START 9613477.2100

W0867

Sample Disposition Record

Control #: B96-0032
Revision #:
Date Initiated: 01/11/96

0045302

Section 1 - BACKGROUND
SAF #: B95-089
OU: 100-NR-1
Project ID: 1301N/1325N SI
Task ID: 1
Sampling Event: 1301-N/1325-N LWDF Vadose Zone Characterization
Laboratory: Quanterra
Project Coordinator: R. C. SMith
Task Manager: K. Sykes

Section 2 - SAMPLE INFORMATION
Number of Samples: ALL
ID Numbers: ALL
Matrix: Soil
Collection Date: Nov. and Dec. 1995

SEP 1996 RECEIVED DMC

Section 3 - ISSUE
Class: Lab Direction
NCR Number: NA
Type: Other - Matrix effect
Description: Laboratory has requested the option of analyzing lead by method 7421 (atomic absorption) versus 6010 (ICP) due to matrix effects.

NA
NCR Validation (Print/Sign) Date

Section 4 - DISPOSITION
Type: Rework
Description: With concurrence from task lead, Kira Sykes, analyze lead by either 6010 or 7421. Note in case narrative.

R. C. Smith/ R Clyde Smith 1/16/96
Project Coordinator (Print/Sign) Date

K. Sykes/ Kira Sykes 1/22/96
Task Manager (Print/Sign) Date

NA
QA (Print/Sign) Date

Section 5 - INSPECTION (Issue Class: Nonconformance Only)
Inspection Number:
Inspection Results:

NA
Inspector (Print/Sign) Date

00021A

9613477.2101

Quanterra
Environmental Services

Quanterra Incorporated
13715 Rider Trail North
Earth City, Missouri 63045

314 298-8566 Telephone
314 298-8757 Fax

CERTIFICATE OF ANALYSIS

Bechtel Hanford Incorporated
P.O. Box 1970
Richland, Washington 99352

January 26, 1996

Attention: Joan Kessner

Project number	:	550.111
Date Received by Lab	:	January 10, 1996
Number of Samples	:	Eight (8)
Sample Type	:	Soil
SDG Number	:	W0867
Data Deliverable	:	Summary

I. Introduction

On January 10, 1996, eight (8) soil samples were received by Quanterra, Richland and transferred to Quanterra, St. Louis for chemical analysis. Upon receipt, the samples were given the following laboratory ID numbers to correspond with the specific client IDs:

St Louis ID	WHC ID	Richland ID	Matrix	Date of Receipt
10120-001	B0GL97	60112801	Soil	01/10/96
10120-002	B0GL99	60112802	Soil	01/10/96
10120-003	B0GLB1	60112803	Soil	01/10/96
10120-004	B0GLB3	60112804	Soil	01/10/96
10120-005	B0GLB4	60112805	Soil	01/10/96
10120-006	B0GLB6	60112806	Soil	01/10/96
10120-007	B0GLB8	60112807	Soil	01/10/96
10120-008	B0GLC0	60112808	Soil	01/10/96

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.

Quanterra
Environmental Services

Analyses requested: Chromium, Cadmium, and Nickel by EPA method 6010. Lead by EPA Method 7421.

III. Quality Control

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

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

Metals
All samples were digested for ICP 4.0g to 100 mls to meet client detection limits.

Samples 10120-001, 10120-001MS, 10120-001MSD, 10120-002, 10120-003, 10120-004, 10120-005 and 10120-008 required dilution due to interelement interferences. The instrument software flagged the undiluted run with an error code indicating that an interferant, in this case Iron, was interfering with the analysis of Cadmium and Chromium. The samples were diluted by a factor of 4 and reanalyzed without interference errors.

The recoveries of the Matrix Spike for Chromium (7724%) and Nickel (1620%) and the Matrix Spike Duplicate for Chromium (447%) and Nickel (156%) were greater than 120%, therefore all associated data was flagged with an " N ". See NCM # SL-2407.

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$\abbydave\hanw0867.nar

9613477.2104

Quanterra Environmental Services

LOG #: SL-94- 2407 page 1 of 2

LABORATORY NONCONFORMANCE MEMO (NCM)

PROJECT ID (Name/Number): 550-111 WO 867
NCM INITIATED BY (Name/Date): K. Clay 01-24-96
PARAMETER(S): Cr + Ni ICP
SAMPLE NUMBER(S) AFFECTED: 10120-001, 001MS, 001MSD, 002, 003, 004, 005, 006, 007, 008

AREA:

☐ SHIP/REC	☐ GC	☐ GEN CHEM	☐ BIOASSAY	☐ IH
☐ ORG EXT	☐ HPLC	☑ METALS	☐ RADIOCHEM	☐ DATA VERIFICATION
☐ INORG PREP	☐ GCMS	☐ GEO	☐ COUNTING	☐ REPORTING
☐ OTHER:	☐	☐	☐	☐

NONCONFORMANCE [check appropriate item(s)]:

1. ☐ Not enough sample received for proper analysis.
2. ☐ Holding time exceeded by _____ days due to:
   - 2.1. ☐ **CATEGORY I: Out of Laboratory Control**
     - ☐ Holding time expired at receipt.
   - 2.2. ☐ **CATEGORY II: Laboratory Dependent**
     - ☐ work backlog ☐ instrument failure
     - ☐ communication ☐ other (see #10)
   - 2.3. ☐ **CATEGORY III: Laboratory Reruns**
     - 2.3.1. ☐ ***QA/QC:***
       - ☐ surrogates ☐ internal standards
       - ☐ spike recoveries ☐ blank contamination
     - 2.3.2. ☐ ***CONFIRMATION:***
       - ☐ second column ☐ contamination check
       - ☐ other (see #10)
     - 2.3.3. ☐ ***DILUTION:***
       - ☐ over calibration ☐ under calibration
       - ☐ other (see #10)
     - 2.3.4. ☐ ***OTHER: (see #10)***
3. ☐ Sample lost during extraction/analysis; no re-prep or re-analysis possible.
4. ☐ QC data reported to client outside of:
   - ☑ method limits ☐ internal limits
   - ☐ QAPP limits ☐ contract limits
   - ☐ regulatory limits ☐ blank criteria
5. ☐ Incorrect procedure(s) used. (See #10)
6. ☐ Invalid instrument calibration. (See #10)
7. ☐ Incorrect/incomplete data reported to client. (See #10)
8. ☐ Reported detection limit(s) higher than:
   - ☐ method limits ☐ QAPP limits
   - ☐ contract limits ☐ other (see #10)

   Due to:
   - ☐ sample matrix ☐ insufficient sample
   - ☐ instrumentation ☐ other (see #10)

9. ☐ **Other (specify):** Matrix spike & Matrix spike duplicate recoveries >150% for Cr & Ni KEC 01-24-96
   KEC 01-24-96
   Cr MS = 772% MSD = 447% RPD = 178
   Ni MS = 1620% MSD = 156% RPD = 165
10. ☐ **Comments/Explanation:**

NOTIFICATION [check appropriate item(s)]:

1. ☑ Client notified by (name and date): KLW 1/26/96
   - ☑ in writing ☐ by FAX
   - ☐ by phone ☐ Other (explain) in case narrative
2. ☐ Client's name _____ and response
   - ☐ process "as is" ☐ resample
   - ☐ on hold til ____ ☐ Other (explain)

PROJECT MANAGER (signature & date): Abigail Walter 1/26/96

FURTHER ACTION REQUIRED, SEE PAGE 2 OF 2

000033

9613477.2105

CORRECTIVE ACTION

☐ ROOT CAUSE: INITIALS/DATE KEC 01-24-96

Unknown

☐ CORRECTIVE ACTION: INITIALS/DATE KEC 01-24-96

Report data

☐ RESPONSIBILITY FOR PERFORMING CORRECTIVE ACTION ASSIGNED TO:

☐ ACTIONS TO PREVENT RECURRENCE: INITIALS/DATE KEC 01-24-96

None

FIRST LEVEL SUPERVISOR: [signature] DATE: 1-24-96

RESPONSIBLE MANAGER: DATE:

QC REVIEW

☐ NONCONFORMANCE ☒ DEFICIENCY ☐ RERUN

☐ FURTHER ACTION REQUIRED:

ASSIGNED TO:

QC COORDINATOR: [signature] DATE: 1-24-96

CORRECTIVE ACTION VERIFICATION

☐ VERIFIED ☐ CANNOT VERIFY (specify reason)

REASON:

NCM CLOSURE

QC COORDINATOR: DATE:

SIGNED ORIGINAL MUST BE RETAINED IN FILE: ☐ QUALITY/OPERATIONS FILE ☐ PROJECT FILE

00003C

Quanterra January 11, 1996 11:15 am
Account: 10722 Project: 550.111 Quanterra-Richland QAS No. 550.111 Rev. 1
Master Sample Login: 10120

Project Manager: W. Price

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

Sample Header Template:

Sample No. / #	Client ID / Container Type	C-Matrix / Analysis	Date: Collected / Class	Received / Preservative	Due / Anal. Due Date	Shipper / Hold Date	Rad Category / Site	Rad Sample No. (Container Numbers:% Filled)
10120-001	BOGL97	Soil	19-DEC-95 14:24	10-JAN-96 10:30	14-FEB-96	FED-EX	2	Screening not Required
MUST REACH DL OF 1.0 mg/kg FOR ALL ELEMENTS/RICHLAND I.D. 60112801 ICAP=Cr, Cd, Ni ONLY								
1	AN - Amber Glass-60ML	ICAP/6010/Q4	S	COLD	07-FEB-96	16-JUN-96	S4I	(206977:100)
1		PB/7421/Q4	S	COLD	07-FEB-96	16-JUN-96	S4I	(206977:100)
1		PM/IT/Q4	S	COLD	07-FEB-96	16-JUN-96	S4I	(206977:100)
10120-001MS	BOGL97	Soil	19-DEC-95 14:24	10-JAN-96 10:30	14-FEB-96	FED-EX	2	Screening not Required
MUST REACH DL OF 1.0 mg/kg FOR ALL ELEMENTS/RICHLAND I.D. 60112801 ICAP=Cr, Cd, Ni ONLY								
1	AN - Amber Glass-60ML	ICAP/6010/Q4	S	COLD	07-FEB-96	16-JUN-96	S4I	(206977:100)
1		PB/7421/Q4	S	COLD	07-FEB-96	16-JUN-96	S4I	(206977:100)
10120-001MSD	BOGL97	Soil	19-DEC-95 14:24	10-JAN-96 10:30	14-FEB-96	FED-EX	2	Screening not Required
MUST REACH DL OF 1.0 mg/kg FOR ALL ELEMENTS/RICHLAND I.D. 60112801 ICAP=Cr, Cd, Ni ONLY								
1	AN - Amber Glass-60ML	ICAP/6010/Q4	S	COLD	07-FEB-96	16-JUN-96	S4I	(206977:100)
1		PB/7421/Q4	S	COLD	07-FEB-96	16-JUN-96	S4I	(206977:100)
10120-002	BOGL99	Soil	20-DEC-95 08:27	10-JAN-96 10:30	14-FEB-96	FED-EX	2	Screening not Required
MUST REACH DL OF 1.0 mg/kg FOR ALL ELEMENTS/RICHLAND I.D. 60112802 ICAP=Cr, Cd, Ni ONLY								
1	AN - Amber Glass-60ML	ICAP/6010/Q4	S	COLD	07-FEB-96	17-JUN-96	S4I	(206978:100)
1		PB/7421/Q4	S	COLD	07-FEB-96	17-JUN-96	S4I	(206978:100)
1		PM/IT/Q4	S	COLD	07-FEB-96	17-JUN-96	S4I	(206978:100)
10120-003	BOGLB1	Soil	20-DEC-95 09:40	10-JAN-96 10:30	14-FEB-96	FED-EX	2	Screening not Required
MUST REACH DL OF 1.0 mg/kg FOR ALL ELEMENTS/RICHLAND I.D. 60112803 ICAP=Cr, Cd, Ni ONLY								
1	AN - Amber Glass-60ML	ICAP/6010/Q4	S	COLD	07-FEB-96	17-JUN-96	S4I	(206979:100)
1		PB/7421/Q4	S	COLD	07-FEB-96	17-JUN-96	S4I	(206979:100)
1		PM/IT/Q4	S	COLD	07-FEB-96	17-JUN-96	S4I	(206979:100)
10120-004	BOGLB3	Soil	22-DEC-95 09:30	10-JAN-96 10:30	14-FEB-96	FED-EX	2	Screening not Required
MUST REACH DL OF 1.0 mg/kg FOR ALL ELEMENTS/RICHLAND I.D. 60112804 ICAP=Cr, Cd, Ni ONLY								
1	AN - Amber Glass-60ML	ICAP/6010/Q4	S	COLD	07-FEB-96	19-JUN-96	S4I	(206980:100)
1		PB/7421/Q4	S	COLD	07-FEB-96	19-JUN-96	S4I	(206980:100)
1		PM/IT/Q4	S	COLD	07-FEB-96	19-JUN-96	S4I	(206980:100)
10120-005	BOGLB4	Soil	22-DEC-95 09:30	10-JAN-96 10:30	14-FEB-96	FED-EX	2	Screening not Required
MUST REACH DL OF 1.0 mg/kg FOR ALL ELEMENTS/RICHLAND I.D. 60112805 ICAP=Cr, Cd, Ni ONLY								

Data:

3*=Sample has not been rad screened.

96124772106

00004

Quanterra January 11, 1996 11:15 am
Account: 10722 Project: 550.111 Quanterra-Richland QAS No. 550.111 Rev. 1
Master Sample Login: 10120

Project Manager: W. Price

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

Sample Header Template: _____

Sample No. / #	Client ID / Container Type	C-Matrix / Analysis	Date: Collected / Class	Received / Preservative	Due / Anal. Due Date	Shipper / Hold Date	Site	Rad Category / (Container Numbers:% Filled)	Rad Sample No.
Comments / Data:									
1	AN - Amber Glass-60ML	ICAP/6010/Q4	S	COLD	07-FEB-96	19-JUN-96	S4I	(206981:100)	
1		PB/7421/Q4	S	COLD	07-FEB-96	19-JUN-96	S4I	(206981:100)	
1		PM/IT/Q4	S	COLD	07-FEB-96	19-JUN-96	S4I	(206981:100)	
10120-006	B0GLB6	Soil	27-DEC-95 10:13	10-JAN-96 10:30	14-FEB-96	FED-EX		2 Screening not Required	
MUST REACH DL OF 1.0 mg/kg FOR ALL ELEMENTS/RICHLAND I.D. 60112806 ICAP=Cr, Cd, Ni ONLY									
1	AN - Amber Glass-60ML	ICAP/6010/Q4	S	COLD	07-FEB-96	24-JUN-96	S4I	(206982:100)	
1		PB/7421/Q4	S	COLD	07-FEB-96	24-JUN-96	S4I	(206982:100)	
1		PM/IT/Q4	S	COLD	07-FEB-96	24-JUN-96	S4I	(206982:100)	
10120-007	B0GLB8	Soil	27-DEC-95 13:25	10-JAN-96 10:30	14-FEB-96	FED-EX		2 Screening not Required	
MUST REACH DL OF 1.0 mg/kg FOR ALL ELEMENTS/RICHLAND I.D. 60112807 ICAP=Cr, Cd, Ni ONLY									
1	AN - Amber Glass-60ML	ICAP/6010/Q4	S	COLD	07-FEB-96	24-JUN-96	S4I	(206983:100)	
1		PB/7421/Q4	S	COLD	07-FEB-96	24-JUN-96	S4I	(206983:100)	
1		PM/IT/Q4	S	COLD	07-FEB-96	24-JUN-96	S4I	(206983:100)	
10120-008	B0GLC0	Soil	28-DEC-95 09:20	10-JAN-96 10:30	14-FEB-96	FED-EX		2 Screening not Required	
MUST REACH DL OF 1.0 mg/kg FOR ALL ELEMENTS/RICHLAND I.D. 60112808 ICAP=Cr, Cd, Ni ONLY									
1	AN - Amber Glass-60ML	ICAP/6010/Q4	S	COLD	07-FEB-96	25-JUN-96	S4I	(206984:100)	
1		PB/7421/Q4	S	COLD	07-FEB-96	25-JUN-96	S4I	(206984:100)	
1		PM/IT/Q4	S	COLD	07-FEB-96	25-JUN-96	S4I	(206984:100)	

96137.202

00005

3*=Sample has not been rad screened.

Temp CUR 6147

Chain of Custody Record

To St. Louis

Quanterra Environmental Services

QUA-4124-1

Client: Bechtel Hanford	Project Manager: Van Pettey	Date: 1-10-96	Chain Of Custody Number: 43756
Address:	Telephone Number (Area Code)/Fax Number:	Lab Number:	Page 1 of 1
City / State / Zip Code:	Site Contact:	Lab Contact:	
Project Name: SAF B95-089	Carrier/Waybill Number:		
Contract/Purchase Order/Quote No.:			

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

Special Instructions/ Conditions of Receipt

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
60112801 B06-L97		SEE					CUX					
2 L99												
3 LB1												
4 LB3												
5 LB4												
6 LB6												
7 LB8												
8 LC0												

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 W0867

1. Relinquished By: Heidelberg Quanterra	Date: 1-10-96	Time: 16:00	1. Received By: Marvin Nelson	Date: 1-11-96	Time: 9:30
2. Relinquished By:	Date:	Time:	2. Received By:	Date:	Time:
3. Relinquished By:	Date:	Time:	3. Received By:	Date:	Time:

Comments

00006

9612170109

Bechtel Hanford, Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	Page 1 of 2

Data Turnaround: ☐ Priority ■ Normal

Collector: W. S. Thompson	Company Contact: K. L. Sykes / W. S. Thompson	Telephone: (509) 376-8031
Project Designation: 1301N/1325N SI (Limited Field Investigation)	Sampling Location: 1301-N/1325-N Cribs 100N	SAF No.: B95-089
Ice Chest No.: BI-001	Field Logbook No.: EL-1275	Method of Shipment: Hand Carry in DOE vehicle.
Shipped To: QUANTERRA	Offsite Property No.: N/A	Bill of Lading/Air Bill No.: N/A

Possible Sample Hazards/Remarks: Radioactive

Special Handling and/or Storage: Keep Secured

SDG W0867

SAMPLE ANALYSIS 601128

Preservation	NONE	NONE	NONE
Type of Container	Glass	Glass	Plastic
No. of Container(s)	1	1	1
Volume	~~40~~ 60 ml. DWSK 12/19/95	60 ml.	20 ml.
SAMPLE ANALYSIS	ICP Metals Cadmium Chromium Lead Nickel	Radio-nuclides (see note #1) 601129	Activity Scan

Sample No.	Matrix*	Date Sampled	Time Sampled	ICP Metals	Radio-nuclides	Activity Scan
01 BOGL97	Soil	12-19-95	1424	X	X	X
02 BOGL99	soil	12-20-95	0827	X	X	X
03 BOGLB1	soil	12-20-95	0940	X	X	X
04 BOGLB3	soil	12-22-95	0930	X	X	X
05 BOGLB4	soil	12-22-95	0930	X	X	X
	NSK 1/10/96		610			

CHAIN OF POSSESSION	Sign/Print Names		
Relinquished By: W S Thompson 0955	Date/Time: 1/10/96	Received By: ER Kim Willis	Date/Time: 0955 1-10-96
Relinquished By: ER Kim Willis	Date/Time: 10:30 1-10-96	Received By: Karen Schlinger	Date/Time: 10:30 1-10-96
Relinquished By	Date/Time	Received By	Date/Time
Relinquished By	Date/Time	Received By	Date/Time

SPECIAL INSTRUCTIONS

Note #1: Radionuclides - Gross alpha; gross beta; Sr-90; U-233,U-234; U-238; Pu-238; Pu-239/240; Gamma Spec (to include) - K-40, Mn-54, C0-60, Ru-106, Cs-134, Cs-137, Ce-144, Eu-154, Eu-155, Ra-226, Th-228, Th-232.

Sue Shan 1/10/96

SUMMARY DATA DELIVERABLES

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

00007

Bechtel Hanford, Inc.

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

Page 2 of 2

Data Turnaround: ☐ Priority ■ Normal

Collector: W. S. Thompson	Company Contact: K. L. Sykes / W. S. Thompson	Telephone: (509) 376-8031
Project Designation: 1301N/1325N SI (Limited Field Investigation)	Sampling Location: 1301-N/1325-N Cribs 100N	SAF No.: B95-089
Ice Chest No.: BE001	Field Logbook No.: EL-1275	Method of Shipment: Hand Carry in DOE vehicle.
Shipped To: QUANTERRA	Offsite Property No.: N/A	Bill of Lading/Air Bill No.: N/A
Possible Sample Hazards/Remarks: Radioactive		
Special Handling and/or Storage: Keep Secured		

SAMPLE ANALYSIS 601128 SDG W0867

			Preservation	NONE	NONE	NONE							
			Type of Container	Glass	Glass	Plastic							
			No. of Container(s)	1	1	1							
			Volume	60 ml.	60 ml.	20 ml.							
				ICP Metals Cadmium Chromium Lead Nickel	Radio-nuclides (see note #1) 601129	Activity Scan							
Sample No.	Matrix*	Date Sampled	Time Sampled										
06 BOGLB6	Soil	12/27/95	1013	X	X	X							
07 BOGLB8	Soil	12/27/95	1325	X	X	X							
08 BOGLC0	Soil	12/28/95	0920	X	X	X							
				100									

SDF 1/10/96

CHAIN OF POSSESSION	Sign/Print Names		
Relinquished By: WS Thompson	Date/Time: 0955 1/10/96	Received By: Eee	Date/Time: 0955 1-10-96
Relinquished By: GR	Date/Time: 10:30 1-10-96	Received By:	Date/Time: 10:30 1-10-96
Relinquished By	Date/Time	Received By	Date/Time
Relinquished By	Date/Time	Received By	Date/Time

SPECIAL INSTRUCTIONS

Note #1: Radionuclides - Gross alpha; gross beta; Sr-90; U-233,U-234; U-238; Pu-238; Pu-239/240; Gamma Spec (to include) - K-40, Mn-54, C0-60, Ru-106, Cs-134, Cs-137, Ce-144, Eu-154, Eu-155, Ra-226, Th-228, Th-232.

SUMMARY DATA DELIVERABLES

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

00008

Client Sample Screening Results

10-Jan-96

1-10-96

CLIENT CODE ID	MATRIX	RECEIVED	DETECTOR	ACQ DATE	SAMPLE	MINUTES	CNTS A	NET CPM A	CNTS B	NET CPM B
BHI B0GL97		1/10/96 10:30:00 AM	QUAD21A	1/10/96 1:02:51 PM	B0GL97	30	33	1.04125	3151	104.08083
	SOLID		Bkg:	1/10/96 5:05:48 AM	BKG	800	47	0.05875	762	0.9525

Anl Date: 1/10/96 Tot Sa, Alq: 1.80E+02 , 4.30E+01 Alp; (Dpm/ -9.06E-01 (uCi/ -1.71E-03 (pCi/ -9.49E+00 ± 8.7E+00 CAT II 1.8E+02 Lab Alq
Ppt mg: 43 Units: g , mg Bet; Alq): 2.24E+02 Sa): 4.23E-01 L|g): 2.35E+03 ± 4.2E+01 4.3E-02 L|g

BHI B0GL99		1/10/96 10:30:00 AM	QUAD21B	1/10/96 1:02:51 PM	B0GL99	30	37	1.17208333	3259	107.73833
	SOLID		Bkg:	1/10/96 5:05:48 AM	BKG	800	49	0.06125	716	0.895

Anl Date: 1/10/96 Tot Sa, Alq: 1.80E+02 , 5.58E+01 Alp; (Dpm/ -2.17E-01 (uCi/ -3.15E-04 (pCi/ -1.75E+00 ± 6.5E+00 CAT II 1.8E+02 Lab Alq
Ppt mg: 55.8 Units: g , mg Bet; Alq): 2.28E+02 Sa): 3.31E-01 L|g): 1.84E+03 ± 3.2E+01 5.4E-02 L|g

BHI B0GLB1		1/10/96 10:30:00 AM	QUAD21C	1/10/96 1:02:51 PM	B0GLB1	30	28	0.86833333	1578	51.7
	SOLID		Bkg:	1/10/96 5:05:48 AM	BKG	800	52	0.065	720	0.9

Anl Date: 1/10/96 Tot Sa, Alq: 1.80E+02 , 6.39E+01 Alp; (Dpm/ 1.78E+00 (uCi/ 2.26E-03 (pCi/ 1.25E+01 ± 6.9E+00 CAT II 4.0E+00 Lab Alq
Ppt mg: 63.9 Units: g , mg Bet; Alq): 1.11E+02 Sa): 1.41E-01 L|g): 7.82E+02 ± 2.0E+01 1.3E-01 L|g

BHI B0GLB3		1/10/96 10:30:00 AM	QUAD21D	1/10/96 1:02:51 PM	B0GLB3	30	7	0.15833333	844	27.154583
	SOLID		Bkg:	1/10/96 5:05:48 AM	BKG	800	60	0.075	783	0.97875

Anl Date: 1/10/96 Tot Sa, Alq: 1.80E+02 , 5.10E+01 Alp; (Dpm/ -5.78E-01 (uCi/ -9.20E-04 (pCi/ -5.11E+00 ± 7.3E+00 CAT I 1.8E+02 Lab Alq
Ppt mg: 51 Units: g , mg Bet; Alq): 5.78E+01 Sa): 9.19E-02 L|g): 5.11E+02 ± 1.8E+01 2.0E-01 L|g

BHI B0GLB4		1/10/96 10:30:00 AM	QUAD22A	1/10/96 1:02:55 PM	B0GLB4	30	20	0.63166667	1428	46.52875
	SOLID		Bkg:	1/10/96 5:05:58 AM	BKG	800	28	0.035	857	1.07125

Anl Date: 1/10/96 Tot Sa, Alq: 1.80E+02 , 7.41E+01 Alp; (Dpm/ 1.03E+00 (uCi/ 1.13E-03 (pCi/ 6.29E+00 ± 6.0E+00 CAT II 8.0E+00 Lab Alq
Ppt mg: 74.1 Units: g , mg Bet; Alq): 9.75E+01 Sa): 1.07E-01 L|g): 5.93E+02 ± 1.6E+01 1.7E-01 L|g

00009

96 0127 1

CLIENT CODE ID	MATRIX	RECEIVED	DETECTOR	ACQ DATE	SAMPLE	MINUTES	CNTS A	NET CPM A	CNTS B	NET CPM B
BHI B0GLB6		1/10/96 10:30:00 AM	QUAD22B	1/10/96 1:02:55 PM	B0GLB6	30	6	0.1425	124	3.2445833
	SOLID		Bkg:	1/10/96 5:05:58 AM	BKG	800	46	0.0575	711	0.88875
Anl Date: 1/10/96	Tot Sa, Alq: 1.80E+02	, 4.78E+01	Alp; (Dpm/ 5.45E-01	(uCi/ 9.25E-04	(pCi/ 5.14E+00	± 7.1E+00	CAT I	9.7E+00	Lab	
Ppt mg: 47.8	Units: g	, mg	Bet; Alq): 6.51E+00	Sa): 1.10E-02	L|g): 6.13E+01	± 7.1E+00		1.6E+00	Alq L|g	
BHI B0GLB8		1/10/96 10:30:00 AM	QUAD22C	1/10/96 1:02:55 PM	B0GLB8	30	2	0.01291667	19	-0.272917
	SOLID		Bkg:	1/10/96 5:05:58 AM	BKG	800	43	0.05375	725	0.90625
Anl Date: 1/10/96	Tot Sa, Alq: 1.80E+02	, 2.25E+01	Alp; (Dpm/ 6.37E-02	(uCi/ 2.30E-04	(pCi/ 1.28E+00	± 1.1E+01	CAT I	3.9E+01	Lab	
Ppt mg: 22.5	Units: g	, mg	Bet; Alq): -5.46E-01	Sa): -1.97E-03	L|g): -1.09E+01	± 8.0E+00		1.8E+02	Alq L|g	
BHI B0GLC0		1/10/96 10:30:00 AM	QUAD22D	1/10/96 1:02:55 PM	B0GLC0	30	8	0.21916667	119	3.0741667
	SOLID		Bkg:	1/10/96 5:05:58 AM	BKG	800	38	0.0475	714	0.8925
Anl Date: 1/10/96	Tot Sa, Alq: 1.80E+02	, 3.47E+01	Alp; (Dpm/ 8.09E-01	(uCi/ 1.89E-03	(pCi/ 1.05E+01	± 9.0E+00	CAT I	4.8E+00	Lab	
Ppt mg: 34.7	Units: g	, mg	Bet; Alq): 6.09E+00	Sa): 1.42E-02	L|g): 7.91E+01	± 9.5E+00		1.3E+00	Alq L|g	
BHI B0GS38		1/10/96 10:30:00 AM	QUAD23A	1/10/96 1:02:59 PM	B0GS38	30	66	2.14875	1478	48.401667
	LIQUID		Bkg:	1/10/96 5:06:07 AM	BKG	800	41	0.05125	692	0.865
Anl Date: 1/10/96	Tot Sa, Alq: 1.00E+00	, 1.00E+01	Alp; (Dpm/ 6.08E+00	(uCi/ 2.74E-04	(pCi/ 2.74E+02	± 3.9E+01	CAT I	9.1E-02	Lab	
Ppt mg: 12.8	Units: L	, ml	Bet; Alq): 9.29E+01	Sa): 4.18E-03	L|g): 4.18E+03	± 1.1E+02		1.2E-02	Alq L|g	
BHI B0GS39		1/10/96 10:30:00 AM	QUAD23B	1/10/96 1:02:59 PM	B0GS39	30	23	0.71416667	283	8.4908333
	LIQUID		Bkg:	1/10/96 5:06:07 AM	BKG	800	42	0.0525	754	0.9425
Anl Date: 1/10/96	Tot Sa, Alq: 1.00E+00	, 1.00E+01	Alp; (Dpm/ 2.27E+00	(uCi/ 1.02E-04	(pCi/ 1.02E+02	± 3.0E+01	CAT I	2.4E-01	Lab	
Ppt mg: 12.2	Units: L	, ml	Bet; Alq): 1.62E+01	Sa): 7.29E-04	L|g): 7.29E+02	± 4.9E+01		6.9E-02	Alq L|g	
BHI B0GYX4		1/10/96 10:30:00 AM	QUAD23C	1/10/96 1:02:59 PM	B0GYX4	30	3	0.03875	29	0.0741667
	LIQUID		Bkg:	1/10/96 5:06:07 AM	BKG	800	49	0.06125	714	0.8925
Anl Date: 1/10/96	Tot Sa, Alq: 1.00E+00	, 1.00E+01	Alp; (Dpm/ 1.09E-01	(uCi/ 4.91E-06	(pCi/ 4.91E+00	± 1.8E+01	CAT I	5.1E+00	Lab	
Ppt mg: 0.3	Units: L	, ml	Bet; Alq): 1.20E-01	Sa): 5.39E-06	L|g): 5.39E+00	± 1.6E+01		9.3E+00	Alq L|g	

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CLIENT CODE ID	MATRIX	RECEIVED	DETECTOR	ACQ DATE	SAMPLE	MINUTES	CNTS A	NET CPM A	CNTS B	NET CPM B
BHI B0GYX5		1/10/96 10:30:00 AM	QUAD23D	1/10/96 1:02:59 PM	B0GYX5	30	5	0.11791667	44	0.6141667
	LIQUID		Bkg:	1/10/96 5:06:07 AM	BKG	800	39	0.04875	682	0.8525
Anl Date: 1/10/96	Tot Sa, Alq: 1.00E+00	, 1.00E+01	Alp; (Dpm/ 3.38E-01	(uCi/ 1.52E-05	(pCi/ 1.52E+01	± 1.9E+01	CAT I	1.6E+00	Lab Alq L|g	
Ppt mg: 0.7	Units: L	, ml	Bet; Alq): 1.09E+00	Sa): 4.93E-05	L|g): 4.93E+01	± 1.9E+01		1.0E+00		
BHI B0GYX6		1/10/96 10:30:00 AM	QUAD24A	1/10/96 1:02:47 PM	B0GYX6	30	6	0.15375	48	0.68
	LIQUID		Bkg:	1/10/96 5:05:52 AM	BKG	800	37	0.04625	736	0.92
Anl Date: 1/10/96	Tot Sa, Alq: 1.00E+00	, 1.00E+01	Alp; (Dpm/ 4.60E-01	(uCi/ 2.07E-05	(pCi/ 2.07E+01	± 2.2E+01	CAT I	1.2E+00	Lab Alq L|g	
Ppt mg: 0.7	Units: L	, ml	Bet; Alq): 1.23E+00	Sa): 5.55E-05	L|g): 5.55E+01	± 2.0E+01		9.0E-01		
BHI B0GYY9		1/10/96 10:30:00 AM	QUAD24B	1/10/96 1:02:47 PM	B0GYY9	30	4	0.08833333	34	0.2320833
	LIQUID		Bkg:	1/10/96 5:05:52 AM	BKG	800	36	0.045	721	0.90125
Anl Date: 1/10/96	Tot Sa, Alq: 1.00E+00	, 1.00E+01	Alp; (Dpm/ 2.55E-01	(uCi/ 1.15E-05	(pCi/ 1.15E+01	± 1.9E+01	CAT I	2.2E+00	Lab Alq L|g	
Ppt mg: 0	Units: L	, ml	Bet; Alq): 3.98E-01	Sa): 1.79E-05	L|g): 1.79E+01	± 1.7E+01		2.8E+00		
BHI B0GYZ0		1/10/96 10:30:00 AM	QUAD24C	1/10/96 1:02:47 PM	B0GYZ0	30	3	0.0575	39	0.35625
	LIQUID		Bkg:	1/10/96 5:05:52 AM	BKG	800	34	0.0425	755	0.94375
Anl Date: 1/10/96	Tot Sa, Alq: 1.00E+00	, 1.00E+01	Alp; (Dpm/ 1.60E-01	(uCi/ 7.19E-06	(pCi/ 7.19E+00	± 1.9E+01	CAT I	3.5E+00	Lab Alq L|g	
Ppt mg: 0.5	Units: L	, ml	Bet; Alq): 6.37E-01	Sa): 2.87E-05	L|g): 2.87E+01	± 1.8E+01		1.7E+00		
BHI B0GZM8		1/10/96 10:30:00 AM	QUAD24D	1/10/96 1:02:47 PM	B0GZM8	30	11	0.32541667	68	1.3279167
	LIQUID		Bkg:	1/10/96 5:05:52 AM	BKG	800	33	0.04125	751	0.93875
Anl Date: 1/10/96	Tot Sa, Alq: 4.00E+00	, 1.00E+01	Alp; (Dpm/ 9.23E-01	(uCi/ 1.66E-04	(pCi/ 4.16E+01	± 2.3E+01	CAT I	6.0E-01	Lab Alq L|g	
Ppt mg: 1.9	Units: L	, ml	Bet; Alq): 2.39E+00	Sa): 4.31E-04	L|g): 1.08E+02	± 2.4E+01		4.6E-01		
BHI B0GZN6		1/10/96 10:30:00 AM	QUAD21A	1/10/96 1:44:04 PM	B0GZN6	30	11	0.30791667	65	1.2141667
	LIQUID		Bkg:	1/10/96 5:05:48 AM	BKG	800	47	0.05875	762	0.9525
Anl Date: 1/10/96	Tot Sa, Alq: 4.00E+00	, 1.00E+01	Alp; (Dpm/ 8.85E-01	(uCi/ 1.59E-04	(pCi/ 3.99E+01	± 2.3E+01	CAT I	6.3E-01	Lab Alq L|g	
Ppt mg: 1.8	Units: L	, ml	Bet; Alq): 2.27E+00	Sa): 4.09E-04	L|g): 1.02E+02	± 2.4E+01		4.9E-01		

00011

CLIENT CODE ID	MATRIX	RECEIVED	DETECTOR	ACQ DATE	SAMPLE	MINUTES	CNTS A	NET CPM A	CNTS B	NET CPM B
BHI B0H0H0		1/10/96 10:30:00 AM	QUAD21B	1/10/96 1:44:04 PM	B0H0H0	30	4	0.07208333	63	1.205
	SOLID		Bkg:	1/10/96 5:05:48 AM	BKG	800	49	0.06125	716	0.895
Anl Date: 1/10/96	Tot Sa, Alq: 1.46E+03	, 4.68E+01	Alp; (Dpm/ 2.96E-01	(uCi/ 4.16E-03	(pCi/ 2.84E+00	± 7.3E+00	CAT I	1.8E+01	Lab Alq	
Ppt mg: 46.8	Units: g	, mg	Bet; Alq): 2.48E+00	Sa): 3.49E-02	L/g): 2.39E+01	± 5.4E+00		4.2E+00	L/g	
BHI B0H0H1		1/10/96 10:30:00 AM	QUAD21C	1/10/96 1:44:04 PM	B0H0H1	30	8	0.20166667	74	1.5666667
	SOLID		Bkg:	1/10/96 5:05:48 AM	BKG	800	52	0.065	720	0.9
Anl Date: 1/10/96	Tot Sa, Alq: 1.55E+03	, 8.46E+01	Alp; (Dpm/ 1.20E+00	(uCi/ 9.94E-03	(pCi/ 6.41E+00	± 5.5E+00	CAT I	7.8E+00	Lab Alq	
Ppt mg: 84.6	Units: g	, mg	Bet; Alq): 3.34E+00	Sa): 2.76E-02	L/g): 1.78E+01	± 3.4E+00		5.6E+00	L/g	
BHI B0H0H2		1/10/96 10:30:00 AM	QUAD21D	1/10/96 1:44:04 PM	B0H0H2	30	7	0.15833333	72	1.42125
	SOLID		Bkg:	1/10/96 5:05:48 AM	BKG	800	60	0.075	783	0.97875
Anl Date: 1/10/96	Tot Sa, Alq: 1.57E+03	, 6.74E+01	Alp; (Dpm/ 8.25E-01	(uCi/ 8.66E-03	(pCi/ 5.51E+00	± 6.3E+00	CAT I	9.1E+00	Lab Alq	
Ppt mg: 67.4	Units: g	, mg	Bet; Alq): 3.01E+00	Sa): 3.16E-02	L/g): 2.01E+01	± 4.1E+00		5.0E+00	L/g	
BHI B0H0H3		1/10/96 10:30:00 AM	QUAD22A	1/10/96 1:44:08 PM	B0H0H3	30	5	0.13166667	60	0.92875
	SOLID		Bkg:	1/10/96 5:05:58 AM	BKG	800	28	0.035	857	1.07125
Anl Date: 1/10/96	Tot Sa, Alq: 1.48E+03	, 7.15E+01	Alp; (Dpm/ 7.13E-01	(uCi/ 6.66E-03	(pCi/ 4.49E+00	± 5.9E+00	CAT I	1.1E+01	Lab Alq	
Ppt mg: 71.5	Units: g	, mg	Bet; Alq): 1.87E+00	Sa): 1.75E-02	L/g): 1.18E+01	± 3.4E+00		8.5E+00	L/g	
BHI B0H0H4		1/10/96 10:30:00 AM	QUAD22B	1/10/96 1:44:08 PM	B0H0H4	30	4	0.07583333	61	1.1445833
	SOLID		Bkg:	1/10/96 5:05:58 AM	BKG	800	46	0.0575	711	0.88875
Anl Date: 1/10/96	Tot Sa, Alq: 1.48E+03	, 5.63E+01	Alp; (Dpm/ 3.40E-01	(uCi/ 4.01E-03	(pCi/ 2.72E+00	± 6.2E+00	CAT I	1.8E+01	Lab Alq	
Ppt mg: 56.3	Units: g	, mg	Bet; Alq): 2.31E+00	Sa): 2.73E-02	L/g): 1.85E+01	± 4.3E+00		5.4E+00	L/g	
BHI B0H0H5		1/10/96 10:30:00 AM	QUAD22C	1/10/96 1:44:08 PM	B0H0H5	30	6	0.14625	65	1.2604167
	SOLID		Bkg:	1/10/96 5:05:58 AM	BKG	800	43	0.05375	725	0.90625
Anl Date: 1/10/96	Tot Sa, Alq: 1.46E+03	, 8.28E+01	Alp; (Dpm/ 8.20E-01	(uCi/ 6.51E-03	(pCi/ 4.46E+00	± 5.1E+00	CAT I	1.1E+01	Lab Alq	
Ppt mg: 82.8	Units: g	, mg	Bet; Alq): 2.63E+00	Sa): 2.09E-02	L/g): 1.43E+01	± 3.2E+00		7.0E+00	L/g	

CLIENT CODE ID	MATRIX	RECEIVED	DETECTOR	ACQ DATE	SAMPLE	MINUTES	CNTS A	NET CPM A	CNTS B	NET CPM B
BHI B0H0H6		1/10/96 10:30:00 AM	QUAD22D	1/10/96 1:44:08 PM	B0H0H6	30	5	0.11916667	88	2.0408333
	SOLID		Bkg:	1/10/96 5:05:58 AM	BKG	800	38	0.0475	714	0.8925

Anl Date: 1/10/96	Tot Sa, Alq: 1.55E+03	, 6.82E+01	Alp;	(Dpm/ 5.48E-01	(uCi/ 5.59E-03	(pCi/ 3.62E+00	± 5.6E+00	CAT I	1.4E+01	Lab Alq
Ppt mg: 68.2	Units: g	, mg	Bet;	Alq): 4.28E+00	Sa): 4.37E-02	L/g): 2.83E+01	± 4.4E+00		3.5E+00	L/g

BHI B0H0H7		1/10/96 10:30:00 AM	QUAD23A	1/10/96 1:44:12 PM	B0H0H7	30	3	0.04875	101	2.5016667
	SOLID		Bkg:	1/10/96 5:06:07 AM	BKG	800	41	0.05125	692	0.865

Anl Date: 1/10/96	Tot Sa, Alq: 1.57E+03	, 9.66E+01	Alp;	(Dpm/ 1.89E-01	(uCi/ 1.38E-03	(pCi/ 8.83E-01	± 4.3E+00	CAT I	5.7E+01	Lab Alq
Ppt mg: 96.6	Units: g	, mg	Bet;	Alq): 5.42E+00	Sa): 3.97E-02	L/g): 2.53E+01	± 3.4E+00		4.0E+00	L/g

00013

96154727.2115

9613477.2116

Environmental Restoration Contractor **ERC Team**

Interoffice Memorandum

Job No. 22192
Written Response Required? NO
Closes CCN: N/A
OU: 100-NR-1
TSD: N/A
ERA: N/A
Subject Code: 8610

TO: RC Smith B1-35

DATE: January 8, 1996

COPIES: See Below

FROM: WS Thompson
ER Field Sampling
N1-28 / 6-8031

SUBJECT: **ESTIMATE OF CURIE CONTENT FOR SOIL SAMPLES SHIPPED ON JANUARY 10, 1996, TO QUANTERRA FROM THE 1301N/1325N CRIB DRILLING PROJECT**

This memo provides estimated curie content information for 8 soil samples (B0GL97, B0GL99, B0GLB1, B0GLB3, B0GLB4, B0GLC0, B0GLB6, and B0GLB8) to be shipped to Quanterra on January 10, 1996. The information is provided in order for Quanterra to evaluate acceptance of the samples in accordance with their NRC license. A Radioactive Shipment Record (RSR) will accompany the samples stating the isotopes and the curie content of the shipment. An onsite lab provided detailed analytical data which was used to prepare the RSR, however, this isotopic specific data will not be provided to Quanterra as it could be viewed as compromising the independence of the requested analysis to be performed by Quanterra. Therefore, in lieu of a laboratory total activity report, the approximate curie content (in microcuries) for the 8 samples is:

Co60	Cs137	Sr90
0.060	0.083	0.625

- For the eight samples, an approximate total soil sample weight is 1800 grams. This is determined using the formula, 140 ml x 1.6 gm/ml, for Hanford soil. The samples were not weighed and 1.6 gms/ml is a Hanford site specific soil weight.
- The highest radiological activity measured through the outside of the sample jars using hand held detectors was up to 8,000 dpm; many of the sample jars had less than detectable activity.

Additionally, each soil sample has an accompanying activity scan aliquot for Quanterra to conduct radiological screening to evaluate acceptance criteria.

If you have any questions, please give me a call.

WST:wst
Copies
BHI Document Control H4-79
KL Sykes X0-37
JH Kessner B1-35
JA Lerch B1-35
RL Weiss B1-35
A. Hopkins H9-11

13477.2117

GUIDE

POTENTIAL HAZARDS

HEALTH HAZARDS

Low-level radioactive material; little personal radiation hazard.
Many packages are not required to have radioactive materials labels or markings.
Some radioactive materials cannot be detected by commonly available instruments.

FIRE OR EXPLOSION

Some of these materials may burn, but none of them ignites readily.
Radioactivity does not change flammability or other properties of the ma

EMERGENCY ACTION

Keep unnecessary people away; isolate hazard area and deny entry.
Response actions may be performed prior to any radiation measurements.
Positive pressure self-contained breathing apparatus (SCBA) and structur firefighters' protective clothing will provide limited protection.
Notify Radiation Authority of accident conditions.
Detain uninjured persons, isolate equipment with suspected contaminatic and delay cleanup until instruction of Radiation Authority.

FIRE

Do not move damaged containers; move undamaged containers out of fir zone.
Small Fires: Dry chemical, CO_2, water spray or regular foam.
Large Fires: Water spray, fog (flooding amounts).

SPILL OR LEAK

Do not touch damaged containers or spilled material.
Small Liquid Spills: Take up with sand, earth or other noncombustible absorbent material.
Cover powder spill with plastic sheet or tarp to minimize spreading.

FIRST AID

Use first aid treatment according to the nature of the injury.
Advise medical personnel that victim may be contaminated with low-level radioactive material.

Radioactive Material, excepted package - limitec quantity of material, 7, UN2910

9613477.2118

THIS PACKAGE CONFORMS TO THE CONDITIONS AND LIMITATIONS SPECIFIED IN 49 CFR 173.421 FOR RADIOACTIVE MATERIAL, EXCEPTED PACKAGE-LIMITED QUANTITY OF MATERIAL, UN2910

BECHTEL HANFORD COMPANY

CAUTION

"Internal Contamination - Soil Samples"

Handle sample containers in a hood designated as Radiological Materials Area (RMA).

The outside of the sample containers may have potential smearable radioactive contamination because they were packaged inside of a glovebox. The outside of the plastic bag surrounding the containers was surveyed with no detectable smearable radioactive contamination. Remove the plastic bag in a hood.

96154772116

000127

RADIOACTIVE SHIPMENT RECORD

3. Page 1 of 1 — 34633

1. SHIP TO
Company: Quanterra
Address: 2800 George Wash. Way
City, State, Zip: Richland, WA 99352
Attention: Karen Ackenburgh
Phone: 375-3131 (Ext 135)

2. SHIP FROM U.S. DEPT. OF ENERGY C/O
Company: Bechtel Hanford Co
Address: 1301N Crib/100 Area
City, State, Zip: Richland, WA 99352
Contact: Wendy S. Thompson
Phone: (509) 376-8031, 531-0741

4. Ship [X] Prepaid [ ] Collect
Via: [X] Motor-Rail [ ] Air Psgr [ ] Excl. Use [ ] Air Cargo [ ] UPS Surface [ ] Mail [X] Site Carrier
SHIPMENT AUTHORIZATION NUMBE

5. HM Proper Shipping Name: Radioactive Material,

	excepted package - empty packaging	7	UN2910
	excepted package - instruments or articles	7	UN2910
X	excepted package - limited quantity of material	7	UN2910
	excepted package - articles manufactured from natural or depleted uranium or natural thorium	7	UN2910
	Special Form, n.o.s.	7	UN2974
	Low Specific Activity, n.o.s.	7	UN2912
	n.o.s.	7	UN2982
	Fissile, n.o.s.	7	UN2918
	(other)		

6. Markings Applied: Package Orientation [ ]; Gross Weight [X]; Radioactive - LSA [ ]; Type A [ ]; Type B [ ]

7. For Normal Form Identify
Physical Form: [ ] Liquid [ ] Gas [X] Solid
Chemical Form: [ ] Metal [ ] Oxide [X] Elemental [ ] Nitrate
Other: [ ] Mixtur

8. Additional RAM Desc.: Limited Quantity Radioactive Material [X]; Highway Route Controlled Quantity [ ]

9. Placards Applied [ ] Yes [X] No
If Rail Specify Placards
Route Plan [ ] Yes [X] No

11e. TYPE PACKAGE: Strong Tight [X]; Type A [ ]; Type B [ ]; Type B(U) [ ]; Type B(M) [ ]

11b. CONSTRUCTION: [ ] Box, FB; [ ] Wood; [ ] Steel; [ ] Drum; [ ] Cask; Other Polycooler

11c. FISSILE CLASS: Non-Fissile [X]; Fissile Exempt [ ]; Fissile I [ ]; Fissile II [ ]; Fissile III [ ]; Gms Fissile

11d. Labels Applied: Empty [ ]; Radioactive White I [ ]; Radioactive Yellow II [ ]; Radioactive Yellow III [ ]; Subsidiary Hazard [ ]

N/A

10. EMERGENCY RESPONSE
Telephone: (509) 373-3800
Emergency Response Guide(s): ERG #61 (Attached)

Warning -- Fissile Class III Shipment. Do Not Load More Than ____ Packages Per Vehicle. In Loading and Storage Areas, Keep at Least 20 Feet From Other Packages Bearing Radioactive Labels.

12.

No. Pkgs.	Model Package	COC/Spec	Serial No.	Seal No.	Isotopes	T.I.	Curies/Pkg	Gr. Wt.
1	Strong tight	N/A	N/A	N/A	Sr90, Co60, Cs137	N/A	0.77 uCi	11 pd
50	Samples in glass jars - double bagged and							
	placed inside polycooler #	B1-OCP						
	Sample #: BOGL97, BOGL99, BOGL131, BOGL133, BOGL134, BOGL136, BOGL138							
(Shipper may describe package in detail on one of the unused lines above)					TOTALS	N/A	0.77 uCi	11 pd

13. This is to certify that the above named materials are properly classified, described, packaged, marked and labeled, and are in proper condition for transportation, according to the applicable federal, state, local and international regulations for the transportation of hazardous materials.
Certifier's Signature / On behalf of DOE-RL: Wendy S Thompson — Date: 01/10/96 — Organization: FIELD SAMPLING — Complete Cost Code (Inc. End Function): X60037

14. Surface Dose Rate of Package: [X] <0.5 or N/A mrem/hr (N + β γ)
Dose Rate at 1 Meter from Surface of Package: [X] <0.5 or N/A mrem/hr (N + β γ)
Smears of Outer Container: [X] <22 dpm β γ/cm²; [X] <2.2 dpm α/cm²; [ ] <Tbl. 2-2 HSRCM Onsite Limits
TRUCK LOAD OR EXCLUSIVE USE: Surface [X] <200 mrem/hr (N + β γ); @ 6 feet [X] <10 mrem/hr (N + β γ); @ Cab or sleeper [X] <2 mrem/hr (N + β γ)
Additional Data and Instructions (inc. Readings on Internal Packaging): N/A
Signature - Radiation Monitoring: [illegible] — Bldg. 1301N — Survey No. 5-1301-386 — Date 1-10-96

15. PICKUP OF SHIPMENT: Vehicle HO-D2598 — Driver Bill Whitten
RECEIPT: Signature — Date

16. Shipment has been inspected and verified to be in compliance with DOT regulations
Authorized Signature: M A Sams — Printed Name: M. A. SAMS — Date: 1-10-96

17. AIR TRANSPORT CERTIFICATION
CARGO AIRCRAFT: [ ] Cargo Aircraft Only, Labels Applied
PASSENGER AIRCRAFT: [ ] 1. Ltd Qty; [ ] 2. <3 T.I.; [ ] 3. Research/Medical Diagnosis; [ ] 4. Human Medical Research
Pkg. Dimensions: NA

18. OFFSITE AUTHORIZATION
B/L: RMW-9777 — Date Shipped: 1-10-96 — Routing: KEH/BHI VEHICLE — ETA: 1-10-96
Surveyed By: ____ — Date: ____ — Approved for Shipment Offsite: M A Sams — Date: 1-10-96
Karen Ackenburg - Quanterra 1-10-96

Figure 1

SAMPLE CHECK-IN LIST

(1 Per Shipping Container)

Date/Time Received 1-10-96 10:30 Client Name BHI

Project/Client # _____ Batch or Case # _____

Cooler ID (if noted on outside of cooler) BI-C01

1. Condition of shipping container? O.K.
2. Custody Seals on cooler intact? Yes [X] No [ ]
3. Custody Seals dated and signed? Yes [X] No [ ]
4. Chain of Custody record is taped on inside of cooler lid? Yes [ ] No [X]
5. Vermiculite/packing material is: Wet [ ] Dry [X] _____
6. Each sample is in a plastic bag? Yes [X] No [ ] _____
7. Number of sample containers in cooler: 24
8. Samples have:
   - X tape
   - X custody seals
   - ___ hazard labels
   - ___ appropriate sample labels
9. Samples are:
   - X in good condition
   - ___ broken
   - ___ other
   - ___ leaking
   - ___ have air bubbles
10. Coolant Present? Yes [ ] No [X] Sample Temperature _____
11. The following paperwork should be accounted for (N/A if not applicable):
    Chain of Custody #(s) n/A
    Request for Analysis #(s) ↓
    Airbill # _____ Carrier n/a
12. Have any anomalies been identified above? Yes [X] No [ ]
13. Memos have been initiated for all anomalies identified above? Yes [X]

Printed Name/Signature Karen Ashtenburg Date/Time 1-10-96 10:30

9613477.2122

SAMPLE RECEIPT VARIANCE REPORT
ITAS-RICHLAND LABORATORY

WORK ORDER NUMBER: _____ DATE INITIATED: 1-10-96

INITIATED BY: Karen Achtenburg

DATE/TIME OF SAMPLE (AND/OR RFA & COC) RECEIPT: _____

CLIENT SAMPLE NUMBER	RFA/COC NUMBERS	ANALYSIS REQUESTED

Samples were received with the following deficiencies:

- ☐ 1. Not enough sample received for proper analysis.
- ☐ 2. Sample received without proper preservative.
- ☐ 3. No sample received in container.
- ☐ 4. Sample received without a RFA/COC form.
- ☐ 5. No sample ID on container.
- ☐ 6. Sample received broken or leaking.
- ☐ 7. Holding time exceeded at receipt.
- ☐ 8. Custody tape broken.
- ☐ 9. COC not relinquished by client.
- ☐ 10. Sample information on container does not match sample information on the paper work (Explain below).
- ☐ 11. All shipping containers (coolers) on waybill not received with shipment.
  - ☐ RFA/COC received
  - ☐ RFA/COC not received
- ☒ 12. Other (Explain below).

NOTES: no coolant present - Sample temp - Room

SUPERVISOR REVIEW: _____

PROJECT MANAGER REVIEW: _____

TELEPHONED TO: _____ ON _____ BY _____

TELEFAXED TO: _____ ON _____ BY _____

SIGNED ORIGINAL MUST BE RETAINED IN WORK ORDER FILE

FORM NO. LS-023, 3/92, Rev. 0

9613977.2123

Quanterra Environmental Services

C.O.C. and C.D.C.
COPIED TO: Bel/GP
DATE: 1-11-96
TIME: 10:45
BY: MA

Login No.: 10120

Condition Upon Receipt Variance Report
St. Louis Laboratory

Client: Richland
Date: 1-11-96 Time: 9:30
Project No: 550.111
Initiated by: Marvin Nelson
Shipper/No: 126 1716 836
RFA/COC Numbers: 43756

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 designate) Carol Mitchell Date: 1-11-96

Project Management Review: Abby Holden Date: 1-12-96

SIGNED ORIGINAL MUST BE RETAINED IN THE PROJECT FILE

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

9613477.2124

Quanterra-Richland
P.O. Box 1970
Richland, WA 99352

Project: 550.111

Category: ICP Metals; Cr, Cd, Pb, Ni EPA
Method: EPA 6010
Matrix: SOLID

Sample Date : 12/19/95
Receipt Date : 01/10/96
Report Date : 01/25/96

Client ID: BOGL97

Quanterra ID : 10120-001

Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit	Dilution
Cadmium	7440-43-9	QCBLK89160-1	01/22/96	01/22/96	0.36	MG/KG	U	0.54	4
Chromium	7440-47-3	QCBLK89160-1	01/22/96	01/22/96	8.9	MG/KG		1.1	4
Nickel	7440-02-0	QCBLK89160-1	01/22/96	01/22/96	8.5	MG/KG		1.1	1

9613477.2125

Quanterra-Richland
P.O. Box 1970
Richland, WA 99352

Project: 550.111

Category: ICP Metals; Cr, Cd, Pb, Ni EPA
Method: EPA 6010
Matrix: SOLID

Sample Date : 12/19/95
Receipt Date : 01/10/96
Report Date : 01/25/96

Client ID: BOGL97

Quanterra ID : 10120-001MS

Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit	Dilution
Cadmium	7440-43-9	QCBLK89160-1	01/22/96	01/22/96	95	%REC			4
Chromium	7440-47-3	QCBLK89160-1	01/22/96	01/22/96	7720	%REC			4
Nickel	7440-02-0	QCBLK89160-1	01/22/96	01/22/96	1620	%REC			1

9613477.2126

Quanterra-Richland
P.O. Box 1970
Richland, WA 99352

Project: 550.111

Category: ICP Metals; Cr, Cd, Pb, Ni EPA
Method: EPA 6010
Matrix: SOLID

Sample Date : 12/19/95
Receipt Date : 01/10/96
Report Date : 01/25/96

Client ID: BOGL97

Quanterra ID : 10120-001MSD

Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit	Dilution
Cadmium	7440-43-9	QCBLK89160-1	01/22/96	01/22/96	87	%REC			4
Chromium	7440-47-3	QCBLK89160-1	01/22/96	01/22/96	447	%REC			4
Nickel	7440-02-0	QCBLK89160-1	01/22/96	01/22/96	156	%REC			1

9613477.2127

Quanterra-Richland
P.O. Box 1970
Richland, WA 99352

Project: 550.111

Category: ICP Metals; Cr, Cd, Pb, Ni EPA
Method: EPA 6010
Matrix: SOLID

Sample Date : 12/20/95
Receipt Date : 01/10/96
Report Date : 01/25/96

Client ID: BOGL99

Quanterra ID : 10120-002

Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit	Dilution
Cadmium	7440-43-9	QCBLK89160-1	01/22/96	01/22/96	0.36	MG/KG	U	0.53	4
Chromium	7440-47-3	QCBLK89160-1	01/22/96	01/22/96	6.2	MG/KG		1.1	4
Nickel	7440-02-0	QCBLK89160-1	01/22/96	01/22/96	7.4	MG/KG		1.1	1

9613477.2128

Quanterra-Richland
P.O. Box 1970
Richland, WA 99352

Project: 550.111

Category: ICP Metals; Cr, Cd, Pb, Ni EPA
Method: EPA 6010
Matrix: SOLID

Sample Date : 12/20/95
Receipt Date : 01/10/96
Report Date : 01/25/96

Client ID: BOGLB1

Quanterra ID : 10120-003

Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit	Dilution
Cadmium	7440-43-9	QCBLK89160-1	01/22/96	01/22/96	0.35	MG/KG	U	0.52	4
Chromium	7440-47-3	QCBLK89160-1	01/22/96	01/22/96	3.2	MG/KG		1.0	4
Nickel	7440-02-0	QCBLK89160-1	01/22/96	01/22/96	4.6	MG/KG		1.0	1

9613477.2129

Quanterra-Richland
P.O. Box 1970
Richland, WA 99352

Project: 550.111

Category: ICP Metals; Cr, Cd, Pb, Ni EPA
Method: EPA 6010
Matrix: SOLID

Sample Date : 12/22/95
Receipt Date : 01/10/96
Report Date : 01/25/96

Client ID: B0GLB3

Quanterra ID : 10120-004

Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit	Dilution
Cadmium	7440-43-9	QCBLK89160-1	01/22/96	01/22/96	0.35	MG/KG	U	0.52	4
Chromium	7440-47-3	QCBLK89160-1	01/22/96	01/22/96	5.0	MG/KG		1.0	4
Nickel	7440-02-0	QCBLK89160-1	01/22/96	01/22/96	5.5	MG/KG		1.0	1

9613477.2150

Quanterra-Richland
P.O. Box 1970
Richland, WA 99352

Project: 550.111

Category: ICP Metals; Cr, Cd, Pb, Ni EPA
Method: EPA 6010
Matrix: SOLID

Sample Date : 12/22/95
Receipt Date : 01/10/96
Report Date : 01/25/96

Client ID: BOGLB4

Quanterra ID : 10120-005

Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit	Dilution
Cadmium	7440-43-9	QCBLK89160-1	01/22/96	01/22/96	0.35	MG/KG	U	0.52	4
Chromium	7440-47-3	QCBLK89160-1	01/22/96	01/22/96	3.6	MG/KG		1.0	4
Nickel	7440-02-0	QCBLK89160-1	01/22/96	01/22/96	4.5	MG/KG		1.0	1

9613477.2131

Quanterra-Richland
P.O. Box 1970
Richland, WA 99352

Project: 550.111

Category: ICP Metals; Cr, Cd, Pb, Ni EPA
Method: EPA 6010
Matrix: SOLID

Sample Date : 12/27/95
Receipt Date : 01/10/96
Report Date : 01/25/96

Client ID: BOGLB6

Quanterra ID : 10120-006

Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit	Dilution
Cadmium	7440-43-9	QCBLK89160-1	01/22/96	01/22/96	0.09	MG/KG	U	0.13	1
Chromium	7440-47-3	QCBLK89160-1	01/22/96	01/22/96	1.7	MG/KG		0.26	1
Nickel	7440-02-0	QCBLK89160-1	01/22/96	01/22/96	3.4	MG/KG		1.0	1

9613477.2152

Quanterra-Richland
P.O. Box 1970
Richland, WA 99352

Project: 550.111

Category: ICP Metals; Cr, Cd, Pb, Ni EPA
Method: EPA 6010
Matrix: SOLID

Sample Date : 12/27/95
Receipt Date : 01/10/96
Report Date : 01/25/96

Client ID: BOGLB8

Quanterra ID : 10120-007

Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit	Dilution
Cadmium	7440-43-9	QCBLK89160-1	01/22/96	01/22/96	0.08	MG/KG	U	0.13	1
Chromium	7440-47-3	QCBLK89160-1	01/22/96	01/22/96	0.24	MG/KG	B	0.25	1
Nickel	7440-02-0	QCBLK89160-1	01/22/96	01/22/96	0.40	MG/KG	U	1.0	1

9613477.2133

Quanterra-Richland
P.O. Box 1970
Richland, WA 99352

Project: 550.111

Category: ICP Metals; Cr, Cd, Pb, Ni EPA
Method: EPA 6010
Matrix: SOLID

Sample Date : 12/28/95
Receipt Date : 01/10/96
Report Date : 01/25/96

Client ID: BOGLCO

Quanterra ID : 10120-008

Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit	Dilution
Cadmium	7440-43-9	QCBLK89160-1	01/22/96	01/22/96	0.36	MG/KG	U	0.53	4
Chromium	7440-47-3	QCBLK89160-1	01/22/96	01/22/96	12.2	MG/KG		1.1	4
Nickel	7440-02-0	QCBLK89160-1	01/22/96	01/22/96	11.9	MG/KG		1.1	1

9613477.2134

Quanterra-Richland
P.O. Box 1970
Richland, WA 99352

Project: 550.111

Category: Lead
Method: EPA 7421
Matrix: SOLID

Sample Date : 12/19/95
Receipt Date : 01/10/96
Report Date : 01/25/96

Client ID	Quanterra ID	Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit	Dil
B0GL97	10120-001	Lead	7439-92-1	QCBLK89161-1	01/22/96	01/22/96	2.7	MG/KG		0.32	
B0GL97	10120-001MS	Lead	7439-92-1	QCBLK89161-1	01/22/96	01/22/96	84	%REC			
B0GL97	10120-001MSD	Lead	7439-92-1	QCBLK89161-1	01/22/96	01/22/96	87	%REC			
B0GL99	10120-002	Lead	7439-92-1	QCBLK89161-1	01/22/96	01/22/96	1.9	MG/KG		0.32	
B0GLB1	10120-003	Lead	7439-92-1	QCBLK89161-1	01/22/96	01/22/96	1.7	MG/KG		0.31	
B0GLB3	10120-004	Lead	7439-92-1	QCBLK89161-1	01/22/96	01/22/96	1.6	MG/KG		0.31	
B0GLB4	10120-005	Lead	7439-92-1	QCBLK89161-1	01/22/96	01/22/96	1.7	MG/KG		0.31	
B0GLB6	10120-006	Lead	7439-92-1	QCBLK89161-1	01/22/96	01/22/96	1.2	MG/KG		0.31	
B0GLB8	10120-007	Lead	7439-92-1	QCBLK89161-1	01/22/96	01/22/96	0.10	MG/KG	U	0.30	
B0GLC0	10120-008	Lead	7439-92-1	QCBLK89161-1	01/22/96	01/22/96	3.2	MG/KG		0.32	
NA	QCBLK89161-1	Lead	7439-92-1	QCBLK89161-1	01/22/96	01/22/96	0.10	MG/KG	U	0.30	
NA	QCLCS89161-1	Lead	7439-92-1	QCBLK89161-1	01/22/96	01/22/96	95	%REC			2(

9613477.2155

U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

B0GLB1

Lab Name: QUANTERRA_MO Contract: 550.111
Lab Code: ITMO Case No.: SAS No.: SDG No.: W0867
Matrix (soil/water): SOIL Lab Sample ID: 10120-003
Level (low/med): LOW Date Received: 01/10/96
% Solids: 97.0

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

CAS No.	Analyte	Concentration	C	Q	M
7440-43-9	Cadmium	0.35	U		P
7440-47-3	Chromium	3.2		N	P
7439-92-1	Lead	1.7			F
7440-02-0	Nickel	4.6		N	P

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

Comments:

FORM I - IN

SW-846

9613477.2136

U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

B0GLB3

Lab Name: QUANTERRA_MO Contract: 550.111
Lab Code: ITMO Case No.: SAS No.: SDG No.: W0867
Matrix (soil/water): SOIL Lab Sample ID: 10120-004
Level (low/med): LOW Date Received: 01/10/96
% Solids: 96.7

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

CAS No.	Analyte	Concentration	C	Q	M
7440-43-9	Cadmium	0.35	U		P
7440-47-3	Chromium	5.0		N	P
7439-92-1	Lead	1.6			F
7440-02-0	Nickel	5.5		N	P

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

Comments:

FORM I - IN

SW-846

9613477.2157

U.S. EPA - CLP

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

B0GLB4

Lab Name: QUANTERRA_MO Contract: 550.111

Lab Code: ITMO Case No.: SAS No.: SDG No.: W0867

Matrix (soil/water): SOIL Lab Sample ID: 10120-005

Level (low/med): LOW Date Received: 01/10/96

% Solids: 96.9

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

CAS No.	Analyte	Concentration	C	Q	M
7440-43-9	Cadmium	0.35	U		P
7440-47-3	Chromium	3.6		N	P
7439-92-1	Lead	1.7			F
7440-02-0	Nickel	4.5		N	P

Color Before: Clarity Before: Texture:

Color After: Clarity After: Artifacts:

Comments:

FORM I - IN

SW-846

9613477.2138

U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

B0GLB6

Lab Name: QUANTERRA_MO Contract: 550.111
Lab Code: ITMO Case No.: SAS No.: SDG No.: W0867
Matrix (soil/water): SOIL Lab Sample ID: 10120-006
Level (low/med): LOW Date Received: 01/10/96
% Solids: 96.9

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

CAS No.	Analyte	Concentration	C	Q	M
7440-43-9	Cadmium	0.09	U		P
7440-47-3	Chromium	1.7		N	P
7439-92-1	Lead	1.2			F
7440-02-0	Nickel	3.4		N	P

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

Comments:

FORM I - IN

SW-846

9613477.2139

U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

B0GLB8

Lab Name: QUANTERRA_MO Contract: 550.111
Lab Code: ITMO Case No.: SAS No.: SDG No.: W0867
Matrix (soil/water): SOIL Lab Sample ID: 10120-007
Level (low/med): LOW Date Received: 01/10/96
% Solids: 100.0

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

CAS No.	Analyte	Concentration	C	Q	M
7440-43-9	Cadmium	0.08	U		P
7440-47-3	Chromium	0.24	B	N	P
7439-92-1	Lead	0.10	U		F
7440-02-0	Nickel	0.40	U	N	P

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

Comments:

FORM I - IN

SW-846

9613477.2140

U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

B0GLC0

Lab Name: QUANTERRA_MO Contract: 550.111
Lab Code: ITMO Case No.: SAS No.: SDG No.: W0867
Matrix (soil/water): SOIL Lab Sample ID: 10120-008
Level (low/med): LOW Date Received: 01/10/96
% Solids: 94.9

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

CAS No.	Analyte	Concentration	C	Q	M
7440-43-9	Cadmium	0.36	U		P
7440-47-3	Chromium	12.2		N	P
7439-92-1	Lead	3.2			F
7440-02-0	Nickel	11.9		N	P

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

Comments:

FORM I - IN

SW-846

9613477.2141

U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

B0GL97

Lab Name: QUANTERRA_MO Contract: 550.111
Lab Code: ITMO Case No.: SAS No.: SDG No.: W0867
Matrix (soil/water): SOIL Lab Sample ID: 10120-001
Level (low/med): LOW Date Received: 01/10/96
% Solids: 93.4

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

CAS No.	Analyte	Concentration	C	Q	M
7440-43-9	Cadmium	0.36	U		P
7440-47-3	Chromium	8.9		N	P
7439-92-1	Lead	2.7			F
7440-02-0	Nickel	8.5		N	P

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

Comments:

FORM I - IN

SW-846

9613477.2142

U.S. EPA - CLP

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

B0GL99

Lab Name: QUANTERRA_MO Contract: 550.111

Lab Code: ITMO Case No.: SAS No.: SDG No.: W0867

Matrix (soil/water): SOIL Lab Sample ID: 10120-002

Level (low/med): LOW Date Received: 01/10/96

% Solids: 94.4

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

CAS No.	Analyte	Concentration	C	Q	M
7440-43-9	Cadmium	0.36	U		P
7440-47-3	Chromium	6.2		N	P
7439-92-1	Lead	1.9			F
7440-02-0	Nickel	7.4		N	P

Color Before: Clarity Before: Texture:

Color After: Clarity After: Artifacts:

Comments:

FORM I - IN

SW-846

9613477.2143

FROM THE DESK OF: **DORIS E. AYRES**
SAMPLE & DATA MANAGEMENT
372-9022/B1-35

TO: File W0867 **DATE:** February 26, 1996

SUBJECT: Missing Data

On February 23, 1996, Quanterra delivered radiochemistry package W0867. The Th-232 was not reported for sample B0GL99 due to the Key Line not being identified by the ND software.

9613477.2144

Quanterra Environmental Services

Quanterra Incorporated
2800 George Washington Way
Richland, Washington 99352

509 375-3131 Telephone
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CERTIFICATE OF ANALYSIS

FEB 1996
RECEIVED
Data
Log In

Bechtel Hanford, Inc.
345 Hills
Richland, WA 99352

February 23, 1996

Attention: Joan Kessner

SAF Number	:	B95-089
Date SDG Closed	:	January 12, 1996
Number of Samples	:	Eight (8)
Sample Type	:	Soil
SDG Number	:	W0867
Data Deliverable	:	Summary

I. Introduction

On January 10, 1996, eight soil samples were received by the Quanterra Environmental Services Richland Laboratory (QTESRL) for radiochemical analysis. Upon receipt, the samples were assigned the following laboratory ID numbers to correspond with the Bechtel Hanford, Inc. (BHI) specific IDs:

QTESRL ID#	BHI ID#	MATRIX	DATE OF RECEIPT
60112901	B0GL97	SOIL	01/10/96
60112902	B0GL99	SOIL	01/10/96
60112903	B0GLB1	SOIL	01/10/96
60112904	B0GLB3	SOIL	01/10/96
60112905	B0GLB4	SOIL	01/10/96
60112906	B0GLB6	SOIL	01/10/96
60112907	B0GLB8	SOIL	01/10/96
60112908	B0GLC0	SOIL	01/10/96

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II. Analytical Results/Methodology

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

The requested analyses were:

Alpha Spectroscopy
Plutonium-238, -239/40 by method RICHRC-5010
Uranium-234, -235, -238 by method RICHRC-5030
Gamma Spectroscopy
Gamma Scan by method RICHRC-5017
Gas Proportional Counting
Gross Alpha by method ITAS-RD-3222
Gross Beta by method ITAS-RD-3222
Strontium-90 by method RICHRC-5006

III. Quality Control

The analytical results for each analysis performed under SDG W0867 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, except for alpha and beta analysis, where quality control sample results are reported as pCi/sample.

IV. Comments

Modified detection limits are required for this SAF.

Alpha Spectroscopy

Plutonium-238, -239/40 by method RICHRC-5010
Sample volumes were reduced for many of the samples in the batch due to high screening results. All samples meet the RDL or the activity exceeds the MDA using the reduced volumes. The LCS, batch blank, sample and sample duplicate (B0GLB8) results are within contractual requirements.

Uranium-234, -235, -238 by method RICHRC-5030
Sample volumes were reduced for many of the samples in the batch due to high screening results. Samples B0GL97, B0GL99, B0GLB1, and B0GLB3 did not meet the RDL using the reduction in volume, counting for the standard 200 minutes. They were recounted for 1000 minutes to improve the MDA's. Samples B0GL97 and B0GL99 still do not meet the RDL. However, since the samples were counted for the maximum 1000 minute count time, the data are accepted with the achieved MDA's. Except as noted, the LCS, batch blank, sample and sample duplicate (B0GLB8) results are within contractual requirements.

Gamma Spectroscopy

Gamma Scan by method RICHRC-5017
Achieved detection limits exceed the RDL for Fe-59 and other isotopes in the samples and batch blank. The data are accepted, however, as the samples were counted for the maximum 1000 minute count time, except for sample B0GL97, which was counted for only 200 minutes due to high screening activity. Th-232 is not reported for sample B0GL99 since the Key Line was not identified by the ND software. Na-22 was detected in sample B0GLB3, but is not reported since it is caused by interference from Eu-154 at 1274 keV. Other isotopes are detected in the batch blank and samples, but are not reported either because the result is less than two times the associated error or, in the case of Cd-109, it is a known phantom, caused by x-ray interference from the cave liners of the detectors. All data are accepted with achieved MDA's. Except as noted, the LCS, batch blank, sample and sample duplicate (B0GLC0) results are within contractual requirements.

Gas Proportional Counting

Gross Alpha by method ITAS-RD-3222
The LCS, batch blank, sample and sample duplicate (B0GLB8) results are within contractual requirements.

Gross Beta by method ITAS-RD-3222
The LCS, batch blank, sample and sample duplicate (B0GLB8) results are within contractual requirements.

Strontium-90 by method RICHRC-5006
Sample B0GL97 was removed from the planchet and was run through the fuming nitric acid portion of the procedure again to reduce the planchet precipitate mass to 103.3%, after the initial count showed 107.1% yield, which was outside of acceptable limits. The recount data

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meets acceptance criteria and is reported. Sample B0GLC0 was reanalyzed as the precipitate weight was too low on the initial count. The reanalysis data is accepted and reported. The LCS, batch blank, sample and sample duplicate (B0GLB8) 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:

Suzanne Gaines FOR
Project Manager S.G. 2-23-96

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SAMPLE RESULTS

LAB NAME:	ITAS-RICHLAND	SDG:	W0867
LAB SAMPLE ID:	60112901	MATRIX:	SOIL
CLIENT ID:	B0GL97	DATE RECEIVED:	1/10/96 10:30:00 AM

ISOTOPE	RESULT	COUNTING ERROR (2 s)	TOTAL ERROR (2 s)	MDA	REPORT UNIT	YIELD	METHOD NUMBER
U-234	1.36E+00	8.3E-01	8.5E-01	9.74E-01	pCi/g	83.20%	RICHRC5030
U-235	-2.10E-01	1.9E-01	1.9E-01	9.74E-01	pCi/g	83.20%	RICHRC5030
U-238	7.76E-01	6.5E-01	6.6E-01	9.01E-01	pCi/g	83.20%	RICHRC5030
PU-238	3.81E+00	1.4E+00	1.4E+00	8.76E-01	pCi/g	68.00%	RICHRC5010
PU239/40	2.41E+01	3.4E+00	4.2E+00	3.22E-01	pCi/g	68.00%	RICHRC5010
AM-241.	1.42E+01	2.7E+00	3.1E+00	N/A	pCi/g	N/A	RICHRC5017
CE-144.	2.36E+00	1.7E+00	1.7E+00	2.82E+00	pCi/g	N/A	RICHRC5017
CO-58.	2.68E-01	7.7E-01	7.7E-01	1.25E+00	pCi/g	N/A	RICHRC5017
CO-60.	3.79E+02	2.8E+00	3.8E+01	N/A	pCi/g	N/A	RICHRC5017
CS-134.	6.33E-01	3.9E-01	4.0E-01	6.53E-01	pCi/g	N/A	RICHRC5017
CS-137DA.	5.73E+02	2.8E+00	5.7E+01	N/A	pCi/g	N/A	RICHRC5017
EU-152.	-3.15E-01	1.2E+00	1.2E+00	1.89E+00	pCi/g	N/A	RICHRC5017
EU-154.	2.86E+00	9.5E-01	9.9E-01	1.67E+00	pCi/g	N/A	RICHRC5017
EU-155.	2.02E+00	9.2E-01	9.5E-01	1.50E+00	pCi/g	N/A	RICHRC5017
FE-59.	2.36E-01	2.4E+00	2.4E+00	3.93E+00	pCi/g	N/A	RICHRC5017
K-40.	1.25E+01	3.5E+00	3.7E+00	N/A	pCi/g	N/A	RICHRC5017
MN-54.	2.74E+00	8.0E-01	8.5E-01	N/A	pCi/g	N/A	RICHRC5017
RA-226DA.	1.58E+00	8.0E-01	8.1E-01	1.33E+00	pCi/g	N/A	RICHRC5017
RU-106DA.	2.44E+00	4.1E+00	4.1E+00	6.74E+00	pCi/g	N/A	RICHRC5017
TH-228DA.	5.35E-01	1.2E+00	1.2E+00	2.03E+00	pCi/g	N/A	RICHRC5017
TH-232DA.	-1.67E-01	2.7E+00	2.7E+00	4.34E+00	pCi/g	N/A	RICHRC5017
ALPHA	3.98E+01	8.7E+00	9.7E+00	5.00E+00	pCi/g	100.00%	RD3222
BETA	3.17E+03	3.6E+01	2.1E+02	4.00E+00	pCi/g	100.00%	RD3222
STRONTIUM	1.34E+03	7.8E+01	4.1E+02	3.89E+01	pCi/g	100.00%	RICHRC5006

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SAMPLE RESULTS

LAB NAME:	ITAS-RICHLAND	SDG:	W0867
LAB SAMPLE ID:	60112901	MATRIX:	SOIL
CLIENT ID:	B0GL97	DATE RECEIVED:	1/10/96 10:30:00 AM

ISOTOPE	RESULT	COUNTING ERROR (2 s)	TOTAL ERROR (2 s)	MDA	REPORT UNIT	YIELD	METHOD NUMBER

Number of Results: 24

9613477.2150

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SAMPLE RESULTS

LAB NAME:	ITAS-RICHLAND	SDG:	W0867
LAB SAMPLE ID:	60112902	MATRIX:	SOIL
CLIENT ID:	B0GL99	DATE RECEIVED:	1/10/96 10:30:00 AM

ISOTOPE	RESULT	COUNTING ERROR (2 s)	TOTAL ERROR (2 s)	MDA	REPORT UNIT	YIELD	METHOD NUMBER
U-234	4.51E-01	4.1E-01	4.2E-01	6.06E-01	pCi/g	77.20%	RICHRC5030
U-235	8.46E-02	2.1E-01	2.2E-01	4.84E-01	pCi/g	77.20%	RICHRC5030
U-238	5.64E-01	4.6E-01	4.7E-01	6.55E-01	pCi/g	77.20%	RICHRC5030
PU-238	0.00E+00	2.2E-01	2.3E-01	5.68E-01	pCi/g	75.20%	RICHRC5010
PU239/40	3.85E-01	4.1E-01	4.1E-01	5.67E-01	pCi/g	75.20%	RICHRC5010
CE-144.	-7.90E-02	2.8E-01	2.8E-01	4.51E-01	pCi/g	N/A	RICHRC5017
CO-58.	-3.00E-02	5.1E-02	5.1E-02	8.29E-02	pCi/g	N/A	RICHRC5017
CO-60.	4.51E+00	1.2E-01	4.7E-01	N/A	pCi/g	N/A	RICHRC5017
CS-134.	-1.07E-02	3.1E-02	3.1E-02	5.05E-02	pCi/g	N/A	RICHRC5017
CS-137DA.	5.22E-01	5.9E-02	7.9E-02	N/A	pCi/g	N/A	RICHRC5017
EU-152.	-1.16E-01	9.6E-02	9.7E-02	1.51E-01	pCi/g	N/A	RICHRC5017
EU-154.	6.21E-03	7.8E-02	7.8E-02	1.31E-01	pCi/g	N/A	RICHRC5017
EU-155.	1.56E-02	1.6E-01	1.6E-01	2.54E-01	pCi/g	N/A	RICHRC5017
FE-59.	-1.35E-01	1.3E-01	1.3E-01	2.15E-01	pCi/g	N/A	RICHRC5017
K-40.	9.01E+00	8.0E-01	1.2E+00	N/A	pCi/g	N/A	RICHRC5017
MN-54.	-4.66E-04	3.6E-02	3.6E-02	6.06E-02	pCi/g	N/A	RICHRC5017
RA-224DA.	3.53E-01	9.0E-02	9.7E-02	N/A	pCi/g	N/A	RICHRC5017
RA-226DA.	3.22E-01	6.9E-02	7.6E-02	1.24E-01	pCi/g	N/A	RICHRC5017
RU-106DA.	1.78E-01	2.9E-01	3.0E-01	4.98E-01	pCi/g	N/A	RICHRC5017
TH-228DA.	4.09E-01	1.3E-01	1.4E-01	N/A	pCi/g	N/A	RICHRC5017
ALPHA	6.69E+00	3.9E+00	4.0E+00	4.99E+00	pCi/g	100.00%	RD3222
BETA	2.45E+03	3.2E+01	1.6E+02	3.72E+00	pCi/g	100.00%	RD3222
STRONTIUM	1.23E+03	5.9E+01	3.5E+02	3.24E+01	pCi/g	78.40%	RICHRC5006

Number of Results: 23

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SAMPLE RESULTS

LAB NAME:	ITAS-RICHLAND	SDG:	W0867
LAB SAMPLE ID:	60112903	MATRIX:	SOIL
CLIENT ID:	B0GLB1	DATE RECEIVED:	1/10/96 10:30:00 AM

ISOTOPE	RESULT	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA	REPORT UNIT	YIELD	METHOD NUMBER
U-234	7.27E-01	3.4E-01	3.5E-01	3.68E-01	pCi/g	79.40%	RICHRC5030
U-235	3.33E-02	1.3E-01	1.3E-01	3.10E-01	pCi/g	79.40%	RICHRC5030
U-238	4.40E-01	2.8E-01	2.8E-01	3.50E-01	pCi/g	79.40%	RICHRC5030
PU-238	7.51E-02	1.5E-01	1.5E-01	2.76E-01	pCi/g	71.80%	RICHRC5010
PU239/40	1.50E-01	1.5E-01	1.5E-01	1.02E-01	pCi/g	71.80%	RICHRC5010
CE-144.	-1.76E-01	1.9E-01	1.9E-01	3.15E-01	pCi/g	N/A	RICHRC5017
CO-58.	-3.60E-03	3.9E-02	3.9E-02	6.32E-02	pCi/g	N/A	RICHRC5017
CO-60.	2.37E+00	9.9E-02	2.6E-01	N/A	pCi/g	N/A	RICHRC5017
CS-134.	-1.92E-03	2.4E-02	2.4E-02	3.99E-02	pCi/g	N/A	RICHRC5017
CS-137DA.	1.43E-01	4.5E-02	4.7E-02	N/A	pCi/g	N/A	RICHRC5017
EU-152.	-3.39E-02	6.8E-02	6.8E-02	1.09E-01	pCi/g	N/A	RICHRC5017
EU-154.	1.06E-01	7.5E-02	7.6E-02	1.36E-01	pCi/g	N/A	RICHRC5017
EU-155.	1.36E-02	1.2E-01	1.2E-01	1.86E-01	pCi/g	N/A	RICHRC5017
FE-59.	-8.45E-02	1.2E-01	1.2E-01	1.93E-01	pCi/g	N/A	RICHRC5017
K-40.	9.62E+00	9.2E-01	1.3E+00	N/A	pCi/g	N/A	RICHRC5017
MN-54.	-1.06E-02	3.1E-02	3.1E-02	5.10E-02	pCi/g	N/A	RICHRC5017
RA-224DA.	4.22E-01	7.2E-02	8.4E-02	N/A	pCi/g	N/A	RICHRC5017
RA-226DA.	3.68E-01	9.7E-02	1.0E-01	N/A	pCi/g	N/A	RICHRC5017
RA-228DA.	4.81E-01	2.2E-01	2.3E-01	N/A	pCi/g	N/A	RICHRC5017
RU-106DA.	2.05E-01	2.2E-01	2.2E-01	3.75E-01	pCi/g	N/A	RICHRC5017
TH-228DA.	4.20E-01	1.5E-01	1.6E-01	N/A	pCi/g	N/A	RICHRC5017
TH-232DA.	6.22E-01	2.7E-01	2.8E-01	N/A	pCi/g	N/A	RICHRC5017
ALPHA	5.70E+00	3.7E+00	3.7E+00	5.11E+00	pCi/g	100.00%	RD3222
BETA	8.08E+02	1.8E+01	5.6E+01	3.68E+00	pCi/g	100.00%	RD3222
STRONTIUM	4.01E+02	2.5E+01	1.1E+02	1.76E+01	pCi/g	68.50%	RICHRC5006

9613477.2152

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SAMPLE RESULTS

LAB NAME:	ITAS-RICHLAND	SDG:	W0867
LAB SAMPLE ID:	60112903	MATRIX:	SOIL
CLIENT ID:	B0GLB1	DATE RECEIVED:	1/10/96 10:30:00 AM

ISOTOPE	RESULT	COUNTING ERROR (2 s)	TOTAL ERROR (2 s)	MDA	REPORT UNIT	YIELD	METHOD NUMBER

Number of Results: 25

9613477.2153

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SAMPLE RESULTS

LAB NAME:	ITAS-RICHLAND	SDG:	W0867
LAB SAMPLE ID:	60112904	MATRIX:	SOIL
CLIENT ID:	B0GLB3	DATE RECEIVED:	1/10/96 10:30:00 AM

ISOTOPE	RESULT	COUNTING ERROR (2 s)	TOTAL ERROR (2 s)	MDA	REPORT UNIT	YIELD	METHOD NUMBER
U-234	6.42E-01	2.5E-01	2.6E-01	2.44E-01	pCi/g	79.60%	RICHRC5030
U-235	-4.22E-03	5.1E-02	5.1E-02	1.65E-01	pCi/g	79.60%	RICHRC5030
U-238	4.35E-01	2.1E-01	2.1E-01	2.09E-01	pCi/g	79.60%	RICHRC5030
PU-238	0.00E+00	7.0E-02	7.4E-02	1.81E-01	pCi/g	71.50%	RICHRC5010
PU239/40	2.46E-02	8.5E-02	8.5E-02	1.81E-01	pCi/g	71.50%	RICHRC5010
CE-144.	-4.85E-02	2.0E-01	2.0E-01	3.13E-01	pCi/g	N/A	RICHRC5017
CO-58.	8.97E-03	5.1E-02	5.1E-02	8.53E-02	pCi/g	N/A	RICHRC5017
CO-60.	1.57E+00	1.1E-01	1.9E-01	N/A	pCi/g	N/A	RICHRC5017
CS-134.	-1.38E-02	3.3E-02	3.3E-02	5.39E-02	pCi/g	N/A	RICHRC5017
CS-137DA.	5.87E-02	6.0E-02	6.0E-02	N/A	pCi/g	N/A	RICHRC5017
EU-152.	2.05E+00	1.8E-01	2.7E-01	N/A	pCi/g	N/A	RICHRC5017
EU-154.	1.64E-01	1.2E-01	1.2E-01	2.09E-01	pCi/g	N/A	RICHRC5017
EU-155.	9.12E-02	1.0E-01	1.0E-01	1.64E-01	pCi/g	N/A	RICHRC5017
FE-59.	-1.31E-01	1.4E-01	1.4E-01	2.17E-01	pCi/g	N/A	RICHRC5017
K-40.	8.03E+00	1.1E+00	1.3E+00	N/A	pCi/g	N/A	RICHRC5017
MN-54.	3.15E-03	4.1E-02	4.1E-02	6.73E-02	pCi/g	N/A	RICHRC5017
RA-224DA.	4.73E-01	9.0E-02	1.0E-01	N/A	pCi/g	N/A	RICHRC5017
RA-226DA.	4.15E-01	1.4E-01	1.5E-01	N/A	pCi/g	N/A	RICHRC5017
RU-106DA.	1.53E-01	3.0E-01	3.0E-01	5.09E-01	pCi/g	N/A	RICHRC5017
TH-228DA.	4.06E-01	1.7E-01	1.7E-01	N/A	pCi/g	N/A	RICHRC5017
TH-232DA.	5.04E-01	2.6E-01	2.7E-01	N/A	pCi/g	N/A	RICHRC5017
ALPHA	5.52E+00	3.4E+00	3.5E+00	4.05E+00	pCi/g	100.00%	RD3222
BETA	5.30E+02	1.5E+01	3.8E+01	3.72E+00	pCi/g	100.00%	RD3222
STRONTIUM	2.26E+02	1.3E+01	6.7E+01	8.16E+00	pCi/g	88.80%	RICHRC5006

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SAMPLE RESULTS

LAB NAME:	ITAS-RICHLAND	SDG:	W0867
LAB SAMPLE ID:	60112904	MATRIX:	SOIL
CLIENT ID:	B0GLB3	DATE RECEIVED:	1/10/96 10:30:00 AM

ISOTOPE	RESULT	COUNTING ERROR (2 s)	TOTAL ERROR (2 s)	MDA	REPORT UNIT	YIELD	METHOD NUMBER

Number of Results: 24

9613477.2155

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SAMPLE RESULTS

LAB NAME:	ITAS-RICHLAND	SDG:	W0867
LAB SAMPLE ID:	60112905	MATRIX:	SOIL
CLIENT ID:	B0GLB4	DATE RECEIVED:	1/10/96 10:30:00 AM

ISOTOPE	RESULT	COUNTING ERROR (2 s)	TOTAL ERROR (2 s)	MDA	REPORT UNIT	YIELD	METHOD NUMBER
U-234	3.54E-01	1.3E-01	1.5E-01	5.81E-02	pCi/g	81.30%	RICHRC5030
U-235	7.63E-03	2.6E-02	2.6E-02	7.18E-02	pCi/g	81.30%	RICHRC5030
U-238	5.31E-01	1.6E-01	1.9E-01	6.34E-02	pCi/g	81.30%	RICHRC5030
PU-238	1.42E-02	2.8E-02	2.9E-02	3.85E-02	pCi/g	74.90%	RICHRC5010
PU239/40	-2.28E-03	3.2E-03	3.2E-03	6.50E-02	pCi/g	74.90%	RICHRC5010
CE-144.	-1.31E-01	2.0E-01	2.0E-01	3.12E-01	pCi/g	N/A	RICHRC5017
CO-58.	8.89E-03	4.9E-02	4.9E-02	8.23E-02	pCi/g	N/A	RICHRC5017
CO-60.	1.43E+00	1.0E-01	1.8E-01	N/A	pCi/g	N/A	RICHRC5017
CS-134.	-1.37E-02	3.2E-02	3.3E-02	5.32E-02	pCi/g	N/A	RICHRC5017
CS-137DA.	3.37E-02	3.4E-02	3.4E-02	5.97E-02	pCi/g	N/A	RICHRC5017
EU-152.	7.03E-01	1.0E-01	1.3E-01	1.94E-01	pCi/g	N/A	RICHRC5017
EU-154.	1.29E-01	9.0E-02	9.1E-02	1.67E-01	pCi/g	N/A	RICHRC5017
EU-155.	-2.31E-02	1.0E-01	1.0E-01	1.64E-01	pCi/g	N/A	RICHRC5017
FE-59.	-1.27E-01	1.3E-01	1.3E-01	2.05E-01	pCi/g	N/A	RICHRC5017
K-40.	7.93E+00	1.0E+00	1.3E+00	N/A	pCi/g	N/A	RICHRC5017
MN-54.	2.34E-02	3.8E-02	3.8E-02	6.53E-02	pCi/g	N/A	RICHRC5017
RA-224DA.	4.77E-01	9.2E-02	1.0E-01	N/A	pCi/g	N/A	RICHRC5017
RA-226DA.	3.04E-01	1.2E-01	1.3E-01	N/A	pCi/g	N/A	RICHRC5017
RU-106DA.	-1.62E-01	3.0E-01	3.0E-01	4.98E-01	pCi/g	N/A	RICHRC5017
TH-228DA.	4.98E-01	1.6E-01	1.7E-01	N/A	pCi/g	N/A	RICHRC5017
TH-232DA.	1.56E-01	3.7E-01	3.7E-01	N/A	pCi/g	N/A	RICHRC5017
ALPHA	6.80E+00	3.9E+00	4.0E+00	4.88E+00	pCi/g	100.00%	RD3222
BETA	4.91E+02	1.4E+01	3.5E+01	4.05E+00	pCi/g	100.00%	RD3222
STRONTIUM	2.00E+02	4.2E+00	5.9E+01	1.01E+00	pCi/g	90.80%	RICHRC5006

Quanterra
Environmental Services

SAMPLE RESULTS

LAB NAME:	ITAS-RICHLAND	SDG:	W0867
LAB SAMPLE ID:	60112905	MATRIX:	SOIL
CLIENT ID:	B0GLB4	DATE RECEIVED:	1/10/96 10:30:00 AM

ISOTOPE	RESULT	COUNTING ERROR (2 s)	TOTAL ERROR (2 s)	MDA	REPORT UNIT	YIELD	METHOD NUMBER

Number of Results: 24

9613477.2157

Quanterra Environmental Services

SAMPLE RESULTS

LAB NAME:	ITAS-RICHLAND	SDG:	W0867
LAB SAMPLE ID:	60112906	MATRIX:	SOIL
CLIENT ID:	B0GLB6	DATE RECEIVED:	1/10/96 10:30:00 AM

ISOTOPE	RESULT	COUNTING ERROR (2 s)	TOTAL ERROR (2 s)	MDA	REPORT UNIT	YIELD	METHOD NUMBER
U-234	3.48E-01	1.3E-01	1.4E-01	6.25E-02	pCi/g	86.10%	RICHRC5030
U-235	1.69E-02	3.3E-02	3.4E-02	7.25E-02	pCi/g	86.10%	RICHRC5030
U-238	5.00E-01	1.6E-01	1.7E-01	9.33E-02	pCi/g	86.10%	RICHRC5030
PU-238	-2.57E-03	5.2E-03	5.2E-03	6.16E-02	pCi/g	78.50%	RICHRC5010
PU239/40	0.00E+00	0.0E+00	3.9E-02	3.48E-02	pCi/g	78.50%	RICHRC5010
CE-144.	-9.15E-02	1.3E-01	1.3E-01	2.03E-01	pCi/g	N/A	RICHRC5017
CO-58.	-3.91E-02	4.2E-02	4.2E-02	6.87E-02	pCi/g	N/A	RICHRC5017
CO-60.	5.46E-01	7.5E-02	9.3E-02	N/A	pCi/g	N/A	RICHRC5017
CS-134.	3.10E-03	2.8E-02	2.8E-02	4.64E-02	pCi/g	N/A	RICHRC5017
CS-137DA.	3.48E-02	3.1E-02	3.1E-02	5.29E-02	pCi/g	N/A	RICHRC5017
EU-152.	2.16E-01	7.5E-02	7.8E-02	1.33E-01	pCi/g	N/A	RICHRC5017
EU-154.	4.56E-02	9.0E-02	9.0E-02	1.59E-01	pCi/g	N/A	RICHRC5017
EU-155.	2.12E-02	6.5E-02	6.5E-02	1.04E-01	pCi/g	N/A	RICHRC5017
FE-59.	8.67E-02	1.1E-01	1.1E-01	1.96E-01	pCi/g	N/A	RICHRC5017
K-40.	8.62E+00	1.1E+00	1.4E+00	N/A	pCi/g	N/A	RICHRC5017
MN-54.	8.78E-03	3.3E-02	3.3E-02	5.63E-02	pCi/g	N/A	RICHRC5017
RA-224DA.	5.35E-01	8.5E-02	1.0E-01	N/A	pCi/g	N/A	RICHRC5017
RA-226DA.	3.58E-01	1.2E-01	1.2E-01	N/A	pCi/g	N/A	RICHRC5017
RU-106DA.	2.45E-01	2.7E-01	2.7E-01	4.68E-01	pCi/g	N/A	RICHRC5017
TH-228DA.	5.74E-01	1.6E-01	1.7E-01	N/A	pCi/g	N/A	RICHRC5017
TH-232DA.	6.82E-01	2.7E-01	2.7E-01	N/A	pCi/g	N/A	RICHRC5017
ALPHA	5.79E+00	3.7E+00	3.7E+00	4.99E+00	pCi/g	100.00%	RD3222
BETA	6.40E+01	5.4E+00	6.9E+00	3.78E+00	pCi/g	100.00%	RD3222
STRONTIUM	2.77E+01	1.5E+00	8.5E+00	9.90E-01	pCi/g	99.50%	RICHRC5006

Quanterra
Environmental Services

SAMPLE RESULTS

LAB NAME:	ITAS-RICHLAND	SDG:	W0867
LAB SAMPLE ID:	60112906	MATRIX:	SOIL
CLIENT ID:	B0GLB6	DATE RECEIVED:	1/10/96 10:30:00 AM

ISOTOPE	RESULT	COUNTING ERROR (2 s)	TOTAL ERROR (2 s)	MDA	REPORT UNIT	YIELD	METHOD NUMBER

Number of Results: 24

Quanterra Environmental Services

SAMPLE RESULTS

LAB NAME:	ITAS-RICHLAND	SDG:	W0867
LAB SAMPLE ID:	60112907	MATRIX:	SOIL
CLIENT ID:	B0GLB8	DATE RECEIVED:	1/10/96 10:30:00 AM

ISOTOPE	RESULT	COUNTING ERROR (2 s)	TOTAL ERROR (2 s)	MDA	REPORT UNIT	YIELD	METHOD NUMBER
U-234	5.09E-02	3.2E-02	3.3E-02	2.54E-02	pCi/g	88.60%	RICHRC5030
U-235	3.24E-03	9.7E-03	9.7E-03	2.54E-02	pCi/g	88.60%	RICHRC5030
U-238	2.78E-02	2.3E-02	2.4E-02	2.18E-02	pCi/g	88.60%	RICHRC5030
PU-238	-1.05E-03	2.1E-03	2.1E-03	2.52E-02	pCi/g	83.30%	RICHRC5010
PU239/40	-1.05E-03	2.1E-03	2.1E-03	2.52E-02	pCi/g	83.30%	RICHRC5010
CE-144.	-3.09E-02	7.2E-02	7.3E-02	1.14E-01	pCi/g	N/A	RICHRC5017
CO-58.	-1.30E-02	2.6E-02	2.6E-02	4.27E-02	pCi/g	N/A	RICHRC5017
CO-60.	-8.18E-03	2.3E-02	2.3E-02	3.81E-02	pCi/g	N/A	RICHRC5017
CS-134.	-1.13E-02	1.8E-02	1.8E-02	2.98E-02	pCi/g	N/A	RICHRC5017
CS-137DA.	-7.21E-03	2.1E-02	2.1E-02	3.28E-02	pCi/g	N/A	RICHRC5017
EU-152.	4.72E-02	4.5E-02	4.5E-02	7.85E-02	pCi/g	N/A	RICHRC5017
EU-154.	-4.81E-03	6.2E-02	6.2E-02	1.07E-01	pCi/g	N/A	RICHRC5017
EU-155.	-4.61E-03	3.3E-02	3.3E-02	5.18E-02	pCi/g	N/A	RICHRC5017
FE-59.	2.32E-02	6.2E-02	6.2E-02	1.09E-01	pCi/g	N/A	RICHRC5017
K-40.	4.19E+00	4.7E-01	6.3E-01	1.03E+00	pCi/g	N/A	RICHRC5017
MN-54.	2.05E-02	2.2E-02	2.2E-02	3.85E-02	pCi/g	N/A	RICHRC5017
RA-224DA.	1.25E-01	5.0E-02	5.2E-02	N/A	pCi/g	N/A	RICHRC5017
RA-226DA.	1.16E-01	4.3E-02	4.4E-02	7.97E-02	pCi/g	N/A	RICHRC5017
RU-106DA.	-9.63E-03	1.6E-01	1.6E-01	2.75E-01	pCi/g	N/A	RICHRC5017
TH-228DA.	3.04E-01	1.0E-01	1.0E-01	N/A	pCi/g	N/A	RICHRC5017
TH-232DA.	1.34E-01	1.2E-01	1.2E-01	2.00E-01	pCi/g	N/A	RICHRC5017
ALPHA	-9.06E-01	1.1E+00	1.2E+00	4.87E+00	pCi/g	100.00%	RD3222
BETA	1.53E+00	1.9E+00	1.9E+00	4.00E+00	pCi/g	100.00%	RD3222
STRONTIUM	-1.30E-02	3.6E-02	3.7E-02	1.24E-01	pCi/g	97.40%	RICHRC5006

Quanterra
Environmental Services

SAMPLE RESULTS

LAB NAME:	ITAS-RICHLAND	**SDG:**	W0867
LAB SAMPLE ID:	60112907	**MATRIX:**	SOIL
CLIENT ID:	B0GLB8	**DATE RECEIVED:**	1/10/96 10:30:00 AM

ISOTOPE	RESULT	COUNTING ERROR (2 s)	TOTAL ERROR (2 s)	MDA	REPORT UNIT	YIELD	METHOD NUMBER

Number of Results: 24

9613477.2161

Quanterra Environmental Services

SAMPLE RESULTS

LAB NAME:	ITAS-RICHLAND	**SDG:**	W0867
LAB SAMPLE ID:	60112908	**MATRIX:**	SOIL
CLIENT ID:	B0GLC0	**DATE RECEIVED:**	1/10/96 10:30:00 AM

ISOTOPE	RESULT	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA	REPORT UNIT	YIELD	METHOD NUMBER
U-234	4.54E-01	9.0E-02	1.1E-01	2.02E-02	pCi/g	93.70%	RICHRC5030
U-235	2.91E-02	2.3E-02	2.4E-02	2.49E-02	pCi/g	93.70%	RICHRC5030
U-238	4.18E-01	8.6E-02	1.1E-01	2.20E-02	pCi/g	93.70%	RICHRC5030
PU-238	5.89E-03	1.2E-02	1.2E-02	1.59E-02	pCi/g	70.70%	RICHRC5010
PU239/40	1.03E-02	1.7E-02	1.7E-02	2.93E-02	pCi/g	70.70%	RICHRC5010
CE-144.	-1.73E-01	1.3E-01	1.3E-01	1.98E-01	pCi/g	N/A	RICHRC5017
CO-58.	7.25E-03	4.1E-02	4.1E-02	7.00E-02	pCi/g	N/A	RICHRC5017
CO-60.	1.48E+00	1.1E-01	1.9E-01	N/A	pCi/g	N/A	RICHRC5017
CS-134.	-2.96E-02	2.9E-02	2.9E-02	4.70E-02	pCi/g	N/A	RICHRC5017
CS-137DA.	-1.48E-02	3.2E-02	3.2E-02	5.06E-02	pCi/g	N/A	RICHRC5017
EU-152.	1.86E-03	7.6E-02	7.6E-02	1.26E-01	pCi/g	N/A	RICHRC5017
EU-154.	6.76E-02	9.4E-02	9.4E-02	1.63E-01	pCi/g	N/A	RICHRC5017
EU-155.	-2.03E-02	6.5E-02	6.5E-02	9.99E-02	pCi/g	N/A	RICHRC5017
FE-59.	-4.88E-02	1.2E-01	1.2E-01	2.01E-01	pCi/g	N/A	RICHRC5017
K-40.	1.24E+01	1.1E+00	1.7E+00	N/A	pCi/g	N/A	RICHRC5017
MN-54.	1.52E-02	3.7E-02	3.7E-02	6.38E-02	pCi/g	N/A	RICHRC5017
RA-224DA.	6.27E-01	8.3E-02	1.0E-01	N/A	pCi/g	N/A	RICHRC5017
RA-226DA.	3.40E-01	1.3E-01	1.3E-01	N/A	pCi/g	N/A	RICHRC5017
RA-228DA.	4.34E-01	2.6E-01	2.7E-01	N/A	pCi/g	N/A	RICHRC5017
RU-106DA.	5.41E-02	2.7E-01	2.7E-01	4.69E-01	pCi/g	N/A	RICHRC5017
TH-228DA.	5.67E-01	1.6E-01	1.7E-01	N/A	pCi/g	N/A	RICHRC5017
TH-232DA.	6.16E-01	3.5E-01	3.5E-01	N/A	pCi/g	N/A	RICHRC5017
ALPHA	4.53E+00	3.5E+00	3.5E+00	5.44E+00	pCi/g	100.00%	RD3222
BETA	6.05E+01	5.3E+00	6.6E+00	3.68E+00	pCi/g	100.00%	RD3222
STRONTIUM	1.60E+01	4.5E-01	4.6E+00	1.44E-01	pCi/g	87.30%	RICHRC5006

Quanterra
Environmental Services

SAMPLE RESULTS

LAB NAME:	ITAS-RICHLAND	**SDG:**	W0867
LAB SAMPLE ID:	60112908	**MATRIX:**	SOIL
CLIENT ID:	B0GLC0	**DATE RECEIVED:**	1/10/96 10:30:00 AM

ISOTOPE	RESULT	COUNTING ERROR (2 s)	TOTAL ERROR (2 s)	MDA	REPORT UNIT	YIELD	METHOD NUMBER

Number of Results: 25

9613477.2163

3/3/96

Quanterra

Environmental Services

ITAS Data Review Checklist
RADIOCHEMISTRY

BHI (Soil)

Work Order No(s): 601129

Lab Sample Numbers or SDG: W8867

Method/Test/Parameter: Plutonium

	Review Item	Yes (✓)	No (✓)	N/A (✓)	2nd Level review (✓)
A. 1.	**Calibration** Is the calibration documentation included where applicable?			✓	✓
B. 1.	**Sample Analysis** Are the sample Yields within acceptance criteria?	✓			✓
2.	Were all sample holding times met?	✓			✓
C. 1.	**QC Samples** 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 ≤ the Contract Detection Limit?	✓			✓
4.	Is the Blank result greater than the Contract Detection Limit but the Sample result less than the Contract Detection Limit?			✓	✓
5.	Is the LCS result within acceptance criteria?	✓			✓
6.	Is the LCS yield within acceptance criteria?	✓			✓
7.	Is the LCS Minimum Detectable Activity less than or equal to the Contract Detection Limit?	✓			✓
8.	MS/MSD results and yield meet acceptance criteria?			✓	✓
9.	Duplicate sample results and yield meet acceptance criteria?	✓			✓
D. 1.	**Other** 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:

Analyst: [signature] Date: 2-20-96

Second Level Review: [signature] Date: 2-22-96

Form No: LS-038, 3/94, Rev 2

9613477.2164

3-3-96

Quanterra

Environmental Services

ITAS Data Review Checklist
RADIOCHEMISTRY

BHI - Soil

Work Order No(s): 601129

Lab Sample Numbers or SDG: W0867

Method/Test/Parameter: Uranium

	Review Item	Yes (✓)	No (✓)	N/A (✓)	2nd Level review (✓)
A. 1.	**Calibration** Is the calibration documentation included where applicable?			✓	✓
B. 1.	**Sample Analysis** Are the sample Yields within acceptance criteria?	✓			✓
2.	Were all sample holding times met?	✓			✓
C. 1.	**QC Samples** 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 ≤ the Contract Detection Limit?	✓			✓
4.	Is the Blank result greater than the Contract Detection Limit but the Sample result less than the Contract Detection Limit?			✓	✓
5.	Is the LCS result within acceptance criteria?	✓			✓
6.	Is the LCS yield within acceptance criteria?	✓			✓
7.	Is the LCS Minimum Detectable Activity less than or equal to the Contract Detection Limit?	✓			✓
8.	MS/MSD results and yield meet acceptance criteria?			✓	✓
9.	Duplicate sample results and yield meet acceptance criteria?	✓			✓
D. 1.	**Other** Are all nonconformances included and noted?	N/A			✓
2.	Are all required forms filled out?	✓			✓
3.	Correct methodology used?	✓			✓
4.	Transcription checked?	JM			TR ✓
5.	Were all calculations checked at a minimum frequency?	✓			✓
6.	Units checked?	✓			✓

Comments on any "No" response:

Analyst: [signature] Date: 2-20-96

Second Level Review: [signature] Date: 2-22-96

Form No: LS-038, 3/94, Rev 2

Report recount results for 01-04.

9613477.2165

065

QUANTERRA LABORATORY NONCONFORMANCE MEMO (NCM)

LOG #: RD-96-

Project ID: BHI

NCM Initiated by: [illegible]

Sample Numbers: 60112901, 02, 03, 04

Tests: 1130

Matrix: Soil

W0867

Analytical Area (check appropriate area):

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

Nonconformance (check appropriate area):

Holding Time Violations (exceeded by _____ days)

Category I: Laboratory Independent

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

Category II: Laboratory Dependent

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

Category III: Analysis Reruns (QA/QC)

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

Category IV: Analysis Reruns (Confirmation)

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

Quality Assurance/Quality Control

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

Incorrect or Incomplete Client Deliverable

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

Reported detection limits elevated due to:

- ☒ 24. Sample matrix 60112901
- ☐ 25. Insufficient sample volume
- ☐ 26. Other (complete description required)
- ☒ 27. ***Other (specify):*** Samples incubated for 1000 min

Comments/Explanation: Due to high screening activity of samples the sample volume analyzed was reduced effectively increasing the MDA.

Notification (check appropriate area):

Client notified by (name and date):

- ☐ in writing
- ☐ by telephone
- ☐ by facsimile
- ☑ other (explain) case narrative

Client's name and response:

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

Project Manager (signature and date): [illegible] 2-22-96

000029

9613477.2166

QUANTERRA LABORATORY NONCONFORMANCE MEMO (NCM)

LOG#: RD-96-_____

Corrective Action

Root Cause Initial and date: JK 2-20-96

activity in sample matrix

Corrective Action Initial and Date: JK 2-20-96

Samples recounted for a longer length of time, recount data is accepted. Samples #02-04 have MDAs less than or approximately equal to CL listed in SAF B96.5-089. Sample #04 has an MDA > 0.6 pCi/g but less than 1 pCi/g which is the routine BHI contract detection limit. JMC 2-20-96

Responsibility for performing CA assigned to: _____

Actions to prevent recurrence Initial and Date: _____

First Level Supervisor: Joel Kingsma Date: 2-20-96

Responsible Manager: W. Mackell Date: 2/23/96

Quality Assurance Review

☐ Anomaly ☐ Deficiency ☑ Rerun

☐ Further action required: _____

Assigned to: _____

QA signature: Beverly Allen Date: 2/23/96

Corrective Action Verification

☑ Verified

☐ Cannot Verify (specify reason): _____

Nonconformance Memo Closure

QA signature/date: Beverly Allen 2/23/96

9613477.2167

3-3-96

Quanterra

Environmental Services

ITAS Data Review Checklist
RADIOCHEMISTRY

BHI - Soil

Work Order No(s): 6C1129

Lab Sample Numbers or SDG: W9867

Method/Test/Parameter: Gamma

	Review Item	Yes (✓)	No (✓)	N/A (✓)	2nd Level review (✓)
A. 1.	**Calibration** Is the calibration documentation included where applicable?			✓	✓
B. 1.	**Sample Analysis** Are the sample Yields within acceptance criteria?			✓	✓
2.	Were all sample holding times met?	✓			✓
C. 1.	**QC Samples** 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 ≤ the Contract Detection Limit? N-Cm	✓	1259		✓
4.	Is the Blank result greater than the Contract Detection Limit but the Sample result less than the Contract Detection Limit?			✓	✓
5.	Is the LCS result within acceptance criteria?	✓			✓
6.	Is the LCS yield within acceptance criteria?			✓	✓
7.	Is the LCS Minimum Detectable Activity less than or equal to the Contract Detection Limit?			✓	✓
8.	MS/MSD results and yield meet acceptance criteria?			✓	✓
9.	Duplicate sample results and yield meet acceptance criteria?	✓			✓
D. 1.	**Other** Are all nonconformances included and noted?	NN-2			✓
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:

Analyst: [signature] Date: 2-20-96

Second Level Review: [signature] Date: 2-22-96

Form No: LS-038, 3/94, Rev 2

000031

Report K40, Mn54, Co58, Fe59, Co60, Ru106DA, Cs134, Cs137, Ce144, Eu152, Eu154, Eu155, Ra226DA, Th228DA, Th232DA for all samples + others listed on last page of rp

9613477.2168

169

QUANTERRA LABORATORY NONCONFORMANCE MEMO (NCM)

LOG #: RD-96-_____

Project ID: BHI NCM Initiated by: Joel Thompson 2-20-96

Sample Numbers: P0112918, 60112901, 02, 03, 04, 05, 06, 07, 08, C-08

Tests: Gamma

Matrix: Soil W0867

Analytical Area (check appropriate area):

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

Nonconformance (check appropriate area):

Holding Time Violations (exceeded by _____ days)

Category I: Laboratory Independent

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

Category II: Laboratory Dependent

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

Category III: Analysis Reruns (QA/QC)

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

Category IV: Analysis Reruns (Confirmation)

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

Quality Assurance/Quality Control

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

Incorrect or Incomplete Client Deliverable

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

Reported detection limits elevated due to:

- ☒ 24. Sample matrix – high sample activity
- ☒ 25. Insufficient sample volume – Reduce volume 500g
- ☒ 26. Other (complete description required) Sample aged rel to half life
- ☐ 27. ***Other (specify):*** _____

Comments/Explanation: #1B - Fe59
#01, Co58, Fe59, Ru106, Cs134, Ce144, Eu152, Eu154, Th228 + Th232
2-20-96 JPC Co58, Fe59, Eu155 #02, 03, 04, 05
Co58, Fe59 #06 ; Fe59 #07
Co58, Fe59 #08 + #C-08

Notification (check appropriate area):

Client notified by (name and date): _____

- ☐ in writing
- ☐ by facsimile
- ☐ by telephone
- ☑ other (explain) CDS NARRATIVE

Client's name and response: _____

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

Project Manager (signature and date): [signature] 2-22-96

000032

9613477.2169

QUANTERRA LABORATORY NONCONFORMANCE MEMO (NCM)

LOG#: RD-96-_____

Corrective Action

Root Cause Initial and date: MK 2-20-96

Co58 + Fe59 - sample volume, age of sample, sample activity
Eu155 - sample volume + compton background of sample

Sample C1 due to extremely high activity of sample and reduction of count time because of high sample activity

Corrective Action Initial and Date: MK 2-20-96

Data accepted with MDAs achieved, it should be noted that only sample #C1 did not meet MDAs for isotopes specifically requested by client in SAF B95-089. Co58 Fe59, Eu155 are not requested in this ~~sa~~ SAF but are part of BHI always report list.
MK 2-20-96

Responsibility for performing CA assigned to: _____

Actions to prevent recurrence Initial and Date: _____

First Level Supervisor: [signature] Date: 2-20-96

Responsible Manager: [signature] Date: 2/23/96

Quality Assurance Review

☑ Anomaly ☐ Deficiency ☐ Rerun

☐ Further action required: _____

Assigned to: _____

QA signature: [signature] Date: 2/23/96

Corrective Action Verification

☑ Verified

☐ Cannot Verify (specify reason): _____

Nonconformance Memo Closure

QA signature/date: [signature] 2/23/96

9613477.2170

168

QUANTERRA LABORATORY NONCONFORMANCE MEMO (NCM)

LOG #: RD-96-_____

Project ID: BHI NCM Initiated by: Paul Kangerga

Sample Numbers: P0112918, 60112903, 60112904, 60112905, 06, 08, C0112

Tests: Gamma

Matrix: Soil WO 867

Analytical Area (check appropriate area):

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

Nonconformance (check appropriate area):

Holding Time Violations (exceeded by _____ days)

Category I: Laboratory Independent

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

Category II: Laboratory Dependent

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

Category III: Analysis Reruns (QA/QC)

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

Category IV: Analysis Reruns (Confirmation)

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

Quality Assurance/Quality Control

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

Incorrect or Incomplete Client Deliverable

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

Reported detection limits elevated due to:

- ☐ 24. Sample matrix
- ☐ 25. Insufficient sample volume
- ☐ 26. Other (complete description required)
- ☒ 27. ***Other (specify):*** Isotopes marked detected not reported – ie reportable isotopes

Comments/Explanation: 1B-Cd109, Na22 4DA
#03-Cd109,
#04 – Na22, Cd109
#05 - Cd109
#06 Cd109, U238DLP
#08 Cd109, U238DLP C0112908-Cd10

Notification (check appropriate area):

Client notified by (name and date): _____

- ☐ in writing
- ☐ by facsimile
- ☐ by telephone
- ☐ other (explain) CASE NARRATIVE

Client's name and response: _____

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

Project Manager (signature and date): [signature] 2-22-96

000034

9613477.2171

QUANTERRA LABORATORY NONCONFORMANCE MEMO (NCM)

LOG#: RD-96-_____

Corrective Action

Root Cause Initial and date: JK 2-20-96

Cd109 - known phantom

Na22 - ~~Eu152~~ JK 2-20-96 interference from Eu154 at ~~122 KEV~~ JK 2-20-96 1274 KEV

Ra224 + U238DLP - error or 2x error > result

Corrective Action Initial and Date: JK 2-20-96

data accepted with these exclusions

Responsibility for performing CA assigned to: _____

Actions to prevent recurrence Initial and Date: _____

First Level Supervisor: Joel Kengeman Date: 2-20-96

Responsible Manager: W. Mackell Date: 2/23/96

Quality Assurance Review

☑ Anomaly ☐ Deficiency ☐ Rerun

☐ Further action required: _____

Assigned to: _____

QA signature: Beverly Allen Date: 2/23/96

Corrective Action Verification

☑ Verified

☐ Cannot Verify (specify reason): _____

Nonconformance Memo Closure

QA signature/date: Beverly Allen 2/23/96

9613477.2172

3/3/96

Quanterra

Environmental Services

Data Review Checklist
RADIOCHEMISTRY

Work Order No(s): 601129 BHI soil

Lab Sample Numbers or SDG: W0867

Method/Test/Parameter: α

	Review Item	Yes (✓)	No (✓)	N/A (✓)	2nd Level review (✓)
A. 1.	**Calibration** Is the calibration documentation included where applicable?			✓	✓
B. 1.	**Sample Analysis** Are the sample Yields within acceptance criteria?			✓	✓
2.	Were all sample holding times met?	✓			✓
C. 1.	**QC Samples** 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 ≤ the Contract Detection Limit?	✓			✓
4.	Is the Blank result greater than the Contract Detection Limit but the Sample result less than the Contract Detection Limit?			✓	✓
5.	Is the LCS result within acceptance criteria?	✓			✓
6.	Is the LCS yield within acceptance criteria?			✓	✓
7.	Is the LCS Minimum Detectable Activity less than or equal to the Contract Detection Limit?	✓			✓
8.	MS/MSD results and yield meet acceptance criteria?			✓	✓
9.	Duplicate sample results and yield meet acceptance criteria?	✓			✓
D. 1.	**Other** 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:

Analyst: Joel Ramsey Date: 2-15-96

Second Level Review: [illegible] Date: 2-22-96

Form No. LS-038, 3/94, Rev 2

9613477.2173

3/3/96

Quanterra

Environmental Services

Data Review Checklist
RADIOCHEMISTRY

Work Order No(s): 601129 BHI

Soil

Lab Sample Numbers or SDG: W0807

Method/Test/Parameter: B

	Review Item	Yes (✓)	No (✓)	N/A (✓)	2nd Level review (✓)
A. 1.	**Calibration** Is the calibration documentation included where applicable?			✓	✓
B. 1.	**Sample Analysis** Are the sample Yields within acceptance criteria?			✓	✓
2.	Were all sample holding times met?	✓			✓
C. 1.	**QC Samples** 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 ≤ the Contract Detection Limit?	✓			✓
4.	Is the Blank result greater than the Contract Detection Limit but the Sample result less than the Contract Detection Limit?			✓	✓
5.	Is the LCS result within acceptance criteria?	✓			✓
6.	Is the LCS yield within acceptance criteria?			✓	✓
7.	Is the LCS Minimum Detectable Activity less than or equal to the Contract Detection Limit?	✓			✓
8.	MS/MSD results and yield meet acceptance criteria?			✓	✓
9.	Duplicate sample results and yield meet acceptance criteria?	✓			✓
D. 1.	**Other** 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:

Analyst: Joel Kerrigan Date: 2-15-96

Second Level Review: [illegible] Date: 2-22-96

Form No: LS-038, 3/94, Rev 2

9613477.2174

3-3-96

Quanterra

Environmental Services

ITAS Data Review Checklist
RADIOCHEMISTRY

BAI - Soil

Work Order No(s): 601129

Lab Sample Numbers or SDG: W0567

Method/Test/Parameter: Total Sr

	Review Item	Yes (✓)	No (✓)	N/A (✓)	2nd Level review (✓)
A. 1.	**Calibration** Is the calibration documentation included where applicable?			X	✓
B. 1.	**Sample Analysis** Are the sample Yields within acceptance criteria?	X	X		✓
2.	Were all sample holding times met?			X	✓
C. 1.	**QC Samples** Is the Blank Yield within acceptance criteria?	X			✓
2.	Is the Minimum Detectable Activity for the Blank result ≤ the Contract Detection Limit?	X			✓
3.	Is the Blank result ≤ the Contract Detection Limit?	X			✓
4.	Is the Blank result greater than the Contract Detection Limit but the Sample result less than the Contract Detection Limit?			X	✓
5.	Is the LCS result within acceptance criteria?	X			✓
6.	Is the LCS yield within acceptance criteria?	X			✓
7.	Is the LCS Minimum Detectable Activity less than or equal to the Contract Detection Limit?	X			✓
8.	MS/MSD results and yield meet acceptance criteria?			X	✓
9.	Duplicate sample results and yield meet acceptance criteria?	X			✓
D. 1.	**Other** Are all nonconformances included and noted?	X			✓
2.	Are all required forms filled out?	X			✓
3.	Correct methodology used?	X			✓
4.	Transcription checked?	JM			✓
5.	Were all calculations checked at a minimum frequency?	X			✓
6.	Units checked?	X			✓

Comments on any "No" response:

Analyst: [signature] Date: 2/15/96

Second Level Review: [signature] Date: 5-22-96

Form No: LS-038, 3/94, Rev 2

Report recount for 60112901, reanalysis for #08.

9613477.2175

E004

QUANTERRA LABORATORY NONCONFORMANCE MEMO (NCM)

LOG #: RD-96-_____

Project ID: BHI NCM Initiated by: Joel Klengenna 2-16-96

Sample Numbers: 60112901, 60112908

Tests: Tot. Sr

Matrix: Soil WO 8167

Analytical Area (check appropriate area):

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

Nonconformance (check appropriate area):

Holding Time Violations (exceeded by _____ days)

Category I: Laboratory Independent

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

Category II: Laboratory Dependent

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

Category III: Analysis Reruns (QA/QC)

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

Category IV: Analysis Reruns (Confirmation)

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

Quality Assurance/Quality Control

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

Incorrect or Incomplete Client Deliverable

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

Reported detection limits elevated due to:

- ☐ 24. Sample matrix
- ☐ 25. Insufficient sample volume
- ☐ 26. Other (complete description required)
- ☒ 27. ***Other (specify):*** #01 opt too high
  #08 opt too low

Comments/Explanation:
#01 - refume + recount
#08 - reanalyze

Notification (check appropriate area):

Client notified by (name and date): _____

- ☐ in writing
- ☐ by telephone
- ☐ by facsimile
- ☑ other (explain) CASE NARRATIVE

Client's name and response: _____

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

Project Manager (signature and date): [signature] 2-22-96

000039

9613477.2176

QUANTERRA LABORATORY NONCONFORMANCE MEMO (NCM)

LOG#: RD-96-_____

Corrective Action

Root Cause Initial and date: JR 2-16-96

Uncertain

Corrective Action Initial and Date: JR 2-16-96

Removing #01 from the planchet + performing a fuming HNO_3 reduced the planchet pot mass to 103.3% w/in 105% maximum range - recount data accepted

Reanalysis data for #08 accepted - yield 87.3%, reanalysis QC acceptable. JR 2-22-96

Responsibility for performing CA assigned to: _____

Actions to prevent recurrence Initial and Date: _____

First Level Supervisor: Joel Thompson Date: 2-16-96

Responsible Manager: W. Markell Date: 2/23/96

Quality Assurance Review

☐ Anomaly ☐ Deficiency ☑ Rerun

☐ Further action required: _____

Assigned to: _____

QA signature: Geneviève Thomas Date: 2/23/96

Corrective Action Verification

☑ Verified

☐ Cannot Verify (specify reason): _____

Nonconformance Memo Closure

QA signature/date: Geneviève Thomas 2/23/96

9613477.2177

CHAIN OF

CUSTODY FORMS

Bechtel Hanford, Inc.

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

Page 1 of 2

Data Turnaround
☐ Priority
■ Normal

Collector: W. S. Thompson	Company Contact: K. L. Sykes / W. S. Thompson	Telephone: (509) 376-8031
Project Designation: 1301N/1325N SI (Limited Field Investigation)	Sampling Location: 1301-N/1325-N Cribs 100N	SAF No.: B95-089
Ice Chest No.: BI-001	Field Logbook No.: EL-1275	Method of Shipment: Hand Carry in DOE vehicle.
Shipped To: QUANTERRA	Offsite Property No.: N/A	Bill of Lading/Air Bill No.: N/A

Possible Sample Hazards/Remarks: Radioactive

Special Handling and/or Storage: Keep Secured

SDG W0867

SAMPLE ANALYSIS 601128

Preservation	NONE	NONE	NONE
Type of Container	Glass	Glass	Plastic
No. of Container(s)	1	1	1
Volume	~~40 ml.~~ 60 ml. 12/19/95	60 ml.	20 ml.
	ICP Metals Cadmium Chromium Lead Nickel	Radio-nuclides (see note #1) 601129	Activity Scan

Sample No.	Matrix*	Date Sampled	Time Sampled			
01 B0GL97	Soil	12-19-95	1424	X	X	X
02 B0GL99	soil	12-20-95	0827	X	X	X
03 B0GLB1	soil	12-20-95	0940	X	X	X
04 B0GLB3	soil	12-22-95	0930	X	X	X
05 B0GLB4	soil	12-22-95	0930	X	X	X
	NSR 1/10/96					

CHAIN OF POSSESSION — Sign/Print Names

Relinquished By	Date/Time	Received By	Date/Time
W S Thompson	1/10/96 0955	Rick Whitta R. Whitta	0955 1-10-96
Rick Whitta R. Whitta	ER 1-10-96 10:30	Allen Ter Allen Ter	10:30 1-10-96
Relinquished By	Date/Time	Received By	Date/Time
Relinquished By	Date/Time	Received By	Date/Time

SPECIAL INSTRUCTIONS

Note #1: Radionuclides - Gross alpha; gross beta; Sr-90; U-233,U-234; U-238; Pu-238; Pu-239/240; Gamma Spec (to include) - K-40, Mn-54, C0-60, Ru-106, Cs-134, Cs-137, Ce-144, Eu-154, Eu-155, Ra-226, Th-228, Th-232.

W S Thompson 1/10/96

SUMMARY DATA DELIVERABLES

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

000042

Bechtel Hanford, Inc.

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

Page 2 of 2

Data Turnaround: ☐ Priority ■ Normal

Collector: W. S. Thompson	Company Contact: K. L. Sykes / W. S. Thompson	Telephone: (509) 376-8031
Project Designation: 1301N/1325N SI (Limited Field Investigation)	Sampling Location: 1301-N/1325-N Cribs 100N	SAF No.: B95-089
Ice Chest No.: BE001	Field Logbook No.: EL-1275	Method of Shipment: Hand Carry in DOE vehicle.
Shipped To: QUANTERRA	Offsite Property No.: N/A	Bill of Lading/Air Bill No.: N/A

Possible Sample Hazards/Remarks: Radioactive

Special Handling and/or Storage: Keep Secured

SAMPLE ANALYSIS: 601128 SDG W0867

			Preservation	NONE	NONE	NONE							
			Type of Container	Glass	Glass	Plastic							
			No. of Container(s)	1	1	1							
			Volume	60 ml.	60 ml.	20 ml.							
				ICP Metals Cadmium Chromium Lead Nickel	Radio-nuclides (see note #1) 601129	Activity Scan							
Sample No.	Matrix*	Date Sampled	Time Sampled										
06 BOGLB6	Soil	12/27/95	1013	X	X	X							
07 BOGLB8	Soil	12/27/95	1325	X	X	X							
08 BOGLC0	Soil	12/28/95	0920	X	X	X							

WT 1/10/96

CHAIN OF POSSESSION	Sign/Print Names		
Relinquished By: WS Thompson	Date/Time: 0955	Received By: Eee	Date/Time: 0955
Relinquished By: WS Thompson	Date/Time: 1/10/96	Received By: Bechtel	Date/Time: 1-10-96
Relinquished By: GR	Date/Time: 10:30	Received By: Guy R.	Date/Time: 10:30
Relinquished By: Bechtel	Date/Time: 1-10-96	Received By: Terry Schilling	Date/Time: 1-10-96
Relinquished By	Date/Time	Received By	Date/Time
Relinquished By	Date/Time	Received By	Date/Time

SPECIAL INSTRUCTIONS

Note #1: Radionuclides - Gross alpha; gross beta; Sr-90; U-233,U-234; U-238; Pu-238; Pu-239/240; Gamma Spec (to include) - K-40, Mn-54, C0-60, Ru-106, Cs-134, Cs-137, Ce-144, Eu-154, Eu-155, Ra-226, Th-228, Th-232.

Lawrence Recipin

SUMMARY DATA DELIVERABLES

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

9613477.2180

Environmental Restoration Contractor **ERC Team**

Interoffice Memorandum

Job No. 22192
Written Response Required? NO
Closes CCN: N/A
OU: 100-NR-1
TSD: N/A
ERA: N/A
Subject Code: 8610

TO: RC Smith B1-35

DATE: January 8, 1996

COPIES: See Below

FROM: WS Thompson
ER Field Sampling
N1-28 / 6-8031

SUBJECT: **ESTIMATE OF CURIE CONTENT FOR SOIL SAMPLES SHIPPED ON JANUARY 10, 1996, TO QUANTERRA FROM THE 1301N/1325N CRIB DRILLING PROJECT**

This memo provides estimated curie content information for 8 soil samples (B0GL97, B0GL99, B0GLB1, B0GLB3, B0GLB4, B0GLC0, B0GLB6, and B0GLB8) to be shipped to Quanterra on January 10, 1996. The information is provided in order for Quanterra to evaluate acceptance of the samples in accordance with their NRC license. A Radioactive Shipment Record (RSR) will accompany the samples stating the isotopes and the curie content of the shipment. An onsite lab provided detailed analytical data which was used to prepare the RSR, however, this isotopic specific data will not be provided to Quanterra as it could be viewed as compromising the independence of the requested analysis to be performed by Quanterra. Therefore, in lieu of a laboratory total activity report, the approximate curie content (in microcuries) for the 8 samples is:

Co60	Cs137	Sr90
0.060	0.083	0.625

- For the eight samples, an approximate total soil sample weight is 1800 grams. This is determined using the formula, 140 ml x 1.6 gm/ml, for Hanford soil. The samples were not weighed and 1.6 gms/ml is a Hanford site specific soil weight.
- The highest radiological activity measured through the outside of the sample jars using hand held detectors was up to 8,000 dpm; many of the sample jars had less than detectable activity.

Additionally, each soil sample has an accompanying activity scan aliquot for Quanterra to conduct radiological screening to evaluate acceptance criteria.

If you have any questions, please give me a call.

WST:wst
Copies
BHI Document Control H4-79
KL Sykes X0-37
JH Kessner B1-35
JA Lerch B1-35
RL Weiss B1-35
A. Hopkins H9-11

GUIDE 6

POTENTIAL HAZARDS

HEALTH HAZARDS

Low-level radioactive material; little personal radiation hazard.
Many packages are not required to have radioactive materials labels or markings.
Some radioactive materials cannot be detected by commonly available instruments.

FIRE OR EXPLOSION

Some of these materials may burn, but none of them ignites readily.
Radioactivity does not change flammability or other properties of the materi

EMERGENCY ACTION

Keep unnecessary people away; isolate hazard area and deny entry.
Response actions may be performed prior to any radiation measurements.
Positive pressure self-contained breathing apparatus (SCBA) and structural firefighters' protective clothing will provide limited protection.
Notify Radiation Authority of accident conditions.
Detain uninjured persons, isolate equipment with suspected contamination, and delay cleanup until instruction of Radiation Authority.

FIRE

Do not move damaged containers; move undamaged containers out of fire zone.
Small Fires: Dry chemical, CO2, water spray or regular foam.
Large Fires: Water spray, fog (flooding amounts).

SPILL OR LEAK

Do not touch damaged containers or spilled material.
Small Liquid Spills: Take up with sand, earth or other noncombustible absorbent material.
Cover powder spill with plastic sheet or tarp to minimize spreading.

FIRST AID

Use first aid treatment according to the nature of the injury.
Advise medical personnel that victim may be contaminated with low-level radioactive material.

Radioactive Material, excepted package - limited quantity of material, 7, UN2910

9613477.2182

THIS PACKAGE CONFORMS TO THE CONDITIONS AND LIMITATIONS SPECIFIED IN 49 CFR 173.421 FOR RADIOACTIVE MATERIAL, EXCEPTED PACKAGE-LIMITED QUANTITY OF MATERIAL, UN2910

BECHTEL HANFORD COMPANY

CAUTION

"Internal Contamination - Soil Samples"

Handle sample containers in a hood designated as Radiological Materials Area (RMA).

The outside of the sample containers may have potential smearable radioactive contamination because they were packaged inside of a glovebox. The outside of the plastic bag surrounding the containers was surveyed with no detectable smearable radioactive contamination. Remove the plastic bag in a hood.

961347.2183

000047

9613477.2184

RADIOACTIVE SHIPMENT RECORD

3. Page 1 of 1 — 34633

1. SHIP TO
Company: Quanterra
Address: 2800 George Wash. Way
City, State, Zip: Richland, WA 99352
Attention: Karen Ackenburgh
Phone: 375-3131 (Ext 135)

2. SHIP FROM U.S. DEPT. OF ENERGY C/O
Company: Bechtel Hanford Co
Address: 1301N Crib/100 Area
City, State, Zip: Richland, WA 99352
Contact: Wendy S. Thompson
Phone: (509) 376-8031; 531-0741

4. Ship [X] Prepaid [ ] Collect
Via: [X] Motor-Rail [ ] Air Psgr [ ] Excl. Use [ ] Air Cargo [ ] UPS Surface [ ] Mail [X] Site Carrier
SHIPMENT AUTHORIZATION NUMBER:

5. HM Proper Shipping Name: Radioactive Material,

	excepted package - empty packaging	7	UN2910
	excepted package - instruments or articles	7	UN2910
X	excepted package - limited quantity of material	7	UN2910
	excepted package - articles manufactured from natural or depleted uranium or natural thorium	7	UN2910
	Special Form, n.o.s.	7	UN2974
	Low Specific Activity, n.o.s.	7	UN2912
	n.o.s.	7	UN2982
	Fissile, n.o.s.	7	UN2918
	(other)		

6. Markings Applied: Package Orientation [ ]; Gross Weight [X]; Radioactive - LSA [ ]; Type A [ ]; Type B [ ]

7. For Normal Form Identify
Physical Form: [ ] Liquid [ ] Gas [X] Solid
Chemical Form: [ ] Metal [ ] Oxide [X] Elemental [ ] Nitrate [ ] Mixture
Other:

8. Additional RAM Desc.: Limited Quantity Radioactive Material [X]; Highway Route Controlled Quantity [ ]

9. Placards Applied [ ] Yes [X] No
If Rail Specify Placards
Route Plan [ ] Yes [X] No

11a. TYPE PACKAGE: Strong Tight [X]; Type A [ ]; Type B [ ]; Type B(U) [ ]; Type B(M) [ ]

11b. CONSTRUCTION: [ ] Box, FB; [ ] Wood; [ ] Steel; [ ] Drum; [ ] Cask; Other: Polycooler

11c. FISSILE CLASS: Non-Fissile [X]; Fissile Exempt [ ]; Fissile I [ ]; Fissile II [ ]; Fissile III [ ]; Gms Fissile

11d. Labels Applied: Empty [ ]; Radioactive White I [ ]; Radioactive Yellow II [ ]; Radioactive Yellow III [ ]; Subsidiary Hazard [ ]

N/A

10. EMERGENCY RESPONSE
Telephone: (509) 373-3800
Emergency Response Guide(s): ERG #61 (Attached)

Warning -- Fissile Class III Shipment. Do Not Load More Than ____ Packages Per Vehicle. In Loading and Storage Areas, Keep at Least 20 Feet From Other Packages Bearing Radioactive Labels.

12. No. Pkgs.	Model Package	COC/Spec	Serial No.	Seal No.	Isotopes	T.I.	Curies/Pkg	Gr. Wt.
1	Strong tight	N/A	N/A	N/A	Sr90, Co60, Cs137	N/A	0.77 mCi	11 pds
SOIL	Samples on glass jars - double bagged and placed inside polycooler # B1-001							
	Samples #: BOGL97, BOGL99, BOGL131, BOGL133, BOGL134, BOGL136, BOGL138							
(Shipper may describe package in detail on one of the unused lines above)					TOTALS	N/A	0.77 mCi	11 pds

13. This is to certify that the above named materials are properly classified, described, packaged, marked and labeled, and are in proper condition for transportation, according to the applicable federal, state, local and international regulations for the transportation of hazardous materials.
Certifier's Signature (On behalf of DOE-RL): Wendy S Thompson — Date: 01/10/96 — Organization: FIELD SAMPLING — Complete Cost Code (Inc. End Function): X60037

14. Surface Dose Rate of Package: [X] <0.5 or NA mrem/hr (N + β γ)
Dose Rate at 1 Meter from Surface of Package: [X] <0.5 or NA mrem/hr (N + β γ)
Smears of Outer Container: [ ] <22 dpm β γ/cm²; [X] <2.2 dpm α/cm²; [ ] <Tbl. 2-2 HSRCM Onsite Limits
TRUCK LOAD OR EXCLUSIVE USE: Surface [X] <200 mrem/hr (N + β γ); @ 6 feet [X] <10 mrem/hr (N + β γ); @ Cab or sleeper [X] <2 mrem/hr (N + β γ)
Additional Data and Instructions (inc. Readings on Internal Packaging): NC
Signature - Radiation Monitoring: [signature] — Bldg.: 1301N — Survey No.: 1301-386 — Date: 1-10-96

15. PICKUP OF SHIPMENT — Vehicle: HO-1D 2598 — Driver: Bill Whitten
RECEIPT — Signature: — Date:

16. Shipment has been inspected and verified to be in compliance with DOT regulations
Authorized Signature: M A Sams — Printed Name: M. A. SAMS — Date: 1-10-96

17. AIR TRANSPORT CERTIFICATION
CARGO AIRCRAFT: [ ] Cargo Aircraft Only Labels Applied
PASSENGER AIRCRAFT: [ ] 1. Ltd Qty [ ] 2. <3 T.I. [ ] 3. Research/Medical Diagnosis [ ] 4. Human Medical Research
Pkg. Dimensions: NA

18. OFFSITE AUTHORIZATION
B/L: RMW-9777 — Date Shipped: 1-10-96 — Routing: KEH/BHI VEHICLE — ETA: 1-10-96
Surveyed By: — Date: — Approved for Shipment Offsite: M A Sams — Date: 1-10-96

Karen Ackenburg - Quanterra 1-10-96

9613477.2185

SAMPLE RECEIPT VARIANCE REPORT
ITAS-RICHLAND LABORATORY

WORK ORDER NUMBER: 6-01-128 (1-8) DATE INITIATED: 1-10-96

INITIATED BY: Karen Aichtenberg

DATE/TIME OF SAMPLE (AND/OR RFA & COC) RECEIPT: 1-10 @ 10:30

CLIENT SAMPLE NUMBER	RFA/COC NUMBERS	ANALYSIS REQUESTED
All	Una	Chemical + Rad.

Samples were received with the following deficiencies:

- ☐ 1. Not enough sample received for proper analysis.
- ☐ 2. Sample received without proper preservative.
- ☐ 3. No sample received in container.
- ☐ 4. Sample received without a RFA/COC form.
- ☐ 5. No sample ID on container.
- ☐ 6. Sample received broken or leaking.
- ☐ 7. Holding time exceeded at receipt.
- ☐ 8. Custody tape broken.
- ☐ 9. COC not relinquished by client.
- ☐ 10. Sample information on container does not match sample information on the paper work (Explain below).
- ☐ 11. All shipping containers (coolers) on waybill not received with shipment.
  - ☐ RFA/COC received
  - ☐ RFA/COC not received
- ☒ 12. Other (Explain below).

NOTES: no coolant present - sample temp - Room

SUPERVISOR REVIEW: Sami Heidelberg

PROJECT MANAGER REVIEW: Stephen J. Krumheuer 1-22-96

TELEPHONED TO: Clay Smith ON 1/18/96 BY J.C.

TELEFAXED TO: _____ ON _____ BY _____

SIGNED ORIGINAL MUST BE RETAINED IN WORK ORDER FILE

FORM NO. LS-023, 3/92, Rev. 0

9613477.2186

Sdy W0867

Figure 1

SAMPLE CHECK-IN LIST

(1 Per Shipping Container)

Date/Time Received 1-10-96 10:30 Client Name BHI

Project/Client # B95-089 Batch or Case # _____

Cooler ID (if noted on outside of cooler) BI-CC1

1. Condition of shipping container? O.K.
2. Custody Seals on cooler intact? Yes [X] No [ ]
3. Custody Seals dated and signed? Yes [X] No [ ]
4. Chain of Custody record is taped on inside of cooler lid? Yes [ ] No [X]
5. Vermiculite/packing material is: Wet [ ] Dry [X] _____
6. Each sample is in a plastic bag? Yes [X] No [ ] _____
7. Number of sample containers in cooler: 24
8. Samples have: X tape ____ hazard labels
   X custody seals ____ appropriate sample labels
9. Samples are: X in good condition ____ leaking
   ____ broken ____ have air bubbles
   ____ other
10. Coolant Present? Yes [ ] No [X] Sample Temperature _____
11. The following paperwork should be accounted for (N/A if not applicable):
    Chain of Custody #(s) n/a
    Request for Analysis #(s) ↓
    Airbill # _____ Carrier n/a
12. Have any anomalies been identified above? Yes [X] No [ ]
13. Memos have been initiated for all anomalies identified above? Yes [X]

Printed Name/Signature Karen Kittenberg Date/Time 1-10-96 10:30

SDG W08867

601128 Chem
601129 Rad

Client Sample Screening Results

10-Jan-96

1-10-96

CLIENT CODE ID	MATRIX	RECEIVED	DETECTOR	ACQ DATE	SAMPLE	MINUTES	CNTS A	NET CPM A	CNTS B	NET CPM B
BHI B0GL97		1/10/96 10:30:00 AM	QUAD21A	1/10/96 1:02:51 PM	B0GL97	30	33	1.04125	3151	104.08083
01	SOLID		Bkg:	1/10/96 5:05:48 AM	BKG	800	47	0.05875	762	0.9525
Anl Date: 1/10/96	Tot Sa, Alq: 1.80E+02	, 4.30E+01	Alp; (Dpm/ -9.06E-01	(uCi/ -1.71E-03	(pCi/ -9.49E+00	± 8.7E+00	CAT II	1.8E+02	Lab Alq L|g	
Ppt mg: 43	Units: g	, mg	Bet; Alq): 2.24E+02	Sa): 4.23E-01	L|g): 2.35E+03	± 4.2E+01		4.3E-02		
BHI B0GL99		1/10/96 10:30:00 AM	QUAD21B	1/10/96 1:02:51 PM	B0GL99	30	37	1.17208333	3259	107.73833
02	SOLID		Bkg:	1/10/96 5:05:48 AM	BKG	800	49	0.06125	716	0.895
Anl Date: 1/10/96	Tot Sa, Alq: 1.80E+02	, 5.58E+01	Alp; (Dpm/ -2.17E-01	(uCi/ -3.15E-04	(pCi/ -1.75E+00	± 6.5E+00	CAT II	1.8E+02	Lab Alq L|g	
Ppt mg: 55.8	Units: g	, mg	Bet; Alq): 2.28E+02	Sa): 3.31E-01	L|g): 1.84E+03	± 3.2E+01		5.4E-02		
BHI B0GLB1		1/10/96 10:30:00 AM	QUAD21C	1/10/96 1:02:51 PM	B0GLB1	30	28	0.86833333	1578	51.7
03	SOLID		Bkg:	1/10/96 5:05:48 AM	BKG	800	52	0.065	720	0.9
Anl Date: 1/10/96	Tot Sa, Alq: 1.80E+02	, 6.39E+01	Alp; (Dpm/ 1.78E+00	(uCi/ 2.26E-03	(pCi/ 1.25E+01	± 6.9E+00	CAT II	4.0E+00	Lab Alq L|g	
Ppt mg: 63.9	Units: g	, mg	Bet; Alq): 1.11E+02	Sa): 1.41E-01	L|g): 7.82E+02	± 2.0E+01		1.3E-01		
BHI B0GLB3		1/10/96 10:30:00 AM	QUAD21D	1/10/96 1:02:51 PM	B0GLB3	30	7	0.15833333	844	27.154583
04	SOLID		Bkg:	1/10/96 5:05:48 AM	BKG	800	60	0.075	783	0.97875
Anl Date: 1/10/96	Tot Sa, Alq: 1.80E+02	, 5.10E+01	Alp; (Dpm/ -5.78E-01	(uCi/ -9.20E-04	(pCi/ -5.11E+00	± 7.3E+00	CAT I	1.8E+02	Lab Alq L|g	
Ppt mg: 51	Units: g	, mg	Bet; Alq): 5.78E+01	Sa): 9.19E-02	L|g): 5.11E+02	± 1.8E+01		2.0E-01		
BHI B0GLB4		1/10/96 10:30:00 AM	QUAD22A	1/10/96 1:02:55 PM	B0GLB4	30	20	0.63166667	1428	46.52875
05	SOLID		Bkg:	1/10/96 5:05:58 AM	BKG	800	28	0.035	857	1.07125
Anl Date: 1/10/96	Tot Sa, Alq: 1.80E+02	, 7.41E+01	Alp; (Dpm/ 1.03E+00	(uCi/ 1.13E-03	(pCi/ 6.29E+00	± 6.0E+00	CAT II	8.0E+00	Lab Alq L|g	
Ppt mg: 74.1	Units: g	, mg	Bet; Alq): 9.75E+01	Sa): 1.07E-01	L|g): 5.93E+02	± 1.6E+01		1.7E-01		

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96194722187

CLIENT CODE ID	MATRIX	RECEIVED	DETECTOR	ACQ DATE	SAMPLE	MINUTES	CNTS A	NET CPM A	CNTS B	NET CPM B
BHI B0GLB6 06	SOLID	1/10/96 10:30:00 AM	QUAD22B	1/10/96 1:02:55 PM	B0GLB6	30	6	0.1425	124	3.2445833
			Bkg:	1/10/96 5:05:58 AM	BKG	800	46	0.0575	711	0.88875
Anl Date: 1/10/96	Tot Sa, Alq: 1.80E+02	, 4.78E+01	Alp; (Dpm/ 5.45E-01	(uCi/ 9.25E-04	(pCi/ 5.14E+00	± 7.1E+00	CAT I	9.7E+00	Lab Alq L|g	
Ppt mg: 47.8	Units: g	, mg	Bet; Alq): 6.51E+00	Sa): 1.10E-02	L|g): 6.13E+01	± 7.1E+00		1.6E+00		
BHI B0GLB8 07	SOLID	1/10/96 10:30:00 AM	QUAD22C	1/10/96 1:02:55 PM	B0GLB8	30	2	0.01291667	19	-0.272917
			Bkg:	1/10/96 5:05:58 AM	BKG	800	43	0.05375	725	0.90625
Anl Date: 1/10/96	Tot Sa, Alq: 1.80E+02	, 2.25E+01	Alp; (Dpm/ 6.37E-02	(uCi/ 2.30E-04	(pCi/ 1.28E+00	± 1.1E+01	CAT I	3.9E+01	Lab Alq L|g	
Ppt mg: 22.5	Units: g	, mg	Bet; Alq): -5.46E-01	Sa): -1.97E-03	L|g): -1.09E+01	± 8.0E+00		1.8E+02		
BHI B0GLC0 08	SOLID	1/10/96 10:30:00 AM	QUAD22D	1/10/96 1:02:55 PM	B0GLC0	30	8	0.21916667	119	3.0741667
			Bkg:	1/10/96 5:05:58 AM	BKG	800	38	0.0475	714	0.8925
Anl Date: 1/10/96	Tot Sa, Alq: 1.80E+02	, 3.47E+01	Alp; (Dpm/ 8.09E-01	(uCi/ 1.89E-03	(pCi/ 1.05E+01	± 9.0E+00	CAT I	4.8E+00	Lab Alq L|g	
Ppt mg: 34.7	Units: g	, mg	Bet; Alq): 6.09E+00	Sa): 1.42E-02	L|g): 7.91E+01	± 9.5E+00		1.3E+00		
BHI B0GS38	LIQUID	1/10/96 10:30:00 AM	QUAD23A	1/10/96 1:02:59 PM	B0GS38	30	66	2.14875	1478	48.401667
			Bkg:	1/10/96 5:06:07 AM	BKG	800	41	0.05125	692	0.865
Anl Date: 1/10/96	Tot Sa, Alq: 1.00E+00	, 1.00E+01	Alp; (Dpm/ 6.08E+00	(uCi/ 2.74E-04	(pCi/ 2.74E+02	± 3.9E+01	CAT I	9.1E-02	Lab Alq L|g	
Ppt mg: 12.8	Units: L	, ml	Bet; Alq): 9.29E+01	Sa): 4.18E-03	L|g): 4.18E+03	± 1.1E+02		1.2E-02		
BHI B0GS39	LIQUID	1/10/96 10:30:00 AM	QUAD23B	1/10/96 1:02:59 PM	B0GS39	30	23	0.71416667	283	8.4908333
			Bkg:	1/10/96 5:06:07 AM	BKG	800	42	0.0525	754	0.9425
Anl Date: 1/10/96	Tot Sa, Alq: 1.00E+00	, 1.00E+01	Alp; (Dpm/ 2.27E+00	(uCi/ 1.02E-04	(pCi/ 1.02E+02	± 3.0E+01	CAT I	2.4E-01	Lab Alq L|g	
Ppt mg: 12.2	Units: L	, ml	Bet; Alq): 1.62E+01	Sa): 7.29E-04	L|g): 7.29E+02	± 4.9E+01		6.9E-02		
BHI B0GYX4	LIQUID	1/10/96 10:30:00 AM	QUAD23C	1/10/96 1:02:59 PM	B0GYX4	30	3	0.03875	29	0.0741667
			Bkg:	1/10/96 5:06:07 AM	BKG	800	49	0.06125	714	0.8925
Anl Date: 1/10/96	Tot Sa, Alq: 1.00E+00	, 1.00E+01	Alp; (Dpm/ 1.09E-01	(uCi/ 4.91E-06	(pCi/ 4.91E+00	± 1.8E+01	CAT I	5.1E+00	Lab Alq L|g	
Ppt mg: 0.3	Units: L	, ml	Bet; Alq): 1.20E-01	Sa): 5.39E-06	L|g): 5.39E+00	± 1.6E+01		9.3E+00		

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96 0107 2068

9613477.2189 *** PUISO ***

Due 3-3-96

CHAIN-OF-CUSTODY BATCH ANALYSIS RECORD

10-Jan-1996
Page 1

CUSTOMER: BHI SAF

SAMPLE DELIVERY GROUP W0867

MATRIX : SOIL B95-089

BATCH NUMBER 01-129

	ITAS ID	DUP	ACCOUNT	CUSTOMER ID	COMMENTS
*)	P011291B		BHI		SOME ALIQUOTS REDUCED
*)	P011291S		BHI		DUE TO SCREENING
3)	60112901		BHI	BOGL97	
4)	60112902		BHI	BOGL99	
5)	60112903		BHI	BOGLB1	
6)	60112904		BHI	BOGLB3	
7)	60112905		BHI	BOGLB4	
8)	60112906		BHI	BOGLB6	
9)	60112907 60112907 DUP		BHI	BOGLB8	
10)	60112908		BHI	BOGLCO	

ACTIONS (Initial & Date)

1) INITIATED JH 1/11/96

2) PREP LAB RECEIVED JN 1-11-96 RICHRC5013
REC 1-22-96 JN RICHRC5019 1-30-96 JN

3) SAMPLE REMAINDER STORED ~~1-22-96~~ JN 1-30-96

4) SEPARATION LAB RECEIVED 2-12-96 LM RICHRC 5010

5) COUNTING/MEASUREMENT LAB P 204610 2/13/96

6) DATA REVIEWED AND ANALYTICAL PREP STORED AK 2-20-96
RICHRC0002 KC

Samples 60112901-06: Aliquots reduced due to high beta results of screening
" 60112904,05,06,07 were pulverized to generate ample sized sample

Rich RC 5039 Rev 1 E.D. 2/13/96 M.V.

9613477.2190*** UISO ***

DUE 3-3-96

CHAIN-OF-CUSTODY BATCH ANALYSIS RECORD

10-Jan-1996
Page 1

CUSTOMER: BHI SAF SAMPLE DELIVERY GROUP 1V08C7

MATRIX : SOIL B95-089 BATCH NUMBER 01-129

	ITAS ID	DUP	ACCOUNT	CUSTOMER ID	COMMENTS
*)	P011291B		BHI		SOME ALIQUOTS REDUCED
*)	P011291S		BHI		DUE TO SCREENING
3)	60112901		BHI	BOGL97	
4)	60112902		BHI	BOGL99	
5)	60112903		BHI	BOGLB1	
6)	60112904		BHI	BOGLB3	
7)	60112905		BHI	BOGLB4	
8)	60112906		BHI	BOGLB6	
9)	60112907 C0112907		BHI	BOGLB8	
10)	60112908		BHI	BOGLC0	

ACTIONS (Initial & Date)

1) INITIATED JH 1/11/96

2) PREP LAB RECEIVED JN 1-11-96 RICHRC5013
REC 1-22-96 JN RICHRC5014 1-30-96 JN

3) SAMPLE REMAINDER STORED ~~1-22-96~~ JN 1-30-96

4) SEPARATION LAB RECEIVED 02-01-96 Eue
Sep Procedure 5030

5) COUNTING/MEASUREMENT LAB RD4610 JN 2-14-96

6) DATA REVIEWED AND ANALYTICAL PREP STORED JR 2-16-96 RICHRC0002 Re

Samples 60112901-06: ALIQUOTS REDUCED DUE TO HIGH BETA SCREENING RESULTS
" 60112904, 05, 06 & 08: WERE pulverized TO ~~gen~~ generate Ample SIEVED SAMPLE

Rich Rc 5030 Rev0 2/6/96 M.U. 1st EXTRACTION
Rich RC5030 Rev0 2/12/96 M.U. 2nd Extraction
Rich RC5039 Rev1 2/14/96 M.U. E.D.

DUE 3-3-96

9613477.219 *** GAMMA ***

CHAIN-OF-CUSTODY BATCH ANALYSIS RECORD

10-Jan-1996
Page 1

CUSTOMER: BHI SAF

SAMPLE DELIVERY GROUP WD867

MATRIX : SOIL BC15-089

BATCH NUMBER 01-129

	ITAS ID	DUP	ACCOUNT	CUSTOMER ID	COMMENTS
*)	P0112918 X (JC 1-23-96)		BHI	FINE CHAWA SAND	
*)	P0112918 M (JC 1-23-96)		BHI	CAL 790	
3)	60112901		BHI	BOGL97	
4)	60112902		BHI	BOGL99	
5)	60112903		BHI	BOGLB1	
6)	60112904		BHI	BOGLB3	
7)	60112905		BHI	BOGLB4	
8)	60112906		BHI	BOGLB6	
9)	60112907		BHI	BOGLB8	
10)	60112908		BHI	BOGLCO	
	60112908	Dup			

ACTIONS (Initial & Date)

1) INITIATED JN 1/11/96

2) PREP LAB RECEIVED JN 1-11-96 RICHRC5013

3) SAMPLE REMAINDER STORED 1-23-96 RICHRC-5017

4) SEPARATION LAB RECEIVED N/A

5) COUNTING/MEASUREMENT LAB RICHRD000 AS 1-23-96

6) DATA REVIEWED AND ANALYTICAL PREP STORED JRC 2-16-96 RICHRC0002 Rev

Samples 60112904,05,06,08 were pulverized to generate ample sieved sample

DUE 3-3-96

9613477.2192 *** ALPHA ***

CHAIN-OF-CUSTODY BATCH ANALYSIS RECORD

10-Jan-1996
Page 1

CUSTOMER: BHI SAF

SAMPLE DELIVERY GROUP W08C07

MATRIX : SOIL B95089

BATCH NUMBER 01-129

	ITAS ID	DUP	ACCOUNT	CUSTOMER ID	COMMENTS
*)	P011291B		BHI		
*)	P011291S		BHI	EQEG 1083	10.052 ± 0.936475 DPm
3)	60112901		BHI	BOGL97	
4)	60112902		BHI	BOGL99	
5)	60112903		BHI	BOGLB1	
6)	60112904		BHI	BOGLB3	
7)	60112905		BHI	BOGLB4	
8)	60112906		BHI	BOGLB6	
9)	60112907		BHI	BOGLB8	
	C0112907	Dup			
10)	60112908		BHI	BOGLC0	

ACTIONS (Initial & Date)

1) INITIATED 1/11/96

2) PREP LAB RECEIVED 1-11-96 RICHRC5013 ~~RICHRC5017~~ 3/1-11-96

3) SAMPLE REMAINDER STORED 1-23-96 ~~RICHRC~~ 3/1-23-96 ITAS-CO-3333

4) SEPARATION LAB RECEIVED N/A

5) COUNTING/MEASUREMENT LAB RICHRC0002 AS 1-23-96

6) DATA REVIEWED AND ANALYTICAL PREP STORED 2-15-96 RICHRC0002 Rev 0

Samples ~~G1212~~ 1-23-96 60112904,05,06,08: pulverized to generate sample sieved sample

000056

9613477.2195 *** BETA ***

Due 3-3-96

CHAIN-OF-CUSTODY BATCH ANALYSIS RECORD

10-Jan-1996
Page 1

CUSTOMER: BHI SAF

SAMPLE DELIVERY GROUP W0867

MATRIX : SOIL BC15-089

BATCH NUMBER 01-129

	ITAS ID	DUP	ACCOUNT	CUSTOMER ID	COMMENTS
*)	P011291B		BHI		
*)	P011291S		BHI	EGAU 473	30.236 ± 0.37734
3)	60112901		BHI	BOGL97	
4)	60112902		BHI	BOGL99	
5)	60112903		BHI	BOGLB1	
6)	60112904		BHI	BOGLB3	
7)	60112905		BHI	BOGLB4	
8)	60112906		BHI	BOGLB6	
9)	60112907		BHI	BOGLB8	
	C0112907	Dup			
10)	60112908		BHI	BOGLC0	

ACTIONS (Initial & Date)

1) INITIATED 1/11/96

2) PREP LAB RECEIVED 1-11-96 RICHRL5013 ~~RICHRL5017~~ 1-11-96

3) SAMPLE REMAINDER STORED 1-23-96 ITAS RD-3222

4) SEPARATION LAB RECEIVED NLA

5) COUNTING/MEASUREMENT LAB RD4607 AS 1-23-96

6) DATA REVIEWED AND ANALYTICAL PREP STORED 2-15-96 RICHRC0002 Rev 0

Samples 60112904,05,06,08 pulverized to generate Ample Sieved Sample

000057

9613477.2194 *** TOTAL-SR ***

DUE 3-3-96

CHAIN-OF-CUSTODY BATCH ANALYSIS RECORD

10-Jan-1996
Page 1

CUSTOMER: BHI SAF

SAMPLE DELIVERY GROUP W0867

MATRIX : SOIL B95-089

BATCH NUMBER 01-129

	ITAS ID	DUP	ACCOUNT	CUSTOMER ID	COMMENTS
*)	P011291B		BHI		
*)	P011291S		BHI		
3)	60112901		BHI	BOGL97	
4)	60112902		BHI	BOGL99	
5)	60112903		BHI	BOGLB1	
6)	60112904		BHI	BOGLB3	
7)	60112905		BHI	BOGLB4	
8)	60112906		BHI	BOGLB6	
9)	60112907 Coll 2907		BHI	BOGLB8	
10)	60112908		BHI	BOGLCO	

ACTIONS (Initial & Date)

1) INITIATED SH 1/11/96

2) PREP LAB RECEIVED 9H 1-11-96 RICHRC5013

3) SAMPLE REMAINDER STORED 1-22-96 S / 1-1-96 RW

4) SEPARATION LAB RECEIVED 2-1-96 RTM / RichRC5006

5) COUNTING/MEASUREMENT LAB OP 2/9/96 RICHRD0003Re

6) DATA REVIEWED AND ANALYTICAL PREP STORED JK RICHRC0002Re 2-16-96

Samples 60112901-06 — Aliquots reduced due to high beta results of screening

Samples 60112901,05,06,08 were pulverized to generate ample sievable sample

000058

9613477.2195

Golder Associates Inc.

4104-148th Avenue, NE
Redmond, WA 98052
Telephone (206) 883-0777
Fax (206) 882-5498

COPY

Golder Associates

MAR 1996
RECEIVED
Validation
Log In

March 22, 1996

Our ref: 943-1610.124.0400
94-1610/O/485

CH2M Hill
1022 Lee Blvd.
Richland, Washington 99352

ATTENTION: Ms. Jeanette Duncan

RE: TRANSMITTAL OF DATA VALIDATION PACKAGE,
CONTRACT NO. MSH-SWV-315905

Dear Ms. Duncan:

This letter is to transmit the following data validation package:

SAF#	Project	Data Package	Analyses
B95-089	1301N/1325N LWDF Vadose Zone Characterization	W0867-QES	Radiochemistry, Inorganics

Please call if you have any questions.

Sincerely,

GOLDER ASSOCIATES INC.

Tom Stapp

Thomas M. Stapp
Project Manager

Enclosures

p:\enviros\whc\dv\dptran.ltr

9613077.2105

MEMORANDUM

TO: 1301N/1325N LWDF Vadose Zone Project QA Record March 21, 1996

FR: Heidi Gregerson, Golder Associates Inc. HRG

RE: RADIOCHEMISTRY DATA VALIDATION SUMMARY FOR DATA PACKAGE W0867-QES (943-1610.124 867RAD.NR1)

INTRODUCTION

This memo presents the results of data validation for the analysis specified below on data package W0867-QES prepared by Quanterra Environmental Services. Sample information is provided in the following table.

SAMPLE ID	COMMENTS	ANALYSIS	MEDIA
B0GL97		RADIOCHEMISTRY	SOIL
B0GL99			SOIL
B0GLB1		SEE ATTACHMENT 4	SOIL
B0GLB3			SOIL
B0GLB4	FIELD DUPLICATE		SOIL
B0GLB6			SOIL
B0GLB8	EQUIPMENT BLANK		SOIL
B0GLC0			SOIL

Data validation was conducted to level C in accordance with the WHC statement of work (WHC 1994) and validation procedures (WHC 1993). Attachments 1 through 5 provide the following information as indicated below:

Attachment 1. Glossary of Data Reporting Qualifiers
Attachment 2. Summary of Data Qualifications
Attachment 3. Qualified Data Summary and Annotated Laboratory Reports
Attachment 4. Laboratory Narrative and Chain-of-Custody Documentation
Attachment 5. Data Validation Supporting Documentation

DATA QUALITY OBJECTIVES

This section presents a summary of the data quality in terms of the referenced validation criteria.

Precision. Goals for precision were met.

Accuracy. Goals for accuracy were met, with the exception of those deficiencies listed below.

Detection Limits. Detection limit goals were met for all sample results except for those listed below:

B0GL97: uranium 235, uranium 238, ruthenium 106DA, cesium 134, europium 152, thorium 228DA, and thorium 232DA.
B0GLC0: gross alpha

Completeness. The data package was complete for all requested analyses. A total of eight samples were validated in this data package with a total of 193 determinations reported, all of which were deemed valid. This results in a completeness of 100 percent, which meets the 90 percent objective of the work plan.

MAJOR DEFICIENCIES

No major deficiencies were identified during data validation which required qualification of data as unusable.

MINOR DEFICIENCIES

The following minor deficiencies were identified during data validation which required qualification of data:

Method Blank

- The following isotopes were detected in the method blank: potassium 40 and radium 226DA. Attachments 2 and 5 provide a summary of samples affected, data qualifications applied and supporting documentation.

Laboratory Control Sample

- The percent recovery for uranium 235 was outside the control limit. Attachments 2 and 5 provide a summary of samples affected, data qualifications applied and supporting documentation.

FIELD QC

- Sample B0GLB8 was identified as an equipment blank with the following isotopes detected: uranium 234, uranium 238, potassium 40, radium 224DA, radium 226DA, and thorium 228DA. Qualification of data is not required based on field QC.

- Sample B0GLB4 was identified as a field duplicate of sample B0GLB3. The RPDs were evaluated and determined to be acceptable with the exception of europium 152 which was outside the control limit. Qualification of data is not required based on field QC.

DATA REPORTING

- Reported sample results which are less than the minimum detectable activity (MDA) have been qualified as undetected (U) on the laboratory results form (see Attachment 3).

REFERENCES

WHC 1993, Data Validation Procedures for Radiochemical Analyses, WHC-SD-EN-SPP-001, Rev. 1, 1993. Westinghouse Hanford Company, Richland, Washington.

WHC 1994, Environmental and Waste Characterization Analytical Data Validation, Purchase Order MSH-SWV-315905; Validation Statement of Work, Revision 1.0, September 7, 1994; Westinghouse Hanford Company, Richland, Washington.

9613477.2199

ATTACHMENT 1

GLOSSARY OF DATA REPORTING QUALIFIERS

GLOSSARY OF RADIOCHEMISTRY DATA REPORTING QUALIFIERS

U- Indicates the constituent was analyzed for, but was not detected at a concentration above the minimum detectable activity (MDA). The concentration reported is the laboratory result corrected for sample aliquot size, dilution factors and percent solids (in the case of solid matrices) by the laboratory. The associated data should be considered usable for decision making purposes.

UJ- Indicates the constituent was analyzed for and was not detected at a concentration above the MDA. Due to a quality control deficiency identified during data validation, the concentration reported may not accurately reflect the sample quantitation limit. The associated data should be considered usable for decision making purposes.

J- Indicates the constituent was analyzed for and detected. The concentration reported is qualified as estimated due to a quality control deficiency identified during data validation. The associated data should be considered usable for decision making purposes.

UR- Indicates the constituent was analyzed for and detected. The concentration reported is qualified as unusable due to a quality control deficiency identified during data validation. The associated data should be considered unusable for decision making purposes.

R- Indicates the constituent was analyzed for and detected. The concentration reported is qualified as unusable due to a quality control deficiency identified during data validation. The associated data should be considered unusable for decision making purposes.

9613477.2201

ATTACHMENT 2

SUMMARY OF DATA QUALIFICATIONS

WHC-SD-EN-SPP-002, REV.2

DATA QUALIFICATION SUMMARY - FORM B-7

SDG: W0867-QES	REVIEWER: H. Gregerson	DATE: 3-21-96	PAGE 1 OF 1
COMMENTS: RADIOCHEMISTRY			
COMPOUND/ANALYTE	QUALIFIER	SAMPLES AFFECTED	REASON
Potassium 40	J	ALL SAMPLES	DETECTED IN METHOD BLANK
Radium 226DA	J	B0GL99 B0GLB1 B0GLB3 B0GLB4 B0GLB6 B0GLB8 B0GLC0	DETECTED IN METHOD BLANK
Uranium 235	J/UJ	ALL SAMPLES	LCS %RECOVERY OUTSIDE THE CONTROL LIMIT

Revised HRG 4/4/96

9613477.2203

ATTACHMENT 3

QUALIFIED DATA SUMMARY and ANNOTATED LABORATORY REPORTS

Validated Data Summary, Data Package: W0867-QES

	Sample #	B0GLB1		B0GLB3		B0GLB4		B0GLB6		B0GLB8		B0GLC0		B0GL97		B0GL99	
	Date	12/20/95		12/22/95		12/22/95		12/27/95		12/27/95		12/28/95		12/19/95		12/20/95	
	Location																
	Depth	17.0-19.0 ft		24.0-26.0 ft		24.0-26.0 ft		39.0-41.0 ft				59.5-61.5 ft		8.0-10.0 ft		10.0-12.0 ft	
	Type	SOIL		SOIL		SOIL		SOIL		SOIL		SOIL		SOIL		SOIL	
	Comments					Field Duplicate				Equipment Blank							
Parameter	Units	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
URANIUM-234	pCi/G	0.727		0.642		0.354		0.348		0.051		0.454		1.360		0.451	U
URANIUM-235	pCi/G	0.033	UJ	-0.004	UJ	0.008	UJ	0.017	UJ	0.003	UJ	0.029	J	-0.210	UJ	0.085	UJ
URANIUM-238	pCi/G	0.440		0.435		0.531		0.500		0.028		0.418		0.776	U	0.564	U
PLUTONIUM-238	pCi/G	0.075	U	0.000	U	0.014	U	-0.003	U	-0.001	U	0.006	U	3.810		0.000	U
PLUTONIUM-239/40	pCi/G	0.150		0.025	U	-0.002	U	0.000	U	-0.001	U	0.010	U	24.100		0.385	U
AMERICIUM-241	pCi/G													14.200			
CERIUM-144	pCi/G	-0.176	U	-0.049	U	-0.131	U	-0.092	U	-0.031	U	-0.173	U	2.360	U	-0.079	U
COBALT-58	pCi/G	-0.004	U	0.009	U	0.009	U	-0.039	U	-0.013	U	0.007	U	0.268	U	-0.030	U
COBALT-60	pCi/G	2.370		1.570		1.430		0.546		-0.008	U	1.480		379.000		4.510	
CESIUM-134	pCi/G	-0.002	U	-0.014	U	-0.014	U	0.003	U	-0.011	U	-0.030	U	0.633	U	-0.011	U
CESIUM-137DA	pCi/G	0.143		0.059		0.034	U	0.035	U	-0.007	U	-0.015	U	573.000		0.522	
EUROPIUM-152	pCi/G	-0.034	U	2.050		0.703		0.216		0.047	U	0.002	U	-0.315	U	-0.116	U
EUROPIUM-154	pCi/G	0.106	U	0.164	U	0.129	U	0.046	U	-0.005	U	0.068	U	2.860		0.006	U
EUROPIUM-155	pCi/G	0.014	U	0.091	U	-0.023	U	0.021	U	-0.005	U	-0.020	U	2.020		0.016	U
IRON-59	pCi/G	-0.085	U	-0.131	U	-0.127	U	0.087	U	0.023	U	-0.049	U	0.236	U	-0.135	U
POTASSIUM-40	pCi/G	9.620	J	8.030	J	7.930	J	8.620	J	4.190	J	12.400	J	12.500	J	9.010	J
MANGANESE-54	pCi/G	-0.011	U	0.003	U	0.023	U	0.009	U	0.021	U	0.015	U	2.740		-0.000	U
RADIUM-224DA	pCi/G	0.422		0.473		0.477		0.535		0.125		0.627				0.353	
RADIUM-226DA	pCi/G	0.368	J	0.415	J	0.304	J	0.358	J	0.116	J	0.340	J	1.580		0.322	J
RADIUM-228DA	pCi/G	0.481										0.434					
RUTHENIUM-106DA	pCi/G	0.205	U	0.153	U	-0.162	U	0.245	U	-0.010	U	0.054	U	2.440	U	0.178	U
THORIUM-228DA	pCi/G	0.420		0.406		0.498		0.574		0.304		0.567		0.535	U	0.409	
THORIUM-232DA	pCi/G	0.622		0.504		0.156		0.682		0.134	U	0.616		-0.167	U		
GROSS ALPHA	pCi/G	5.700		5.520		6.800		5.790		-0.906	U	4.530	U	39.800		6.690	
GROSS BETA	pCi/G	808.000		530.000		491.000		64.000		1.530	U	60.500		3170.000		2450.000	
STRONTIUM-90	pCi/G	401.000		226.000		200.000		27.700		-0.013	U	16.000		1340.000		1230.000	

The decimal places shown do not reflect the precision reported by the laboratory.

Verified HRG
3/22/96

9613477.2205

Quanterra Environmental Services

SAMPLE RESULTS

LAB NAME:	ITAS-RICHLAND	SDG:	W0867
LAB SAMPLE ID:	60112903	MATRIX:	SOIL
CLIENT ID:	B0GLB1	DATE RECEIVED:	1/10/96 10:30:00 AM

ISOTOPE	RESULT	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA	REPORT UNIT	YIELD	METHOD NUMBER
U-234	7.27E-01	3.4E-01	3.5E-01	3.68E-01	pCi/g	79.40%	RICHRC5030
U-235	3.33E-02 UJ	1.3E-01	1.3E-01	3.10E-01	pCi/g	79.40%	RICHRC5030
U-238	4.40E-01	2.8E-01	2.8E-01	3.50E-01	pCi/g	79.40%	RICHRC5030
PU-238	7.51E-02 U	1.5E-01	1.5E-01	2.76E-01	pCi/g	71.80%	RICHRC5010
PU239/40	1.50E-01	1.5E-01	1.5E-01	1.02E-01	pCi/g	71.80%	RICHRC5010
CE-144.	-1.76E-01 U	1.9E-01	1.9E-01	3.15E-01	pCi/g	N/A	RICHRC5017
CO-58.	-3.60E-03 U	3.9E-02	3.9E-02	6.32E-02	pCi/g	N/A	RICHRC5017
CO-60.	2.37E+00	9.9E-02	2.6E-01	N/A	pCi/g	N/A	RICHRC5017
CS-134.	-1.92E-03 U	2.4E-02	2.4E-02	3.99E-02	pCi/g	N/A	RICHRC5017
CS-137DA.	1.43E-01	4.5E-02	4.7E-02	N/A	pCi/g	N/A	RICHRC5017
EU-152.	-3.39E-02 U	6.8E-02	6.8E-02	1.09E-01	pCi/g	N/A	RICHRC5017
EU-154.	1.06E-01 U	7.5E-02	7.6E-02	1.36E-01	pCi/g	N/A	RICHRC5017
EU-155.	1.36E-02 U	1.2E-01	1.2E-01	1.86E-01	pCi/g	N/A	RICHRC5017
FE-59.	-8.45E-02 U	1.2E-01	1.2E-01	1.93E-01	pCi/g	N/A	RICHRC5017
K-40.	9.62E+00 J	9.2E-01	1.3E+00	N/A	pCi/g	N/A	RICHRC5017
MN-54.	-1.06E-02 U	3.1E-02	3.1E-02	5.10E-02	pCi/g	N/A	RICHRC5017
RA-224DA.	4.22E-01	7.2E-02	8.4E-02	N/A	pCi/g	N/A	RICHRC5017
RA-226DA.	3.68E-01 J	9.7E-02	1.0E-01	N/A	pCi/g	N/A	RICHRC5017
RA-228DA.	4.81E-01	2.2E-01	2.3E-01	N/A	pCi/g	N/A	RICHRC5017
RU-106DA.	2.05E-01 U	2.2E-01	2.2E-01	3.75E-01	pCi/g	N/A	RICHRC5017
TH-228DA.	4.20E-01	1.5E-01	1.6E-01	N/A	pCi/g	N/A	RICHRC5017
TH-232DA.	6.22E-01	2.7E-01	2.8E-01	N/A	pCi/g	N/A	RICHRC5017
ALPHA	5.70E+00	3.7E+00	3.7E+00	5.11E+00	pCi/g	100.00%	RD3222
BETA	8.08E+02	1.8E+01	5.6E+01	3.68E+00	pCi/g	100.00%	RD3222
STRONTIUM	4.01E+02	2.5E+01	1.1E+02	1.76E+01	pCi/g	68.50%	RICHRC5006

010 HCG 3/21/96 ~~000009~~

9613477.2206

Quanterra
Environmental Services

SAMPLE RESULTS

LAB NAME:	ITAS-RICHLAND	SDG:	W0867
LAB SAMPLE ID:	60112903	MATRIX:	SOIL
CLIENT ID:	B0GLB1	DATE RECEIVED:	1/10/96 10:30:00 AM

ISOTOPE	RESULT	COUNTING ERROR (2 s)	TOTAL ERROR (2 s)	MDA	REPORT UNIT	YIELD	METHOD NUMBER

Number of Results: 25

HRG 3/21/96

~~000010~~

9615477.2207

Quanterra Environmental Services

SAMPLE RESULTS

LAB NAME:	ITAS-RICHLAND	SDG:	W0867
LAB SAMPLE ID:	60112904	MATRIX:	SOIL
CLIENT ID:	B0GLB3	DATE RECEIVED:	1/10/96 10:30:00 AM

ISOTOPE	RESULT	COUNTING ERROR (2 s)	TOTAL ERROR (2 s)	MDA	REPORT UNIT	YIELD	METHOD NUMBER
U-234	6.42E-01	2.5E-01	2.6E-01	2.44E-01	pCi/g	79.60%	RICHRC5030
U-235	-4.22E-03 UJ	5.1E-02	5.1E-02	1.65E-01	pCi/g	79.60%	RICHRC5030
U-238	4.35E-01	2.1E-01	2.1E-01	2.09E-01	pCi/g	79.60%	RICHRC5030
PU-238	0.00E+00 U	7.0E-02	7.4E-02	1.81E-01	pCi/g	71.50%	RICHRC5010
PU239/40	2.46E-02 U	8.5E-02	8.5E-02	1.81E-01	pCi/g	71.50%	RICHRC5010
CE-144.	-4.85E-02 U	2.0E-01	2.0E-01	3.13E-01	pCi/g	N/A	RICHRC5017
CO-58.	8.97E-03 U	5.1E-02	5.1E-02	8.53E-02	pCi/g	N/A	RICHRC5017
CO-60.	1.57E+00	1.1E-01	1.9E-01	N/A	pCi/g	N/A	RICHRC5017
CS-134.	-1.38E-02 U	3.3E-02	3.3E-02	5.39E-02	pCi/g	N/A	RICHRC5017
CS-137DA.	5.87E-02	6.0E-02	6.0E-02	N/A	pCi/g	N/A	RICHRC5017
EU-152.	2.05E+00	1.8E-01	2.7E-01	N/A	pCi/g	N/A	RICHRC5017
EU-154.	1.64E-01 U	1.2E-01	1.2E-01	2.09E-01	pCi/g	N/A	RICHRC5017
EU-155.	9.12E-02 U	1.0E-01	1.0E-01	1.64E-01	pCi/g	N/A	RICHRC5017
FE-59.	-1.31E-01 U	1.4E-01	1.4E-01	2.17E-01	pCi/g	N/A	RICHRC5017
K-40.	8.03E+00 J	1.1E+00	1.3E+00	N/A	pCi/g	N/A	RICHRC5017
MN-54.	3.15E-03 U	4.1E-02	4.1E-02	6.73E-02	pCi/g	N/A	RICHRC5017
RA-224DA.	4.73E-01	9.0E-02	1.0E-01	N/A	pCi/g	N/A	RICHRC5017
RA-226DA.	4.15E-01 J	1.4E-01	1.5E-01	N/A	pCi/g	N/A	RICHRC5017
RU-106DA.	1.53E-01 U	3.0E-01	3.0E-01	5.09E-01	pCi/g	N/A	RICHRC5017
TH-228DA.	4.06E-01	1.7E-01	1.7E-01	N/A	pCi/g	N/A	RICHRC5017
TH-232DA.	5.04E-01	2.6E-01	2.7E-01	N/A	pCi/g	N/A	RICHRC5017
ALPHA	5.52E+00	3.4E+00	3.5E+00	4.05E+00	pCi/g	100.00%	RD3222
BETA	5.30E+02	1.5E+01	3.8E+01	3.72E+00	pCi/g	100.00%	RD3222
STRONTIUM	2.26E+02	1.3E+01	6.7E+01	8.16E+00	pCi/g	88.80%	RICHRC5006

HRG 3/21/96 ~~000011~~

9613477.2208

Quanterra
Environmental Services

SAMPLE RESULTS

LAB NAME:	ITAS-RICHLAND	SDG:	W0867
LAB SAMPLE ID:	60112904	MATRIX:	SOIL
CLIENT ID:	B0GLB3	DATE RECEIVED:	1/10/96 10:30:00 AM

ISOTOPE	RESULT	COUNTING ERROR (2 s)	TOTAL ERROR (2 s)	MDA	REPORT UNIT	YIELD	METHOD NUMBER

Number of Results: 24

HKG 3/21/96

~~000012~~

Quanterra
Environmental Services

SAMPLE RESULTS

LAB NAME:	ITAS-RICHLAND	SDG:	W0867
LAB SAMPLE ID:	60112905	MATRIX:	SOIL
CLIENT ID:	B0GLB4	DATE RECEIVED:	1/10/96 10:30:00 AM

ISOTOPE	RESULT	COUNTING ERROR (2 s)	TOTAL ERROR (2 s)	MDA	REPORT UNIT	YIELD	METHOD NUMBER
U-234	3.54E-01	1.3E-01	1.5E-01	5.81E-02	pCi/g	81.30%	RICHRC5030
U-235	7.63E-03 U J	2.6E-02	2.6E-02	7.18E-02	pCi/g	81.30%	RICHRC5030
U-238	5.31E-01	1.6E-01	1.9E-01	6.34E-02	pCi/g	81.30%	RICHRC5030
PU-238	1.42E-02 U	2.8E-02	2.9E-02	3.85E-02	pCi/g	74.90%	RICHRC5010
PU239/40	-2.28E-03 U	3.2E-03	3.2E-03	6.50E-02	pCi/g	74.90%	RICHRC5010
CE-144.	-1.31E-01 U	2.0E-01	2.0E-01	3.12E-01	pCi/g	N/A	RICHRC5017
CO-58.	8.89E-03 U	4.9E-02	4.9E-02	8.23E-02	pCi/g	N/A	RICHRC5017
CO-60.	1.43E+00	1.0E-01	1.8E-01	N/A	pCi/g	N/A	RICHRC5017
CS-134.	-1.37E-02 U	3.2E-02	3.3E-02	5.32E-02	pCi/g	N/A	RICHRC5017
CS-137DA.	3.37E-02 U	3.4E-02	3.4E-02	5.97E-02	pCi/g	N/A	RICHRC5017
EU-152.	7.03E-01	1.0E-01	1.3E-01	1.94E-01	pCi/g	N/A	RICHRC5017
EU-154.	1.29E-01 U	9.0E-02	9.1E-02	1.67E-01	pCi/g	N/A	RICHRC5017
EU-155.	-2.31E-02 U	1.0E-01	1.0E-01	1.64E-01	pCi/g	N/A	RICHRC5017
FE-59.	-1.27E-01 U	1.3E-01	1.3E-01	2.05E-01	pCi/g	N/A	RICHRC5017
K-40.	7.93E+00 J	1.0E+00	1.3E+00	N/A	pCi/g	N/A	RICHRC5017
MN-54.	2.34E-02 U	3.8E-02	3.8E-02	6.53E-02	pCi/g	N/A	RICHRC5017
RA-224DA.	4.77E-01	9.2E-02	1.0E-01	N/A	pCi/g	N/A	RICHRC5017
RA-226DA.	3.04E-01 J	1.2E-01	1.3E-01	N/A	pCi/g	N/A	RICHRC5017
RU-106DA.	-1.62E-01 U	3.0E-01	3.0E-01	4.98E-01	pCi/g	N/A	RICHRC5017
TH-228DA.	4.98E-01	1.6E-01	1.7E-01	N/A	pCi/g	N/A	RICHRC5017
TH-232DA.	1.56E-01	3.7E-01	3.7E-01	N/A	pCi/g	N/A	RICHRC5017
ALPHA	6.80E+00	3.9E+00	4.0E+00	4.88E+00	pCi/g	100.00%	RD3222
BETA	4.91E+02	1.4E+01	3.5E+01	4.05E+00	pCi/g	100.00%	RD3222
STRONTIUM	2.00E+02	4.2E+00	5.9E+01	1.01E+00	pCi/g	90.80%	RICHRC5006

HCG 3/21/96 ~~000013~~

9613477.2210

Quanterra
Environmental Services

SAMPLE RESULTS

LAB NAME:	ITAS-RICHLAND	SDG:	W0867
LAB SAMPLE ID:	60112905	MATRIX:	SOIL
CLIENT ID:	B0GLB4	DATE RECEIVED:	1/10/96 10:30:00 AM

ISOTOPE	RESULT	COUNTING ERROR (2 s)	TOTAL ERROR (2 s)	MDA	REPORT UNIT	YIELD	METHOD NUMBER

Number of Results: 24

HLG 3/21/96 ~~00-014~~

9613477.2211

Quanterra Environmental Services

SAMPLE RESULTS

LAB NAME:	ITAS-RICHLAND	SDG:	W0867
LAB SAMPLE ID:	60112906	MATRIX:	SOIL
CLIENT ID:	B0GLB6	DATE RECEIVED:	1/10/96 10:30:00 AM

ISOTOPE	RESULT	COUNTING ERROR (2 s)	TOTAL ERROR (2 s)	MDA	REPORT UNIT	YIELD	METHOD NUMBER
U-234	3.48E-01	1.3E-01	1.4E-01	6.25E-02	pCi/g	86.10%	RICHRC5030
U-235	1.69E-02 UJ	3.3E-02	3.4E-02	7.25E-02	pCi/g	86.10%	RICHRC5030
U-238	5.00E-01	1.6E-01	1.7E-01	9.33E-02	pCi/g	86.10%	RICHRC5030
PU-238	-2.57E-03 U	5.2E-03	5.2E-03	6.16E-02	pCi/g	78.50%	RICHRC5010
PU239/40	0.00E+00 U	0.0E+00	3.9E-02	3.48E-02	pCi/g	78.50%	RICHRC5010
CE-144.	-9.15E-02 U	1.3E-01	1.3E-01	2.03E-01	pCi/g	N/A	RICHRC5017
CO-58.	-3.91E-02 U	4.2E-02	4.2E-02	6.87E-02	pCi/g	N/A	RICHRC5017
CO-60.	5.46E-01	7.5E-02	9.3E-02	N/A	pCi/g	N/A	RICHRC5017
CS-134.	3.10E-03 U	2.8E-02	2.8E-02	4.64E-02	pCi/g	N/A	RICHRC5017
CS-137DA.	3.48E-02 U	3.1E-02	3.1E-02	5.29E-02	pCi/g	N/A	RICHRC5017
EU-152.	2.16E-01	7.5E-02	7.8E-02	1.33E-01	pCi/g	N/A	RICHRC5017
EU-154.	4.56E-02 U	9.0E-02	9.0E-02	1.59E-01	pCi/g	N/A	RICHRC5017
EU-155.	2.12E-02 U	6.5E-02	6.5E-02	1.04E-01	pCi/g	N/A	RICHRC5017
FE-59.	8.67E-02 U	1.1E-01	1.1E-01	1.96E-01	pCi/g	N/A	RICHRC5017
K-40.	8.62E+00 J	1.1E+00	1.4E+00	N/A	pCi/g	N/A	RICHRC5017
MN-54.	8.78E-03 U	3.3E-02	3.3E-02	5.63E-02	pCi/g	N/A	RICHRC5017
RA-224DA.	5.35E-01	8.5E-02	1.0E-01	N/A	pCi/g	N/A	RICHRC5017
RA-226DA.	3.58E-01 J	1.2E-01	1.2E-01	N/A	pCi/g	N/A	RICHRC5017
RU-106DA.	2.45E-01 U	2.7E-01	2.7E-01	4.68E-01	pCi/g	N/A	RICHRC5017
TH-228DA.	5.74E-01	1.6E-01	1.7E-01	N/A	pCi/g	N/A	RICHRC5017
TH-232DA.	6.82E-01	2.7E-01	2.7E-01	N/A	pCi/g	N/A	RICHRC5017
ALPHA	5.79E+00	3.7E+00	3.7E+00	4.99E+00	pCi/g	100.00%	RD3222
BETA	6.40E+01	5.4E+00	6.9E+00	3.78E+00	pCi/g	100.00%	RD3222
STRONTIUM	2.77E+01	1.5E+00	8.5E+00	9.90E-01	pCi/g	99.50%	RICHRC5006

HLG 3/21/96 ~~000015~~

9613477.2212

Quanterra
Environmental Services

SAMPLE RESULTS

LAB NAME:	ITAS-RICHLAND	SDG:	W0867
LAB SAMPLE ID:	60112906	MATRIX:	SOIL
CLIENT ID:	B0GLB6	DATE RECEIVED:	1/10/96 10:30:00 AM

ISOTOPE	RESULT	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA	REPORT UNIT	YIELD	METHOD NUMBER

Number of Results: 24

HRG 3/21/96 ~~000016~~

9613477.2213

Quanterra Environmental Services

SAMPLE RESULTS

LAB NAME:	ITAS-RICHLAND	SDG:	W0867
LAB SAMPLE ID:	60112907	MATRIX:	SOIL
CLIENT ID:	B0GLB8	DATE RECEIVED:	1/10/96 10:30:00 AM

ISOTOPE	RESULT	COUNTING ERROR (2 s)	TOTAL ERROR (2 s)	MDA	REPORT UNIT	YIELD	METHOD NUMBER
U-234	5.09E-02	3.2E-02	3.3E-02	2.54E-02	pCi/g	88.60%	RICHRC5030
U-235	3.24E-03 UJ	9.7E-03	9.7E-03	2.54E-02	pCi/g	88.60%	RICHRC5030
U-238	2.78E-02	2.3E-02	2.4E-02	2.18E-02	pCi/g	88.60%	RICHRC5030
PU-238	-1.05E-03 U	2.1E-03	2.1E-03	2.52E-02	pCi/g	83.30%	RICHRC5010
PU239/40	-1.05E-03 U	2.1E-03	2.1E-03	2.52E-02	pCi/g	83.30%	RICHRC5010
CE-144.	-3.09E-02 U	7.2E-02	7.3E-02	1.14E-01	pCi/g	N/A	RICHRC5017
CO-58.	-1.30E-02 U	2.6E-02	2.6E-02	4.27E-02	pCi/g	N/A	RICHRC5017
CO-60.	-8.18E-03 U	2.3E-02	2.3E-02	3.81E-02	pCi/g	N/A	RICHRC5017
CS-134.	-1.13E-02 U	1.8E-02	1.8E-02	2.98E-02	pCi/g	N/A	RICHRC5017
CS-137DA.	-7.21E-03 U	2.1E-02	2.1E-02	3.28E-02	pCi/g	N/A	RICHRC5017
EU-152.	4.72E-02 U	4.5E-02	4.5E-02	7.85E-02	pCi/g	N/A	RICHRC5017
EU-154.	-4.81E-03 U	6.2E-02	6.2E-02	1.07E-01	pCi/g	N/A	RICHRC5017
EU-155.	-4.61E-03 U	3.3E-02	3.3E-02	5.18E-02	pCi/g	N/A	RICHRC5017
FE-59.	2.32E-02 U	6.2E-02	6.2E-02	1.09E-01	pCi/g	N/A	RICHRC5017
K-40.	4.19E+00 J	4.7E-01	6.3E-01	1.03E+00	pCi/g	N/A	RICHRC5017
MN-54.	2.05E-02 U	2.2E-02	2.2E-02	3.85E-02	pCi/g	N/A	RICHRC5017
RA-224DA.	1.25E-01	5.0E-02	5.2E-02	N/A	pCi/g	N/A	RICHRC5017
RA-226DA.	1.16E-01 J	4.3E-02	4.4E-02	7.97E-02	pCi/g	N/A	RICHRC5017
RU-106DA.	-9.63E-03 U	1.6E-01	1.6E-01	2.75E-01	pCi/g	N/A	RICHRC5017
TH-228DA.	3.04E-01	1.0E-01	1.0E-01	N/A	pCi/g	N/A	RICHRC5017
TH-232DA.	1.34E-01 U	1.2E-01	1.2E-01	2.00E-01	pCi/g	N/A	RICHRC5017
ALPHA	-9.06E-01 U	1.1E+00	1.2E+00	4.87E+00	pCi/g	100.00%	RD3222
BETA	1.53E+00 U	1.9E+00	1.9E+00	4.00E+00	pCi/g	100.00%	RD3222
STRONTIUM	-1.30E-02 U	3.6E-02	3.7E-02	1.24E-01	pCi/g	97.40%	RICHRC5006

HRG 3/21/96. ~~000017~~

9613477.2214

Quanterra
Environmental Services

SAMPLE RESULTS

LAB NAME:	ITAS-RICHLAND	SDG:	W0867
LAB SAMPLE ID:	60112907	MATRIX:	SOIL
CLIENT ID:	B0GLB8	DATE RECEIVED:	1/10/96 10:30:00 AM

ISOTOPE	RESULT	COUNTING ERROR (2 s)	TOTAL ERROR (2 s)	MDA	REPORT UNIT	YIELD	METHOD NUMBER

Number of Results: 24

HRG 3/21/96 ~~000018~~

9613477.2215

Quanterra Environmental Services

SAMPLE RESULTS

LAB NAME:	ITAS-RICHLAND	SDG:	W0867
LAB SAMPLE ID:	60112908	MATRIX:	SOIL
CLIENT ID:	B0GLC0	DATE RECEIVED:	1/10/96 10:30:00 AM

ISOTOPE	RESULT	COUNTING ERROR (2 s)	TOTAL ERROR (2 s)	MDA	REPORT UNIT	YIELD	METHOD NUMBER
U-234	4.54E-01	9.0E-02	1.1E-01	2.02E-02	pCi/g	93.70%	RICHRC5030
U-235	2.91E-02 J	2.3E-02	2.4E-02	2.49E-02	pCi/g	93.70%	RICHRC5030
U-238	4.18E-01	8.6E-02	1.1E-01	2.20E-02	pCi/g	93.70%	RICHRC5030
PU-238	5.89E-03 U	1.2E-02	1.2E-02	1.59E-02	pCi/g	70.70%	RICHRC5010
PU239/40	1.03E-02 U	1.7E-02	1.7E-02	2.93E-02	pCi/g	70.70%	RICHRC5010
CE-144.	-1.73E-01 U	1.3E-01	1.3E-01	1.98E-01	pCi/g	N/A	RICHRC5017
CO-58.	7.25E-03 U	4.1E-02	4.1E-02	7.00E-02	pCi/g	N/A	RICHRC5017
CO-60.	1.48E+00	1.1E-01	1.9E-01	N/A	pCi/g	N/A	RICHRC5017
CS-134.	-2.96E-02 U	2.9E-02	2.9E-02	4.70E-02	pCi/g	N/A	RICHRC5017
CS-137DA.	-1.48E-02 U	3.2E-02	3.2E-02	5.06E-02	pCi/g	N/A	RICHRC5017
EU-152.	1.86E-03 U	7.6E-02	7.6E-02	1.26E-01	pCi/g	N/A	RICHRC5017
EU-154.	6.76E-02 U	9.4E-02	9.4E-02	1.63E-01	pCi/g	N/A	RICHRC5017
EU-155.	-2.03E-02 U	6.5E-02	6.5E-02	9.99E-02	pCi/g	N/A	RICHRC5017
FE-59.	-4.88E-02 U	1.2E-01	1.2E-01	2.01E-01	pCi/g	N/A	RICHRC5017
K-40.	1.24E+01 J	1.1E+00	1.7E+00	N/A	pCi/g	N/A	RICHRC5017
MN-54.	1.52E-02 U	3.7E-02	3.7E-02	6.38E-02	pCi/g	N/A	RICHRC5017
RA-224DA.	6.27E-01	8.3E-02	1.0E-01	N/A	pCi/g	N/A	RICHRC5017
RA-226DA.	3.40E-01 J	1.3E-01	1.3E-01	N/A	pCi/g	N/A	RICHRC5017
RA-228DA.	4.34E-01	2.6E-01	2.7E-01	N/A	pCi/g	N/A	RICHRC5017
RU-106DA.	5.41E-02 U	2.7E-01	2.7E-01	4.69E-01	pCi/g	N/A	RICHRC5017
TH-228DA.	5.67E-01	1.6E-01	1.7E-01	N/A	pCi/g	N/A	RICHRC5017
TH-232DA.	6.16E-01	3.5E-01	3.5E-01	N/A	pCi/g	N/A	RICHRC5017
ALPHA	4.53E+00 U	3.5E+00	3.5E+00	5.44E+00	pCi/g	100.00%	RD3222
BETA	6.05E+01	5.3E+00	6.6E+00	3.68E+00	pCi/g	100.00%	RD3222
STRONTIUM	1.60E+01	4.5E-01	4.6E+00	1.44E-01	pCi/g	87.30%	RICHRC5006

HRG 3/21/96 ~~000019~~

9615477.2216

Quanterra Environmental Services

SAMPLE RESULTS

LAB NAME:	ITAS-RICHLAND	SDG:	W0867
LAB SAMPLE ID:	60112908	MATRIX:	SOIL
CLIENT ID:	B0GLC0	DATE RECEIVED:	1/10/96 10:30:00 AM

ISOTOPE	RESULT	COUNTING ERROR (2 s)	TOTAL ERROR (2 s)	MDA	REPORT UNIT	YIELD	METHOD NUMBER

Number of Results: 25

HRG 3/21/96

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9613477.2217

Quanterra Environmental Services

SAMPLE RESULTS

LAB NAME:	ITAS-RICHLAND	SDG:	W0867
LAB SAMPLE ID:	60112901	MATRIX:	SOIL
CLIENT ID:	B0GL97	DATE RECEIVED:	1/10/96 10:30:00 AM

ISOTOPE	RESULT	COUNTING ERROR (2 s)	TOTAL ERROR (2 s)	MDA	REPORT UNIT	YIELD	METHOD NUMBER
U-234	1.36E+00	8.3E-01	8.5E-01	9.74E-01	pCi/g	83.20%	RICHRC5030
U-235	-2.10E-01 UJ	1.9E-01	1.9E-01	9.74E-01	pCi/g	83.20%	RICHRC5030
U-238	7.76E-01 U	6.5E-01	6.6E-01	9.01E-01	pCi/g	83.20%	RICHRC5030
PU-238	3.81E+00	1.4E+00	1.4E+00	8.76E-01	pCi/g	68.00%	RICHRC5010
PU239/40	2.41E+01	3.4E+00	4.2E+00	3.22E-01	pCi/g	68.00%	RICHRC5010
AM-241.	1.42E+01	2.7E+00	3.1E+00	N/A	pCi/g	N/A	RICHRC5017
CE-144.	2.36E+00 U	1.7E+00	1.7E+00	2.82E+00	pCi/g	N/A	RICHRC5017
CO-58.	2.68E-01 U	7.7E-01	7.7E-01	1.25E+00	pCi/g	N/A	RICHRC5017
CO-60.	3.79E+02	2.8E+00	3.8E+01	N/A	pCi/g	N/A	RICHRC5017
CS-134.	6.33E-01 U	3.9E-01	4.0E-01	6.53E-01	pCi/g	N/A	RICHRC5017
CS-137DA.	5.73E+02	2.8E+00	5.7E+01	N/A	pCi/g	N/A	RICHRC5017
EU-152.	-3.15E-01 U	1.2E+00	1.2E+00	1.89E+00	pCi/g	N/A	RICHRC5017
EU-154.	2.86E+00	9.5E-01	9.9E-01	1.67E+00	pCi/g	N/A	RICHRC5017
EU-155.	2.02E+00	9.2E-01	9.5E-01	1.50E+00	pCi/g	N/A	RICHRC5017
FE-59.	2.36E-01 U	2.4E+00	2.4E+00	3.93E+00	pCi/g	N/A	RICHRC5017
K-40.	1.25E+01 J	3.5E+00	3.7E+00	N/A	pCi/g	N/A	RICHRC5017
MN-54.	2.74E+00	8.0E-01	8.5E-01	N/A	pCi/g	N/A	RICHRC5017
RA-226DA.	1.58E+00	8.0E-01	8.1E-01	1.33E+00	pCi/g	N/A	RICHRC5017
RU-106DA.	2.44E+00 U	4.1E+00	4.1E+00	6.74E+00	pCi/g	N/A	RICHRC5017
TH-228DA.	5.35E-01 U	1.2E+00	1.2E+00	2.03E+00	pCi/g	N/A	RICHRC5017
TH-232DA.	-1.67E-01 U	2.7E+00	2.7E+00	4.34E+00	pCi/g	N/A	RICHRC5017
ALPHA	3.98E+01	8.7E+00	9.7E+00	5.00E+00	pCi/g	100.00%	RD3222
BETA	3.17E+03	3.6E+01	2.1E+02	4.00E+00	pCi/g	100.00%	RD3222
STRONTIUM	1.34E+03	7.8E+01	4.1E+02	3.89E+01	pCi/g	100.00%	RICHRC5006

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HRG 3/21/96

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Quanterra
Environmental Services

SAMPLE RESULTS

LAB NAME:	ITAS-RICHLAND	SDG:	W0867
LAB SAMPLE ID:	60112901	MATRIX:	SOIL
CLIENT ID:	B0GL97	DATE RECEIVED:	1/10/96 10:30:00 AM

ISOTOPE	RESULT	COUNTING ERROR (2 s)	TOTAL ERROR (2 s)	MDA	REPORT UNIT	YIELD	METHOD NUMBER

Number of Results: 24

HRG 3/21/96
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9613477.2219

Quanterra Environmental Services

SAMPLE RESULTS

LAB NAME:	ITAS-RICHLAND	SDG:	W0867
LAB SAMPLE ID:	60112902	MATRIX:	SOIL
CLIENT ID:	B0GL99	DATE RECEIVED:	1/10/96 10:30:00 AM

ISOTOPE	RESULT	COUNTING ERROR (2 s)	TOTAL ERROR (2 s)	MDA	REPORT UNIT	YIELD	METHOD NUMBER
U-234	4.51E-01 U	4.1E-01	4.2E-01	6.06E-01	pCi/g	77.20%	RICHRC5030
U-235	8.46E-02 UJ	2.1E-01	2.2E-01	4.84E-01	pCi/g	77.20%	RICHRC5030
U-238	5.64E-01 U	4.6E-01	4.7E-01	6.55E-01	pCi/g	77.20%	RICHRC5030
PU-238	0.00E+00 U	2.2E-01	2.3E-01	5.68E-01	pCi/g	75.20%	RICHRC5010
PU239/40	3.85E-01 U	4.1E-01	4.1E-01	5.67E-01	pCi/g	75.20%	RICHRC5010
CE-144.	-7.90E-02 U	2.8E-01	2.8E-01	4.51E-01	pCi/g	N/A	RICHRC5017
CO-58.	-3.00E-02 U	5.1E-02	5.1E-02	8.29E-02	pCi/g	N/A	RICHRC5017
CO-60.	4.51E+00	1.2E-01	4.7E-01	N/A	pCi/g	N/A	RICHRC5017
CS-134.	-1.07E-02 U	3.1E-02	3.1E-02	5.05E-02	pCi/g	N/A	RICHRC5017
CS-137DA.	5.22E-01	5.9E-02	7.9E-02	N/A	pCi/g	N/A	RICHRC5017
EU-152.	-1.16E-01 U	9.6E-02	9.7E-02	1.51E-01	pCi/g	N/A	RICHRC5017
EU-154.	6.21E-03 U	7.8E-02	7.8E-02	1.31E-01	pCi/g	N/A	RICHRC5017
EU-155.	1.56E-02 U	1.6E-01	1.6E-01	2.54E-01	pCi/g	N/A	RICHRC5017
FE-59.	-1.35E-01 U	1.3E-01	1.3E-01	2.15E-01	pCi/g	N/A	RICHRC5017
K-40.	9.01E+00 J	8.0E-01	1.2E+00	N/A	pCi/g	N/A	RICHRC5017
MN-54.	-4.66E-04 U	3.6E-02	3.6E-02	6.06E-02	pCi/g	N/A	RICHRC5017
RA-224DA.	3.53E-01	9.0E-02	9.7E-02	N/A	pCi/g	N/A	RICHRC5017
RA-226DA.	3.22E-01 J	6.9E-02	7.6E-02	1.24E-01	pCi/g	N/A	RICHRC5017
RU-106DA.	1.78E-01 U	2.9E-01	3.0E-01	4.98E-01	pCi/g	N/A	RICHRC5017
TH-228DA.	4.09E-01	1.3E-01	1.4E-01	N/A	pCi/g	N/A	RICHRC5017
ALPHA	6.69E+00	3.9E+00	4.0E+00	4.99E+00	pCi/g	100.00%	RD3222
BETA	2.45E+03	3.2E+01	1.6E+02	3.72E+00	pCi/g	100.00%	RD3222
STRONTIUM	1.23E+03	5.9E+01	3.5E+02	3.24E+01	pCi/g	78.40%	RICHRC5006

Number of Results: 23

024 HRG 3/21/96

~~000008~~

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ATTACHMENT 4

LABORATORY NARRATIVE and CHAIN-OF-CUSTODY DOCUMENTATION

9613477.2221

Quanterra Environmental Services

Quanterra Incorporated
2800 George Washington Way
Richland, Washington 99352

509 375-3131 Telephone
509 375-5590 Fax

CERTIFICATE OF ANALYSIS

FEB 1996
RECEIVED
Data
Log In

Bechtel Hanford, Inc.
345 Hills
Richland, WA 99352

February 23, 1996

Attention: Joan Kessner

SAF Number	:	B95-089
Date SDG Closed	:	January 12, 1996
Number of Samples	:	Eight (8)
Sample Type	:	Soil
SDG Number	:	W0867
Data Deliverable	:	Summary

I. Introduction

On January 10, 1996, eight soil samples were received by the Quanterra Environmental Services Richland Laboratory (QTESRL) for radiochemical analysis. Upon receipt, the samples were assigned the following laboratory ID numbers to correspond with the Bechtel Hanford, Inc. (BHI) specific IDs:

QTESRL ID#	BHI ID#	MATRIX	DATE OF RECEIPT
60112901	B0GL97	SOIL	01/10/96
60112902	B0GL99	SOIL	01/10/96
60112903	B0GLB1	SOIL	01/10/96
60112904	B0GLB3	SOIL	01/10/96
60112905	B0GLB4	SOIL	01/10/96
60112906	B0GLB6	SOIL	01/10/96
60112907	B0GLB8	SOIL	01/10/96
60112908	B0GLC0	SOIL	01/10/96

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II. Analytical Results/Methodology

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

The requested analyses were:

Alpha Spectroscopy
Plutonium-238, -239/40 by method RICHRC-5010
Uranium-234, -235, -238 by method RICHRC-5030
Gamma Spectroscopy
Gamma Scan by method RICHRC-5017
Gas Proportional Counting
Gross Alpha by method ITAS-RD-3222
Gross Beta by method ITAS-RD-3222
Strontium-90 by method RICHRC-5006

III. Quality Control

The analytical results for each analysis performed under SDG W0867 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, except for alpha and beta analysis, where quality control sample results are reported as pCi/sample.

IV. Comments

Modified detection limits are required for this SAF.

Alpha Spectroscopy

Plutonium-238, -239/40 by method RICHRC-5010
Sample volumes were reduced for many of the samples in the batch due to high screening results. All samples meet the RDL or the activity exceeds the MDA using the reduced volumes. The LCS, batch blank, sample and sample duplicate (B0GLB8) results are within contractual requirements.

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Uranium-234, -235, -238 by method RICHRC-5030
Sample volumes were reduced for many of the samples in the batch due to high screening results. Samples B0GL97, B0GL99, B0GLB1, and B0GLB3 did not meet the RDL using the reduction in volume, counting for the standard 200 minutes. They were recounted for 1000 minutes to improve the MDA's. Samples B0GL97 and B0GL99 still do not meet the RDL. However, since the samples were counted for the maximum 1000 minute count time, the data are accepted with the achieved MDA's. Except as noted, the LCS, batch blank, sample and sample duplicate (B0GLB8) results are within contractual requirements.

Gamma Spectroscopy

Gamma Scan by method RICHRC-5017
Achieved detection limits exceed the RDL for Fe-59 and other isotopes in the samples and batch blank. The data are accepted, however, as the samples were counted for the maximum 1000 minute count time, except for sample B0GL97, which was counted for only 200 minutes due to high screening activity. Th-232 is not reported for sample B0GL99 since the Key Line was not identified by the ND software. Na-22 was detected in sample B0GLB3, but is not reported since it is caused by interference from Eu-154 at 1274 keV. Other isotopes are detected in the batch blank and samples, but are not reported either because the result is less than two times the associated error or, in the case of Cd-109, it is a known phantom, caused by x-ray interference from the cave liners of the detectors. All data are accepted with achieved MDA's. Except as noted, the LCS, batch blank, sample and sample duplicate (B0GLC0) results are within contractual requirements.

Gas Proportional Counting

Gross Alpha by method ITAS-RD-3222
The LCS, batch blank, sample and sample duplicate (B0GLB8) results are within contractual requirements.

Gross Beta by method ITAS-RD-3222
The LCS, batch blank, sample and sample duplicate (B0GLB8) results are within contractual requirements.

Strontium-90 by method RICHRC-5006
Sample B0GL97 was removed from the planchet and was run through the fuming nitric acid portion of the procedure again to reduce the planchet precipitate mass to 103.3%, after the initial count showed 107.1% yield, which was outside of acceptable limits. The recount data

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Quanterra
Environmental Services

meets acceptance criteria and is reported. Sample B0GLC0 was reanalyzed as the precipitate weight was too low on the initial count. The reanalysis data is accepted and reported. The LCS, batch blank, sample and sample duplicate (B0GLB8) 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:

Stephen J. Koenkemeyer

Suzanne Gaines
Project Manager

FOR S.G. 2-23-96

HRG 3/21/96

Bechtel Hanford, Inc.

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

Page 1 of 2

Data Turnaround: ☐ Priority ■ Normal

Collector: W. S. Thompson	Company Contact: K. L. Sykes / W. S. Thompson	Telephone: (509) 376-8031
Project Designation: 1301N/1325N SI (Limited Field Investigation)	Sampling Location: 1301-N/1325-N Cribs 100N	SAF No.: B95-089
Ice Chest No.: BI-001	Field Logbook No.: EL-1275	Method of Shipment: Hand Carry in DOE vehicle.
Shipped To: QUANTERRA	Offsite Property No.: N/A	Bill of Lading/Air Bill No.: N/A

Possible Sample Hazards/Remarks: Radioactive

Special Handling and/or Storage: Keep Secured

SAMPLE ANALYSIS: 601128 SDG W0867

Preservation	NONE	NONE	NONE									
Type of Container	Glass	Glass	Plastic									
No. of Container(s)	1	1	1									
Volume	60 ml. 40 ml. DWSK 12/19/95	60 ml.	20 ml.									
	ICP Metals Cadmium Chromium Lead Nickel	Radio-nuclides (see note #1) 601129	Activity Scan									
Sample No.	Matrix*	Date Sampled	Time Sampled									
01 BOGL97	Soil	12-19-95	1424	X	X	X						
02 BOGL99	soil	12-20-95	0827	X	X	X						
03 BOGLB1	soil	12-20-95	0940	X	X	X						
04 BOGLB3	soil	12-22-95	0930	X	X	X						
05 BOGLB4	soil	12-22-95	0930	X	X	X						
	WSK 1/10/96											

CHAIN OF POSSESSION	Sign/Print Names		
Relinquished By	Date/Time	Received By	Date/Time
W S Thompson 1/10/96	0935	Kim Willis 1-10-96	0935
Kim Willis 1-10-96	10:30	Darren Schlinger 1-10-96	10:30
Relinquished By	Date/Time	Received By	Date/Time
Relinquished By	Date/Time	Received By	Date/Time

SPECIAL INSTRUCTIONS

Note #1: Radionuclides - Gross alpha; gross beta; Sr-90; U-233,U-234; U-238; Pu-238; Pu-239/240; Gamma Spec (to include) - K-40, Mn-54, C0-60, Ru-106, Cs-134, Cs-137, Ce-144, Eu-154, Eu-155, Ra-226, Th-228, Th-232.

SUMMARY DATA DELIVERABLES

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

030 ~~00-042~~ HRD 3/29/96

Bechtel Hanford, Inc.

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

Data Turnaround: ☐ Priority ■ Normal

Collector: W. S. Thompson	Company Contact: K. L. Sykes / W. S. Thompson	Telephone: (509) 376-8031
Project Designation: 1301N/1325N SI (Limited Field Investigation)	Sampling Location: 1301-N/1325-N Cribs 100N	SAF No.: B95-089
Ice Chest No.: BE001	Field Logbook No.: EL-1275	Method of Shipment: Hand Carry in DOE vehicle.
Shipped To: QUANTERRA	Offsite Property No.: N/A	Bill of Lading/Air Bill No.: N/A

Possible Sample Hazards/Remarks: Radioactive

Special Handling and/or Storage: Keep Secured

SDG W08867

SAMPLE ANALYSIS 601128

			Preservation	NONE	NONE	NONE							
			Type of Container	Glass	Glass	Plastic							
			No. of Container(s)	1	1	1							
			Volume	60 ml.	60 ml.	20 ml.							
				ICP Metals Cadmium Chromium Lead Nickel	Radio-nuclides (see note #1) 601129	Activity Scan							
Sample No.	Matrix*	Date Sampled	Time Sampled										
6 BOGLB6	Soil	12/27/95	1013	X	X	X							
7 BOGLB8	Soil	12/27/95	1325	X	X	X							
8 BOGLC0	Soil	12/28/95	0920	X	X	X							

DAF 1/10/96

CHAIN OF POSSESSION	Sign/Print Names		
Relinquished By: WS Thompson / K L Thompson	Date/Time: 0955 1/10/96	Received By: EL / Bechtel	Date/Time: 0955 1-10-96
Relinquished By: EL / Bechtel	Date/Time: 10:30 1-10-96	Received By: Quanterra	Date/Time: 10:30 1-10-96
Relinquished By	Date/Time	Received By	Date/Time
Relinquished By	Date/Time	Received By	Date/Time

SPECIAL INSTRUCTIONS

Note #1: Radionuclides - Gross alpha; gross beta; Sr-90; U-233,U-234; U-238; Pu-238; Pu-239/240; Gamma Spec (to include) - K-40, Mn-54, C0-60, Ru-106, Cs-134, Cs-137, Ce-144, Eu-154, Eu-155, Ra-226, Th-228, Th-232.

SUMMARY DATA DELIVERABLES

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

HCG 3/21/96

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031

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ATTACHMENT 5

DATA VALIDATION SUPPORTING DOCUMENTATION

RADIOCHEMICAL DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: 1301N/1325N LWDF			DATA PACKAGE:		
VALIDATOR: H. GREGERSON		LAB: QUANTERRA		DATE: 3/21/71	
CASE:			SDG: W0862-QES		

ANALYSES PERFORMED

☒ Gross Alpha/Beta	☒ Strontium-90	☐ Technetium-99	☒ Alpha Spectroscopy	☒ Gamma Spectroscopy	
☐ Total Uranium	☐ Radium-22	☐ Tritium	☐		

SAMPLES/MATRIX B0GL97 B0GL99 B0GLB1 B0GLB3
B0GLB4 B0GLB6 B0GLB8 B0GLC0 / SOIL

1. Completeness . . . . . ☐ N/A

Technical verification forms present? . . . . . Yes No N/A

Comments:

2. Initial Calibration . . . . . ☒ N/A

Instruments/detectors calibrated within one year of sample analysis? . . . . . Yes No N/A

Initial calibration acceptable? . . . . . Yes No N/A

Standards NIST traceable? . . . . . Yes No N/A

Standards Expired? . . . . . Yes No N/A

Comments:

3. Continuing Calibration . . . . . ☒ N/A

Calibration checked within one week of sample analysis? . . . Yes No N/A
Calibration check acceptable? . . . . . Yes No N/A
Calibration check standards NIST traceable? . . . . . Yes No N/A
Calibration check standards expired? . . . . . Yes No N/A

Comments:

4. Blanks . . . . . ☐ N/A

Method blank analyzed? . . . . . Yes No N/A
Method blank results acceptable? . . . . . Yes No N/A
Analytes detected in method blank? . . . . . 1. Yes No N/A
Field blank(s) analyzed? . . . . . Yes No N/A
Field blank results acceptable? . . . . . Yes No N/A
Analytes detected in field blank(s)? . . . . . 2. Yes No N/A
Transcription/Calculation Errors? . . . . . Yes No N/A

Comments:
1. K-40, Ra-226DA, were detected in the MB and associated samples were qualified. See supporting document.
2. U-234, U-238, K-40, Ra-224DA, Ra-226DA, Th228DA were detected in the field blank BOGLB8. Qualification not required.

5. Matrix Spikes . . . . . ☐ N/A

Matrix spike analyzed? . . . . . HRG 3/24/98 ~~Yes~~ No N/A
Spike recoveries acceptable? . . . . . Yes No N/A
Spike source traceable? . . . . . Yes No N/A
Spike source expired? . . . . . Yes No N/A
Transcription/Calculation Errors? . . . . . Yes No N/A

Comments:

034

6. Laboratory Control Samples . . . . . ☐ N/A

LCS analyzed? . . . . . Yes No 1. N/A
LCS recoveries acceptable? . . . . . Yes No N/A
LCS traceable? . . . . . Yes No N/A
Transcription/Calculation Errors? . . . . . Yes No N/A

Comments: 1. The LCS %R for U-235 was outside the control limit and associated samples were qualified. See supporting document.

7. Chemical Recovery . . . . . ☐ N/A

Chemical carrier added? . . . . . Yes No N/A
Chemical recovery acceptable? . . . . . Yes No N/A
Chemical carrier traceable? . . . . . Yes No N/A
Chemical carrier expired? . . . . . Yes No N/A
Transcription/Calculation errors? . . . . . Yes No N/A

Comments:

8. Duplicates . . . . . ☐ N/A

Duplicates Analyzed? . . . . . Yes No N/A
RPD Values Acceptable? . . . . . Yes No N/A
Transcription/Calculation Errors? . . . . . Yes No N/A

Comments:

9. Field QC Samples . . . . . ☐ N/A

Field duplicate sample(s) analyzed? . . . . . Yes No 1. N/A
Field duplicate RPD values acceptable? . . . . . Yes No N/A
Field split sample(s) analyzed? . . . . . Yes No N/A
Field split RPD values acceptable? . . . . . Yes No N/A
Performance audit sample(s) analyzed? . . . . . Yes No N/A
Performance audit sample results acceptable? . . . . . Yes No N/A

Comments:
1. BOGLB4 is a field duplicate of BOGLB3. The RPD for Eu-152 was outside the control limit. Qualification of data not required for field QC.

10. Holding Times

Are sample holding times acceptable? . . . . . Yes No N/A

Comments:

11. Results and Detection Limits (Levels D & E) . . . . . ☐ N/A

Results reported for all required sample analyses? . . . . . Yes No N/A
Results supported in raw data? . . . . . Yes No N/A
Results Acceptable? . . . . . Yes No N/A
Transcription/Calculation errors? . . . . . Yes No N/A
MDA's meet required detection limits? . . . . . Yes 1. No N/A
Transcription/calculation errors? . . . . . Yes No N/A

Comments:
1. See p. A-5 for a list of samples and ~~some~~ isotopes that had MDAs which exceeded RDLs.

Comments:

11. The following MDAs exceed the RDL:

BOGL97: U-235, U-238, Ru-106DA, Cs-134, Eu-152, Th-228DA, Th-232DA

~~BOGL00~~: alpha

BOGL10 HRG 3/21/90

HOLDING TIME SUMMARY

SDG: W0867-QES | VALIDATOR: HEIDI GREGERSON | DATE: 3/21/96 | PAGE 1 OF 3

COMMENTS:

FIELD SAMPLE ID	ANALYSIS TYPE	DATE SAMPLED	DATE PREPARED	DATE ANALYZED	PREP. HOLDING TIME, DAYS	ANALYSIS HOLDING TIME, DAYS	QUALIFIER
BOGL97	Pu	12/9/95	1/11/96	2/13/96	23	33	none
	U		1/11/96	2/14/96	23	34	none
	Gamma		1/11/96	1/23/96	23	12	none
	Gross α β		1/11/96	1/23/96	23	12	none
	Sr		1/11/96	2/9/96	23	29	none
BOGL99	Pu	12/20/95		2/13/96	22	33	none
	U			2/14/96	22	34	none
	Gamma			1/23/96	22	12	none
	Gross α β			1/23/96	22	12	none
	Sr			2/9/96	22	29	none
BOGLB1	Pu	12/20/95		2/13/96	22	33	none
	U			2/14/96	22	34	none
	Gamma			1/23/96	22	12	none
	Gross α β			1/23/96	22	12	none
	Sr			2/9/96	22	29	none
BOGLB3	Pu	12/22/95		2/13/96	20	33	none
	U			2/14/96	20	34	none

HOLDING TIME SUMMARY

SDG: W0867-QES | VALIDATOR: HEIDI GREGERSON | DATE: 3/21/96 | PAGE 2 OF 3

COMMENTS:

FIELD SAMPLE ID	ANALYSIS TYPE	DATE SAMPLED	DATE PREPARED	DATE ANALYZED	PREP. HOLDING TIME, DAYS	ANALYSIS HOLDING TIME, DAYS	QUALIFIER
BOGLB3	Gamma	12/22/95	1/11/96	1/23/96	20	12	none
	Gross α β			1/23/96	20	12	none
	Sr			2/9/96	20	29	none
BOGLB4	Pu	12/22/95		2/13/96	20	33	none
	U			2/14/96	20	34	none
	Gamma			1/23/96	20	12	none
	Gross α β			1/23/96	20	12	none
	Sr			2/9/96	20	29	none
BOGLB6	Pu	12/27/95		2/13/96	15	33	none
	U			2/14/96	15	34	none
	Gamma			1/23/96	15	12	none
	Gross α β			1/23/96	15	12	none
	Sr			2/9/96	15	29	none
BOGLB8	Pu	12/27/95		2/13/96	15	33	none
	U			2/14/96	15	34	none
	Gamma			1/23/96	15	12	none
	Gross α β			1/23/96	15	12	none

HOLDING TIME SUMMARY

SDG: U0867-QES	VALIDATOR: HEIDI GREGERSON	DATE: 3/21/96	PAGE 3 OF 3

COMMENTS:

FIELD SAMPLE ID	ANALYSIS TYPE	DATE SAMPLED	DATE PREPARED	DATE ANALYZED	PREP. HOLDING TIME, DAYS	ANALYSIS HOLDING TIME, DAYS	QUALIFIER
BOGLB8	Sr	12/27/95	1/11/96	2/9/96	15	29	none
BOGLC0	Pu	12/28/95		2/13/96	14	33	none
	U			2/14/96	14	34	none
	Gamma			1/23/96	14	~~43~~ 12	none
	Gross α β			1/23/96	14	~~43~~ 12	none
	Sr			2/9/96	14	29	none

Quanterra Environmental Services

BLANK RESULTS

LAB NAME:	ITAS-RICHLAND	SDG:	W0867
LAB SAMPLE ID:	P011291B	MATRIX:	SOIL

ISOTOPE	RESULT	COUNTING ERROR (2 s)	TOTAL ERROR (2 s)	MDA	REPORT UNIT	YIELD	METHOD NUMBER
U-234	3.51E-03	1.0E-02	1.0E-02	2.75E-02	pCi/g	81.90%	RICHRC5030
U-235	-2.06E-03	1.8E-03	1.9E-03	2.91E-02	pCi/g	81.90%	RICHRC5030
U-238	4.33E-03	1.0E-02	1.0E-02	2.36E-02	pCi/g	81.90%	RICHRC5030
PU-238	-1.01E-03	2.0E-03	2.0E-03	2.41E-02	pCi/g	80.40%	RICHRC5010
PU239/40	5.03E-03	1.0E-02	1.0E-02	1.36E-02	pCi/g	80.40%	RICHRC5010
CE-144.	5.56E-02	6.4E-02	6.4E-02	1.09E-01	pCi/g	N/A	RICHRC5017
CO-58.	-3.28E-02	2.4E-02	2.4E-02	3.77E-02	pCi/g	N/A	RICHRC5017
CO-60.	6.57E-03	1.8E-02	1.8E-02	3.15E-02	pCi/g	N/A	RICHRC5017
CS-134.	6.32E-03	1.5E-02	1.5E-02	2.66E-02	pCi/g	N/A	RICHRC5017
CS-137DA.	1.04E-02	1.6E-02	1.6E-02	2.79E-02	pCi/g	N/A	RICHRC5017
EU-152.	-1.94E-02	4.0E-02	4.0E-02	6.48E-02	pCi/g	N/A	RICHRC5017
EU-154.	-2.74E-02	5.2E-02	5.3E-02	8.68E-02	pCi/g	N/A	RICHRC5017
EU-155.	-1.35E-02	3.2E-02	3.2E-02	5.20E-02	pCi/g	N/A	RICHRC5017
FE-59.	-8.21E-02	6.7E-02	6.8E-02	1.02E-01	pCi/g	N/A	RICHRC5017
K-40.	3.13E+00	3.4E-01	4.6E-01	7.38E-01	pCi/g	N/A	RICHRC5017
MN-54.	1.77E-02	1.8E-02	1.9E-02	3.17E-02	pCi/g	N/A	RICHRC5017
RA-226DA.	1.54E-01	3.7E-02	4.0E-02	7.00E-02	pCi/g	N/A	RICHRC5017
RU-106DA.	-2.30E-02	1.5E-01	1.5E-01	2.40E-01	pCi/g	N/A	RICHRC5017
TH-228DA.	7.66E-02	5.9E-02	5.9E-02	N/A	pCi/g	N/A	RICHRC5017
TH-232DA.	7.50E-02	9.4E-02	9.4E-02	1.57E-01	pCi/g	N/A	RICHRC5017
ALPHA	5.96E-03	3.0E-02	3.0E-02	8.16E-02	pCi/sa	100.00%	RD3222
BETA	1.16E+00	4.8E-01	4.9E-01	8.51E-01	pCi/sa	100.00%	RD3222
STRONTIUM	7.34E-02	5.4E-02	5.8E-02	1.41E-01	pCi/g	85.30%	RICHRC5006

Number of Results: 23

041 HRG 3/21/96

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Quanterra
Environmental Services

LABORATORY CONTROL SAMPLE

LAB NAME:	ITAS-RICHLAND	SDG:	W0867
LAB SAMPLE ID:	P011291S	MATRIX:	SOIL

ISOTOPE	RESULT	COUNTING ERROR (2 s)	TOTAL ERROR (2 s)	MDA	REPORT UNIT	YIELD	EXPECTED	RECOVE
U-234	1.46E+00	1.7E-01	2.9E-01	3.46E-02	pCi/g	87.40%	1.62E+00	89.94%
U-235	3.51E-02	2.8E-02	2.8E-02	2.59E-02	pCi/g	87.40%	7.41E-02	47.37%
U-238	1.68E+00	1.9E-01	3.3E-01	3.21E-02	pCi/g	87.40%	1.70E+00	98.75%
PU239/40	3.11E+00	2.5E-01	4.7E-01	2.49E-02	pCi/g	84.30%	3.39E+00	91.83%
CS-137DA.	1.26E+00	1.2E-01	1.7E-01	N/A	pCi/g	N/A	1.45E+00	86.69%
RA-226DA.	1.60E+00	1.8E-01	2.4E-01	N/A	pCi/g	N/A	2.16E+00	74.07%
ALPHA	4.05E+00	4.0E-01	7.9E-01	8.57E-02	pCi/sa	100.00%	4.53E+00	89.47%
BETA	1.42E+01	1.2E+00	1.5E+00	7.93E-01	pCi/sa	100.00%	1.36E+01	104.40%
STRONTIUM	5.35E+00	2.5E-01	1.6E+00	1.35E-01	pCi/g	96.70%	6.06E+00	88.34%

Number of Results: 9

042 HLG 3/21/96

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MEMORANDUM

TO: 1301N/1325N LWDF Vadose Zone Characterization Project QA Record — March 21, 1996

FR: Heidi Gregerson, Golder Associates Inc. HG

RE: INORGANIC DATA VALIDATION SUMMARY FOR DATA PACKAGE W0867-QES (943-1610.124 867INO.NR1)

INTRODUCTION

This memo presents the results of data validation for the analysis indicated below on data package W0867-QES prepared by Quanterra Environmental Services. Sample information is provided in the following table.

SAMPLE ID	COMMENTS	ANALYSIS	MEDIA
B0GLB1		INORGANICS	SOIL
B0GLB3			SOIL
B0GLB4	FIELD DUPLICATE	SEE ATTACHMENT 4	SOIL
B0GLB6			SOIL
B0GLB8	EQUIPMENT BLANK		SOIL
B0GLC0			SOIL
B0GL97			SOIL
B0GL99			SOIL

Data validation was conducted to level C in accordance with the WHC statement of work (WHC 1994) and validation procedures (WHC 1993). Attachments 1 through 5 provide the following information as indicated below:

Attachment 1. Glossary of Data Reporting Qualifiers
Attachment 2. Summary of Data Qualifications
Attachment 3. Qualified Data Summary and Annotated Laboratory Reports
Attachment 4. Laboratory Narrative and Chain-of-Custody Documentation
Attachment 5. Data Validation Supporting Documentation

DATA QUALITY OBJECTIVES

This section presents a summary of the data quality in terms of the referenced validation criteria.

Precision. Goals for precision were met, with the exception of those deficiencies listed below.

Accuracy. Goals for accuracy were met, with the exception of those deficiencies listed below.

Detection Limits. Detection limit goals were met for all sample results.

Completeness. The data package was complete for all requested analyses. A total of eight samples were validated in this data package with a total of 32 determinations reported, all of which were deemed valid. This results in a completeness of 100%, which meets the 90% objective of the work plan.

MAJOR DEFICIENCIES

No major deficiencies were identified during data validation which required qualification of data as unusable.

MINOR DEFICIENCIES

The following minor deficiencies were identified during data validation which required qualification of data:

Spike Sample

- The percent recovery for chromium and nickel was outside the control limit and associated samples were qualified. Attachments 2 and 5 provide a summary of samples affected, data qualifications applied and supporting documentation.

Duplicate

- The RPDs for chromium and nickel were outside the control and associated samples were qualified. Attachments 2 and 5 provide a summary of samples affected, data qualifications applied and supporting documentation.

FIELD QC

- Sample B0GLB8 was identified as an equipment blank with chromium detected. Qualification of data is not required based on field QC.

- Sample B0GLB4 was identified as a field duplicate of sample B0GLB3. The RPDs were evaluated and determined to be within control limits.

REFERENCES

WHC 1993, Data Validation Procedures for Chemical Analyses, WHC-SD-EN-SPP-002, Rev. 2, 1993. Westinghouse Hanford Company, Richland, Washington.

WHC 1994, Environmental and Waste Characterization Analytical Data Validation, Purchase Order MSH-SWV-315905; Validation Statement of Work, Revision 1.0, September 7, 1994; Westinghouse Hanford Company, Richland, Washington.

ATTACHMENT 1

GLOSSARY OF DATA REPORTING QUALIFIERS

Glossary of Inorganic Data Reporting Qualifiers.

B - Indicates the constituent was analyzed for and detected. The concentration reported is less than the contract required detection limit (CRDL) but greater than the instrument detection limit (IDL). The associated data should be considered usable for decision making purposes.

U - Indicates the constituent was analyzed for and not detected. The concentration reported is the sample detection limit corrected for aliquot size, dilution and percent solids (in the case of solid matrices) by the laboratory. The associated data should be considered usable for decision making purposes.

UJ - Indicates the constituent was analyzed for and not detected. Due to a minor quality control deficiency identified during data validation the concentration may not accurately reflect the sample detection limit. The associated data have been qualified as estimated but should be considered usable for decision making purposes.

BJ - Indicates the constituent was analyzed for and detected at a concentration less than the contract required detection limit (CRDL) but greater than the instrument detection limit (IDL). Due to a minor quality control deficiency identified during data validation the associated data have been qualified as estimated, but should be considered usable for decision making purposes.

J - Indicates the constituent was analyzed for and detected. Due to a minor quality control deficiency identified during data validation the associated data have been qualified as estimated, but should be considered usable for decision making purposes.

UR - Indicates the constituent was analyzed for and not detected. Due to a major quality control deficiency identified during data validation, the associated data have been qualified as unusable for decision making purposes.

R - Indicates the constituent was analyzed for and detected. Due to a major quality control deficiency identified during data validation, the associated data have been qualified as unusable for decision making purposes.

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ATTACHMENT 2

SUMMARY OF DATA QUALIFICATIONS

WHC-SD-EN-SPP-002, REV.2

DATA QUALIFICATION SUMMARY - FORM B-7

SDG:W0867-QES	REVIEWER: H. Gregerson	DATE: 3-21-96	PAGE 1 OF 1
COMMENTS: INORGANICS			
COMPOUND/ANALYTE	QUALIFIER	SAMPLES AFFECTED	REASON
CHROMIUM	J/BJ	ALL	MS RECOVERY AND DUPLICATE RPD WAS ABOVE THE CONTROL LIMIT
NICKEL	J	B0GLB1 B0GLB3 B0GLB4 B0GLB6 B0GLC0 B0GL97 B0GL99	MS RECOVERY AND DUPLICATE RPD WAS ABOVE THE CONTROL LIMIT

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ATTACHMENT 3

QUALIFIED DATA SUMMARY and ANNOTATED LABORATORY REPORTS

Validated Data Summary, Data Package: W0867-QES

	Sample #	B0GLB1		B0GLB3		B0GLB4		B0GLB6		B0GLB8		B0GLC0		B0GL97		B0GL99	
	Date	12/20/95		12/22/95		12/22/95		12/27/95		12/27/95		12/28/95		12/19/95		12/20/95	
	Location																
	Depth	17.0-19.0 ft		24.0-26.0 ft		24.0-26.0 ft		39.0-41.0 ft				59.5-61.5 ft		8.0-10.0 ft		10.0-12.0 ft	
	Type	SOIL		SOIL		SOIL		SOIL		SOIL		SOIL		SOIL		SOIL	
	Comments					Field Duplicate				Equipment Blank							
Parameter	Units	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
CADMIUM	MG/KG	0.350	U	0.350	U	0.350	U	0.090	U	0.080	U	0.360	U	0.360	U	0.360	U
CHROMIUM	MG/KG	3.200	J	5.000	J	3.600	J	1.700	J	0.240	BJ	12.200	J	8.900	J	6.200	J
LEAD	MG/KG	1.700		1.600		1.700		1.200		0.100	U	3.200		2.700		1.900	
NICKEL	MG/KG	4.600	J	5.500	J	4.500	J	3.400	J	0.400	U	11.900	J	8.500	J	7.400	J

The decimal places shown do not reflect the precision reported by the laboratory.

Verified HRG
3/21/96

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

B0GLB1

Lab Name: QUANTERRA_MO Contract: 550.111

Lab Code: ITMO Case No.: SAS No.: SDG No.: W0867

Matrix (soil/water): SOIL Lab Sample ID: 10120-003

Level (low/med): LOW Date Received: 01/10/96

% Solids: 97.0

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

CAS No.	Analyte	Concentration	C	Q	M	
7440-43-9	Cadmium	0.35	U		P	
7440-47-3	Chromium	3.2	/	N	P	4
7439-92-1	Lead	1.7			F	
7440-02-0	Nickel	4.6	/	N	P	4

Color Before: Clarity Before: Texture:

Color After: Clarity After: Artifacts:

Comments:

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

B0GLB3

Lab Name: QUANTERRA_MO Contract: 550.111
Lab Code: ITMO Case No.: SAS No.: SDG No.: W0867
Matrix (soil/water): SOIL Lab Sample ID: 10120-004
Level (low/med): LOW Date Received: 01/10/96
% Solids: 96.7

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

CAS No.	Analyte	Concentration	C	Q	M	
7440-43-9	Cadmium	0.35	U		P	
7440-47-3	Chromium	5.0		N	P	J
7439-92-1	Lead	1.6			F	
7440-02-0	Nickel	5.5		N	P	J

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

Comments:

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

B0GLB4

Lab Name: QUANTERRA_MO Contract: 550.111

Lab Code: ITMO Case No.: SAS No.: SDG No.: W0867

Matrix (soil/water): SOIL Lab Sample ID: 10120-005

Level (low/med): LOW Date Received: 01/10/96

% Solids: 96.9

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

CAS No.	Analyte	Concentration	C	Q	M	
7440-43-9	Cadmium	0.35	U		P	
7440-47-3	Chromium	3.6	/	N	P	J
7439-92-1	Lead	1.7			F	
7440-02-0	Nickel	4.5	/	N	P	J

Color Before: Clarity Before: Texture:

Color After: Clarity After: Artifacts:

Comments:

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

B0GLB6

Lab Name: QUANTERRA_MO Contract: 550.111
Lab Code: ITMO Case No.: SAS No.: SDG No.: W0867
Matrix (soil/water): SOIL Lab Sample ID: 10120-006
Level (low/med): LOW Date Received: 01/10/96
% Solids: 96.9

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

CAS No.	Analyte	Concentration	C	Q	M	
7440-43-9	Cadmium	0.09	U		P	
7440-47-3	Chromium	1.7	/	N	P	J
7439-92-1	Lead	1.2			F	
7440-02-0	Nickel	3.4	/	N	P	J

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

Comments:

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

B0GLB8

Lab Name: QUANTERRA_MO Contract: 550.111

Lab Code: ITMO Case No.: SAS No.: SDG No.: W0867

Matrix (soil/water): SOIL Lab Sample ID: 10120-007

Level (low/med): LOW Date Received: 01/10/96

% Solids: 100.0

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

CAS No.	Analyte	Concentration	C	Q	M	
7440-43-9	Cadmium	0.08	U		P	
7440-47-3	Chromium	0.24	~~B~~	N	P	BJ
7439-92-1	Lead	0.10	U		F	
7440-02-0	Nickel	0.40	U	N	P	

Color Before: Clarity Before: Texture:

Color After: Clarity After: Artifacts:

Comments:

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

B0GLC0

Lab Name: QUANTERRA_MO Contract: 550.111
Lab Code: ITMO Case No.: SAS No.: SDG No.: W0867
Matrix (soil/water): SOIL Lab Sample ID: 10120-008
Level (low/med): LOW Date Received: 01/10/96
% Solids: 94.9

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

CAS No.	Analyte	Concentration	C	Q	M	
7440-43-9	Cadmium	0.36	U		P	
7440-47-3	Chromium	12.2	/	N	P	J
7439-92-1	Lead	3.2			F	
7440-02-0	Nickel	11.9	/	N	P	J

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

Comments:

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

B0GL97

Lab Name: QUANTERRA_MO Contract: 550.111

Lab Code: ITMO Case No.: SAS No.: SDG No.: W0867

Matrix (soil/water): SOIL Lab Sample ID: 10120-001

Level (low/med): LOW Date Received: 01/10/96

% Solids: 93.4

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

CAS No.	Analyte	Concentration	C	Q	M	
7440-43-9	Cadmium	0.36	U		P	
7440-47-3	Chromium	8.9		N	P	J
7439-92-1	Lead	2.7			F	
7440-02-0	Nickel	8.5		N	P	J

Color Before: Clarity Before: Texture:

Color After: Clarity After: Artifacts:

Comments:

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

B0GL99

Lab Name: QUANTERRA MO Contract: 550.111

Lab Code: ITMO Case No.: SAS No.: SDG No.: W0867

Matrix (soil/water): SOIL Lab Sample ID: 10120-002

Level (low/med): LOW Date Received: 01/10/96

% Solids: 94.4

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

CAS No.	Analyte	Concentration	C	Q	M	
7440-43-9	Cadmium	0.36	U		P	
7440-47-3	Chromium	6.2		N	P	J
7439-92-1	Lead	1.9			F	
7440-02-0	Nickel	7.4		N	P	J

Color Before: Clarity Before: Texture:

Color After: Clarity After: Artifacts:

Comments:

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HRG 3/21/96

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ATTACHMENT 4

LABORATORY NARRATIVE and CHAIN-OF-CUSTODY DOCUMENTATION

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Quanterra
Environmental Services

Quanterra Incorporated
13715 Rider Trail North
Earth City, Missouri 63045

314 298-8566 Telephone
314 298-8757 Fax

CERTIFICATE OF ANALYSIS

Bechtel Hanford Incorporated
P.O. Box 1970
Richland, Washington 99352

January 26, 1996

Attention: Joan Kessner

Project number	:	550.111
Date Received by Lab	:	January 10, 1996
Number of Samples	:	Eight (8)
Sample Type	:	Soil
SDG Number	:	W0867
Data Deliverable	:	Summary

I. Introduction

On January 10, 1996, eight (8) soil samples were received by Quanterra, Richland and transferred to Quanterra, St. Louis for chemical analysis. Upon receipt, the samples were given the following laboratory ID numbers to correspond with the specific client IDs:

St Louis ID	WHC ID	Richland ID	Matrix	Date of Receipt
10120-001	B0GL97	60112801	Soil	01/10/96
10120-002	B0GL99	60112802	Soil	01/10/96
10120-003	B0GLB1	60112803	Soil	01/10/96
10120-004	B0GLB3	60112804	Soil	01/10/96
10120-005	B0GLB4	60112805	Soil	01/10/96
10120-006	B0GLB6	60112806	Soil	01/10/96
10120-007	B0GLB8	60112807	Soil	01/10/96
10120-008	B0GLC0	60112808	Soil	01/10/96

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.

HRG 3/21/96
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Quanterra
Environmental Services

Analyses requested: Chromium, Cadmium, and Nickel by EPA method 6010. Lead by EPA Method 7421.

III. Quality Control

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

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

Metals
All samples were digested for ICP 4.0g to 100 mls to meet client detection limits.

Samples 10120-001, 10120-001MS, 10120-001MSD, 10120-002, 10120-003, 10120-004, 10120-005 and 10120-008 required dilution due to interelement interferences. The instrument software flagged the undiluted run with an error code indicating that an interferant, in this case Iron, was interfering with the analysis of Cadmium and Chromium. The samples were diluted by a factor of 4 and reanalyzed without interference errors.

The recoveries of the Matrix Spike for Chromium (7724%) and Nickel (1620%) and the Matrix Spike Duplicate for Chromium (447%) and Nickel (156%) were greater than 120%, therefore all associated data was flagged with an " N ". See NCM # SL-2407.

HRG 3/21/96
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Quanterra
Environmental Services

Bechtel Hanford Incorporated
January 26, 1996
Project Number: 550.111
SDG: W0867
Page 3

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$\abbydave\hanw0867.nar

HRG 3/21/96
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Bechtel Hanford, Inc.

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

Page 1 of 2

Data Turnaround
☐ Priority
■ Normal

Collector: W. S. Thompson	Company Contact: K. L. Sykes / W. S. Thompson	Telephone: (509) 376-8031
Project Designation: 1301N/1325N SI (Limited Field Investigation)	Sampling Location: 1301-N/1325-N Cribs 100N	SAF No.: B95-089
Ice Chest No.: BI-001	Field Logbook No.: EL-1275	Method of Shipment: Hand Carry in DOE vehicle.
Shipped To: QUANTERRA	Offsite Property No.: N/A	Bill of Lading/Air Bill No.: N/A

Possible Sample Hazards/Remarks: Radioactive

Special Handling and/or Storage: Keep Secured

SAMPLE ANALYSIS: 601128 SDG W0867

Sample No.	Matrix*	Date Sampled	Time Sampled	ICP Metals Cadmium Chromium Lead Nickel	Radionuclides (see note #1) 601129	Activity Scan
Preservation				NONE	NONE	NONE
Type of Container				Glass	Glass	Plastic
No. of Container(s)				1	1	1
Volume				60 ml.	60 ml.	20 ml.
01 BOGL97	Soil	12-19-95	1424	X	X	X
02 BOGL99	soil	12-20-95	0827	X	X	X
03 BOGLB1	soil	12-20-95	0940	X	X	X
04 BOGLB3	soil	12-22-95	0930	X	X	X
05 BOGLB4	soil	12-22-95	0930	X	X	X
	NSK 1/10/96					

CHAIN OF POSSESSION	Sign/Print Names		
Relinquished By: WS Thompson / W S Thompson	Date/Time: 0935 1/10/96	Received By: GR / Date/Time: 0855 1-10-96	
Relinquished By: GR / Date/Time: 10:30 1-10-96		Received By: Aaron Schlenker / Date/Time: 10:30 1-10-96	
Relinquished By	Date/Time	Received By	Date/Time
Relinquished By	Date/Time	Received By	Date/Time

SPECIAL INSTRUCTIONS

Note #1: Radionuclides - Gross alpha; gross beta; Sr-90; U-233,U-234; U-238; Pu-238; Pu-239/240; Gamma Spec (to include) - K-40, Mn-54, C0-60, Ru-106, Cs-134, Cs-137, Ce-144, Eu-154, Eu-155, Ra-226, Th-228, Th-232.

SUMMARY DATA DELIVERABLES

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

021

00007 3/21/96

Bechtel Hanford, Inc.

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

Page 2 of 2

Data Turnaround: ☐ Priority ■ Normal

Collector: W. S. Thompson	Company Contact: K. L. Sykes / W. S. Thompson	Telephone: (509) 376-8031
Project Designation: 1301N/1325N SI (Limited Field Investigation)	Sampling Location: 1301-N/1325-N Cribs 100N	SAF No.: B95-089
Ice Chest No.: BE001	Field Logbook No.: EL-1275	Method of Shipment: Hand Carry in DOE vehicle.
Shipped To: QUANTERRA	Offsite Property No.: N/A	Bill of Lading/Air Bill No.: N/A

Possible Sample Hazards/Remarks: Radioactive

Special Handling and/or Storage: Keep Secured

SDG W0867

SAMPLE ANALYSIS: 601128

	Sample No.	Matrix*	Date Sampled	Time Sampled	ICP Metals Cadmium Chromium Lead Nickel	Radio-nuclides (see note #1) 601129	Activity Scan
	Preservation				NONE	NONE	NONE
	Type of Container				Glass	Glass	Plastic
	No. of Container(s)				1	1	1
	Volume				60 ml.	60 ml.	20 ml.
06	BOGLB6	Soil	12/27/95	1013	X	X	X
07	BOGLB8	Soil	12/27/95	1325	X	X	X
08	BOGLC0	Soil	12/28/95	0920	X	X	X
				TOTAL	100		

JSR 1/10/96

CHAIN OF POSSESSION	Sign/Print Names	Date/Time	Sign/Print Names	Date/Time
Relinquished By	WS Thompson	0955	Received By	0955
Relinquished By	K L Sykes	1-10-96	Received By	1-10-96
Relinquished By		10:30	Received By	10:30
Relinquished By		1-10-96	Received By	1-10-96
Relinquished By		Date/Time	Received By	Date/Time
Relinquished By		Date/Time	Received By	Date/Time

SPECIAL INSTRUCTIONS

Note #1: Radionuclides - Gross alpha; gross beta; Sr-90; U-233,U-234; U-238; Pu-238; Pu-239/240; Gamma Spec (to include) - K-40, Mn-54, C0-60, Ru-106, Cs-134, Cs-137, Ce-144, Eu-154, Eu-155, Ra-226, Th-228, Th-232.

SUMMARY DATA DELIVERABLES

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

022

00008

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ATTACHMENT 5

DATA VALIDATION SUPPORTING DOCUMENTATION

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: 130N/1325N LWDF			DATA PACKAGE:		
VALIDATOR: H. GREGERSON		LAB: QUANTERRA		DATE: 3/21/71	
CASE:			SDG: WD867-QES		
ANALYSES PERFORMED					
☐ CLP/ICP	☐ CLP/GFAA	☐ CLP/Hg	☐ CLP/Cyanide	☐	☐
☒ SW-846/ICP	☒ SW-846/GFAA	☐ SW-846/Hg	☐ SW-846 Cyanide	☐	☐
SAMPLES/MATRIX BOGLB1	BOGLB3	BOGLB4	BOGLB6	BOGLB8	
BOGLC0	BOGL97	BOGL99	/SOIL		

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

Is technical verification documentation present? . . . . . (Yes) No N/A

Is a case narrative present? . . . . . (Yes) No N/A

Comments:

2. HOLDING TIMES

Are sample holding times acceptable? . . . . . (Yes) No N/A

Comments:

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

3. INSTRUMENT PERFORMANCE AND CALIBRATIONS

Were initial calibrations performed on all instruments? . . . . Yes No N/A
Are initial calibrations acceptable? . . . . . Yes No N/A
Are ICP interference checks acceptable? . . . . . Yes No N/A
Were ICV and CCV checks performed on all instruments? . . . . . Yes No N/A
Are ICV and CCV checks acceptable? . . . . . Yes No N/A

Comments:

4. BLANKS

Were ICB and CCB checks performed for all applicable analyses? Yes No N/A
Are ICB and CCB results acceptable? . . . . . Yes No N/A
Were preparation blanks analyzed? . . . . . Yes No N/A
Are preparation blank results acceptable? . . . . . Yes No N/A
Were field/trip blanks analyzed? . . . . . Yes No 1. N/A
Are field/trip blank results acceptable? . . . . . Yes No N/A

Comments:
1. EQGLB8 is an equipment blank with Cr detected. Qualification of data is not required based on field QC.

5. ACCURACY

Were spike samples analyzed? . . . . . Yes No 1. N/A
Are spike sample recoveries acceptable? . . . . . Yes No N/A
Were laboratory control samples (LCS) analyzed? . . . . . Yes No N/A
Are LCS recoveries acceptable? . . . . . Yes No N/A

Comments:
1. The MS and MSD %R for Cr and Ni were above the control limit and associated samples were qualified. See supporting documents.

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

6. PRECISION

Were laboratory duplicates analyzed? . . . . . Yes No 1. N/A

Are laboratory duplicate samples RPD values acceptable? . . . . Yes No N/A

Were ICP serial dilution samples analyzed? . . . . . Yes No N/A

Are ICP serial dilution %D values acceptable? . . . . . Yes No N/A

Are field duplicate RPD values acceptable? . . . . . 2. Yes No N/A

Are field split RPD values acceptable? . . . . . Yes No N/A

Comments:

1. The RPD for Cr and Ni were outside the control limit. Associated samples have already been qualified due to MS %R.

2. B0GLB4 is a field duplicate of B0GLB3, RPDs are acceptable.

7. FURNACE AA QUALITY CONTROL

Were duplicate injections performed as required? . . . . . Yes No N/A

Are duplicate injection %RSD values acceptable? . . . . . Yes No N/A

Were analytical spikes performed as required? . . . . . Yes No N/A

Are analytical spike recoveries acceptable? . . . . . Yes No N/A

Was MSA performed as required? . . . . . Yes No N/A

Are MSA results acceptable? . . . . . Yes No N/A

Comments: GFAA raw data not supplied.

8. REPORTED RESULTS AND DETECTION LIMITS

Are results reported for all requested analyses? . . . . . Yes No N/A

Are all results supported in the raw data? . . . . . Yes No N/A

Are results calculated properly? . . . . . Yes No N/A

Do results meet the CRDLs? . . . . . Yes ~~No~~ N/A

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Comments:

HOLDING TIME SUMMARY

SDG: W0867-QES	VALIDATOR: HEIDI GREGERSON	DATE: 3/21/71	PAGE 1 OF 1
COMMENTS:			

FIELD SAMPLE ID	ANALYSIS TYPE	DATE SAMPLED	DATE PREPARED	DATE ANALYZED	PREP. HOLDING TIME, DAYS	ANALYSIS HOLDING TIME, DAYS	QUALIFIER
BOGLB1	ICP	12/20/95	1/22/96	1/22/96	33	33	none
↓	GFAA	↓	↓	1/22/96	33	33	none
BOGLB3	ICP	12/22/95	1/22/96		31	31	none
↓	GFAA		↓		31	31	none
BOGLB4	ICP		1/22/96		31	31	none
↓	GFAA	↓	↓		31	31	none
BOGLB6	ICP	12/27/95	1/22/96		26	26	none
↓	GFAA		↓		26	26	none
BOGLB8	ICP		1/22/96		26	26	none
↓	GFAA	↓	↓		26	26	none
BOGLC0	ICP	12/28/95	1/22/96		25	25	none
↓	GFAA	↓	↓		25	25	none
BOGL97	ICP	12/19/95	1/22/96		34	34	none
↓	GFAA	↓	↓		34	34	none
BOGL99	ICP	12/20/95	1/22/96		33	33	none
↓	GFAA	↓	↓	↓	33	33	none

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5A
SPIKE SAMPLE RECOVERY

EPA SAMPLE NO.

B0GL97S

Lab Name: QUANTERRA_MO Contract: 550.111

Lab Code: ITMO Case No.: _____ SAS No.: _____ SDG No.: W0867

Matrix (soil/water): SOIL Level (low/med): LOW

% Solids for Sample: 93.4

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

Analyte	Control Limit %R	Spiked Sample Result (SSR)	C	Sample Result (SR)	C	Spike Added (SA)	%R	Q	M
Cadmium	80-120	1.2782		0.3640	U	1.34	95.4		P
Chromium	80-120	422.1306		8.8956		5.35	7724.0	N	P
Lead	80-120	4.4775		2.6788		2.14	84.1		F
Nickel	80-120	225.2160		8.4660		13.38	1620.0	N	P

Comments:

Cr: All samples affected

Ni: B0GLB1 B0GLC0
B0GLB3 B0GL97
B0GLB4 B0GL99
B0GLB6

FORM V (Part 1) - IN

SW-846

HRG 3/21/96
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U.S. EPA - CLP

5A
SPIKE SAMPLE RECOVERY

EPA SAMPLE NO.

B0GL97SD

Lab Name: QUANTERRA_MO Contract: 550.111

Lab Code: ITMO Case No.: _____ SAS No.: _____ SDG No.: W0867

Matrix (soil/water): SOIL Level (low/med): LOW

% Solids for Sample: 93.4

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

Analyte	Control Limit %R	Spiked Sample Result (SSR)	C	Sample Result (SR)	C	Spike Added (SA)	%R	Q	M
Cadmium	80-120	1.1622		0.3640	U	1.34	86.7		P
Chromium	80-120	32.8146		8.8956		5.35	447.1	N	P
Lead	80-120	4.5460		2.6788		2.14	87.3		F
Nickel	80-120	29.3951		8.4660		13.38	156.4	N	P

Comments:

Cr: All samples affected.

Ni: B0GLB1 B0GLC0
B0GLB3 B0GL97
B0GLB4 B0GL99
B0GLB6

FORM V (Part 1) - IN SW-846

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HRG 5/21/96

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U.S. EPA - CLP

6A
MATRIX SPIKE DUPLICATES

EPA SAMPLE NO.

B0GL97S

Lab Name: QUANTERRA MO Contract: 550.111

Lab Code: ITMO Case No.: SAS No.: SDG No.: W0867

Matrix (soil/water): SOIL Level (low/med): LOW

% Solids: 93.4

Percent recoveries:

Analyte	Control Limit	Matrix Spike (S)		Matrix Spike Duplicate (SD)		RPD	Q	M
Cd	20%	95.40		86.70		9.6		P
Cr	20%	7724.00		447.10		178.1		P
Pb	20%	84.10		87.30		3.7		F
Ni	20%	1620.00		156.40		164.8		P

Cr: All samples affected.

Ni: B0GLB1 B0GLC0
B0GLB3 B0GL97
B0GLB4 B0GL99
B0GLB6

FORM VI - IN

030

HRG 3/21/96
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