

Quanterra
2800 George Washington Way
Richland, Washington 99352-1613

509 375-3131 Telephone
509 375-5590 Fax

RECEIVED
JAN 18 2000

W02910-225
Quanterra

0052375

EDMC

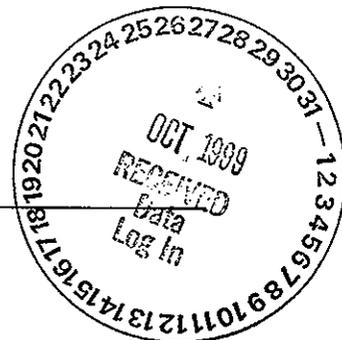
CERTIFICATE OF ANALYSIS

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

October 22, 1999

Attention: Joan Kessner

SAF Number : B99-075
Date First Sample Received : September 24, 1999
Number of Samples : One (1)
Sample Type : Soil
SDG Number : W02910
Data Deliverable : 15 Day Priority / 45 Day Summary



I. Introduction

On September 24, 1999, 1 priority soil sample was received by the Quanterra Richland Laboratory (QRL) for 15-day priority radiochemical and chemical analyses. Upon receipt, the sample was assigned the following laboratory ID number to correspond with the Bechtel Hanford, Inc. (BHI) specific ID:

<u>QESRL ID#</u>	<u>BHI ID#</u>	<u>MATRIX</u>	<u>DATE OF RECEIPT</u>
9D2V5J10	B0WCK8	SOIL	9/24/99

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:

Gamma Spectroscopy
Gamma Scan by method RICH-RC-5017
Chemical Analyses
Chromium Hex by EPA method 7196

0002

Bechtel Hanford, Inc.
October 22, 1999
Page 2

III. Quality Control

The analytical results for each analysis performed under SDG W02910 includes a minimum of one laboratory control sample (LCS), one method (reagent) blank, and one sample duplicate analysis. Any exceptions have been noted in the "Comments" section.

QC and sample results are reported in the same units.

IV. Comments

Gamma Spectroscopy

Gamma Scan by method RICH-RC-5017:

The LCS, batch blank, samples and sample duplicate (B0WCK8) results are within contractual requirements.

Chemical Analyses

Chromium Hex by EPA method 7196:

The LCS, batch blank, samples, sample duplicate (B0WCK8) and sample matrix spike (B0WCK8) 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:



Jackie Waddell
Project Manager

SAMPLE RESULTS

LAB NAME: QUANTERRA, Richland **SDG: /RPT GRP:** W02910 / 8962
LAB SAMPLE ID: 9D2V5J10 **MATRIX:** SOIL
CLIENT ID: B0WCK8 **DATE RECEIVED:** 9/24/99 9:45:00 AM

ANALYTE	RESULT	Q	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA/IDL	REPORT UNIT	YIELD	METHOD NUMBER
HEXCHROME	8.00E-02	U	N/A	N/A	8.00E-02	mg/kg	N/A	EPA7196
AM-241	-3.77E-02	U	6.1E-02	6.1E-02	1.02E-01	pCi/g		RICHRC5017
CO-60	2.18E-02	U	1.5E-02	1.5E-02	2.77E-02	pCi/g		RICHRC5017
CS-137	2.94E+00		3.0E-01	3.0E-01	2.61E-02	pCi/g		RICHRC5017
EU-152	1.25E-01	U	6.2E-02	6.2E-02	8.35E-02	pCi/g		RICHRC5017
EU-154	-2.48E-03	U	4.3E-02	4.3E-02	7.25E-02	pCi/g		RICHRC5017
EU-155	4.04E-02	U	4.3E-02	4.3E-02	7.26E-02	pCi/g		RICHRC5017
TH-232	6.24E-01		1.6E-01	1.6E-01	1.61E-01	pCi/g		RICHRC5017

Number of Results:

DUPLICATE RESULTS

LAB NAME: QUANTERRA, Richland **SDG: /RPT GRP:** W02910 / 8962
LAB SAMPLE ID: D2V5J14R **MATRIX:** SOIL
CLIENT ID: B0WCK8 DUP **DATE RECEIVED:** 9/24/99 9:45:00 AM
ORIG LAB SAMPLE ID: 9D2V5J10

ANALYTE	DUP RESULT	Q	COUNTING ERROR (2 s)	TOTAL ERROR (2 s)	MDA/ IDL	REPORT UNIT	YIELD	METHOD NUMBER	ORIG RESULT	RPD
AM-241	-1.75E-03	U	3.7E-02	3.7E-02	6.11E-02	pCi/g		RICHRC5017	-3.77E-02	182.22%
CO-60	2.31E-02	U	1.4E-02	1.4E-02	2.59E-02	pCi/g		RICHRC5017	2.18E-02	5.68%
CS-137	2.93E+00		3.0E-01	3.0E-01	2.17E-02	pCi/g		RICHRC5017	2.94E+00	0.47%
EU-152	1.62E-01	U	5.6E-02	5.6E-02	7.15E-02	pCi/g		RICHRC5017	1.25E-01	25.81%
EU-154	1.55E-02	U	4.0E-02	4.0E-02	6.93E-02	pCi/g		RICHRC5017	-2.48E-03	276.36%
EU-155	1.45E-02	U	3.3E-02	3.3E-02	5.57E-02	pCi/g		RICHRC5017	4.04E-02	94.33%
TH-232	5.42E-01		1.3E-01	1.3E-01	1.33E-01	pCi/g		RICHRC5017	6.24E-01	14.06%

Number of Results:

DUPLICATE RESULTS

LAB NAME: QUANTERRA, Richland SDG: /RPT GRP: W02910 / 8962
LAB SAMPLE ID: D2V5J16R MATRIX: SOIL
CLIENT ID: B0WCK8 DATE RECEIVED: 9/24/99 9:45:00 AM
ORIG LAB SAMPLE ID: 9D2V5J10

ANALYTE	DUP RESULT	Q	COUNTING ERROR (2 s)	TOTAL ERROR (2 s)	MDA/ IDL	REPORT UNIT	YIELD	METHOD NUMBER	ORIG RESULT	RPD
HEXCHROME	1.20E-01		N/A	N/A	8.00E-02	mg/kg	N/A	EPA7196	8.00E-02	40.00%

Number of Results:

BLANK RESULTS

LAB NAME: QUANTERRA, Richland SDG /RPT GRP: W02910 / 8962
LAB SAMPLE ID: D2XRD11B MATRIX: SOIL

ANALYTE	RESULT	Q	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA/IDL	REPORT UNIT	YIELD	METHOD NUMBER
AM-241	1.05E-02	U	8.2E-02	8.2E-02	1.37E-01	pCi/g		RICHRC5017
CO-60	3.24E-03	U	8.3E-03	8.3E-03	1.49E-02	pCi/g		RICHRC5017
CS-137	1.56E-03	U	8.1E-03	8.1E-03	1.41E-02	pCi/g		RICHRC5017
EU-152	-8.89E-03	U	2.0E-02	2.0E-02	3.39E-02	pCi/g		RICHRC5017
EU-154	-1.13E-02	U	2.3E-02	2.3E-02	3.79E-02	pCi/g		RICHRC5017
EU-155	-5.29E-03	U	2.1E-02	2.1E-02	3.70E-02	pCi/g		RICHRC5017
TH-232	4.48E-02	U	4.6E-02	4.6E-02	8.13E-02	pCi/g		RICHRC5017

Number of Results:

BLANK RESULTS

LAB NAME: QUANTERRA, Richland SDG /RPT GRP: W02910 / 8962
LAB SAMPLE ID: D381511B MATRIX: SOIL

ANALYTE	RESULT	Q	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA/IDL	REPORT UNIT	YIELD	METHOD NUMBER
HEXCHROME	0.00E+00	U	N/A	N/A	2.00E-03	mg/L	N/A	EPA7196

Number of Results:

LABORATORY CONTROL SAMPLE

LAB NAME: QUANTERRA, Richland SDG: /RPT GRP: W02910 / 8962
LAB SAMPLE ID: D2XRD12S MATRIX: SOIL

ANALYTE	RESULT	Q	COUNTING ERROR (2 s)	TOTAL ERROR (2 s)	MDA/ IDL	REPORT UNIT	YIELD	EXPECTED	RECOVERY
CS-137	3.34E-01		5.5E-02	5.5E-02	3.82E-02	pCi/g		3.09E-01	108.24%

Number of Results:

LABORATORY CONTROL SAMPLE

LAB NAME: QUANTERRA, Richland SDG: /RPT GRP: W02910 / 8962
LAB SAMPLE ID: D381512S MATRIX: SOIL

ANALYTE	RESULT	COUNTING Q ERROR (2 s)	TOTAL ERROR (2 s)	MDA/ IDL	REPORT UNIT	YIELD	EXPECTED	RECOVERY
HEXCHROME	9.51E-01	N/A	N/A	2.00E-03	mg/L	N/A	1.00E+00	95.10%

Number of Results:

MATRIX SPIKE RESULTS

LAB NAME: QUANTERRA, Richland SDG: /RPT GRP: W02910 / 8962
LAB SAMPLE ID: D2V5J15W MATRIX: SOIL

ANALYTE	SPIKE RESULT* Q	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA/IDL	REPORT UNIT	SAMPLE RESULT	EXPECTED	RECOVERY
HEXCHROME	3.57E+01	N/A	N/A	8.00E-02	mg/kg	8.00E-02	4.00E+01	89.40%

Number of Results:

*Spike Result Corrected For Sample Result

Result = IDL When Not Detecte

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

J = No U qualifier and result < RDL.

MATRIX SPIKE RESULTS

LAB NAME: QUANTERRA, Richland SDG: /RPT GRP: W02910 / 8962
LAB SAMPLE ID: D2V5J17W MATRIX: SOIL

ANALYTE	SPIKE RESULT* Q	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA/IDL	REPORT UNIT	SAMPLE RESULT	EXPECTED	RECOVERY
HEXCHROME	6.74E+02	N/A	N/A	8.00E-02	mg/kg	8.00E-02	6.81E+02	98.97%

Number of Results:

*Spike Result Corrected For Sample Result

Result = IDL When Not Detected

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

Data Review Checklist
RADIOCHEMISTRY

Lot Number: <u>J9I240153</u>					
Client ID: <u>BHI</u>					
Due Date: <u>10/15/99</u>					
QC Batch Number: <u>9270217</u>		SDG Number: <u>2910</u>			
Method Test Parameter: <u>X</u>					
Matrix: <u>soil</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?			✓		
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: Pam Kenitz Date: 10-15-99

Second Level Review: Jackie Waddell Date: 10/22/99



Richland Laboratory
Data Review Check List
METALS

Work Order Number(s): <u>D2V5J</u> Lot <u>J9I240153</u> QC Batch <u>9277235</u>				
Lab Sample Numbers or SDG: <u>W02910</u>				
Method/Test/Parameter: <u>CR46 in SOIL</u> <u>RICHWC5005</u>				
Review Item	Yes (✓)	No (✓)	N/A (✓)	2 nd Level Review (✓)
A. Initial Calibration				
1. Performed at required frequency with required number of levels?	✓			
2. Correlation coefficient within QC limits?	✓			
3. Initial calibration verification (ICV) analyzed immediately after calibration and results within QC limits?	✓			
4. Initial calibration blank (ICB) analyzed immediately after ICV and concentrations of all parameters ≤ reporting limit?	✓			
B. Continuing Calibration				
1. CCV analyzed at required frequency and all parameters within QC limits?	✓			
2. CCB analyzed at required frequency and all results ≤ reporting limit?	✓			
C. Sample Analysis				
1. Were any samples with concentrations above the linear range for any parameter diluted and reanalyzed?	✓			
2. Were all sample holding times met?	✓			
D. QC Samples				
1. All results for the preparation blank below limits?	✓			
2. MS or MS/MSD recoveries within QC limits and %RPD (for MSD) acceptable?	✓			
3. LCS percent recovery within QC limits and %RPD (for LCSD) acceptable?	✓			
4. Analytical spikes within QC limits where applicable?			✓	
5. ICP only: One serial dilution performed per SDG?			✓	
6. ICP only: CRDL standard (CRI or CRA) analyzed at required frequency?			✓	
7. ICP only: Interference check samples (ICSA, ICSAB) and HICAL analyzed at the required frequencies and within QC limits?			✓	

Review Item	Yes (✓)	No (✓)	N/A (✓)	2 nd Level Review (✓)
E. Other				
1. Are all nonconformances included and noted?			✓	
2. Is the correct date and time of analysis shown?	✓			
3. Did the analyst sign and date the front page of the analytical run?	✓			
4. Correct methodology used?	✓			
5. Transcriptions checked?	✓			
6. Calculations checked at minimum frequency?	✓			
7. Units checked?	✓			

Comments on any "No" response:

@1 - PbCrO₄ spike required x20 dilution.

Analyst: Roxie Ross

Second-Level Review: Jackie Waddell

Date: 10/15/99

Date: 10/22/99

CHAIN OF CUSTODY

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

B99-075-23

Page 1 of 1

Collector Fahlber/Behnke	Company Contact J Adler	Telephone No. 373-4316	Project Coordinator TRENT, SJ	Price Code 8L	Data Turnaround 21 Days
Project Designation 105-DR FSB - Soil	Sampling Location 105DR	SAF No. B99-075			
Ice Chest No. XYZ-123	Field Logbook No. EL 1281	Method of Shipment Hand deliver - Govt Vehicle			
Shipped To Quanterra Incorporated	Offsite Property No. N/A	Bill of Lading/Air Bill No. N/A			

COA R105D42800

POSSIBLE SAMPLE HAZARDS/REMARKS

Q-27038

Special Handling and/or Storage

Preservation	Cool 4C	Cool 4C	Cool 4C	None
Type of Container	aG	aG	aG	aG
No. of Container(s)	1	1	1	1
Volume	60mL	60mL	60mL	500mL

EXC
W02910
SAMPLE ANALYSIS Due 10-15
JAI240153

Sample No.	Matrix *	Sample Date	Sample Time	Chromium Hex - 7196	ICP Metals - 6010A (Add-on) (Lead)	PCBs - 8080 (Aroclor-1254)	See item (1) in Special Instructions.						
BOWCK8 D2V5J	Soil	9-23-99	0852	X	X	X	X						BOWCK8

CHAIN OF POSSESSION	Sign/Print Names	SPECIAL INSTRUCTIONS	Matrix *
Relinquished By R. F. Adler	Date/Time 9-23-99 1400	Received By R. F. Adler	Date/Time 9-23-99 1400
Relinquished By R. F. Adler	Date/Time 9-24-99 0900	Received By R. F. Adler	Date/Time 9-24-99 0900
Relinquished By R. F. Adler	Date/Time 9-24-99 0945	Received By R. F. Adler	Date/Time 9-24-99 0945
Relinquished By R. F. Adler	Date/Time 9-24-99	Received By L. O. O'Connell	Date/Time 9-24-99
		(1) Gamma Spectroscopy (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155)	Soil Water Vapor Other Solid Other Liquid
		Sampler unavailable to relinquish samplers.	

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

0017

ERC Radiological Counting Facility Analysis Report

RCF Number RCF6531

Sample Date & Time 9/23/99 0852

Project ID: 105-DR SAF Number: B99-075

Date Analyzed 9/24/99 4:51:1

Sample ID: BOWCD0

Gamma Energy Analysis

Nuclide	Activity (pCi/g)	Error (pCi/g)	MDC (pCi/g)
K-40	< 4.1E+01		4.1E+01
Co-60	< 6.3E+00		6.3E+00
Cs-137	< 4.7E+00		4.7E+00
Eu-152	< 1.3E+01		1.3E+01
Eu-154	< 1.4E+01		1.4E+01
Eu-155	< 1.4E+01		1.4E+01
Th-232D	1.3E+01 +/- 1.2E+01		1.2E+01
Th-234	< 6.8E+01		6.8E+01
U-235	< 3.1E+01		3.1E+01
U-238	< 6.8E+02		6.8E+02
U-238D	< 1.0E+01		1.0E+01
Am-241	< 9.1E+00		9.1E+00

BOWCJ6
BOWCJ7
BOWEK8

Total GEA (pCi/g) 1.3E+01 +/- 1.2E+01

	Activity (pCi/g)	Error (pCi/g)
Gross Alpha**	5.9E-01 +/- 5.5E-01	
Gross Beta	1.1E+01 +/- 1.3E+00	

Alpha MDC (pCi/g)	3.7E-01
Beta MDC (pCi/g)	6.3E+00

Definitions:

All errors reported at 2 standard deviations.
 N/R = no result or analysis not requested. <MDC = Less than detection limit.
 All GEA results reported as "<" list the Minimum Detectable Concentration (MDC) value for that radionuclide.
 Rounding error may result in the reported total GEA activity differing from the sum of the > MDC GEA values in the second significant digit.

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, transuramics and daughter products. The results must then be balanced for the gross alpha analysis.
 **The gross alpha results are not corrected for mass absorption
 # No peaks for this radionuclide were visible above background in the spectrum. The result was reported as less than MDC.

Analyst



9/24/99

Report To
Dave St. John

Fax
372-9487

Report Printed: Friday, September 24, 1999

Figure 1

SAMPLE CHECK-IN LIST

Date/Time Received: 9/24 0945 SG#: W02910
Work Order Number: JA1240153 SAF #: B99-075
Shipping Container ID: X47 123 Chain of Custody #: B99-075-23

- 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 20
- 5. Vermiculite/packing materials is Wet Dry na
- 6. Number of samples in shipping container: 4
- 7. Sample holding times exceeded? Yes No

8. Samples have: <input checked="" type="checkbox"/> tape <input checked="" type="checkbox"/> custody seals <input type="checkbox"/> hazard labels <input type="checkbox"/> appropriate sample labels
9. Samples are: <input checked="" type="checkbox"/> in good condition <input type="checkbox"/> broken <input type="checkbox"/> leaking <input type="checkbox"/> have air bubbles

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

Sample Custodian/Laboratory: Hindlberg Date: 9-24-99
Telephoned To: _____ On _____ By _____

Client Sample Screening Results

24-Sep-99

Ⓟ 9/24/99

CLIENT CODE	ID	MATRIX	RECEIVED	DETECTOR	ACQ DATE	SAMPLE	MINUTES	CNTS A	NET CPM A	CNTS B	NET CPM B				
BHI	B0WCK8D2V5J		9/24/99 11:00:00 AM	QUAD23C	9/24/99 12:06:47 PM	B0WCK8D2V5J	30	41	1.240416667	149	3.92791667				
	D2V5J	SOIL		Bkg:	9/24/99 4:52:18 AM	BKG	800	101	0.12625	831	1.03875				
Anl Date: 9/24/99		Tot Sa, Alq: 7.83E+02		, 9.58E+01		Alp; (Dpm/	8.12E+00	(uCi/	2.99E-02	(pCi/	3.82E+01	± 7.4E+00	CAT	1.3E+00	Lab
Ppt mg: 95.8		Units: g		, mg		Bet; Alq):	7.76E+00	Sa):	2.85E-02	Ljg):	3.65E+01	± 4.1E+00	II	2.7E+00	Alq Ljg

0020

24-Sep-99

COC Signature Page

W02910

Lot or Batch #: 9270217 Initials/Date Procedure #

Released By	Initials/Date	Procedure #
Released By	RAA 9-30-99	RichRC0009
Received	WA 9-30-99	RichRC 5013 5017
Released By	WV 9-30-99	n/a
Received	nd 10/4/99	RichRC0007
Released By	nd 10/13/99	n/a
Received		
Released By		n/a
Received		
Released By		n/a
Received		
Released By		n/a
Received		
Released By		n/a
Received		

RQC053

Quanterra Incorporated
RAD PREP BENCH WORKSHEET

Run Date: 9/27/99
Time: 12:28:43

Prep	Sep1	Sep2
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Samples Covered
 Labware Labeled
 Verify Test/Container
 Samples Ordered Sequentially
 Logbooks Entered

 *
 * QC BATCH: 9270217 *
 *

Prep Dt/Tm/Person: 9/27/99 0
 Sep1 Dt/Tm/Person: 0/00/00 000000
 Sep2 Dt/Tm/Person: 0/00/00 000000
 Cocktail Date/Time: 0/00/00

W02910

T8: Gamma by HPGE 7 day ingrowth
 AW: Gamma PrpRC5017
 SI: CLIENT: HANFORD

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
10/15/99	J9I240153-001 D2V5J-1-03	SOLID									0.05	pCi/g
10/15/99	J9I240153-001 D2V5J-1-04X	SOLID									0.05	pCi/g
0/00/00	J9I270000-217 D2XRD-1-01B	SOLID									0.05	pCi/g
0/00/00	J9I270000-217 D2XRD-1-02C	SOLID									0.05	pCi/g

NUMBER OF WORK ORDERS IN BATCH: 4

0022

W02944 (R) 10/1/99
J9124016
21 DAY FAT

W02910



COC Signature Page

Lot or Batch #:	Initials/Date	Procedure #
9274297 9277235		
Released By	<u>NRD 10-1-99</u>	<u>Recha 10009</u>
Received	<u>(R) 10/1/99</u>	<u>RICH WC 5005</u>
Released By	<u>(R) 10/4/99</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		
Released By		<u>n/a</u>
Received		
Released By		<u>n/a</u>
Received		

RQC050

Quanterra Incorporated
WET CHEM BATCHSHEET
Richland

Run Date: 10/04/99
Time: 11:27:59

PRODUCTION FIGURES - WET CHEM

TOTAL NUMBER	SAMPLE NUMBER	QC	RE-RUN MATRIX	RE-RUN OTHER	MISC NUMBER	TOTAL HOURS	EXPANDED DELIVERABLE
--------------	---------------	----	---------------	--------------	-------------	-------------	----------------------

METHOD:	EA Chromium, Hexavalent (7196A)	INITIALS:	DATA ENTRY:
QC BATCH #:	9277235	PREP	INITIALS
PREP DATE:	10/04/99	ANAL	DATE
USER:	ROSSR		

Work Order	Lab Number	Structured Analysis	Exp. Del.	Analysis Date	Sample ID:
D2V5J-1-01	J-9I240153-001	XX A DW EA 5I			BOWCK8
D2V5J-1-05	J-9I240153-001-S	XX A DW EA 5I			BOWCK8
D2V5J-1-07	J-9I240153-001-S	XX A DW EA 5I			BOWCK8
D2V5J-1-06	J-9I240153-001-X	XX A DW EA 5I			BOWCK8 DUP
D3815-1-01	J-9J040000-235-B	XX A DW EA 5I			INTRA-LAB BLANK
D3815-1-02	J-9J040000-235-C	XX A DW EA 5I			INTRA-LAB CHECK

Control Limits

(75-125)

(75-125)

(80-120)

0024

ORIGINAL *Day*

SDR # B00-005
Revision #: 0
Date Initiated: 09/29/99

SAMPLE DISPOSITION RECORD

SAF: B99-075
OU: 100-DR
Project ID: 105F/105DR
Task ID: 3
Sampling Event: 105-DR Phase III Sampling and Analysis

Laboratory: **Quanterra Incorporated**

Task Manager: **R.S. Day**

Sampling Information:
Number of Samples: 1
ID Numbers: B0WCK8
Matrix: Soil
Collection Date: 09/23/99

Issue Background:

Class: Project Data Use General Laboratory Direction Validation Direction Sample Management Direction

Type: **Other**

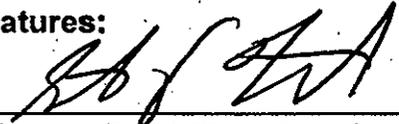
Description: **Conduct PCB Analysis Using Method 8082**

Disposition:

Description: The chain of custody for the listed sample requested analysis for PCBs using method 8080. The laboratory has retired method 8080, however. The laboratory was instructed by ERC Sample Management to analyze for PCBs using method 8082.

Justification: PCB results from either method are acceptable and are comparable. In addition, method 8080 has been retired by the laboratory and currently only runs method 8082.

Approval Signatures:

S. J. Trent  10/8/99
Project Coordinator (Print/Sign Name) Date

R.S. Day  10-13-99
Task Manager (Print/Sign Name) Date

Quanterra Incorporated
13715 Rider Trail North
Earth City, Missouri 63045

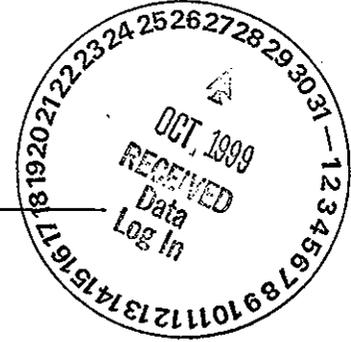
CASE NARRATIVE

314 298-8566 Telephone
314 298-8757 Fax

Bechtel Hanford Incorporated
3350 George Washington Way
Richland, Washington 99352

October 21, 1999

Attention: Joan Kessner



Project Number : 550.268
SDG : W02910
Number of Samples : One (1)
Sample Matrix : Soil
Data Deliverable : Summary
Date SDG Closed : October 8, 1999

II. Introduction

On September 24, 1999, one (1) "soil" sample was received by Quanterra, Richland and transferred to Quanterra, St. Louis for chemical analysis. The samples were received at Quanterra, St. Louis on 9/25/99 at a temperature of 3 degrees 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>
22232-001	B0WCK8	B99-075	SOIL	24-SEP-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 - Lead - 6010A
PCB - 8080 - Aroclor 1254

Deviation from Request: The PCBs were analyzed utilizing method 8082.

Bechtel Hanford Incorporated
October 21, 1999
Project Number: 550.268
SDG: W02910
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: The term "Detection Limit" used in the analytical data reports refers to either the lab's standard reporting limits or contractually required reporting limits, whichever is applicable.

Please refer to the attached cross-reference table for the standard preparation methods used at Quanterra, St. Louis.

The Priority data was transmitted via facsimile on 10/15/99.

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

There are no comments or non-conformances associated with this data.

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

Method 3545 (ASE) was used as the extraction method instead of our standard method (method 3550B).

000003

Bechtel Hanford Incorporated

October 21, 1999

Project Number: 550.268

SDG: W02910

Page 3

I certify that this Summary 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:



Marti Ward

St. Louis Project Manager

000004

Quanterra St. Louis

Sample Preparation Methods

"Quanterra Standard" Preparation Method Used Unless Otherwise Noted

Organic Preparation Methods	Matrix	Analysis	SW846 Reference
Separatory Funnel Liquid-Liquid <i>(Quanterra Standard)</i>	Liquid	Pesticides, PCBs, Semivolatiles, TPH (Diesel Range Organics), Herbicides, TCLP (Semivolatiles, Pesticides, Herbicides), Phenols, PAHs,	3510C
Continuous Liquid-Liquid	Liquid	Pesticides, Semivolatiles	3520C
Ultrasonic <i>(Quanterra Standard)</i>	Solid	Pesticides, PCBs, Semivolatiles, Herbicides, PAHs	3550B
Pressurized Fluid Extraction	Solid	Pesticides, PCBs, Semivolatiles, PAHs	3545
Waste Dilution <i>(Quanterra Standard)</i>	Solvent/Oil	Pesticides, PCBs, Semivolatiles, TPH, Herbicides, TCLP (Semivolatiles, Pesticides, Herbicides)	3580A
Purge and Trap <i>(Quanterra Standard)</i>	All	Volatiles, Gasoline Range Organics	5030B
Toxicity Characteristic Leaching Procedure <i>(Quanterra Standard)</i>	All	Pesticides, Semivolatiles, Herbicides, Volatiles, Metals	1311
Inorganic Preparation Methods	Matrix	Analysis	SW846 Reference
Acid Digestion <i>(Quanterra Standard)</i>	Liquid	ICP or FLAA Metals	3010A
Acid Digestion - Total Recoverable	Liquid	ICP or FLAA Metals	3005A
Acid Digestion <i>(Quanterra Standard)</i>	Liquid	GFAA Metals	3020A
Acid Digestion <i>(Quanterra Standard)</i>	Solid	ICP, FLAA, or GFAA Metals	3050B

000004A

W02910

Quanterra September 29, 1999 01:54 pm
Account: 10722 Project: 550.268 Quanterra-Richland QAS No. 550.268 Rev. 0
Master Sample Login: 22232

Project Manager: M. Ward

Reviewed by and Date: *S. Souvire*

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)	
22232-001	BOWCK8	Soil	23-SEP-99 08:52	24-SEP-99 09:45	15-OCT-99	AIRBORNE	1	Screening not Required
SAF B99-075 // ICP = PB ONLY // PCB = AR-1254 ONLY								
1	AN - Amber Glass-60ML	ICAP/6010/Q4	S	COLD	12-OCT-99	21-MAR-00 S5K	(463999:100)	
1		PCB/8082/Q4	S	COLD	12-OCT-99	07-OCT-99 S5K	(464000:99)	
2		PM/IT/Q4	S	COLD	12-OCT-99	21-MAR-00 S5K	(463999:100 464000:99)	
22232-001MS	BOWCK8	Soil	23-SEP-99 08:52	24-SEP-99 09:45	15-OCT-99	AIRBORNE	1	Screening not Required
SAF B99-075 // ICP = PB ONLY // PCB = AR-1254 ONLY								
1	AN - Amber Glass-60ML	ICAP/6010/Q4	S	COLD	12-OCT-99	21-MAR-00 S5K	(463999:100)	
1		PCB/8082/Q4	S	COLD	12-OCT-99	07-OCT-99 S5K	(464000:99)	
22232-001MSD	BOWCK8	Soil	23-SEP-99 08:52	24-SEP-99 09:45	15-OCT-99	AIRBORNE	1	Screening not Required
SAF B99-075 // ICP = PB ONLY // PCB = AR-1254 ONLY								
1	AN - Amber Glass-60ML	ICAP/6010/Q4	S	COLD	12-OCT-99	21-MAR-00 S5K	(463999:100)	
1		PCB/8082/Q4	S	COLD	12-OCT-99	07-OCT-99 S5K	(464000:99)	

000005

*=Sample has not been rad screened.

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

B99-075-23

Page 1 of 1

Collector Fahlber/Behnke	Company Contact J Adler	Telephone No. 373-4316	Project Coordinator TRENT, SJ	Price Code 8L	Data Turnaround 21 Days
Project Designation 105-DR FSB - Soil	Sampling Location 105DR	Field Logbook No. EL 1281	SAF No. B99-075		
Ice Chest No. X42-123	Offsite Property No. N/A	Method of Shipment <i>Hand deliver - Govt Vehicle</i>			
Shipped To Quanterra Incorporated			Bill of Lading/Air Bill No. N/A		
COA R105D42800					

POSSIBLE SAMPLE HAZARDS/REMARKS

<p>Q-27038</p> <p>Special Handling and/or Storage</p>	Preservation	Cool 4C	Cool 4C	Cool 4C	None				
	Type of Container	aG	aG	aG	G				
	No. of Container(s)	1	1	1	1				
	Volume	60mL	60mL	60mL	50mL				

<p>SAMPLE ANALYSIS</p> <p><i>Due 10-15</i></p> <p><i>JAI240153</i></p>	<p>Chromium Hex</p>	<p>ICP Metals - 6010A (Add-on) (Lead)</p> <p><i>100% full</i></p>	<p>PCBs - 8080 (Aroclor-1254)</p>	<p>See Form (1) for Special Instructions</p>
---	---------------------	---	-----------------------------------	--

Sample No.	Matrix *	Sample Date	Sample Time	Chromium Hex	ICP Metals - 6010A (Add-on) (Lead)	PCBs - 8080 (Aroclor-1254)	See Form (1) for Special Instructions			
B0WCK8 DRUGS	Soil	9-23-99	0852	X	X	X	X			<i>BOND</i>
<i>Sent 9-24-99</i>										

CHAIN OF POSSESSION	Sign/Print Names	SPECIAL INSTRUCTIONS	Matrix *
Relinquished By <i>R. F. Adler</i>	Date/Time <i>9-23-99 1400</i>	Received By <i>R. F. Adler</i>	Date/Time <i>9-23-99 1400</i>
Relinquished By <i>R. F. Adler</i>	Date/Time <i>9-24-99 0900</i>	Received By <i>W. J. Nelson</i>	Date/Time <i>9-24-99 0900</i>
Relinquished By <i>W. J. Nelson</i>	Date/Time <i>9-24-99 0945</i>	Received By <i>W. J. Nelson</i>	Date/Time <i>9-24-99 0945</i>
Relinquished By <i>W. J. Nelson</i>	Date/Time <i>9-24-99 1600</i>	Received By <i>W. J. Nelson</i>	Date/Time <i>9-25-99 8:15</i>
LABORATORY SECTION	Received By <i>[Signature]</i>	Title <i>[Signature]</i>	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

Sampler unavailable to relinquish samplers.

ERC Radiological Counting Facility Analysis Report

RCF Number RCF6531

Sample Date & Time 9/23/99 0852

Project ID: 105-DR

SAP Number: B99-075

Date Analyzed 9/24/99 4:51:1

Sample ID: B0WCDO

Gamma Energy Analysis

Nuclide	Activity (pCi/g)	Error (pCi/g)	MDC (pCi/g)
K-40	< 4.1E+01		4.1E+01
Co-60	< 6.3E+00		6.3E+00
Cs-137	< 4.7E+00		4.7E+00
Eu-152	< 1.3E+01		1.3E+01
Eu-154	< 1.4E+01		1.4E+01
Eu-155	< 1.4E+01		1.4E+01
Th-232D	1.3E+01 +/- 1.2E+01		1.2E+01
Th-234	< 6.8E+01		6.8E+01
U-235	< 3.1E+01		3.1E+01
U-238	< 6.8E+02		6.8E+02
U-238D	< 1.0E+01		1.0E+01
Am-241	< 9.1E+00		9.1E+00

BOWCJ6
BOWCJ7
BOWCK8

Total GEA (pCi/g) 1.3E+01 +/- 1.2E+01

	Activity (pCi/g)	Error (pCi/g)
Gross Alpha**	5.9E-01 +/- 5.5E-01	
Gross Beta	1.1E+01 +/- 1.3E+00	

Alpha MDC (pCi/g)	3.7E-01
Beta MDC (pCi/g)	6.3E+00

Definitions:

All errors reported at 2 standard deviations.
 N/R = no result or analysis not requested. <MDC = Less than detection limit.
 All GEA results reported as "<" list the Minimum Detectable Concentration (MDC) value for that radionuclide.
 Rounding error may result in the reported total GEA activity differing from the sum of the > MDC GEA values in the second significant digit.

For soils and natural samples, the following applies:

The analysis of U-238 is based on the activity of Pb-214.
 The analysis of U-235 is based on the activity of Pb-214.
 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
 # No peaks for this radionuclide were visible above background in the spectrum. The result was reported as less than MDC.

Analyst  9/24/99

Report To Dave St. John Fax 372-9487

Report Printed: Friday, September 24, 1999

000007

Figure 1

SAMPLE CHECK-IN LIST

Date/Time Received: 9/24 0945 SG#: W002910
Work Order Number: J9I240153 SAF #: B99-075
Shipping Container ID: Xyz 123 Chain of Custody # B99-075-23

- 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 20
- 5. Vermiculite/packing materials is Wet Dry na
- 6. Number of samples in shipping container: 4
- 7. Sample holding times exceeded? Yes No

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

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

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

Sample Custodian/Laboratory: Hi delberg Date: 9-24-99

Telephoned To: _____ On _____ By _____

Login No.: 22232

Condition Upon Receipt Variance Report
St. Louis Laboratory

W02910

Client: Richland
Project No: 550.248
Shipper/No: Aurlianne 40126 SN 92599
Condition/Variance (Check all that apply): 4012496014

Date: 9-25-99 Time: 815
Initiated by: Sue [Signature]
RFA/COC Numbers: B99-05-23

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 $4C \pm 2C$ 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 type (circle all that apply).	

No variances were noted during sample receipt. Cooler Temperature Upon Receipt: 3° - temp. blank

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: 9-25-99

Project Management Review: Shiela [Signature] Date: 9-29-99

SIGNED ORIGINAL MUST BE RETAINED IN THE PROJECT FILE

Bechtel Hanford Incorporated
3350 George Washington Way
Richland, WA 99352

Project: 550.268

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

Sample Date : 09/23/99
Receipt Date : 09/24/99
Report Date : 10/15/99

Client ID: B0WCK8

Quanterra ID : 22232-001

Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit	Dilution
Aroclor-1254	11097-69-1	QCBLK208505-1	10/04/99	10/06/99	34	UG/KG	U	34	1
TCMX	877-09-8	QCBLK208505-1	10/04/99	10/06/99	104	%REC			1
DCB	2051-24-3	QCBLK208505-1	10/04/99	10/06/99	78	%REC			1

Data is incomplete without Case Narrative

000011

Bechtel Hanford Incorporated
3350 George Washington Way
Richland, WA 99352

Project: 550.268

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

Sample Date : 09/23/99
Receipt Date : 09/24/99
Report Date : 10/15/99

Client ID: BOWCK8

Quanterra ID : 22232-001MS

Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result Unit	Detection		
						Qual.	Limit	Dilution
Aroclor-1016	12674-11-2	QCBLK208505-1	10/04/99	10/05/99	55 %REC			1
Aroclor-1260	11096-82-5	QCBLK208505-1	10/04/99	10/05/99	47 %REC			1
TCMX	877-09-8	QCBLK208505-1	10/04/99	10/05/99	58 %REC			1
DCB	2051-24-3	QCBLK208505-1	10/04/99	10/05/99	61 %REC			1

Data is incomplete without Case Narrative

000012

Bechtel Hanford Incorporated
3350 George Washington Way
Richland, WA 99352

Project: 550.268

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

Sample Date : 09/23/99
Receipt Date : 09/24/99
Report Date : 10/15/99

Client ID: BOWCK8

Quanterra ID : 22232-001MSD

Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result Unit	Qual.	Detection Limit	Dilution
Aroclor-1016	12674-11-2	QCBLK208505-1	10/04/99	10/05/99	54 %REC			1
Aroclor-1260	11096-82-5	QCBLK208505-1	10/04/99	10/05/99	47 %REC			1
TCMX	877-09-8	QCBLK208505-1	10/04/99	10/05/99	63 %REC			1
DCB	2051-24-3	QCBLK208505-1	10/04/99	10/05/99	46 %REC			1

Data is incomplete without Case Narrative

000013

FORM 1
 PCB ORGANICS ANALYSIS DATA SHEET

Quanterra-Richland SAMPLE NO.

BOWCK8

Lab Name: QUANTERRA, ST. LOUIS MO Contract: 550.268

Lab Code: Case No.: SAS No.: SDG No.: W02910

Matrix: (soil/water) SOIL Lab Sample ID: 22232-001

Sample wt/vol: 15.4 (g/mL) G Lab File ID: IA_336

% Moisture: 5 decanted: (Y/N) N Date Received: 09/24/99

Extraction: (SepF/Cont/Sonc) OTHER Date Extracted: 10/04/99

Concentrated Extract Volume: 5 (mL) Date Analyzed: 10/06/99

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
11097-69-1-----	Aroclor-1254	34	U	

FORM I PCB

000016

Bechtel Hanford Incorporated
3350 George Washington Way
Richland, WA 99352

Project: 550.268

Category: ICAP Metals
Method: EPA 6010
Matrix: SOLID

Sample Date : 09/23/99
Receipt Date : 09/24/99
Report Date : 10/15/99

Client ID	Quanterra ID	Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit	Dil.
BOWCK8	22232-001	Lead	7439-92-1	QCBLK209103-1	10/14/99	10/14/99	2.1	MG/KG	B	10.6	1
BOWCK8	22232-001MS	Lead	7439-92-1	QCBLK209103-1	10/14/99	10/14/99	95	%REC			1
BOWCK8	22232-001MSD	Lead	7439-92-1	QCBLK209103-1	10/14/99	10/14/99	93	%REC			1
NA	QCCLCS209103-1	Lead	7439-92-1	QCBLK209103-1	10/14/99	10/14/99	93	%REC			1
NA	QCBLK209103-1	Lead	7439-92-1	QCBLK209103-1	10/14/99	10/14/99	0.20	MG/KG	B	10.0	1

Data is incomplete without Case Narrative

000026

