ5*

Isotope	Activity pCi/gm	2 σ err	CI/gm
K-40	1.5e+02	+/- 2.1e+00	1.5e-10
Co-60	2.9e+00	+/- 2.6e-01	2.9e-12
I-129	< 3.8e+00		3.8e-12
Cs-137	2.6e+01	+/- 1.6e+00	2.6e-11
Eu-152	3.0e+01	+/- 2.1e+00	3.0e-11
Eu-154	3.6e+00	+/- 4.0e-01	3.6e-12
Eu-155	< 2.9e-01		2.9e-13
Th-232dau	6.3e-01	+/- 1.8e-01	6.3e-13
U-235	< 5.2e-01		5.2e-13
U-238	< 9.7e+00		9.7e-12
U-238dau	5.6e-01	+/- 1.5e-01	5.6e-13
Np-237	< 1.4e-01		1.4e-13
Am-241	< 1.9e-01		1.9e-13

*A1*

*TA = 280 pCi/gm*

Tot Act Gem (pCi/gm)	2.2e+02	+/- 6.7e+00	2.2e-10
Y/Sr-90	< N/R		
Gross Alpha **	1.0e+00	+/- 9.8e-01	1.0E-12
Gross Beta	5.9e+01	+/- 1.4e+01	5.9E-11
AEA total	< N/R		

MDA (pCi/g)
6.3E-01
2.7E+01

Reported as Sr/Y-90 Betas.

**Definitions:**

All errors reported at 2 standard deviations  
N/R means no result or analysis not requested.  
A Assigned as residual beta from Gamma/Beta balance.

For soils and natural samples, the following applies:

The analysis of U-238 is based on the activity of Pa-234m.  
 The analysis of Np-237 is based on the activity of Pa-233.  
 U-238dau is the activity of Pb-214 and Bi-214, short lived daughter products of U-238. Equilibrium between parent and daughter products probably does not exist in disturbed materials.  
 Th-232dau is the activity of Ac-228, Pb-212, and Tl-208, short lived daughter products of Th-232. Equilibrium between parent and daughter products may not exist in disturbed materials.  
 Other samples, not containing natural materials, may have inapplicable results for the Th, U, transuranics and daughter products. The results must then be balanced for the gross alpha analysis.  
 \*\*The gross alpha results are not corrected for mass absorption

Note! 152-Eu is not a 100% Beta emitter.

*David Brehm*  
\_\_\_\_\_  
David Brehm  
ERC Radiological Counting Facility

2/11/99  
\_\_\_\_\_  
Date

Figure 1

SAMPLE CHECK-IN LIST

Date/Time Received: 2-18-99 1310 SG#: W02636

Work Order Number: J9B190106 SAF #: B99-005

Shipping Container ID: EX 96-081 Chain of Custody # B99-005-019 - 023

- 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 4°C
- 5. Vermiculite/packing materials is Wet  Dry
- 6. Number of samples in shipping container: 21
- 7. Sample holding times exceeded? Yes  No

8. Samples have:

<input checked="" type="checkbox"/> tape	<input type="checkbox"/> hazard labels
<input checked="" type="checkbox"/> custody seals	<input type="checkbox"/> appropriate sample labels

9. Samples are:

<input checked="" type="checkbox"/> in good condition	<input type="checkbox"/> leaking
<input type="checkbox"/> broken	<input type="checkbox"/> have air bubbles

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

11. Description of anomalies (include sample numbers):  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Sample Custodian/Laboratory: L. Menley Date: 2-18-99

Telephoned To: \_\_\_\_\_ On \_\_\_\_\_ By \_\_\_\_\_

# Client Sample Screening Results

22-Feb-99

*(R)*  
2/23/99

CLIENT CODE	ID	MATRIX	RECEIVED	DETECTOR	ACQ DATE	SAMPLE	MINUTES	CNTS A	NET CPM A	CNTS B	NET CPM B			
BH	B0TV51		2/18/99 4:27:00 PM	QUAD21A	2/22/99 6:57:32 PM	B0TV51	30	17	0.504166667	299	8.94166667			
		SOIL		Bkg:	2/22/99 4:07:29 PM	BKG	240	15	0.0625	246	1.025			
<b>Anl Date:</b>	2/22/99	<b>Tot Sa, Alq:</b>	6.00E+01	, 1.00E+02	<b>Alp; (Dpm/</b>	2.85E+00	<b>(uCi/</b>	7.71E-04	<b>(pCi/</b>	1.28E+01	+ 6.1E+00	<b>CAT</b>	3.9E+00	<b>Lab</b>
<b>Ppt mg:</b>	100 /	<b>Units:</b>	g /	, mg	<b>Bet; Alq:</b>	2.04E+01	<b>Sa:</b>	5.52E-03	<b>Ljg:</b>	9.19E+01	+ 6.0E+00	<b>I /</b>	1.1E+00	<b>Alq</b>
													<b>Ljg</b>	
BH	B0TVJ4		2/18/99 4:27:00 PM	QUAD21B	2/22/99 6:57:32 PM	B0TVJ4	30	18	0.55	215	6.08333333			
		SOIL		Bkg:	2/22/99 4:07:29 PM	BKG	240	12	0.05	260	1.08333333			
<b>Anl Date:</b>	2/22/99	<b>Tot Sa, Alq:</b>	6.00E+01	, 8.19E+01	<b>Alp; (Dpm/</b>	3.11E+00	<b>(uCi/</b>	1.03E-03	<b>(pCi/</b>	1.71E+01	+ 7.0E+00	<b>CAT</b>	2.9E+00	<b>Lab</b>
<b>Ppt mg:</b>	81.9 /	<b>Units:</b>	g /	, mg	<b>Bet; Alq:</b>	1.31E+01	<b>Sa:</b>	4.32E-03	<b>Ljg:</b>	7.19E+01	+ 5.9E+00	<b>I /</b>	1.4E+00	<b>Alq</b>
													<b>Ljg</b>	
BH	B0TVJ5		2/18/99 4:27:00 PM	QUAD21C	2/22/99 6:57:32 PM	B0TVJ5	30	13	0.316666667	285	8.42083333			
		SOIL		Bkg:	2/22/99 4:07:29 PM	BKG	240	28	0.116666667	259	1.07916667			
<b>Anl Date:</b>	2/22/99	<b>Tot Sa, Alq:</b>	6.00E+01	, 1.01E+02	<b>Alp; (Dpm/</b>	1.58E+00	<b>(uCi/</b>	4.24E-04	<b>(pCi/</b>	7.06E+00	+ 5.7E+00	<b>CAT</b>	7.1E+00	<b>Lab</b>
<b>Ppt mg:</b>	100.8 /	<b>Units:</b>	g /	, mg	<b>Bet; Alq:</b>	1.87E+01	<b>Sa:</b>	5.02E-03	<b>Ljg:</b>	8.36E+01	+ 5.7E+00	<b>I /</b>	1.2E+00	<b>Alq</b>
													<b>Ljg</b>	
BH	B0TVJ6		2/18/99 4:27:00 PM	QUAD21D	2/22/99 6:57:32 PM	B0TVJ6	30	10	0.2375	195	5.54583333			
		SOIL		Bkg:	2/22/99 4:07:29 PM	BKG	240	23	0.095833333	229	0.95416667			
<b>Anl Date:</b>	2/22/99	<b>Tot Sa, Alq:</b>	6.00E+01	, 8.58E+01	<b>Alp; (Dpm/</b>	1.17E+00	<b>(uCi/</b>	3.68E-04	<b>(pCi/</b>	6.13E+00	+ 5.8E+00	<b>CAT</b>	8.2E+00	<b>Lab</b>
<b>Ppt mg:</b>	85.8 /	<b>Units:</b>	g /	, mg	<b>Bet; Alq:</b>	1.22E+01	<b>Sa:</b>	3.84E-03	<b>Ljg:</b>	6.41E+01	+ 5.5E+00	<b>I /</b>	1.6E+00	<b>Alq</b>
													<b>Ljg</b>	
BH	B0TVJ7		2/18/99 4:27:00 PM	QUAD22A	2/22/99 6:57:34 PM	B0TVJ7	30	8	0.179166667	252	7.30833333			
		SOIL		Bkg:	2/22/99 4:07:33 PM	BKG	240	21	0.0875	262	1.09166667			
<b>Anl Date:</b>	2/22/99	<b>Tot Sa, Alq:</b>	6.00E+01	, 9.80E+01	<b>Alp; (Dpm/</b>	7.31E-01	<b>(uCi/</b>	2.02E-04	<b>(pCi/</b>	3.36E+00	+ 5.2E+00	<b>CAT</b>	1.5E+01	<b>Lab</b>
<b>Ppt mg:</b>	98 /	<b>Units:</b>	g /	, mg	<b>Bet; Alq:</b>	1.57E+01	<b>Sa:</b>	4.32E-03	<b>Ljg:</b>	7.20E+01	+ 5.3E+00	<b>I /</b>	1.4E+00	<b>Alq</b>
													<b>Ljg</b>	
BH	B0TVJ8		2/18/99 4:27:00 PM	QUAD22C	2/22/99 6:57:34 PM	B0TVJ8	30	17	0.470833333	330	9.84583333			
		SOIL		Bkg:	2/22/99 4:07:33 PM	BKG	240	23	0.095833333	277	1.15416667			
<b>Anl Date:</b>	2/22/99	<b>Tot Sa, Alq:</b>	6.00E+01	, 9.40E+01	<b>Alp; (Dpm/</b>	2.38E+00	<b>(uCi/</b>	6.83E-04	<b>(pCi/</b>	1.14E+01	+ 6.0E+00	<b>CAT</b>	4.4E+00	<b>Lab</b>
<b>Ppt mg:</b>	94 /	<b>Units:</b>	g /	, mg	<b>Bet; Alq:</b>	2.12E+01	<b>Sa:</b>	6.09E-03	<b>Ljg:</b>	1.01E+02	+ 6.3E+00	<b>I /</b>	9.9E-01	<b>Alq</b>
													<b>Ljg</b>	

0056

COC Signature Page

W02680

Batch #: 9054299

	Initials/Date	Procedure #
Released By	<u>IDA 7-23-99</u>	<u>RichRC0009</u>
Received	<u>CZ 2/23/99</u>	<u>RC5013</u>
Released By	<u>CZ 2/24/99</u>	n/a
Received	<u>SK 2/24-99</u>	<u>RC 5019</u>
Released By	<u>R-3-99</u>	n/a
Received	<u>JH 3-4-99</u>	<u>Rich RC 5010</u>
Released By	<u>JH 3-5-99</u>	<u>JH n/a</u>
Received	<u>CU 3-5-99</u>	<u>Ed of 3-8-99 RIC RC 5039 1</u>
Released By	<u>W 3-8-99</u>	n/a
Received	<u>/ 3/8/99</u>	<u>RICHARDSON</u>
Released By	<u>/ 3/9/99</u>	n/a
Received	<u>JM 3-9-99</u>	<u>RICHESCOIS</u>
Released By	<u>JM 3-9-99</u>	n/a
Received	<u>PK 3-9-99</u>	<u>RICH RC 0022</u>
	<u>PK 3-10-99</u>	

RQC053

Quanterra Incorporated  
RAD PREP BENCH WORKSHEET

Run Date: 2/23/99  
Time: 15:26:41

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

\*\*\*\*\*  
 \*  
 \* QC BATCH: 9054299 \*  
 \*  
 \*\*\*\*\*

Prep Dt/Tm/Person:	2/23/99	0
Sep1 Dt/Tm/Person:	0/00/00	0000
Sep2 Dt/Tm/Person:	0/00/00	0000
Cocktail Date/Time:	0/00/00	

SO: Plutonium-238,239/40 by Alpha Spec  
 6I: PuAm PrpRC5013/RC5019, SepRC5080(5003)/RC5010(5039)  
 5I: 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
3/05/99	J9B190106-001 CQX98-1-02	SOLID										pCi/g
3/05/99	J9B190106-001 CQX98-1-07X	SOLID		JCQX981R								pCi/g
0/00/00	J9B230000-299 CR2D5-1-01B	SOLID		JCR2D51B								pCi/g
0/00/00	J9B230000-299 CR2D5-1-02C	SOLID		JCR2D51S								pCi/g

NUMBER OF WORK ORDERS IN BATCH: 4

820J

COC Signature Page

6002686

Batch #: 9054300

Batch #:	Initials/Date	Procedure #
Released By	<u>DA 2-23-99</u>	<u>Richardson</u>
Received	<u>CZ 2/23/99</u>	<u>RC5013/5017</u>
Released By	<u>CZ 2/24/99</u>	<u>n/a</u>
Received	<u>p 2/24/99</u>	<u>RICHERSON</u>
Released By		<u>n/a</u>
Received	<u>JW 3/12/99</u>	<u>RICHERSON</u>
Released By	<u>JW 3/14/99</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: 2/23/99  
Time: 15:27:52

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

\*\*\*\*\*  
 \*  
 \* QC BATCH: 9054300 \*  
 \*  
 \*\*\*\*\*

Prep Dt/Tm/Person: 2/23/99 0  
 Sep1 Dt/Tm/Person: 0/00/00 000000  
 Sep2 Dt/Tm/Person: 0/00/00 000000  
 Cocktail Date/Time: 0/00/00

TA: Gamma by HPGE  
 AW: Gamma Prep RC5017  
 SI: RCH: HANFORD ANALYTICAL

<u>ANL</u>	<u>LOT#,MSRUN#/ DUE WORK ORDER</u>	<u>CLIENT</u>	<u>INIT/ 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>
3/05/99	J9B190106-001 CQX98-1-01	SOLID									--	pCi/g
3/05/99	J9B190106-001 CQX98-1-08X	SOLID		JCQX981R							--	pCi/g
0/00/00	J9B230000-300 CR2D6-1-01B	SOLID		JCR2D61B							--	pCi/g
0/00/00	J9B230000-300 CR2D6-1-02C	SOLID		JCR2D61S							--	pCi/g

---



---



---

NUMBER OF WORK ORDERS IN BATCH: 4

0030

COC Signature Page

602686  
 Batch #: 9054301

	Initials/Date	Procedure #
Released By	<u>RL 2-23-99</u>	<u>RichRC0009</u>
Received	<u>CZ 2/23/99</u>	<u>RC5013</u>
Released By	<u>CZ 2/24/99</u>	<u>n/a</u>
Received	<u>Drc 2-24-99</u>	<u>RC5013-D</u>
Released By	<u>Drc 2-26-99</u>	<u>n/a</u>
Received	<u>RTM 3/5/99</u>	<u>RichRC5006/2</u>
Released By	<u>RTM 3/8/99</u>	<u>n/a</u>
Received	<u>oal 3/8/99</u>	<u>RICHARD003 Rev 2</u>
Released By	<u>ml 3/9/99</u>	<u>n/a</u>
Received	<u>KI 3/9/99</u>	<u>RICHIS SOC1 JM 3-9-99</u>
Released By	<u>JM 3-9-99</u>	<u>n/a</u>
Received	<u>W 3/9/99</u>	<u>RICHRC0002/2</u>
Released By	<u>W 3/9/99</u>	<u>n/a</u>
Received		

RQC053

Quanterra Incorporated  
RAD PREP BENCH WORKSHEET

Run Date: 2/23/99  
Time: 15:35:49

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

\*\*\*\*\*  
 \*  
 \* QC BATCH: 9054301 \*  
 \*  
 \*\*\*\*\*

Prep Dt/Tm/Person:	2/23/99	0
Sep1 Dt/Tm/Person:	0/00/00	00000
Sep2 Dt/Tm/Person:	0/00/00	00000
Cocktail Date/Time:	0/00/00	

TH: Total Strontium by GPC  
 CH: Sr-Total PrpRC5013, SepRC5006  
 01: STANDARD TEST SET

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
3/05/99	J9B190106-001 CQX98-1-05	SOLID										pCi/g
		<i>2g</i>										
3/05/99	J9B190106-001 CQX98-1-09X	SOLID		JCQX981R								pCi/g
0/00/00	J9B230000-301 CR2D8-1-01B	SOLID		JCR2D81B								pCi/g
0/00/00	J9B230000-301 CR2D8-1-02C	SOLID		JCR2D81S								pCi/g

NUMBER OF WORK ORDERS IN BATCH: 4

3000

COC Signature Page

Batch #:	Initials/Date	Procedure #
9081399		
Released By	JW 3/22/99	RICHRC00002/2
Received	SK 3/22/99	RC502D
Released By	SK 3/25/99	n/a
Received	SK 3/26/99	
Released By	EB 3/25/99	RICHRC5069
Received	EB 3/29/99	n/a
Released By	3/29/99	n/a
Received	3/29/99	RICHRC00001
Released By	3/31/99	n/a
Received	DM 3/31/98	RICHMT 5002 RO
Released By	DM 4/13/98	n/a
Received	nd 4/2/99	
Released By		n/a
Received	JM4-2-99	N/A
Released By	JM4-2-99	n/a
Received	JW4/16/99	RICHRC00002/2
Released	JW4/16/99	

RQC053

Quanterra Incorporated  
RAD PREP BENCH WORKSHEET

Run Date: 3/22/99  
Time: 16:40:07

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

\*\*\*\*\*  
 \* QC BATCH: 9081399 \*  
 \*\*\*\*\*

Prep Dt/Tm/Person: 3/22/99 0  
 Sep1 Dt/Tm/Person: 0/00/00 00000  
 Sep2 Dt/Tm/Person: 0/00/00 00000  
 Cocktail Date/Time: 0/00/00

S4: Nickel by ICP and Nickel-63 by Liquid Scint  
 AF: Ni-63 PrpRC5013/5019, SepRC5069  
 5I: 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
3/05/99	J9B190106-001 CQX98-1-0CS	9081187 SOLID		JCQX982W	(JCQX981W)						30	pCi/g
3/05/99	J9B190106-001 CQX98-1-0DX	9081187 SOLID		JCQX982R	(JCQX981R)						30	pCi/g
3/05/99	J9B190106-001 CQX98-2-03	9081187 SOLID									30	pCi/g
0/00/00	J9C220000-399 CRVEE-1-01B	SOLID		JCRVEE1B							30	pCi/g
0/00/00	J9C220000-399 CRVEE-1-02C	SOLID		JCRVEE1S							30	pCi/g
0/00/00	J9C220000-399 CRVEE-1-03B N	SOLID		JCRVEE1N							30	pCi/g

NUMBER OF WORK ORDERS IN BATCH: 6

1000

DUE DATE 3-5-99

\*\*\* RE-EXTRACTION REQUEST \*\*\*  
CHAIN-OF-CUSTODY BATCH ANALYSIS RECORD

CUSTOMER BHI

ANALYSIS N163

MATRIX Soil

SAMPLE DELIVERY GROUP J9B190106  
W02686

OLD BATCH NUMBER 9054297

NEW BATCH NUMBER 9081399

LAB SAMPLE ID	CUSTOMER ID	COMMENTS
1) <u>CQX98103</u>	<u>CQX98203</u> <small>131299</small>	
2) <u>CQX98106X</u>	<u>JCQX98202R</u>	
3) <u>CQX9810AS</u>	<u>JCQX98202W</u>	
4)	<u>PW3122199</u>	
5)		
6)		
7)		
8)		
9)		
10)		
11)		
12)		
13)		
14)		
15)		
16)		
17)		
18)		
19)		
20)		

LAB QC ID		
BLANK)	<u>assign</u>	<u>JCRVEE1B</u>
SPIKE)	<u>new</u>	<u>JCRVEE1S</u>

W02686



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 27, 1999

Attention: Joan Kessner

---

Project Number	:	550.181
SDG	:	W02686
Number of Samples	:	One (1)
Sample Matrix	:	Soil
Data Deliverable	:	IV/EA
Date SDG Closed	:	February 20, 1999

---

### II. Introduction

On February 20, 1999, one (1) "soil" sample was received by Quanterra, Richland and transferred to Quanterra, St. Louis for chemical analysis. There are no comments or nonconformances associated with the shipping and receiving of these samples. 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 #</u>	<u>Matrix</u>	<u>Date of Receipt</u>
20757-001	B0TV51	B99-005	Soil	20-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.

Analyses requested: ICP Metals - 6010A (Supertrace) {Arsenic, Barium, Cadmium, Chromium, Lead, Silver}  
Pest/PCBs 8080 (TCL)

Deviation from Request: No Deviation from requested methods.

000002

Bechtel Hanford Incorporated  
March 27, 1999  
Project Number: 550.181  
SDG: W02686  
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  
MS- Matrix Spike  
MSD- Matrix Spike Duplicate

#### V. Comments

General: Priority results were transmitted via facsimile on March 23, 1999.

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

There were no comments for this parameter.

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

Sample B0TV51 was extracted outside of holding time due to a login and internal COC editing error. Initially, PCBs were only logged in to the LIMS database. The issue was discovered prior to reporting the data. At that time Pesticide analysis was requested on the sample but insufficient sample remained to perform matrix QC (MS/MSD). There are hits in the sample. The surrogates and LCS are good. A better review of the internal COC will be performed in the future.

PCBs: 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 for this parameter.

000003

Bechtel Hanford Incorporated  
March 27, 1999  
Project Number: 550.181  
SDG: W02686  
Page 3

---

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

Reviewed and approved:

A handwritten signature in cursive script that reads "Shiela Louvier".

Shiela M. Louvier  
St. Louis Project Manager

000004

Final

W02686

Quanterra February 25, 1999 09:45 am  
Account: 10722 Project: 550.181 Quanterra-Richland QAS No. 550.181 Rev. 4  
Master Sample Login: 20757

Project Manager: S. Louvier

SN

Reviewed by and Date: *J. Sheila Jerni* 2-26-99

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)	
20757-001	B0TV51	Soil	18-FEB-99 09:10	20-FEB-99 09:15	05-MAR-99	AIRBORNE	1	R8250-001
	SAF B99-005 ****ICAPT/6010 = AS, BA, CD, CR, PB, AG							
1	AN - Amber Glass-120ML	PCB/8082/Q4	S	COLD	03-MAR-99	04-MAR-99 T1C		(430393:99)
1	AN - Amber Glass-60ML	ICAPT/6010/Q4	S	COLD	03-MAR-99	17-AUG-99 TF7		(430391:100)
1		PM/IT/Q4	S	COLD	03-MAR-99	17-AUG-99 TF7		(430391:100)
20757-001MS	B0TV51	Soil	18-FEB-99 09:10	20-FEB-99 09:15	05-MAR-99	AIRBORNE	1	R8250-001
	SAF B99-005 ****ICAPT/6010 = AS, BA, CD, CR, PB, AG							
1	AN - Amber Glass-120ML	PCB/8082/Q4	S	COLD	03-MAR-99	04-MAR-99 T1C		(430393:99)
1	AN - Amber Glass-60ML	ICAPT/6010/Q4	S	COLD	03-MAR-99	17-AUG-99 TF7		(430391:100)
20757-001MSD	B0TV51	Soil	18-FEB-99 09:10	20-FEB-99 09:15	05-MAR-99	AIRBORNE	1	R8250-001
	SAF B99-005 ****ICAPT/6010 = AS, BA, CD, CR, PB, AG							
1	AN - Amber Glass-120ML	PCB/8082/Q4	S	COLD	03-MAR-99	04-MAR-99 T1C		(430393:99)
1	AN - Amber Glass-60ML	ICAPT/6010/Q4	S	COLD	03-MAR-99	17-AUG-99 TF7		(430391:100)

000005

3\*-Sample has not been rad screened.



COK 17782 D-27047 Temp 6°C

Bechtel Hanford Inc.		<b>CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST</b>				B99-005-019	Page 1 of 1	
Collector Stankovich/Jacques <i>Nielson</i>		Company Contact Mike Stankovich		Telephone No. (509) 531-7620		Project Coordinator Trent, SJ	Price Code	Data Turnaround <b>15 Days</b>
Project Designation 100 D Areas - Full Protocol		Sampling Location 116-DR-9		SAF No. B99-005				
Ice Chest No.		Field Logbook No. EL-1339-5		Method of Shipment Hand Delivered/Govt. Vehicle				
Shipped To Quanterra Incorporated		Offsite Property No. NA		Bill of Lading/Air Bill No. NA				

1x 60ml G COA 1x 120ml G

POSSIBLE SAMPLE HAZARDS/REMARKS Possible Radioactive & PCB Contamination	Preservation	None	None	None	None	None	Cool 4C	None			
	Type of Container	P	aG	aG	aG	aG	aG	P			
Special Handling and/or Storage Cool 4C	No. of Container(s)	1	1	1	1	1	1	1			
	Volume	20mL	60mL	60mL	60mL	60mL	120mL	1000mL			
SDC W02686		SAMPLE ANALYSIS JAB190106		Activity Scan <i>dial not done</i>	See item (1) in Special Instructions.	Isotopic Plutonium	Nickel-63	Sr-90 - Total Sr	Pest/PCBs - 8080 (TCL)	See item (2) in Special Instructions.	
Sample No.	Matrix *	Sample Date	Sample Time	Activity Scan	See item (1) in Special Instructions.	Isotopic Plutonium	Nickel-63	Sr-90 - Total Sr	Pest/PCBs - 8080 (TCL)	See item (2) in Special Instructions.	
B0TV51 CQX98	Soil	2/18/99	0910	X	X	X	X	X	X	X	AI
					100%				100%		

<b>CHAIN OF POSSESSION</b>				<b>SPECIAL INSTRUCTIONS</b> COA - R116D9 2F00 Lab & R116D9 2600 Shippers						<b>Matrix *</b> Soil Water Vapor Other Solid Other Liquid	
Relinquished By <i>R. Nielson</i>		Date/Time 2/18/99		Received By <i>R. Nielson</i>		Date/Time 2-18-99		(1) ICP Metals - 6010A (Supertrace) (Arsenic, Barium, Cadmium, Chromium, Lead, Silver) (2) Gamma Spectroscopy (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155); Gamma Spec - Add-on (Americium-241, Uranium-238)			
Relinquished By		Date/Time		Received By <i>W. B. J.</i>		Date/Time 2-20-99					
Relinquished By		Date/Time		Received By		Date/Time					
Relinquished By		Date/Time		Received By		Date/Time					

<b>LABORATORY SECTION</b>	Received By	Title		Date/Time
<b>FINAL SAMPLE POSITION</b>	Disposal Method	Disposed By		Date/Time

Post-It® Fax Note	7671	Date	2/11/99	# of pages	▶
To	Diane Jacques		From	Dane Baker	
Co./Dept.			Co.	RCF	
Phone #			Phone #	373-9731	
Fax #	373-1395		Fax #		

**GAMMA-RAY ENERGY ANALYSIS REPORT**  
 Thermo Hanford Inc.  
 Radiological Counting Facility

THI - RCF

Project: 116-D-9  
 Customer ID: BOTPK7  
 RCF ID: 5383

Other Solid

Sample time, date 2/3/99 0740  
 Analysis date 2/8/99

BOTV51  
 BOTVJ4  
 BOTVJ5

Isotope	Activity pCi/gm		2 $\sigma$ err	CI/gm
K-40	1.5e+02	+/-	2.1e+00	1.5e-10
Co-60	2.9e+00	+/-	2.6e-01	2.9e-12
I-129	< 3.8e+00			3.8e-12
Cs-137	2.6e+01	+/-	1.6e+00	2.6e-11
Eu-152	3.0e+01	+/-	2.1e+00	3.0e-11
Eu-154	3.6e+00	+/-	4.0e-01	3.6e-12
Eu-155	< 2.9e-01			2.9e-13
Th-232dau	6.3e-01	+/-	1.8e-01	6.3e-13
U-235	< 5.2e-01			5.2e-13
U-238	< 9.7e+00			9.7e-12
U-238dau	5.6e-01	+/-	1.5e-01	5.6e-13
Np-237	< 1.4e-01			1.4e-13
Am-241	< 1.9e-01			1.9e-13
Tot Act Gam (pCi/gm)	2.2e+02	+/-	6.7e+00	2.2e-10
Y/Sr-90	< N/R			
Gross Alpha **	1.0e+00	+/-	9.8e-01	1.0E-12
Gross Beta	5.9e+01	+/-	1.4e+01	5.9E-11
AEA total	< N/R			

A1

TA = 280 pCi/gm

MDA (pCi/g)
6.3E-01
2.7E-01

Reported as Sr/Y-90 Betas.

**Definitions:**

All errors reported at 2 standard deviations  
 N/R means no result or analysis not requested.  
 A Assigned as residual beta from Gamma/Beta balance.  
 For soils and natural samples, the following applies:

The analysis of U-238 is based on the activity of Pa-234m.  
 The analysis of Np-237 is based on the activity of Pa-233.  
 U-238dau is the activity of Pb-214 and Bi-214, short lived daughter products of U-238. Equilibrium between parent and daughter products probably does not exist in disturbed materials.  
 Th-232dau is the activity of Ac-228, Pb-212, and Tl-208, short lived daughter products of Th-232. Equilibrium between parent and daughter products may not exist in disturbed materials.  
 Other samples, not containing natural materials, may have inapplicable results for the Th, U, transuranics and daughter products. The results must then be balanced for the gross alpha analysis.  
 \*\*The gross alpha results are not corrected for mass absorption

Note! 152-Eu is not a 100% Beta emitter.

  
 David Brehm  
 ERC Radiological Counting Facility

2/11/99  
 Date

Figure 1

SAMPLE CHECK-IN LIST

Date/Time Received: 2-18-99 1310 SG#: W02686  
Work Order Number: J9B190106 SAF #: B99-005  
Shipping Container ID: EX96081 Chain of Custody #: B99-005-019-023

- 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 4°C
- 5. Vermiculite/packing materials is 21 Wet  Dry
- 6. Number of samples in shipping container: 21
- 7. Sample holding times exceeded? Yes  No

8. Samples have:

<input checked="" type="checkbox"/> tape	<input type="checkbox"/> hazard labels
<input checked="" type="checkbox"/> custody seals	<input type="checkbox"/> appropriate sample labels

9. Samples are:

<input checked="" type="checkbox"/> in good condition	<input type="checkbox"/> leaking
<input type="checkbox"/> broken	<input type="checkbox"/> have air bubbles

- 10. Where any anomalies identified in sample receipt? Yes  No
- 11. Description of anomalies (include sample numbers): \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

Sample Custodian/Laboratory: L. Allen Date: 2-18-99

Telephoned To: \_\_\_\_\_ On \_\_\_\_\_ By \_\_\_\_\_

000009

Login No.: 20757  
W02686

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

Client: Rickland  
Project No: 530.181  
Shipper/No: Airborne 5157740 372

Date: 2-20-99 Time: 915  
Initiated by: [Signature]  
RFA/COC Numbers: 1082

**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: _____	
<input type="checkbox"/> pH _____	9. <input type="checkbox"/> All coolers on airbill not received with shipment.
<input type="checkbox"/> other: _____	10. <input type="checkbox"/> Other (explain below): _____
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.	

No variances were noted during sample receipt. Cooler Temperature Upon Receipt: 6°

Temperature Variance Does Not Affect the Following Analyses: \_\_\_\_\_

Notes: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**Corrective Action:**

- Client's Name: \_\_\_\_\_ Informed verbally on: \_\_\_\_\_ By: \_\_\_\_\_
- Client's Name: \_\_\_\_\_ Informed in writing on: \_\_\_\_\_ By: \_\_\_\_\_
- Sample(s) processed "as is".
- Comments: \_\_\_\_\_  
Sample(s) on hold until: \_\_\_\_\_ If released, notify: \_\_\_\_\_

Sample Control Supervisor Review: (or designate) [Signature] Date: 2-22-99

Project Management Review: [Signature] Date: 2-26-99

SIGNED ORIGINAL MUST BE RETAINED IN THE PROJECT FILE

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

Project: 550.181

Category: Pesticides  
Method: EPA 8080  
Matrix: SOLID

Sample Date : 02/18/99  
Receipt Date : 02/20/99  
Report Date : 03/18/99

Client ID: B0TV51

Quanterra ID : 20757-001

Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result Unit	Qual.	Detection Limit	Dilution
alpha-BHC	319-84-6	QCBLK195056-1	03/09/99	03/17/99	1.8 UG/KG	U	1.8	1
beta-BHC	319-85-7	QCBLK195056-1	03/09/99	03/17/99	1.8 UG/KG	U	1.8	1
delta-BHC	319-86-8	QCBLK195056-1	03/09/99	03/17/99	1.8 UG/KG	P	1.8	1
gamma-BHC (Lindane)	58-89-9	QCBLK195056-1	03/09/99	03/17/99	1.8 UG/KG	U	1.8	1
Heptachlor	76-44-8	QCBLK195056-1	03/09/99	03/17/99	1.8 UG/KG	U	1.8	1
Aldrin	309-00-2	QCBLK195056-1	03/09/99	03/17/99	1.8 UG/KG	U	1.8	1
Heptachlor Epoxide	1024-57-3	QCBLK195056-1	03/09/99	03/17/99	1.8 UG/KG	U	1.8	1
Endosulfan I	959-98-8	QCBLK195056-1	03/09/99	03/17/99	1.8 UG/KG	U	1.8	1
Diieldrin	60-57-1	QCBLK195056-1	03/09/99	03/17/99	1.8 UG/KG	U	1.8	1
4,4'-DDE	72-55-9	QCBLK195056-1	03/09/99	03/17/99	1.8 UG/KG	U	1.8	1
Endrin	72-20-8	QCBLK195056-1	03/09/99	03/17/99	1.8 UG/KG	U	1.8	1
Endosulfan II	33213-65-9	QCBLK195056-1	03/09/99	03/17/99	1.8 UG/KG	U	1.8	1
4,4'-DDD	72-54-8	QCBLK195056-1	03/09/99	03/17/99	1.8 UG/KG	U	1.8	1
Endosulfan Sulfate	1031-07-8	QCBLK195056-1	03/09/99	03/17/99	1.8 UG/KG	U	1.8	1
4,4'-DDT	50-29-3	QCBLK195056-1	03/09/99	03/17/99	3.8 UG/KG	U	1.8	1
Methoxychlor	72-43-5	QCBLK195056-1	03/09/99	03/17/99	3.5 UG/KG	U	3.5	1
Endrin Ketone	53494-70-5	QCBLK195056-1	03/09/99	03/17/99	1.8 UG/KG	U	1.8	1
Endrin Aldehyde	7421-93-4	QCBLK195056-1	03/09/99	03/17/99	1.8 UG/KG	U	1.8	1
alpha-Chlordane	5103-71-9	QCBLK195056-1	03/09/99	03/17/99	1.8 UG/KG	U	1.8	1
gamma-Chlordane	5103-74-2	QCBLK195056-1	03/09/99	03/17/99	1.8 UG/KG	U	1.8	1
TCMX	877-09-8	QCBLK195056-1	03/09/99	03/17/99	74	*REC		1
DCB	2051-24-3	QCBLK195056-1	03/09/99	03/17/99	81	*REC		1

FORM 1  
PEST ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

BOTV51

Lab Name: QUANTERRA, ST. LOUIS MO Contract: 550.181  
 Lab Code: Case No.: SAS No.: SDG No.: W02686  
 Matrix: (soil/water) SOIL Lab Sample ID: 20757-001  
 Sample wt/vol: 30.1 (g/mL) G Lab File ID: EA\_040  
 % Moisture: 5 decanted: (Y/N) N Date Received: 02/20/99  
 Extraction: (SepF/Cont/Sonc) SONC Date Extracted: 03/09/99  
 Concentrated Extract Volume: 10 (mL) Date Analyzed: 03/17/99  
 Injection Volume: \_\_\_\_\_ (uL) Dilution Factor: 1.0  
 GPC Cleanup: (Y/N) N pH: 7.0 Sulfur Cleanup: (Y/N) N

CAS NO. COMPOUND CONCENTRATION UNITS:  
(ug/L or ug/Kg) UG/KG Q

57-74-9-----	alpha-BHC	1.8	U
319-85-7-----	beta-BHC	1.8	U
319-86-8-----	delta-BHC	1.8	P
58-89-9-----	gamma-BHC (Lindane)	1.8	U
76-44-8-----	Heptachlor	1.8	U
309-00-2-----	Aldrin	1.8	U
1024-57-3-----	Heptachlor epoxide	1.8	U
959-98-8-----	Endosulfan I	1.8	U
60-57-1-----	Dieldrin	1.8	U
72-55-9-----	4,4'-DDE	1.8	U
72-20-8-----	Endrin	1.8	U
33213-65-9-----	Endosulfan II	1.8	U
72-54-8-----	4,4'-DDD	1.8	U
1031-07-8-----	Endosulfan sulfate	1.8	U
50-29-3-----	4,4'-DDT	3.8	
72-43-5-----	Methoxychlor	3.5	U
53494-70-5-----	Endrin ketone	1.8	U
7421-36-3-----	Endrin aldehyde	1.8	U
5103-71-9-----	alpha-Chlordane	1.8	U
5103-74-2-----	gamma-Chlordane	1.8	U

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

Project: 550.181

Category: PCB's  
Method: EPA 8082  
Matrix: SOLID

Sample Date : 02/18/99  
Receipt Date : 02/20/99  
Report Date : 03/04/99

Client ID: BCTV51

Quanterra ID : 20757-001

Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit	Dilution
Aroclor-1016	12674-11-2	QCBLK193998-1	02/24/99	03/01/99	35	UG/KG	U	35	1
Aroclor-1221	11104-28-2	QCBLK193998-1	02/24/99	03/01/99	35	UG/KG	U	35	1
Aroclor-1232	11141-16-5	QCBLK193998-1	02/24/99	03/01/99	35	UG/KG	U	35	1
Aroclor-1242	53469-21-9	QCBLK193998-1	02/24/99	03/01/99	35	UG/KG	U	35	1
Aroclor-1248	12672-29-6	QCBLK193998-1	02/24/99	03/01/99	35	UG/KG	U	35	1
Aroclor-1254	11097-69-1	QCBLK193998-1	02/24/99	03/01/99	35	UG/KG	U	35	1
Aroclor-1260	11096-82-5	QCBLK193998-1	02/24/99	03/01/99	80	UG/KG		35	1
TCMX	877-09-8	QCBLK193998-1	02/24/99	03/01/99	82	*REC			1
DCB	2051-24-3	QCBLK193998-1	02/24/99	03/01/99	90	*REC			1

000022



Bechtel Hanford Inc.  
3150 George Washington Way  
Richland, WA 99352

Project: 550.181

Category: PCB's  
Method: EPA 8082  
Matrix: SOLID

Sample Date : 02/18/99  
Receipt Date : 02/20/99  
Report Date : 03/04/99

Client ID: B0TVS1

Quanterra ID : 20757-001MS

Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Detection		Dilution
							Qual.	Limit	
Aroclor-1016	12674-11-2	QCBLK193998-1	02/24/99	03/01/99	72	%REC			1
Aroclor-1260	11096-82-5	QCBLK193998-1	02/24/99	03/01/99	61	%REC			1
TCMX	877-09-8	QCBLK193998-1	02/24/99	03/01/99	90	%REC			1
DCB	2051-24-3	QCBLK193998-1	02/24/99	03/01/99	100	%REC			1

000023



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

Project: 550.181

Category: PCB's  
Method: EPA 8082  
Matrix: SOLID

Sample Date : 02/18/99  
Receipt Date : 02/20/99  
Report Date : 03/04/99

Client ID: BOTV51

Quanterra ID : 20757-001MSD

Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit	Dilution
Aroclor-1016	12674-11-2	QCBLK193998-1	02/24/99	03/01/99	79	*REC			1
Aroclor-1260	11096-82-5	QCBLK193998-1	02/24/99	03/01/99	67	*REC			1
TCMX	877-09-8	QCBLK193998-1	02/24/99	03/01/99	94	*REC			1
DCB	2051-24-3	QCBLK193998-1	02/24/99	03/01/99	90	*REC			1

000024

FORM 1  
PCB ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

B0TV51

Lab Name: QUANTERRA, ST. LOUIS MO      Contract: 550.181  
 Lab Code:                      Case No.:                      SAS No.:                      SDG No.: W02686  
 Matrix: (soil/water) SOIL                      Lab Sample ID: 20757-001  
 Sample wt/vol:                      30.1 (g/mL) G                      Lab File ID:    DA\_156  
 % Moisture:    5                      decanted: (Y/N) N                      Date Received: 02/20/99  
 Extraction:    (SepF/Cont/Sonc) SONC                      Date Extracted:02/24/99  
 Concentrated Extract Volume:                      10 (mL)                      Date Analyzed: 03/01/99  
 Injection Volume:                      1.0 (uL)                      Dilution Factor: 1.0  
 GPC Cleanup:    (Y/N) N                      pH: 7.0                      Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG		Q
12674-11-2-----	Aroclor-1016	35	U	
11104-28-2-----	Aroclor-1221	35	U	
1114-16-5-----	Aroclor-1232	35	U	
53469-21-9-----	Aroclor-1242	35	U	
12672-29-6-----	Aroclor-1248	35	U	
11097-69-1-----	Aroclor-1254	35	U	
11096-82-5-----	Aroclor-1260	80		
37324-23-5-----	Aroclor-1262	35	U	
11100-14-4-----	Aroclor-1268	35	U	

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

Project: 550.181

Category: ICAP Metals  
Method: EPA 6010  
Matrix: SOLID

Sample Date : 02/18/99  
Receipt Date : 02/20/99  
Report Date : 03/04/99

Client ID: BOTV51

Quanterra ID : 20757-001

Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit	Dilution
Arsenic	7440-38-2	QCBLK194656-1	03/02/99	03/03/99	1.2	MG/KG		1.1	1
Barium	7440-39-3	QCBLK194656-1	03/02/99	03/03/99	71.9	MG/KG		21.1	1
Cadmium	7440-43-9	QCBLK194656-1	03/02/99	03/03/99	0.05	MG/KG	U	0.53	1
Chromium	7440-47-3	QCBLK194656-1	03/02/99	03/03/99	22.7	MG/KG		1.1	1
Lead	7439-92-1	QCBLK194656-1	03/02/99	03/03/99	2.4	MG/KG		0.32	1
Silver	7440-22-4	QCBLK194656-1	03/02/99	03/03/99	0.26	MG/KG	U	1.1	1

000037



Bechtel Hanford Inc.  
3150 George Washington Way  
Richland, WA 99352

Project: 550.181

Category: ICAP Metals  
Method: EPA 6010  
Matrix: SOLID

Sample Date : 02/18/99  
Receipt Date : 02/20/99  
Report Date : 03/04/99

Client ID: B0TV51

Quanterra ID : 20757-001MS

Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit	Dilution
Arsenic	7440-38-2	QCBLK194656-1	03/02/99	03/03/99	96	%REC			1
Barium	7440-39-3	QCBLK194656-1	03/02/99	03/03/99	103	%REC			1
Cadmium	7440-43-9	QCBLK194656-1	03/02/99	03/03/99	80	%REC			1
Chromium	7440-47-3	QCBLK194656-1	03/02/99	03/03/99	91	%REC			1
Lead	7439-92-1	QCBLK194656-1	03/02/99	03/03/99	92	%REC			1
Silver	7440-22-4	QCBLK194656-1	03/02/99	03/03/99	88	%REC			1

000038

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

Project: 550.181

Category: ICAP Metals  
Method: EPA 6010  
Matrix: SOLID

Sample Date : 02/18/99  
Receipt Date : 02/20/99  
Report Date : 03/04/99

Client ID: BOTV51

Quanterra ID : 20757-001MSD

Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit	Dilution
Arsenic	7440-38-2	QCBLK194656-1	03/02/99	03/03/99	59	%REC			1
Barium	7440-39-3	QCBLK194656-1	03/02/99	03/03/99	105	%REC			1
Cadmium	7440-43-9	QCBLK194656-1	03/02/99	03/03/99	81	%REC			1
Chromium	7440-47-3	QCBLK194656-1	03/02/99	03/03/99	105	%REC			1
Lead	7439-92-1	QCBLK194656-1	03/02/99	03/03/99	94	%REC			1
Silver	7440-22-4	QCBLK194656-1	03/02/99	03/03/99	90	%REC			1

000039

U.S. EPA - CLP

COVER PAGE - INORGANIC ANALYSES DATA PACKAGE

Lab Name: QUANTERRA\_MO Contract: 550.181
Lab Code: ITMO Case No.: SAS No.: SDG No.: W02686
SOW No.: SW846

Table with 2 columns: EPA Sample No. and Lab Sample ID. Rows include BOTV51, BOTV51SD, BOTV51S and their corresponding Lab Sample IDs.

Were ICP interelement corrections applied ? Yes/No YES
Were ICP background corrections applied ? Yes/No YES
If yes - were raw data generated before application of background corrections ? Yes/No NO

Comments:

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package and in the computer-readable data submitted on floppy diskette has been authorized by the Laboratory Manager or the Manager's designee, as verified by the following signature.

Signature: Name:
Date: Title:

