

W01885

0048830

CERTIFICATE OF ANALYSIS

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

September 29, 1997

Attention: Joan Kessner



SAF Number	:	B97-160
Number of Samples	:	One (1)
Sample Type	:	Soil
SDG Number	:	W01885
Data Deliverable	:	Summary

I. Introduction

On August 29, 1997, one 7 day TAT soil sample was received by the Quanterra Environmental Services Richland Laboratory (QTESRL) for radiochemical analysis. The sample was assigned the following ID number to correspond with the Bechtel Hanford (BHI) specific ID:

<u>QTESRL ID#</u>	<u>BHI ID#</u>	<u>MATRIX</u>	<u>DATE OF INITIATION</u>
70900901	B0LVV3	SOIL	8/29/97

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**
Uranium-234, -235, -238 by method RICH-RC-5062
- Gamma Spectroscopy**
Gamma Scan by method RICH-RC-5017
- Gas Proportional Counting**
Gross Alpha by method RD3222
Gross Beta by method RD3222

0002

III. Quality Control

The analytical results for each analysis performed under SDG W01885 include a minimum of one Laboratory Control Sample (LCS), one method (reagent) blank, and one duplicate. 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

The analyses for each sample delivery date were performed separately.

Uranium-234, -235, -238 by method RICH-RC-5062

The analytical batch had to be reanalyzed due to a technician error. The reanalysis data are acceptable. There are no other comments or nonconformances associated with this SDG.

Gamma Spectroscopy

Gamma Scan by method RICH-RC-5017

There are no comments or nonconformances associated with this SDG.

Gas Proportional Counting

Gross Alpha by method RICH-RC-5014

There are no comments or nonconformances associated with this SDG.

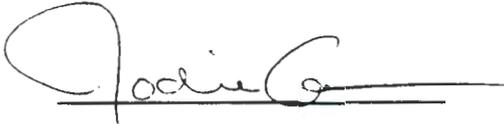
Gross Beta by method RICH-RC-5014

There are no comments or nonconformances associated with this SDG.

Bechtel Hanford Inc.
September 25, 1997
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:

A handwritten signature in black ink, appearing to read "Jodie Carnes", written over a horizontal line.

Jodie Carnes
Project Manager

00004

SAMPLE RESULTS

LAB NAME: QUANTERRA, Richland **SDG: /RPT GRP:** W01885 / 3383
LAB SAMPLE ID: 70900901 **MATRIX:** SOIL
CLIENT ID: B0LVV3 **DATE RECEIVED:** 8/28/1997 2:25:00 PM

ANALYTE	RESULT	COUNTING ERROR (2 s)	TOTAL ERROR (2 s)	MDA/IDL	REPORT UNIT	YIELD	METHOD NUMBER
U-234	1.08E+02	3.0E+00	1.4E+01	7.59E-02	pCi/g	77.20%	RICHRC5030
U-235	2.86E+00	4.9E-01	6.1E-01	5.65E-02	pCi/g	77.20%	RICHRC5030
U-238	1.19E+02	3.2E+00	1.5E+01	7.59E-02	pCi/g	77.20%	RICHRC5030
CO-60	1.11E-01	9.9E-02	1.0E-01	2.91E-01	pCi/g	N/A	RICHRC5017
CS-137DA	6.96E-01	2.3E-01	2.4E-01	N/A	pCi/g	N/A	RICHRC5017
EU-152	2.48E-01	3.2E-01	3.2E-01	6.39E-01	pCi/g	N/A	RICHRC5017
EU-154	-3.30E-01	5.0E-01	5.0E-01	8.46E-01	pCi/g	N/A	RICHRC5017
EU-155	5.91E-01	3.7E-01	3.7E-01	6.88E-01	pCi/g	N/A	RICHRC5017
U-235HP	4.02E+00	1.2E+00	1.2E+00	N/A	pCi/g	N/A	RICHRC5017
U-238	9.32E+01	1.0E+01	1.4E+01	N/A	pCi/g	N/A	RICHRC5017
ALPHA	1.65E+02	1.7E+01	2.8E+01	4.00E+00	pCi/g	100.00%	RD3222
BETA	2.08E+02	1.2E+01	2.1E+01	5.87E+00	pCi/g	100.00%	RD3222-B

Number of Results: 12

**Quanterra Data Review Checklist
RADIOCHEMISTRY**

Work Order number (stk) 709009
 Client ID: BHQ
 Due Date: 9-5-97
 Lab Sample Number or SDG: WQ1885
 Method Test Parameters: UI50
 Matrix: SOIL

Review Item	Yes (✓)	No (✓)	NA (✓)	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. 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 > 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?			/	/
D. Other				
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: *Neil Kempfman*
 Second Level Review: *Jodie G*
 Form #: LS-038.2 /96, Rev. 4

Date: 9-9-97
 Date: 9/25/97

0008A

SAFB97160

Quanterra Data Review Checklist
RADIOCHEMISTRY

Work Order number (s):	709029			
Client ID:	B114			
Due Date:	9-5-97			
Lab Sample Number or SDG:	W01835			
Method Test Parameters:	f			
Matrix:	SDIC			
Review Item	Yes (✓)	No (✓)	N/A (✓)	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. 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?			/	/
D. Other				
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: No add on isotopes/client CCC (handwritten)

NO ADD-ONS per John K... 9/24/97

First Level Review: Joel Kengema

Date: 9-5-97

Second Level Review: [Signature]

Date: 9/25/97

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

Report BHA'S for blank + Sample. Also for sample result

U235-DHP as detected > 20 smor, HP

00009

- Quanterra Data Review Checklist
RADIOCHEMISTRY

Work Order number (S): 709009
 Client ID: BH4
 Due Date: 9-5-97
 Lab Sample Number or SDG: W01885
 Method Test Parameters: 2
 Matrix: SOIL

Review Item	Yes (✓)	No (✓)	N/A (✓)	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. 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?			/	/
D. Other				
1. Are all Nonconformances included and noted?			/	/
2. Are all required forms filled 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: [Signature]
 Second Level Review: [Signature]
 Form #: LS-038.2/96, Rev. 4

Date: 9-1-97
 Date: 9/25/97

Quanterra Data Review Checklist
RADIOCHEMISTRY

Work Order number (s):	709009			
Client ID:	BHW			
Due Date:	9-5-97			
Lab Sample Number or SDG:	W01885			
Method Test Parameters:	F			
Matrix:	SOIL			
Review Item	Yes (✓)	No (✓)	N/A (✓)	2nd 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. 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?			—	—
D. Other				
1. Are all Nonconformances included and noted?			—	—
2. Are all required forms filed out?	—			—
3. Correct methodology used?	—			—
4. Transcription checked?	S/K			JPK
5. Were all calculations checked at a minimum frequency?	—			—
6. Units checked?	—			—

Comments on any "No" response: _____

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

Date: 9-4-97
 Date: 9/25/97

CHAIN OF
CUSTODY FORMS

00012

Data Turnaround
 7 days Priority
 Normal

Collector <i>Wally Bowring</i>	Company Contact <i>Froeh Gustafson</i>	Telephone <i>373-5904</i>
Project Designation <i>North Process Pond</i>	Sampling Location <i>300 FF-1</i>	SAF No. <i>B97-160</i>
Chest No.	Field Logbook No. <i>EFL 1133-4</i>	Method of Shipment <i>Car Vehicle</i>
Shipped To <i>Quanterra</i>	Offsite Property No.	Bill of Lading/Air Bill No.

Special Handling and/or Storage	Preservation	<i>none</i>											
	Type of Container	<i>p</i>											
	No. of Container(s)	<i>1</i>											
	Volume	<i>750ml</i>											

10900901

SAMPLE ANALYSIS

See special inst.

Sample No.	Matrix*	Date Sampled	Time Sampled										
<i>302VV3</i>	<i>S</i>	<i>8-28-97</i>	<i>1350</i>	<i>X</i>									

CHAIN OF POSSESSION	Sign/Print Names		SPECIAL INSTRUCTIONS <i>Gross alpha/Beta, Gamma Spec, Isotopic Uranium</i> <i>sample was formerly BOL8H2 to ACF 7-1-97 @ 0924</i>	Matrix* S - Soil SE - Sediment SO - Solids SL - Sludge W - Water O - Oil A - Air DS - Dross DL - Dross T - Tissue WI - Wipe L - Liquid V - Vegetation X - Other		
	Relinquished By <i>[Signature]</i>	Date/Time <i>8-28-97/1350</i>			Received By <i>[Signature]</i>	Date/Time <i>08/28/97 1350</i>
	Relinquished By <i>[Signature]</i>	Date/Time <i>08/29/97 1425</i>			Received By <i>[Signature]</i>	Date/Time <i>8/31/97 1435</i>
	Relinquished By	Date/Time			Received By <i>[Signature]</i>	Date/Time <i>8/30/97</i>

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

GAMMA-RAY ENERGY ANALYSIS REPORT

Thermo Hanford Inc.
Radiological Counting Facility THI - RCF

N-PATT-2

Project 300-FF-1 Birth Process Pond
Customer ID B0L8H2
RCF ID RCF1214

9A @ 2.5'

Ludlum @ 1007

background 390

Isotope	Sample time, date	924	7/1/97
	Activity, pCi/gm on date		7/2/97
K40	1.0e+01 +/-	1.4e+00	
Co60	< 1.0e-01		
I129	< 1.5e+01		
Ce137	4.9e-01 +/-	1.0e-01	
Eu152	< 4.2e-01		
Eu154	< 2.6e-01		
Eu155	< 8.9e-01		
Th32dau	7.0e-01 +/-	1.9e-01	
U235	5.6e+00 +/-	6.4e-01	
U238	1.8e+02 +/-	2.0e+01	
U238dau	3.3e-01 +/-	1.3e-01	
Np237	< 1.9e-01		
Am241	4.3e+00 +/-	1.0e+00	

per HPTS 1345 = 300 pCi

Total Activity (pCi/gm) 2.0e+02

Alpha Activities

Sr-90 N/R
Gross Alpha N/R
Gross Beta N/R
AEA N/R

Definitions:

All errors reported at 2 standard deviations

For soils and natural samples, the following applies

The analysis of U238 is based on the activity of Pa234m

The analysis of Np237 is based on the activity of Pa233

U238dau is the activity of Pb214 and Bi214 short lived daughter products of U238. Equilibrium between parent and daughter products probably does not exist in disturbed materials

Th32dau is the activity of Ac228, Pb212, and Tl208, short lived daughter products of Th232. 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 against the gross alpha analysis

N/R means no result or analysis not requested.

SE Hill by RCB
Radiological analyst

7-7-97
Date

Albert I. Davis
Albert I. Davis
Radiological Manager

07-07-97
Date

Project review

Date

GAMMA-RAY ENERGY ANALYSIS REPORT

Thermo Hanford Inc.
Radiological Counting Facility THI - RCF

NPATT-2

Project 300-FF-1/Brth Process Pond
Customer ID B0L8H2
RCF ID RCF1214

9A @ 2.5'

Sample time, date 924 7/1/97
Activity, pCi/gm on date 7/2/97

Lithium @ 1007

Isotope	Activity, pCi/gm on date		
K40	1.0e+01 +/-	1.4e+00	
Co60	< 1.0e-01		
I129	< 1.5e+01		
Ce137	4.9e-01 +/-	1.0e-01	
Eu152	< 4.2e-01		
Eu154	< 2.8e-01		
Eu155	< 8.9e-01		
Th32dau	7.0e-01 +/-	1.9e-01	
U235	5.6e+00 +/-	6.4e-01	
U238	1.8e+02 +/-	2.0e+01	
U238dau	3.3e-01 +/-	1.3e-01	
Np237	< 1.9e-01		
Am241	4.3e+00 +/-	1.0e+00	

EPLVUS

background 390

per HPT's 1345 = 300 pCi

SOLID

Total Activity (pCi/gm) 2.0e+02 < 2k pCi/g

Alpha Activities

Sr-90 N/R
Gross Alpha N/R
Gross Beta N/R
AEA N/R

CIT I
9/2/97

Definitions:
All errors reported at 2 standard deviations
For soils and natural samples, the following applies
The analysis of U238 is based on the activity of Pa234m

The analysis of Np237 is based on the activity of Pa233

U238dau is the activity of Po214 and Bi214 short lived daughter products products of U238. Equilibrium between parent and daughter products probably does not exist in disturbed materials.

Th32dau is the activity of Ac228, Pb212, and Tl208, short lived daughter products products of Th232. Equilibrium between parent and daughter products may not exist in disturbed materials.

Other samples, not containing natural materials, may have applicable results for the Th, U, transurans and daughter products. The results must then be balanced against the gross alpha analysis.

N/R means no result or analysis not requested.

SEH/LL/ND 7-7-97
Radiological analyst Date

Albert I. Davis 07-07-97
Radiological Manager Date

Project review Date



DUE DATE 9-5

*** REANALYSIS REQUEST ***
CHAIN-OF-CUSTODY BATCH ANALYSIS RECORD

CUSTOMER BHQ

ANALYSIS UISO

MATRIX Soil

SAMPLE DELIVERY GROUP W01885

BATCH NUMBER 9-009

9-5-97

LAB SAMPLE ID	CUSTOMER ID	COMMENTS
1) T090091B <u>T0900901</u>		<u>wrong boxes used</u>
2)		
3)		
4)		
5)		
6)		
7)		
8)		
9)		
10)		
11)		
12)		
13)		
14)		
15)		
16)		
17)		
18)		
19)		
20)		
LAB OC ID		
BLANK) <u>T090091B</u>		
SPIKE) <u>T090091B</u>		
SPIKE <u>T090091B</u>		

ACTIONS (Initial & Date)

1) INITIATED
SOP(S) #

JU 9/8/97
JUC

4) SEPARATION LAB RECEIVED MS 9-8-97
SOP(S) # RICHRC5062 3

2) PREP LAB RECEIVED
SOP(S) #

MS 9-8-97
RICHRC5017

5) COUNTING MEASUREMENT
LAB RECEIVED (R) 9/8/97
SOP(S) # RICHRC608 R-U

3) SAMPLE REMAINDER STORED
SOP(S) #

MS 9-8-97
N/A

6) DATA REVIEWED AND
ANALYTICAL PREP STORED MS 9-9-97
SOP(S) # RICHRC5062 R-U

CHAIN-OF-CUSTODY BATCH ANALYSIS RECORD

2-Sep-1997
Page 1

*See
9-5-97*

CUSTOMER: BHG

SAMPLE DELIVERY GROUP WGIFFS

MATRIX: SOIL

BATCH NUMBER 9-009

QES ID	DUP	ACCOUNT	CUSTOMER ID	COMMENTS
=====				
1)		70900901	BHG BOLV3	
=====				

ACTIONS (Initial & Date)

- 1) INITIATED ~~MA~~ 9-2-97 5) COUNTING/MEASUREMENT LAB PA/S/97
- SOP(S) # R12800 SOP(S) # RICH50208
- 2) PREP LAB RECEIVED 9-3-97 ok 6) DATA REVIEWED AND ANALYTICAL PREP STORED _____
- SOP(S) # RICH5013-0 SOP(S) # _____
- 3) SAMPLE REMAINDER STORED 9-3-97 ok
- SOP(S) # JK
- 4) SEPARATION LAB RECEIVED 7/8 9-4-97
- SOP(S) # RICH5062.3

*EO RB 9-4-97
RICH5039*

Rec'd
9-5-97

CHAIN-OF-CUSTODY BATCH ANALYSIS RECORD

2-Sep-1997
Page 1

CUSTOMER: BHQ
MATRIX: SOIL

SAF
B977160

SAMPLE DELIVERY GROUP:
BATCH NUMBER:

WCIFPS
9-009

QES ID	DUP	ACCOUNT	CUSTOMER ID	COMMENTS
TD90091B	BLK FINE ORNMA SAND			
TD90091S	BHQ2C01			
TD90092S	BHQ2C02			
70900901		BHQ	BOLVVS	

ACTIONS (Initial & Date)

1) INITIATED

~~KH~~ 9-2-97

5) COUNTING/MEASUREMENT LAB

9/4/97 ml

SOP(S) #

~~RD~~ 2500

SOP(S) #

RICH RD0007

2) PREP LAB RECEIVED

9-3-97 ml

6) DATA REVIEWED AND ANALYTICAL PREP STORED

TR 9-5-97

SOP(S) #

RK REC 3017-1
RK REC 3015-D

SOP(S) #

RICH RC0002 Rev

3) SAMPLE REMAINDER STORED

9-3-97 ml

SOP(S) #

~h
|
~h

4) SEPARATION LAB RECEIVED

SOP(S) #

