W01982

Quanterra
Environmental Services

0048832

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

October 24, 1997

Attention: Joan Kessner

OCT 1997
RECEIVED
Data
Log In

APR 1998
RECEIVED
EDMC

Project number	:	550.232
Date Received by Lab	:	October 8, 1997
Number of Samples	:	Five (5)
Sample Type	:	Soil
SDG Number	:	W01982
Data Deliverable	:	Summary

I. Introduction

On October 8, 1997, five (5) soil samples were received by Quanterra, Richland and were transferred to Quanterra, St. Louis for chemical analysis. Upon receipt, the sample were given the following laboratory ID number to correspond with the specific client ID:

St. Louis ID	BHI ID	Richland ID	Matrix	Date of Receipt
16019-001	B0L957	71013601	Soil	08-OCT-97
16019-002	B0L958	71013602	Soil	08-OCT-97
16019-003	B0L959	71013603	Soil	08-OCT-97
16019-004	B0L960	71013604	Soil	08-OCT-97
16019-005	B0L961	71013605	Soil	08-OCT-97

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. PCBs by EPA Method 8080. ICP Metals (As,Tl) by EPA Method 6010.

III. Quality Control

A Laboratory Control Sample and Method Blank were analyzed with each preparation batch. A Matrix Spike and Matrix Spike Duplicate were performed per the protocol for each analyte in 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 matrix spike analyzed with this SDG showed low recovery for Pyrene (51%). The lower control limit for Pyrene recovery is 52%.

Pesticide/PCBs
There are no comments or nonconformances associated with this analysis.

Metals
There are no comments or nonconformances associated with this analysis.

Quanterra
Environmental Services

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:

Wade H. Price
Project Manager
e:\\price$\hanford\hanw1982.nar

Sample Disposition Record

Control #:	B97-050
Revision#:	0
Date Initiated:	7/1/97

Section 1 - BACKGROUND

SAF#: B97-120, B97-129, B97-133, B97-136
OU: 300-FF-1
Project ID: 300-FF-1 RD
Task ID: 1
Sampling Event: 300-FF-1 Process Trenches Verification Sampli, 300FF-1 SOUTH PROCESS POND, 300FF-1 NORTH PROCESS POND, AND 300FF-1 ASHPITS/CLEAN SOIL.
Laboratory: Quanterra, TMA
Project Coordinator: Koerner, CC
Task Manager: Johnson, CR

Section 2 - SAMPLE INFORMATION

Number of Samples:
ID Numbers: ALL OFF-SITE SAMPLES.
MATRIX: Soil
Collection Date:

Section 3 - ISSUE

Class: Lab Direction
NCR Number: N/A
Type: Clarification of Direction
Description: Chain of Custody (COC) for off-site analysis requests SemiVOA (8270A) TCL list with benzo(a)pyrene and chrysene. COC also requests ICP metals (6010A) with add-ons for arsenic and thallium.

N/A

NCR Validation (Print/Sign) Date

Section 4 - DISPOSITION

Type: Repair
Description: All off-site samples requesting SemiVOA or ICP metals analysis for SAF's B97-120, B97-129, B97-133, and B97-136 should be specifically analyzed for the mentioned tests as follows: Perform SemiVOA (8270A) analysis for benzo(a)pyrene and chrysene only. Perform ICP metals (6010A) analysis for arsenic and thallium only. Other requested analysis shall be performed according to COC directions.

Koerner, CC — 7-8-97
Project Coordinator (Print/Sign) Date

Johnson, CR — Charlie Johnson — 7/16/97
Task Manager (Print/Sign) Date

N/A
QA (Print/Sign) Date

Section 5 - INSPECTION (Issue Class: Nonconformance Only)

Inspection Number: N/A
Inspection Results: N/A

N/A
Inspector (Print/Sign) Date

Quanterra October 10, 1997 01:51 pm
Account: 10722 Project: 550.232 Quanterra-Richland QAS No. 550.232 Rev. 0
Master Sample Login: 16019

Project Manager: W. Price

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

Sample Header Template:

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

#	Container Type	Analysis	Class	Preservative	Anal. Due Date	Hold Date	Site	(Container Numbers:% Filled)
Data:								
16019-001	B0L957	Soil	03-OCT-97 10:25	08-OCT-97 11:23	22-OCT-97	AIR BORNE	1	Screening not Required
RICHLAND I.D. 71013601//SEE QAS FOR TARGET LISTS.								
1	AN - Amber Glass-120ML	BNA/8270/Q4	S	COLD	20-OCT-97	17-OCT-97	S4C	(336149:99)
1		PCB/8080/Q4	S	COLD	20-OCT-97	17-OCT-97	S4C	(336148:98)
1		PM/IT/Q4	S	COLD	20-OCT-97	01-APR-98	S4C	(336148:98)
1	AN - Amber Glass-60ML	ICAP/6010/Q4	S	COLD	20-OCT-97	01-APR-98	S4C	(336147:100)
16019-001MS	B0L957	Soil	03-OCT-97 10:25	08-OCT-97 11:23	22-OCT-97	AIR BORNE	1	Screening not Required
RICHLAND I.D. 71013601//SEE QAS FOR TARGET LISTS.								
1	AN - Amber Glass-120ML	BNA/8270/Q4	S	COLD	20-OCT-97	17-OCT-97	S4C	(336149:99)
1		PCB/8080/Q4	S	COLD	20-OCT-97	17-OCT-97	S4C	(336148:98)
1	AN - Amber Glass-60ML	ICAP/6010/Q4	S	COLD	20-OCT-97	01-APR-98	S4C	(336147:100)
16019-001MSD	B0L957	Soil	03-OCT-97 10:25	08-OCT-97 11:23	22-OCT-97	AIR BORNE	1	Screening not Required
RICHLAND I.D. 71013601//SEE QAS FOR TARGET LISTS.								
1	AN - Amber Glass-120ML	BNA/8270/Q4	S	COLD	20-OCT-97	17-OCT-97	S4C	(336149:99)
1		PCB/8080/Q4	S	COLD	20-OCT-97	17-OCT-97	S4C	(336148:98)
1	AN - Amber Glass-60ML	ICAP/6010/Q4	S	COLD	20-OCT-97	01-APR-98	S4C	(336147:100)
16019-002	B0L958	Soil	03-OCT-97 10:30	08-OCT-97 11:23	22-OCT-97	AIR BORNE	1	Screening not Required
RICHLAND I.D. 71013602//SEE QAS FOR TARGET LISTS.								
1	AN - Amber Glass-120ML	BNA/8270/Q4	S	COLD	20-OCT-97	17-OCT-97	S4C	(336152:99)
1		PCB/8080/Q4	S	COLD	20-OCT-97	17-OCT-97	S4C	(336151:98)
1		PM/IT/Q4	S	COLD	20-OCT-97	01-APR-98	S4C	(336151:98)
1	AN - Amber Glass-60ML	ICAP/6010/Q4	S	COLD	20-OCT-97	01-APR-98	S4C	(336150:100)
16019-003	B0L959	Soil	03-OCT-97 10:50	08-OCT-97 11:23	22-OCT-97	AIR BORNE	1	Screening not Required
RICHLAND I.D. 71013603//SEE QAS FOR TARGET LISTS.								
1	AN - Amber Glass-120ML	BNA/8270/Q4	S	COLD	20-OCT-97	17-OCT-97	S4C	(336155:99)
1		PCB/8080/Q4	S	COLD	20-OCT-97	17-OCT-97	S4C	(336154:98)
1		PM/IT/Q4	S	COLD	20-OCT-97	01-APR-98	S4C	(336154:98)
1	AN - Amber Glass-60ML	ICAP/6010/Q4	S	COLD	20-OCT-97	01-APR-98	S4C	(336153:100)
16019-004	B0L960	Soil	03-OCT-97 10:56	08-OCT-97 11:23	22-OCT-97	AIR BORNE	1	Screening not Required
RICHLAND I.D. 71013604//SEE QAS FOR TARGET LISTS.								
1	AN - Amber Glass-120ML	BNA/8270/Q4	S	COLD	20-OCT-97	17-OCT-97	S4C	(336158:99)
1		PCB/8080/Q4	S	COLD	20-OCT-97	17-OCT-97	S4C	(336157:98)

3*=Sample has not been rad screened.

Quanterra October 10, 1997 01:51 pm
Account: 10722 Project: 550.232 Quanterra-Richland QAS No. 550.232 Rev. 0
Master Sample Login: 16019

/
roject Manager: W. Price

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

ample Header Template: _____

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

#	Container Type	Analysis	Class	Preservative	Anal. Due Date	Hold Date	Site	(Container Numbers:% Filled)
ata:								
1		PM/IT/Q4	S	COLD	20-OCT-97	01-APR-98	S4C	(336157:98)
1	AN - Amber Glass-60ML	ICAP/6010/Q4	S	COLD	20-OCT-97	01-APR-98	S4C	(336156:100)

6019-005 B0L961 Soil 03-OCT-97 11:19 08-OCT-97 11:23 22-OCT-97 AIR BORNE 1 Screening not Required
RICHLAND I.D. 71013605//SEE QAS FOR TARGET LISTS.

1	AN - Amber Glass-120ML	BNA/8270/Q4	S	COLD	20-OCT-97	17-OCT-97	S4C	(336161:99)
1		PCB/8080/Q4	S	COLD	20-OCT-97	17-OCT-97	S4C	(336160:98)
1		PM/IT/Q4	S	COLD	20-OCT-97	01-APR-98	S4C	(336160:98)
1	AN - Amber Glass-60ML	ICAP/6010/Q4	S	COLD	20-OCT-97	01-APR-98	S4C	(336159:100)

3*=Sample has not been rad screened.

000006

[redacted]

Chain of Custody Record

S-4C

ST 10/11

Quanterra

QUA-4124 0797

Client: Bechtel	Project Manager: J. Carnes	Date: 10-9-97	Chain of Custody Number: 00058
Address	Telephone Number (Area Code)/Fax Number	Lab Number	Page 1 of 1
City / State / Zip Code	Site Contact	Lab Contact	
Project Name: SAF B97-120	Carrier/Waybill Number		
Contract/Purchase Order/Quote No.			

Analysis (Attach list if more space is needed): SEE COC

Special Instructions/ Conditions of Receipt: 100 a/o

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	
71013601 BOL 957													
2 958													
3 959													
4 960													
5 961													

Chemical Analysis Bottles

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 Due 10-23-97

QC Requirements (Specify): SDG W01982

1. Relinquished By: Heidelberg Quanterra	Date: 10-9-97	Time: 16:00	1. Received By: Jimmie Jackson	Date: 10-10-97	Time: 8:00
2. Relinquished By	Date	Time	2. Received By	Date	Time
3. Relinquished By	Date	Time	3. Received By	Date	Time

Comments: 000007

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

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

B97-120-02 | Page 1 of

Collector: Doug Bowers/Bob Fahlberg	Company Contact: Frank Gustafson	Telephone No.: 373-5904	Project Coordinator: Koerner, CC
Date Turnaround: 15 Days			
Project Designation: 300-FF-1 Process Trenches Verification/Screening Sampling	Sampling Location: 300 FF-1		SAF No.: B97-120
Ice Chest No.: ERC 96-027	Field Logbook No.: ~~SFL-1195-4~~ 10-1-97 EL 1395		Method of Shipment: Gov vehicle
Shipped To: Quantera	Offsite Property No.		Bill of Lading/Air Bill No.

POSSIBLE SAMPLE HAZARDS/REMARKS: Possible radioactive

Special Handling and/or Storage: cool 4C

SAMPLE ANALYSIS: SDG W01982

710136

Preservation	None	None	None	Cool 4C	Cool 4C	None				
Type of Container	P	P	sG	sG	sG	sG				
No. of Container(s)	1	1	1	1	1	1				
Volume	20ml	20ml	60ml	120ml	120ml	1000ml				
	Activity Scan	Isotopic Uranium	ICP Metals - 6010A (Add-on) (Arsenic, Thallium)	PCBs - 8080	Semi-VOA - 8270A (TCL) (Benzo(a)pyrene, Chrysene)	Gamma Spectroscopy (Cobalt-60)				
		710137				710137				

Sample No.	Matrix*	Sample Date	Sample Time	Activity Scan	Isotopic Uranium	ICP Metals	PCBs	Semi-VOA	Gamma Spectroscopy		
B0L957 01	S	10-3-97	1025	X	X	X	X	X	X		B0L957
B0L958 02	S	10-3-97	1030	X	X	X	X	X	X		B0L958
B0L959 03	S	10-3-97	1050	X	X	X	X	X	X		B0L959
B0L960 04	S	10-3-97	1056	X	X	X	X	X	X		B0L960
B0L961 05	S	10-3-97	1119	X	X	X	X	X	X		B0L961
					5X125mLs 100%		5X250mLs 100%		5X250mLs 100%		
					5X 60 mLs 100%						

CHAIN OF POSSESSION — Sign/Print Names

Relinquished By	Date/Time	Received By	Date/Time
Doug Bowers	10-8-97 1123	Fahlberg	10-8-97 1123
		Lloyd	

SPECIAL INSTRUCTIONS: 5X120mLs 5X120mLs
J. Jacobs 10-10-97

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

Post-it® Fax Note 7671 | Date | # of pages ▶ 6
To Denny Bowers | From A. I. Davis
Co./Dept. | Co.
Phone # | Phone # 372-9231
Fax # 376-8251 | Fax #

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

BOL857

Project	300-FF-1	
Customer ID	80L857	Soil
RCF ID	RCF1872	
Sample time, date	1025	10/3/97
Analysis date		10/6/97

Isotope		Activity pCi/gm		2 s err	Ci/gm	
K40	<	3.2e+00			3.2e-12	
Co60		7.9e-01	+/-	2.3e-01	7.9e-13	
I129	<	2.2e+00			2.2e-12	
Cs137	<	2.7e-01			2.7e-13	
Eu152	<	7.9e-01			7.9e-13	
Eu154	<	3.5e-01			3.5e-13	
Eu155	<	1.3e+00			1.3e-12	
Th32dau		1.8e+00	+/-	7.8e-01	1.8e-12	
U235	<	2.0e+00			2.0e-12	
U238	<	3.3e+01			3.3e-11	
U238dau	<	6.9e-01			6.9e-13	
Np237	<	5.3e-01			5.3e-13	
Am241	<	7.1e-01			7.1e-13	
Tot Act Gam (pCi/gm)		2.6e+00		Ci/gm	2.6e-12	
Y/Sr-90	<	N/R				
Gross Alpha	<	1.3e+00			1.3e-12	
Gross Beta		2.0e+01	+/-	3.5e+00	2.0e-11	Reported as 137-Cs Betas.
AEA total	<	N/R				

Total Activity (pCi/gm) 2.0e+01
(Ci/gm) 2.0e-11

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, may 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.

SE Hoff 6 9 10 — Radiological analyst
10-7-97 — Date

Albert I. Davis — Radiological Manager
10-07-97 — Date

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GAMMA-RAY ENERGY ANALYSIS REPORT

Thermo Hanford Inc.
Radiological Counting Facility THI - RCF

B0L958

Project	300-FF-1		
Customer ID	B0L958	Soil	
RCF ID	RCF1873		
	Sample time, date	1030	10/3/97
	Analysis date		10/6/97

Isotope		Activity pCi/gm		2 s err	Ci/gm
K40		2.5e+01	+/-	5.0e+00	2.5e-11
Co60		6.7e-01	+/-	3.8e-01	6.7e-13
I129	<	2.2e+00			2.2e-12
Cs137	<	1.8e-01			1.8e-13
Eu152	<	1.9e+00			1.9e-12
Eu154	<	5.1e-01			5.1e-13
Eu155	<	1.4e+00			1.4e-12
Th32dau	<	1.7e+00			1.7e-12
U235	<	1.7e+00			1.7e-12
U238	<	4.1e+01			4.1e-11
U238dau	<	5.8e-01			5.8e-13
Np237	<	4.3e-01			4.3e-13
Am241	<	7.2e-01			7.2e-13
Tot Act Gam (pCi/gm)		2.6e+01		Ci/gm	2.6e-11
Y/Sr-90	<	N/R			
Gross Alpha	<	7.7e-01			7.7e-13
Gross Beta		1.8e+01	+/-	3.2e+00	1.8e-11
AEA total	<	N/R			

Reported as 137-Cs Betas.

Total Activity (pCi/gm) 1.8e+01
(Ci/gm) 1.8e-11

Definitions:

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

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, may 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.

Radiological analyst — Date 10-7-97

Albert I. Davis — Date 10-07-97
Radiological Manager

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GAMMA-RAY ENERGY ANALYSIS REPORT

Therme Hanford Inc.
Radiological Counting Facility THI - RCF

B0L959

Project	300-FF-1		
Customer ID	B0L989	Soil	
RCF ID	RCF1874		
	Sample time, date	1050	10/3/97
	Analysis date		10/6/97

Isotope		Activity pCi/gm		2 s err	Ci/gm	
K40		1.8e+01	+/-	7.0e+00	1.8e-11	
Co60	<	6.9e-01			6.9e-13	
I129	<	7.3e+01			7.3e-11	
Cs137	<	6.4e-01			6.4e-13	
Eu152	<	3.4e+00			3.4e-12	
Eu154	<	1.7e+00			1.7e-12	
Eu155	<	1.8e+00			1.8e-12	
Th32deu	<	1.1e+00			1.1e-12	
U235	<	2.9e+00			2.9e-12	
U238	<	7.0e+01			7.0e-11	
U238deu		3.4e+00	+/-	7.5e-01	3.4e-12	
Np237	<	1.1e+00			1.1e-12	
Am241	<	2.6e+00			2.6e-12	
Tot Act Gam (pCi/gm)		2.1e+01		Ci/gm	2.1e-11	
Y/Sr-90	<	N/R				
Gross Alpha	<	1.1e+00			1.1e-12	
Gross Beta		2.3e+01	+/-	4.4e+00	2.3e-11	Reported as 137-Cs Betas.
AEA total	<	N/R				

Total Activity (pCi/gm) 2.3e+01
(Ci/gm) 2.3e-11

Definitions:

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

All errors reported at 2 standard deviations
A Assigned as residual beta from Gamma/Beta between.
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

U238deu 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.

Th32deu 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, may 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.

Radiological analyst — Date 10-7-97

Albert L. Davis, Radiological Manager — Date 10-07-97

GAMMA-RAY ENERGY ANALYSIS REPORT

Thermo Hanford Inc.
Radiological Counting Facility THI - RCF

B0L960

Project	300-FF-1		
Customer ID	B0L990	Soil	
RCF ID	RCF1875		
	Sample time, date	1056	10/3/97
	Analysis date		10/6/97

Isotope		Activity pCi/gm		2 s err	Ci/gm	
K40	<	1.2e+01			1.2e-11	
Co60	<	1.3e+00			1.3e-12	
I129	<	1.3e+02			1.3e-10	
Cs137	<	8.2e-01			8.2e-13	
Eu152	<	5.3e+00			5.3e-12	
Eu154	<	4.2e+00			4.2e-12	
Eu155	<	3.6e+00			3.6e-12	
Th32dau	<	3.8e+00			3.8e-12	
U235	<	5.9e+00			5.9e-12	
U238	<	1.2e+02			1.2e-10	
U238dau		3.7e+00	+/-	1.1e+00	3.7e-12	
Np237	<	2.1e+00			2.1e-12	
Am241	<	5.5e+00			5.5e-12	
Tot Act Gam (pCi/gm)		3.7e+00		Ci/gm	3.7e-12	
Y/Sr-90	<	N/R				
Gross Alpha	<	9.5e-01			9.5e-13	
Gross Beta		2.2e+01	+/-	3.6e+00	2.2e-11	Reported as 137-Cs Betas.
AEA total	<	N/R				

Total Activity (pCi/gm) 2.2e+01
(Ci/gm) 2.2e-11

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

Definitions:

All errors reported at 2 standard deviations
A Assigned on 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, may 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.

CE Hoffly 10-7-97
Radiological analyst Date

Albert I. Davis 10-07-97
Albert I. Davis Date
Radiological Manager

GAMMA-RAY ENERGY ANALYSIS REPORT

Thermo Hanford Inc.
Radiological Counting Facility THI - RCF

Project	300-FF-1		
Customer ID	B0L991	Soil	B0L961
RCF ID	RCF1876		
	Sample time, date	1119	10/3/97
	Analysis date		10/7/97

Isotope		Activity pCi/gm		2 s err	Ci/gm
K40		2.3e+01	+/-	7.7e+00	2.3e-11
Co60	<	5.8e-01			5.8e-13
I129	<	4.8e+00			4.8e-12
Cs137	<	3.1e-01			3.1e-13
Eu152	<	1.9e+00			1.9e-12
Eu154	<	1.3e+00			1.3e-12
Eu155	<	2.9e+00			2.9e-12
Th32dau	<	7.9e+00			7.9e-12
U235	<	4.8e+00			4.8e-12
U238	<	5.2e+01			5.2e-11
U238dau	<	4.5e+00			4.5e-12
Np237	<	1.3e+00			1.3e-12
Am241	<	1.8e+00			1.8e-12
Tot Act Gam (pCi/gm)		2.3e+01		Ci/gm	2.3e-11
Y/Sr-90	<	N/R			
Gross Alpha	<	8.9e-01			8.9e-13
Gross Beta		1.5e+01	+/-	3.2e+00	1.5e-11
AEA total	<	N/R			

Reported as 137-Cs Betas.

Total Activity (pCi/gm) 2.3e+01
(Ci/gm) 2.3e-11

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

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, may 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.

Radiological analyst — Date 10-7-97

Albert I. Davis — Date 10-07-97
Radiological Manager

Figure 1

SAMPLE CHECK-IN LIST

Date/Time Received: 10/8 @ 1120 SG#: _____

Work Order Number: _____ SAF #: B97-120

Shipping Container ID: 96-027 Chain of Custody # B97-120-02

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 2° C
5. Vermiculite/packing materials is Wet [ ] Dry [✓] n/a
6. Number of samples in shipping container: 30
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: Heidelberg Date: 10-8-97 1123

Telephoned To: _____ On _____ By _____

000014

Quanterra
Environmental Services

013029

Login No.: ~~0800~~ 16019

Condition Upon Receipt Variance Report
St. Louis Laboratory

Client: Richland Date: 10-10-97 Time: 0800

Project No: 550.232 Initiated by: Jimmie Jackson

Shipper/No: A/B 5999649 014 RFA/COC Numbers:

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: 2°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 designee) [signature] Date: 10-10-97

Project Management Review: [signature] Date: 10/17/97

SIGNED ORIGINAL MUST BE RETAINED IN THE PROJECT FILE

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

Quanterra
Environmental Services

Bechtel Hanford Incorporated
3350 George Washington Way
Richland, WA 99352

Project: 550.232

Category: Semi-VOA 8270A (TCL)
Method: EPA 8270
Matrix: SOLID

Sample Date : 10/03/97
Receipt Date : 10/08/97
Report Date : 10/22/97

Client ID: BOL957

Quanterra ID : 16019-001

Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit	Dilution
Chrysene	218-01-9	QCBLK156013-1	10/14/97	10/17/97	330	UG/KG	U	330	1
Benzo(a)Pyrene	50-32-8	QCBLK156013-1	10/14/97	10/17/97	330	UG/KG	U	330	1
Aldol Condensation	TIC-4	QCBLK156013-1	10/14/97	10/17/97	61000	UG/KG	BJN		1
Unknown	TIC-2	QCBLK156013-1	10/14/97	10/17/97	150	UG/KG	J		1
bis(2-Ethylhexyl)Phthalate	117-81-7	QCBLK156013-1	10/14/97	10/17/97	180	UG/KG	BJN		1
Nitrobenzene-d5	4165-60-0	QCBLK156013-1	10/14/97	10/17/97	55	%REC			1
2-Fluorobiphenyl	321-60-8	QCBLK156013-1	10/14/97	10/17/97	58	%REC			1
Terphenyl-d14	1718-51-0	QCBLK156013-1	10/14/97	10/17/97	51	%REC			1
Phenol-d5	4165-62-2	QCBLK156013-1	10/14/97	10/17/97	75	%REC			1
2-Fluorophenol	367-12-4	QCBLK156013-1	10/14/97	10/17/97	76	%REC			1
2,4,6-Tribromophenol	118-79-6	QCBLK156013-1	10/14/97	10/17/97	62	%REC			1

Quanterra
Environmental Services

Bechtel Hanford Incorporated
3350 George Washington Way
Richland, WA 99352

Project: 550.232

Category: Semi-VOA 8270A (TCL)
Method: EPA 8270
Matrix: SOLID

Sample Date : 10/03/97
Receipt Date : 10/08/97
Report Date : 10/22/97

Client ID: BOL957

Quanterra ID : 16019-001MS

Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit	Dilution
Phenol	108-95-2	QCBLK156013-1	10/14/97	10/17/97	68	%REC			1
2-Chlorophenol	95-57-8	QCBLK156013-1	10/14/97	10/17/97	76	%REC			1
1,4-Dichlorobenzene	106-46-7	QCBLK156013-1	10/14/97	10/17/97	54	%REC			1
N-nitroso-di-n-propylamine	621-64-7	QCBLK156013-1	10/14/97	10/17/97	76	%REC			1
1,2,4-Trichlorobenzene	120-82-1	QCBLK156013-1	10/14/97	10/17/97	59	%REC			1
4-Chloro-3-Methylphenol	59-50-7	QCBLK156013-1	10/14/97	10/17/97	81	%REC			1
Acenaphthene	83-32-9	QCBLK156013-1	10/14/97	10/17/97	68	%REC			1
4-Nitrophenol	100-02-7	QCBLK156013-1	10/14/97	10/17/97	69	%REC			1
2,4-Dinitrotoluene	121-14-2	QCBLK156013-1	10/14/97	10/17/97	71	%REC			1
Pentachlorophenol	87-86-5	QCBLK156013-1	10/14/97	10/17/97	53	%REC			1
Pyrene	129-00-0	QCBLK156013-1	10/14/97	10/17/97	51	%REC	*		1
Nitrobenzene-d5	4165-60-0	QCBLK156013-1	10/14/97	10/17/97	56	%REC			1
2-Fluorobiphenyl	321-60-8	QCBLK156013-1	10/14/97	10/17/97	60	%REC			1
Terphenyl-d14	1718-51-0	QCBLK156013-1	10/14/97	10/17/97	52	%REC			1
Phenol-d5	4165-62-2	QCBLK156013-1	10/14/97	10/17/97	76	%REC			1
2-Fluorophenol	367-12-4	QCBLK156013-1	10/14/97	10/17/97	78	%REC			1
2,4,6-Tribromophenol	118-79-6	QCBLK156013-1	10/14/97	10/17/97	64	%REC			1

Quanterra
Environmental Services

Bechtel Hanford Incorporated
3350 George Washington Way
Richland, WA 99352

Project: 550.232

Category: Semi-VOA 8270A (TCL)
Method: EPA 8270
Matrix: SOLID

Sample Date : 10/03/97
Receipt Date : 10/08/97
Report Date : 10/22/97

Client ID: BOL957

Quanterra ID : 16019-001MSD

Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit	Dilution
Phenol	108-95-2	QCBLK156013-1	10/14/97	10/17/97	68	%REC			1
2-Chlorophenol	95-57-8	QCBLK156013-1	10/14/97	10/17/97	74	%REC			1
1,4-Dichlorobenzene	106-46-7	QCBLK156013-1	10/14/97	10/17/97	40	%REC			1
N-nitroso-di-n-propylamine	621-64-7	QCBLK156013-1	10/14/97	10/17/97	76	%REC			1
1,2,4-Trichlorobenzene	120-82-1	QCBLK156013-1	10/14/97	10/17/97	48	%REC			1
4-Chloro-3-Methylphenol	59-50-7	QCBLK156013-1	10/14/97	10/17/97	85	%REC			1
Acenaphthene	83-32-9	QCBLK156013-1	10/14/97	10/17/97	69	%REC			1
4-Nitrophenol	100-02-7	QCBLK156013-1	10/14/97	10/17/97	71	%REC			1
2,4-Dinitrotoluene	121-14-2	QCBLK156013-1	10/14/97	10/17/97	74	%REC			1
Pentachlorophenol	87-86-5	QCBLK156013-1	10/14/97	10/17/97	52	%REC			1
Pyrene	129-00-0	QCBLK156013-1	10/14/97	10/17/97	53	%REC			1
Nitrobenzene-d5	4165-60-0	QCBLK156013-1	10/14/97	10/17/97	60	%REC			1
2-Fluorobiphenyl	321-60-8	QCBLK156013-1	10/14/97	10/17/97	64	%REC			1
Terphenyl-d14	1718-51-0	QCBLK156013-1	10/14/97	10/17/97	54	%REC			1
Phenol-d5	4165-62-2	QCBLK156013-1	10/14/97	10/17/97	81	%REC			1
2-Fluorophenol	367-12-4	QCBLK156013-1	10/14/97	10/17/97	84	%REC			1
2,4,6-Tribromophenol	118-79-6	QCBLK156013-1	10/14/97	10/17/97	68	%REC			1

Quanterra
Environmental Services

Bechtel Hanford Incorporated
3350 George Washington Way
Richland, WA 99352

Project: 550.232

Category: Semi-VOA 8270A (TCL)
Method: EPA 8270
Matrix: SOLID

Client ID: B0L958

Sample Date : 10/03/97
Receipt Date : 10/08/97
Report Date : 10/22/97

Quanterra ID : 16019-002

Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit	Dilution
Chrysene	218-01-9	QCBLK156013-1	10/14/97	10/17/97	330	UG/KG	U	330	1
Benzo(a)Pyrene	50-32-8	QCBLK156013-1	10/14/97	10/17/97	330	UG/KG	U	330	1
Aldol Condensation	TIC-4	QCBLK156013-1	10/14/97	10/17/97	68000	UG/KG	BJN		1
Unknown-1	TIC-32	QCBLK156013-1	10/14/97	10/17/97	110	UG/KG	J		1
Unknown-2	TIC-33	QCBLK156013-1	10/14/97	10/17/97	74	UG/KG	J		1
Unknown-3	TIC-34	QCBLK156013-1	10/14/97	10/17/97	290	UG/KG	J		1
ButylBenzylPhthalate	85-68-7	QCBLK156013-1	10/14/97	10/17/97	210	UG/KG	BJN		1
bis(2-Ethylhexyl)Phthalate	117-81-7	QCBLK156013-1	10/14/97	10/17/97	180	UG/KG	BJN		1
Unknown-4	TIC-35	QCBLK156013-1	10/14/97	10/17/97	86	UG/KG	J		1
Nitrobenzene-d5	4165-60-0	QCBLK156013-1	10/14/97	10/17/97	56	%REC			1
2-Fluorobiphenyl	321-60-8	QCBLK156013-1	10/14/97	10/17/97	62	%REC			1
Terphenyl-d14	1718-51-0	QCBLK156013-1	10/14/97	10/17/97	54	%REC			1
Phenol-d5	4165-62-2	QCBLK156013-1	10/14/97	10/17/97	77	%REC			1
2-Fluorophenol	367-12-4	QCBLK156013-1	10/14/97	10/17/97	78	%REC			1
2,4,6-Tribromophenol	118-79-6	QCBLK156013-1	10/14/97	10/17/97	67	%REC			1

Quanterra Environmental Services

Bechtel Hanford Incorporated
3350 George Washington Way
Richland, WA 99352

Project: 550.232

Category: Semi-VOA 8270A (TCL)
Method: EPA 8270
Matrix: SOLID

Client ID: B0L959

Sample Date : 10/03/97
Receipt Date : 10/08/97
Report Date : 10/22/97

Quanterra ID : 16019-003

Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit	Dilution
Chrysene	218-01-9	QCBLK156013-1	10/14/97	10/17/97	350	UG/KG	U	350	1
Benzo(a)Pyrene	50-32-8	QCBLK156013-1	10/14/97	10/17/97	350	UG/KG	U	350	1
Aldol Condensation	TIC-4	QCBLK156013-1	10/14/97	10/17/97	61000	UG/KG	BJN		1
Unknown-1	TIC-32	QCBLK156013-1	10/14/97	10/17/97	500	UG/KG	J		1
Unknown-2	TIC-33	QCBLK156013-1	10/14/97	10/17/97	94	UG/KG	J		1
Unknown-3	TIC-34	QCBLK156013-1	10/14/97	10/17/97	120	UG/KG	J		1
ButylBenzylPhthalate	85-68-7	QCBLK156013-1	10/14/97	10/17/97	230	UG/KG	BJN		1
Unknown-4	TIC-35	QCBLK156013-1	10/14/97	10/17/97	98	UG/KG	J		1
bis(2-Ethylhexyl)Phthalate	117-81-7	QCBLK156013-1	10/14/97	10/17/97	200	UG/KG	BJN		1
Unknown-5	TIC-36	QCBLK156013-1	10/14/97	10/17/97	70	UG/KG	J		1
Unknown-6	TIC-37	QCBLK156013-1	10/14/97	10/17/97	77	UG/KG	J		1
Nitrobenzene-d5	4165-60-0	QCBLK156013-1	10/14/97	10/17/97	61	%REC			1
2-Fluorobiphenyl	321-60-8	QCBLK156013-1	10/14/97	10/17/97	62	%REC			1
Terphenyl-d14	1718-51-0	QCBLK156013-1	10/14/97	10/17/97	54	%REC			1
Phenol-d5	4165-62-2	QCBLK156013-1	10/14/97	10/17/97	82	%REC			1
2-Fluorophenol	367-12-4	QCBLK156013-1	10/14/97	10/17/97	87	%REC			1
2,4,6-Tribromophenol	118-79-6	QCBLK156013-1	10/14/97	10/17/97	75	%REC			1

Quanterra
Environmental Services

Bechtel Hanford Incorporated
3350 George Washington Way
Richland, WA 99352

Project: 550.232

Category: Semi-VOA 8270A (TCL)
Method: EPA 8270
Matrix: SOLID

Sample Date : 10/03/97
Receipt Date : 10/08/97
Report Date : 10/22/97

Client ID: BOL960

Quanterra ID : 16019-004

Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit	Dilution
Chrysene	218-01-9	QCBLK156013-1	10/14/97	10/17/97	350	UG/KG	U	350	1
Benzo(a)Pyrene	50-32-8	QCBLK156013-1	10/14/97	10/17/97	350	UG/KG	U	350	1
Aldol Condensation	TIC-4	QCBLK156013-1	10/14/97	10/17/97	60000	UG/KG	BJN		1
Hexadecanoic acid	57-10-3	QCBLK156013-1	10/14/97	10/17/97	480	UG/KG	JN		1
Unknown-1	TIC-32	QCBLK156013-1	10/14/97	10/17/97	76	UG/KG	J		1
ButylBenzylPhthalate	85-68-7	QCBLK156013-1	10/14/97	10/17/97	230	UG/KG	BJN		1
Unknown-2	TIC-33	QCBLK156013-1	10/14/97	10/17/97	85	UG/KG	J		1
Unknown-3	TIC-34	QCBLK156013-1	10/14/97	10/17/97	190	UG/KG	J		1
Unknown-4	TIC-35	QCBLK156013-1	10/14/97	10/17/97	88	UG/KG	J		1
Unknown-5	TIC-36	QCBLK156013-1	10/14/97	10/17/97	150	UG/KG	J		1
Unknown-6	TIC-37	QCBLK156013-1	10/14/97	10/17/97	71	UG/KG	J		1
Unknown-7	TIC-7	QCBLK156013-1	10/14/97	10/17/97	140	UG/KG	J		1
Nitrobenzene-d5	4165-60-0	QCBLK156013-1	10/14/97	10/17/97	56	%REC			1
2-Fluorobiphenyl	321-60-8	QCBLK156013-1	10/14/97	10/17/97	57	%REC			1
Terphenyl-d14	1718-51-0	QCBLK156013-1	10/14/97	10/17/97	54	%REC			1
Phenol-d5	4165-62-2	QCBLK156013-1	10/14/97	10/17/97	77	%REC			1
2-Fluorophenol	367-12-4	QCBLK156013-1	10/14/97	10/17/97	79	%REC			1
2,4,6-Tribromophenol	118-79-6	QCBLK156013-1	10/14/97	10/17/97	69	%REC			1

Quanterra
Environmental Services

Bechtel Hanford Incorporated
3350 George Washington Way
Richland, WA 99352

Project: 550.232

Category: Semi-VOA 8270A (TCL)
Method: EPA 8270
Matrix: SOLID

Client ID: B0L961

Sample Date : 10/03/97
Receipt Date : 10/08/97
Report Date : 10/22/97

Quanterra ID : 16019-005

Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit	Dilution
Chrysene	218-01-9	QCBLK156013-1	10/14/97	10/20/97	350	UG/KG	U	350	1
Benzo(a)Pyrene	50-32-8	QCBLK156013-1	10/14/97	10/20/97	350	UG/KG	U	350	1
Aldol Condensation	TIC-4	QCBLK156013-1	10/14/97	10/20/97	56000	UG/KG	BJN		1
Unknown-1	TIC-32	QCBLK156013-1	10/14/97	10/20/97	320	UG/KG	J		1
ButylBenzylPhthalate	85-68-7	QCBLK156013-1	10/14/97	10/20/97	190	UG/KG	BJN		1
Unknown-2	TIC-33	QCBLK156013-1	10/14/97	10/20/97	100	UG/KG	J		1
Unknown-3	TIC-34	QCBLK156013-1	10/14/97	10/20/97	120	UG/KG	J		1
Unknown-4	TIC-35	QCBLK156013-1	10/14/97	10/20/97	130	UG/KG	J		1
Nitrobenzene-d5	4165-60-0	QCBLK156013-1	10/14/97	10/20/97	51	%REC			1
2-Fluorobiphenyl	321-60-8	QCBLK156013-1	10/14/97	10/20/97	51	%REC			1
Terphenyl-d14	1718-51-0	QCBLK156013-1	10/14/97	10/20/97	50	%REC			1
Phenol-d5	4165-62-2	QCBLK156013-1	10/14/97	10/20/97	69	%REC			1
2-Fluorophenol	367-12-4	QCBLK156013-1	10/14/97	10/20/97	72	%REC			1
2,4,6-Tribromophenol	118-79-6	QCBLK156013-1	10/14/97	10/20/97	69	%REC			1

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B0L957

Lab Name: QUANTERRA MO Contract: 550-232

Lab Code: ITMO Case No.: S01901 SAS No.: SDG No.: W01982

Matrix: (soil/water) SOIL Lab Sample ID: 16019-001

Sample wt/vol: 30.00 (g/mL) G Lab File ID: A9589

Level: (low/med) LOW Date Received: 10/08/97

% Moisture: 0 decanted: (Y/N) N Date Extracted: 10/14/97

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 10/17/97

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH:

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
218-01-9	Chrysene	330	U
50-32-8	Benzo(a)Pyrene	330	U

1F
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

B0L957

Lab Name: QUANTERRA MO Contract: 550-232

Lab Code: ITMO Case No.: S01901 SAS No.: SDG No.: W01982

Matrix: (soil/water) SOIL Lab Sample ID: 16019-001

Sample wt/vol: 30.00 (g/mL) G Lab File ID: A9589

Level: (low/med) LOW Date Received: 10/08/97

% Moisture: 0 decanted: (Y/N) N Date Extracted: 10/14/97

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 10/17/97

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH:

Number TICs found: 3

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

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1. 0	Aldol Condensation	4.92	61000	ABJN
2.	UNKNOWN	21.86	150	J
3. 117817	bis(2-Ethylhexyl)Phthalate	27.20	180	BJN

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B0L958

Lab Name: QUANTERRA MO Contract: 550-232

Lab Code: ITMO Case No.: S01901 SAS No.: SDG No.: W01982

Matrix: (soil/water) SOIL Lab Sample ID: 16019-002

Sample wt/vol: 30.20 (g/mL) G Lab File ID: A9592

Level: (low/med) LOW Date Received: 10/08/97

% Moisture: 0 decanted: (Y/N) N Date Extracted: 10/14/97

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 10/17/97

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH:

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
218-01-9	Chrysene	330	U
50-32-8	Benzo(a)Pyrene	330	U

1F
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

B0L958

Lab Name: QUANTERRA MO Contract: 550-232

Lab Code: ITMO Case No.: S01901 SAS No.: SDG No.: W01982

Matrix: (soil/water) SOIL Lab Sample ID: 16019-002

Sample wt/vol: 30.20 (g/mL) G Lab File ID: A9592

Level: (low/med) LOW Date Received: 10/08/97

% Moisture: 0 decanted: (Y/N) N Date Extracted: 10/14/97

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 10/17/97

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH:

Number TICs found: 7

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

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1. 0	Aldol Condensation	4.92	68000	ABJN
2.	UNKNOWN	11.05	110	J
3.	UNKNOWN	11.86	74	J
4.	UNKNOWN	21.87	290	J
5. 85687	Butylbenzylphthalate	25.65	210	BJN
6. 117817	bis(2-Ethylhexyl)Phthalate	27.20	180	BJN
7.	UNKNOWN	31.52	86	J

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BOL959

Lab Name: QUANTERRA MO Contract: 550-232

Lab Code: ITMO Case No.: S01901 SAS No.: SDG No.: W01982

Matrix: (soil/water) SOIL Lab Sample ID: 16019-003

Sample wt/vol: 30.10 (g/mL) G Lab File ID: A9593

Level: (low/med) LOW Date Received: 10/08/97

% Moisture: 5 decanted: (Y/N) N Date Extracted: 10/14/97

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 10/17/97

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH:

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
218-01-9	Chrysene	350	U
50-32-8	Benzo(a)Pyrene	350	U

1F
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

BOL959

Lab Name: QUANTERRA MO Contract: 550-232

Lab Code: ITMO Case No.: S01901 SAS No.: SDG No.: W01982

Matrix: (soil/water) SOIL Lab Sample ID: 16019-003

Sample wt/vol: 30.10 (g/mL) G Lab File ID: A9593

Level: (low/med) LOW Date Received: 10/08/97

% Moisture: 5 decanted: (Y/N) N Date Extracted: 10/14/97

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 10/17/97

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH:

Number TICs found: 9

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

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1. 0	Aldol Condensation	4.88	61000	ABJN
2.	UNKNOWN	21.88	500	J
3.	UNKNOWN	23.20	94	J
4.	UNKNOWN	23.89	120	J
5. 85687	Butylbenzylphthalate	25.65	230	BJN
6.	UNKNOWN	26.92	98	J
7. 117817	bis(2-Ethylhexyl)Phthalate	27.20	200	BJN
8.	UNKNOWN	28.54	70	J
9.	UNKNOWN	30.03	77	J

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B0L960

Lab Name: QUANTERRA MO Contract: 550-232

Lab Code: ITMO Case No.: S01901 SAS No.: SDG No.: W01982

Matrix: (soil/water) SOIL Lab Sample ID: 16019-004

Sample wt/vol: 30.10 (g/mL) G Lab File ID: A9594

Level: (low/med) LOW Date Received: 10/08/97

% Moisture: 7 decanted: (Y/N) N Date Extracted: 10/14/97

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 10/17/97

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH:

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
218-01-9	Chrysene	350	U
50-32-8	Benzo(a)Pyrene	350	U

1F
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

B0L960

Lab Name: QUANTERRA MO Contract: 550-232

Lab Code: ITMO Case No.: S01901 SAS No.: SDG No.: W01982

Matrix: (soil/water) SOIL Lab Sample ID: 16019-004

Sample wt/vol: 30.10 (g/mL) G Lab File ID: A9594

Level: (low/med) LOW Date Received: 10/08/97

% Moisture: 7 decanted: (Y/N) N Date Extracted: 10/14/97

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 10/17/97

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH:

Number TICs found: 10

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

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1. 0	Aldol Condensation	4.86	60000	ABJN
2. 57103	Hexadecanoic acid	21.88	480	JN
3.	UNKNOWN	23.89	76	J
4. 85687	Butylbenzylphthalate	25.65	230	BJN
5.	UNKNOWN	25.98	85	J
6.	UNKNOWN	26.91	190	J
7.	UNKNOWN	28.54	88	J
8.	UNKNOWN	30.04	150	J
9.	UNKNOWN	31.44	71	J
10.	UNKNOWN	31.50	140	J

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BOL961

Lab Name: QUANTERRA MO Contract: 550-232

Lab Code: ITMO Case No.: S01901 SAS No.: SDG No.: W01982

Matrix: (soil/water) SOIL Lab Sample ID: 16019-005

Sample wt/vol: 30.00 (g/mL) G Lab File ID: A9610

Level: (low/med) LOW Date Received: 10/08/97

% Moisture: 7 decanted: (Y/N) N Date Extracted: 10/14/97

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 10/20/97

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH:

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
218-01-9	Chrysene	350	U
50-32-8	Benzo(a)Pyrene	350	U

1F
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

BOL961

Lab Name: QUANTERRA MO Contract: 550-232

Lab Code: ITMO Case No.: S01901 SAS No.: SDG No.: W01982

Matrix: (soil/water) SOIL Lab Sample ID: 16019-005

Sample wt/vol: 30.00 (g/mL) G Lab File ID: A9610

Level: (low/med) LOW Date Received: 10/08/97

% Moisture: 7 decanted: (Y/N) N Date Extracted: 10/14/97

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 10/20/97

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH:

Number TICs found: 6

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

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1. 0	Aldol Condensation	4.91	56000	ABJN
2.	UNKNOWN	21.85	320	J
3. 85687	Butylbenzylphthalate	25.62	190	BJN
4.	UNKNOWN	28.52	100	J
5.	UNKNOWN	30.02	120	J
6.	UNKNOWN	31.48	130	J

Quanterra
Environmental Services

Bechtel Hanford Incorporated
3350 George Washington Way
Richland, WA 99352

Project: [illegible]

Category: PCB's-8080
Method: EPA 8080
Matrix: SOLID

Sample Date : 10/13/97
Receipt Date : 10/08/97
Report Date : 10/22/97

Client ID: B0L957

Quanterra ID : 16019-001

Analyte	CAS Number	Blank Sample Name	Prep Date	Analysis Date	Result	Unit	Lab	Detection Limit	Dilution
Aroclor-1016	12674-11-2	QCBLK156014-1	10/14/97	10/21/97	33	UG/KG	U	33	1
Aroclor-1221	11104-28-2	QCBLK156014-1	10/14/97	10/21/97	33	UG/KG	U	33	1
Aroclor-1232	11141-16-5	QCBLK156014-1	10/14/97	10/21/97	33	UG/KG	U	33	1
Aroclor-1242	53469-21-9	QCBLK156014-1	10/14/97	10/21/97	33	UG/KG	U	33	1
Aroclor-1248	12672-29-6	QCBLK156014-1	10/14/97	10/21/97	33	UG/KG	U	33	1
Aroclor-1254	11097-69-1	QCBLK156014-1	10/14/97	10/21/97	33	UG/KG	U	33	1
Aroclor-1260	11096-82-5	QCBLK156014-1	10/14/97	10/21/97	33	UG/KG	U	33	1
DCB	2051-24-3	QCBLK156014-1	10/14/97	10/21/97	102	%REC			1
TCMX	877-09-8	QCBLK156014-1	10/14/97	10/21/97	108	%REC			1

Quanterra Environmental Services

[illegible]
[illegible] George Washington Hwy.
Richland, WA [illegible]

[illegible]

Category: PCB's-8080
Method: EPA 8080
Matrix: SOLID

Sample Date [illegible]
Extract Date [illegible]
Analyzed Date [illegible]

Client ID: B0L957

Quanterra ID: 16013-001MS

Analyte	CAS Number	Blank Sample Name	Prep Date	Analysis Date	Result	Unit	Qual	Detection Limit	Dilution
Aroclor-1016	12674-11-2	QCBLK156014-1	[illegible]	[illegible]	[illegible]	REC			1
Aroclor-1260	11096-82-5	QCBLK156014-1	[illegible]	[illegible]	[illegible]	REC			1
DCB	2051-24-3	QCBLK156014-1	[illegible]	[illegible]	[illegible]	REC			1
TCMX	877-09-8	QCBLK156014-1	[illegible]	[illegible]	[illegible]	REC			1

Quanterra
Environmental Services

Bechtel Hanford Incorporated
3350 George Washington Way
Richland, WA 99352

Project: 351 OSD

Category: PCB's-8080
Method: EPA 8080
Matrix: SOLID

Sample Date : 10/03/97
Received Date : 10/08/97
Report Date : 10/22/97

Client ID: B0L957

Quanterra ID : 16019-[illegible]MSD

Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual	Detection Limit	Dilution
Aroclor-1016	12674-11-2	ICBLK156014-1	10/14/97	10/21/97	[illegible]	UREC			1
Aroclor-1260	11096-82-5	ICBLK156014-1	10/14/97	10/21/97	[illegible]	UREC	*		1
DCB	2051-24-3	ICBLK156014-1	10/14/97	10/21/97	[illegible]	UREC			1
TCMX	877-09-8	ICBLK156014-1	10/14/97	10/21/97	[illegible]	UREC			1

Quanterra Environmental Services

Bechtel Hanford Incorporated
3350 George Washington Way
Richland, WA [illegible]

Project: [illegible]

Category: PCB's-8080
Method: EPA 8080
Matrix: SOLID

Sample Date : 10/03/97
Receipt Date : 10/08/97
Report Date : 10/22/97

Client ID: B0L958

Quanterra ID : 16019-002

Analyte	CAS Number	Blank Sample Name	Prep Date	Analyses Date	Result	Unit	Lab	Detection Limit	Dilution
Aroclor-1016	12674-11-2	QCBLK156014-1	10/14/97	10/21/97	33	UG/KG	U	33	1
Aroclor-1221	11104-28-2	QCBLK156014-1	10/14/97	10/21/97	33	UG/KG	U	33	1
Aroclor-1232	11141-16-5	QCBLK156014-1	10/14/97	10/21/97	33	UG/KG	U	33	1
Aroclor-1242	53469-21-9	QCBLK156014-1	10/14/97	10/21/97	33	UG/KG	U	33	1
Aroclor-1248	12672-29-6	QCBLK156014-1	10/14/97	10/21/97	33	UG/KG	U	33	1
Aroclor-1254	11097-69-1	QCBLK156014-1	10/14/97	10/21/97	33	UG/KG	U	33	1
Aroclor-1260	11096-82-5	QCBLK156014-1	10/14/97	10/21/97	33	UG/KG	U	33	1
DCB	2051-24-3	QCBLK156014-1	10/14/97	10/21/97	131	%REC			1
TCMX	877-09-8	QCBLK156014-1	10/14/97	10/21/97	110	%REC			1

Quanterra
Environmental Services

Battelle Hanford Incorporated
3351 George Washington Way
Richland, WA 99352

Project: 581 212

Category: PCB's-8080
Method: EPA 8080
Matrix: SOLID

Sample Date : 10/03/97
Receipt Date : 10/08/97
Report Date : 10/22/97

Client ID: B0L959

Quanterra ID : 16019-033

Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit	Dilution
Aroclor-1016	12674-11-2	QCBLK156014-1	10/14/97	10/20/97	35	UG/KG	U	35	1
Aroclor-1221	11104-28-2	QCBLK156014-1	10/14/97	10/20/97	35	UG/KG	U	35	1
Aroclor-1232	11141-16-5	QCBLK156014-1	10/14/97	10/20/97	35	UG/KG	U	35	1
Aroclor-1242	53469-21-9	QCBLK156014-1	10/14/97	10/20/97	35	UG/KG	U	35	1
Aroclor-1248	12672-29-6	QCBLK156014-1	10/14/97	10/20/97	35	UG/KG	U	35	1
Aroclor-1254	11097-69-1	QCBLK156014-1	10/14/97	10/20/97	35	UG/KG	U	35	1
Aroclor-1260	11096-82-5	QCBLK156014-1	10/14/97	10/20/97	35	UG/KG	U	35	1
DCB	2051-24-3	QCBLK156014-1	10/14/97	10/20/97	130	%REC			1
TCMX	877-09-8	QCBLK156014-1	10/14/97	10/20/97	114	%REC			1

Quanterra
Environmental Services

[illegible]
[illegible] George Washington Way
Richland, WA [illegible]

[illegible]

Category: PCB's-8080
Method: EPA 8080
Matrix: SOLID

Client ID: 30L960

[illegible] Date 10/03/97
[illegible] Date 10/08/97
[illegible] 10/22/97
[illegible] ID [illegible]

Analyte	CAS Number	Blank Sample Name	[illegible] Date	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	Dilution
Aroclor-1016	12674-11-2	QCBLK156014-1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1
Aroclor-1221	11104-28-2	QCBLK156014-1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1
Aroclor-1232	11141-16-5	QCBLK156014-1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1
Aroclor-1242	53469-21-9	QCBLK156014-1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1
Aroclor-1248	12672-29-6	QCBLK156014-1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1
Aroclor-1254	11097-69-1	QCBLK156014-1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1
Aroclor-1260	11096-82-5	QCBLK156014-1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1
DCB	2051-24-3	QCBLK156014-1	[illegible]	[illegible]	[illegible]	[illegible]	REC			-
TCMX	877-09-8	QCBLK156014-1	[illegible]	[illegible]	[illegible]	[illegible]	REC			1

Quanterra Environmental Services

Bechtel Hanford Incorporated
3350 George Washington Way
Richland, WA 99352

Project: 881.232

Category: PCB's-8080
Method: EPA 8080
Matrix: SOLID

Sample Date : 10/03/97
Receipt Date : 10/08/97
Report Date : 10/22/97

Client ID: B0L961

Quanterra ID : 15019-008

Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Units	Qual.	Detection Limit	Dilution
Aroclor-1016	12674-11-2	QCBLK156014-1	10/14/97	10/20/97	35	UG/KG	U	35	1
Aroclor-1221	11104-28-2	QCBLK156014-1	10/14/97	10/20/97	35	UG/KG	U	35	1
Aroclor-1232	11141-16-5	QCBLK156014-1	10/14/97	10/20/97	35	UG/KG	U	35	1
Aroclor-1242	53469-21-9	QCBLK156014-1	10/14/97	10/20/97	35	UG/KG	U	35	1
Aroclor-1248	12672-29-6	QCBLK156014-1	10/14/97	10/20/97	35	UG/KG	U	35	1
Aroclor-1254	11097-69-1	QCBLK156014-1	10/14/97	10/20/97	35	UG/KG	U	35	1
Aroclor-1260	11096-82-5	QCBLK156014-1	10/14/97	10/20/97	35	UG/KG	U	35	1
DCB	2051-24-3	QCBLK156014-1	10/14/97	10/20/97	126	%REC			1
TCMX	877-09-8	QCBLK156014-1	10/14/97	10/20/97	98	%REC			1

1D
PCB ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B0L957

Lab Name: QUANTERRA,MO Contract: 550.232

Lab Code: ITMO Case No.: _____ SAS No.: _____ SDG No.: W01982

Matrix: (soil/water) SOIL Lab Sample ID: 16019-001

Sample wt/vol: 30.0 (g/ml) G Lab File ID: _____

Level: (low/med) LOW Date Sampled: 10-03-97

% Moisture: not dec. _____ dec. _____ Date Extracted: 10-14-97

Extraction: (SepF/Cont/Sonc) Sonc Date Analyzed: 10-20-97

GPC Cleanup: (Y/N) N pH: _____ Dilution Factor: 1

CAS NO.	Compound	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
12674-11-2	Aroclor-1016	33	U
11104-28-2	Aroclor-1221	33	U
11141-16-5	Aroclor-1232	33	U
53469-21-9	Aroclor-1242	33	U
12672-29-6	Aroclor-1248	33	U
11097-69-1	Aroclor-1254	33	U
11096-82-5	Aroclor-1260	33	U

U: Concentration of analyte is less than the value given.

FORM I PEST

1D
PCB ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B0L958

Lab Name: QUANTERRA,MO Contract: 550.232

Lab Code: ITMO Case No.: _____ SAS No.: _____ SDG No.: W01982

Matrix: (soil/water) SOIL Lab Sample ID: 16019-002

Sample wt/vol: 30.0 (g/ml) G Lab File ID: _____

Level: (low/med) LOW Date Sampled: 10-03-97

% Moisture: not dec. _____ dec. _____ Date Extracted: 10-14-97

Extraction: (SepF/Cont/Sonc) Sonc Date Analyzed: 10-20-97

GPC Cleanup: (Y/N) N pH: _____ Dilution Factor: 1

CAS NO.	Compound	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
12674-11-2	Aroclor-1016	33	U
11104-28-2	Aroclor-1221	33	U
11141-16-5	Aroclor-1232	33	U
53469-21-9	Aroclor-1242	33	U
12672-29-6	Aroclor-1248	33	U
11097-69-1	Aroclor-1254	33	U
11096-82-5	Aroclor-1260	33	U

U: Concentration of analyte is less than the value given.

FORM I PEST

1D
PCB ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B0L959

Lab Name: QUANTERRA,MO Contract: 550.232

Lab Code: ITMO Case No.: _____ SAS No.: _____ SDG No.: W01982

Matrix: (soil/water) SOIL Lab Sample ID: 16019-003

Sample wt/vol: 30.1 (g/ml) G Lab File ID: _____

Level: (low/med) LOW Date Sampled: 10-03-97

% Moisture: not dec. _____ dec. _____ Date Extracted: 10-14-97

Extraction: (SepF/Cont/Sonc) Sonc Date Analyzed: 10-20-97

GPC Cleanup: (Y/N) N pH: _____ Dilution Factor: 1

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

CAS NO.	Compound		Q
12674-11-2------	Aroclor-1016	33	U
11104-28-2------	Aroclor-1221	33	U
11141-16-5------	Aroclor-1232	33	U
53469-21-9------	Aroclor-1242	33	U
12672-29-6------	Aroclor-1248	33	U
11097-69-1------	Aroclor-1254	33	U
11096-82-5------	Aroclor-1260	33	U

U: Concentration of analyte is less than the value given.

FORM I PEST

1D
PCB ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B0L960

Lab Name: QUANTERRA,MO Contract: 550.232

Lab Code: ITMO Case No.: _____ SAS No.: _____ SDG No.: W01982

Matrix: (soil/water) SOIL Lab Sample ID: 16019-004

Sample wt/vol: 30.0 (g/ml) G Lab File ID: _____

Level: (low/med) LOW Date Sampled: 10-03-97

% Moisture: not dec. _____ dec. _____ Date Extracted: 10-14-97

Extraction: (SepF/Cont/Sonc) Sonc Date Analyzed: 10-20-97

GPC Cleanup: (Y/N) N pH: _____ Dilution Factor: 1

CAS NO.	Compound	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
12674-11-2	Aroclor-1016	33	U
11104-28-2	Aroclor-1221	33	U
11141-16-5	Aroclor-1232	33	U
53469-21-9	Aroclor-1242	33	U
12672-29-6	Aroclor-1248	33	U
11097-69-1	Aroclor-1254	33	U
11096-82-5	Aroclor-1260	33	U

U: Concentration of analyte is less than the value given.

FORM I PEST

1D
PCB ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B0L961

Lab Name: QUANTERRA,MO Contract: 550.232

Lab Code: ITMO Case No.: _____ SAS No.: _____ SDG No.: W01982

Matrix: (soil/water) SOIL Lab Sample ID: 16019-005

Sample wt/vol: 30.0 (g/ml) G Lab File ID: _____

Level: (low/med) LOW Date Sampled: 10-03-97

% Moisture: not dec._____ dec._____ Date Extracted: 10-14-97

Extraction: (SepF/Cont/Sonc) Sonc Date Analyzed: 10-20-97

GPC Cleanup: (Y/N) N pH: _____ Dilution Factor: 1

CAS NO.	Compound	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
12674-11-2	Aroclor-1016	33	U
11104-28-2	Aroclor-1221	33	U
11141-16-5	Aroclor-1232	33	U
53469-21-9	Aroclor-1242	33	U
12672-29-6	Aroclor-1248	33	U
11097-69-1	Aroclor-1254	33	U
11096-82-5	Aroclor-1260	33	U

U: Concentration of analyte is less than the value given.

FORM I PEST

Quanterra
Environmental Services

Bechtel Hanford Incorporated
3350 George Washington Way
Richland, WA [illegible]

Project: [illegible]

Category: ICP Metals-6010A As,Tl
Method: EPA 6010
Matrix: SOLID

Sample Date 10/23/97
Receipt Date 10/28/97
Report Date 10/22/97

Client ID: B0L957

Quanterra ID : 16019-001

Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Lab	Detection Limit	Dilution
Arsenic	7440-38-2	ICBLK156127-1	10/14/97	10/15/97	[illegible]	MG/KG	U	[illegible]	1
Thallium	7440-28-0	ICBLK156127-1	10/14/97	10/15/97	[illegible]	MG/KG		[illegible]	1

Quanterra
Environmental Services

Bechtel Hanford Incorporated
1081 George Washington Way
Richland, WA [illegible]

Project: [illegible]

Category: ICP Metals-6010A (As,Tl)
Method: EPA 6010
Matrix: SOLID

Sample Date 10/03/97
Receipt Date : 10/08/97
Report Date 10/22/97

Client ID: B0L957

Quanterra ID : 16019-001MS

Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Lab	Detection Limit	Dilution
Arsenic	7440-38-2	QCBLK156127-1	10/14/97	10/15/97	[illegible]	UG/L			1
Thallium	7440-28-0	QCBLK156127-1	10/14/97	10/15/97	[illegible]	UG/L			1

Quanterra
Environmental Services

Bechtel Hanford Incorporated
3350 George Washington Way
Richland, WA 99352

Project: 881.012

Category: ICP Metals-6010A (As,Tl
Method: EPA 6010
Matrix: SOLID

Sample Date 11/13/97
Receipt Date : 11/18/97
Report Date : 11/22/97

Client ID: B0L957

Quanterra ID : 16019-001MSD

Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit	Dilution
Arsenic	7440-38-2	QCBLK1541127-1	11/14/97	11/18/97	95	UREC			1
Thallium	7440-28-0	QCBLK1541127-1	11/14/97	11/18/97	<4	REC			1

Quanterra Environmental Services

Bechtel Hanford Incorporated
3350 George Washington Way
Richland, WA [illegible]

Project: [illegible]

Category: ICP Metals-6010A As,Tl
Method: EPA 6010
Matrix: SOLID

Client ID: B0L956

Sample Date : 10/03/97
Receipt Date : 10/08/97
Report Date : 10/22/97

Quanterra ID : 16019-[illegible]

Analyte	CAS Number	Blank Sample Name	Prep. Date	Analysis Date	Result	Unit	Qual	Detection Limit	Dilution
Arsenic	7440-38-2	ICBLK1961127-1	[illegible]	[illegible]	[illegible]	MG/KG	[illegible]	[illegible]	1
Thallium	7440-28-0	ICBLK1961127-1	[illegible]	[illegible]	[illegible]	MG/KG	[illegible]	[illegible]	1

Quanterra Environmental Services

Bechtel Hanford [illegible]
[illegible] George Washington [illegible]
Richland, WA [illegible]

Project: [illegible]

Category: ICP Metals-6010A As,Tl
Method: EPA 6010
Matrix: SOLID

Client ID: B0L959

Sample Date : 10/03/97
Receipt Date 10/08/97
Report Date 10/22/97

Quanterra ID : 16019-003

Analyte	CAS Number	Blank Sample Name	Prep Date	Analysis Date	Result	Unit	Qual	Detection Limit	Dilution
Arsenic	7440-38-2	2CBLK136107-1	10/14/97	10/15/97	[illegible]	MG/KG	B	11.5	1
Thallium	7440-28-0	2CBLK136107-1	10/14/97	[illegible]	[illegible]	MG/KG	[illegible]	21.2	1

Quanterra Environmental Services

Bechtel Hanford Incorporated
3350 George Washington Way
Richland, WA 99352

Project: [illegible]

Category: ICP Metals-6010A As,Tl
Method: EPA 6010
Matrix: SOLID

Sample Date : 10/03/97
Receipt Date : 10/06/97
Report Date : 10/22/97

Client ID: B0L960

Quanterra ID : 16019-004

Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual	Detection Limit	Dilution
Arsenic	7440-38-2	ICBLK156127-1	10/14/97	10/15/97	[illegible]	MG/KG	B	[illegible]	1
Thallium	7440-28-0	ICBLK156127-1	10/14/97	10/15/97	[illegible]	MG/KG	U	[illegible]	1

Quanterra
Environmental Services

Bechtel Hanford Incorporated
3150 George Washington Way
Richland, WA 99352

Project: 881.032

Category: ICP Metals-6010A (As,Tl)
Method: EPA 6010
Matrix: SOLID

Sample Date : 10/03/97
Receipt Date : 10/08/97
Report Date : 10/22/97

Client ID: B0L961

Quanterra ID : 16119-005

Analyte	CAS Number	Blank Sample Name	Prep Date	Analyses Date	Result	Unit	Qual	Detection Limit	Dilution
Arsenic	7440-38-2	QCBLK156127-1	10/14/97	10/15/97	13.6	MG/KG	B	32.3	1
Thallium	7440-28-0	QCBLK156127-1	10/14/97	10/15/97	[illegible]	MG/KG	U	215	1

U.S. EPA - CLP

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

B0L957

Lab Name: QUANTERRA MO Contract: 550.232

Lab Code: ITMO Case No.: SAS No.: SDG No.: W01982

Matrix (soil/water): SOIL Lab Sample ID: 16019-001

Level (low/med): LOW Date Received: 10/08/97

% Solids: 99.9

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

CAS No.	Analyte	Concentration	C	Q	M
7440-38-2	Arsenic	5.6	U		P
7440-28-0	Thallium	3.2	U		P

Color Before: Clarity Before: Texture:

Color After: Clarity After: Artifacts:

Comments:

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U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

B0L958

Lab Name: QUANTERRA_MO_____ Contract: 550.232___
Lab Code: ITMO__ Case No.:_____ SAS No.:_____ SDG No.: W01982_____
Matrix (soil/water): SOIL_ Lab Sample ID: 16019-002
Level (low/med): LOW__ Date Received: 10/08/97
% Solids: _99.9

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

CAS No.	Analyte	Concentration	C	Q	M
7440-38-2	Arsenic__	5.6	U		P_
7440-28-0	Thallium_	3.2	U		P_

Color Before: _____ Clarity Before: _____ Texture: _____
Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

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SW-846

U.S. EPA - CLP

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

B0L959

Lab Name: QUANTERRA MO Contract: 550.232

Lab Code: ITMO Case No.: SAS No.: SDG No.: W01982

Matrix (soil/water): SOIL Lab Sample ID: 16019-003

Level (low/med): LOW Date Received: 10/08/97

% Solids: 95.4

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

CAS No.	Analyte	Concentration	C	Q	M
7440-38-2	Arsenic	10.6	B		P
7440-28-0	Thallium	3.4	U		P

Color Before: Clarity Before: Texture:

Color After: Clarity After: Artifacts:

Comments:

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U.S. EPA - CLP

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

B0L960

Lab Name: QUANTERRA_MO Contract: 550.232

Lab Code: ITMO Case No.: SAS No.: SDG No.: W01982

Matrix (soil/water): SOIL Lab Sample ID: 16019-004

Level (low/med): LOW Date Received: 10/08/97

% Solids: 93.1

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

CAS No.	Analyte	Concentration	C	Q	M
7440-38-2	Arsenic	13.8	B		P
7440-28-0	Thallium	3.4	U		P

Color Before: Clarity Before: Texture:

Color After: Clarity After: Artifacts:

Comments:

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U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

B0L961

Lab Name: QUANTERRA_MO Contract: 550.232
Lab Code: ITMO Case No.: SAS No.: SDG No.: W01982
Matrix (soil/water): SOIL Lab Sample ID: 16019-005
Level (low/med): LOW Date Received: 10/08/97
% Solids: 93.0

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

CAS No.	Analyte	Concentration	C	Q	M
7440-38-2	Arsenic	13.5	B		P
7440-28-0	Thallium	3.4	U		P

Color Before: Clarity Before: Texture:
Color After: Clarity After: Artifacts:

Comments:

FORM I - IN

SW-846

Quanterra
Environmental Services

Quanterra Incorporated
2800 George Washington Way
Richland, Washington 99352

509 375-3131 Telephone
509 375-5590 Fax

CERTIFICATE OF ANALYSIS

OCT 1997
RECEIVED
Data
Log In

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

October 27, 1997

Attention: Joan Kessner

SAF Number	:	B97-120
Date SDG Closed	:	October 8, 1997
Number of Samples	:	Five (5)
Sample Type	:	Soil
SDG Number	:	W01982
Data Deliverable	:	Summary

I. Introduction

On October 8, 1997, five soil samples were received by the Quanterra Inc., Richland Laboratory (QRL) for radiochemical analysis. Upon receipt, these samples were assigned the following laboratory ID numbers to correspond with the Bechtel Hanford (BHI) specific IDs:

QTESRL ID#	BHI ID#	MATRIX	DATE OF INITIATION
71013701	B0L957	SOIL	10/8/97
71013702	B0L958	SOIL	10/8/97
71013703	B0L959	SOIL	10/8/97
71013704	B0L960	SOIL	10/8/97
71013705	B0L961	SOIL	10/8/97

II. Analytical Results/Methodology

The analytical results for this report are presented by laboratory sample ID. Each set of data includes sample identification information, analytical results and the appropriate associated statistical errors.

The requested analyses were:

Alpha Spectroscopy
Uranium-234, -235, -238 by method RICH-RC-5030
Gamma Spectroscopy
Gamma Scan by method RICH-RC-5017

III. Quality Control

The analytical results for each analysis performed under SDG W01982 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

Uranium-234, -235, -238 by method RICH-RC-5030
The LCS, batch blank, sample and sample duplicate (B0L957) results are within contractual requirements.

Gamma Spectroscopy

Gamma Scan by method RICH-RC-5017
The LCS, batch blank, sample and sample duplicate (B0L957) 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:

Andy Kopriva
Project Manager

Quanterra
Environmental Services

SAMPLE RESULTS

LAB NAME:	QUANTERRA, Richland	**SDG: /RPT GRP:**	W01982 / 3631
LAB SAMPLE ID:	71013701	**MATRIX:**	SOIL
CLIENT ID:	B0L957	**DATE RECEIVED:**	10/8/1997 11:23:00 AM

ANALYTE	RESULT	COUNTING ERROR (2 s)	TOTAL ERROR (2 s)	MDA/IDL	REPORT UNIT	YIELD	METHOD NUMBER
U-234	3.47E-01	9.0E-02	1.1E-01	3.29E-02	pCi/g	71.10%	RICHRC5030
U-235	4.03E-02	3.1E-02	3.2E-02	2.34E-02	pCi/g	71.10%	RICHRC5030
U-238	3.77E-01	9.4E-02	1.1E-01	2.66E-02	pCi/g	71.10%	RICHRC5030
CO-60	3.50E-03	1.0E-02	1.0E-02	1.77E-02	pCi/g	N/A	RICHRC5017
CS-137DA	-8.55E-03	9.6E-03	9.6E-03	1.51E-02	pCi/g	N/A	RICHRC5017
EU-152	-8.69E-03	2.2E-02	2.2E-02	3.51E-02	pCi/g	N/A	RICHRC5017
EU-154	-3.67E-02	3.6E-02	3.6E-02	5.76E-02	pCi/g	N/A	RICHRC5017
EU-155	1.36E-02	2.2E-02	2.3E-02	3.72E-02	pCi/g	N/A	RICHRC5017
K-40	1.55E+01	4.9E-01	1.6E+00	N/A	pCi/g	N/A	RICHRC5017
RA-224DA	2.32E-01	2.1E-02	3.2E-02	N/A	pCi/g	N/A	RICHRC5017
RA-226DA	1.57E-01	2.2E-02	2.7E-02	4.41E-02	pCi/g	N/A	RICHRC5017
RA-228DA	2.37E-01	4.3E-02	4.9E-02	8.44E-02	pCi/g	N/A	RICHRC5017

Number of Results: 12

Result = IDL When Not Detected

Quanterra
Environmental Services

SAMPLE RESULTS

LAB NAME:	QUANTERRA, Richland	SDG: /RPT GRP:	W01982 / 3631
LAB SAMPLE ID:	71013702	MATRIX:	SOIL
CLIENT ID:	B0L958	DATE RECEIVED:	10/8/1997 11:23:00 AM

ANALYTE	RESULT	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA/IDL	REPORT UNIT	YIELD	METHOD NUMBER
U-234	3.32E-01	8.6E-02	1.0E-01	3.25E-02	pCi/g	73.70%	RICHRC5030
U-235	4.61E-03	1.1E-02	1.1E-02	2.50E-02	pCi/g	73.70%	RICHRC5030
U-238	3.34E-01	8.6E-02	1.0E-01	2.21E-02	pCi/g	73.70%	RICHRC5030
CO-60	-1.89E-03	1.0E-02	1.0E-02	1.70E-02	pCi/g	N/A	RICHRC5017
CS-137DA	8.75E-03	9.1E-03	9.2E-03	1.57E-02	pCi/g	N/A	RICHRC5017
EU-152	6.09E-03	2.3E-02	2.3E-02	3.79E-02	pCi/g	N/A	RICHRC5017
EU-154	-4.17E-03	3.4E-02	3.4E-02	5.72E-02	pCi/g	N/A	RICHRC5017
EU-155	4.51E-03	2.1E-02	2.1E-02	3.37E-02	pCi/g	N/A	RICHRC5017
K-40	1.55E+01	5.1E-01	1.6E+00	N/A	pCi/g	N/A	RICHRC5017
RA-224DA	1.79E-01	2.5E-02	3.1E-02	N/A	pCi/g	N/A	RICHRC5017
RA-226DA	1.88E-01	2.9E-02	3.5E-02	N/A	pCi/g	N/A	RICHRC5017
RA-228DA	2.41E-01	7.0E-02	7.4E-02	N/A	pCi/g	N/A	RICHRC5017

Number of Results: 12

Result = IDL When Not Detected

Quanterra
Environmental Services

SAMPLE RESULTS

LAB NAME:	QUANTERRA, Richland	SDG: /RPT GRP:	W01982 / 3631
LAB SAMPLE ID:	71013703	MATRIX:	SOIL
CLIENT ID:	B0L959	DATE RECEIVED:	10/8/1997 11:23:00 AM

ANALYTE	RESULT	COUNTING ERROR (2 s)	TOTAL ERROR (2 s)	MDA/IDL	REPORT UNIT	YIELD	METHOD NUMBER
U-234	1.39E+00	2.0E-01	3.2E-01	4.30E-02	pCi/g	65.30%	RICHRC5030
U-235	4.06E-02	3.4E-02	3.5E-02	3.18E-02	pCi/g	65.30%	RICHRC5030
U-238	1.26E+00	1.9E-01	2.9E-01	3.18E-02	pCi/g	65.30%	RICHRC5030
CO-60	-6.87E-03	1.1E-02	1.1E-02	1.79E-02	pCi/g	N/A	RICHRC5017
CS-137DA	1.14E-02	1.1E-02	1.1E-02	1.89E-02	pCi/g	N/A	RICHRC5017
EU-152	-7.92E-03	2.5E-02	2.5E-02	4.17E-02	pCi/g	N/A	RICHRC5017
EU-154	6.59E-03	3.5E-02	3.5E-02	5.92E-02	pCi/g	N/A	RICHRC5017
EU-155	5.79E-02	2.9E-02	2.9E-02	4.59E-02	pCi/g	N/A	RICHRC5017
K-40	1.48E+01	5.3E-01	1.6E+00	N/A	pCi/g	N/A	RICHRC5017
RA-224DA	6.16E-01	3.1E-02	6.9E-02	N/A	pCi/g	N/A	RICHRC5017
RA-226DA	5.04E-01	5.5E-02	7.5E-02	N/A	pCi/g	N/A	RICHRC5017
RA-228DA	6.39E-01	9.2E-02	1.1E-01	N/A	pCi/g	N/A	RICHRC5017
U-238	1.07E+00	3.9E-01	4.0E-01	N/A	pCi/g	N/A	RICHRC5017

Number of Results: 13

Result = IDL When Not Detected

Quanterra
Environmental Services

SAMPLE RESULTS

LAB NAME:	QUANTERRA, Richland	SDG: /RPT GRP:	W01982 / 3631
LAB SAMPLE ID:	71013704	MATRIX:	SOIL
CLIENT ID:	B0L960	DATE RECEIVED:	10/8/1997 11:23:00 AM

ANALYTE	RESULT	COUNTING ERROR (2 s)	TOTAL ERROR (2 s)	MDA/IDL	REPORT UNIT	YIELD	METHOD NUMBER
U-234	1.30E+00	2.2E-01	3.4E-01	5.37E-02	pCi/g	45.40%	RICHRC5030
U-235	1.81E-02	2.6E-02	2.6E-02	2.45E-02	pCi/g	45.40%	RICHRC5030
U-238	1.15E+00	2.0E-01	3.1E-01	5.12E-02	pCi/g	45.40%	RICHRC5030
CO-60	3.58E-03	1.2E-02	1.2E-02	2.07E-02	pCi/g	N/A	RICHRC5017
CS-137DA	8.07E-04	1.1E-02	1.1E-02	1.74E-02	pCi/g	N/A	RICHRC5017
EU-152	-3.48E-02	2.8E-02	2.8E-02	4.29E-02	pCi/g	N/A	RICHRC5017
EU-154	-1.13E-02	3.9E-02	3.9E-02	6.35E-02	pCi/g	N/A	RICHRC5017
EU-155	6.27E-03	2.9E-02	2.9E-02	4.71E-02	pCi/g	N/A	RICHRC5017
K-40	1.47E+01	4.7E-01	1.5E+00	N/A	pCi/g	N/A	RICHRC5017
RA-224DA	6.09E-01	3.0E-02	6.8E-02	N/A	pCi/g	N/A	RICHRC5017
RA-226DA	4.71E-01	4.2E-02	6.3E-02	N/A	pCi/g	N/A	RICHRC5017
RA-228DA	7.32E-01	8.6E-02	1.1E-01	N/A	pCi/g	N/A	RICHRC5017
U-238	1.29E+00	6.0E-01	6.2E-01	N/A	pCi/g	N/A	RICHRC5017

Number of Results: 13

Result = IDL When Not Detected

Quanterra
Environmental Services

SAMPLE RESULTS

LAB NAME:	QUANTERRA, Richland	SDG: /RPT GRP:	W01982 / 3631
LAB SAMPLE ID:	71013705	MATRIX:	SOIL
CLIENT ID:	B0L961	DATE RECEIVED:	10/8/1997 11:23:00 AM

ANALYTE	RESULT	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA/IDL	REPORT UNIT	YIELD	METHOD NUMBER
U-234	1.08E+00	2.0E-01	2.9E-01	4.10E-02	pCi/g	46.80%	RICHRC5030
U-235	2.62E-02	3.1E-02	3.2E-02	3.61E-02	pCi/g	46.80%	RICHRC5030
U-238	1.13E+00	2.0E-01	3.0E-01	3.61E-02	pCi/g	46.80%	RICHRC5030
CO-60	-9.53E-03	1.2E-02	1.2E-02	1.93E-02	pCi/g	N/A	RICHRC5017
CS-137DA	1.32E-02	1.1E-02	1.1E-02	1.84E-02	pCi/g	N/A	RICHRC5017
EU-152	1.21E-03	2.5E-02	2.5E-02	4.28E-02	pCi/g	N/A	RICHRC5017
EU-154	3.07E-02	3.6E-02	3.6E-02	6.35E-02	pCi/g	N/A	RICHRC5017
EU-155	5.09E-02	3.0E-02	3.1E-02	5.23E-02	pCi/g	N/A	RICHRC5017
K-40	1.51E+01	5.3E-01	1.6E+00	N/A	pCi/g	N/A	RICHRC5017
RA-224DA	6.28E-01	3.1E-02	7.0E-02	N/A	pCi/g	N/A	RICHRC5017
RA-226DA	4.91E-01	4.5E-02	6.7E-02	N/A	pCi/g	N/A	RICHRC5017
RA-228DA	6.76E-01	9.3E-02	1.1E-01	N/A	pCi/g	N/A	RICHRC5017

Number of Results: 12

Result = IDL When Not Detected

Quanterra Data Review Checklist
RADIOCHEMISTRY

Work Order number (s): 710137

Client ID: BHI

Due Date: 10-23-97

Lab Sample Number or SDG: W91982

Method Test Parameters: U ISO

Matrix: Soil

Review Item	Yes (✓)	No (✓)	N/A (✓)	2nd Level Review (✓)
A. Calibration				
1. Is the calibration documentation included where applicable?			✓	
B. Sample Analysis				
1. Are the sample yields within acceptance criteria?	✓			✓
2. Were all sample holding times met?	✓			✓
3. Is the sample Minimum Detectable Activity < the Contract Detection Limit?	✓			✓
C. QC Samples				
1. Is the blank yield within acceptance criteria	✓			✓
2. Is the Minimum Detectable Activity for the blank result ≤ the Contract Detection Limit?	✓			✓
3. Is the blank result < 1/2 the Contract Detection Limit?	✓			✓
4. Is the blank > 1/2 the Contract Detection Limit but < Contract Detection Limit?			✓	
5. Is the blank result > the Contract Detection Limit but the sample result < the Contract Detection Limit?			✓	
6. Is the LCS result within acceptance criteria?	✓			✓
7. Is the LCS yield within acceptance criteria	✓			✓
8. Is the LCS Minimum Detectable Activity ≤ the Contract Detection Limit?	✓			✓
9. MS/MSD results and yield meet acceptance criteria?			✓	
10. Duplicate sample results and yield meet acceptance criteria?	✓			✓
D. Other				
1. Are all Nonconformances included and noted?			✓	
2. Are all required forms filed out?	✓			✓
3. Correct methodology used?	✓			✓
4. Transcription checked? JM 10-26-97	✓			
5. Were all calculations checked at a minimum frequency?	✓			
6. Units checked?	✓			✓

Comments on any "No" response: _____

First Level Review: Joel Nagemann Date: 10-27-97

Second Level Review: [signature] Date: 10/27/97

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

Quanterra Data Review Checklist
RADIOCHEMISTRY

Work Order number(s):	710137
Client ID:	BHI
Due Date:	10/23
Lab Sample Number or SDG:	W01982
Method Test Parameters:	Gamma a
Matrix:	Soil

Review Item	Yes (✓)	No (✓)	N/A (✓)	2nd Level Review (✓)
A. Calibration				
1. Is the calibration documentation included where applicable?			✓	
B. Sample Analysis				
1. Are the sample yields within acceptance criteria?			✓	
2. Were all sample holding times met?	✓			✓
3. Is the sample Minimum Detectable Activity < the Contract Detection Limit?	✓			✓
C. QC Samples				
1. Is the blank yield within acceptance criteria			✓	
2. Is the Minimum Detectable Activity for the blank result ≤ the Contract Detection Limit?	✓			✓
3. Is the blank result < 1/2 the Contract Detection Limit?	✓			✓
4. Is the blank > 1/2 the Contract Detection Limit but < Contract Detection Limit?			✓	
5. Is the blank result > the Contract Detection Limit but the sample result < the Contract Detection Limit?			✓	
6. Is the LCS result within acceptance criteria?	✓			✓
7. Is the LCS yield within acceptance criteria			✓	
8. Is the LCS Minimum Detectable Activity ≤ the Contract Detection Limit?			✓	
9. MS/MSD results and yield meet acceptance criteria?			✓	
10. Duplicate sample results and yield meet acceptance criteria?	✓			✓
D. Other				
1. Are all Nonconformances included and noted?			✓	
2. Are all required forms filed out?	✓			✓
3. Correct methodology used?	✓			✓
4. Transcription checked?	✓			
5. Were all calculations checked at a minimum frequency?	✓			
6. Units checked?	✓			✓

Comments on any "No" response: _____

First Level Review: [signature] Date: 10-27-97

Second Level Review: [signature] Date: 10/27/97

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

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

B97-120-02 | Page 1 of 1

Collector: Doug Bowers/Bob Fahlberg	Company Contact: Frank Gustafson	Telephone No.: 373-5904	Project Coordinator: Koerner, CC
Date Turnaround: 15 Days			
Project Designation: 300-FF-1 Process Trenches Verification/Screening Sampling	Sampling Location: 300 FF-1		SAF No.: B97-120
Ice Chest No.: ERC 96-027	Field Logbook No.: ~~SFR-1199-4~~ 10-3-97 EL 1395		Method of Shipment: Gov vehicle
Shipped To: Quanterra	Offsite Property No.		Bill of Lading/Air Bill No.

000016

POSSIBLE SAMPLE HAZARDS/REMARKS
Possible radioactive

Special Handling and/or Storage
cool 4C

SAMPLE ANALYSIS
710136 SDG W01982

Preservation	None	None	None	Cool 4C	Cool 4C	None				
Type of Container	P	P	sG	sG	sG	sG				
No. of Container(s)	1	1	1	1	1	1				
Volume	20ml	20ml	60ml	120ml	120ml	1000ml				
	Activity Scan	Isotopic Uranium 710137	ICP Metals - 6010A (Add-on) (Arsenic, Thallium)	PCBs - 8080	Semi-VOA - 8270A (TCL) (Benzo(a)pyrene, Chrysene)	Gamma Spectroscopy (Cobalt-60) 710137				

Sample No.	Matrix *	Sample Date	Sample Time	Activity Scan	Isotopic Uranium	ICP Metals	PCBs	Semi-VOA	Gamma Spectroscopy			
B0L957 01	S	10-3-97	1025	X	X	X	X	X	X		B0L957	
B0L958 02	S	10-3-97	1030	X	X	X	X	X	X		B0L958	
B0L959 03	S	10-3-97	1050	X	X	X	X	X	X		B0L959	
B0L960 04	S	10-3-97	1056	X	X	X	X	X	X		B0L960	
B0L961 05	S	10-3-97	1119	X	X	X	X	X	X		B0L961	

CHAIN OF POSSESSION — Sign/Print Names

Relinquished By	Date/Time	Received By	Date/Time
Doug Bowers	10-8-97 1123	Fahlberg	10-8-97 1123
		Lockard	

SPECIAL INSTRUCTIONS

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

Post-it® Fax Note 7671 Date 10/7/97 # of pages ▶ 6
To Dennis Bowman From A. Davis
Co./Dept. Co.
Phone # Phone # 371-9231
Fax # 376-8851 Fax #

GAMMA-RAY ENERGY ANALYSIS REPORT

Thermo Hanford Inc.
Radiological Counting Facility THI - RCF

B0L857

Project	300-FF-1		
Customer ID	B0L857	Soil	
RCF ID	RCF1872		
	Sample time, date	1025	10/3/97
	Analysis date		10/6/97

Isotope		Activity pCi/gm		2 s err	Ci/gm	
K40	<	3.2e+00			3.2e-12	
Co60		7.9e-01	+/-	2.3e-01	7.9e-13	
I129	<	2.2e+00			2.2e-12	
Cs137	<	2.7e-01			2.7e-13	
Eu152	<	7.9e-01			7.9e-13	
Eu154	<	3.5e-01			3.5e-13	
Eu155	<	1.3e+00			1.3e-12	
Th32dau		1.8e+00	+/-	7.8e-01	1.8e-12	
U235	<	2.0e+00			2.0e-12	
U238	<	3.3e+01			3.3e-11	
U238dau	<	6.9e-01			6.9e-13	
Np237	<	5.3e-01			5.3e-13	
Am241	<	7.1e-01			7.1e-13	
Tot Act Gam (pCi/gm)		2.6e+00		Ci/gm	2.6e-12	
Y/Sr-90	<	N/R				
Gross Alpha	<	1.3e+00			1.3e-12	
Gross Beta		2.0e+01	+/-	3.5e+00	2.0e-11	Reported as 137-Cs Betas.
AEA total	<	N/R				

Total Activity (pCi/gm) 2.0e+01
(Ci/gm) 2.0e-11

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

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, may have inapplicable results for the Th, U, transuranium and daughter products. The results must then be balanced for the gross alpha analysis.

N/R means no result or analysis not requested.

S E Huff 6 9 10 — 10-7-97
Radiological analyst — Date

Albert I. Davis — 10-07-97
Radiological Manager — Date

GAMMA-RAY ENERGY ANALYSIS REPORT

Thermo Hanford Inc.
Radiological Counting Facility THI - RCF

B0L958

Project	300-FF-1		
Customer ID	B0L958	Soil	
RCF ID	RCF1873		
	Sample time, date	1030	10/3/97
	Analysis date		10/6/97

Isotope		Activity pCi/gm		2 s err	Ci/gm
K40		2.5e+01	+/-	5.0e+00	2.5e-11
Co60		6.7e-01	+/-	3.8e-01	6.7e-13
I129	<	2.2e+00			2.2e-12
Cs137	<	1.8e-01			1.8e-13
Eu152	<	1.9e+00			1.9e-12
Eu154	<	5.1e-01			5.1e-13
Eu155	<	1.4e+00			1.4e-12
Th32dau	<	1.7e+00			1.7e-12
U235	<	1.7e+00			1.7e-12
U238	<	4.1e+01			4.1e-11
U238dau	<	5.8e-01			5.8e-13
Np237	<	4.3e-01			4.3e-13
Am241	<	7.2e-01			7.2e-13
Tot Act Gam (pCi/gm)		2.6e+01		Ci/gm	2.6e-11
Y/Sr-90	<	N/R			
Gross Alpha	<	7.7e-01			7.7e-13
Gross Beta		1.8e+01	+/-	3.2e+00	1.8e-11
AEA total	<	N/R			

Reported as 137-Cs Betas.

Total Activity (pCi/gm)	1.8e+01
(Ci/gm)	1.8e-11

Definitions:

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

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, may 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.

Radiological analyst — 10-7-97 Date

Albert I. Davis — 10-07-97 Date
Radiological Manager

GAMMA-RAY ENERGY ANALYSIS REPORT

Thermo Hanford Inc.
Radiological Counting Facility THI - RCF

B0L959

Project	300-FF-1		
Customer ID	B0L999	Soil	
RCF ID	RCF1874		
	Sample time, date	1050	10/3/97
	Analysis date		10/6/97

Isotope		Activity pCi/gm		2 s er	Ci/gm	
K40		1.8e+01	+/-	7.0e+00	1.8e-11	
Co60	<	6.9e-01			6.9e-13	
I129	<	7.3e+01			7.3e-11	
Cs137	<	6.4e-01			6.4e-13	
Eu152	<	3.4e+00			3.4e-12	
Eu154	<	1.7e+00			1.7e-12	
Eu155	<	1.8e+00			1.8e-12	
Th32dau	<	1.1e+00			1.1e-12	
U235	<	2.9e+00			2.9e-12	
U238	<	7.0e+01			7.0e-11	
U238dau		3.4e+00	+/-	7.6e-01	3.4e-12	
Np237	<	1.1e+00			1.1e-12	
Am241	<	2.6e+00			2.6e-12	
Tot Act Gam (pCi/gm)		2.1e+01		Ci/gm	2.1e-11	
Y/Sr-90	<	N/R				
Gross Alpha	<	1.1e+00			1.1e-12	
Gross Beta		2.3e+01	+/-	4.4e+00	2.3e-11	Reported as 137-Cs Betas.
AEA total	<	N/R				

Total Activity (pCi/gm) 2.3e+01
(Ci/gm) 2.3e-11

Definitions:

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

All errors reported at 2 standard deviations
A Assigned as residual beta from Gamma/Beta between.
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, may have inexplicable 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.

SE Huff for AID 10-7-97
Radiological analyst Date

Albert I. Davis 10-07-97
Albert I. Davis Date
Radiological Manager

GAMMA-RAY ENERGY ANALYSIS REPORT

Thermo Hanford Inc.
Radiological Counting Facility THI - RCF

B0L960

Project	300-FF-1			
Customer ID	B0L960	Soil		
RCF ID	RCF1875			
	Sample time, date		1056	10/3/97
	Analysis date			10/6/97

Isotope		Activity pCi/gm		2 s err	Ci/gm	
K40	<	1.2e+01			1.2e-11	
Co60	<	1.3e+00			1.3e-12	
I129	<	1.3e+02			1.3e-10	
Cs137	<	8.2e-01			8.2e-13	
Eu152	<	5.3e+00			5.3e-12	
Eu154	<	4.2e+00			4.2e-12	
Eu155	<	3.6e+00			3.6e-12	
Th32dau	<	3.8e+00			3.8e-12	
U235	<	5.9e+00			5.9e-12	
U238	<	1.2e+02			1.2e-10	
U238dau		3.7e+00	+/-	1.1e+00	3.7e-12	
Np237	<	2.1e+00			2.1e-12	
Am241	<	5.5e+00			5.5e-12	
Tot Act Gam (pCi/gm)		3.7e+00		Ci/gm	3.7e-12	
Y/Sr-90	<	N/R				
Gross Alpha	<	9.5e-01			9.5e-13	
Gross Beta		2.2e+01	+/-	3.6e+00	2.2e-11	Reported as 137-Cs Betas.
AEA total	<	N/R				

Total Activity (pCi/gm) 2.2e+01
(Ci/gm) 2.2e-11

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

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, may have inapplicable results for the Th, U, transmission and daughter products. The results must then be balanced for the gross alpha analysis.

N/R means no result or analysis not requested.

C E Hoffly 10-7-97
Radiological Analyst Date

Albert I. Davis 10-07-97
Albert I. Davis Date
Radiological Manager

GAMMA-RAY ENERGY ANALYSIS REPORT

Thermo Hanford Inc.
Radiological Counting Facility THI - RCF

Project	300-FF-1		
Customer ID	B0L991	Soil	B0L961
RCF ID	RCF1876		
	Sample time, date	1119	10/3/97
	Analysis date		10/7/97

Isotope		Activity pCi/gm		2 s err	Ci/gm
K40		2.3e+01	+/-	7.7e+00	2.3e-11
Co60	<	5.8e-01			5.8e-13
I129	<	4.8e+00			4.8e-12
Cs137	<	3.1e-01			3.1e-13
Eu152	<	1.9e+00			1.9e-12
Eu154	<	1.3e+00			1.3e-12
Eu155	<	2.9e+00			2.9e-12
Th32dau	<	7.9e+00			7.9e-12
U235	<	4.8e+00			4.8e-12
U238	<	5.2e+01			5.2e-11
U238dau	<	4.5e+00			4.5e-12
Np237	<	1.3e+00			1.3e-12
Am241	<	1.8e+00			1.8e-12
Tot Act Gam (pCi/gm)		2.3e+01		Ci/gm	2.3e-11
Y/Sr-90	<	N/R			
Gross Alpha	<	8.8e-01			8.8e-13
Gross Beta		1.5e+01	+/-	3.2e+00	1.5e-11
AEA total	<	N/R			

Reported as 137-Cs Betas.

Total Activity (pCi/gm)	2.3e+01
(Ci/gm)	2.3e-11

Definitions:

All errors reported at 2 standard deviations
A Assigned as residual beta from Gamma/Beta balance.

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

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, may 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.

SE Hyll L. Ord	10-7-97	Albert I. Davis	10-07-97
Radiological analyst	Date	Albert I. Davis Radiological Manager	Date

Figure 1

SAMPLE CHECK-IN LIST

Date/Time Received: 10/8 @ 1120 SG#: _____

Work Order Number: _____ SAF #: B97-120

Shipping Container ID: 96-027 Chain of Custody #: B97-120-02

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 2° C
5. Vermiculite/packing materials is Wet [ ] Dry [✓] na
6. Number of samples in shipping container: 30
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: Heidelberg Date: 10-8-97 1123

Telephoned To: _____ On _____ By _____

000022

*** UISO ***

CHAIN-OF-CUSTODY BATCH ANALYSIS RECORD

9-Oct-1997
Page 1

CUSTOMER: BHI

SAMPLE DELIVERY GROUP W01982

MATRIX : SOIL

BATCH NUMBER 10-137

	QES ID	DUP	ACCOUNT	CUSTOMER ID	COMMENTS
	T1013715 EQIE237				
1)	71013701 R1013701		BHI	BOL957	
2)	71013702		BHI	BOL958	
3)	71013703		BHI	BOL959	SAMPLE MISTAKENLY GIVEN HCLO4 ASHING
4)	71013704		BHI	BOL960	
5)	71013705		BHI	BOL961	

ACTIONS (Initial & Date)

1) INITIATED RB 10/9/97 RB 10-9-97

SOP(S) # RD9888

2) PREP LAB RECEIVED JW 10-14-97

SOP(S) # RICHRC5013

3) SAMPLE REMAINDER STORED JW 10-17-97 JW 10-17-97 RICHRC5019

SOP(S) # _____

4) SEPARATION LAB RECEIVED 10/20/97

SOP(S) # RICHRC5030

ED RB 10-23-97 RICHRC5037

1st ext RICHRC5030 JW 10/21/97

2nd ext RICHRC5030 JW 10/22/97

5) COUNTING/MEASUREMENT LAB 10/23/97

SOP(S) # RICHRC0008

6) DATA REVIEWED AND ANALYTICAL PREP STORED JK 10-27-97

SOP(S) # RICHRC0002 Rev 1

*** GAMMA ***

Due 10/23

CHAIN-OF-CUSTODY BATCH ANALYSIS RECORD

9-Oct-1997
Page 1

CUSTOMER: BHI

SAMPLE DELIVERY GROUP W01982

MATRIX : SOIL

BATCH NUMBER 10-137

	GES ID	DUP	ACCOUNT	CUSTOMER ID	COMMENTS
	T10137IX	"OSBK"			
	T10137IM	CAL 491			
1)	71013701 R10137O1		BHI	BOL957	7 DAYS FOR INGROWTH
2)	71013702		BHI	BOL958	
3)	71013703		BHI	BOL959	
4)	71013704		BHI	BOL960	
5)	71013705		BHI	BOL961	

ACTIONS (Initial & Date)

1) INITIATED RB 10/9/97
SOP(S) # RD9800 RB 10-9-97

2) PREP LAB RECEIVED 10-14-97
SOP(S) # RICHRC5013

3) SAMPLE REMAINDER STORED 10-17-97
SOP(S) # _____

4) SEPARATION LAB RECEIVED NA
SOP(S) # _____

5) COUNTING/MEASUREMENT LAB 10/27/97
SOP(S) # RICHRD0007

6) DATA REVIEWED AND ANALYTICAL PREP STORED 7-97 10-27-97
SOP(S) # RICHRC5002Rev

No Addon issues per Client COC

000024