START 9413478.3033

0045047 W0755

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

October 24, 1995

Attention: Joan Kessner

SEP 1996 RECEIVED EDMC

OCT 1995 RECEIVED Data Log In

Project number	:	550.105
Date Received by Lab	:	October 4, 1995
Number of Samples	:	Three (3)
Sample Type	:	Solid
SDG Number	:	W0755
Data Deliverable	:	Summary

I. Introduction

On October 4, 1995, three (3) solid 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 ID's:

St Louis ID	BHI ID	Richland ID	Matrix	Date of Receipt
9489-001	B0GNZ0	51005301	Solid	10/04/95
9489-002	B0GNZ1	51005302	Solid	10/04/95
9489-003	B0GNZ2	51005303	Solid	10/04/95

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.

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Analyses requested: ICP metals by EPA method 6010 and Arsenic, Lead, Selenium, and Thallium by Trace. Formate, Chloride, Fluoride, Nitrate, Phosphate, and Sulfate by EPA method 300.0. Sulfide by EPA method 9030. Cyanide by EPA method 9010. PH by EPA method 9045.

III. Quality Control

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

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

Percent solids was not determined for samples in SDG W0755. Due to software configuration, the CLP forms list solid sample result units as " dry weight" and % solids as "100". The results on the forms are actually mg/Kg as is and are not corrected for percent solids. The figure of 100 was used as percent solids for calculation purposes only and does not represent measured solids content of the samples.

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All the samples in SDG W0755 required dilution due to interelement interferences. The instrument software flagged the undiluted run with an error code indicating that an interferant, in this case Calcium for 9489-001and 9489-003 and Iron for 9489-002, was interfering with the analysis of most of the elements requested. The samples were diluted and reanalyzed without interference errors.

The Matrix Spike recovery for the Sulfide analysis on sample 9489-001 was outside of the suggested limits of 75-125%.

The Relative Percent Difference could not be calculated due to the values being below the detection limits for sample 9489-001 and it's duplicate on the Sulfide analysis.

In order to clarify the Formate peaks from the Fluoride peaks, the entire batch was reprinted showing only the four minutes of run and reintegrated to even out the baseline.

The Relative Percent Difference could not be calculated due to the values being below the detection limits for sample 9489-001 and its duplicate on the Phosphate analysis.

The Matrix Spike recoveries for the Sulfate and Nitrite analyses on sample 9489-001 were outside of the suggested limits of 75-125% due to the Nitrite, Phosphate, and Sulfate sample concentrations exceeding the spike concentrations by a factor of four or more.

The retention times were entered into the computer program incorrectly, so it failed to identify the peaks on the calibration curve. The correct retention times were then entered correctly and the data for the calibration curve was regenerated.

Samples, 9489-001, 9489-001DUP, 9489-001MS, 9489-002 and 9489-003 were manually integrated for Fluoride to level the baseline.

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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\hanw0755.nar

Quanterra October 06, 1995 03:43 pm
Account: 10722 Project: 550.105 Quanterra-Richland QAS No. 550.105 Rev. 0
Master Sample Login: 9489

Project Manager: W. Price

Draft: Final: Entered and Reviewed by: Bob Cowan PM Review: Holly Wolf

Sample Header Template:

Sample No. / Comments	Client ID	C-Matrix	Date: Collected	Received	Due	Shipper	Rad Category	Rad Sample No.
9489-001	BOGNZ0	Solid	03-OCT-95 09:17	04-OCT-95 10:15	18-OCT-95	FED-EX	2	R4301-003
RICHLAND I.D. 51005301////TAL METALS (AS, PB, SE, TL) BY TRACE.								

#	Container Type	Analysis	Class	Preservative	Anal. Due Date	Hold Date	Site	(Container Numbers:% Filled)
1	VI - Vial-40ml	ICAPT/6010/Q4	S	COLD	16-OCT-95	31-MAR-96	S16B	(184680:100)
1	AN - Amber Glass-120ML	ANIONS/300.0/Q4	P	COLD	N/A	N/A	S16B	(184681:100)
1		BR/300.0/Q4	S	COLD	16-OCT-95	31-OCT-95	S16B	(184681:100)
1		CL/300.0/Q4	C	COLD	16-OCT-95	31-OCT-95	S16B	(184681:100)
1		CN/9010/Q4	S	COLD	16-OCT-95	17-OCT-95	S16B	(184682:99)
1		FL/300.0/Q4	C	COLD	16-OCT-95	31-OCT-95	S16B	(184681:100)
1		FORMATE/300.0/Q4	S	COLD	16-OCT-95	31-OCT-95	S16B	(184681:100)
1		NO2/300.0/Q4	C	COLD	16-OCT-95	05-OCT-95	S16B	(184681:100)
1		NO3/300.0/Q4	C	COLD	16-OCT-95	05-OCT-95	S16B	(184681:100)
1		OPHOS/300.0/Q4	C	COLD	16-OCT-95	05-OCT-95	S16B	(184681:100)
1		PH/9045/Q4	S	COLD	16-OCT-95	17-OCT-95	S16B	(184681:100)
1		S/9030/Q4	S	COLD	16-OCT-95	10-OCT-95	S16B	(184683:98)
1		SO4/300.0/Q4	C	COLD	16-OCT-95	31-OCT-95	S16B	(184681:100)

Sample No. / Comments	Client ID	C-Matrix	Date: Collected	Received	Due	Shipper	Rad Category	Rad Sample No.
9489-001DUP	BOGNZ0	Solid	03-OCT-95 09:17	04-OCT-95 10:15	18-OCT-95	FED-EX	2	R4301-003
RICHLAND I.D. 51005301////TAL METALS (AS, PB, SE, TL) BY TRACE.								

#	Container Type	Analysis	Class	Preservative	Anal. Due Date	Hold Date	Site	(Container Numbers:% Filled)
1	AN - Amber Glass-120ML	ANIONS/300.0/Q4	P	COLD	N/A	N/A	S16B	(184681:100)
1		BR/300.0/Q4	S	COLD	16-OCT-95	31-OCT-95	S16B	(184681:100)
1		CL/300.0/Q4	C	COLD	16-OCT-95	31-OCT-95	S16B	(184681:100)
1		CN/9010/Q4	S	COLD	16-OCT-95	17-OCT-95	S16B	(184682:99)
1		FL/300.0/Q4	C	COLD	16-OCT-95	31-OCT-95	S16B	(184681:100)
1		FORMATE/300.0/Q4	S	COLD	16-OCT-95	31-OCT-95	S16B	(184681:100)
1		NO2/300.0/Q4	C	COLD	16-OCT-95	05-OCT-95	S16B	(184681:100)
1		NO3/300.0/Q4	C	COLD	16-OCT-95	05-OCT-95	S16B	(184681:100)
1		OPHOS/300.0/Q4	C	COLD	16-OCT-95	05-OCT-95	S16B	(184681:100)
1		PH/9045/Q4	S	COLD	16-OCT-95	17-OCT-95	S16B	(184681:100)
1		S/9030/Q4	S	COLD	16-OCT-95	10-OCT-95	S16B	(184683:98)
1		SO4/300.0/Q4	C	COLD	16-OCT-95	31-OCT-95	S16B	(184681:100)

Sample No. / Comments	Client ID	C-Matrix	Date: Collected	Received	Due	Shipper	Rad Category	Rad Sample No.
9489-001MS	BOGNZ0	Solid	03-OCT-95 09:17	04-OCT-95 10:15	18-OCT-95	FED-EX	2	R4301-003
RICHLAND I.D. 51005301////TAL METALS (AS, PB, SE, TL) BY TRACE.								

#	Container Type	Analysis	Class	Preservative	Anal. Due Date	Hold Date	Site	(Container Numbers:% Filled)
1	VI - Vial-40ml	ICAPT/6010/Q4	S	COLD	16-OCT-95	31-MAR-96	S16B	(184680:100)
1	AN - Amber Glass-120ML	ANIONS/300.0/Q4	P	COLD	N/A	N/A	S16B	(184681:100)
1		BR/300.0/Q4	S	COLD	16-OCT-95	31-OCT-95	S16B	(184681:100)
1		CL/300.0/Q4	C	COLD	16-OCT-95	31-OCT-95	S16B	(184681:100)
1		CN/9010/Q4	S	COLD	16-OCT-95	17-OCT-95	S16B	(184682:99)
1		FL/300.0/Q4	C	COLD	16-OCT-95	31-OCT-95	S16B	(184681:100)
1		FORMATE/300.0/Q4	S	COLD	16-OCT-95	31-OCT-95	S16B	(184681:100)

3*=Sample has not been rad screened.

0000006

9613470.3037

Quanterra October 06, 1995 03:43 pm
Account: 10722 Project: 550.105 Quanterra-Richland QAS No. 550.105 Rev. 0
Master Sample Login: 9489

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	Received	Due	Shipper	Rad Category	Rad Sample No. / (Container Numbers:% Filled)
Comments / Data:								
1		NO2/300.0/Q4	C	COLD	16-OCT-95	05-OCT-95	S16B	(184681:100)
1		NO3/300.0/Q4	C	COLD	16-OCT-95	05-OCT-95	S16B	(184681:100)
1		OPHOS/300.0/Q4	C	COLD	16-OCT-95	05-OCT-95	S16B	(184681:100)
1		S/9030/Q4	S	COLD	16-OCT-95	10-OCT-95	S16B	(184683:98)
1		SO4/300.0/Q4	C	COLD	16-OCT-95	31-OCT-95	S16B	(184681:100)
9489-001MSD	BOGNZ0	Solid	03-OCT-95 09:17	04-OCT-95 10:15	18-OCT-95	FED-EX	2	R4301-003
RICHLAND I.D. 51005301////TAL METALS (AS, PB, SE, TL) BY TRACE.								
1	VI - Vial-40ml	ICAPT/6010/Q4	S	COLD	16-OCT-95	31-MAR-96	S16B	(184680:100)
9489-002	BOGNZ1	Solid	03-OCT-95 09:38	04-OCT-95 10:15	18-OCT-95	FED-EX	1	R4301-002
RICHLAND I.D. 51005302////TAL METALS (AS, PB, SE, TL) BY TRACE.								
1	VI - Vial-40ml	ICAPT/6010/Q4	S	COLD	16-OCT-95	31-MAR-96	S16B	(184696:100)
1	AN - Amber Glass-120ML	ANIONS/300.0/Q4	P	COLD	N/A	N/A	S16B	(184697:100)
1		BR/300.0/Q4	S	COLD	16-OCT-95	31-OCT-95	S16B	(184697:100)
1		CL/300.0/Q4	C	COLD	16-OCT-95	31-OCT-95	S16B	(184697:100)
1		CN/9010/Q4	S	COLD	16-OCT-95	17-OCT-95	S16B	(184698:99)
1		FL/300.0/Q4	C	COLD	16-OCT-95	31-OCT-95	S16B	(184697:100)
1		FORMATE/300.0/Q4	S	COLD	16-OCT-95	31-OCT-95	S16B	(184697:100)
1		NO2/300.0/Q4	C	COLD	16-OCT-95	05-OCT-95	S16B	(184697:100)
1		NO3/300.0/Q4	C	COLD	16-OCT-95	05-OCT-95	S16B	(184697:100)
1		OPHOS/300.0/Q4	C	COLD	16-OCT-95	05-OCT-95	S16B	(184697:100)
1		PH/9045/Q4	S	COLD	16-OCT-95	17-OCT-95	S16B	(184697:100)
1		S/9030/Q4	S	COLD	16-OCT-95	10-OCT-95	S16B	(184699:98)
1		SO4/300.0/Q4	C	COLD	16-OCT-95	31-OCT-95	S16B	(184697:100)
9489-003	BOGNZ2	Solid	03-OCT-95 09:50	04-OCT-95 10:15	18-OCT-95	FED-EX	2	R4301-001
RICHLAND I.D. 51005303////TAL METALS (AS, PB, SE, TL) BY TRACE.								
1	VI - Vial-40ml	ICAPT/6010/Q4	S	COLD	16-OCT-95	31-MAR-96	S16B	(184700:100)
1	AN - Amber Glass-120ML	ANIONS/300.0/Q4	P	COLD	N/A	N/A	S16B	(184701:100)
1		BR/300.0/Q4	S	COLD	16-OCT-95	31-OCT-95	S16B	(184701:100)
1		CL/300.0/Q4	C	COLD	16-OCT-95	31-OCT-95	S16B	(184701:100)
1		CN/9010/Q4	S	COLD	16-OCT-95	17-OCT-95	S16B	(184702:99)
1		FL/300.0/Q4	C	COLD	16-OCT-95	31-OCT-95	S16B	(184701:100)
1		FORMATE/300.0/Q4	S	COLD	16-OCT-95	31-OCT-95	S16B	(184701:100)
1		NO2/300.0/Q4	C	COLD	16-OCT-95	05-OCT-95	S16B	(184701:100)
1		NO3/300.0/Q4	C	COLD	16-OCT-95	05-OCT-95	S16B	(184701:100)
1		OPHOS/300.0/Q4	C	COLD	16-OCT-95	05-OCT-95	S16B	(184701:100)
1		PH/9045/Q4	S	COLD	16-OCT-95	17-OCT-95	S16B	(184701:100)
1		S/9030/Q4	S	COLD	16-OCT-95	10-OCT-95	S16B	(184703:98)
1		SO4/300.0/Q4	C	COLD	16-OCT-95	31-OCT-95	S16B	(184701:100)

3*=Sample has not been rad screened.

0000007

Temp 6°C cuk# 5471

[redacted]

Chain of Custody Record

Quanterra Environmental Services

QUA-4124-1

Client	Project Manager	Date	Chain Of Custody Number
BHI St Louis	V Pettey	10/4/95	43612
Address	Telephone Number (Area Code)/Fax Number	Lab Number	Page 1 of 1

City	State	Zip Code	Site Contact	Lab Contact

Project Name: B95-106

Carrier/Waybill Number:

Contract/Purchase Order/Quote No.:

Analysis (Attach list if more space is needed)

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
51005301 BOGNZ0	See COC											
1 2 BOGNZ1												
3 BOGNZ2												
$ 10/4/95												

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 W0755

	Date	Time		Date	Time
1. Relinquished By: Tom Rutter	10/4/95	1600	1. Received By: Del Mitchell	10-5-95	
2. Relinquished By			2. Received By		
3. Relinquished By			3. Received By		

Comments

8000000

9613470.2069

Bechtel Hanford, Inc.

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

Page ____ of ____

Date Turnaround: X Priority / Normal

Collector: D. Bowers, M. Mehlhorn	Company Contact: Dave Encke	Telephone: 373-3461
Project Designation: Concrete Removal Characterization	Sampling Location: 183-H Solar Evaporation Basin Project	SAF No.: B95-106
Ice Chest No.: ER-9	Field Logbook No.: EFL-1133-1	Method of Shipment: Hand Deliver - Government Vehicle
Shipped To: Quanterra	Offsite Property No.	Bill of Lading/Air Bill No.
Possible Sample Hazards/Remarks		
Special Handling and/or Storage: Cool Samples to 4 Degrees Celsius		

Preservation	Cool	Cool	Cool	Cool	None	None				
Type of Container	AG	AG	AG	AG	G	P				
No. of Container(s)	1	1	1	1	1	1				
Volume	40 ml.	60 ml.	60 ml.	60 ml.	1 Liter	20 ml.				
SAMPLE ANALYSIS	ICP Metals Include Super-trace	Anions See Item 1 Below	Cyanide	Sulfide	See Item 2 Below	Activity Scan				

Sample No.	Matrix*	Date Sampled	Time Sampled										
BOGNZ0, N6003	DS	10-3-95	0917	✓	✓	✓	✓	✓	✓	01			
BOGNZ1, N6004	DS	10-3-95	0938	✓	✓	✓	✓	✓	✓	2			
BOGNZ2, N6005	DS	10-3-95	0950	✓	✓	✓	✓	✓	✓	3			
				5100	53			5100	54				
				100	100	100	100						

CHAIN OF POSSESSION	Sign/Print Names		
Relinquished By: Doug Bowers	Date/Time: 10-3-95 1255	Received By: Gue B. Whitten	Date/Time: 1255 10-3-95
Relinquished By: Gue B. Whitten	Date/Time: 10-4-95 1015	Received By: Gillington	Date/Time: 1015 10-4-95
Relinquished By	Date/Time	Received By	Date/Time
Relinquished By	Date/Time	Received By	Date/Time

SPECIAL INSTRUCTIONS

Item 1 - Anoins - ICF -- F, Cl, SO4, PO4, NO2, NO3, formate and pH

Item 2 - Gross Alpha, Gross Beta; u-234, -235, -238; Tc-99; Gamma Spec.

SDG W0755

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

0000009

Client Sample Screening Results

04-Oct-95

(R3) 10/4/95

CLIENT CODE ID	MATRIX	RECEIVED	DETECTOR	ACQ DATE	SAMPLE	MINUTES	CNTS A	NET CPM A	CNTS B	NET CPM B
WHC B0GNZ0		10/4/95 10:15:00 AM	QUAD21B	10/4/95 3:02:12 PM	B0GNZ0	30	31	0.97333333	257	7.7116667
	SOLID		Bkg:	10/4/95 1:32:30 PM	BKG	200	12	0.06	171	0.855

Anl Date: 10/4/95	Tot Sa, Alq: 1.33E+03	, 8.69E+01	Alp;	(Dpm/ 5.90E+00	(uCi/ 4.07E-02	(pCi/ 3.06E+01	± 7.3E+00	CAT II	1.6E+00	Lab
Ppt mg: 86.9	Units: g	, mg	Bet;	Alq): 1.65E+01	Sa): 1.14E-01	Lig): 8.56E+01	± 6.1E+00		1.2E+00	Alq Lig

CLIENT CODE ID	MATRIX	RECEIVED	DETECTOR	ACQ DATE	SAMPLE	MINUTES	CNTS A	NET CPM A	CNTS B	NET CPM B
WHC B0GNZ1		10/4/95 10:15:00 AM	QUAD21C	10/4/95 3:02:12 PM	B0GNZ1	30	14	0.41166667	218	6.1916667
	SOLID		Bkg:	10/4/95 1:32:30 PM	BKG	200	11	0.055	215	1.075

Anl Date: 10/4/95	Tot Sa, Alq: 1.43E+03	, 7.68E+01	Alp;	(Dpm/ 2.15E+00	(uCi/ 1.79E-02	(pCi/ 1.26E+01	± 7.0E+00	CAT II	4.0E+00	Lab
Ppt mg: 76.8	Units: g	, mg	Bet;	Alq): 1.33E+01	Sa): 1.11E-01	Lig): 7.81E+01	± 6.3E+00		1.3E+00	Alq Lig

CLIENT CODE ID	MATRIX	RECEIVED	DETECTOR	ACQ DATE	SAMPLE	MINUTES	CNTS A	NET CPM A	CNTS B	NET CPM B
WHC B0GNZ2		10/4/95 10:15:00 AM	QUAD21D	10/4/95 3:02:12 PM	B0GNZ2	30	54	1.745	233	6.8116667
	SOLID		Bkg:	10/4/95 1:32:30 PM	BKG	200	11	0.055	191	0.955

Anl Date: 10/4/95	Tot Sa, Alq: 1.57E+03	, 9.73E+01	Alp;	(Dpm/ 1.16E+01	(uCi/ 8.37E-02	(pCi/ 5.35E+01	± 8.3E+00	CAT II	9.3E-01	Lab
Ppt mg: 97.3	Units: g	, mg	Bet;	Alq): 1.43E+01	Sa): 1.04E-01	Lig): 6.62E+01	± 5.2E+00		1.5E+00	Alq Lig

CLIENT CODE ID	MATRIX	RECEIVED	DETECTOR	ACQ DATE	SAMPLE	MINUTES	CNTS A	NET CPM A	CNTS B	NET CPM B
WHC B0GP01		10/4/95 10:15:00 AM	QUAD22A	10/4/95 3:02:16 PM	B0GP01	30	71	2.34666667	3251	107.26667
	LIQUID		Bkg:	10/4/95 1:17:15 PM	BKG	200	4	0.02	220	1.1

Anl Date: 10/4/95	Tot Sa, Alq: 1.00E+00	, 1.00E+01	Alp;	(Dpm/ 3.82E+00	(uCi/ 1.72E-04	(pCi/ 1.72E+02	± 3.2E+01	CAT I	1.5E-01	Lab
Ppt mg: 2	Units: L	, ml	Bet;	Alq): 1.99E+02	Sa): 8.96E-03	Lig): 8.96E+03	± 1.6E+02		5.6E-03	Alq Lig

CLIENT CODE ID	MATRIX	RECEIVED	DETECTOR	ACQ DATE	SAMPLE	MINUTES	CNTS A	NET CPM A	CNTS B	NET CPM B
WHC B0GP06		10/4/95 10:15:00 AM	QUAD22B	10/4/95 3:02:16 PM	B0GP06	30	14	0.42666667	75	1.615
	LIQUID		Bkg:	10/4/95 1:17:15 PM	BKG	200	8	0.04	177	0.885

Anl Date: 10/4/95	Tot Sa, Alq: 1.00E+00	, 1.00E+01	Alp;	(Dpm/ 1.37E+00	(uCi/ 6.17E-05	(pCi/ 6.17E+01	± 2.6E+01	CAT I	4.1E-01	Lab
Ppt mg: 7.4	Units: L	, ml	Bet;	Alq): 2.85E+00	Sa): 1.28E-04	Lig): 1.28E+02	± 2.5E+01		3.9E-01	Alq Lig

0000010

(R3) 10/4/95

CLIENT CODE ID	MATRIX	RECEIVED	DETECTOR	ACQ DATE	SAMPLE	MINUTES	CNTS A	NET CPM A	CNTS B	NET CPM B
WHC TEDF100495001		10/4/95 12:45:00 PM	QUAD22C	10/4/95 3:02:16 PM	TEDF100495001	30	5	0.09166667	50	0.6816667
	LIQUID		Bkg:	10/4/95 1:17:15 PM	BKG	200	15	0.075	197	0.985

Anl Date:	10/4/95	Tot Sa, Alq:	1.00E+00	,	1.00E+01	Alp;	(Dpm/	2.55E-01	(uCi/	1.15E-05	(pCi/	1.15E+01	± 2.2E+01	CAT	2.2E+00	Lab
Ppt mg:	2.7	Units:	L	,	ml	Bet;	Alq):	1.22E+00	Sa):	5.50E-05	Lig):	5.50E+01	± 2.1E+01	I	9.1E-01	Alq Lig

0000011

9613740.3042

961347D.3043

SAMPLE STATUS REPORT FOR N 6005. RAD SCREEN BOGNZ2 TIME: 10/ 4/95 8:14
DISPATCHED: 9/29/95 13: 8 SAMPLE HAS NOT BEEN SLURPED
RECEIVED: 10/ 3/95 12:20

EXT.	DETER.	RESULTS OR STATUS	OUT OF RANGE?	GOOD ANS?	CHARGE CODE
****	********	**********	***	***	******
4271	TOT-ACT	< 5.00000E 01 pCi/G	N	Y	X60051

END OF REPORT

SAMPLE STATUS REPORT FOR N 6004. RAD SCREEN BOGNZI TIME: 10/ 4/95 8:14
DISPATCHED: 9/29/95 13: 8 SAMPLE HAS NOT BEEN SLURPED
RECEIVED: 10/ 3/95 12:20

EXT.	DETER.	RESULTS OR STATUS	OUT OF RANGE?	GOOD ANS?	CHARGE CODE
4271	TOT-ACT	< 5.00000E 01 pCi/G	N	Y	X60051

END OF REPORT

9613470.3046

SAMPLE STATUS REPORT FOR N 6003. RAD SCREEN BOGNZO TIME: 10/ 4/95 8:14
DISPATCHED: 9/29/95 13: 8 SAMPLE HAS NOT BEEN SLURPED
RECEIVED: 10/ 3/95 12:20

EXT.	DETER.	RESULTS OR STATUS	OUT OF RANGE?	GOOD ANS?	CHARGE CODE
****	********	**********	***	***	******
4271	TOT-ACT	< 5.00000E 01 pCi/G	N	Y	X60051

END OF REPORT

Figure 1

SAMPLE CHECK-IN LIST

(1 Per Shipping Container)

Date/Time Received 10-4-95 10:15 Client Name BHI

Project/Client # B95-106 Batch or Case # _____

Cooler ID (if noted on outside of cooler) EL-9

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 [X] Dry [ ] _____
6. Each sample is in a plastic bag? Yes [X] No [ ] _____
7. Number of sample containers in cooler: 26
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 [X] No [ ] Sample Temperature 4°C
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 [ ] No [X]
13. Memos have been initiated for all anomalies identified above? Yes [X]

Printed Name/Signature Karen Stillwaggon Date/Time 10-4-95 10:15

Quanterra Environmental Services 9613470.3047

C.O.R. and C.O.C.
COPIED TO: BW & WP
DATE: 10-5-95
TIME: 14:15
BY: 2m

Work Order No.: 9489

Condition Upon Receipt Variance Report
St. Louis Laboratory

Client: Richland
Date: 10-5-95 0925
Project No: 519
Initiated by: [illegible]
Analysis Requested: Refer to RFA/COC
RFA/COC Numbers: 43612
Client Sample Numbers Affected: Entire Login

Condition/Variance (Check all that apply): Circle Number to Denote that Item was Evaluated. "NA" = "Not Applicable".

1. NA Not enough sample received for proper analysis.
   Received approximately: _____
2. ☐ Sample received broken/leaking.
3. ☐ Sample received without proper preservative.
   - ☐ Cooler temperature not within 4°C ± 2°C
     Record temperature: 6 °C
   - ☐ pH _____
   - ☐ other: _____
4. ☐ Sample received in improper container.
5. ☐ Sample received without proper paperwork. Explain: _____
6. ☐ Paperwork received without sample.
7. ☐ No sample ID on sample container.
8. ☐ Custody tape disturbed/broken/missing.
9. NA Sample splits performed by lab.
10. NA Volatile sample received with approximately _____ mm headspace.
11. ☐ Sample ID on container does not match sample ID on paperwork. Explain: _____
12. ☐ All coolers on airbill not received with shipment.
13. ☐ Other (explain below):
    Shipping containers not rad surveyed.
    265 8838 542

Notes: _____

Corrective Action:

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

☐ Sample(s) processed "as is". Comments: _____
☐ Sample(s) on hold until: _____ If released, notify: _____

Sample Control Supervisor Review: (or designate) [illegible] Date: 10-5-95
Project Management Review: Abby Wolder Date: 10/6/95

SIGNED ORIGINAL MUST BE RETAINED IN THE PROJECT FILE

0000016

9613470.3048

Quanterra
Environmental Services

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

Project: 550.105

Category: ICP Metals-TAL EPA 6010
Method: EPA 6010
Matrix: SOLID

Sample Date : 10/03/95
Receipt Date : 10/04/95
Report Date : 10/17/95

Client ID: BOGNZO

Quanterra ID : 9489-001

Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit	Dilution
Aluminum	7429-90-5	QCBLK79966-1	10/10/95	10/10/95	10800	MG/KG		100	5
Antimony	7440-36-0	QCBLK79966-1	10/10/95	10/10/95	13.8	MG/KG	U	50.0	5
Arsenic	7440-38-2	QCBLK79966-1	10/10/95	10/11/95	34.8	MG/KG		1.0	1
Barium	7440-39-3	QCBLK79966-1	10/10/95	10/10/95	136	MG/KG		20.0	1
Beryllium	7440-41-7	QCBLK79966-1	10/10/95	10/10/95	0.68	MG/KG	B	3.5	5
Cadmium	7440-43-9	QCBLK79966-1	10/10/95	10/10/95	1.2	MG/KG	U	10.0	5
Calcium	7440-70-2	QCBLK79966-1	10/10/95	10/10/95	96000	MG/KG		2500	5
Chromium	7440-47-3	QCBLK79966-1	10/10/95	10/10/95	96.2	MG/KG		10.0	5
Cobalt	7440-48-4	QCBLK79966-1	10/10/95	10/10/95	13.0	MG/KG	B	25.0	5
Copper	7440-50-8	QCBLK79966-1	10/10/95	10/10/95	88.4	MG/KG		12.5	5
Iron	7439-89-6	QCBLK79966-1	10/10/95	10/10/95	38900	MG/KG		50.0	5
Lead	7439-92-1	QCBLK79966-1	10/10/95	10/11/95	9.5	MG/KG		0.30	1
Magnesium	7439-95-4	QCBLK79966-1	10/10/95	10/10/95	6000	MG/KG		500	1
Manganese	7439-96-5	QCBLK79966-1	10/10/95	10/10/95	593	MG/KG		7.5	5
Nickel	7440-02-0	QCBLK79966-1	10/10/95	10/10/95	38.6	MG/KG		4.0	1
Potassium	7440-09-7	QCBLK79966-1	10/10/95	10/10/95	1730	MG/KG	B	2500	5
Selenium	7782-49-2	QCBLK79966-1	10/10/95	10/11/95	0.26	MG/KG	U	0.50	1
Silver	7440-22-4	QCBLK79966-1	10/10/95	10/10/95	3.0	MG/KG	U	100	5
Sodium	7440-23-5	QCBLK79966-1	10/10/95	10/10/95	9740	MG/KG		100	1
Thallium	7440-28-0	QCBLK79966-1	10/10/95	10/11/95	1.5	MG/KG		1.0	1
Vanadium	7440-62-2	QCBLK79966-1	10/10/95	10/10/95	53.7	MG/KG		25.0	5
Zinc	7440-66-6	QCBLK79966-1	10/10/95	10/10/95	156	MG/KG		10.0	5

9613470.3049

Quanterra
Environmental Services

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

Project: 550.105

Category: ICP Metals-TAL EPA 6010
Method: EPA 6010
Matrix: SOLID

Client ID: BOGNZO

Sample Date : 10/03/95
Receipt Date : 10/04/95
Report Date : 10/17/95

Quanterra ID : 9489-001MS

Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit	Dilution
Antimony	7440-36-0	QCBLK79966-1	10/10/95	10/10/95	86	%REC			5
Arsenic	7440-38-2	QCBLK79966-1	10/10/95	10/11/95	100	%REC			1
Barium	7440-39-3	QCBLK79966-1	10/10/95	10/10/95	92	%REC			1
Beryllium	7440-41-7	QCBLK79966-1	10/10/95	10/10/95	106	%REC			5
Cadmium	7440-43-9	QCBLK79966-1	10/10/95	10/10/95	103	%REC			5
Chromium	7440-47-3	QCBLK79966-1	10/10/95	10/10/95	134	%REC			5
Cobalt	7440-48-4	QCBLK79966-1	10/10/95	10/10/95	97	%REC			5
Copper	7440-50-8	QCBLK79966-1	10/10/95	10/10/95	104	%REC			5
Lead	7439-92-1	QCBLK79966-1	10/10/95	10/11/95	88	%REC			1
Manganese	7439-96-5	QCBLK79966-1	10/10/95	10/10/95	116	%REC			5
Nickel	7440-02-0	QCBLK79966-1	10/10/95	10/10/95	94	%REC			1
Selenium	7782-49-2	QCBLK79966-1	10/10/95	10/11/95	94	%REC			1
Silver	7440-22-4	QCBLK79966-1	10/10/95	10/10/95	85	%REC			5
Thallium	7440-28-0	QCBLK79966-1	10/10/95	10/11/95	94	%REC			1
Vanadium	7440-62-2	QCBLK79966-1	10/10/95	10/10/95	93	%REC			5
Zinc	7440-66-6	QCBLK79966-1	10/10/95	10/10/95	91	%REC			5

9613470.3050

Quanterra
Environmental Services

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

Project: 550.105

*Category: ICP Metals-TAL EPA 6010
Method: EPA 6010
Matrix: SOLID

Sample Date : 10/03/95
Receipt Date : 10/04/95
Report Date : 10/17/95

Client ID: BOGNZO

Quanterra ID : 9489-001MSD

Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit	Dilution
Antimony	7440-36-0	QCBLK79966-1	10/10/95	10/10/95	82	%REC			1
Arsenic	7440-38-2	QCBLK79966-1	10/10/95	10/11/95	99	%REC			1
Barium	7440-39-3	QCBLK79966-1	10/10/95	10/10/95	89	%REC			1
Beryllium	7440-41-7	QCBLK79966-1	10/10/95	10/10/95	94	%REC			1
Cadmium	7440-43-9	QCBLK79966-1	10/10/95	10/10/95	93	%REC			1
Chromium	7440-47-3	QCBLK79966-1	10/10/95	10/10/95	123	%REC			1
Cobalt	7440-48-4	QCBLK79966-1	10/10/95	10/10/95	83	%REC			1
Copper	7440-50-8	QCBLK79966-1	10/10/95	10/10/95	84	%REC			1
Lead	7439-92-1	QCBLK79966-1	10/10/95	10/11/95	88	%REC			1
Manganese	7439-96-5	QCBLK79966-1	10/10/95	10/10/95	30	%REC			1
Nickel	7440-02-0	QCBLK79966-1	10/10/95	10/10/95	84	%REC			1
Selenium	7782-49-2	QCBLK79966-1	10/10/95	10/11/95	93	%REC			1
Silver	7440-22-4	QCBLK79966-1	10/10/95	10/10/95	78	%REC			1
Thallium	7440-28-0	QCBLK79966-1	10/10/95	10/11/95	93	%REC			1
Vanadium	7440-62-2	QCBLK79966-1	10/10/95	10/10/95	60	%REC			1
Zinc	7440-66-6	QCBLK79966-1	10/10/95	10/10/95	45	%REC			1

9613470.3051

Quanterra
Environmental Services

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

Project: 550.105

Category: ICP Metals-TAL EPA 6010
Method: EPA 6010
Matrix: SOLID

Client ID: BOGNZ1

Sample Date : 10/03/95
Receipt Date : 10/04/95
Report Date : 10/17/95

Quanterra ID : 9489-002

Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit	Dilution
Aluminum	7429-90-5	QCBLK79966-1	10/10/95	10/10/95	7430	MG/KG		20.0	1
Antimony	7440-36-0	QCBLK79966-1	10/10/95	10/10/95	15.0	MG/KG	B	50.0	5
Arsenic	7440-38-2	QCBLK79966-1	10/10/95	10/11/95	34.7	MG/KG		1.0	1
Barium	7440-39-3	QCBLK79966-1	10/10/95	10/10/95	222	MG/KG		20.0	1
Beryllium	7440-41-7	QCBLK79966-1	10/10/95	10/10/95	0.57	MG/KG	B	0.70	1
Cadmium	7440-43-9	QCBLK79966-1	10/10/95	10/10/95	1.8	MG/KG	B	10.0	5
Calcium	7440-70-2	QCBLK79966-1	10/10/95	10/10/95	53800	MG/KG		500	1
Chromium	7440-47-3	QCBLK79966-1	10/10/95	10/10/95	338	MG/KG		10.0	5
Cobalt	7440-48-4	QCBLK79966-1	10/10/95	10/10/95	16.6	MG/KG	B	25.0	5
Copper	7440-50-8	QCBLK79966-1	10/10/95	10/10/95	202	MG/KG		12.5	5
Iron	7439-89-6	QCBLK79966-1	10/10/95	10/10/95	188000	MG/KG		50.0	5
Lead	7439-92-1	QCBLK79966-1	10/10/95	10/11/95	228	MG/KG		0.30	1
Magnesium	7439-95-4	QCBLK79966-1	10/10/95	10/10/95	8160	MG/KG		500	1
Manganese	7439-96-5	QCBLK79966-1	10/10/95	10/10/95	2090	MG/KG		7.5	5
Nickel	7440-02-0	QCBLK79966-1	10/10/95	10/10/95	173	MG/KG		4.0	1
Potassium	7440-09-7	QCBLK79966-1	10/10/95	10/10/95	1240	MG/KG		500	1
Selenium	7782-49-2	QCBLK79966-1	10/10/95	10/11/95	0.26	MG/KG	U	0.50	1
Silver	7440-22-4	QCBLK79966-1	10/10/95	10/10/95	3.0	MG/KG	U	100	5
Sodium	7440-23-5	QCBLK79966-1	10/10/95	10/10/95	6190	MG/KG		100	1
Thallium	7440-28-0	QCBLK79966-1	10/10/95	10/11/95	8.5	MG/KG		1.0	1
Vanadium	7440-62-2	QCBLK79966-1	10/10/95	10/10/95	32.9	MG/KG		25.0	5
Zinc	7440-66-6	QCBLK79966-1	10/10/95	10/10/95	140	MG/KG		2.0	1

9613470.3052

Quanterra
Environmental Services

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

Project: 550.105

Category: ICP Metals-TAL EPA 6010
Method: EPA 6010
Matrix: SOLID

Client ID: BOGNZ2

Sample Date : 10/03/95
Receipt Date : 10/04/95
Report Date : 10/17/95

Quanterra ID : 9489-003

Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit	Dilution
Aluminum	7429-90-5	QCBLK79966-1	10/10/95	10/10/95	12700	MG/KG		100	5
Antimony	7440-36-0	QCBLK79966-1	10/10/95	10/10/95	36.7	MG/KG	B	50.0	5
Arsenic	7440-38-2	QCBLK79966-1	10/10/95	10/11/95	51.5	MG/KG		1.0	1
Barium	7440-39-3	QCBLK79966-1	10/10/95	10/10/95	146	MG/KG		100	5
Beryllium	7440-41-7	QCBLK79966-1	10/10/95	10/10/95	0.95	MG/KG	B	3.5	5
Cadmium	7440-43-9	QCBLK79966-1	10/10/95	10/10/95	2.1	MG/KG	B	10.0	5
Calcium	7440-70-2	QCBLK79966-1	10/10/95	10/10/95	125000	MG/KG		2500	5
Chromium	7440-47-3	QCBLK79966-1	10/10/95	10/10/95	251	MG/KG		10.0	5
Cobalt	7440-48-4	QCBLK79966-1	10/10/95	10/10/95	19.4	MG/KG	B	25.0	5
Copper	7440-50-8	QCBLK79966-1	10/10/95	10/10/95	257	MG/KG		12.5	5
Iron	7439-89-6	QCBLK79966-1	10/10/95	10/10/95	184000	MG/KG		50.0	5
Lead	7439-92-1	QCBLK79966-1	10/10/95	10/11/95	8.3	MG/KG		0.30	1
Magnesium	7439-95-4	QCBLK79966-1	10/10/95	10/10/95	6750	MG/KG		2500	5
Manganese	7439-96-5	QCBLK79966-1	10/10/95	10/10/95	1970	MG/KG		7.5	5
Nickel	7440-02-0	QCBLK79966-1	10/10/95	10/10/95	133	MG/KG		4.0	1
Potassium	7440-09-7	QCBLK79966-1	10/10/95	10/10/95	1830	MG/KG		500	1
Selenium	7782-49-2	QCBLK79966-1	10/10/95	10/11/95	0.26	MG/KG	U	0.50	1
Silver	7440-22-4	QCBLK79966-1	10/10/95	10/10/95	3.0	MG/KG	U	100	5
Sodium	7440-23-5	QCBLK79966-1	10/10/95	10/10/95	4490	MG/KG		100	1
Thallium	7440-28-0	QCBLK79966-1	10/10/95	10/11/95	7.6	MG/KG		1.0	1
Vanadium	7440-62-2	QCBLK79966-1	10/10/95	10/10/95	40.6	MG/KG		25.0	5
Zinc	7440-66-6	QCBLK79966-1	10/10/95	10/10/95	206	MG/KG		10.0	5

9613470.3053

U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

B0GNZ0

Lab Name: QUANTERRA MO Contract: 550.105
Lab Code: ITMO Case No.: SAS No.: SDG No.: W0755
Matrix (soil/water): SOIL Lab Sample ID: 9489-001
Level (low/med): LOW Date Received: 10/04/95
% Solids: 100.0

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	10800			P
7440-36-0	Antimony	13.8	U		P
7440-38-2	Arsenic	34.8			P
7440-39-3	Barium	136			P
7440-41-7	Beryllium	0.68	B		P
7440-43-9	Cadmium	1.2	U		P
7440-70-2	Calcium	96000			P
7440-47-3	Chromium	96.2			P
7440-48-4	Cobalt	13.0	B		P
7440-50-8	Copper	88.4			P
7439-89-6	Iron	38900			P
7439-92-1	Lead	9.5			P
7439-95-4	Magnesium	6000			P
7439-96-5	Manganese	593			P
7440-02-0	Nickel	38.6			P
7440-09-7	Potassium	1730	B		P
7782-49-2	Selenium	0.26	U		P
7440-22-4	Silver	3.0	U	N	P
7440-23-5	Sodium	9740			P
7440-28-0	Thallium	1.5			P
7440-62-2	Vanadium	53.7		N	P
7440-66-6	Zinc	156		N	P

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

Comments:

FORM I - IN

SW-846

0000025

9613470.3054

U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

B0GNZ1

Lab Name: QUANTERRA MO Contract: 550.105
Lab Code: ITMO Case No.: SAS No.: SDG No.: W0755
Matrix (soil/water): SOIL Lab Sample ID: 9489-002
Level (low/med): LOW Date Received: 10/04/95
% Solids: 100.0

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	7430			P
7440-36-0	Antimony	15.0	B		P
7440-38-2	Arsenic	34.7			P
7440-39-3	Barium	222			P
7440-41-7	Beryllium	0.57	B		P
7440-43-9	Cadmium	1.8	B		P
7440-70-2	Calcium	53800			P
7440-47-3	Chromium	338			P
7440-48-4	Cobalt	16.6	B		P
7440-50-8	Copper	202			P
7439-89-6	Iron	188000			P
7439-92-1	Lead	228			P
7439-95-4	Magnesium	8160			P
7439-96-5	Manganese	2090			P
7440-02-0	Nickel	173			P
7440-09-7	Potassium	1240			P
7782-49-2	Selenium	0.26	U		P
7440-22-4	Silver	3.0	U	N	P
7440-23-5	Sodium	6190			P
7440-28-0	Thallium	8.5			P
7440-62-2	Vanadium	32.9		N	P
7440-66-6	Zinc	140		N	P

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

Comments:

FORM I - IN

SW-846

9613470.3055

U.S. EPA - CLP

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

B0GNZ2

Lab Name: QUANTERRA_MO Contract: 550.105

Lab Code: ITMO Case No.: SAS No.: SDG No.: W0755

Matrix (soil/water): SOIL Lab Sample ID: 9489-003

Level (low/med): LOW Date Received: 10/04/95

% Solids: 100.0

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	12700			P
7440-36-0	Antimony	36.7	B		P
7440-38-2	Arsenic	51.5			P
7440-39-3	Barium	146			P
7440-41-7	Beryllium	0.95	B		P
7440-43-9	Cadmium	2.1	B		P
7440-70-2	Calcium	125000			P
7440-47-3	Chromium	251			P
7440-48-4	Cobalt	19.4	B		P
7440-50-8	Copper	257			P
7439-89-6	Iron	184000			P
7439-92-1	Lead	8.3			P
7439-95-4	Magnesium	6750			P
7439-96-5	Manganese	1970			P
7440-02-0	Nickel	133			P
7440-09-7	Potassium	1830			P
7782-49-2	Selenium	0.26	U		P
7440-22-4	Silver	3.0	U	N	P
7440-23-5	Sodium	4490			P
7440-28-0	Thallium	7.6			P
7440-62-2	Vanadium	40.6		N	P
7440-66-6	Zinc	206		N	P

Color Before: Clarity Before: Texture:

Color After: Clarity After: Artifacts:

Comments:

FORM I - IN

SW-846

9613470.3056

Quanterra
Environmental Services

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

Project: 550.105

Category: Formate EPA 300.0
Method: EPA 300.0
Matrix: SOLID

Sample Date : 10/03/95
Receipt Date : 10/04/95
Report Date : 10/17/95

Client ID	Quanterra ID	Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit	Dil
BOGNZ0	9489-001	Formate	00-00-0	QCBLK80179-1	10/10/95	10/10/95	27.2	UG/G		4.97	1
BOGNZ0	9489-001DUP	Formate	00-00-0	QCBLK80179-1	10/10/95	10/10/95	26.4	UG/G		4.97	1
BOGNZ0	9489-001MS	Formate	00-00-0	QCBLK80179-1	10/10/95	10/10/95	103	%REC			1
BOGNZ1	9489-002	Formate	00-00-0	QCBLK80179-1	10/10/95	10/10/95	38.8	UG/G		4.98	1
BOGNZ2	9489-003	Formate	00-00-0	QCBLK80179-1	10/10/95	10/10/95	8.00	UG/G		4.85	1
NA	QCBLK80179-1	Formate	00-00-0	QCBLK80179-1	10/10/95	10/10/95	5.00	UG/G	U	5.00	1
NA	QCLCS80179-1	Formate	00-00-0	QCBLK80179-1	10/10/95	10/10/95	110	%REC			1

9613470.3057

Quanterra
Environmental Services

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

Project: 550.105

Category: CHLORIDE
Method: EPA 300.0
Matrix: SOLID

Sample Date : 10/03/95
Receipt Date : 10/04/95
Report Date : 10/17/95

Client ID	Quanterra ID	Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit	Dil
BOGNZ0	9489-001	Chloride	16887-00-6	QCBLK80505-2	10/13/95	10/13/95	142	UG/G		9.94	5
BOGNZ0	9489-001DUP	Chloride	16887-00-6	QCBLK80505-2	10/13/95	10/13/95	141	UG/G		9.91	5
BOGNZ0	9489-001MS	Chloride	16887-00-6	QCBLK80505-2	10/13/95	10/13/95	99	%REC			10
BOGNZ1	9489-002	Chloride	16887-00-6	QCBLK80505-2	10/13/95	10/13/95	13.8	UG/G		2.00	1
BOGNZ2	9489-003	Chloride	16887-00-6	QCBLK80505-3	10/13/95	10/13/95	38.5	UG/G		1.99	1
NA	QCBLK80505-2	Chloride	16887-00-6	QCBLK80505-2	10/13/95	10/13/95	2.00	UG/G	U	2.00	1
NA	QCBLK80505-3	Chloride	16887-00-6	QCBLK80505-3	10/13/95	10/13/95	2.00	UG/G	U	2.00	1
NA	QCLCS80505-2	Chloride	16887-00-6	QCBLK80505-2	10/13/95	10/13/95	98	%REC			1
NA	QCLCS80505-3	Chloride	16887-00-6	QCBLK80505-3	10/13/95	10/13/95	86	%REC			1

Quanterra
Environmental Services

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

Project: 550.105

*Category: FLUORIDE
Method: EPA 300.0
Matrix: SOLID

Sample Date : 10/03/95
Receipt Date : 10/04/95
Report Date : 10/17/95

Client ID	Quanterra ID	Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit	Dil
BOGNZ0	9489-001	Fluoride	16984-48-8	QCBLK80505-2	10/13/95	10/13/95	29.3	UG/G		9.94	10
BOGNZ0	9489-001DUP	Fluoride	16984-48-8	QCBLK80505-2	10/13/95	10/13/95	31.6	UG/G		9.91	10
BOGNZ0	9489-001MS	Fluoride	16984-48-8	QCBLK80505-2	10/13/95	10/13/95	81	%REC			10
BOGNZ1	9489-002	Fluoride	16984-48-8	QCBLK80505-2	10/13/95	10/13/95	42.6	UG/G		4.99	5
BOGNZ2	9489-003	Fluoride	16984-48-8	QCBLK80505-3	10/13/95	10/13/95	33.3	UG/G		4.97	5
NA	QCBLK80505-2	Fluoride	16984-48-8	QCBLK80505-2	10/13/95	10/13/95	1.00	UG/G	U	1.00	1
NA	QCBLK80505-3	Fluoride	16984-48-8	QCBLK80505-3	10/13/95	10/13/95	1.00	UG/G	U	1.00	1
NA	QCLCS80505-2	Fluoride	16984-48-8	QCBLK80505-2	10/13/95	10/13/95	95	%REC			1
NA	QCLCS80505-3	Fluoride	16984-48-8	QCBLK80505-3	10/13/95	10/13/95	94	%REC			1

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Quanterra
Environmental Services

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

Project: 550.105

*Category: Nitrate
Method: EPA 300.0
Matrix: SOLID

Sample Date : 10/03/95
Receipt Date : 10/04/95
Report Date : 10/17/95

Client ID	Quanterra ID	Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit	Dil.
BOGNZ0	9489-001	Nitrate-N	14797-55-8	QCBLK80505-2	10/13/95	10/13/95	861	UG/G		39.8	200
BOGNZ0	9489-001DUP	Nitrate-N	14797-55-8	QCBLK80505-2	10/13/95	10/13/95	907	UG/G		39.7	200
BOGNZ0	9489-001MS	Nitrate-N	14797-55-8	QCBLK80505-2	10/13/95	10/13/95	108	%REC			200
BOGNZ1	9489-002	Nitrate-N	14797-55-8	QCBLK80505-2	10/13/95	10/13/95	383	UG/G		20.0	100
BOGNZ2	9489-003	Nitrate-N	14797-55-8	QCBLK80505-3	10/13/95	10/13/95	515	UG/G		19.9	100
NA	QCBLK80505-2	Nitrate-N	14797-55-8	QCBLK80505-2	10/13/95	10/13/95	0.20	UG/G	U	0.20	1
NA	QCBLK80505-3	Nitrate-N	14797-55-8	QCBLK80505-3	10/13/95	10/13/95	0.20	UG/G	U	0.20	1
NA	QCLCS80505-2	Nitrate-N	14797-55-8	QCBLK80505-2	10/13/95	10/13/95	100	%REC			1
NA	QCLCS80505-3	Nitrate-N	14797-55-8	QCBLK80505-3	10/13/95	10/13/95	99	%REC			1

Quanterra
Environmental Services

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

Project: 550.105

Category: Nitrite
Method: EPA 300.0
Matrix: SOLID

Sample Date : 10/03/95
Receipt Date : 10/04/95
Report Date : 10/17/95

Client ID	Quanterra ID	Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit	Dil
BOGNZ0	9489-001	Nitrite-N	14797-65-0	QCBLK80505-2	10/13/95	10/13/95	381	UG/G		39.8	200
BOGNZ0	9489-001DUP	Nitrite-N	14797-65-0	QCBLK80505-2	10/13/95	10/13/95	413	UG/G		39.7	200
BOGNZ0	9489-001MS	Nitrite-N	14797-65-0	QCBLK80505-2	10/13/95	10/13/95	616	%REC			200
BOGNZ1	9489-002	Nitrite-N	14797-65-0	QCBLK80505-2	10/13/95	10/13/95	3.41	UG/G		0.20	1
BOGNZ2	9489-003	Nitrite-N	14797-65-0	QCBLK80505-3	10/13/95	10/13/95	4.44	UG/G		0.40	2
NA	QCBLK80505-2	Nitrite-N	14797-65-0	QCBLK80505-2	10/13/95	10/13/95	0.20	UG/G	U	0.20	1
NA	QCBLK80505-3	Nitrite-N	14797-65-0	QCBLK80505-3	10/13/95	10/13/95	0.20	UG/G	U	0.20	1
NA	QCLCS80505-2	Nitrite-N	14797-65-0	QCBLK80505-2	10/13/95	10/13/95	102	%REC			1
NA	QCLCS80505-3	Nitrite-N	14797-65-0	QCBLK80505-3	10/13/95	10/13/95	82	%REC			1

9613470.3061

Quanterra
Environmental Services

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

Project: 550.105

*Category: Orthophosphate
Method: EPA 300.0
Matrix: SOLID

Sample Date : 10/03/95
Receipt Date : 10/04/95
Report Date : 10/17/95

Client ID	Quanterra ID	Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit	Dil
BOGNZ0	9489-001	Ortho-Phosphate	14265-44-2	QCBLK80505-2	10/13/95	10/13/95	4.97	UG/G	U	4.97	1
BOGNZ0	9489-001DUP	Ortho-Phosphate	14265-44-2	QCBLK80505-2	10/13/95	10/13/95	4.96	UG/G	U	4.96	1
BOGNZ0	9489-001MS	Ortho-Phosphate	14265-44-2	QCBLK80505-2	10/13/95	10/13/95	108	%REC			1
BOGNZ1	9489-002	Ortho-Phosphate	14265-44-2	QCBLK80505-2	10/13/95	10/13/95	4.99	UG/G	U	4.99	1
BOGNZ2	9489-003	Ortho-Phosphate	14265-44-2	QCBLK80505-3	10/13/95	10/13/95	4.97	UG/G	U	4.97	1
NA	QCBLK80505-2	Ortho-Phosphate	14265-44-2	QCBLK80505-2	10/13/95	10/13/95	5.00	UG/G	U	5.00	1
NA	QCBLK80505-3	Ortho-Phosphate	14265-44-2	QCBLK80505-3	10/13/95	10/13/95	5.00	UG/G	U	5.00	1
NA	QCLCS80505-2	Ortho-Phosphate	14265-44-2	QCBLK80505-2	10/13/95	10/13/95	97	%REC			1
NA	QCLCS80505-3	Ortho-Phosphate	14265-44-2	QCBLK80505-3	10/13/95	10/13/95	103	%REC			1

9613470.3062

Quanterra
Environmental Services

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

Project: 550.105

Category: SULFATE
Method: EPA 300.0
Matrix: SOLID

Sample Date : 10/03/95
Receipt Date : 10/04/95
Report Date : 10/17/95

Client ID	Quanterra ID	Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit	Dil
BOGNZ0	9489-001	Sulfate	14808-79-8	QCBLK80505-2	10/13/95	10/13/95	820	UG/G		24.8	5
BOGNZ0	9489-001DUP	Sulfate	14808-79-8	QCBLK80505-2	10/13/95	10/13/95	794	UG/G		24.8	5
BOGNZ0	9489-001MS	Sulfate	14808-79-8	QCBLK80505-2	10/13/95	10/13/95	46	%REC			10
BOGNZ1	9489-002	Sulfate	14808-79-8	QCBLK80505-2	10/13/95	10/13/95	430	UG/G		24.9	5
BOGNZ2	9489-003	Sulfate	14808-79-8	QCBLK80505-3	10/13/95	10/13/95	227	UG/G		9.94	2
NA	QCBLK80505-2	Sulfate	14808-79-8	QCBLK80505-2	10/13/95	10/13/95	5.00	UG/G	U	5.00	1
NA	QCBLK80505-3	Sulfate	14808-79-8	QCBLK80505-3	10/13/95	10/13/95	5.00	UG/G	U	5.00	1
NA	QCLCS80505-2	Sulfate	14808-79-8	QCBLK80505-2	10/13/95	10/13/95	92	%REC			1
NA	QCLCS80505-3	Sulfate	14808-79-8	QCBLK80505-3	10/13/95	10/13/95	95	%REC			1

9613470.5063

Quanterra
Environmental Services

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

Project: 550.105

*Category: Cyanide EPA 9010
Method: EPA 9010
Matrix: SOLID

Sample Date : 10/03/95
Receipt Date : 10/04/95
Report Date : 10/17/95

Client ID	Quanterra ID	Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit	Dil
BOGNZ0	9489-001	Cyanide	57-12-5	QCBLK79945-1	10/09/95	10/11/95	2.83	UG/G		0.50	1
BOGNZ0	9489-001DUP	Cyanide	57-12-5	QCBLK79945-1	10/09/95	10/11/95	2.39	UG/G		0.50	1
BOGNZ0	9489-001MS	Cyanide	57-12-5	QCBLK79945-1	10/09/95	10/11/95	87	%REC			1
BOGNZ1	9489-002	Cyanide	57-12-5	QCBLK79945-1	10/09/95	10/11/95	0.56	UG/G		0.50	1
BOGNZ2	9489-003	Cyanide	57-12-5	QCBLK79945-2	10/09/95	10/11/95	0.69	UG/G		0.50	1
NA	QCBLK79945-1	Cyanide	57-12-5	QCBLK79945-1	10/09/95	10/11/95	0.50	UG/G	U	0.50	1
NA	QCBLK79945-2	Cyanide	57-12-5	QCBLK79945-2	10/09/95	10/11/95	0.50	UG/G	U	0.50	1
NA	QCLCS79945-1	Cyanide	57-12-5	QCBLK79945-1	10/09/95	10/11/95	96	%REC			1
NA	QCLCS79945-2	Cyanide	57-12-5	QCBLK79945-2	10/09/95	10/11/95	95	%REC			1

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Quanterra
Environmental Services

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

Project: 550.105

*Category: pH EPA 9045
Method: EPA 9045
Matrix: SOLID

Sample Date : 10/03/95
Receipt Date : 10/04/95
Report Date : 10/17/95

Client ID	Quanterra ID	Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit	Dil
BOGNZ0	9489-001	pH	C-006	QCBLK80150-1	10/11/95	10/11/95	12.04	PH			1
BOGNZ0	9489-001DUP	pH	C-006	QCBLK80150-1	10/11/95	10/11/95	12.05	PH			1
BOGNZ1	9489-002	pH	C-006	QCBLK80150-1	10/11/95	10/11/95	10.80	PH			1
BOGNZ2	9489-003	pH	C-006	QCBLK80150-2	10/11/95	10/11/95	12.11	PH			1
NA	QCBLK80150-1	pH	C-006	QCBLK80150-1	10/11/95	10/11/95	5.16	PH			1
NA	QCBLK80150-2	pH	C-006	QCBLK80150-2	10/11/95	10/11/95	5.47	PH			1

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Quanterra
Environmental Services

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

Project: 550.105

Category: Sulfide EPA 9030
Method: EPA 9030
Matrix: SOLID

Sample Date : 10/03/95
Receipt Date : 10/04/95
Report Date : 10/17/95

Client ID	Quanterra ID	Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit	Dil
BOGNZ0	9489-001	Sulfide	18496-25-8	QCBLK80054-1	10/10/95	10/10/95	10.1	UG/G	U	10.1	1
BOGNZ0	9489-001DUP	Sulfide	18496-25-8	QCBLK80054-1	10/10/95	10/10/95	10.1	UG/G	U	10.1	1
BOGNZ0	9489-001MS	Sulfide	18496-25-8	QCBLK80054-1	10/10/95	10/10/95	0	%REC			1
BOGNZ1	9489-002	Sulfide	18496-25-8	QCBLK80054-1	10/10/95	10/10/95	48.9	UG/G		10.2	1
BOGNZ2	9489-003	Sulfide	18496-25-8	QCBLK80054-1	10/10/95	10/10/95	9.96	UG/G	U	9.96	1
NA	QCBLK80054-1	Sulfide	18496-25-8	QCBLK80054-1	10/10/95	10/10/95	10.1	UG/G	U	10.1	1
NA	QCLCS80054-1	Sulfide	18496-25-8	QCBLK80054-1	10/10/95	10/10/95	80	%REC			1

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W0755

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Quanterra Environmental Services

Quanterra Incorporated
2800 George Washington Way
Richland, Washington 99352

509 375-3131 Telephone
509 375-5590 Fax

CERTIFICATE OF ANALYSIS

OCT 1995
RECEIVED
Data
Log In

Bechtel Hanford, Inc.
345 Hills
Richland, WA 99352

October 30, 1995

Attention: Joan Kessner

SAF Number	:	B95-106
Date SDG Closed	:	October 4, 1995
Number of Samples	:	Three (3)
Sample Type	:	Other
SDG Number	:	W0755
Data Deliverable	:	Summary

I. Introduction

On October 4, 1995, three "other" matrix 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
51003501	B0GNZ0	Other	10/4/95
51003502	B0GNZ1	Other	10/4/95
51003503	B0GNZ2	Other	10/4/95

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.

Quanterra
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The requested analyses were:

Alpha Spectroscopy
Uranium-234, -235, -238 by method ITAS-RD-3234
Gamma Spectroscopy
Gamma Scan by method ITAS-RD-3219
Gas Proportional Counting
Gross Alpha by method ITAS-RD-3222
Gross Beta by method ITAS-RD-3222
Liquid Scintillation Counting
Technetium-99 by method ITAS-IT-RS-0001

III. Quality Control

The analytical results for each analysis performed under SDG W0755 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 with the exception of Gross Alpha and Gross Beta QC sample results which are reported in pCi/sample.

IV. Comments

Alpha Spectroscopy

Uranium-234, -235, -238 by method ITAS-RD-3234
All of the batch samples contained U-236. U-235 and U-236 are nearly impossible to resolve because of their similar regions of interest. The computer attempted to define the areas of each but the computer's resolution was questionable, therefore, the analyst combined the U-235 and U-236 region of interest counts for calculation and reporting, and those counts are reported as U-235. The U-235 results for this batch should be flagged as estimates due to the U-236 contribution to the U-235 region of interest which cannot be resolved. The technician noted that the LCS was contaminated by sample B0GNZ0. The LCS is within limits and the sample was analyzed in duplicate with the duplicate results agreeing with the sample results within 3 sigma. The blank is also within limits. The data are accepted and the cross-contamination noted by the technician is determined to have been insignificant. The LCS, batch blank, sample and sample duplicate (B0GNZ0) results are within contractual requirements.

Gamma Spectroscopy

Gamma Scan by method ITAS-RD-3219
The LCS results have a high bias, however, the results are within 3 sigma of the expected activity and the LCS is accepted. Sample B0GNZ0 and its duplicate did not meet the Fe-59 RDL due to insufficient sample provided for analysis, and sample background activity. The Fe-59 RDL is met in the blank and the results are accepted. The LCS, batch blank, sample and sample duplicate (B0GNZ0) results are within contractual requirements.

Gas Proportional Counting

Gross Alpha by method ITAS-RD-3222
The batch was reanalyzed due to a low LCS recovery. The reanalysis results are accepted and reported. The cause of the initial low spike recovery is unknown. The reanalysis results for the samples agree with the initial analysis. The LCS, batch blank, sample and sample duplicate (B0GNZ0) results are within contractual requirements.

Gross Beta by method ITAS-RD-3222
The LCS, batch blank, sample and sample duplicate (B0GNZ0) results are within contractual requirements.

Liquid Scintillation Counting

Technetium-99 by method ITAS-IT-RS-0001
The blank TSIE is 95.37, which is below the lower end point of the quench curve (98 TSIE). The blank result is less than the MDA and the RDL, and the lower end of the quench curve is fairly flat, therefore, the blank result is accepted. The team leader is looking into a possible trend with batch blank quench problems. The matrix spike, LCS, batch blank, sample and sample duplicate (B0GNZ2) results are within contractual requirements.

Quanterra
Environmental Services

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

Suzanne Gaines
Project Manager

9613470.3070

Quanterra Environmental Services

SAMPLE RESULTS

LAB NAME:	ITAS-RICHLAND	SDG:	W0755
LAB SAMPLE ID:	51005401	MATRIX:	OTHER
CLIENT ID:	B0GNZ0	DATE RECEIVED:	10/4/95 10:15:00 AM

ISOTOPE	RESULT	COUNTING ERROR (2 s)	TOTAL ERROR (2 s)	MDA	REPORT UNIT	YIELD	METHOD NUMBER
U-234	1.60E+01	6.1E-01	2.7E+00	3.50E-02	pCi/g	70.60%	RD3234
U-238DA	1.43E+01	5.8E-01	2.5E+00	3.33E-02	pCi/g	70.60%	RD3234
CO-58	2.38E-02	1.5E-02	1.5E-02	2.80E-02	pCi/g	N/A	RD3219
CO-60	2.34E-02	1.8E-02	1.9E-02	3.43E-02	pCi/g	N/A	RD3219
CS-137DA	6.48E-01	4.5E-02	7.9E-02	N/A	pCi/g	N/A	RD3219
EU-152	-1.88E-02	4.2E-02	4.2E-02	6.88E-02	pCi/g	N/A	RD3219
EU-154	0.00E+00	4.8E-02	4.8E-02	8.03E-02	pCi/g	N/A	RD3219
EU-155	3.97E-02	5.2E-02	5.2E-02	8.72E-02	pCi/g	N/A	RD3219
FE-59	-2.24E-02	3.6E-02	3.6E-02	5.83E-02	pCi/g	N/A	RD3219
K-40	8.96E+00	5.7E-01	1.1E+00	N/A	pCi/g	N/A	RD3219
RA-224DA	3.56E-01	4.6E-02	5.8E-02	N/A	pCi/g	N/A	RD3219
RA-226DA	3.83E-01	6.8E-02	7.8E-02	N/A	pCi/g	N/A	RD3219
RA-228DA	4.12E-01	1.1E-01	1.2E-01	N/A	pCi/g	N/A	RD3219
U-235	7.48E-01	1.8E-01	1.9E-01	N/A	pCi/g	N/A	RD3219
U-235	1.84E+00	2.1E-01	3.7E-01	2.69E-02	pCi/g	70.60%	RD3219
U-238DLP	1.01E+01	1.2E+00	1.6E+00	N/A	pCi/g	N/A	RD3219
ALPHA	1.80E+01	6.1E+00	6.4E+00	5.54E+00	pCi/g	100.00%	RD3222
BETA	4.11E+01	4.5E+00	5.2E+00	3.87E+00	pCi/g	100.00%	RD3222
TC-99	8.90E+01	1.6E+00	1.0E+01	9.60E-01	pCi/g	95.10%	ITAS-IT-RS-0001

Number of Results: 19

9613470.3071

Quanterra Environmental Services

SAMPLE RESULTS

LAB NAME:	ITAS-RICHLAND	**SDG:**	W0755
LAB SAMPLE ID:	51005402	**MATRIX:**	OTHER
CLIENT ID:	B0GNZ1	**DATE RECEIVED:**	10/4/95 10:15:00 AM

ISOTOPE	RESULT	COUNTING ERROR (2 s)	TOTAL ERROR (2 s)	MDA	REPORT UNIT	YIELD	METHOD NUMBER
U-234	2.40E+00	2.4E-01	4.7E-01	3.79E-02	pCi/g	70.60%	RD3234
U-238DA	1.95E+00	2.1E-01	3.9E-01	3.33E-02	pCi/g	70.60%	RD3234
CO-58	6.12E-03	1.1E-02	1.1E-02	1.97E-02	pCi/g	N/A	RD3219
CO-60	1.58E-02	1.1E-02	1.1E-02	2.20E-02	pCi/g	N/A	RD3219
CS-137DA	1.54E-01	2.4E-02	2.8E-02	N/A	pCi/g	N/A	RD3219
EU-152	2.34E-02	2.8E-02	2.8E-02	4.85E-02	pCi/g	N/A	RD3219
EU-154	-2.29E-02	3.4E-02	3.4E-02	5.64E-02	pCi/g	N/A	RD3219
EU-155	-1.55E-02	3.3E-02	3.3E-02	5.28E-02	pCi/g	N/A	RD3219
FE-59	-3.56E-03	2.7E-02	2.7E-02	4.54E-02	pCi/g	N/A	RD3219
K-40	4.80E+00	4.2E-01	6.4E-01	N/A	pCi/g	N/A	RD3219
RA-224DA	1.89E-01	3.4E-02	3.9E-02	N/A	pCi/g	N/A	RD3219
RA-226DA	2.57E-01	4.5E-02	5.2E-02	N/A	pCi/g	N/A	RD3219
U-235	2.02E-01	7.0E-02	7.8E-02	3.93E-02	pCi/g	70.60%	RD3219
U-238DLP	6.25E-01	5.6E-01	5.7E-01	N/A	pCi/g	N/A	RD3219
ALPHA	5.25E+00	3.6E+00	3.6E+00	5.11E+00	pCi/g	100.00%	RD3222
BETA	3.40E+01	4.2E+00	4.7E+00	3.95E+00	pCi/g	100.00%	RD3222
TC-99	8.57E+01	1.6E+00	1.0E+01	9.60E-01	pCi/g	95.10%	ITAS-IT-RS-0001

Number of Results: 17

9613470.3072

Quanterra Environmental Services

SAMPLE RESULTS

LAB NAME:	ITAS-RICHLAND	SDG:	W0755
LAB SAMPLE ID:	51005403	MATRIX:	OTHER
CLIENT ID:	B0GNZ2	DATE RECEIVED:	10/4/95 10:15:00 AM

ISOTOPE	RESULT	COUNTING ERROR (2 s)	TOTAL ERROR (2 s)	MDA	REPORT UNIT	YIELD	METHOD NUMBER
U-234	4.93E+01	9.5E-01	7.6E+00	3.96E-02	pCi/g	90.50%	RD3234
U-238DA	3.28E+01	7.8E-01	5.1E+00	2.96E-02	pCi/g	90.50%	RD3234
BE-7	2.03E-01	1.6E-01	1.6E-01	N/A	pCi/g	N/A	RD3219
CO-58	8.46E-03	1.2E-02	1.3E-02	2.23E-02	pCi/g	N/A	RD3219
CO-60	1.91E-02	1.5E-02	1.5E-02	2.87E-02	pCi/g	N/A	RD3219
CS-137DA	5.90E-02	2.3E-02	2.4E-02	N/A	pCi/g	N/A	RD3219
EU-152	-2.16E-02	3.6E-02	3.6E-02	5.54E-02	pCi/g	N/A	RD3219
EU-154	-9.45E-03	3.9E-02	3.9E-02	6.69E-02	pCi/g	N/A	RD3219
EU-155	8.18E-02	5.6E-02	5.6E-02	8.53E-02	pCi/g	N/A	RD3219
FE-59	4.07E-03	3.0E-02	3.0E-02	4.96E-02	pCi/g	N/A	RD3219
K-40	6.16E+00	4.7E-01	7.8E-01	N/A	pCi/g	N/A	RD3219
RA-224DA	2.83E-01	3.1E-02	4.2E-02	N/A	pCi/g	N/A	RD3219
RA-226DA	3.24E-01	5.8E-02	6.7E-02	N/A	pCi/g	N/A	RD3219
RA-228DA	2.88E-01	8.5E-02	8.9E-02	N/A	pCi/g	N/A	RD3219
U-235	4.40E+00	2.8E-01	7.3E-01	2.46E-02	pCi/g	90.50%	RD3219
U-238DLP	6.95E+00	1.4E+00	1.5E+00	N/A	pCi/g	N/A	RD3219
ALPHA	5.52E+01	1.0E+01	1.2E+01	4.87E+00	pCi/g	100.00%	RD3222
BETA	6.96E+01	5.7E+00	7.3E+00	3.86E+00	pCi/g	100.00%	RD3222
TC-99	3.26E+01	9.9E-01	4.3E+00	9.60E-01	pCi/g	95.10%	ITAS-IT-RS-0001

Number of Results: 19

9613470.3073

Suzi

Sierra Environmental Services

Data Review Checklist
RADIOCHEMISTRY

5100544

Work Order No(s): 510054

BHI

OTHER

Lab Sample Numbers or SDG: 60755

Method/Test/Parameter: U ISO

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?	TL			TR
5. Were all calculations checked at a minimum frequency?	✓			✓
6. Units checked?	✓			✓

Comments on any "No" response:

Analyst: Joel Kempema Date: 10-18-95

Second Level Review: Suzy Haines Date: 10/30/95

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

9613470.3074

1051

QUANTERRA LABORATORY NONCONFORMANCE MEMO (NCM)

LOG #: RD-95-_____

Project ID: BHI

NCM Initiated by: Joel Kengema 10-18-95

Sample Numbers: 51005401, 61005401, ~~56~~ 51005402-03

Tests: U130 JK 10-18-95

Matrix: Other W0755

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):*** U235 region of interest manually integrated to include U236

Comments/Explanation: Samples contain U236 & difficulty in ~~the~~ JK 10-18-95 resolving U235/U23 is basis for reporting U235 & U236 as a combined result as U235.

Notification (check appropriate area):

Client notified by (name and date): _____

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

Client's name and response: _____

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

Project Manager (signature and date): Sey Jones 10/30/95

9613470.3075

QUANTERRA LABORATORY NONCONFORMANCE MEMO (NCM)

LOG#: RD-95-_____

Corrective Action

Root Cause Initial and date: JK 10-18-95

U236 in sample

Corrective Action Initial and Date: JK 10-18-95

Data accepted to report U235 inclusive of U235 & U236.

Responsibility for performing CA assigned to: _____

Actions to prevent recurrence Initial and Date: _____

First Level Supervisor: Joel Kengeman Date: 10-18-95

Responsible Manager: W. Mac Kelly Date: 10/30/95

Quality Assurance Review

☐ Anomaly ☒ Deficiency ☐ Rerun

☐ Further action required: _____

Assigned to: _____

QA signature: [signature] Date: 10/30/95

Corrective Action Verification

☒ Verified

☐ Cannot Verify (specify reason): _____

Nonconformance Memo Closure

QA signature/date: [signature] 10/30/95

9613470.3076

QUANTERRA LABORATORY NONCONFORMANCE MEMO (NCM)

LOG #: RD-95- 3336

Project ID: BHI NCM Initiated by: John Norton 10-10-95

Sample Numbers: M10054/5 510054 01

Tests: U150

Matrix: OTHER

Analytical Area (check appropriate area):

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

Nonconformance (check appropriate area):

Holding Time Violations (exceeded by _____ days)

Category I: Laboratory Independent

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

Category II: Laboratory Dependent

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

Category III: Analysis Reruns (QA/QC)

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

Category IV: Analysis Reruns (Confirmation)

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

Quality Assurance/Quality Control

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

Incorrect or Incomplete Client Deliverable

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

Reported detection limits elevated due to:

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

Comments/Explanation: SPIKE WAS CONTAMINATED BY SAMPLE 510054 01. OTHER SAMPLES IN THIS SET MAY ALSO ~~HA~~ BE CROSS CONTAMINATED: PROBABLY LESS THAN 10% SAMPLE INVOLVED. JW 10/10/95 During MBD preparation BG 10/30/95

Notification (check appropriate area):

Client notified by (name and date): _____

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

Client's name and response: _____

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

Project Manager (signature and date): Suzy Haines 10/30/95

9613470.3077

QUANTERRA LABORATORY NONCONFORMANCE MEMO (NCM)

LOG#: RD-95- 336

Corrective Action

Root Cause Initial and date: MK 10-17-95

heating sample on hotplate

Corrective Action Initial and Date: MK 10-17-95

Blank and Spike appear to be unaffected, if other samples affected it ~~to~~ at a level insignificant to activity of samples
MK 10-17-95

Responsibility for performing CA assigned to:

Actions to prevent recurrence Initial and Date: MK 10-30-95

~~Technician is aware of hotplate 10/30/95~~ MK 10-30-95
This type of occurance can happen when heating ~~[illegible]~~ to dryness after adding HCL; hotplate temperature too high. Technician to monitor heat range of hotplate more closely.

First Level Supervisor: Joel Thompson Date: 10-17-95

Responsible Manager: W. Mackellar Date: 10/30/95

Quality Assurance Review

☒ Anomaly ☐ Deficiency ☐ Rerun

☐ Further action required:

Assigned to:

QA signature: Beverly Stein Date: 10/30/95

Corrective Action Verification

☒ Verified

☐ Cannot Verify (specify reason):

Nonconformance Memo Closure

QA signature/date: Beverly Stein 10/30/95

9613470.3078

10-19-95

Quanterra

Environmental Services

ITAS Data Review Checklist
RADIOCHEMISTRY

BHI - Other

Work Order No(s): 510 054

Lab Sample Numbers or SDG: W0755

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?	✓			✓
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: 10-19-95

Second Level Review: [signature] Date: 10/30/95

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

1049

9613470.3079

QUANTERRA LABORATORY NONCONFORMANCE MEMO (NCM)

LOG #: RD-95-_____

Project ID: BHI

NCM Initiated by: Joel Mangona 10-19-95

Sample Numbers: M100541M

Tests: Gamma

Matrix: Other

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):*** Spike recovery > ±20%

Comments/Explanation:

Cs137 128% at 2.4σ error

Ra228 123% at 2.5σ error

U238DLP 164% at 1.0σ error

Notification (check appropriate area):

Client notified by (name and date): _____

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

Client's name and response: _____

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

Project Manager (signature and date): Suzy Haines 10/20/95

QUANTERRA LABORATORY NONCONFORMANCE MEMO (NCM)

LOG#: RD-95-_____

Corrective Action

Root Cause Initial and date: JPR 10-19-95

Suspect counting statistics

Corrective Action Initial and Date: JPR 10-19-95

Data accepted w/in 3σ error

Responsibility for performing CA assigned to: _____

Actions to prevent recurrence Initial and Date: JPR 10-19-95

Monitor for trends

First Level Supervisor: [signature] Date: 10-19-95

Responsible Manager: W. MacKellar Date: 10/30/95

Quality Assurance Review

☐ Anomaly ☒ Deficiency ☐ Rerun

☐ Further action required: _____

Assigned to: _____

QA signature: [signature] Date: 10/30/95

Corrective Action Verification

☒ Verified

☐ Cannot Verify (specify reason): _____

Nonconformance Memo Closure

QA signature/date: [signature] 10/30/95

9613470.3081

1050

QUANTERRA LABORATORY NONCONFORMANCE MEMO (NCM)

LOG #: RD-95-_____

Project ID: BHI

NCM Initiated by: Joel Kempema 10-19-95

Sample Numbers: M10054 1M, 51005401, 61005401, 51005403

Tests: Gamma

Matrix: Other

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: 01, G01

- ☐ 24. Sample matrix
- ☒ 25. Insufficient sample volume Fe59
- ☐ 26. Other (complete description required)
- ☒ 27. ***Other (specify):*** Isotopes marked detected not reported

Comments/Explanation: 1M-Cd109
#01=Cd109 & Xe131m #G-01=Cd109 Xe
#03=Nb95, Xe131m

Notification (check appropriate area):

Client notified by (name and date): _____

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

Client's name and response: _____

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

Project Manager (signature and date): Suzy Gaines 10/30/95

9613470.3082

QUANTERRA LABORATORY NONCONFORMANCE MEMO (NCM)

LOG#: RD-95-_____

Corrective Action

Root Cause Initial and date: TR 10-19-95

Cd109 - Rlnunghantom, Xe131m - U235 interference

Nb95 - Pa234m interference

Fe59 MDA >CL due to sample mass analyzed, sample background activity

Corrective Action Initial and Date: TR 10-19-95

Data accepted, note in case narrative

The ottawa sand matrix blank ~~met~~ MDA met CL for all isotopes including Fe59. TR 10-19-95

Responsibility for performing CA assigned to: _____

Actions to prevent recurrence Initial and Date: _____

First Level Supervisor: Joel Klengenna Date: 10-19-95

Responsible Manager: W. MacKellar Date: 10/30/95

Quality Assurance Review

☐ Anomaly ☒ Deficiency ☐ Rerun

☐ Further action required: _____

Assigned to: _____

QA signature: [illegible] Date: 10/30/95

Corrective Action Verification

☒ Verified

☐ Cannot Verify (specify reason): _____

Nonconformance Memo Closure

QA signature/date: [illegible] 10/30/95

9613470.3083

10-19-95

Quanterra Environmental Services

Reanalysis

ITAS Data Review Checklist
RADIOCHEMISTRY

BHI - Other

Work Order No(s): 10-054

Lab Sample Numbers or SDG: W0755

Method/Test/Parameter: Alpha

Review Item	Yes (✓)	No (✓)	N/A (✓)	2nd Level review (✓)
A. **Calibration** 1. Is the calibration documentation included where applicable?			✓	✓
B. **Sample Analysis** 1. Are the sample Yields within acceptance criteria?			✓	✓
2. Were all sample holding times met?	✓			✓
C. **QC Samples** 1. Is the Blank Yield within acceptance criteria?			✓	✓
2. Is the Minimum Detectable Activity for the Blank result ≤ the Contract Detection Limit?	✓			✓
3. Is the Blank result ≤ 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. **Other** 1. Are all nonconformances included and noted?	✓			✓
2. Are all required forms filled out?	✓			✓
3. Correct methodology used?	✓			✓
4. Transcription checked?	✓			✓
5. Were all calculations checked at a minimum frequency?	✓			✓
6. Units checked?	✓			✓

Comments on any "No" response:

Analyst: [signature] Date: 10-18-95

Second Level Review: [signature] Date: 10/30/95

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

Report these reanalysis results.

9613470.3084

438

QUANTERRA LABORATORY NONCONFORMANCE MEMO (NCM)

LOG #: RD-95-_____

Project ID: BHI

NCM Initiated by: Joel Thompson 10-18-95

Sample Numbers: 510054 01,02,03, G10054/01, + QC

Tests: Alpha

Matrix: Other W0755

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):*** Samples reanalyzed

Comments/Explanation: Initial analysis spike recovery was 59%.

Notification (check appropriate area):

Client notified by (name and date): _____

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

Client's name and response: _____

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

Project Manager (signature and date): Suzy Haines 10/30/95

9613470.3085

QUANTERRA LABORATORY NONCONFORMANCE MEMO (NCM)

LOG#: RD-95-_____

Corrective Action

Root Cause Initial and date: TPC 10-18-95

Spike recovery in initial analysis

Corrective Action Initial and Date: TPC 10-18-95

Reanalysis data accepted.

Client sample results agree with initial analysis.

Responsibility for performing CA assigned to: _____

Actions to prevent recurrence Initial and Date: _____

First Level Supervisor: Joel Kingsma Date: 10-18-95

Responsible Manager: W. Markell Date: 10/30/95

Quality Assurance Review

☐ Anomaly ☐ Deficiency ☒ Rerun

☐ Further action required: _____

Assigned to: _____

QA signature: Beverly Thomas Date: 10/30/95

Corrective Action Verification

☒ Verified

☐ Cannot Verify (specify reason): _____

Nonconformance Memo Closure

QA signature/date: Beverly Thomas 10/30/95

9613470.3086

10-19-95

Quanterra
Environmental Services

ITAS Data Review Checklist
RADIOCHEMISTRY

BHI-Other

Work Order No(s): 510054

Lab Sample Numbers or SDG: W0755

Method/Test/Parameter: Beta

	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?	JM			JM
5.	Were all calculations checked at a minimum frequency?	✓			✓
6.	Units checked?	✓			✓

Comments on any "No" response:

Analyst: Joel Kenyonma Date: 10-16-95

Second Level Review: Sergio Franco Date: 10/30/95

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

9613470.3087

10-19-95

Quanterra

Environmental Services

ITAS Data Review Checklist
RADIOCHEMISTRY

BHI-Other

Work Order No(s): 510054

Lab Sample Numbers or SDG: W4755

Method/Test/Parameter: Tc-99

	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: 10-17-95

Second Level Review: [signature] Date: 10/30/95

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

9613470.3088

1048

QUANTERRA LABORATORY NONCONFORMANCE MEMO (NCM)

LOG #: RD-95-_____

Project ID: BHI

NCM Initiated by: _____

Sample Numbers: M10054/B

Tests: Tc99 W0755

Matrix: Other

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):*** Blank TSIE is 95.37 below lower point on growth curve ≈ 98TSIE

Comments/Explanation: _____

Notification (check appropriate area):

Client notified by (name and date): _____

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

Client's name and response: _____

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

Project Manager (signature and date): Suzy Haines 10/30/95

9613470.3089

QUANTERRA LABORATORY NONCONFORMANCE MEMO (NCM)

LOG#: RD-95-_____

Corrective Action

Root Cause Initial and date: JTC 10-17-95 JTC 10-17-95

Uncertain cause for quench in blanks

Corrective Action Initial and Date: JTC 10-17-95

Data accepted blank result <MDA <CCL. The calibration quench curve for Tc99 is relatively flat at the lower end of the curve.

Responsibility for performing CA assigned to: _____

Actions to prevent recurrence Initial and Date: _____

Notified Team Leader SW. to investigate w/ tech why blanks are having quench problems

First Level Supervisor: [signature] Date: 10-17-95

Responsible Manager: W. MacKellar Date: 10/30/95

Quality Assurance Review

☐ Anomaly ☑ Deficiency ☐ Rerun

☐ Further action required: _____

Assigned to: _____

QA signature: [signature] Date: 10/30/95

Corrective Action Verification

☑ Verified

☐ Cannot Verify (specify reason): _____

Nonconformance Memo Closure

QA signature/date: [signature] 10/30/95

9613470.3090

CHAIN OF

CUSTODY FORMS

Bechtel Hanford, Inc.

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

Page ____ of ____

Data Turnaround: X Priority / Normal

Collector: D. Bowers, M. Mehlhorn	Company Contact: Dave Encke	Telephone: 373-3461
Project Designation: Concrete Removal Characterization	Sampling Location: 183-H Solar Evaporation Basin Project	SAF No.: B95-106
Ice Chest No.: ER-9	Field Logbook No.: EFL-1133-1	Method of Shipment: Hand Deliver - Government Vehicle
Shipped To: Quanterra	Offsite Property No.	Bill of Lading/Air Bill No.

Possible Sample Hazards/Remarks

Special Handling and/or Storage: Cool Samples to 4 Degrees Celsius

			Preservation	Cool	Cool	Cool	Cool	None	None				
			Type of Container	G	G	G	G	G	P				
			No. of Container(s)	1	1	1	1	1	1				
			Volume	40 ml.	60 ml.	60 ml.	60 ml.	1 Liter	20 ml.				
SAMPLE ANALYSIS				ICP Metals Include Super-trace	Anions See Item 1 Below	Cyanide	Sulfide	See Item 2 Below	Activity Scan				
Sample No.	Matrix*	Date Sampled	Time Sampled										
BOGNZ0, N6003	DS	10-3-95	0917	✓	✓	✓	✓	✓	✓	01			
BOGNZ1, N6004	DS	10-3-95	0938	✓	✓	✓	✓	✓	✓	2			
BOGNZ2, N6005	DS	10-3-95	0950	✓	✓	✓	✓	✓	✓	3			
				510053				510054					

CHAIN OF POSSESSION	Sign/Print Names		
Relinquished By: Doug Bowers	Date/Time: 10-3-95 / 1255	Received By: B. Whitten	Date/Time: 1255 10-3-95
Relinquished By: B. Whitten	Date/Time: 10-4-95 / 10:15	Received By: Gilliland	Date/Time: 10:15 10-4-95
Relinquished By	Date/Time	Received By	Date/Time
Relinquished By	Date/Time	Received By	Date/Time

SPECIAL INSTRUCTIONS

Item 1 - Anoins - ICF -- F, Cl, SO4, PO4, NO2, NO3, formate and pH

Item 2 - Gross Alpha, Gross Beta; u-234, -235, -238; Tc-99; Gamma Spec.

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

SDG-W0755

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

SAMPLE STATUS REPORT FOR N 6005. RAD SCREEN BOGNZ2 TIME: 10/ 4/95 8:14
DISPATCHED: 9/29/95 13: 8 SAMPLE HAS NOT BEEN SLURPED
RECEIVED: 10/ 3/95 12:20

EXT.	DETER.	RESULTS OR STATUS	OUT OF RANGE?	GOOD ANS?	CHARGE CODE
4271	TOT-ACT	< 5.00000E 01 pCi/G	N	Y	X60051

END OF REPORT

SAMPLE STATUS REPORT FOR N 6004. RAD SCREEN 'BOGNZ1 TIME: 10/ 4/95 8:14
DISPATCHED: 9/29/95 13: 8 SAMPLE HAS NOT BEEN SLURPED
RECEIVED: 10/ 3/95 12:20

EXT.	DETER.	RESULTS OR STATUS	OUT OF RANGE?	GOOD ANS?	CHARGE CODE
4271	TOT-ACT	< 5.00000E 01 pCi/G	N	Y	X60051

END OF REPORT

SAMPLE STATUS REPORT FOR N 6003. RAD SCREEN BOGNZO TIME: 10/ 4/95 8:14
DISPATCHED: 9/29/95 13: 8 SAMPLE HAS NOT BEEN SLURPED
RECEIVED: 10/ 3/95 12:20

EXT.	DETER.	RESULTS OR STATUS	OUT OF RANGE?	GOOD ANS?	CHARGE CODE
4271	TOT-ACT	< 5.00000E 01 pCi/G	N	Y	X60051

END OF REPORT

9613470.3095

SDG W0755 WO# 510053 510054

Figure 1

SAMPLE CHECK-IN LIST

(1 Per Shipping Container)

Date/Time Received 10-4-95 10:15 Client Name BHI

Project/Client # B95-106 Batch or Case # _____

Cooler ID (if noted on outside of cooler) EL-9

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 [X] Dry [ ] _____
6. Each sample is in a plastic bag? Yes [X] No [ ] _____
7. Number of sample containers in cooler: 26
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 [X] No [ ] Sample Temperature 4°C
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 [ ] No [X]
13. Memos have been initiated for all anomalies identified above? Yes [X]

Printed Name/Signature Karen Stottenberg Date/Time 10-4-95 10:15

0040

510053 Chem
510054 Rad

SDW-W0755

Client Sample Screening Results

04-Oct-95

(R3) 10/4/95

CLIENT CODE ID	MATRIX	RECEIVED	DETECTOR	ACQ DATE	SAMPLE	MINUTES	CNTS A	NET CPM A	CNTS B	NET CPM B
WHC B0GNZ0		10/4/95 10:15:00 AM	QUAD21B	10/4/95 3:02:12 PM	B0GNZ0	30	31	0.97333333	257	7.7116667
01	SOLID		Bkg:	10/4/95 1:32:30 PM	BKG	200	12	0.06	171	0.855

Anl Date: 10/4/95	Tot Sa, Alq: 1.33E+03	, 8.69E+01	Alp;	(Dpm/ 5.90E+00	(uCi/ 4.07E-02	(pCi/ 3.06E+01	± 7.3E+00	CAT II	1.6E+00	Lab Alq
Ppt mg: 86.9	Units: g	, mg	Bet;	Alq): 1.65E+01	Sa): 1.14E-01	L/g): 8.56E+01	± 6.1E+00		1.2E+00	L/g

CLIENT CODE ID	MATRIX	RECEIVED	DETECTOR	ACQ DATE	SAMPLE	MINUTES	CNTS A	NET CPM A	CNTS B	NET CPM B
WHC B0GNZ1		10/4/95 10:15:00 AM	QUAD21C	10/4/95 3:02:12 PM	B0GNZ1	30	14	0.41166667	218	6.1916667
02	SOLID		Bkg:	10/4/95 1:32:30 PM	BKG	200	11	0.055	215	1.075

Anl Date: 10/4/95	Tot Sa, Alq: 1.43E+03	, 7.68E+01	Alp;	(Dpm/ 2.15E+00	(uCi/ 1.79E-02	(pCi/ 1.26E+01	± 7.0E+00	CAT II	4.0E+00	Lab Alq
Ppt mg: 76.8	Units: g	, mg	Bet;	Alq): 1.33E+01	Sa): 1.11E-01	L/g): 7.81E+01	± 6.3E+00		1.3E+00	L/g

CLIENT CODE ID	MATRIX	RECEIVED	DETECTOR	ACQ DATE	SAMPLE	MINUTES	CNTS A	NET CPM A	CNTS B	NET CPM B
WHC B0GNZ2		10/4/95 10:15:00 AM	QUAD21D	10/4/95 3:02:12 PM	B0GNZ2	30	54	1.745	233	6.8116667
03	SOLID		Bkg:	10/4/95 1:32:30 PM	BKG	200	11	0.055	191	0.955

Anl Date: 10/4/95	Tot Sa, Alq: 1.57E+03	, 9.73E+01	Alp;	(Dpm/ 1.16E+01	(uCi/ 8.37E-02	(pCi/ 5.35E+01	± 8.3E+00	CAT II	9.3E-01	Lab Alq
Ppt mg: 97.3	Units: g	, mg	Bet;	Alq): 1.43E+01	Sa): 1.04E-01	L/g): 6.62E+01	± 5.2E+00		1.5E+00	L/g

CLIENT CODE ID	MATRIX	RECEIVED	DETECTOR	ACQ DATE	SAMPLE	MINUTES	CNTS A	NET CPM A	CNTS B	NET CPM B
WHC B0GP01		10/4/95 10:15:00 AM	QUAD22A	10/4/95 3:02:16 PM	B0GP01	30	71	2.34666667	3251	107.26667
	LIQUID		Bkg:	10/4/95 1:17:15 PM	BKG	200	4	0.02	220	1.1

Anl Date: 10/4/95	Tot Sa, Alq: 1.00E+00	, 1.00E+01	Alp;	(Dpm/ 3.82E+00	(uCi/ 1.72E-04	(pCi/ 1.72E+02	± 3.2E+01	CAT I	1.5E-01	Lab Alq
Ppt mg: 2	Units: L	, ml	Bet;	Alq): 1.99E+02	Sa): 8.96E-03	L/g): 8.96E+03	± 1.6E+02		5.6E-03	L/g

CLIENT CODE ID	MATRIX	RECEIVED	DETECTOR	ACQ DATE	SAMPLE	MINUTES	CNTS A	NET CPM A	CNTS B	NET CPM B
WHC B0GP06		10/4/95 10:15:00 AM	QUAD22B	10/4/95 3:02:16 PM	B0GP06	30	14	0.42666667	75	1.615
	LIQUID		Bkg:	10/4/95 1:17:15 PM	BKG	200	8	0.04	177	0.885

Anl Date: 10/4/95	Tot Sa, Alq: 1.00E+00	, 1.00E+01	Alp;	(Dpm/ 1.37E+00	(uCi/ 6.17E-05	(pCi/ 6.17E+01	± 2.6E+01	CAT I	4.1E-01	Lab Alq
Ppt mg: 7.4	Units: L	, ml	Bet;	Alq): 2.85E+00	Sa): 1.28E-04	L/g): 1.28E+02	± 2.5E+01		3.9E-01	L/g

0041

9613470.3096

9613470.3097 *** UISO ***

10/19/95

CHAIN-OF-CUSTODY BATCH ANALYSIS RECORD

5-Oct-1995
Page 1

CUSTOMER: BHI

SAMPLE DELIVERY GROUP W0755

MATRIX : OTHER Priority

BATCH NUMBER 10-054

	ITAS ID	DUP	ACCOUNT	CUSTOMER ID	COMMENTS
	M100541B				
	M100541S				
1)	51005401		BHI	BOGNZ0	
	G1005401	DUP			
2)	51005402		BHI	BOGNZ1	
3)	51005403		BHI	BOGNZ2	

ACTIONS (Initial & Date)

1) INITIATED BAB 10/5/95

2) PREP LAB RECEIVED 10/5/95 2:19
REC 10-7-95 gN

3) SAMPLE REMAINDER STORED JN 10-10-95

4) SEPARATION LAB RECEIVED 10/10/95 Eoc
1st EXT. 10-11-95 ✓

5) COUNTING/MEASUREMENT LAB AS 10/13/95

6) DATA REVIEWED AND ANALYTICAL PREP STORED JK 10-16-95

PRIORITY

Edd 10-13-95 LM

10/19/95

9613470.3098 *** GAMMA ***

CHAIN-OF-CUSTODY BATCH ANALYSIS RECORD

5-Oct-1995
Page 1

CUSTOMER: BHI Priority SAMPLE DELIVERY GROUP WO 755

MATRIX : OTHER BATCH NUMBER 10-054

	ITAS ID	DUP	ACCOUNT	CUSTOMER ID	COMMENTS
	M100541X			Blank "OSBK"	
	M100541M			CAL 491	
1)	51005401		BHI	BOGNZ0	
	G1005401				Dup
2)	51005402		BHI	BOGNZ1	
3)	51005403		BHI	BOGNZ2	

ACTIONS (Initial & Date)

1) INITIATED BAB 10/5/95

2) PREP LAB RECEIVED 10/5/95 WE

3) SAMPLE REMAINDER STORED 10/9/95 WE

4) SEPARATION LAB RECEIVED N/A

5) COUNTING/MEASUREMENT LAB 10-9-95

6) DATA REVIEWED AND ANALYTICAL PREP STORED 10-18-95

9613470.3098 *** ALPHA ***

10/19/95

CHAIN-OF-CUSTODY BATCH ANALYSIS RECORD

5-Oct-1995
Page 1

CUSTOMER: BHI

Priority

SAMPLE DELIVERY GROUP W0755

MATRIX : OTHER

BATCH NUMBER 10-054

	ITAS ID	DUP	ACCOUNT	CUSTOMER ID	COMMENTS
	M1005418			Blank	
	M1005415			EQEG929	10.074 ± 0.086698 DPM
1)	51005401		BHI	BOGNZ0	
	G1005401			Dup	
2)	51005402		BHI	BOGNZ1	
3)	51005403		BHI	BOGNZ2	

ACTIONS (Initial & Date)

1) INITIATED BAB 10/5/95

2) PREP LAB RECEIVED 10/5/95 EVZ

3) SAMPLE REMAINDER STORED 10/11/95 EVZ

4) SEPARATION LAB RECEIVED N/A

5) COUNTING/MEASUREMENT LAB 10-11-95

6) DATA REVIEWED AND ANALYTICAL PREP STORED MK 10-16-95

10/19/95

9613470.3100 *** BETA ***

CHAIN-OF-CUSTODY BATCH ANALYSIS RECORD

5-Oct-1995
Page 1

CUSTOMER: BHI

Priority

SAMPLE DELIVERY GROUP W0755

MATRIX : OTHER

BATCH NUMBER 10-054

	ITAS ID	DUP	ACCOUNT	CUSTOMER ID	COMMENTS
	m100541B			Blank	
	m100541S			EQAU412	30.289 ± 0.378 DPM
1)	51005401		BHI	BOGNZ0	
	G1005401			Dup	
2)	51005402		BHI	BOGNZ1	
3)	51005403		BHI	BOGNZ2	

ACTIONS (Initial & Date)

1) INITIATED BAB 10/5/95

2) PREP LAB RECEIVED 10/5/95 RWE

3) SAMPLE REMAINDER STORED 10/11/95 RWE

4) SEPARATION LAB RECEIVED N/A

5) COUNTING/MEASUREMENT LAB AS 10/11/95

6) DATA REVIEWED AND ANALYTICAL PREP STORED MR 10-16-95

9613470.3101 *** TC-99 ***

10/19/95

CHAIN-OF-CUSTODY BATCH ANALYSIS RECORD

5-Oct-1995
Page 1

CUSTOMER: BHI

Priority

SAMPLE DELIVERY GROUP W0755

MATRIX : OTHER

BATCH NUMBER 10-054

	ITAS ID	DUP	ACCOUNT	CUSTOMER ID	COMMENTS
1)	51005401		BHI	BOGNZ0	
2)	51005402		BHI	BOGNZ1	
3)	51005403		BHI	BOGNZ2	

ACTIONS (Initial & Date)

1) INITIATED BAB 10/5/95

2) PREP LAB RECEIVED 10/5/95 EVE

3) SAMPLE REMAINDER STORED

4) SEPARATION LAB RECEIVED 10/06/95 mm

5) COUNTING/MEASUREMENT LAB AS 10/13/95

6) DATA REVIEWED AND ANALYTICAL PREP STORED JR 10-17-95

9613470.3102

Golder Associates Inc.

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

Golder Associates

December 28, 1995

Our ref: 943-1610.113.0400
94-1610/O/424

ERC
1022 Lee Blvd.
Richland, Washington 99352

DEC 1995
RECEIVED
Validation
Log In

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
B95-106	183 H BASIN D&D Surface Removal Characterization	W0755-QES	Metals, Radiochemistry, General Chemistry

Please call if you have any questions.

Sincerely,

GOLDER ASSOCIATES INC.

Tom Stapp

Thomas M. Stapp
Task Manager

Michael Hess
FOR:

Douglas Mather
Project Manager

Enclosures

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

9613470.3103

MEMORANDUM

TO: 183-H Basin D&D, Surface Removal Characterization Project QA Record

December 28, 1995

FR: Tom Stapp, Golder Associates Inc.

RE: RADIOCHEMISTRY DATA VALIDATION SUMMARY FOR DATA PACKAGE W0755-QES (943-1610.113 755RAD.HBS)

INTRODUCTION

This memo presents the results of data validation for the analysis specified below on data package W0755-QES prepared by Quanterra Environmental Services. Sample information is provided in the following table.

SAMPLE ID	COMMENTS	ANALYSIS	MEDIA
B0GNZ0		RADIOCHEMISTRY	DRUM SOLID
B0GNZ1			DRUM SOLID
B0GNZ2		SEE ATTACHMENT 4	DRUM SOLID

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 the deficiency indicated 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 three samples were validated in this data package with a total of 55 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.

Matrix Spike Samples

- Percent recovery of the Technetium-99 spike was unacceptable. Attachments 2 and 5 provide a summary of samples affected, qualification applied and supporting documentation.

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.

9613470.3105

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.

9613470.3107

ATTACHMENT 2

SUMMARY OF DATA QUALIFICATIONS

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

DATA QUALIFICATION SUMMARY - FORM B-7

SDG: W0755-QES	REVIEWER: T. Stapp	DATE: 12-27-95	PAGE 1 OF 1
COMMENTS: RADIOCHEMISTRY			
COMPOUND/ANALYTE	QUALIFIER	SAMPLES AFFECTED	REASON
TECHNETIUM-99	J	ALL SAMPLES	MS RECOVERY EXCEEDS 140%

9615470.3109

ATTACHMENT 3

QUALIFIED DATA SUMMARY and ANNOTATED LABORATORY REPORTS

Validated Data Summary, Data Package: W0755-QES

	Sample #	BOGNZ0		BOGNZ1		BOGNZ2	
	Date	10/3/95		10/3/95		10/3/95	
	Location						
	Depth						
	Type	Drum Solid		Drum Solid		Drum Solid	
	Comments						
Parameter	Units	Results	Q	Results	Q	Results	Q
URANIUM-235	pCi/G	1.840		0.202		4.400	
URANIUM-234	pCi/G	16.000		2.400		49.300	
URANIUM-238DA	pCi/G	14.300		1.950		32.800	
BERYLLIUM-7	pCi/G					0.203	
COBALT-58	pCi/G	0.024	U	0.006	U	0.008	U
COBALT-60	pCi/G	0.023	U	0.016	U	0.019	U
CESIUM-137DA	pCi/G	0.648		0.154		0.059	
EUROPIUM-152	pCi/G	-0.019	U	0.023	U	-0.022	U
EUROPIUM-154	pCi/G	0.000	U	-0.023	U	-0.009	U
EUROPIUM-155	pCi/G	0.040	U	-0.016	U	0.082	U
IRON-59	pCi/G	-0.022	U	-0.004	U	0.004	U
POTASSIUM-40	pCi/G	8.960		4.800		6.160	
RADIUM-224DA	pCi/G	0.356		0.189		0.283	
RADIUM-226DA	pCi/G	0.383		0.257		0.324	
RADIUM-228DA	pCi/G	0.412				0.288	
URANIUM-235	pCi/G	0.748					
URANIUM-238DLP	pCi/G	10.100		0.625		6.950	
GROSS ALPHA	pCi/G	18.000		5.250		55.200	
GROSS BETA	pCi/G	41.100		34.000		69.600	
TECHNETIUM-99	pCi/G	89.000	J	85.700	J	32.600	J

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

Verified
TMV
12-28-95

9613470.3111

Quanterra Environmental Services

SAMPLE RESULTS

LAB NAME:	ITAS-RICHLAND	SDG:	W0755
LAB SAMPLE ID:	51005401	MATRIX:	OTHER
CLIENT ID:	B0GNZ0	DATE RECEIVED:	10/4/95 10:15:00 AM

ISOTOPE	RESULT	COUNTING ERROR (2 s)	TOTAL ERROR (2 s)	MDA	REPORT UNIT	YIELD	METHOD NUMBER
U-234	1.60E+01	6.1E-01	2.7E+00	3.50E-02	pCi/g	70.60%	RD3234
U-238DA	1.43E+01	5.8E-01	2.5E+00	3.33E-02	pCi/g	70.60%	RD3234
CO-58	2.38E-02 U	1.5E-02	1.5E-02	2.80E-02	pCi/g	N/A	RD3219
CO-60	2.34E-02 U	1.8E-02	1.9E-02	3.43E-02	pCi/g	N/A	RD3219
CS-137DA	6.48E-01	4.5E-02	7.9E-02	N/A	pCi/g	N/A	RD3219
EU-152	-1.88E-02 U	4.2E-02	4.2E-02	6.88E-02	pCi/g	N/A	RD3219
EU-154	0.00E+00 U	4.8E-02	4.8E-02	8.03E-02	pCi/g	N/A	RD3219
EU-155	3.97E-02 U	5.2E-02	5.2E-02	8.72E-02	pCi/g	N/A	RD3219
FE-59	-2.24E-02 U	3.6E-02	3.6E-02	5.83E-02	pCi/g	N/A	RD3219
K-40	8.96E+00	5.7E-01	1.1E+00	N/A	pCi/g	N/A	RD3219
RA-224DA	3.56E-01	4.6E-02	5.8E-02	N/A	pCi/g	N/A	RD3219
RA-226DA	3.83E-01	6.8E-02	7.8E-02	N/A	pCi/g	N/A	RD3219
RA-228DA	4.12E-01	1.1E-01	1.2E-01	N/A	pCi/g	N/A	RD3219
U-235	7.48E-01	1.8E-01	1.9E-01	N/A	pCi/g	N/A	RD3219
U-235	1.84E+00	2.1E-01	3.7E-01	2.69E-02	pCi/g	70.60%	~~RD3219~~ RD3234 TMS 12-27-95
U-238DLP	1.01E+01	1.2E+00	1.6E+00	N/A	pCi/g	N/A	RD3219
ALPHA	1.80E+01	6.1E+00	6.4E+00	5.54E+00	pCi/g	100.00%	RD3222
BETA	4.11E+01	4.5E+00	5.2E+00	3.87E+00	pCi/g	100.00%	RD3222
TC-99	8.90E+01 J	1.6E+00	1.0E+01	9.60E-01	pCi/g	95.10%	ITAS-IT-RS-0001

Number of Results: 19

TMS 12-27-95

~~0006~~

9613470.3112

Quanterra Environmental Services

SAMPLE RESULTS

LAB NAME:	ITAS-RICHLAND	SDG:	W0755
LAB SAMPLE ID:	51005402	MATRIX:	OTHER
CLIENT ID:	B0GNZ1	DATE RECEIVED:	10/4/95 10:15:00 AM

ISOTOPE	RESULT	COUNTING ERROR (2 s)	TOTAL ERROR (2 s)	MDA	REPORT UNIT	YIELD	METHOD NUMBER
U-234	2.40E+00	2.4E-01	4.7E-01	3.79E-02	pCi/g	70.60%	RD3234
U-238DA	1.95E+00	2.1E-01	3.9E-01	3.33E-02	pCi/g	70.60%	RD3234
CO-58	6.12E-03 U	1.1E-02	1.1E-02	1.97E-02	pCi/g	N/A	RD3219
CO-60	1.58E-02 U	1.1E-02	1.1E-02	2.20E-02	pCi/g	N/A	RD3219
CS-137DA	1.54E-01	2.4E-02	2.8E-02	N/A	pCi/g	N/A	RD3219
EU-152	2.34E-02 U	2.8E-02	2.8E-02	4.85E-02	pCi/g	N/A	RD3219
EU-154	-2.29E-02 U	3.4E-02	3.4E-02	5.64E-02	pCi/g	N/A	RD3219
EU-155	-1.55E-02 U	3.3E-02	3.3E-02	5.28E-02	pCi/g	N/A	RD3219
FE-59	-3.56E-03 U	2.7E-02	2.7E-02	4.54E-02	pCi/g	N/A	RD3219
K-40	4.80E+00	4.2E-01	6.4E-01	N/A	pCi/g	N/A	RD3219
RA-224DA	1.89E-01	3.4E-02	3.9E-02	N/A	pCi/g	N/A	RD3219
RA-226DA	2.57E-01	4.5E-02	5.2E-02	N/A	pCi/g	N/A	RD3219
U-235	2.02E-01	7.0E-02	7.8E-02	3.93E-02	pCi/g	70.60%	RD3234 ~~RD3219~~ TMB 12-27-9
U-238DLP	6.25E-01	5.6E-01	5.7E-01	N/A	pCi/g	N/A	RD3219
ALPHA	5.25E+00	3.6E+00	3.6E+00	5.11E+00	pCi/g	100.00%	RD3222
BETA	3.40E+01	4.2E+00	4.7E+00	3.95E+00	pCi/g	100.00%	RD3222
TC-99	8.57E+01 J	1.6E+00	1.0E+01	9.60E-01	pCi/g	95.10%	ITAS-IT-RS-0001

Number of Results: 17

TMB 12-27-95

~~0007~~

9613470.3113

Quanterra Environmental Services

SAMPLE RESULTS

LAB NAME:	ITAS-RICHLAND	SDG:	W0755
LAB SAMPLE ID:	51005403	MATRIX:	OTHER
CLIENT ID:	B0GNZ2	DATE RECEIVED:	10/4/95 10:15:00 AM

ISOTOPE	RESULT	COUNTING ERROR (2 s)	TOTAL ERROR (2 s)	MDA	REPORT UNIT	YIELD	METHOD NUMBER
U-234	4.93E+01	9.5E-01	7.6E+00	3.96E-02	pCi/g	90.50%	RD3234
U-238DA	3.28E+01	7.8E-01	5.1E+00	2.96E-02	pCi/g	90.50%	RD3234
BE-7	2.03E-01	1.6E-01	1.6E-01	N/A	pCi/g	N/A	RD3219
CO-58	8.46E-03 U	1.2E-02	1.3E-02	2.23E-02	pCi/g	N/A	RD3219
CO-60	1.91E-02 U	1.5E-02	1.5E-02	2.87E-02	pCi/g	N/A	RD3219
CS-137DA	5.90E-02	2.3E-02	2.4E-02	N/A	pCi/g	N/A	RD3219
EU-152	-2.16E-02 U	3.6E-02	3.6E-02	5.54E-02	pCi/g	N/A	RD3219
EU-154	-9.45E-03 U	3.9E-02	3.9E-02	6.69E-02	pCi/g	N/A	RD3219
EU-155	8.18E-02 U	5.6E-02	5.6E-02	8.53E-02	pCi/g	N/A	RD3219
FE-59	4.07E-03 U	3.0E-02	3.0E-02	4.96E-02	pCi/g	N/A	RD3219
K-40	6.16E+00	4.7E-01	7.8E-01	N/A	pCi/g	N/A	RD3219
RA-224DA	2.83E-01	3.1E-02	4.2E-02	N/A	pCi/g	N/A	RD3219
RA-226DA	3.24E-01	5.8E-02	6.7E-02	N/A	pCi/g	N/A	RD3219
RA-228DA	2.88E-01	8.5E-02	8.9E-02	N/A	pCi/g	N/A	RD3219
U-235	4.40E+00	2.8E-01	7.3E-01	2.46E-02	pCi/g	90.50%	~~RD3219~~ RD3234 TMS 12-27-95
U-238DLP	6.95E+00	1.4E+00	1.5E+00	N/A	pCi/g	N/A	RD3219
ALPHA	5.52E+01	1.0E+01	1.2E+01	4.87E+00	pCi/g	100.00%	RD3222
BETA	6.96E+01	5.7E+00	7.3E+00	3.86E+00	pCi/g	100.00%	RD3222
TC-99	3.26E+01 J	9.9E-01	4.3E+00	9.60E-01	pCi/g	95.10%	ITAS-IT-RS-0001

Number of Results: 19

TMS 12-27-95

~~0008~~

011

9613470.3114

ATTACHMENT 4

LABORATORY NARRATIVE and CHAIN-OF-CUSTODY DOCUMENTATION

9613470.3115

Quanterra
Environmental Services

Quanterra Incorporated
2800 George Washington Way
Richland, Washington 99352

509 375-3131 Telephone
509 375-5590 Fax

CERTIFICATE OF ANALYSIS

OCT 1995
RECEIVED
Data
Log In

Bechtel Hanford, Inc.
345 Hills
Richland, WA 99352

October 30, 1995

Attention: Joan Kessner

SAF Number	:	B95-106
Date SDG Closed	:	October 4, 1995
Number of Samples	:	Three (3)
Sample Type	:	Other
SDG Number	:	W0755
Data Deliverable	:	Summary

I. Introduction

On October 4, 1995, three "other" matrix 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
51003501	B0GNZ0	Other	10/4/95
51003502	B0GNZ1	Other	10/4/95
51003503	B0GNZ2	Other	10/4/95

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.

TWS 12-27-95

~~0002~~

Quanterra
Environmental Services

The requested analyses were:

Alpha Spectroscopy
Uranium-234, -235, -238 by method ITAS-RD-3234
Gamma Spectroscopy
Gamma Scan by method ITAS-RD-3219
Gas Proportional Counting
Gross Alpha by method ITAS-RD-3222
Gross Beta by method ITAS-RD-3222
Liquid Scintillation Counting
Technetium-99 by method ITAS-IT-RS-0001

III. Quality Control

The analytical results for each analysis performed under SDG W0755 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 with the exception of Gross Alpha and Gross Beta QC sample results which are reported in pCi/sample.

IV. Comments

Alpha Spectroscopy

Uranium-234, -235, -238 by method ITAS-RD-3234
All of the batch samples contained U-236. U-235 and U-236 are nearly impossible to resolve because of their similar regions of interest. The computer attempted to define the areas of each but the computer's resolution was questionable, therefore, the analyst combined the U-235 and U-236 region of interest counts for calculation and reporting, and those counts are reported as U-235. The U-235 results for this batch should be flagged as estimates due to the U-236 contribution to the U-235 region of interest which cannot be resolved. The technician noted that the LCS was contaminated by sample B0GNZ0. The LCS is within limits and the sample was analyzed in duplicate with the duplicate results agreeing with the sample results within 3 sigma. The blank is also within limits. The data are accepted and the cross-contamination noted by the technician is determined to have been insignificant. The LCS, batch blank, sample and sample duplicate (B0GNZ0) results are within contractual requirements.

TMB 12-27-95

Quanterra
Environmental Services

Gamma Spectroscopy

Gamma Scan by method ITAS-RD-3219
The LCS results have a high bias, however, the results are within 3 sigma of the expected activity and the LCS is accepted. Sample B0GNZ0 and its duplicate did not meet the Fe-59 RDL due to insufficient sample provided for analysis, and sample background activity. The Fe-59 RDL is met in the blank and the results are accepted. The LCS, batch blank, sample and sample duplicate (B0GNZ0) results are within contractual requirements.

Gas Proportional Counting

Gross Alpha by method ITAS-RD-3222
The batch was reanalyzed due to a low LCS recovery. The reanalysis results are accepted and reported. The cause of the initial low spike recovery is unknown. The reanalysis results for the samples agree with the initial analysis. The LCS, batch blank, sample and sample duplicate (B0GNZ0) results are within contractual requirements.

Gross Beta by method ITAS-RD-3222
The LCS, batch blank, sample and sample duplicate (B0GNZ0) results are within contractual requirements.

Liquid Scintillation Counting

Technetium-99 by method ITAS-IT-RS-0001
The blank TSIE is 95.37, which is below the lower end point of the quench curve (98 TSIE). The blank result is less than the MDA and the RDL, and the lower end of the quench curve is fairly flat, therefore, the blank result is accepted. The team leader is looking into a possible trend with batch blank quench problems. The matrix spike, LCS, batch blank, sample and sample duplicate (B0GNZ2) results are within contractual requirements.

Quanterra
Environmental Services

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
Project Manager

TMJ 12-27-95

Bechtel Hanford, Inc.

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

Page ____ of ____

Data Turnaround: X Priority / Normal

Collector: D. Bowers, M. Mehlhorn	Company Contact: Dave Encke	Telephone: 373-3461
Project Designation: Concrete Removal Characterization	Sampling Location: 183-H Solar Evaporation Basin Project	SAF No.: B95-106
Ice Chest No.: ER-9	Field Logbook No.: EFL-1133-1	Method of Shipment: Hand Deliver - Government Vehicle
Shipped To: Quanterra	Offsite Property No.	Bill of Lading/Air Bill No.
Possible Sample Hazards/Remarks		

Special Handling and/or Storage: Cool Samples to 4 Degrees Celsius

			Preservation	Cool	Cool	Cool	Cool	None	None				
			Type of Container	G	G	G	G	G	P				
			No. of Container(s)	1	1	1	1	1	1				
			Volume	40 ml.	60 ml.	60 ml.	60 ml.	1 Liter	20 ml.				
SAMPLE ANALYSIS				ICP Metals Include Super-trace	Anions See Item 1 Below	Cyanide	Sulfide	See Item 2 Below	Activity Scan				
Sample No.	Matrix*	Date Sampled	Time Sampled										
BOGNZ0, N6003	DS	10-3-95	0917	✓	✓	✓	✓	✓	✓	01			
BOGNZ1, N6004	DS	10-3-95	0938	✓	✓	✓	✓	✓	✓	2			
BOGNZ2, N6005	DS	10-3-95	0950	✓	✓	✓	✓	✓	✓	3			
				510053				510054					

CHAIN OF POSSESSION	Sign/Print Names		
Relinquished By: Doug Bowers	Date/Time: 10-3-95 / 1255	Received By: B. Whitten	Date/Time: 1255 10-3-95
Relinquished By: B. Whitten	Date/Time: 10-4-95 / 10:15	Received By: Karen Hollenbeck	Date/Time: 10:15 10-4-95
Relinquished By	Date/Time	Received By	Date/Time
Relinquished By	Date/Time	Received By	Date/Time

SPECIAL INSTRUCTIONS

Item 1 - Anoins - ICF -- F, Cl, SO4, PO4, NO2, NO3, formate and pH

Item 2 - Gross Alpha, Gross Beta; u-234, -235, -238; Tc-99; Gamma Spec.

SDG W0755

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

0036

9513170.5119

9613470.3120

ATTACHMENT 5

DATA VALIDATION SUPPORTING DOCUMENTATION

RADIOCHEMICAL DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E

PROJECT: 183 H Basin D&D Surface Removal	DATA PACKAGE:	
VALIDATOR: T. Stapp	LAB: QUANTERRA	DATE: 12-27-95
CASE:	SDG: W0755-QES	

ANALYSES PERFORMED

☒ Gross Alpha/Beta	☐ Strontium-90	☒ Technetium-99	☒ Alpha Spectroscopy U-234 235 238	☒ Gamma Spectroscopy	
☐ Total Uranium	☐ Radium-22	☐ Tritium	☐		

SAMPLES/MATRIX BOGNZO, BOGNZI, BOGNZZ /

DRUM SOLIDS

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: Raw data not provided and not evaluated.

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: Raw data not provided and not evaluated.

4. Blanks . . . . . ☐ N/A

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

Comments: ① Field QC was not identified in the VSR and evaluation was not performed.

5. Matrix Spikes . . . . . ☐ N/A

Matrix spike analyzed? . . . . . (Yes) No N/A
Spike recoveries acceptable? . . . . . NOTE ①. . . . . 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: ① Recovery % of Tc-99 spike is out of limits. The sample result is close to being 4 times greater than the spike level, however the rule does not apply and qualification of associated samples will be applied (~~J/UJ~~) to results ≥ MDA.

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

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

Comments:

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? . . NOTE ① . . . . . Yes No N/A.
Transcription/Calculation Errors? . . . . . Yes No N/A

Comments: ~~① Gamma spec analysis of U-235 for duplicate RPD was out of limits and associated results are qualified (TMD).~~ ① No qualification applied due to transcription error on Duplicate reporting sheet. All RPD are within required control limits.

TMD 12-27-95

021

9. Field QC Samples . . . . . ☒ N/A

Field duplicate sample(s) analyzed? . . . . . Yes No (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: Field QC Samples were not identified in the VSR and evaluation is not performed.

10. Holding Times

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

Comments: Collected: Analyzed:

BOGNZO	10-03-95	10-18-95	Iso U	≤ 180 DAYS
NZ1	↓	10-19-95	GAMMA	↓
NZ2	↓	10-18-95	Grs α	↓
		10-16-95	Grs β	↓
		10-17-95	Tc-99	↓

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) No N/A
Transcription/calculation errors? . . . . . Yes No (N/A)

Comments:

9613470.3125

MEMORANDUM

TO: 183-H Basin D&D, Surface Removal Characterization Project QA Record — December 28, 1995

FR: Thomas Stapp, Golder Associates Inc.

RE: INORGANIC DATA VALIDATION SUMMARY FOR DATA PACKAGE W0755-QES (943-1610.113 755INO.HBS)

INTRODUCTION

This memo presents the results of data validation for the analysis indicated below on data package W0755-QES prepared by Quanterra Environmental Services. Sample information is provided in the following table.

SAMPLE ID	COMMENTS	ANALYSIS	MEDIA
B0GNZ0		INORGANICS	DRUM SOLIDS
B0GNZ1			DRUM SOLIDS
B0GNZ2		SEE ATTACHMENT 4	DRUM SOLIDS

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 indicated below.

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

LOO 001

Completeness. The data package was complete for all requested analyses. A total of three samples were validated in this data package with a total of 66 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:

Method Blanks

- Thallium was detected at a negative concentration in the method blank qualifying associated results as estimated (J). Attachments 2 and 5 provide a summary of samples affected, data qualifications applied and supporting documentation

Matrix Spike Recovery

- Zinc and vanadium percent recovery was unacceptable. Attachments 2 and 5 provide a summary of samples affected, data qualifications applied and supporting documentation.

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.

9613470.3127

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.

9613470.3129

ATTACHMENT 2

SUMMARY OF DATA QUALIFICATIONS

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

DATA QUALIFICATION SUMMARY - FORM B-7

SDG:W0755-QES	REVIEWER: Tom Stapp	DATE: 12-28-95	PAGE 1 OF 1
COMMENTS: INORGANICS			
COMPOUND/ANALYTE	QUALIFIER	SAMPLES AFFECTED	REASON
VANADIUM	J	ALL SAMPLES	MS RECOVERY WAS <75% CONTROL LIMIT
ZINC	J	ALL SAMPLES	MS RECOVERY WAS <75% CONTROL LIMIT
THALLIUM	J	BOGNZ0	CONTAMINANT DETECTED IN METHOD BLANK AT A NEGATIVE LEVEL

9613470.3131

ATTACHMENT 3

QUALIFIED DATA SUMMARY and ANNOTATED LABORATORY REPORTS

Validated Data Summary, Data Package: W0755-QES

	Sample #	BOGNZ0		B0GNZ1		BOGNZ2	
	Date	10/03/95		10/03/95		10/03/95	
	Location						
	Depth						
	Type	Drum Solid		Drum Solid		Drum Solid	
	Comments						
Parameter	Units	Results	Q	Results	Q	Results	Q
ALUMINUM	MG/KG	10800.000		7430.000		12700.000	
ANTIMONY	MG/KG	13.800	U	15.000	B	36.700	B
ARSENIC	MG/KG	34.800		34.700		51.500	
BARIUM	MG/KG	136.000		222.000		146.000	
BERYLLIUM	MG/KG	0.680	B	0.570	B	0.950	B
CADMIUM	MG/KG	1.200	U	1.800	B	2.100	B
CALCIUM	MG/KG	96000.000		53800.000		125000.000	
CHROMIUM	MG/KG	96.200		338.000		251.000	
COBALT	MG/KG	13.000	B	16.600	B	19.400	B
COPPER	MG/KG	88.400		202.000		257.000	
IRON	MG/KG	38900.000		188000.000		184000.000	
LEAD	MG/KG	9.500		228.000		8.300	
MAGNESIUM	MG/KG	6000.000		8160.000		6750.000	
MANGANESE	MG/KG	593.000		2090.000		1970.000	
NICKEL	MG/KG	38.600		173.000		133.000	
POTASSIUM	MG/KG	1730.000	B	1240.000		1830.000	
SELENIUM	MG/KG	0.260	U	0.260	U	0.260	U
SILVER	MG/KG	3.000	U	3.000	U	3.000	U
SODIUM	MG/KG	9740.000		6190.000		4490.000	
THALLIUM	MG/KG	1.500	J	8.500		7.600	
VANADIUM	MG/KG	53.700	J	32.900	J	40.600	J
ZINC	MG/KG	156.000	J	140.000	J	206.000	J

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

Verified
TMS 12-28-95

9613470.3133

U.S. EPA - CLP

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

B0GNZ0

o Name: QUANTERRA_MO Contract: 550.105

o Code: ITMO Case No.: SAS No.: SDG No.: W0755

trix (soil/water): SOIL Lab Sample ID: 9489-001

vel (low/med): LOW Date Received: 10/04/95

Solids: 100.0

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	10800			P
7440-36-0	Antimony	13.8	U		P
7440-38-2	Arsenic	34.8			P
7440-39-3	Barium	136			P
7440-41-7	Beryllium	0.68	B		P
7440-43-9	Cadmium	1.2	U		P
7440-70-2	Calcium	96000			P
7440-47-3	Chromium	96.2			P
7440-48-4	Cobalt	13.0	B		P
7440-50-8	Copper	88.4			P
7439-89-6	Iron	38900			P
7439-92-1	Lead	9.5			P
7439-95-4	Magnesium	6000			P
7439-96-5	Manganese	593			P
7440-02-0	Nickel	38.6			P
7440-09-7	Potassium	1730	B		P
7782-49-2	Selenium	0.26	U		P
7440-22-4	Silver	3.0	U	N	P
7440-23-5	Sodium	9740			P
7440-28-0	Thallium	1.5			P
7440-62-2	Vanadium	53.7		N	P
7440-66-6	Zinc	156		N	P

Q

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FORM I - IN

SW-846

TMc 12-28-95

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U.S. EPA - CLP

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

B0GNZ1

ab Name: QUANTERRA_MO Contract: 550.105

ab Code: ITMO Case No.: SAS No.: SDG No.: W0755

atrix (soil/water): SOIL Lab Sample ID: 9489-002

evel (low/med): LOW Date Received: 10/04/95

Solids: 100.0

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

CAS No.	Analyte	Concentration	C	Q	M	Q
7429-90-5	Aluminum	7430			P	
7440-36-0	Antimony	15.0	B		P	
7440-38-2	Arsenic	34.7			P	
7440-39-3	Barium	222			P	
7440-41-7	Beryllium	0.57	B		P	
7440-43-9	Cadmium	1.8	B		P	
7440-70-2	Calcium	53800			P	
7440-47-3	Chromium	338			P	
7440-48-4	Cobalt	16.6	B		P	
7440-50-8	Copper	202			P	
7439-89-6	Iron	188000			P	
7439-92-1	Lead	228			P	
7439-95-4	Magnesium	8160			P	
7439-96-5	Manganese	2090			P	
7440-02-0	Nickel	173			P	
7440-09-7	Potassium	1240			P	
7782-49-2	Selenium	0.26	U		P	
7440-22-4	Silver	3.0	U	N	P	
7440-23-5	Sodium	6190			P	
7440-28-0	Thallium	8.5			P	
7440-62-2	Vanadium	32.9		N	P	J
7440-66-6	Zinc	140		N	P	J

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U.S. EPA - CLP

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

B0GNZ2

Lab Name: QUANTERRA_MO Contract: 550.105

Lab Code: ITMO Case No.: SAS No.: SDG No.: W0755

Matrix (soil/water): SOIL Lab Sample ID: 9489-003

Level (low/med): LOW Date Received: 10/04/95

% Solids: 100.0

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

CAS No.	Analyte	Concentration	C	Q	M	Q
7429-90-5	Aluminum	12700			P	
7440-36-0	Antimony	36.7	B		P	
7440-38-2	Arsenic	51.5			P	
7440-39-3	Barium	146			P	
7440-41-7	Beryllium	0.95	B		P	
7440-43-9	Cadmium	2.1	B		P	
7440-70-2	Calcium	125000			P	
7440-47-3	Chromium	251			P	
7440-48-4	Cobalt	19.4	B		P	
7440-50-8	Copper	257			P	
7439-89-6	Iron	184000			P	
7439-92-1	Lead	8.3			P	
7439-95-4	Magnesium	6750			P	
7439-96-5	Manganese	1970			P	
7440-02-0	Nickel	133			P	
7440-09-7	Potassium	1830			P	
7782-49-2	Selenium	0.26	U		P	
7440-22-4	Silver	3.0	U	N	P	
7440-23-5	Sodium	4490			P	
7440-28-0	Thallium	7.6			P	
7440-62-2	Vanadium	40.6		N	P	J
7440-66-6	Zinc	206		N	P	J

Color Before: Clarity Before: Texture:

Color After: Clarity After: Artifacts:

Comments:

FORM I - IN

SW-846

TMS 12-28-95

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9613470.3136

ATTACHMENT 4

LABORATORY NARRATIVE and CHAIN-OF-CUSTODY DOCUMENTATION

9613470.3157

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

October 24, 1995

Attention: Joan Kessner

OCT 1995 RECEIVED Data Log In

Project number	:	550.105
Date Received by Lab	:	October 4, 1995
Number of Samples	:	Three (3)
Sample Type	:	Solid
SDG Number	:	W0755
Data Deliverable	:	Summary

I. Introduction

On October 4, 1995, three (3) solid 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 ID's:

St Louis ID	BHI ID	Richland ID	Matrix	Date of Receipt
9489-001	B0GNZ0	51005301	Solid	10/04/95
9489-002	B0GNZ1	51005302	Solid	10/04/95
9489-003	B0GNZ2	51005303	Solid	10/04/95

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.

TMP 12-28-95

Quanterra
Environmental Services

Analyses requested: ICP metals by EPA method 6010 and Arsenic, Lead, Selenium, and Thallium by Trace. Formate, Chloride, Fluoride, Nitrate, Phosphate, and Sulfate by EPA method 300.0. Sulfide by EPA method 9030. Cyanide by EPA method 9010. PH by EPA method 9045.

III. Quality Control

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

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

Percent solids was not determined for samples in SDG W0755. Due to software configuration, the CLP forms list solid sample result units as " dry weight" and % solids as "100". The results on the forms are actually mg/Kg as is and are not corrected for percent solids. The figure of 100 was used as percent solids for calculation purposes only and does not represent measured solids content of the samples.

TMS 12-28-95
~~000000~~ B1 4

Quanterra
Environmental Services

All the samples in SDG W0755 required dilution due to interelement interferences. The instrument software flagged the undiluted run with an error code indicating that an interferant, in this case Calcium for 9489-001and 9489-003 and Iron for 9489-002, was interfering with the analysis of most of the elements requested. The samples were diluted and reanalyzed without interference errors.

The Matrix Spike recovery for the Sulfide analysis on sample 9489-001 was outside of the suggested limits of 75-125%.

The Relative Percent Difference could not be calculated due to the values being below the detection limits for sample 9489-001 and it's duplicate on the Sulfide analysis.

In order to clarify the Formate peaks from the Fluoride peaks, the entire batch was reprinted showing only the four minutes of run and reintegrated to even out the baseline.

The Relative Percent Difference could not be calculated due to the values being below the detection limits for sample 9489-001 and its duplicate on the Phosphate analysis.

The Matrix Spike recoveries for the Sulfate and Nitrite analyses on sample 9489-001 were outside of the suggested limits of 75-125% due to the Nitrite, Phosphate, and Sulfate sample concentrations exceeding the spike concentrations by a factor of four or more.

The retention times were entered into the computer program incorrectly, so it failed to identify the peaks on the calibration curve. The correct retention times were then entered correctly and the data for the calibration curve was regenerated.

Samples, 9489-001, 9489-001DUP, 9489-001MS, 9489-002 and 9489-003 were manually integrated for Fluoride to level the baseline.

TMB 12-28-95

9613470.3140

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\hanw0755.nar

TMS 12-28-95
~~200205~~ 011

Bechtel Hanford, Inc.

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

Data Turnaround: X Priority / Normal

Collector: D. Bowers, M. Mehlhorn	Company Contact: Dave Encke	Telephone: 373-3461
Project Designation: Concrete Removal Characterization	Sampling Location: 183-H Solar Evaporation Basin Project	SAF No.: B95-106
Ice Chest No.: 6R-9	Field Logbook No.: EFL-1133-1	Method of Shipment: Hand Deliver - Government Vehicle
Shipped To: Quanterra	Offsite Property No.	Bill of Lading/Air Bill No.
Possible Sample Hazards/Remarks		
Special Handling and/or Storage: Cool Samples to 4 Degrees Celsius		

Preservation	Cool	Cool	Cool	Cool	None	None
Type of Container	AG	AG	AG	AG	G	P
No. of Container(s)	1	1	1	1	1	1
Volume	40 ml.	60 ml.	60 ml.	60 ml.	1 Liter	20 ml.
SAMPLE ANALYSIS	ICP Metals Include Super-trace	Anions See Item 1 Below	Cyanide	Sulfide	See Item 2 Below	Activity Scan

Sample No.	Matrix*	Date Sampled	Time Sampled							
BOGNZ0, N6003	DS	10-3-95	0917	✓	✓	✓	✓	✓	✓	01
BOGNZ1, N6004	DS	10-3-95	0938	✓	✓	✓	✓	✓	✓	2
BOGNZ2, N6005	DS	10-3-95	0950	✓	✓	✓	✓	✓	✓	3
				5100	53			5100	54	
				100	100	100	100			

CHAIN OF POSSESSION	Sign/Print Names		
Relinquished By: Doug Bowers	Date/Time: 10-3-95 / 1255	Received By: B. Whitten	Date/Time: 1255 10-3-95
Relinquished By: B. Whitten	Date/Time: 10-4-95 / 1015	Received By: [illegible]	Date/Time: 1017 10-4-95
Relinquished By	Date/Time	Received By	Date/Time
Relinquished By	Date/Time	Received By	Date/Time

SPECIAL INSTRUCTIONS

Item 1 - Anoins - ICF -- F, Cl, SO4, PO4, NO2, NO3, formate and pH

Item 2 - Gross Alpha, Gross Beta; u-234, -235, -238; Tc-99; Gamma Spec.

SDG W0755

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

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0117

9613470.3142

ATTACHMENT 5

DATA VALIDATION SUPPORTING DOCUMENTATION

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: 183 H Basin D&D Surface Removal			DATA PACKAGE:		
VALIDATOR: T. Stapp		LAB: QUANTERRA		DATE: 12-28-95	
CASE:			SDG: WO755-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		
BOGNZO	/ DRUM	SOLIDS
BOGNZ1	↓	↓
BOGNZ2	↓	↓

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:

	Collected:	Analyzed:	DAYS:
BOGNZO	10-03-95	10-10, 11-95	≤ 180
BOGNZ1	↓	↓ ↓	↓
BOGNZ2	↓	↓ ↓	↓

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: Raw data not provided and not evaluated.

4. BLANKS

Were ICB and CCB checks performed for all applicable analyses? Yes No (N/A) NOTE ①
Are ICB and CCB results acceptable? . . . . . Yes No (N/A)
Were preparation blanks analyzed? . . . . . (Yes) No N/A
Are preparation blank results acceptable? . . NOTE ② . . . . Yes (No) N/A
Were field/trip blanks analyzed? . . . . . Yes No (N/A)
Are field/trip blank results acceptable? . . . . . Yes No (N/A)
Comments: ① Raw data for CCB and ICB is provided but is not included for Level C validation procedures. Evaluation is not performed.
② Thallium detected @ a negative concentration and qualifies BOGNZO result as estimated (J).

5. ACCURACY

Were spike samples analyzed? . . . . . (Yes) No N/A
Are spike sample recoveries acceptable? . . . . NOTE ① . . . Yes (No) N/A
Were laboratory control samples (LCS) analyzed? . . . . . (Yes) No N/A
Are LCS recoveries acceptable? . . . . . (Yes) No N/A
Comments: ① V and Zn qualify associated samples as estimated (J/UJ).
See attached MS summary.

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

6. PRECISION

Were laboratory duplicates analyzed? . . . . . Yes No 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? . . . . . Yes No N/A
Are field split RPD values acceptable? . . . . . Yes No N/A

Comments:

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:

8. REPORTED RESULTS AND DETECTION LIMITS

re results reported for all requested analyses? . . . . . Yes No N/A
re all results supported in the raw data? . . . . . Yes No N/A
re results calculated properly? . . . . . Yes No N/A
o results meet the CRDLs? . . . . . Yes No N/A

omments:

9613470.3146

U.S. EPA - CLP

5A
SPIKE SAMPLE RECOVERY
Summary

EPA SAMPLE NO.

B0GNZ0SD

b Name: QUANTERRA_MO Contract: 550.105

b Code: ITMO Case No.: SAS No.: SDG No.: W0755

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

Solids for Sample: 100.0

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
luminum									NR
ntimony	80-120	40.9450		13.8000	U	50.00	81.9		P
rsenic	80-120	233.0390		34.8200		200.00	99.1		P
arium	80-120	314.2270		136.0490		200.00	89.1		P
eryllium	80-120	5.3700		0.6800	B	5.00	93.8		P
admium	80-120	4.6460		1.1500	U	5.00	92.9		P
alcium									NR
hromium		120.7230		96.1910		20.00	122.7		P
obalt	80-120	54.3500		12.9900	B	50.00	82.7		P
opper	80-120	109.3140		88.4210		25.00	83.6		P
ron									NR
ead	80-120	53.6940		9.4970		50.00	88.4		P
agnesium									NR
anganese		608.1030		593.0810		50.00	30.0		P
ickel	80-120	80.5050		38.5550		50.00	83.9		P
otassium									NR
elenium	80-120	185.4310		0.2600	U	200.00	92.7		P
ilver	80-120	3.9250	B	3.0000	U	5.00	78.5	N	P
odium									NR
hallium	80-120	187.0930		1.4880		200.00	92.8		P
anadium	80-120	83.6550		53.6580		50.00	60.0	N	P
inc	80-120	178.2850		155.7980		50.00	45.0	N	P

mments: Associated results for the circled analytes are qualified as estimated (J/UJ); for all samples.

FORM V (Part 1) - IN SW-846

TAS 12-28-95

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U.S. EPA - CLP

3
BLANKS

Lab Name: QUANTERRA_MO Contract: 550.105

Lab Code: ITMO Case No.: _____ SAS No.: _____ SDG No.: W0755

Preparation Blank Matrix (soil/water): SOIL

Preparation Blank Concentration Units (ug/L or mg/kg): MG/KG

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Prepa-ration Blank mg/kg	C	M
Aluminum	22.3	U	22.3	U	22.3	U	22.3	U	3.912	B	P
Antimony	27.6	U	27.6	U	27.6	U	27.6	U	2.760	U	P
Arsenic	3.1	U	3.1	U	3.1	U	3.1	U	0.310	U	P
Barium	0.8	U	0.8	U	0.8	U	0.8	U	0.080	U	P
Beryllium	1.0	B	0.6	U	0.6	U	0.6	B	0.060	U	P
Cadmium	2.3	U	2.3	U	2.3	U	2.3	U	0.230	U	P
Calcium	18.8	U	33.3	B	18.8	U	24.7	B	3.793	B	P
Chromium	3.7	U	3.7	U	3.7	U	3.7	U	0.370	U	P
Cobalt	4.2	U	4.2	U	4.2	U	4.2	U	0.420	U	P
Copper	3.6	U	3.6	U	5.5	B	3.6	U	1.016	B	P
Iron	7.8	B	21.1	B	25.3	B	7.4	B	1.232	B	P
Lead	0.8	U	0.8	U	0.8	U	0.8	U	0.082	B	P
Magnesium	63.3	U	63.3	U	63.3	U	63.3	U	8.586	B	P
Manganese	1.5	B	1.6	B	2.9	B	1.5	B	0.090	U	P
Nickel	11.3	U	11.3	U	11.3	U	11.3	U	1.130	U	P
Potassium	1382.4	U	1382.4	U	1382.4	U	1382.4	U	138.240	U	P
Selenium	2.6	U	4.5	B	2.6	U	2.6	U	0.260	U	P
Silver	6.0	U	6.0	U	6.0	U	6.0	U	0.600	U	P
Sodium	27.7	U	28.0	B	47.0	B	64.0	B	5.802	B	P
Thallium	4.1	U	-5.8	B	-4.6	B	4.1	U	-0.729	B	P
Vanadium	4.3	U	4.3	U	4.3	U	4.3	U	0.593	B	P
Zinc	1.7	U	1.7	U	1.7	U	1.7	U	0.322	B	P

Thallium absolute value = 7.29 and qualifies ~~all~~ the sample result for BOGNZO as estimated (J).

FORM III - IN

SW-846

12-28-95

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029

9613470.3148

MEMORANDUM

TO: 183-H BASIN D&D SURFACE REMOVAL CHARACTERIZATION Project QA Record December 28, 1995

FR: Thomas Stapp, Golder Associates Inc.

RE: GENERAL CHEMISTRY DATA VALIDATION SUMMARY FOR DATA PACKAGE W0755-QES (943-1610.113 755GEN.HBS)

INTRODUCTION

This memo presents the results of data validation for the analyses indicated below on data package WO755-QES prepared by Quanterra Environmental Services. Sample information is provided in the following table.

SAMPLE ID	COMMENTS	ANALYSIS	MEDIA
BOGNZ0		INORGANICS	DRUM SOLID
BOGNZ1			DRUM SOLID
BOGNZ2		SEE ATTACHMENT 4	DRUM SOLID

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.

Detection Limits. Detection limit goals are not specified for solid and soil matrices for the requested analyses, however qualification is not applied for this data quality objective.

Completeness. The data package was complete for all requested analyses. Three samples were validated in this data package with a total of eighty determinations reported, 77 of which were deemed valid. This results in a completeness of 96%, which meets the 90% objective of the work plan.

MAJOR DEFICIENCIES

The following major deficiency was identified during data validation which required qualification of data as unusable.

Holding Time

- The holding time for ortho-phosphate analysis exceeded the limit by a factor of two, qualifying associated non-detect results as rejected (UR). Attachments 2 and 5 provide a summary of the samples affected, data qualifications applied and supporting documentation.

MINOR DEFICIENCIES

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

Holding Time

- The holding time for pH, nitrite, and nitrate analyses exceeded the limit by a factor of two, qualifying associated results as estimated (J). Attachments 2 and 5 provide a summary of the samples affected, data qualifications applied and supporting documentation.

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.

9613470.3150

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

DATA QUALIFICATION SUMMARY

SDG: WO755-QES	VALIDATOR: T.Stapp	DATE: 12-28-95	PAGE: 1 OF 1
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
NITRITE	J	ALL SAMPLES	HOLDING TIME IS EXCEEDED BY >2 TIMES THE LIMIT
NITRATE	J	ALL SAMPLES	HOLDING TIME IS EXCEEDED BY >2 TIMES THE LIMIT
ORTHO-PHOSPHATE	UR	ALL SAMPLES	HOLDING TIME IS EXCEEDED BY >2 TIMES THE LIMIT
pH	J	ALL SAMPLES	HOLDING TIME IS EXCEEDED BY <2 TIMES THE LIMIT

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ATTACHMENT 3

QUALIFIED DATA SUMMARY and ANNOTATED LABORATORY REPORTS

Validated Data Summary, Data Package: W0755-QES

	Sample #	BOGNZ0		BOGNZ1		BOGNZ2	
	Date	10/3/95		10/3/95		10/3/95	
	Location						
	Depth						
	Type	Drum Solid		Drum Solid		Drum Solid	
	Comments						
Parameter	Units	Results	Q	Results	Q	Results	Q
NO3-N	UG/G	861	J	383	J	515	J
NO2-N	UG/G	381	J	3.41	J	4.44	J
ORTHO-PO4	UG/G	4.97	UR	4.99	UR	4.97	UR
SO4	UG/G	820		430		227	
CL	UG/G	142		13.8		38.5	
F	UG/G	29.3		42.6		33.3	
BR	UG/G						
pH	pH	12.04	J	10.8	J	12.11	J
SULFIDE	UG/G	10.1	U	48.9		9.96	U
FORMATE	UG/G	27.2		38.8		8	
CN	UG/G	2.83		0.56		0.69	

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

Verified HRG
1/11/96

008
Revised HRG
1/11/96

96134/4.3155

9613470.3156

Quanterra
Environmental Services

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

Project: 550.105

*Category: Orthophosphate
Method: EPA 300.0
Matrix: SOLID

Sample Date : 10/03/95
Receipt Date : 10/04/95
Report Date : 10/17/95

Client ID	Quanterra ID	Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit	Dil.
BOGNZ0	9489-001	Ortho-Phosphate	14265-44-2	QCBLK80505-2	10/13/95	10/13/95	4.97	UG/G	~~U~~ UR Q	4.97	1
BOGNZ0	9489-001DUP	Ortho-Phosphate	14265-44-2	QCBLK80505-2	10/13/95	10/13/95	4.96	UG/G	U	4.96	1
BOGNZ0	9489-001MS	Ortho-Phosphate	14265-44-2	QCBLK80505-2	10/13/95	10/13/95	108	%REC			1
BOGNZ1	9489-002	Ortho-Phosphate	14265-44-2	QCBLK80505-2	10/13/95	10/13/95	4.99	UG/G	~~U~~ UR	4.99	1
BOGNZ2	9489-003	Ortho-Phosphate	14265-44-2	QCBLK80505-3	10/13/95	10/13/95	4.97	UG/G	~~U~~ UR	4.97	1
NA	QCBLK80505-2	Ortho-Phosphate	14265-44-2	QCBLK80505-2	10/13/95	10/13/95	5.00	UG/G	U	5.00	1
NA	QCBLK80505-3	Ortho-Phosphate	14265-44-2	QCBLK80505-3	10/13/95	10/13/95	5.00	UG/G	U	5.00	1
NA	QCLCS80505-2	Ortho-Phosphate	14265-44-2	QCBLK80505-2	10/13/95	10/13/95	97	%REC			1
NA	QCLCS80505-3	Ortho-Phosphate	14265-44-2	QCBLK80505-3	10/13/95	10/13/95	103	%REC			1

TNR 12-28-95

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Quanterra
Environmental Services

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

Project: 550.105

Category: SULFATE
Method: EPA 300.0
Matrix: SOLID

Sample Date : 10/03/95
Receipt Date : 10/04/95
Report Date : 10/17/95

Client ID	Quanterra ID	Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit	Dil.
BOGNZ0	9489-001	Sulfate	14808-79-8	QCBLK80505-2	10/13/95	10/13/95	820	UG/G		24.8	5
BOGNZ0	9489-001DUP	Sulfate	14808-79-8	QCBLK80505-2	10/13/95	10/13/95	794	UG/G		24.8	5
BOGNZ0	9489-001MS	Sulfate	14808-79-8	QCBLK80505-2	10/13/95	10/13/95	46	%REC			10
BOGNZ1	9489-002	Sulfate	14808-79-8	QCBLK80505-2	10/13/95	10/13/95	430	UG/G		24.9	5
BOGNZ2	9489-003	Sulfate	14808-79-8	QCBLK80505-3	10/13/95	10/13/95	227	UG/G		9.94	2
NA	QCBLK80505-2	Sulfate	14808-79-8	QCBLK80505-2	10/13/95	10/13/95	5.00	UG/G	U	5.00	1
NA	QCBLK80505-3	Sulfate	14808-79-8	QCBLK80505-3	10/13/95	10/13/95	5.00	UG/G	U	5.00	1
NA	QCLCS80505-2	Sulfate	14808-79-8	QCBLK80505-2	10/13/95	10/13/95	92	%REC			1
NA	QCLCS80505-3	Sulfate	14808-79-8	QCBLK80505-3	10/13/95	10/13/95	95	%REC			1

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Quanterra
Environmental Services

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

Project: 550.105

Category: CHLORIDE
Method: EPA 300.0
Matrix: SOLID

Sample Date : 10/03/95
Receipt Date : 10/04/95
Report Date : 10/17/95

Client ID	Quanterra ID	Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit	Dil.
BOGNZ0	9489-001	Chloride	16887-00-6	QCBLK80505-2	10/13/95	10/13/95	142	UG/G		9.94	5
BOGNZ0	9489-001DUP	Chloride	16887-00-6	QCBLK80505-2	10/13/95	10/13/95	141	UG/G		9.91	5
BOGNZ0	9489-001MS	Chloride	16887-00-6	QCBLK80505-2	10/13/95	10/13/95	99	%REC			10
BOGNZ1	9489-002	Chloride	16887-00-6	QCBLK80505-2	10/13/95	10/13/95	13.8	UG/G		2.00	1
BOGNZ2	9489-003	Chloride	16887-00-6	QCBLK80505-3	10/13/95	10/13/95	38.5	UG/G		1.99	1
NA	QCBLK80505-2	Chloride	16887-00-6	QCBLK80505-2	10/13/95	10/13/95	2.00	UG/G	U	2.00	1
NA	QCBLK80505-3	Chloride	16887-00-6	QCBLK80505-3	10/13/95	10/13/95	2.00	UG/G	U	2.00	1
NA	QCLCS80505-2	Chloride	16887-00-6	QCBLK80505-2	10/13/95	10/13/95	98	%REC			1
NA	QCLCS80505-3	Chloride	16887-00-6	QCBLK80505-3	10/13/95	10/13/95	86	%REC			1

TMB 12-28-95

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Quanterra
Environmental Services

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

Project: 550.105

*Category: FLUORIDE
Method: EPA 300.0
Matrix: SOLID

Sample Date : 10/03/95
Receipt Date : 10/04/95
Report Date : 10/17/95

Client ID	Quanterra ID	Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit	Dil.
BOGNZ0	9489-001	Fluoride	16984-48-8	QCBLK80505-2	10/13/95	10/13/95	29.3	UG/G		9.94	10
BOGNZ0	9489-001DUP	Fluoride	16984-48-8	QCBLK80505-2	10/13/95	10/13/95	31.6	UG/G		9.91	10
BOGNZ0	9489-001MS	Fluoride	16984-48-8	QCBLK80505-2	10/13/95	10/13/95	81	%REC			10
BOGNZ1	9489-002	Fluoride	16984-48-8	QCBLK80505-2	10/13/95	10/13/95	42.6	UG/G		4.99	5
BOGNZ2	9489-003	Fluoride	16984-48-8	QCBLK80505-3	10/13/95	10/13/95	33.3	UG/G		4.97	5
NA	QCBLK80505-2	Fluoride	16984-48-8	QCBLK80505-2	10/13/95	10/13/95	1.00	UG/G	U	1.00	1
NA	QCBLK80505-3	Fluoride	16984-48-8	QCBLK80505-3	10/13/95	10/13/95	1.00	UG/G	U	1.00	1
NA	QCLCS80505-2	Fluoride	16984-48-8	QCBLK80505-2	10/13/95	10/13/95	95	%REC	✓		1
NA	QCLCS80505-3	Fluoride	16984-48-8	QCBLK80505-3	10/13/95	10/13/95	94	%REC	✓		1

TMB 12-28-95

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Quanterra
Environmental Services

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

Project: 550.105

*Category: pH EPA 9045
Method: EPA 9045
Matrix: SOLID

Sample Date : 10/03/95
Receipt Date : 10/04/95
Report Date : 10/17/95

Client ID	Quanterra ID	Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit	Dil.
BOGNZ0	9489-001	pH	C-006	QCBLK80150-1	10/11/95	10/11/95	12.04	PH	J		1
BOGNZ0	9489-001DUP	pH	C-006	QCBLK80150-1	10/11/95	10/11/95	12.05	PH			1
BOGNZ1	9489-002	pH	C-006	QCBLK80150-1	10/11/95	10/11/95	10.80	PH	J		1
BOGNZ2	9489-003	pH	C-006	QCBLK80150-2	10/11/95	10/11/95	12.11	PH	J		1
NA	QCBLK80150-1	pH	C-006	QCBLK80150-1	10/11/95	10/11/95	5.16	PH			1
NA	QCBLK80150-2	pH	C-006	QCBLK80150-2	10/11/95	10/11/95	5.47	PH			1

TMc 12-28-95

TMc 12-28-95

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Quanterra
Environmental Services

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

Project: 550.105

Category: Sulfide EPA 9030
Method: EPA 9030
Matrix: SOLID

Sample Date : 10/03/95
Receipt Date : 10/04/95
Report Date : 10/17/95

Client ID	Quanterra ID	Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit	Dil.
B0GNZ0	9489-001	Sulfide	18496-25-8	QCBLK80054-1	10/10/95	10/10/95	10.1	UG/G	U	10.1	1
B0GNZ0	9489-001DUP	Sulfide	18496-25-8	QCBLK80054-1	10/10/95	10/10/95	10.1	UG/G	U	10.1	1
B0GNZ0	9489-001MS	Sulfide	18496-25-8	QCBLK80054-1	10/10/95	10/10/95	0	%REC			1
B0GNZ1	9489-002	Sulfide	18496-25-8	QCBLK80054-1	10/10/95	10/10/95	48.9	UG/G		10.2	1
B0GNZ2	9489-003	Sulfide	18496-25-8	QCBLK80054-1	10/10/95	10/10/95	9.96	UG/G	U	9.96	1
NA	QCBLK80054-1	Sulfide	18496-25-8	QCBLK80054-1	10/10/95	10/10/95	10.1	UG/G	U	10.1	1
NA	QCLCS80054-1	Sulfide	18496-25-8	QCBLK80054-1	10/10/95	10/10/95	80	%REC	✓		1

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Quanterra
Environmental Services

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

Project: 550.105

Category: Formate EPA 300.0
Method: EPA 300.0
Matrix: SOLID

Sample Date : 10/03/95
Receipt Date : 10/04/95
Report Date : 10/17/95

Client ID	Quanterra ID	Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit	Dil.
BOGNZ0	9489-001	Formate	00-00-0	QCBLK80179-1	10/10/95	10/10/95	27.2	UG/G		4.97	1
BOGNZ0	9489-001DUP	Formate	00-00-0	QCBLK80179-1	10/10/95	10/10/95	26.4	UG/G		4.97	1
BOGNZ0	9489-001MS	Formate	00-00-0	QCBLK80179-1	10/10/95	10/10/95	103	%REC			1
BOGNZ1	9489-002	Formate	00-00-0	QCBLK80179-1	10/10/95	10/10/95	38.8	UG/G		4.98	1
BOGNZ2	9489-003	Formate	00-00-0	QCBLK80179-1	10/10/95	10/10/95	8.00	UG/G		4.85	1
NA	QCBLK80179-1	Formate	00-00-0	QCBLK80179-1	10/10/95	10/10/95	5.00	UG/G	U	5.00	1
NA	QCLCS80179-1	Formate	00-00-0	QCBLK80179-1	10/10/95	10/10/95	110	%REC	✓		1

TMD 12-28-95

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Quanterra
Environmental Services

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

Project: 550.105

Category: Cyanide EPA 9010
Method: EPA 9010
Matrix: SOLID

Sample Date : 10/03/95
Receipt Date : 10/04/95
Report Date : 10/17/95

Client ID	Quanterra ID	Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit	Dil.
BOGNZ0	9489-001	Cyanide	57-12-5	QCBLK79945-1	10/09/95	10/11/95	2.83	UG/G		0.50	1
BOGNZ0	9489-001DUP	Cyanide	57-12-5	QCBLK79945-1	10/09/95	10/11/95	2.39	UG/G		0.50	1
BOGNZ0	9489-001MS	Cyanide	57-12-5	QCBLK79945-1	10/09/95	10/11/95	87	%REC			1
BOGNZ1	9489-002	Cyanide	57-12-5	QCBLK79945-1	10/09/95	10/11/95	0.56	UG/G		0.50	1
BOGNZ2	9489-003	Cyanide	57-12-5	QCBLK79945-2	10/09/95	10/11/95	0.69	UG/G		0.50	1
NA	QCBLK79945-1	Cyanide	57-12-5	QCBLK79945-1	10/09/95	10/11/95	0.50	UG/G	U	0.50	1
NA	QCBLK79945-2	Cyanide	57-12-5	QCBLK79945-2	10/09/95	10/11/95	0.50	UG/G	U	0.50	1
NA	QCLCS79945-1	Cyanide	57-12-5	QCBLK79945-1	10/09/95	10/11/95	96	%REC	✓		1
NA	QCLCS79945-2	Cyanide	57-12-5	QCBLK79945-2	10/09/95	10/11/95	95	%REC	✓		1

TMD 12-28-95

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Quanterra
Environmental Services

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

Project: 550.105

Category: Nitrate
Method: EPA 300.0
Matrix: SOLID

Sample Date : 10/03/95
Receipt Date : 10/04/95
Report Date : 10/17/95

Client ID	Quanterra ID	Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual	Detection Limit	Dil.
BOGNZ0	9489-001	Nitrate-N	14797-55-8	QCBLK80505-2	10/13/95	10/13/95	861	UG/G	~~R~~ Q J	39.8	200
BOGNZ0	9489-001DUP	Nitrate-N	14797-55-8	QCBLK80505-2	10/13/95	10/13/95	907	UG/G		39.7	200
BOGNZ0	9489-001MS	Nitrate-N	14797-55-8	QCBLK80505-2	10/13/95	10/13/95	108	%REC			200
BOGNZ1	9489-002	Nitrate-N	14797-55-8	QCBLK80505-2	10/13/95	10/13/95	383	UG/G	~~R~~ J	20.0	100
BOGNZ2	9489-003	Nitrate-N	14797-55-8	QCBLK80505-3	10/13/95	10/13/95	515	UG/G	~~R~~ J	19.9	100
NA	QCBLK80505-2	Nitrate-N	14797-55-8	QCBLK80505-2	10/13/95	10/13/95	0.20	UG/G	U	0.20	1
NA	QCBLK80505-3	Nitrate-N	14797-55-8	QCBLK80505-3	10/13/95	10/13/95	0.20	UG/G	U	0.20	1
NA	QCLCS80505-2	Nitrate-N	14797-55-8	QCBLK80505-2	10/13/95	10/13/95	100	%REC	✓		1
NA	QCLCS80505-3	Nitrate-N	14797-55-8	QCBLK80505-3	10/13/95	10/13/95	99	%REC	✓		1

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Quanterra
Environmental Services

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

Project: 550.105

*Category: Nitrite
Method: EPA 300.0
Matrix: SOLID

Sample Date : 10/03/95
Receipt Date : 10/04/95
Report Date : 10/17/95

Client ID	Quanterra ID	Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit	Dil.
BOGNZ0	9489-001	Nitrite-N	14797-65-0	QCBLK80505-2	10/13/95	10/13/95	381	UG/G	~~R~~ J Q	39.8	200
BOGNZ0	9489-001DUP	Nitrite-N	14797-65-0	QCBLK80505-2	10/13/95	10/13/95	413	UG/G		39.7	200
BOGNZ0	9489-001MS	Nitrite-N	14797-65-0	QCBLK80505-2	10/13/95	10/13/95	616	%REC			200
BOGNZ1	9489-002	Nitrite-N	14797-65-0	QCBLK80505-2	10/13/95	10/13/95	3.41	UG/G	~~R~~ J	0.20	1
BOGNZ2	9489-003	Nitrite-N	14797-65-0	QCBLK80505-3	10/13/95	10/13/95	4.44	UG/G	~~R~~ J	0.40	2
NA	QCBLK80505-2	Nitrite-N	14797-65-0	QCBLK80505-2	10/13/95	10/13/95	0.20	UG/G	U	0.20	1
NA	QCBLK80505-3	Nitrite-N	14797-65-0	QCBLK80505-3	10/13/95	10/13/95	0.20	UG/G	U	0.20	1
NA	QCLCS80505-2	Nitrite-N	14797-65-0	QCBLK80505-2	10/13/95	10/13/95	102	%REC			1
NA	QCLCS80505-3	Nitrite-N	14797-65-0	QCBLK80505-3	10/13/95	10/13/95	82	%REC			1

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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

OCT 1995
RECEIVED
Data
Log In

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

October 24, 1995

Attention: Joan Kessner

Project number	:	550.105
Date Received by Lab	:	October 4, 1995
Number of Samples	:	Three (3)
Sample Type	:	Solid
SDG Number	:	W0755
Data Deliverable	:	Summary

I. Introduction

On October 4, 1995, three (3) solid 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 ID's:

St Louis ID	BHI ID	Richland ID	Matrix	Date of Receipt
9489-001	B0GNZ0	51005301	Solid	10/04/95
9489-002	B0GNZ1	51005302	Solid	10/04/95
9489-003	B0GNZ2	51005303	Solid	10/04/95

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.

TMS 12-28-95
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Environmental Services

Analyses requested: ICP metals by EPA method 6010 and Arsenic, Lead, Selenium, and Thallium by Trace. Formate, Chloride, Fluoride, Nitrate, Phosphate, and Sulfate by EPA method 300.0. Sulfide by EPA method 9030. Cyanide by EPA method 9010. PH by EPA method 9045.

III. Quality Control

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

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

Percent solids was not determined for samples in SDG W0755. Due to software configuration, the CLP forms list solid sample result units as " dry weight" and % solids as "100". The results on the forms are actually mg/Kg as is and are not corrected for percent solids. The figure of 100 was used as percent solids for calculation purposes only and does not represent measured solids content of the samples.

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Environmental Services

All the samples in SDG W0755 required dilution due to interelement interferences. The instrument software flagged the undiluted run with an error code indicating that an interferant, in this case Calcium for 9489-001and 9489-003 and Iron for 9489-002, was interfering with the analysis of most of the elements requested. The samples were diluted and reanalyzed without interference errors.

The Matrix Spike recovery for the Sulfide analysis on sample 9489-001 was outside of the suggested limits of 75-125%.

The Relative Percent Difference could not be calculated due to the values being below the detection limits for sample 9489-001 and it's duplicate on the Sulfide analysis.

In order to clarify the Formate peaks from the Fluoride peaks, the entire batch was reprinted showing only the four minutes of run and reintegrated to even out the baseline.

The Relative Percent Difference could not be calculated due to the values being below the detection limits for sample 9489-001 and its duplicate on the Phosphate analysis.

The Matrix Spike recoveries for the Sulfate and Nitrite analyses on sample 9489-001 were outside of the suggested limits of 75-125% due to the Nitrite, Phosphate, and Sulfate sample concentrations exceeding the spike concentrations by a factor of four or more.

The retention times were entered into the computer program incorrectly, so it failed to identify the peaks on the calibration curve. The correct retention times were then entered correctly and the data for the calibration curve was regenerated.

Samples, 9489-001, 9489-001DUP, 9489-001MS, 9489-002 and 9489-003 were manually integrated for Fluoride to level the baseline.

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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\hanw0755.nar

TB 12-28-95

Bechtel Hanford, Inc.

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

Page ____ of ____

Data Turnaround: X Priority / Normal

Collector: D. Bowers, M. Mehlhorn	Company Contact: Dave Encke	Telephone: 373-3461
Project Designation: Concrete Removal Characterization	Sampling Location: 183-H Solar Evaporation Basin Project	SAF No.: B95-106
Ice Chest No.: ER-9	Field Logbook No.: EFL-1133-1	Method of Shipment: Hand Deliver - Government Vehicle
Shipped To: Quanterra	Offsite Property No.	Bill of Lading/Air Bill No.
Possible Sample Hazards/Remarks		
Special Handling and/or Storage: Cool Samples to 4 Degrees Celsius		

Preservation	Cool	Cool	Cool	Cool	None	None				
Type of Container	AG	AG	AG	AG	G	P				
No. of Container(s)	1	1	1	1	1	1				
Volume	40 ml.	60 ml.	60 ml.	60 ml.	1 Liter	20 ml.				
SAMPLE ANALYSIS	ICP Metals Include Super-trace	Anions See Item 1 Below	Cyanide	Sulfide	See Item 2 Below	Activity Scan				

Sample No.	Matrix*	Date Sampled	Time Sampled											
BOGN20, N6003	DS	10-3-95	0917	✓	✓	✓	✓	✓	✓	01				
BOGN21, N6004	DS	10-3-95	0938	✓	✓	✓	✓	✓	✓	2				
BOGN22, N6005	DS	10-3-95	0950	✓	✓	✓	✓	✓	✓	3				
				5100	53			5100	54					
				100	100	100	100							

CHAIN OF POSSESSION	Sign/Print Names		
Relinquished By: Doug Bowers	Date/Time: 10-3-95 / 1255	Received By: B. Whitten	Date/Time: 1255 10-3-95
Relinquished By: B. Whitten	Date/Time: 10-4-95 / 1015	Received By: [illegible]	Date/Time: 1017 10-4-95
Relinquished By	Date/Time	Received By	Date/Time
Relinquished By	Date/Time	Received By	Date/Time

SPECIAL INSTRUCTIONS

Item 1 - Anoins - ICF -- F, Cl, SO4, PO4, NO2, NO3, formate and pH

Item 2 - Gross Alpha, Gross Beta; u-234, -235, -238; Tc-99; Gamma Spec.

SDG W0755

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

0000009

02

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ATTACHMENT 5

DATA VALIDATION SUPPORTING DOCUMENTATION

GENERAL CHEMISTRY DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: 183 H-Basin D&D Surface Removal			DATA PACKAGE:		
VALIDATOR: T. Staff		LAB: QUANTERRA		DATE: 12-28-95	
CASE:			SDG: W0755-QES		

ANALYSES PERFORMED

☒ Anions/IC	☐ TOC	☐ TOX	☐ TPH-418.1	Oil and Grease	Alkalinity
☐ Ammonia	☐ BOD/COD	☒ Chloride	☐ Chromium-VI	☒ pH	☐ NO_3/NO_2
☒ Sulfate	☐ TDS	☐ TKN	☒ Phosphate	☒ CN	☐
☒ Sulfide	☐	☐	☐	☐	☐

SAMPLES/MATRIX BOGNZO / DRUM SOLIDS
BOGNZ1
BOGNZ2

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: See Hold Time Summary page B-1.

GENERAL CHEMISTRY DATA VALIDATION CHECKLIST

3. INSTRUMENT CALIBRATION

Was initial calibration performed for all applicable analyses? Yes No N/A
Are initial calibration results acceptable? . . . . . Yes No N/A
Was a calibration check performed for all applicable analyses? Yes No N/A
Are calibration check results acceptable? . . . . . Yes No N/A

Comments: Raw data not provided and not evaluated for Level C data validation.

4. BLANKS

Were laboratory blanks analyzed? . . . . . Yes No N/A
Are laboratory blank results acceptable? . . . . . Yes No N/A
Were field/trip blanks analyzed? . . . . . NOTE ① . . . . . Yes No N/A
Are field/trip blank results acceptable? . . . . . Yes No N/A

Comments: ① Field QC was not identified in the VSR and has not been evaluated.

5. ACCURACY

Were spike samples analyzed at the required frequency? NOTE ① . . . . Yes No N/A TMS 12-28-9
Are spike recoveries acceptable? . . . . . Yes No N/A
Were LCS analyses performed at the required frequency? . . . . Yes No N/A
Are LCS recoveries acceptable? . . . . . Yes No N/A

Comments: ① Spike samples not required per D.V. procedures.

6. PRECISION

Were laboratory duplicate samples analyzed at the required frequency? . . . . . Yes No N/A
Are laboratory duplicate sample RPD values acceptable? . . . . Yes No N/A
Are field duplicate RPD values acceptable? . . . . . Yes No N/A
Are field split RPD values acceptable? . . . . . Yes No N/A

GENERAL CHEMISTRY DATA VALIDATION CHECKLIST

Comments: Field QC was not identified in this SDG and will not be evaluated.

7. ANALYTE QUANTITATION

Was analyte quantitation performed properly? . . . . . Yes No N/A

Comments: Raw data not provided.

8. REPORTED RESULTS AND DETECTION LIMITS

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

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

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

Do results meet the CRDLs? . . . . NOTE ① . . . . . Yes No N/A

Comments: ① CRDL's have not been established for Soil and other Solid matrices - No qualif. applied.

HOLDING TIME SUMMARY

SDG: W0755-QES	VALIDATOR: T. Stapp	DATE: 12-28-95	PAGE 1 OF 1
COMMENTS: WET CHEM.			

FIELD SAMPLE ID	ANALYSIS TYPE	DATE SAMPLED	DATE PREPARED	DATE ANALYZED	PREP. HOLDING TIME, DAYS	ANALYSIS HOLDING TIME, DAYS	QUALIFIER
BOGNZ0	F, Cl, NO_3, NO_2	10-03-95	10-13-95	10-13-95	10	10	(R) for NO_2, NO_3
	PO_4, SO_4		↓	↓	10	10	(R) for PO_4
	FORMATE		10-10-95	10-10-95	7	7	NONE
	SULFIDE		10-10-95	10-10-95	7	7	NONE
↓	CN, pH		10-09, 11-95	10-11-95	6(CN), 8(pH)	8	(R) for pH
	~~TMS - pH~~						
BOGNZ1	F, Cl, NO_3, NO_2		10-13-95	10-13-95	10	10	(R) for NO_2, NO_3
	PO_4, SO_4		↓	↓	10	10	(R) for PO_4
	FORMATE		10-10-95	10-10-95	7	7	NONE
	SULFIDE		10-10-95	10-10-95	7	7	NONE
↓	pH, CN		10-09-11-95	10-11-95	6(CN), 8(pH)	8	(R) for pH
BOGNZ2	F, Cl, NO_3, NO_2		10-13-95	10-13-95	10	10	(R) for NO_2, NO_3
	PO_4, SO_4		↓	↓	10	10	(R) for PO_4
	FORMATE		10-10-95	10-10-95	7	7	NONE
	SULFIDE		10-10-95	10-10-95	7	7	NONE
↓	pH, CN	↓	10-09, 11-95	10-11-95	6(CN), 8(pH)	8	(R) for pH
				TMS			