W02238

Quanterra
Environmental Services

0049292

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 13, 1998

Attention: Joan Kessner

JUN 1998 RECEIVED EDMC
MAR 1998 RECEIVED Data Log In

Project number	:	550.260
Date Received by Lab	:	February 13, 1998
Number of Samples	:	One (1)
Sample Type	:	Other Solid
SDG Number	:	W02238
Data Deliverable	:	Summary

I. Introduction

On February 13, 1998, one (1) other solid sample was received by Quanterra, Richland and transferred to Quanterra, St. Louis for chemical analysis. Upon receipt, the sample was given the following laboratory ID number to correspond with the specific client ID:

St. Louis ID	BHI ID	Richland ID	Matrix	Date of Receipt
16970-001	B0N424	80221801	Other Solid	13-FEB-98

II. Analytical Results/ Methodology

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

Analyses requested
Semivolatiles by EPA Method 8270, Volatiles by EPA Method 8260, TCLP Metals by EPA Methods 1311/6010/7470.

III. Quality Control

A Laboratory Control Sample and Method Blank were analyzed with each preparation batch. Matrix Spike and Matrix Spike Duplicate analyses were performed per the protocol for this SDG.

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

V. Comments

Shipping and Receiving
There are no comments or nonconformances associated with the shipping and receiving of these samples.

Semivolatiles
The sample MS and MSD in this SDG were run with a five fold dilution due to a large aldol condensation peak that masked the first internal standard and surrogate.

The surrogate 2-Fluorophenol was below QC limits in the MS (23%) and MSD (11%). The limit is 25%. The sample had 33% recovery for this surrogate.

Pyrene was found in the sample at the same level as the spike added. There was no recovery of Pyrene in the MS and only 3% recovery in the MSD. An "in house" LCS run with these samples had acceptable recovery for Pyrene, indicating a problem with the sample and not the instrumentation.

Volatiles
The sample, MS and MSD all had low recovery for the surrogate Dibromofluoromethane and are flagged with an '*'.

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TCLP Metals
Samples 16970-001, 16970-001S and 16970-001SD were prepped 25 mls to 100 mls for both the ICP and Mercury digestions due to limited sample volume. There was no dilution on the extraction blank.

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

Reviewed and approved:

Sheila Loarie for REW
Robert E. White
Project Manager

WO 2238

Quanterra February 19, 1998 09:51 am
Account: 10722 Project: 550.260 Quanterra-Richland QAS No. 550.26 Rev. 1
Master Sample Login: 16970

roject Manager: W. Price

raft: Final: Entered and Reviewed by: PM Review:

ample Header Template:

ample No. / Comments	Client ID	C-Matrix	Date: Collected	Received	Due	Shipper	Rad Category	Rad Sample No.
ata:								

#	Container Type	Analysis	Class	Preservative	Anal. Due Date	Hold Date	Site	(Container Numbers:% Filled)
16970-001		Solid	11-FEB-98 10:35	13-FEB-98 09:30	05-MAR-98	AIRBORNE	2	R6946-001
RICHLAND I.D. 80221801								
1	AN - Amber Glass-250ML	EXTMETAL/TCLP/Q4	S	COLD	02-MAR-98	11-MAR-98	R1B	(358937:99)
1		HG/TCLP/Q4	S	COLD	02-MAR-98	11-MAR-98	R1B	(358937:99)
1		ICAP/TCLP/Q4	S	COLD	02-MAR-98	10-AUG-98	R1B	(358937:99)
1	AN - Amber Glass-120ML	BNA/8270/Q4	S	COLD	02-MAR-98	25-FEB-98	R1B	(358936:99)
1	AN - Amber Glass-60ML	VOA/8260/Q4	S	COLD	02-MAR-98	25-FEB-98	R1B	(358935:99)
16970-001MS		Solid	11-FEB-98 10:35	13-FEB-98 09:30	05-MAR-98	AIRBORNE	2	R6946-001
RICHLAND I.D. 80221801								
1	AN - Amber Glass-250ML	EXTMETAL/TCLP/Q4	S	COLD	02-MAR-98	11-MAR-98	R1B	(358937:99)
1		HG/TCLP/Q4	S	COLD	02-MAR-98	11-MAR-98	R1B	(358937:99)
1		ICAP/TCLP/Q4	S	COLD	02-MAR-98	10-AUG-98	R1B	(358937:99)
1	AN - Amber Glass-120ML	BNA/8270/Q4	S	COLD	02-MAR-98	25-FEB-98	R1B	(358936:99)
1	AN - Amber Glass-60ML	VOA/8260/Q4	S	COLD	02-MAR-98	25-FEB-98	R1B	(358935:99)
16970-001MSD		Solid	11-FEB-98 10:35	13-FEB-98 09:30	05-MAR-98	AIRBORNE	2	R6946-001
RICHLAND I.D. 80221801								
1	AN - Amber Glass-250ML	EXTMETAL/TCLP/Q4	S	COLD	02-MAR-98	11-MAR-98	R1B	(358937:99)
1		HG/TCLP/Q4	S	COLD	02-MAR-98	11-MAR-98	R1B	(358937:99)
1		ICAP/TCLP/Q4	S	COLD	02-MAR-98	10-AUG-98	R1B	(358937:99)
1	AN - Amber Glass-120ML	BNA/8270/Q4	S	COLD	02-MAR-98	25-FEB-98	R1B	(358936:99)
1	AN - Amber Glass-60ML	VOA/8260/Q4	S	COLD	02-MAR-98	25-FEB-98	R1B	(358935:99)

000005

3*=Sample has not been rad screened.

[redacted]

Chain of Custody Record

ST1 OWS

Quanterra

QUA 4124 0797

Client: Bechtel	Project Manager: A. Koprucu	Date: 2-17-98	Chain of Custody Number: 00447
Address	Telephone Number (Area Code)/Fax Number	Lab Number	Page 1 of 1
City / State / Zip Code	Site Contact	Lab Contact	
Project Name: B98-058 REW	Carrier/Waybill Number		
Contract/Purchase Order/Quote No.			

Sample I.D. No. and Description (Containers for each sample may be combined on one line)	Date	Time	Matrix: Aqueous	Sed.	Soil		Containers & Preservatives: Unpres.	H2SO4	HNO3	HCl	NaOH	ZnAc/NaOH	Analysis (Attach list if more space is needed): SEE CoC	Special Instructions/ Conditions of Receipt
80221801 BON424	Chemical Analysis													

Possible Hazard Identification: ☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown

Sample Disposal: ☒ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months (A fee may be assessed if samples are retained longer than 3 months)

Turn Around Time Required: ☐ 24 Hours ☐ 48 Hours ☐ 7 Days ☐ 14 Days ☐ 21 Days ☒ Other _____

QC Requirements (Specify): SDG W02238

1. Relinquished By: Heidelberg QES	Date: 2-17-98	Time: 16:00	1. Received By: [illegible]	Date: 2-18-98	Time: 08:00
2. Relinquished By	Date	Time	2. Received By	Date	Time
3. Relinquished By	Date	Time	3. Received By	Date	Time

Comments: 00006

DISTRIBUTION: WHITE - Stays with the Sample; CANARY - Returned to Client with Report; PINK - Field Copy

R 1 B Temp 4°C Cuk# 14167

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	B98-058-02	Page 1 of 1

Collector R Fahlberg	**Company Contact** Tom Pickett	**Telephone No.** 373-4630	**Project Coordinator** TRENT, SJ	**Data Turnaround** 45 Days
Project Designation Purgewater Truck Repair and Cleanout	**Sampling Location** 100N		**SAF No.** B98-058	
Ice Chest No.	**Field Logbook No.** EL-1309-1		**Method of Shipment** Hand Delivered	
Shipped To Quanterra Incorporated	**Offsite Property No.**		**Bill of Lading/Air Bill No.**	

POSSIBLE SAMPLE HAZARDS/REMARKS

Special Handling and/or Storage

Preservation	None	None	None	Cool 4C	None	Cool 4C	None	None		
Type of Container	P	P	P	aG	~~P~~ aG	aG	aG	P		
No. of Container(s)	1	1	1	1	1	1	1	1		
Volume	20ml	20ml	20ml	60ml	60ml	120ml	250ml	1000ml		
SAMPLE ANALYSIS	Activity Scan	Gross Alpha; Gross Beta	Isotopic Plutonium	VOA - 8260A (TCL)	Strontium-89,90 – Total Sr	Semi-VOA - 8270A (TCL)	Metals by ICP (TCLP) - 1311/6010A; Mercury (TCLP) - 1311/7470	See item (1) in Special Instructions.		
Sample No. / Matrix * / Sample Date / Sample Time										
B0N424 / Other Solid / 2.11.98 / 1035	X	X	X	X	X	X	X	X		
~~B0N426 / Other Solid~~ / RN 2/13/98										
				100		100	100			

CHAIN OF POSSESSION — **Sign/Print Names**

Relinquished By	Date/Time	Received By	Date/Time
[signature]	2/13/98 1137	[signature]	1137 2/13/98
Relinquished By	Date/Time	Received By	Date/Time
	1600	2nd <100ppm	
Relinquished By	Date/Time	Received By	Date/Time
[signature]	2/13/98	2nd [signature]	2-14-98 930
Relinquished By	Date/Time	Received By	Date/Time

SPECIAL INSTRUCTIONS

(1) Gamma Spectroscopy {Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155}; Gamma Spec - Add-on {Americium-241}

Matrix *

S	=	Soil
SE	=	Sediment
SO	=	Solid
SL	=	Sludge
W	=	Water
O	=	Oil
A	=	Air
DS	=	Drum Solids
DL	=	Drum Liquids
T	=	Tissue
WI	=	Wipe
L	=	Liquid
V	=	Vegetation
X	=	Other

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

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	B98-058-02	Page 1 of 1

Collector: R Fahlberg	Company Contact: Tom Pickett	Telephone No.: 373-4630	Project Coordinator: TRENT, SJ
Data Turnaround: 45 Days			
Project Designation: Purgewater Truck Repair and Cleanout	Sampling Location: 100N		SAF No.: B98-058
Chest No.	Field Logbook No.: EL-1309-1		Method of Shipment: Hand Delivered
Shipped To: Quanterra Incorporated	Offsite Property No.		Bill of Lading/Air Bill No.

POSSIBLE SAMPLE HAZARDS/REMARKS

Special Handling and/or Storage

SAMPLE ANALYSIS

SDG W02238

80221801

Sample No.	Matrix *	Sample Date	Sample Time	Activity Scan	Gross Alpha; Gross Beta	Isotopic Plutonium	VOA - 8260A (TCL)	Strontium-89,90 – Total Sr	Semi-VOA - 8270A (TCL)	Metals by ICP (TCLP) - 1311/6010A; Mercury (TCLP) - 1311/7470	See item (1) in Special Instructions.
				None	None	None	Cool 4C	None	Cool 4C	None	None
				P	P	P	aG	~~P~~ aG	aG	aG	P
				1	1	1	1	1	1	1	1
				20ml	20ml	20ml	60ml	60ml	120ml	250ml	1000ml
					* 80221901			*			*
0N424	Other Solid	2-11-98	1035	X	X	X	X	X	X	X	X
~~0N426~~	~~Other Solid~~	RN 2/13/98									

CHAIN OF POSSESSION — Sign/Print Names

Relinquished By	Date/Time	Received By	Date/Time
[signature]	2/13/98 1137	[signature]	2/13/98 1137
		2100 PM	

SPECIAL INSTRUCTIONS

(1) Gamma Spectroscopy (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155); Gamma Spec - Add-on (Americium-241)

Matrix *

- S = Soil
- SE = Sediment
- SO = Solid
- SL = Sludge
- W = Water
- O = Oil
- A = Air
- DS = Drum Solids
- DL = Drum Liquids
- T = Tissue
- WI = Wipe
- L = Liquid
- V = Vegetation
- X = Other

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

Figure 1

SAMPLE CHECK-IN LIST

Date/Time Received: 2/13 1135 SG#: W02238

Work Order Number: 802218 + 219 SAF #: B98-058

Shipping Container ID: 96-089 Chain of Custody # B98-058-02

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°
5. Vermiculite/packing materials is Wet [] Dry [✓] Ice
6. Number of samples in shipping container: 8
7. Sample holding times exceeded? Yes [] No [✓]

8. Samples have:
   - [✓] tape
   - [ ] custody seals
   - [ ] hazard labels
   - [ ] appropriate sample labels

9. Samples are:
   - [✓] in good condition
   - [ ] broken
   - [ ] leaking
   - [ ] have air bubbles

10. Where any anomalies identified in sample receipt? Yes [] No [✓]
11. Description of anomalies (include sample numbers): _____

Sample Custodian/Laboratory: [signature] Date: 2/13/98

Telephoned To: _____ On _____ By _____

000009

Post-it® Fax Note 7671

To B.L. Gallegos		Date 2/11	# of pages ▶ 1
Co./Dept.		From A. I. Davis	
Phone #		Co.	
Fax # 376-8851		Phone # 373-9731	
		Fax #	

GAMMA-RAY ENERGY ANALYSIS REPORT

Thermo Hanford Inc.
Radiological Counting Facility THI-RCF

Project	100 N	Purge Water Truck	
Customer ID	8SN423	Liquid	
RCF ID	RCF2752		
	Sample time, date	1035	2/11/98
	Analysis date		2/11/98

1000g Solid

Isotope		Activity pCi/gm		2sigma	Ci/gm
K40		1.7e+00	+/-	5.5e+00	1.7e-11
Co60		2.9e+00	+/-	7.2e-01	2.9e-12
I129	<	2.5e+00			2.5e-12
Cs137		3.4e+00	+/-	2.8e+00	3.4e-11
Eu152	<	2.4e+00			2.4e-12
Eu154	<	2.8e+00			2.8e-12
Eu155	<	2.0e+00			2.0e-12
Th232dau	<	2.3e+00			2.3e-12
U235	<	5.7e+00			5.7e-12
U238	<	9.4e+00			9.4e-11
U238dau		2.1e+00	+/-	2.0e-02	2.1e-12
Np237	<	1.7e+00			1.7e-12
Am241	<	1.0e+00			1.0e-12
Tot Act Gam (pCi/gm)		5.7e+00		Ci/gm	5.7e-11
Y/Sr-90	<	N/R			
Gross Alpha		5.1e+00	+/-	8.8e-01	5.1e-12
Gross Beta		1.2e+02	+/-	8.8e+00	1.2e-10
AEA total	<	N/R			

Cat II Beta

2/13/98

< 10K pCi

Reported as 137-Cs Betas. > 100K pCi

Total Activity	(pCi/gm)	1.3e+02
	(Ci/gm)	1.3e-10

< 2K pCi/g

Definitions:

All errors reported at 2 standard deviations

A Assigned as residual beta (gamma/beta emitter).

For soils and natural samples, distributing applies

The analyses of U238 is based on activity of Pa234m

The analyses of Np237 is based on 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 natural samples.

Th32dau is the activity of Ac228, Bi212, and Tl208, short lived daughter products of 232Th. Equilibrium between parent and daughter products may not exist in natural samples.

Other samples, not containing naturally occurring nuclides, may have inapplicable results for the Th, U, transuranics and daughter products. The results must be evaluated for alpha emitters.

N/R means no result or analysis not performed.

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

Radiological analyst — Date 2-11-98

Albert I. Davis, Radiological Manager — Date 2/12/98

000010

Quanterra Environmental Services

BWS SL

014167

Login No.: 16970

Condition Upon Receipt Variance Report
St. Louis Laboratory

Client: Richland

Project No: 550.260

Shipper/No: A/B 5999739 012

Date: 2-14-98 Time: 0930

Initiated by: Jed Mitchell

RFA/COC Numbers: No Rich coc B98-058-02

Condition/Variance (Check all that apply):

1. ☐ Sample received broken/leaking.
2. ☐ Sample received without proper preservative.
   - ☐ Cooler temperature not within 4°C ± 2°C
     Record temperature: _____
   - ☐ pH _____
   - ☐ other: _____
3. ☐ Sample received in improper container.
4. ☐ Sample received without proper paperwork. Explain: _____
5. ☐ Paperwork received without sample.
6. ☐ No sample ID on sample container.
7. ☐ Custody tape disturbed/broken/missing.
8. ☐ Sample ID on container does not match sample ID on paperwork. Explain: _____
9. ☐ All coolers on airbill not received with shipment.
10. ☐ Other (explain below): _____

☑ No variances were noted during sample receipt. Cooler Temperature Upon Receipt: 4°C

Notes:

Corrective Action:

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

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

☐ Sample(s) processed "as is". _____

☐ Sample(s) on hold until: _____ If released, notify: _____

Sample Control Supervisor Review: (or designate) Jed Mitchell Date: 2-14-98

Project Management Review: Robert E. White Date: 2-18-98

SIGNED ORIGINAL MUST BE RETAINED IN THE PROJECT FILE

SL-ADMIN-0004, Revised 11/24/95

000011

Quanterra-Richland
3350 George Washington Way
Richland, WA 99352-1613

Project: 550.260

Category : TCLP Metals
Matrix : SOLID

Client ID: BON424

Sample Date : 02/11/98
Receipt Date : 02/13/98
Report Date : 03/12/98

Quanterra ID : 16970-001

Analyte	Method	Extract Date	Prep Date	Analyses Date	Result	Units	Qual.	Detection Limit	Regulatory Level	Dilution
Mercury	EPA 7470	02/28/98	03/02/98	03/02/98	0.0004	MG/L	U	0.0008	0.20	4
Arsenic	EPA 6010	02/28/98	03/02/98	03/02/98	0.0052	MG/L	U	1.2	5.0	4
Barium	EPA 6010	02/28/98	03/02/98	03/02/98	1.3	MG/L		0.80	100	4
Cadmium	EPA 6010	02/28/98	03/02/98	03/02/98	0.0016	MG/L	U	0.020	1.0	4
Chromium	EPA 6010	02/28/98	03/02/98	03/02/98	0.052	MG/L		0.040	5.0	4
Lead	EPA 6010	02/28/98	03/02/98	03/02/98	0.0036	MG/L	U	0.40	5.0	4
Selenium	EPA 6010	02/28/98	03/02/98	03/02/98	0.010	MG/L	B	1.0	1.0	4
Silver	EPA 6010	02/28/98	03/02/98	03/02/98	0.0032	MG/L	U	0.040	5.0	4

Quanterra-Richland
3350 George Washington Way
Richland, WA 99352-1613

Project: 550.260

Category : TCLP Metals
Matrix : SOLID

Sample Date : 02/11/98
Receipt Date : 02/13/98
Report Date : 03/04/98

Client ID: BON424

Quanterra ID : 16970-001MS

Analyte	Method	Extract Date	Prep Date	Analyses Date	Result	Units	Qual.	Detection Limit	Regulatory Level	Dilution
Mercury	EPA 7470	02/28/98	03/02/98	03/02/98	102	%REC				4
Arsenic	EPA 6010	02/28/98	03/02/98	03/02/98	98	%REC				4
Barium	EPA 6010	02/28/98	03/02/98	03/02/98	98	%REC				4
Cadmium	EPA 6010	02/28/98	03/02/98	03/02/98	96	%REC				4
Chromium	EPA 6010	02/28/98	03/02/98	03/02/98	98	%REC				4
Lead	EPA 6010	02/28/98	03/02/98	03/02/98	97	%REC				4
Selenium	EPA 6010	02/28/98	03/02/98	03/02/98	99	%REC				4
Silver	EPA 6010	02/28/98	03/02/98	03/02/98	96	%REC				4

Quanterra-Richland
3350 George Washington Way
Richland, WA 99352-1613

Project: 550.260

Category : TCLP Metals
Matrix : SOLID

Client ID: BON424

Sample Date : 02/11/98
Receipt Date : 02/13/98
Report Date : 03/04/98

Quanterra ID : 16970-001MSD

Analyte	Method	Extract Date	Prep Date	Analyses Date	Result	Units	Qual.	Detection Limit	Regulatory Level	Dilution
Mercury	EPA 7470	02/28/98	03/02/98	03/02/98	101	%REC				4
Arsenic	EPA 6010	02/28/98	03/02/98	03/02/98	98	%REC				4
Barium	EPA 6010	02/28/98	03/02/98	03/02/98	98	%REC				4
Cadmium	EPA 6010	02/28/98	03/02/98	03/02/98	96	%REC				4
Chromium	EPA 6010	02/28/98	03/02/98	03/02/98	98	%REC				4
Lead	EPA 6010	02/28/98	03/02/98	03/02/98	96	%REC				4
Selenium	EPA 6010	02/28/98	03/02/98	03/02/98	100	%REC				4
Silver	EPA 6010	02/28/98	03/02/98	03/02/98	96	%REC				4

U.S. EPA - CLP

COVER PAGE - INORGANIC ANALYSES DATA PACKAGE

Lab Name: QUANTERRA_MO Contract: 550.260

Lab Code: ITMO Case No.: _____ SAS No.: _____ SDG No.: W02238

SOW No.: SW846

EPA Sample No.	Lab Sample ID
B0N424	P16970-001
B0N424SD	P16970-001SD
B0N424S	P16970-001S
PBT166279	PBT166279

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: _____

U.S. EPA - CLP

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

B0N424

Lab Name: QUANTERRA_MO Contract: 550.260

Lab Code: ITMO Case No.: SAS No.: SDG No.: W02238

Matrix (soil/water): WATER Lab Sample ID: P16970-00

Level (low/med): LOW Date Received: 02/13/98

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7440-38-2	Arsenic	5.2	U		P
7440-39-3	Barium	1280			P
7440-43-9	Cadmium	1.6	U		P
7440-47-3	Chromium	51.8			P
7439-92-1	Lead	3.6	U		P
7439-97-6	Mercury	0.40	U		CV
7782-49-2	Selenium	10.0	B		P
7440-22-4	Silver	3.2	U		P

Color Before: Clarity Before: Texture:

Color After: Clarity After: Artifacts:

Comments:

FORM I - IN

TCLP

Quanterra-Richland
3350 George Washington Way
Richland, WA 99352-1613

Project: 550.260

Category: Semivolatile
Method: EPA 8270
Matrix: SOLID

Client ID: BON424

Sample Date : 02/11/98
Receipt Date : 02/13/98
Report Date : 03/12/98

Quanterra ID : 16970-001

Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit	Dilution
Phenol	108-95-2	QCBLK165819-1	02/24/98	03/06/98	1600	UG/KG	U	1600	5
bis(2-Chloroethyl)Ether	111-44-4	QCBLK165819-1	02/24/98	03/06/98	1600	UG/KG	U	1600	5
2-Chlorophenol	95-57-8	QCBLK165819-1	02/24/98	03/06/98	1600	UG/KG	U	1600	5
1,3-Dichlorobenzene	541-73-1	QCBLK165819-1	02/24/98	03/06/98	1600	UG/KG	U	1600	5
1,4-Dichlorobenzene	106-46-7	QCBLK165819-1	02/24/98	03/06/98	1600	UG/KG	U	1600	5
1,2-Dichlorobenzene	95-50-1	QCBLK165819-1	02/24/98	03/06/98	1600	UG/KG	U	1600	5
2-Methylphenol	95-48-7	QCBLK165819-1	02/24/98	03/06/98	1600	UG/KG	U	1600	5
2,2'-oxybis (1-Chloropropane)	108-60-1	QCBLK165819-1	02/24/98	03/06/98	1600	UG/KG	U	1600	5
4-Methylphenol	106-44-5	QCBLK165819-1	02/24/98	03/06/98	1600	UG/KG	U	1600	5
N-nitroso-di-n-propylamine	621-64-7	QCBLK165819-1	02/24/98	03/06/98	1600	UG/KG	U	1600	5
Hexachloroethane	67-72-1	QCBLK165819-1	02/24/98	03/06/98	1600	UG/KG	U	1600	5
Nitrobenzene	98-95-3	QCBLK165819-1	02/24/98	03/06/98	1600	UG/KG	U	1600	5
Isophorone	78-59-1	QCBLK165819-1	02/24/98	03/06/98	1600	UG/KG	U	1600	5
2-Nitrophenol	88-75-5	QCBLK165819-1	02/24/98	03/06/98	1600	UG/KG	U	1600	5
2,4-Dimethylphenol	105-67-9	QCBLK165819-1	02/24/98	03/06/98	1600	UG/KG	U	1600	5
bis(2-Chloroethoxy)Methane	111-91-1	QCBLK165819-1	02/24/98	03/06/98	1600	UG/KG	U	1600	5
2,4-Dichlorophenol	120-83-2	QCBLK165819-1	02/24/98	03/06/98	1600	UG/KG	U	1600	5
1,2,4-Trichlorobenzene	120-82-1	QCBLK165819-1	02/24/98	03/06/98	1600	UG/KG	U	1600	5
Naphthalene	91-20-3	QCBLK165819-1	02/24/98	03/06/98	1600	UG/KG	U	1600	5
4-Chloroaniline	106-47-8	QCBLK165819-1	02/24/98	03/06/98	1600	UG/KG	U	1600	5
Hexachlorobutadiene	87-68-3	QCBLK165819-1	02/24/98	03/06/98	1600	UG/KG	U	1600	5
4-Chloro-3-Methylphenol	59-50-7	QCBLK165819-1	02/24/98	03/06/98	1600	UG/KG	U	1600	5
2-Methylnaphthalene	91-57-6	QCBLK165819-1	02/24/98	03/06/98	1600	UG/KG	U	1600	5
Hexachlorocyclopentadiene	77-47-4	QCBLK165819-1	02/24/98	03/06/98	8000	UG/KG	U	8000	5
2,4,6-Trichlorophenol	88-06-2	QCBLK165819-1	02/24/98	03/06/98	1600	UG/KG	U	1600	5
2,4,5-Trichlorophenol	95-95-4	QCBLK165819-1	02/24/98	03/06/98	1600	UG/KG	U	1600	5
2-Chloronaphthalene	91-58-7	QCBLK165819-1	02/24/98	03/06/98	1600	UG/KG	U	1600	5
2-Nitroaniline	88-74-4	QCBLK165819-1	02/24/98	03/06/98	8000	UG/KG	U	8000	5
DimethylPhthalate	131-11-3	QCBLK165819-1	02/24/98	03/06/98	1600	UG/KG	U	1600	5
Acenaphthylene	208-96-8	QCBLK165819-1	02/24/98	03/06/98	1600	UG/KG	U	1600	5
2,6-Dinitrotoluene	606-20-2	QCBLK165819-1	02/24/98	03/06/98	1600	UG/KG	U	1600	5
3-Nitroaniline	99-09-2	QCBLK165819-1	02/24/98	03/06/98	8000	UG/KG	U	8000	5
Acenaphthene	83-32-9	QCBLK165819-1	02/24/98	03/06/98	1600	UG/KG	U	1600	5
2,4-Dinitrophenol	51-28-5	QCBLK165819-1	02/24/98	03/06/98	8000	UG/KG	U	8000	5
4-Nitrophenol	100-02-7	QCBLK165819-1	02/24/98	03/06/98	8000	UG/KG	U	8000	5
Dibenzofuran	132-64-9	QCBLK165819-1	02/24/98	03/06/98	1600	UG/KG	U	1600	5
2,4-Dinitrotoluene	121-14-2	QCBLK165819-1	02/24/98	03/06/98	1600	UG/KG	U	1600	5
Diethylphthalate	84-66-2	QCBLK165819-1	02/24/98	03/06/98	1600	UG/KG	U	1600	5
4-Chlorophenyl-PhenylEther	7005-72-3	QCBLK165819-1	02/24/98	03/06/98	1600	UG/KG	U	1600	5
Fluorene	86-73-7	QCBLK165819-1	02/24/98	03/06/98	1600	UG/KG	U	1600	5
4-Nitroaniline	100-01-6	QCBLK165819-1	02/24/98	03/06/98	8000	UG/KG	U	8000	5
4,6-Dinitro-2-Methylphenol	534-52-1	QCBLK165819-1	02/24/98	03/06/98	8000	UG/KG	U	8000	5
n-Nitrosodiphenylamine	86-30-6	QCBLK165819-1	02/24/98	03/06/98	1600	UG/KG	U	1600	5
4-Bromophenyl-Phenyl Ether	101-55-3	QCBLK165819-1	02/24/98	03/06/98	1600	UG/KG	U	1600	5
Hexachlorobenzene	118-74-1	QCBLK165819-1	02/24/98	03/06/98	1600	UG/KG	U	1600	5
Pentachlorophenol	87-86-5	QCBLK165819-1	02/24/98	03/06/98	8000	UG/KG	U	8000	5
Phenanthrene	85-01-8	QCBLK165819-1	02/24/98	03/06/98	520	UG/KG	J	1600	5
Anthracene	120-12-7	QCBLK165819-1	02/24/98	03/06/98	1600	UG/KG	U	1600	5
Carbazole	86-74-8	QCBLK165819-1	02/24/98	03/06/98	450	UG/KG	J	1600	5
Di-N-Butylphthalate	84-74-2	QCBLK165819-1	02/24/98	03/06/98	1600	UG/KG	U	1600	5
Fluoranthene	206-44-0	QCBLK165819-1	02/24/98	03/06/98	1300	UG/KG	J	1600	5
Pyrene	129-00-0	QCBLK165819-1	02/24/98	03/06/98	1600	UG/KG	J	1600	5
ButylBenzylPhthalate	85-68-7	QCBLK165819-1	02/24/98	03/06/98	1600	UG/KG	U	1600	5
3,3'-Dichlorobenzidine	91-94-1	QCBLK165819-1	02/24/98	03/06/98	8000	UG/KG	U	8000	5
Benzo(a)Anthracene	56-55-3	QCBLK165819-1	02/24/98	03/06/98	750	UG/KG	J	1600	5
Chrysene	218-01-9	QCBLK165819-1	02/24/98	03/06/98	900	UG/KG	J	1600	5
bis(2-Ethylhexyl)Phthalate	117-81-7	QCBLK165819-1	02/24/98	03/06/98	1000	UG/KG	J	1600	5
di-N-OctylPhthalate	117-84-0	QCBLK165819-1	02/24/98	03/06/98	1600	UG/KG	U	1600	5
Benzo(b)Fluoranthene	205-99-2	QCBLK165819-1	02/24/98	03/06/98	510	UG/KG	J	1600	5
Benzo(k)Fluoranthene	207-08-9	QCBLK165819-1	02/24/98	03/06/98	1600	UG/KG	U	1600	5
Benzo(a)Pyrene	50-32-8	QCBLK165819-1	02/24/98	03/06/98	1600	UG/KG	U	1600	5

Quanterra-Richland
3350 George Washington Way
Richland, WA 99352-1613

Project: 550.260

Category: Semivolatile
Method: EPA 8270
Matrix: SOLID

Sample Date : 02/11/98
Receipt Date : 02/13/98
Report Date : 03/12/98

Client ID: BON424

Quanterra ID : 16970-001

Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit	Dilution
Indeno(1,2,3-CD)Pyrene	193-39-5	QCBLK165819-1	02/24/98	03/06/98	1600	UG/KG	U	1600	5
Dibenz(a,h)Anthracene	53-70-3	QCBLK165819-1	02/24/98	03/06/98	1600	UG/KG	U	1600	5
Benzo(g,h,i)Perylene	191-24-2	QCBLK165819-1	02/24/98	03/06/98	1600	UG/KG	U	1600	5
Aldol Condensation	TIC-4	QCBLK165819-1	02/24/98	03/06/98	280000	UG/KG	BJN		5
Unknown-1	TIC-32	QCBLK165819-1	02/24/98	03/06/98	570	UG/KG	J		5
Nitrobenzene-d5	4165-60-0	QCBLK165819-1	02/24/98	03/06/98	83	%REC			5
2-Fluorobiphenyl	321-60-8	QCBLK165819-1	02/24/98	03/06/98	60	%REC			5
Terphenyl-d14	1718-51-0	QCBLK165819-1	02/24/98	03/06/98	90	%REC			5
Phenol-d5	4165-62-2	QCBLK165819-1	02/24/98	03/06/98	82	%REC			5
2-Fluorophenol	367-12-4	QCBLK165819-1	02/24/98	03/06/98	33	%REC			5
2,4,6-Tribromophenol	118-79-6	QCBLK165819-1	02/24/98	03/06/98	52	%REC			5

Quanterra-Richland
3350 George Washington Way
Richland, WA 99352-1613

Project: 550.260

Category: Semivolatile
Method: EPA 8270
Matrix: SOLID

Client ID: BON424

Sample Date : 02/11/98
Receipt Date : 02/13/98
Report Date : 03/12/98

Quanterra ID : 16970-001MS

Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit	Dilution
Phenol	108-95-2	QCBLK165819-1	02/24/98	03/06/98	68	%REC			5
2-Chlorophenol	95-57-8	QCBLK165819-1	02/24/98	03/06/98	31	%REC			5
1,4-Dichlorobenzene	106-46-7	QCBLK165819-1	02/24/98	03/06/98	51	%REC			5
N-nitroso-di-n-propylamine	621-64-7	QCBLK165819-1	02/24/98	03/06/98	55	%REC			5
1,2,4-Trichlorobenzene	120-82-1	QCBLK165819-1	02/24/98	03/06/98	61	%REC			5
4-Chloro-3-Methylphenol	59-50-7	QCBLK165819-1	02/24/98	03/06/98	83	%REC			5
Acenaphthene	83-32-9	QCBLK165819-1	02/24/98	03/06/98	85	%REC			5
4-Nitrophenol	100-02-7	QCBLK165819-1	02/24/98	03/06/98	70	%REC			5
2,4-Dinitrotoluene	121-14-2	QCBLK165819-1	02/24/98	03/06/98	89	%REC			5
Pentachlorophenol	87-86-5	QCBLK165819-1	02/24/98	03/06/98	64	%REC			5
Pyrene	129-00-0	QCBLK165819-1	02/24/98	03/06/98	0	%REC	*		5
Nitrobenzene-d5	4165-60-0	QCBLK165819-1	02/24/98	03/06/98	95	%REC			5
2-Fluorobiphenyl	321-60-8	QCBLK165819-1	02/24/98	03/06/98	71	%REC			5
Terphenyl-d14	1718-51-0	QCBLK165819-1	02/24/98	03/06/98	90	%REC			5
Phenol-d5	4165-62-2	QCBLK165819-1	02/24/98	03/06/98	86	%REC			5
2-Fluorophenol	367-12-4	QCBLK165819-1	02/24/98	03/06/98	23	%REC	*		5
2,4,6-Tribromophenol	118-79-6	QCBLK165819-1	02/24/98	03/06/98	49	%REC			5

Quanterra-Richland
3350 George Washington Way
Richland, WA 99352-1613

Project: 550.260

Category: Semivolatile
Method: EPA 8270
Matrix: SOLID

Client ID: BON424

Sample Date : 02/11/98
Receipt Date : 02/13/98
Report Date : 03/12/98

Quanterra ID : 16970-001MSD

Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit	Dilution
Phenol	108-95-2	QCBLK165819-1	02/24/98	03/06/98	73	%REC			5
2-Chlorophenol	95-57-8	QCBLK165819-1	02/24/98	03/06/98	31	%REC			5
1,4-Dichlorobenzene	106-46-7	QCBLK165819-1	02/24/98	03/06/98	55	%REC			5
N-nitroso-di-n-propylamine	621-64-7	QCBLK165819-1	02/24/98	03/06/98	72	%REC			5
1,2,4-Trichlorobenzene	120-82-1	QCBLK165819-1	02/24/98	03/06/98	65	%REC			5
4-Chloro-3-Methylphenol	59-50-7	QCBLK165819-1	02/24/98	03/06/98	79	%REC			5
Acenaphthene	83-32-9	QCBLK165819-1	02/24/98	03/06/98	86	%REC			5
4-Nitrophenol	100-02-7	QCBLK165819-1	02/24/98	03/06/98	75	%REC			5
2,4-Dinitrotoluene	121-14-2	QCBLK165819-1	02/24/98	03/06/98	94	%REC			5
Pentachlorophenol	87-86-5	QCBLK165819-1	02/24/98	03/06/98	65	%REC			5
Pyrene	129-00-0	QCBLK165819-1	02/24/98	03/06/98	3	%REC	*		5
Nitrobenzene-d5	4165-60-0	QCBLK165819-1	02/24/98	03/06/98	87	%REC			5
2-Fluorobiphenyl	321-60-8	QCBLK165819-1	02/24/98	03/06/98	74	%REC			5
Terphenyl-d14	1718-51-0	QCBLK165819-1	02/24/98	03/06/98	95	%REC			5
Phenol-d5	4165-62-2	QCBLK165819-1	02/24/98	03/06/98	85	%REC			5
2-Fluorophenol	367-12-4	QCBLK165819-1	02/24/98	03/06/98	11	%REC	*		5
2,4,6-Tribromophenol	118-79-6	QCBLK165819-1	02/24/98	03/06/98	50	%REC			5

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B0N424

Lab Name: QUANTERRA MO Contract: 550-260

Lab Code: ITMO Case No.: S97001 SAS No.: SDG No.: W02238

Matrix: (soil/water) SOIL Lab Sample ID: 16970-001

Sample wt/vol: 30.00 (g/mL) G Lab File ID: H5920

Level: (low/med) LOW Date Received: 02/13/98

% Moisture: decanted: (Y/N) N Date Extracted: 02/24/98

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 03/06/98

Injection Volume: 2.0(uL) Dilution Factor: 5.0

GPC Cleanup: (Y/N) N pH:

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
108-95-2	Phenol	1600	U
111-44-4	bis(2-Chloroethyl)Ether	1600	U
95-57-8	2-Chlorophenol	1600	U
541-73-1	1,3-Dichlorobenzene	1600	U
106-46-7	1,4-Dichlorobenzene	1600	U
95-50-1	1,2-Dichlorobenzene	1600	U
95-48-7	2-Methylphenol	1600	U
108-60-1	2,2'-oxybis(1-Chloropropane)	1600	U
106-44-5	4-Methylphenol	1600	U
621-64-7	N-Nitroso-Di-n-Propylamine	1600	U
67-72-1	Hexachloroethane	1600	U
98-95-3	Nitrobenzene	1600	U
78-59-1	Isophorone	1600	U
88-75-5	2-Nitrophenol	1600	U
105-67-9	2,4-Dimethylphenol	1600	U
111-91-1	bis(2-Chloroethoxy)Methane	1600	U
120-83-2	2,4-Dichlorophenol	1600	U
120-82-1	1,2,4-Trichlorobenzene	1600	U
91-20-3	Naphthalene	1600	U
106-47-8	4-Chloroaniline	1600	U
87-68-3	Hexachlorobutadiene	1600	U
59-50-7	4-Chloro-3-Methylphenol	1600	U
91-57-6	2-Methylnaphthalene	1600	U
77-47-4	Hexachlorocyclopentadiene	8000	U
88-06-2	2,4,6-Trichlorophenol	1600	U
95-95-4	2,4,5-Trichlorophenol	1600	U
91-58-7	2-Chloronaphthalene	1600	U
88-74-4	2-Nitroaniline	8000	U
131-11-3	Dimethyl Phthalate	1600	U
208-96-8	Acenaphthylene	1600	U
606-20-2	2,6-Dinitrotoluene	1600	U
99-09-2	3-Nitroaniline	8000	U
83-32-9	Acenaphthene	1600	U

1C
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B0N424

Lab Name: QUANTERRA MO Contract: 550-260

Lab Code: ITMO Case No.: S97001 SAS No.: SDG No.: W02238

Matrix: (soil/water) SOIL Lab Sample ID: 16970-001

Sample wt/vol: 30.00 (g/mL) G Lab File ID: H5920

Level: (low/med) LOW Date Received: 02/13/98

% Moisture: decanted: (Y/N) N Date Extracted: 02/24/98

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 03/06/98

Injection Volume: 2.0(uL) Dilution Factor: 5.0

GPC Cleanup: (Y/N) N pH:

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
51-28-5	2,4-Dinitrophenol	8000	U
100-02-7	4-Nitrophenol	8000	U
132-64-9	Dibenzofuran	1600	U
121-14-2	2,4-Dinitrotoluene	1600	U
84-66-2	Diethylphthalate	1600	U
7005-72-3	4-Chlorophenyl-phenylether	1600	U
86-73-7	Fluorene	1600	U
100-01-6	4-Nitroaniline	8000	U
534-52-1	4,6-Dinitro-2-Methylphenol	8000	U
86-30-6	N-Nitrosodiphenylamine (1)	1600	U
101-55-3	4-Bromophenyl-phenylether	1600	U
118-74-1	Hexachlorobenzene	1600	U
87-86-5	Pentachlorophenol	8000	U
85-01-8	Phenanthrene	520	J
120-12-7	Anthracene	1600	U
86-74-8	Carbazole	450	J
84-74-2	Di-n-Butylphthalate	1600	U
206-44-0	Fluoranthene	1300	J
129-00-0	Pyrene	1600	U
85-68-7	Butylbenzylphthalate	1600	U
91-94-1	3,3'-Dichlorobenzidine	8000	U
56-55-3	Benzo(a)Anthracene	750	J
218-01-9	Chrysene	900	J
117-81-7	bis(2-Ethylhexyl)Phthalate	1000	J
117-84-0	Di-n-Octyl Phthalate	1600	U
205-99-2	Benzo(b)Fluoranthene	510	J
207-08-9	Benzo(k)Fluoranthene	1600	U
50-32-8	Benzo(a)Pyrene	1600	U
193-39-5	Indeno(1,2,3-cd)Pyrene	1600	U
53-70-3	Dibenz(a,h)Anthracene	1600	U
191-24-2	Benzo(g,h,i)Perylene	1600	U

(1) - Cannot be separated from Diphenylamine

1F

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

B0N424

Lab Name: QUANTERRA MO Contract: 550-260

Lab Code: ITMO Case No.: S97001 SAS No.: SDG No.: W02238

Matrix: (soil/water) SOIL Lab Sample ID: 16970-001

Sample wt/vol: 30.00 (g/mL) G Lab File ID: H5920

Level: (low/med) LOW Date Received: 02/13/98

% Moisture: decanted: (Y/N) N Date Extracted: 02/24/98

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 03/06/98

Injection Volume: 2.0(uL) Dilution Factor: 5.0

GPC Cleanup: (Y/N) N pH:

Number TICs found: 2

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1. 0	Aldol Condensation	4.32	280000	ABJN
2.	UNKNOWN	27.48	570	J

Quanterra-Richland
3350 George Washington Way
Richland, WA 99352-1613

Project: 550.260

Category: Volatiles 8260
Method: EPA 8260A
Matrix: SOLID

Client ID: BON424

Sample Date : 02/11/98
Receipt Date : 02/13/98
Report Date : 03/04/98

Quanterra ID : 16970-001

Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit	Dilution
Chloromethane	74-87-3	QCBLK166054-1	02/25/98	02/25/98	10	UG/KG	U	10	1
Bromomethane	74-83-9	QCBLK166054-1	02/25/98	02/25/98	10	UG/KG	U	10	1
Vinyl Chloride	75-01-4	QCBLK166054-1	02/25/98	02/25/98	10	UG/KG	U	10	1
Chloroethane	75-00-3	QCBLK166054-1	02/25/98	02/25/98	10	UG/KG	U	10	1
Methylene Chloride	75-09-2	QCBLK166054-1	02/25/98	02/25/98	8	UG/KG	B	5	1
Acetone	67-64-1	QCBLK166054-1	02/25/98	02/25/98	17	UG/KG	BJ	20	1
Carbon Disulfide	75-15-0	QCBLK166054-1	02/25/98	02/25/98	5	UG/KG	U	5	1
1,1-Dichloroethene	75-35-4	QCBLK166054-1	02/25/98	02/25/98	5	UG/KG	U	5	1
1,1-Dichloroethane	75-34-3	QCBLK166054-1	02/25/98	02/25/98	5	UG/KG	U	5	1
1,2-Dichloroethene (total)	540-59-0	QCBLK166054-1	02/25/98	02/25/98	5	UG/KG	U	5	1
Chloroform	67-66-3	QCBLK166054-1	02/25/98	02/25/98	2	UG/KG	J	5	1
1,2-Dichloroethane	107-06-2	QCBLK166054-1	02/25/98	02/25/98	5	UG/KG	U	5	1
2-Butanone (MEK)	78-93-3	QCBLK166054-1	02/25/98	02/25/98	20	UG/KG	U	20	1
1,1,1-Trichloroethane	71-55-6	QCBLK166054-1	02/25/98	02/25/98	5	UG/KG	U	5	1
Carbon Tetrachloride	56-23-5	QCBLK166054-1	02/25/98	02/25/98	5	UG/KG	U	5	1
Bromodichloromethane	75-27-4	QCBLK166054-1	02/25/98	02/25/98	5	UG/KG	U	5	1
1,2-Dichloropropane	78-87-5	QCBLK166054-1	02/25/98	02/25/98	5	UG/KG	U	5	1
cis-1,3-Dichloropropene	10061-01-5	QCBLK166054-1	02/25/98	02/25/98	5	UG/KG	U	5	1
Trichloroethene	79-01-6	QCBLK166054-1	02/25/98	02/25/98	5	UG/KG	U	5	1
Dibromochloromethane	124-48-1	QCBLK166054-1	02/25/98	02/25/98	5	UG/KG	U	5	1
1,1,2-Trichloroethane	79-00-5	QCBLK166054-1	02/25/98	02/25/98	5	UG/KG	U	5	1
Benzene	71-43-2	QCBLK166054-1	02/25/98	02/25/98	5	UG/KG	U	5	1
trans-1,3-Dichloropropene	10061-02-6	QCBLK166054-1	02/25/98	02/25/98	5	UG/KG	U	5	1
Bromoform	75-25-2	QCBLK166054-1	02/25/98	02/25/98	5	UG/KG	U	5	1
4-Methyl-2-Pentanone (MIBK)	108-10-1	QCBLK166054-1	02/25/98	02/25/98	20	UG/KG	U	20	1
2-Hexanone	591-78-6	QCBLK166054-1	02/25/98	02/25/98	20	UG/KG	U	20	1
Tetrachloroethene	127-18-4	QCBLK166054-1	02/25/98	02/25/98	5	UG/KG	U	5	1
1,1,2,2-Tetrachloroethane	79-34-5	QCBLK166054-1	02/25/98	02/25/98	5	UG/KG	U	5	1
Toluene	108-88-3	QCBLK166054-1	02/25/98	02/25/98	5	UG/KG	U	5	1
Chlorobenzene	108-90-7	QCBLK166054-1	02/25/98	02/25/98	5	UG/KG	U	5	1
EthylBenzene	100-41-4	QCBLK166054-1	02/25/98	02/25/98	5	UG/KG	U	5	1
Styrene	100-42-5	QCBLK166054-1	02/25/98	02/25/98	5	UG/KG	U	5	1
Xylene (total)	1330-20-7	QCBLK166054-1	02/25/98	02/25/98	5	UG/KG	U	5	1
Toluene-d8	2037-26-5	QCBLK166054-1	02/25/98	02/25/98	88	%REC			1
Bromofluorobenzene	460-00-4	QCBLK166054-1	02/25/98	02/25/98	99	%REC			1
Dibromofluoromethane	1868-53-7	QCBLK166054-1	02/25/98	02/25/98	28	%REC	*		1

Quanterra-Richland
3350 George Washington Way
Richland, WA 99352-1613

Project: 550.260

Category: Volatiles 8260
Method: EPA 8260A
Matrix: SOLID

Client ID: BON424

Sample Date : 02/11/98
Receipt Date : 02/13/98
Report Date : 03/04/98

Quanterra ID : 16970-001MS

Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit	Dilution
1,1-Dichloroethene	75-35-4	QCBLK166054-1	02/25/98	02/25/98	109	%REC			1
Trichloroethene	79-01-6	QCBLK166054-1	02/25/98	02/25/98	91	%REC			1
Benzene	71-43-2	QCBLK166054-1	02/25/98	02/25/98	97	%REC			1
Toluene	108-88-3	QCBLK166054-1	02/25/98	02/25/98	94	%REC			1
Chlorobenzene	108-90-7	QCBLK166054-1	02/25/98	02/25/98	90	%REC			1
Toluene-d8	2037-26-5	QCBLK166054-1	02/25/98	02/25/98	83	%REC			1
Bromofluorobenzene	460-00-4	QCBLK166054-1	02/25/98	02/25/98	94	%REC			1
Dibromofluoromethane	1868-53-7	QCBLK166054-1	02/25/98	02/25/98	12	%REC	*		1

Quanterra-Richland
3350 George Washington Way
Richland, WA 99352-1613

Project: 550.260

Category: Volatiles 8260
Method: EPA 8260A
Matrix: SOLID

Client ID: B0N424

Sample Date : 02/11/98
Receipt Date : 02/13/98
Report Date : 03/04/98

Quanterra ID : 16970-001MSD

Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit	Dilution
1,1-Dichloroethene	75-35-4	QCBLK166054-1	02/25/98	02/25/98	114	%REC			1
Trichloroethene	79-01-6	QCBLK166054-1	02/25/98	02/25/98	95	%REC			1
Benzene	71-43-2	QCBLK166054-1	02/25/98	02/25/98	102	%REC			1
Toluene	108-88-3	QCBLK166054-1	02/25/98	02/25/98	99	%REC			1
Chlorobenzene	108-90-7	QCBLK166054-1	02/25/98	02/25/98	96	%REC			1
Toluene-d8	2037-26-5	QCBLK166054-1	02/25/98	02/25/98	86	%REC			1
Bromofluorobenzene	460-00-4	QCBLK166054-1	02/25/98	02/25/98	97	%REC			1
Dibromofluoromethane	1868-53-7	QCBLK166054-1	02/25/98	02/25/98	20	%REC	*		1

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BON424

Lab Name: QUANTERRA MO Contract: 550.260

Lab Code: ITMO Case No.: SAS No.: SDG No.: W02238

Matrix: (soil/water) SOIL Lab Sample ID: 16970-001

Sample wt/vol: 5.0 (g/mL) G Lab File ID: BSMP1540

Level: (low/med) LOW Date Received: 02/13/98

% Moisture: not dec. _____ Date Analyzed: 02/25/98

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) ug/Kg	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	8	B
67-64-1	Acetone	17	JB
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (total)	5	U
67-66-3	Chloroform	2	J
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	20	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Chlorodibromomethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-pentanone	20	U
591-78-6	2-Hexanone	20	U
127-18-4	Tetrachloroethene	5	U
108-88-3	Toluene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Xylenes (total)	5	U

1E
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

BON424

Lab Name: QUANTERRA MO Contract: 550.260

Lab Code: ITMO Case No.: SAS No.: SDG No.: W02238

Matrix: (soil/water) SOIL Lab Sample ID: 16970-001

Sample wt/vol: 5.0 (g/mL) G Lab File ID: BSMP1540

Level: (low/med) LOW Date Received: 02/13/98

% Moisture: not dec. _____ Date Analyzed: 02/25/98

Column: (pack/cap) CAP Dilution Factor: 1.0

Number TICs found: 0

CONCENTRATION UNITS:
(ug/L or ug/Kg) ug/Kg

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				
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30.				

Quanterra
Environmental Services

CERTIFICATE OF ANALYSIS

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

March 21, 1998

Attention: Joan Kessner

MAR 1998
RECEIVED
Data
Log In

SAF Number	:	B98-058
Date SDG Closed	:	February 20, 1998
Number of Samples	:	One (1)
Sample Type	:	Other-Solid
SDG Number	:	W02238
Data Deliverable	:	Summary

I. Introduction

On February 13, 1997, one "other" solid sample was received by the Quanterra, Inc., Richland Laboratory (QRL) for 45 day TAT radiochemical and chemical analysis. Upon receipt, the sample was assigned the following laboratory ID number to correspond with the Bechtel Hanford, Inc. (BHI) specific ID:

QESRL ID#	BHI ID#	MATRIX	DATE OF RECEIPT
80221901	B0N424	Other-Solid	2/13/98

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
Gas Proportional Counting
Gross Alpha by method RICH-RC-5014
Gross Beta by method RICH-RC-5014
Total Strontium by method RICH-RC-5006

III. Quality Control

The analytical results for each analysis performed under SDG W02238 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

Plutonium-238, -239/40 by method RICH-RC-5010

The LCS, batch blank, sample duplicate (B0N424) and sample results were within specified requirements.

Gamma Spectroscopy

Gamma Scan by method RICH-RC-5017

The LCS, batch blank and sample duplicate results were within specified requirements. The MDA result for Eu-152 and Eu-155 exceeded the contractual requirement of 0.1 pCi/gram at 0.1464 and 0.1221 pCi/gram respectively (the MDA for Eu-152 and Eu-154 in the duplicate was 0.1414 and 0.1074 pCi/gram respectively). The MDA value for the Eu-152 and Eu-154 was impacted by the compton background due to a high level of Cs-137 and natural gamma emitters. All other contractual requirements for this analysis were met.

Gas Proportional Counting

Gross Alpha by method RICH-RC-5014

The LCS, batch blank, sample duplicate (B0N424) and sample results were within specified requirements.

Gross Beta by method RICH-RC-5014

The LCS, batch blank, sample duplicate (B0N424) and sample results were within specified requirements.

Total Strontium by method RICH-RC-5006

The LCS, batch blank, sample duplicate (B0N424) and sample results were within specified 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:

Andy Kopriva
Project Manager

Quanterra
Environmental Services

SAMPLE RESULTS

LAB NAME:	QUANTERRA, Richland	**SDG: /RPT GRP:**	W02238 / 4750
LAB SAMPLE ID:	80221901	**MATRIX:**	OTHER
CLIENT ID:	B0N424	**DATE RECEIVED:**	2/13/1998 1:20:00 PM

ANALYTE	RESULT	Q	COUNTING ERROR (2 s)	TOTAL ERROR (2 s)	MDA/IDL	REPORT UNIT	YIELD	METHOD NUMBER
PU-238	1.11E-02	U	2.2E-02	2.2E-02	3.00E-02	pCi/g	29.70%	RICHRC5010
PU239/40	5.54E-02		5.0E-02	5.1E-02	3.00E-02	pCi/g	29.70%	RICHRC5010
AM-241	-5.19E-03	U	1.4E-01	1.4E-01	2.17E-01	pCi/g	N/A	RICHRC5017
CO-60	3.77E-02	U	1.7E-02	1.7E-02	3.24E-02	pCi/g	N/A	RICHRC5017
CS-137DA	2.88E+01		2.1E-01	2.9E+00	N/A	pCi/g	N/A	RICHRC5017
EU-152	3.89E-02	U	9.2E-02	9.2E-02	1.46E-01	pCi/g	N/A	RICHRC5017
EU-154	4.88E-02	U	4.3E-02	4.3E-02	8.01E-02	pCi/g	N/A	RICHRC5017
EU-155	9.82E-03	U	7.3E-02	7.3E-02	1.22E-01	pCi/g	N/A	RICHRC5017
K-40	9.37E+00		5.6E-01	1.1E+00	N/A	pCi/g	N/A	RICHRC5017
RA-224DA	7.40E-01		7.2E-02	1.0E-01	N/A	pCi/g	N/A	RICHRC5017
RA-226	5.56E-01		8.2E-02	9.9E-02	N/A	pCi/g	N/A	RICHRC5017
RA-228	6.99E-01		1.3E-01	1.5E-01	N/A	pCi/g	N/A	RICHRC5017
U-238	2.01E+00	U	1.1E+00	1.1E+00	1.75E+00	pCi/g	N/A	RICHRC5017
ALPHA	8.79E+00	J	4.5E+00	4.6E+00	5.59E+00	pCi/g	100.00%	RICHRC5014
BETA	1.49E+02		1.0E+01	1.7E+01	6.07E+00	pCi/g	100.00%	RICHRC5014-B
STRONTIUM	2.37E+01		4.6E-01	8.6E+00	1.15E-01	pCi/g	92.40%	RICHRC5006

Number of Results: 16

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

Quanterra Data Review Checklist
RADIOCHEMISTRY

Work Order number (s): 802219

Client ID: BHI

Due Date: 4-6-98

Lab Sample Number or SDG: W02238

Method Test Parameters: Plutonium

Matrix: Other

Review Item	Yes (✓)	No (✓)	NA (✓)	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?	—		4/23-17-98	
D. Other				
1. Are all Nonconformances included and noted?			—	
2. Are all required forms filled out?	—			
3. Correct methodology used?	—			
4. Transcription checked? Jm 3-5-98	—			—
5. Were all calculations checked at a minimum frequency?	—			
6. Units checked?	—			—

Comments on any "No" response: _____

First Level Review: [signature] Date: 3-17-98

Second Level Review: [signature] Date: 3/24/98

Form #: LS-038.2/96, Rev 4

Quanterra Data Review Checklist
RADIOCHEMISTRY

Work Order number(s): 802219

Client ID: BNI

Due Date: 4-6-98

Lab Sample Number or SDG: W02238

Method Test Parameters: Gamma

Matrix: Other

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?	✓	✓ N/A		
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?	N/A			
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] Date: 3-18-98

Second Level Review: [signature] Date: 3/25/98

Form # LS-038.2/96/Rev 4

Report BHI's + K40, Ra226DA + Ra226DA, Ra228DA, Th232DA + Am241DA for sample + duplicate,

QUANTERRA LABORATORY NONCONFORMANCE MEMO (NCM)

LOG #: RD-98-_____

Project ID: BHF NCM Initiated by: MR 3-18-98

Sample Numbers: 80221901, D0221901

Tests: Gamma

Matrix: Other W02238

Analytical Area (check appropriate area):

- ☐ Sample control
- ☐ Organic preparation
- ☐ Inorganic preparation
- ☐ GC
- ☐ HPLC
- ☐ GC/MS
- ☐ Wet chemistry
- ☐ Metals
- ☐ Reporting
- ☐ Data review
- ☒ Radiochemistry
- ☐ Bioassay

Nonconformance (check appropriate area):

Holding Time Violations (exceeded by _____ days)

Category I: Laboratory Independent

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

Category II: Laboratory Dependent

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

Category III: Analysis Reruns (QA QC)

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

Category IV: Analysis Reruns (Confirmation)

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

Quality Assurance/Quality Control

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

Incorrect or Incomplete Client Deliverable

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

Reported detection limits elevated due to:

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

Comments/Explanation: Eu 152 / Eu 155 MDA > RDL

Notification (check appropriate area):

Client notified by (name and date): _____

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

Client's name and response: _____

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

Project Manager (signature and date): [signature] 3/20/98

000013

QUANTERRA LABORATORY NONCONFORMANCE MEMO (NCM)

LOG#: RD-98-_____

Corrective Action

Root Cause Initial and date: JK 3-18-98

lower density of sample combined with compton background of sample due to higher level of Cs137DA + natural emitters

Corrective Action Initial and Date: JK 3-18-98

~~Other samples~~ JK 3-18-98 Blank MDAs are below RDL, other higher MDAs are less than RDL or are detected, data accepted.

Responsibility for performing CA assigned to: _____

Actions to prevent recurrence N/A Initial and Date: _____

First Level Supervisor: Joel Kempman Date: 3-18-98

Responsible Manager: Jacqueline Waddell Date: 3/25/98

Quality Assurance Review

☒ Anomaly ☐ Deficiency ☐ Rerun

☐ Further action required: _____

Assigned to: _____

QA signature: Jodie Ca Date: 3/25/98

Corrective Action Verification

☐ Verified

☐ Cannot Verify (specify reason): N/A

Nonconformance Memo Closure

QA signature/date: Jodie Ca 3/25/98

Quanterra Data Review Checklist
RADIOCHEMISTRY

Work Order number(s): 802219

Client ID: BHI

Due Date: 4-6-98

Lab Sample Number or SDG: W02238

Method Test Parameters: Alpha

Matrix: Other

Review item	Yes (✓)	No (✓)	NA (✓)	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? JM 2-27-98	✓			
5. Were all calculations checked at a minimum frequency?	✓			
6. Units checked?	✓			✓

Comments on any "No" response: _____

First Level Review: [signature] Date: 3-17-98 MK 3-17-98

Second Level Review: [signature] Date: 3/20/98

Form #: LS-038.2/96, Rev 4

Quanterra Data Review Checklist
RADIOCHEMISTRY

Work Order number (s): 802219

Client ID: BHI

Due Date: 4-6-98

Lab Sample Number or SDG: W9 2238

Method Test Parameters: Beta

Matrix: Other

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?	✓		NC	✓
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? SM 2-26-98	✓			
5. Were all calculations checked at a minimum frequency?	✓			
6. Units checked?	✓			✓

Comments on any "No" response: _____

First Level Review: [signature] Date: 2-17-98

Second Level Review: [signature] Date: 3/20/98

Form #: LS-038.2 /96, Rev 4

000018

Quanterra Data Review Checklist
RADIOCHEMISTRY

Work Order number (s): 802219

Client ID: BHI

Due Date: 3-30-98

Lab Sample Number or SDG: WQ2238

Method Test Parameters: Total SR

Matrix: Other

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? JM 3-10-98	✓			
5. Were all calculations checked at a minimum frequency?	✓			
6. Units checked?	✓			✓

Comments on any "No" response: _____

First Level Review: Joel Klingerman Date: 3/10/98

Second Level Review: [illegible] Date: 3/20/98

Form #: LS-038.2/96, Rev 4

CHAIN OF

CUSTODY FORMS

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	B98-058-02	Page 1 of 1

Collector R Fahlberg	**Company Contact** Tom Pickett	**Telephone No.** 373-4630	**Project Coordinator** TRENT, SJ	**Data Turnaround** 45 Days
Project Designation Purgewater Truck Repair and Cleanout	**Sampling Location** 100N		**SAF No.** B98-058	
Ice Chest No.	**Field Logbook No.** EL-1309-1		**Method of Shipment** Hand Delivered	
Shipped To Quanterra Incorporated	**Offsite Property No.**		**Bill of Lading/Air Bill No.**	

POSSIBLE SAMPLE HAZARDS/REMARKS

Special Handling and/or Storage

SAMPLE ANALYSIS 80221801 SDG W02238

Preservation	None	None	None	Cool 4C	None	Cool 4C	None	None		
Type of Container	P	P	P	aG	~~P~~ aG	aG	aG	P		
No. of Container(s)	1	1	1	1	1	1	1	1		
Volume	20ml	20ml	20ml	60ml	60ml	120ml	250ml	1000ml		
	Activity Scan	Gross Alpha; Gross Beta * 8022	Isotopic Plutonium 1901	VOA - 8260A (TCL)	Strontium-89,90 – Total Sr *	Semi-VOA - 8270A (TCL)	Metals by ICP (TCLP) - 1311/6010A; Mercury (TCLP) - 1311/7470	See item (1) in Special Instructions *		
Sample No.	Matrix *	Sample Date	Sample Time							
B0N424	Other Solid	2-11-98	1035	X	X	X	X	X	X	X	X		
~~B0N426~~	~~Other Solid~~	RN 2/13/98											

CHAIN OF POSSESSION — Sign/Print Names

Relinquished By	Date/Time	Received By	Date/Time
[signature]	2/13/98 1137	[signature]	2/13/98 1137
		2100 pm	

SPECIAL INSTRUCTIONS

(1) Gamma Spectroscopy (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155); Gamma Spec - Add-on (Americium-241)

Matrix *

S	=	Soil
SE	=	Sediment
SO	=	Solid
SL	=	Sludge
W	=	Water
O	=	Oil
A	=	Air
DS	=	Drum Solids
DL	=	Drum Liquids
T	=	Tissue
WI	=	Wipe
L	=	Liquid
V	=	Vegetation
X	=	Other

LABORATORY SECTION	Received By	Title	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method 0000:9	Disposed By	Date/Time

802218 Chem
802219 Rad

01

Post-it® Fax Note 7671 | Date 2/12 | # of pages ▶ 1
To B.L. Fieldhouse | From A. I. Davis
Co./Dept. | Co.
Phone # | Phone # 373-9731
Fax # 376-0851 | Fax #

GAMMA-RAY ENERGY ANALYSIS REPORT

Thermo Hanford Inc.
Radiological Counting Facility THI-RCF

Project	100 N	Purge Water Truck	
Customer ID	B0N423	Liquid	
RCF ID	RCF2752		
	Sample time, date	1935	2/11/98
	Analysis date		2/11/98

1000g Solid

Isotope		Activity pCi/gm		2sear	Ci/gm
K40		1.7e+00	+/-	5.5e-00	1.7e-11
Co60		2.9e+00	+/-	7.2e-01	2.9e-12
I129	<	2.5e+00			2.5e-12
Cs137		3.4e+00	+/-	2.8e+00	3.4e-11
Eu152	<	2.4e+00			2.4e-12
Eu154	<	2.8e+00			2.8e-12
Eu155	<	2.0e+00			2.0e-12
Th232dau	<	2.3e+00			2.3e-12
U235	<	5.7e+00			5.7e-12
U238	<	9.4e+01			9.4e-11
U238dau		2.1e+00	+/-	2.5e-02	2.1e-12
Np237	<	1.7e+00			1.7e-12
Am241	<	1.0e+00			1.0e-12
Tot Act Gam (pCi/gm)		5.7e+01		Ci/gm	5.7e-11
Y/Sr-90	<	N/R			
Gross Alpha		5.1e+00	+/-	8.8e-01	5.1e-12
Gross Beta		1.2e+02	+/-	8.8e+00	1.2e-10
AEA total	<	N/R			
Total Activity (pCi/gm)					1.3e+02
(Ci/gm)					1.3e-10

Ca+ II Beta

2/13/98

< 10K pCi

Reported as 137-Cs Betas. > 100K pCi

< 2K pCi/g

Definitions:

All errors reported at 2 standard deviations

A Assigned as residual beta from Gamma/Beta balance.

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 232Th. Equilibrium between parent and daughter products may not exist in disturbed materials.

Other samples, not containing natural materials, will have inapplicable results for the Th, U, transuranics and daughter products. The results must then be balanced for the gross alpha analysis.

N/R means no result or analysis not requested.

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

Radiological analyst — Date

Albert I. Davis, Radiological Manager — 2/12/98 Date

000030

Figure 1

SAMPLE CHECK-IN LIST

Date/Time Received: 2/13 1135 SG#: W02238

Work Order Number: 802218 + 219 SAF #: B98-058

Shipping Container ID: 96-089 Chain of Custody # B98-058-02

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°
5. Vermiculite/packing materials is Wet [ ] ~~Dry~~ [✓] n/a
6. Number of samples in shipping container: 8
7. Sample holding times exceeded? Yes [ ] No [✓]

8. Samples have:
   - [✓] tape
   - [ ] custody seals
   - [ ] hazard labels
   - [ ] appropriate sample labels

9. Samples are:
   - [✓] in good condition
   - [ ] broken
   - [ ] leaking
   - [ ] have air bubbles

10. Where any anomalies identified in sample receipt? Yes [ ] No [✓]
11. Description of anomalies (include sample numbers): _____

Sample Custodian/Laboratory: [signature] Date: 2/13/98

Telephoned To: _____ On _____ By _____

000031

CHAIN-OF-CUSTODY BATCH ANALYSIS RECORD 17-Feb-1998

Page 1

CUSTOMER: SHI SAF SAMPLE DELIVERY GROUP W02238

MATRIX : OTHER B98-058 BATCH NUMBER 02-219

	QES ID	QVP	ACCOUNT	CUSTOMER ID	COMMENTS
	J0221978				
	J0221915	IQ HI 319			
( )	B0221901		SHI	B0N424	
	D0221901				

ACTIONS (Initial & Date)

1) INITIATED JH 2/17/98

SOP(S) # RD 0500

2) PREP LAB RECEIVED 2-24-98

SOP(S) # RICHRCS13 RICHRCS19

3) SAMPLE REMAINDER STORED 2-25-98

SOP(S) # NA

4) SEPARATION LAB RECEIVED 3/3/98

SOP(S) # RICHRCSON

5) COUNTING/MEASUREMENT LAB calyks

SOP(S) # RICHRCOOR

6) DATA REVIEWED AND ANALYTICAL PREP STORED 3-17-98

SOP(S) # RICHRCOOR Rev 1

E.D. 3/4 3-4-98 RICHRCS039.1

CHAIN-OF-CUSTODY BATCH ANALYSIS RECORD 17-Feb-1998

Page 1

CUSTOMER: BHI SAF SAMPLE DELIVERY GROUP W02238

MATRIX : OTHER B98-058 BATCH NUMBER 02-219

	GES ID	DUP	ACCOUNT	CUSTOMER ID	COMMENTS
	J022191X	OSBK			
	J022191M	CAL 491			
1)	80221901		BHI	BONA24	
	P0221901				

ACTIONS (Initial & Date)

1) INITIATED 2/17/98

SOP(S) # RD0800

2) PREP LAB RECEIVED 2-24-98

SOP(S) # RICHR5013/RICHR5017 ~~RICHR5019~~ 2-2-2598

3) SAMPLE REMAINDER STORED 2-25-98

SOP(S) # NA

4) SEPARATION LAB RECEIVED

SOP(S) # ✓

5) COUNTING/MEASUREMENT LAB 2/25/98

SOP(S) # RICHR00007

6) DATA REVIEWED AND ANALYTICAL PREP STORED 3-18-98

SOP(S) # RICHR0002 (Rev 1)

Y spec add on
Am 241 HP

000022

CHAIN-OF-CUSTODY BATCH ANALYSIS RECORD

17-Feb-1998
Page 1

CUSTOMER: BHI SAF SAMPLE DELIVERY GROUP W02238

MATRIX : OTHER B98-058 BATCH NUMBER 02-219

GES ID	DUP	ACCOUNT	CUSTOMER ID	COMMENTS
J0221915				
J0221915	EQEG 1967		10.057 ± 0.094436 DPM	
1) 80221901		BHI	80N434	
D0221901				

ACTIONS (Initial & Date)

1) INITIATED 2/17/98

SOP(S) # RD3300

2) PREP LAB RECEIVED 2-24-98

SOP(S) # RICHRC5013/RD3222

3) SAMPLE REMAINDER STORED 2-25-98

SOP(S) # NA

4) SEPARATION LAB RECEIVED

SOP(S) #

5) COUNTING/MEASUREMENT LAB 2/26/98

SOP(S) # RICHRD0003

6) DATA REVIEWED AND ANALYTICAL PREP STORED 3-17-98

SOP(S) # RICHRC0002 Rev 1

000024

*** BETA ***

CHAIN-OF-CUSTODY BATCH ANALYSIS RECORD

17-Feb-1998
Page 1

CUSTOMER: BHI SAF SAMPLE DELIVERY GROUP W02238

MATRIX : OTHER B98-058 BATCH NUMBER 02-219

	GES ID	DUP	ACCOUNT	CUSTOMER ID	COMMENTS
	J0221915				
	J0221915 EQAU 647			30.328 ± 9.37849 DPM	
1)	B0221901		BHI	00N424	
	D0221901				

ACTIONS (Initial & Date)

1) INITIATED JH 2/17/98

SOP(S) # RD3500

2) PREP LAB RECEIVED JH 2-24-98

SOP(S) # RICHRC5013/RD3222

3) SAMPLE REMAINDER STORED JH 2-25-98

SOP(S) # NA

4) SEPARATION LAB RECEIVED

SOP(S) #

5) COUNTING/MEASUREMENT LAB 2/26/98

SOP(S) # RICHRDCCC3

6) DATA REVIEWED AND ANALYTICAL PREP STORED MR 3-17-98

SOP(S) # RICHRCOOC Rev 1

000035

DUE 3-30-98

*** TOTAL-SR ***

CHAIN-OF-CUSTODY BATCH ANALYSIS RECORD

17-Feb-1998
Page 1

CUSTOMER: BHI SAF SAMPLE DELIVERY GROUP W02238

MATRIX : OTHER B98-058 BATCH NUMBER 02-219

QES ID	DUP	ACCOUNT	CUSTOMER ID	COMMENTS
J0221918			SA WT ESF14003 Pr.11/21/97 EX.7/22/98	ppt. wt
J0221915		80.274 ± 1.1446 DPM	6G EQGF257 Pr.11/21/97 EX.7/22/98	.0436
1) 80221901		BHI	6G ESF14004 Pr.11/21/97 EX.7/22/98	.0943
D0221901	Dup	BON424 6.02	6.01 ESF14005 Pr.11/21/97 EX.7/22/98	.0924
				.0948

ACTIONS (Initial & Date)

1) INITIATED JH 2/17/98
SOP(S) # RD8800

2) PREP LAB RECEIVED JN 2-24-98
SOP(S) # RICHRC5013

3) SAMPLE REMAINDER STORED JN 2-25-98
SOP(S) # Nt

4) SEPARATION LAB RECEIVED RTM 3/3/98
SOP(S) # RichRC5000/2

5) COUNTING/MEASUREMENT LAB 3/6/98
SOP(S) # RICHRD0003

6) DATA REVIEWED AND ANALYTICAL PREP STORED JRC 3-10-98
SOP(S) # RICHRC0002 Rev

prep 2 recd: 2-26-98 DK
RichRC5013-0

filtered for hydroxides prior to Sr determination steps
fumed prior to Sr determination steps
RTM 3/4/98

Sep. time 3/5/98 14:28 RTM

OCCLUE