W01888

Quanterra
Environmental Services

Quanterra Incorporated
13715 Rider Trail North
Earth City, Missouri 63045

314 298-8566 Telephone
314 298-8757 Fax

0048834

CASE NARRATIVE

Bechtel Hanford Incorporated
3350 George Washington Way
Richland, Washington 99352

October 20, 1997

Attention: Joan Kessner

Project number	:	550.232
Date Received by Lab	:	August 29, 1997
Number of Samples	:	One (1)
Sample Type	:	Soil
SDG Number	:	W01888
Data Deliverable	:	Summary

I. Introduction

On August 29, 1997, one (1) soil sample was received by Quanterra, Richland and was 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
15758-001	B0L884	70901201	Soil	08/29/97

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 were no variances associated with sample receipt.

Semivolatiles
Sample 15758-001was extracted six days outside the extraction holding time. The sample was received at Quanterra, St. Louis on the last day of the holding time. See NCM# 3723

There was low recovery for Pentachlorophenol in the MS/MSD for sample B0L884 (15758-001).

PCBs
Sample (15758-001) was extracted 6 days out side of the extraction hold time. The sample was received at Quanterra, St. Louis on the last day of the holding time. See NCM# 3706

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

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
c:\\price$\hanford\hanw11888.nar

LOG #: 3723

LABORATORY NONCONFORMANCE MEMO (NCM)

Quanterra Incorporated

Project ID/Client: 550.232

NCM Initiated by/Date: S. Lourier / 10-20-97 Project Manager: W. Price.

Sample Numbers/QC batch or lot numbers: 15758-001, MS, MSD

Tests: BNA / 8270

Analytical Area (check appropriate area):

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

Nonconformance (check appropriate area): *To be completed by analyst*

Holding Time Violations (exceeded by 6 days)

Category I: Laboratory Independent

- ☐ 1. Holding time expired in transit
- ☒ 2. Sample rec'd > 48 hrs after sampling. or ½ holding time has expired
- ☐ 3. Test added by client after expiration

Category II: Laboratory Dependent

- ☐ 4. Instrument failure
- ☐ 5. Analyst error
- ☐ 6. Log-in error
- ☐ 7. Miscommunication
- ☐ 8. Other (explanation required) Not logged in until expired

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 (explanation required) _____

Category V: Analysis Reruns (Dilution)

- ☐ 17. Over calibration
- ☐ 18. Under calibration
- ☐ 19. Other (explanation required) _____

Quality Assurance/Quality Control

- ☐ 20. QC data reported outside of controls
- ☐ 21. Incorrect procedure used
- ☐ 22. SOP intentionally modified with QA and tech approval
- ☐ 23. Invalid instrument calibration
- ☐ 24. Received insufficient sample for proper analysis

Incorrect or Incomplete Client Deliverable

- ☐ 25. Hardcopy deliverable error
- ☐ 26. Electronic deliverable error

Reported Detection Limits Elevated Due to:

- ☐ 27. Sample matrix: Does not include high analyte content
- ☐ 28. Insufficient sample volume
- ☐ 29. Other (explanation required)

Miscellaneous

- ☐ 30. Instrument/equipment Tag-out
- ☐ 31. Other (explanation required)

Notification (check appropriate area): ☒ Required ☐ Not Required *To be completed by project manager*

Client notified by (name and date): MKP

- ☒ In writing narrative
- ☐ By telephone
- ☐ By facsimile
- ☐ Other (explain)

Client's name and response: _____

- ☐ Process "as is"
- ☐ Re-sample
- ☐ On hold until _____
- ☐ Other (explain)

Project manager (signature and date): [signature] 10/20/97

000004

QUANTERRA LABORATORY NONCONFORMANCE MEMO

LOG #: _____

Corrective Action: *To be completed and reviewed by all associates involved*

Problem Description/Root Cause Author's initials and date: SMZ 10-20-97

Sample received on last day of hold (9/3). Logged in on 9/5

Corrective Actions (Short Term) Author's initials and date: SMZ 10-20-97

Sample extracted 16 days past hold

Corrective Actions to Prevent Reoccurrence (Long Term)

None by operations.

Corrective Action approved by (Supervisor/Group Leader) and date: _____

Additional Comments: _____

Corrective Action to be completed by (if other than Supervisor/Group Leader): _____

Date Corrective Action is to be completed: _____

Quality Assurance Review *To be completed by a QA associate*

☐ Anomaly ☐ Deficiency ☐ Notified Ops/Sys Manager (Initials) _____

☐ Further action required: _____

Further action assigned to: _____

QA signature: _____ Date: _____

Corrective Action Verification: *To be completed by a QA associate*

☐ Verification not required or requested

☐ Verified / CA completed on: _____ by _____

☐ Cannot verify (specify reason) _____

Verified by: _____ Date: _____

Nonconformance Memo Closure:

QA signature: _____ Date: _____

The Office of Quality Assurance maintains a copy of this NCM indicating its final status.

000005

LOG #: 3706

LABORATORY NONCONFORMANCE MEMO (NCM)

Quanterra Incorporated

Project ID/Client: 550.232

NCM Initiated by/Date: J. Kleszczewski / 10-14-97 Project Manager: W. Price

Sample Numbers/QC batch or lot numbers: 15758-001, MS, MSD

Tests: PCB/8080

Analytical Area (check appropriate area):

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

Nonconformance (check appropriate area): *To be completed by analyst*

Holding Time Violations (exceeded by 6 days)

Category I: Laboratory Independent

- ☐ 1. Holding time expired in transit
- ☒ 2. Sample rec'd > 48 hrs after sampling. or ½ holding time has expired
- ☐ 3. Test added by client after expiration

Category II: Laboratory Dependent

- ☐ 4. Instrument failure
- ☐ 5. Analyst error
- ☐ 6. Log-in error
- ☐ 7. Miscommunication
- ☐ 8. Other (explanation required) Not logged in until supried

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 (explanation required) _____

Category V: Analysis Reruns (Dilution)

- ☐ 17. Over calibration
- ☐ 18. Under calibration
- ☐ 19. Other (explanation required) _____

Quality Assurance/Quality Control

- ☐ 20. QC data reported outside of controls
- ☐ 21. Incorrect procedure used
- ☐ 22. SOP intentionally modified with QA and tech approval
- ☐ 23. Invalid instrument calibration
- ☐ 24. Received insufficient sample for proper analysis

Incorrect or Incomplete Client Deliverable

- ☐ 25. Hardcopy deliverable error
- ☐ 26. Electronic deliverable error

Reported Detection Limits Elevated Due to:

- ☐ 27. Sample matrix: Does not include high analyte content
- ☐ 28. Insufficient sample volume
- ☐ 29. Other (explanation required)

Miscellaneous

- ☐ 30. Instrument/equipment Tag-out
- ☐ 31. Other (explanation required) _____

Notification (check appropriate area): ☐ Required ☐ Not Required *To be completed by project manager*

Client notified by (name and date): _____

- ☒ In writing narrative
- ☐ By telephone
- ☐ By facsimile
- ☐ Other (explain)

Client's name and response: _____

- ☐ Process "as is"
- ☐ Re-sample
- ☐ On hold until _____
- ☐ Other (explain)

Project manager (signature and date): _____ 10/20/97

000006

QUANTERRA LABORATORY NONCONFORMANCE MEMO

LOG #: 3706

Corrective Action: *To be completed and reviewed by all associates involved*

Problem Description/Root Cause Author's initials and date: JNR 10-14-97

Sample received on last day of hold. (9/3). Logged in on 9/5.

Corrective Actions (Short Term) Author's initials and date: JNR 10-14-97

Sample extracted 6 days past hold.

Corrective Actions to Prevent Reoccurrence (Long Term)

None by operations. JNR 10-14-97

Corrective Action approved by (Supervisor/Group Leader) and date: JMK 10-14-97

Additional Comments:

Corrective Action to be completed by (if other than Supervisor/Group Leader):

Date Corrective Action is to be completed:

Quality Assurance Review *To be completed by a QA associate*

☐ Anomaly ☒ Deficiency ☐ Notified Ops/Sys Manager (Initials)

☐ Further action required:

Further action assigned to:

QA signature: M Lewter Date: 10/15/97

Corrective Action Verification: *To be completed by a QA associate*

☐ Verification not required or requested

☐ Verified / CA completed on: _____ by _____

☐ Cannot verify (specify reason) _____

Verified by: _____ Date: _____

Nonconformance Memo Closure:

QA signature: _____ Date: _____

The Office of Quality Assurance maintains a copy of this NCM indicating its final status.

000007

Quanterra September 05, 1997 03:46 pm

Account: 10722 Project: 550.232 Quanterra-Richland QAS No. 550.232 Rev. 0

Master Sample Login: 15758

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
Data:				(Container Numbers:% Filled)

15758-001	B0L884	Soil	20-AUG-97 13:40	29-AUG-97 14:25	26-SEP-97 AIR BORNE	1	Screening not Required	
RICHLAND I.D. 70901201//SEE QAS FOR TARGET LISTS.								
1 AN - Amber Glass-120ML	BNA/8270/Q4	S	COLD	19-SEP-97	03-SEP-97 R5F		(329626:99)	
1	PCB/8080/Q4	S	COLD	19-SEP-97	03-SEP-97 R5F		(329625:98)	
1	PM/IT/Q4	S	COLD	19-SEP-97	16-FEB-98 R5F		(329625:98)	
1 AN - Amber Glass-60ML	ICAP/6010/Q4	S	COLD	19-SEP-97	16-FEB-98 R5F		(329624:100)	
15758-001MS	B0L884	Soil	20-AUG-97 13:40	29-AUG-97 14:25	26-SEP-97 AIR BORNE	1	Screening not Required	
RICHLAND I.D. 70901201//SEE QAS FOR TARGET LISTS.								
1 AN - Amber Glass-120ML	BNA/8270/Q4	S	COLD	19-SEP-97	03-SEP-97 R5F		(329626:99)	
1	PCB/8080/Q4	S	COLD	19-SEP-97	03-SEP-97 R5F		(329625:98)	
1 AN - Amber Glass-60ML	ICAP/6010/Q4	S	COLD	19-SEP-97	16-FEB-98 R5F		(329624:100)	
15758-001MSD	B0L884	Soil	20-AUG-97 13:40	29-AUG-97 14:25	26-SEP-97 AIR BORNE	1	Screening not Required	
RICHLAND I.D. 70901201//SEE QAS FOR TARGET LISTS.								
1 AN - Amber Glass-120ML	BNA/8270/Q4	S	COLD	19-SEP-97	03-SEP-97 R5F		(329626:99)	
1	PCB/8080/Q4	S	COLD	19-SEP-97	03-SEP-97 R5F		(329625:98)	
1 AN - Amber Glass-60ML	ICAP/6010/Q4	S	COLD	19-SEP-97	16-FEB-98 R5F		(329624:100)	

300000

3*=Sample has not been rad screened.

RSF TEMP 4°C COR012704

TO: St. Louis QC

Chain of Custody Record

Quanterra Environmental Services

QUA-4124-1

Client: BHI	Project Manager: Jodie Cannon	Date: 9-2-97	Chain Of Custody Number: 64821
Address	Telephone Number (Area Code)/Fax Number	Lab Number	Page 1 of 1
City / State / Zip Code	Site Contact	Lab Contact	
Project Name: SAF 897-129	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.	H_2SO_4	HNO_3	HCl	NaOH	ZnAc/NaOH
70901201 - 802884	Chem Bottles only										

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

Special Instructions/ Conditions of Receipt

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 WC1888

1. Relinquished By: Karen Stettenburg (Quanterra)	Date: 9-2-97	Time: 1600	1. Received By: JIMMIE L. JACKSON	Date: 9-3-97	Time: 8:05
2. Relinquished By	Date	Time	2. Received By	Date	Time
3. Relinquished By	Date	Time	3. Received By	Date	Time

Comments

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

65003

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

B97-129-02 | Page 1 of 1

Collector Doug Bowers/Bob Fahlberg	**Company Contact** Frank Gustafson **Telephone No.** 373-5904	**Project Coordinator** Koerner, CC
Project Designation 300-FF-1 South Process Pond	**Sampling Location** 300 FF-1	**SAF No.** B97-129
Ice Chest No.	**Field Logbook No.** EFL 1133-4	**Method of Shipment** Gov vehicle
Shipped To Quanterra	**Offsite Property No.**	**Bill of Lading/Air Bill No.**

POSSIBLE SAMPLE HAZARDS/REMARKS
Possible Radioactive

Special Handling and/or Storage
cool 4C

Preservation	None	None	None	Cool 4C	Cool 4C	None				
Type of Container	P	P	aG	aG	aG	aG				
No. of Container(s)	1	1	1	1	1	1				
Volume	20ml	20ml	60ml	120ml	120ml	1000ml				
SAMPLE ANALYSIS	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)				
			7090/201			7090/301				

Sample No.	Matrix *	Sample Date	Sample Time										
BOL884	S	8-20-97	1340	X	X	1 X	1 X	1 X	X		BOL4C4		
						100%	100%	100%					

CHAIN OF POSSESSION

Relinquished By	Date/Time	Received By	Date/Time
[signature]	8-28-97/1550	[signature]	08/28/97 1350
[signature]	08/29/97 14:25	[signature]	8/29/97 14:25
		[signature] <1000 Ga	

SPECIAL INSTRUCTIONS

KRA 9/2/97

WG1888

SDG WG1888

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 ____

C00010

GAMMA-RAY ENERGY ANALYSIS REPORT

Thermo Hanford Inc.
Radiological Counting Facility THI - RCF

B0L884

Project	300-FF-1 South Process Pond	
Customer ID	B0L9C4 Asbestos #1	
RCF ID	RCF1603	
	Sample time, date -	1340 8/20/97
	Analysis date	8/21/97

Isotope		Activity pCi/gm		2 s err	Ci/gm	
K40		1.4e+01	+/-	5.1e+00	1.4e-11	
Co60	<	5.7e-01			5.7e-13	
I129	<	6.1e+01			6.1e-11	
Cs137	<	4.8e-01			4.8e-13	
Eu152	<	3.1e+00			3.1e-12	
Eu154	<	1.4e+00			1.4e-12	
Eu155	<	1.8e+00			1.8e-12	
Th32dau	<	7.2e-01			7.2e-13	
U235	<	2.5e+00			2.5e-12	
U238	<	6.4e+01			6.4e-11	
U238dau		1.8e+00	+/-	4.5e-01	1.8e-12	
Np237	<	9.1e-01			9.1e-13	
Am241	<	2.5e+00			2.5e-12	
Tot Act Gam (pCi/gm)		1.5e+01		Ci/gm	1.5e-11	
Y/Sr-90	<	N/R				
Gross Alpha		1.2e+00	+/-	4.2e-01	1.2e-12	
Gross Beta		1.3e+01	+/-	1.5e+00	1.3e-11	Reported as 137-Cs Betas.
AEA total	<	N/R				

Totas Activity (pCi/gm) 1.6e+01
(Ci/gm) 1.6e-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 analyse of U238 is based on the activity of Pa234m

The analyse of Np237 is based on the activity of Pa233

U238dau is the activity of Pb214 and Bi214, short lived daughter products of U238. Equalibrium between parent and daughter products prosably 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 unapplicable 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 Hedges [illegible] 8-21-97
Radiological analyst Date

Albert I. Davis 08-28-97
Albert I. Davis Date
Radiological Manager

Project review Date

Quanterra
Environmental Services

BWSWP

012704

Login No.: 15758

Condition Upon Receipt Variance Report
St. Louis Laboratory

Client: Rockland

Date: 9-3-97 Time: 8:05

Project No: 550.232

Initiated by: TIMMIE JACKSON

Shipper/No:

RFA/COC Numbers: 64821

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 designee) _____ Date: 9-3-97

Project Management Review: _____ Date: 9/9/97

SIGNED ORIGINAL MUST BE RETAINED IN THE PROJECT FILE

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 : 08/20/97
Receipt Date : 08/29/97
Report Date : 10/13/97

Client ID: B0L884

Quanterra ID : 15758-001

Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit	Dilution
Chrysene	218-01-9	QCBLK151902-1	09/09/97	10/02/97	350	UG/KG	U	350	1
Benzo(a)Pyrene	50-32-8	QCBLK151902-1	09/09/97	10/02/97	350	UG/KG	U	350	1
Aldol Condensation	TIC-4	QCBLK151902-1	09/09/97	10/02/97	53000	UG/KG	BJN		1
Unknown-1	TIC-32	QCBLK151902-1	09/09/97	10/02/97	170	UG/KG	BJ		1
Unknown-2	TIC-33	QCBLK151902-1	09/09/97	10/02/97	210	UG/KG	BJ		1
bis(2-Ethylhexyl)Phthalate	117-81-7	QCBLK151902-1	09/09/97	10/02/97	63	UG/KG	JN		1
Unknown-3	TIC-34	QCBLK151902-1	09/09/97	10/02/97	110	UG/KG	J		1
Nitrobenzene-d5	4165-60-0	QCBLK151902-1	09/09/97	10/02/97	55	%REC			1
2-Fluorobiphenyl	321-60-8	QCBLK151902-1	09/09/97	10/02/97	66	%REC			1
Terphenyl-d14	1718-51-0	QCBLK151902-1	09/09/97	10/02/97	82	%REC			1
Phenol-d5	4165-62-2	QCBLK151902-1	09/09/97	10/02/97	84	%REC			1
2-Fluorophenol	367-12-4	QCBLK151902-1	09/09/97	10/02/97	75	%REC			1
2,4,6-Tribromophenol	118-79-6	QCBLK151902-1	09/09/97	10/02/97	54	%REC			1

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 : 08/20/97
Receipt Date : 08/29/97
Report Date : 10/13/97

Client ID: B0L884

Quanterra ID : 15758-001MS

Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit	Dilution
Phenol	108-95-2	QCBLK151902-1	09/09/97	10/02/97	76	%REC			1
2-Chlorophenol	95-57-8	QCBLK151902-1	09/09/97	10/02/97	82	%REC			1
1,4-Dichlorobenzene	106-46-7	QCBLK151902-1	09/09/97	10/02/97	53	%REC			1
N-nitroso-di-n-propylamine	621-64-7	QCBLK151902-1	09/09/97	10/02/97	116	%REC			1
1,2,4-Trichlorobenzene	120-82-1	QCBLK151902-1	09/09/97	10/02/97	64	%REC			1
4-Chloro-3-Methylphenol	59-50-7	QCBLK151902-1	09/09/97	10/02/97	78	%REC			1
Acenaphthene	83-32-9	QCBLK151902-1	09/09/97	10/02/97	78	%REC			1
4-Nitrophenol	100-02-7	QCBLK151902-1	09/09/97	10/02/97	58	%REC			1
2,4-Dinitrotoluene	121-14-2	QCBLK151902-1	09/09/97	10/02/97	75	%REC			1
Pentachlorophenol	87-86-5	QCBLK151902-1	09/09/97	10/02/97	12	%REC	*		1
Pyrene	129-00-0	QCBLK151902-1	09/09/97	10/02/97	70	%REC			1
Nitrobenzene-d5	4165-60-0	QCBLK151902-1	09/09/97	10/02/97	67	%REC			1
2-Fluorobiphenyl	321-60-8	QCBLK151902-1	09/09/97	10/02/97	74	%REC			1
Terphenyl-d14	1718-51-0	QCBLK151902-1	09/09/97	10/02/97	76	%REC			1
Phenol-d5	4165-62-2	QCBLK151902-1	09/09/97	10/02/97	84	%REC			1
2-Fluorophenol	367-12-4	QCBLK151902-1	09/09/97	10/02/97	85	%REC			1
2,4,6-Tribromophenol	118-79-6	QCBLK151902-1	09/09/97	10/02/97	55	%REC			1

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 : 08/20/97
Receipt Date : 08/29/97
Report Date : 10/13/97

Client ID: B0L884

Quanterra ID : 15758-001MSD

Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit	Dilution
Phenol	108-95-2	QCBLK151902-1	09/09/97	10/02/97	75	%REC			1
2-Chlorophenol	95-57-8	QCBLK151902-1	09/09/97	10/02/97	80	%REC			1
1,4-Dichlorobenzene	106-46-7	QCBLK151902-1	09/09/97	10/02/97	42	%REC			1
N-nitroso-di-n-propylamine	621-64-7	QCBLK151902-1	09/09/97	10/02/97	123	%REC			1
1,2,4-Trichlorobenzene	120-82-1	QCBLK151902-1	09/09/97	10/02/97	56	%REC			1
4-Chloro-3-Methylphenol	59-50-7	QCBLK151902-1	09/09/97	10/02/97	78	%REC			1
Acenaphthene	83-32-9	QCBLK151902-1	09/09/97	10/02/97	76	%REC			1
4-Nitrophenol	100-02-7	QCBLK151902-1	09/09/97	10/02/97	58	%REC			1
2,4-Dinitrotoluene	121-14-2	QCBLK151902-1	09/09/97	10/02/97	76	%REC			1
Pentachlorophenol	87-86-5	QCBLK151902-1	09/09/97	10/02/97	11	%REC	*		1
Pyrene	129-00-0	QCBLK151902-1	09/09/97	10/02/97	71	%REC			1
Nitrobenzene-d5	4165-60-0	QCBLK151902-1	09/09/97	10/02/97	68	%REC			1
2-Fluorobiphenyl	321-60-8	QCBLK151902-1	09/09/97	10/02/97	76	%REC			1
Terphenyl-d14	1718-51-0	QCBLK151902-1	09/09/97	10/02/97	74	%REC			1
Phenol-d5	4165-62-2	QCBLK151902-1	09/09/97	10/02/97	81	%REC			1
2-Fluorophenol	367-12-4	QCBLK151902-1	09/09/97	10/02/97	84	%REC			1
2,4,6-Tribromophenol	118-79-6	QCBLK151902-1	09/09/97	10/02/97	52	%REC			1

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B0L884

Lab Name: QUANTERRA MO Contract: 550-232

Lab Code: ITMO Case No.: S75801 SAS No.: SDG No.: W01888

Matrix: (soil/water) SOIL Lab Sample ID: 15758-001

Sample wt/vol: 30.20 (g/mL) G Lab File ID: H4315

Level: (low/med) LOW Date Received: 08/29/97

% Moisture: 6 decanted: (Y/N) N Date Extracted: 09/09/97

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 10/02/97

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.

B0L884

Lab Name: QUANTERRA MO Contract: 550-232

Lab Code: ITMO Case No.: S75801 SAS No.: SDG No.: W01888

Matrix: (soil/water) SOIL Lab Sample ID: 15758-001

Sample wt/vol: 30.20 (g/mL) G Lab File ID: H4315

Level: (low/med) LOW Date Received: 08/29/97

% Moisture: 6 decanted: (Y/N) N Date Extracted: 09/09/97

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 10/02/97

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH:

Number TICs found: 5

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

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1. 0	Aldol Condensation	4.74	53000	ABJN
2. 0	UNKNOWN	19.21	170	BJ
3. 0	UNKNOWN	20.49	210	BJ
4. 117817	bis(2-Ethylhexyl)Phthalate	25.86	63	JN
5.	UNKNOWN	30.27	110	J

Bechtel Hanford Incorporated
3350 George Washington Way
Richland, WA 99352

Project: 550.232

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

Sample Date : 08/20/97
Receipt Date : 08/29/97
Report Date : 10/17/97

Client ID: B0L884

Quanterra ID : 15758-001

Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit	Dilution
Aroclor-1016	12674-11-2	QCBLK151765-1	09/09/97	09/10/97	35	UG/KG	U	35	1
Aroclor-1221	11104-28-2	QCBLK151765-1	09/09/97	09/10/97	35	UG/KG	U	35	1
Aroclor-1232	11141-16-5	QCBLK151765-1	09/09/97	09/10/97	35	UG/KG	U	35	1
Aroclor-1242	53469-21-9	QCBLK151765-1	09/09/97	09/10/97	35	UG/KG	U	35	1
Aroclor-1248	12672-29-6	QCBLK151765-1	09/09/97	09/10/97	35	UG/KG	U	35	1
Aroclor-1254	11097-69-1	QCBLK151765-1	09/09/97	09/10/97	35	UG/KG	U	35	1
Aroclor-1260	11096-82-5	QCBLK151765-1	09/09/97	09/10/97	35	UG/KG	U	35	1
DCB	2051-24-3	QCBLK151765-1	09/09/97	09/10/97	112	%REC			1

Bechtel Hanford Incorporated
3350 George Washington Way
Richland, WA 99352

Project: 550.232

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

Sample Date : 08/20/97
Receipt Date : 08/29/97
Report Date : 10/17/97

Client ID: B0L884

Quanterra ID : 15758-001MS

Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit	Dilution
Aroclor-1016	12674-11-2	QCBLK151765-1	09/09/97	09/10/97	124	%REC			1
Aroclor-1260	11096-82-5	QCBLK151765-1	09/09/97	09/10/97	134	%REC			1
DCB	2051-24-3	QCBLK151765-1	09/09/97	09/10/97	111	%REC			1

Bechtel Hanford Incorporated
3350 George Washington Way
Richland, WA 99352

Project: 550.232

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

Sample Date : 08/20/97
Receipt Date : 08/29/97
Report Date : 10/17/97

Client ID: B0L884

Quanterra ID : 15758-001MSD

Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit	Dilution
Aroclor-1016	12674-11-2	QCBLK151765-1	09/09/97	09/10/97	127	%REC			1
Aroclor-1260	11096-82-5	QCBLK151765-1	09/09/97	09/10/97	140	%REC	*		1
DCB	2051-24-3	QCBLK151765-1	09/09/97	09/10/97	112	%REC			1

1D

PCB ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B0L884

Lab Name: QUANTERRA,MO Contract: 550-232

Lab Code: ITMO Case No.: _____ SAS No.: _____ SDG No.: W01888

Matrix: (soil/water) SOIL Lab Sample ID: 15758-001

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

Level: (low/med) LOW Date Sampled: 08-20-97

% Moisture: not dec. 6 dec. _____ Date Extracted: 09-09-97

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 09-10-97

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	35	U
11104-28-2	Aroclor-1221	35	U
11141-16-5	Aroclor-1232	35	U
53469-21-9	Aroclor-1242	35	U
12672-29-6	Aroclor-1248	35	U
11097-69-1	Aroclor-1254	35	U
11096-82-5	Aroclor-1260	35	U

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

FORM I PEST

Bechtel Hanford Incorporated
3350 George Washington Way
Richland, WA 99352

Project: 550.232

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

Client ID: B0L884

Sample Date : 08/20/97
Receipt Date : 08/29/97
Report Date : 09/27/97

Quanterra ID : 15758-001

Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit	Dilution
Arsenic	7440-38-2	QCBLK153203-1	09/18/97	09/18/97	3.6	MG/KG	B	31.9	1
Thallium	7440-28-0	QCBLK153203-1	09/18/97	09/18/97	4.0	MG/KG	B	213	1

Bechtel Hanford Incorporated
3350 George Washington Way
Richland, WA 99352

Project: 550.232

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

Sample Date : 08/20/97
Receipt Date : 08/29/97
Report Date : 09/27/97

Client ID: B0L884

Quanterra ID : 15758-001MS

Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit	Dilution
Arsenic	7440-38-2	QCBLK153203-1	09/18/97	09/18/97	96	%REC			1
Thallium	7440-28-0	QCBLK153203-1	09/18/97	09/18/97	90	%REC			1

Bechtel Hanford Incorporated
3350 George Washington Way
Richland, WA 99352

Project: 550.232

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

Sample Date : 08/20/97
Receipt Date : 08/29/97
Report Date : 09/27/97

Client ID: B0L884

Quanterra ID : 15758-001MSD

Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit	Dilution
Arsenic	7440-38-2	QCBLK153203-1	09/18/97	09/18/97	98	%REC			1
Thallium	7440-28-0	QCBLK153203-1	09/18/97	09/18/97	92	%REC			1

U.S. EPA - CLP

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

B0L884

Lab Name: QUANTERRA_MO Contract: 550.232

Lab Code: ITMO Case No.: SAS No.: SDG No.: W01888

Matrix (soil/water): SOIL Lab Sample ID: 15758-001

Level (low/med): LOW Date Received: 08/29/97

% Solids: 94.0

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

CAS No.	Analyte	Concentration	C	Q	M
7440-38-2	Arsenic	3.6	B		P
7440-28-0	Thallium	4.0	B		P

Color Before: Clarity Before: Texture:

Color After: Clarity After: Artifacts:

Comments:

CERTIFICATE OF ANALYSIS

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

September 29, 1997

Attention: Joan Kessner

SAF Number	:	B97-129
Date SDG Closed	:	September 12, 1997
Number of Samples	:	One (1)
Sample Type	:	Soil
SDG Number	:	W01888
Data Deliverable	:	Summary

I. Introduction

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

QTESRL ID#	BHI ID#	MATRIX	DATE OF INITIATION
70901301	B0L884	SOIL	8/29/97

II. Analytical Results/Methodology

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

The requested analyses were:

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

III. Quality Control

The analytical results for each analysis performed under SDG W01888 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 (B0L884) results are within contractual requirements.

Gamma Spectroscopy

Gamma Scan by method RICH-RC-5017
The LCS, batch blank, sample and sample duplicate (B0L884) 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:

Jodie Carnes
Project Manager

SAMPLE RESULTS

LAB NAME:	QUANTERRA, Richland	**SDG: /RPT GRP:**	W01888 / 3459
LAB SAMPLE ID:	70901301	**MATRIX:**	SOIL
CLIENT ID:	B0L884	**DATE RECEIVED:**	8/29/1997 2:25:00 PM

ANALYTE	RESULT	COUNTING ERROR (2 s)	TOTAL ERROR (2 s)	MDA/IDL	REPORT UNIT	YIELD	METHOD NUMBER
U-234	2.12E+00	2.2E-01	4.1E-01	2.73E-02	pCi/g	76.60%	RICHRC5030
U-235	7.59E-02	4.1E-02	4.3E-02	2.50E-02	pCi/g	76.60%	RICHRC5030
U-238	2.14E+00	2.2E-01	4.1E-01	1.48E-02	pCi/g	76.60%	RICHRC5030
CO-60	-1.97E-03	1.1E-02	1.1E-02	1.83E-02	pCi/g	N/A	RICHRC5017
CS-137DA	-5.21E-03	1.1E-02	1.1E-02	1.81E-02	pCi/g	N/A	RICHRC5017
EU-152	-8.90E-03	2.7E-02	2.7E-02	4.38E-02	pCi/g	N/A	RICHRC5017
EU-154	-7.71E-03	3.3E-02	3.3E-02	5.62E-02	pCi/g	N/A	RICHRC5017
EU-155	1.82E-02	2.6E-02	2.6E-02	4.26E-02	pCi/g	N/A	RICHRC5017
RA-224DA	5.63E-01	3.3E-02	6.5E-02	N/A	pCi/g	N/A	RICHRC5017
RA-226DA	4.03E-01	5.0E-02	6.4E-02	N/A	pCi/g	N/A	RICHRC5017
RA-228DA	5.22E-01	9.3E-02	1.1E-01	N/A	pCi/g	N/A	RICHRC5017
U-235HP	1.15E-01	7.1E-02	7.2E-02	N/A	pCi/g	N/A	RICHRC5017
U-238	7.99E-01	3.0E-01	3.1E-01	N/A	pCi/g	N/A	RICHRC5017

Number of Results: 13

Result = IDL When Not Detected

Quanterra Data Review Checklist
RADIOCHEMISTRY

Work Order number (s): 7C9C13

Client ID: BHC

Due Date: 9-13-97

Lab Sample Number or SDG: WP1888

Method Test Parameter: UI-C

Matrix: SOIL

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 filled out?	✓			✓
3. Correct methodology used?	✓			✓
4. Transcription checked? JM 9-15-97	✓			✓
5. Were all calculations checked at a minimum frequency?	✓			✓
6. Units checked?	✓			✓

Comments on any "No" response: _____

First Level Review: Joel Klemperer Date: 9-15-97

Second Level Review: Andrea Date: 9/20/97

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

Quanterra Data Review Checklist
RADIOCHEMISTRY

Work Order number(s):	709013
Client ID:	BHI
Due Date:	10-13-97
Lab Sample Number of SDG:	WO1888
Method Test Parameter:	Gamma
Matrix:	Soil

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 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: Joel Kungsman Date: 9-25-97

Second Level Review: Cindie Ca Date: 9/25/97

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

Report BHI 5" + Ra224DA, Ra226DA, Ra228DA, U235HP, U238HP for sample + Dups.

CHAIN OF

CUSTODY FORMS

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

B97-129-02 | Page 1 of 1

Collector Doug Bowers/Bob Fahlberg	**Company Contact** Frank Gustafson	**Telephone No.** 373-5904	**Project Coordinator** Koerner, CC	**Data Turnaround** 45 Days
Project Designation 300-FF-1 South Process Pond	**Sampling Location** 300 FF-1		**SAF No.** B97-129	
Ice Chest No.	**Field Logbook No.** EFL 1133-4		**Method of Shipment** Gov vehicle	
Shipped To Quanterra	**Offsite Property No.**		**Bill of Lading/Air Bill No.**	

POSSIBLE SAMPLE HAZARDS/REMARKS
Possible Radioactive

Special Handling and/or Storage
cool 4C

Preservation	None	None	None	Cool 4C	Cool 4C	None				
Type of Container	P	P	aG	aG	aG	aG				
No. of Container(s)	1	1	1	1	1	1				
Volume	20ml	20ml	60ml	120ml	120ml	1000ml				
SAMPLE ANALYSIS	Activity Scan	Isotopic Uranium	ICP Metals - 6010A (Addon) (Arsenic, Thallium) 7090/7201	PCBs - 8080	Semi-VOA - 8270A (TCL) (Benzo(a)pyrene, Chrysene)	Gamma Spectroscopy (Cobalt-60) 7090/7301				
Sample No.	**Matrix ***	**Sample Date**	**Sample Time**								
B0L864	S	8-20-97	1340	V	X	X	X	V	X		B0L4C4

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

Relinquished By	Date/Time	Received By	Date/Time
[signature]	8-28-97/1350	[signature]	08/29/97 1350
[signature]	08/29/97 14:25	[signature]	8/29/97 14:25
		[signature]	

SPECIAL INSTRUCTIONS

KBS 4/2/97

WO#888

SDG WO#886

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

000013

109012 Chem
109013 Rad

GAMMA-RAY ENERGY ANALYSIS REPORT

Thermo Hanford Inc.
Radiological Counting Facility THI - RCF

B0L884

Project	300-FF-1 South Process Pond	
Customer ID	B0L9C4 Assessment	
RCF ID	RCF1603	
Sample time, date	- 1340	8/20/97
Analysis date		8/21/97

Solid 100cg

Isotope		Activity pCi/gm		2 s err	Ci/gm
K40		1.4e+01	+/-	5.1e+00	1.4e-11
Co60	<	5.7e-01			5.7e-13
I129	<	6.1e+01			6.1e-11
Cs137	<	4.8e-01			4.8e-13
Eu152	<	3.1e+00			3.1e-12
Eu154	<	1.4e+00			1.4e-12
Eu155	<	1.6e+00			1.6e-12
Th32dau	<	7.2e-01			7.2e-13
U235	<	2.5e+00			2.5e-12
U238	<	6.4e+01			6.4e-11
U238dau		1.6e+00	+/-	4.5e-01	1.6e-12
Np237	<	9.1e-01			9.1e-13
Am241	<	2.5e+00			2.5e-12
Tot Act Gam (pCi/gm)		1.5e+01		Ci/gm	1.5e-11
Y/Sr-90	<	N/R			
Gross Alpha		1.2e+00	+/-	4.2e-01	1.2e-12
Gross Beta		1.3e+01	+/-	1.5e+00	1.3e-11
AEA total	<	N/R			

C, T I Cc
9/2/97 ml

< 10K pCi
Reported as 137-Cs Betas. < 100K pCi
< 2K pCi/g

Total Activity (pCi/gm) 1.8e+01
(Ci/gm) 1.8e-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 & CWD — Radiological analyst — 8-28-97 Date

Albert I. Davis — Radiological Manager — 08-28-97 Date

Project review — Date

*** U(SI) ***

Dee 9-13-97

CHAIN-OF-CUSTODY BATCH ANALYSIS RECORD

CUSTOMER: DHI

SAMPLE DELIVERY GROUP WC1888

MATRIX : SOIL

BATCH NUMBER 9-013

	GES ID	DUP	ACCOUNT	CUSTOMER ID	COMMENTS
	to 901318				
	to 901315			EQLE 215	
1)	70901301		DHI	BOL.384	
	R0901301				

ACTIONS (Initial & Date)

1) INITIATED ~~KM~~ 9-2-97

SOP(S) # RDZ800

2) PREP LAB RECEIVED 9-3-97 DK

SOP(S) # RICHRC5030

REC 9-4-97 RICHRC5019

3) SAMPLE REMAINDER STORED 9-4-97 DK

SOP(S) # NA

4) SEPARATION LAB RECEIVED 09/08/97 Eve

SOP(S) # RICHRC5030

ED RO 9-12-97
RICHRL5039

5) COUNTING/MEASUREMENT LAB (B) 9/13/97

SOP(S) # RICHED0005 R.0

6) DATA REVIEWED AND ANALYTICAL PREP STORED 1JK 9-15-97

SOP(S) # RICHRL0002 Rev 1

*** GAMMA ***

Rec 10-13-97

CHAIN-OF-CUSTODY BATCH ANALYSIS RECORD

2-Sep-1997
Page 1

CUSTOMER: BHI

SAMPLE DELIVERY GROUP WJC1F8F

MATRIX : SOIL

BATCH NUMBER 9-013

	GES ID	DUP	ACCOUNT	CUSTOMER ID	COMMENTS
	T09013IX	OSBK			
	T09013IM	CAL491			
1)	70901301		BHI	BOL384	
	R09013O1	DUP			

ACTIONS (Initial & Data)

1) INITIATED ~~KH~~ 9-2-97

SOP(S) # RD280C

2) PREP LAB RECEIVED 9-3-97 DJK

RICHRC5017-1

SOP(S) # RICHRC5013-0

3) SAMPLE REMAINDER STORED 9-4-97 DJK

SOP(S) # N/A

4) SEPARATION LAB RECEIVED

SOP(S) #

5) COUNTING/MEASUREMENT LAB 9/4/97

SOP(S) # RICHRD0007

6) DATA REVIEWED AND ANALYTICAL PREP STORED 9-25-97

SOP(S) # RICHRC0002 Rev 1

No Addm 13 Types on COC per PM. 9-24-97

000016