START 9613477.2269

0045303 W0871-QES 164 2

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

SEP 1996 RECEIVED EDMC

JAN 1996 RECEIVED Data Log In

January 24, 1996

Attention: Joan Kessner

Project number	:	550.118
Date Received by Lab	:	January 10, 1996
Number of Samples	:	Eight (8)
Sample Type	:	Soil
SDG Number	:	W0871
Data Deliverable	:	Summary

I. Introduction

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

St Louis ID	WHC ID	Richland ID	Matrix	Date of Receipt
10125-001	B0H0H0	60113501	Soil	01/10/96
10125-002	B0H0H1	60113502	Soil	01/10/96
10125-003	B0H0H2	60113503	Soil	01/10/96
10125-004	B0H0H3	60113504	Soil	01/10/96
10125-005	B0H0H4	60113505	Soil	01/10/96
10125-006	B0H0H5	60113506	Soil	01/10/96
10125-007	B0H0H6	60113507	Soil	01/10/96
10125-008	B0H0H7	60113508	Soil	01/10/96

9613477.1279

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II. Analytical Results/ Methodology

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

Analyses requested: ICP Metals by EPA method 6010 and Mercury by EPA method 7470 following TCLP Extraction by EPA method 1311. Chromium by EPA method 6010. pH by EPA method 9045. Cyanide by EPA Method 335.2. Chloride, Fluoride, Nitrite, Nitrate, Phosphate and Sulfate by EPA Method 300.0. Nitrate/Nitrite by EPA Method 353.1. Sulfide by EPA Method 9030. Hexavalent Chromium by EPA method 3060A performed at QTESRL.

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 were performed per the protocol for the analyses in this SDG. pH analysis uses only Sample Duplicate for matrix QC.

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

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V. Comments

Total Chromium analysis was added after the samples were received and therefore does not appear on the Chain of Custody.

Metals
Due to software limitations all the forms in the SDG W0871 package are labelled "TCLP " even though both Total and TCLP results were reported.

TCLP:
The recoveries of the Matrix Spike Duplicate for the following list of elements was less than 80%, therefore all associated data was flagged with an " N ". All the recoveries for the Matrix Spike were within the 80%-120% range. See NCM # SL-2387.

	% REC
Arsenic	76.4
Barium	76.6
Cadmium	78.7
Chromium	78.7
Lead	78.5
Selenium	78.7

Chromium:
There are no comments or nonconformances associated with the Total Chromium analysis.

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Wet Chemistry

The Relative Percent Differences could not be calculated for the Fluoride, Sulfate, Phosphate and Nitrite analyses due to the values being below the detection limits for sample 10125-001 and its duplicate.

The Relative Percent Differences could not be calculated for the Nitrate/Nitrite analysis due to the values being below the detection limits for sample 10125-001 and its duplicate.

The Relative Percent Differences could not be calculated for the Cyanide analysis due to the values being below the detection limits for sample 10125-001 and its duplicate.

The Relative Percent Differences could not be calculated for the Sulfide analysis due to the values being below the detection limits for sample 10125-001 and its duplicate.

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\hanw0871.nar

Bechtel Hanford, Inc.

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

Data Turnaround: X Priority / Normal

Collector: Doug Bowers	Company Contact: D. B. Encke	Telephone: 373-3461
Project Designation: 183-H Soil Screen/Verification (Loading ramp/Berm pile)	Sampling Location: 183-H Solar Basin	SAF No.: B96-052
Ice Chest No.: ER-17	Field Logbook No.: EFL-1133-1	Method of Shipment: Hand deliver
Shipped To: Quanterra	Offsite Property No.	Bill of Lading/Air Bill No.
Possible Sample Hazards/Remarks: none		
Special Handling and/or Storage		

SAMPLE ANALYSIS: 601135 SDG W0871

Preservation	none	cool to 4C	cool to 4C	cool to 4C	cool to 4C	cool to 4C	none	none		
Type of Container	P/G	P/G	P/G	P/G	P/G	P/G	P/G	P/G		
No. of Container(s)	1	1	1	1	1	1	2	1		
Volume	120 mL	250 mL	60 mL	60 mL	60 mL	60 ml	1 L	20 mL		
%	100	100	100	100	100		601136			
	TCLP Metals	Cyanide	Sulfide	See Item #1 below	NO2-NO3	Chromium Hex	See Item #2 below	Activity Scan		
Sample No. / Matrix* / Date Sampled / Time Sampled										
B0H0H0 01 / S / 1-8-96 / 1137	X	X	X	X	X	X	X	X	NG	195
B0H0H1 02 / S / 1-8-96 / 1158	X	X	X	X	X	X	X	X	NG	196
B0H0H2 03 / S / 1-8-96 / 1236	X	X	X	X	X	X	X	X	NG	196
B0H0H3 04 / S / 1-8-96 / 1303	X	X	X	X	X	X	X	X	NG	197
B0H0H4 05 / S / 1-8-96 / 1352	X	X	X	X	X	X	X	X	NG	198
B0H0H5 06 / S / 1-8-96 / 1415	X	X	X	X	X	X	X	X	NG	199

CHAIN OF POSSESSION	Sign/Print Names		
Relinquished By: Doug Bowers	Date/Time: 1-9-96/0800	Received By: ER / Ric Walter B Walter	Date/Time: 0800 1-9-96
Relinquished By: ER / Ric Walter B Walter	Date/Time: 10:30 1-10-96	Received By: [illegible] / Kevin Gallinberg	Date/Time: 10:30 1-10-96
Relinquished By	Date/Time	Received By	Date/Time
Relinquished By	Date/Time	Received By	Date/Time

SPECIAL INSTRUCTIONS

Hexavalent chrom must be extracted per SW-846 3060A with a holding time of 96 hours.

Sample analysis for nitrate, nitrite, and phosphate by EPA 300.0 are being requested for Information only. The ERC Contractor acknowledges the holding times will not be met.

Item #1; Anions - IC F, Cl, SO4, PO4, NO2, NO3, pH

Item #2; Gross Alpha/Beta, U-234, -235, -238, Tc-99, Total U, 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

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

Bechtel Hanford, Inc.

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

Data Turnaround: X Priority / Normal

Collector: Doug Bowers	Company Contact: D. B. Encke	Telephone: 373-3461
Project Designation: 183-H Soil Screen/Verification (Loading ramp/Berm pile)	Sampling Location: 183-H Solar Basin	SAF No.: B96-052
Ice Chest No.: ER-17	Field Logbook No.	Method of Shipment: Hand deliver
Shipped To: Quanterra	Offsite Property No.	Bill of Lading/Air Bill No.
Possible Sample Hazards/Remarks: none		
Special Handling and/or Storage		

Preservation	none	cool to 4C	cool to 4C	cool to 4C	cool to 4C	cool to 4C	cool to 4C	none	none		
Type of Container	P/G	P/G	P/G	P/G	P/G	P/G	P/G	P/G			
No. of Container(s)	1	1	1	1	1	1	2	1			
Volume	120 mL	250 mL	60 mL	60 mL	60 mL	60 ml	1 L	20 mL			
SAMPLE ANALYSIS 601135 SDG W0871 %	100 TCLP Metals	100 Cyanide	100 Sulfide	100 See Item #1 below	100 NO2-NO3	Chromium Hex	601136 See Item #2 below	Activity Scan			

Sample No.	Matrix*	Date Sampled	Time Sampled										
B0H0H6 07	S	1-8-96	1415	X	X	X	X	X	X	X	X	N 6199	
B0H0H7 08	S	1-8-96	1452	X	X	X	X	X	X	X	X	NC 201	

CHAIN OF POSSESSION

Relinquished By	Date/Time	Received By	Date/Time
Doug Bowers	1-8-96/0800	ERC Bubba	1-8-96 0800
ERC Bubba	1-10-96 10:30	[illegible]	1-10-96 10:30

SPECIAL INSTRUCTIONS

Hexavalent chrom must be extracted per SW-846 3060A with a holding time of 96 hours.

Sample analysis for nitrate, nitrite, and phosphate by EPA 300.0 are being requested for Information only. The ERC Contractor acknowledges the holding times will not be met.

Item #1; Anions - IC F, Cl, SO4, PO4, NO2, NO3, pH

Item #2; Gross Alpha/Beta, U-234, -235, -238, Tc-99, Total U, 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

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

AMPLE STATUS REPORT FOR N 6195. RAD SCREEN BOHOH1 TIME: 1/10/96 7:39D
ISPATCHED: 1/ 5/96 10:36 SAMPLE HAS NOT BEEN SLURPED PAGE 1
RECEIVED: 1/ 8/96 16: 0

EXT.	DETER.	RESULTS OR STATUS	OUT OF RANGE?	GOOD ANS?	CHARGE CODE
****	********	**********	***	***	******
4271	TOT-ACT	< 5.00000E 01 pCi/G	N	Y	PV5AB

END OF REPORT

PRESS ANY KEY TO CONTINUE

9613477.2276

AMPLE STATUS REPORT FOR N 6196. RAD SCREEN BOHOH2 TIME: 1/10/96 7:40D
ISPATCHED: 1/ 5/96 10:36 SAMPLE HAS NOT BEEN SLURPED PAGE 1
RECEIVED: 1/ 8/96 16: 0

EXT.	DETER.	RESULTS OR STATUS	OUT OF RANGE?	GOOD ANS?	CHARGE CODE
****	********	**********	***	***	******
4271	TOT-ACT	< 5.00000E 01 pCi/G	N	Y	PV5AB

END OF REPORT

PRESS ANY KEY TO CONTINUE

9613477.2277

AMPLE STATUS REPORT FOR N 6197. RAD SCREEN BOHOH3 TIME: 1/10/96 7:41D
ISPATCHED: 1/ 5/96 10:36 SAMPLE HAS NOT BEEN SLURPED PAGE 1
RECEIVED: 1/ 8/96 16: 0

EXT.	DETER.	RESULTS OR STATUS	OUT OF RANGE?	GOOD ANS?	CHARGE CODE
****	********	**********	***	***	******
4271	TOT-ACT	< 5.00000E 01 pCi/G	N	Y	PV5AB

END OF REPORT

PRESS ANY KEY TO CONTINUE

9613477.2278

AMPLE STATUS REPORT FOR N 6198. RAD SCREEN BOHOH4 TIME: 1/10/96 7:41D
ISPATCHED: 1/ 5/96 10:36 SAMPLE HAS NOT BEEN SLURPED PAGE 1
RECEIVED: 1/ 8/96 16: 0

EXT.	DETER.	RESULTS OR STATUS	OUT OF RANGE?	GOOD ANS?	CHARGE CODE
****	********	**********	***	***	******
4271	TOT-ACT	< 5.00000E 01 pCi/G	N	Y	PV5AB

END OF REPORT

PRESS ANY KEY TO CONTINUE

AMPLE STATUS REPORT FOR N 6I99. RAD SCREEN BOHOH5 TIME: 1/10/96 7:42D
ISPATCHED: 1/ 5/96 10:37 SAMPLE HAS NOT BEEN SLURPED PAGE 1
RECEIVED: 1/ 8/96 16: 0

EXT.	DETER.	RESULTS OR STATUS	OUT OF RANGE?	GOOD ANS?	CHARGE CODE
4271	TOT-ACT	< 5.00000E 01 pCi/G	N	Y	PV5AB

END OF REPORT

PRESS ANY KEY TO CONTINUE

AMPLE STATUS REPORT FOR N 6201. RAD SCREEN BOHOH7 TIME: 1/10/96 7:42D
ISPATCHED: 1/ 5/96 10:37 SAMPLE HAS NOT BEEN SLURPED PAGE 1
RECEIVED: 1/ 8/96 16: 0

EXT.	DETER.	RESULTS OR STATUS	OUT OF RANGE?	GOOD ANS?	CHARGE CODE
4271	TOT-ACT	< 5.00000E 01 pCi/G	N	Y	PV5AB

END OF REPORT

PRESS ANY KEY TO CONTINUE

Figure 1

SAMPLE CHECK-IN LIST

(1 Per Shipping Container)

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

Project/Client # _____ Batch or Case # _____

Cooler ID (if noted on outside of cooler) ER-17

1. Condition of shipping container? O.K.
2. Custody Seals on cooler intact? Yes [X] No [ ]
3. Custody Seals dated and signed? Yes [X] No [ ]
4. Chain of Custody record is taped on inside of cooler lid? Yes [ ] No [X]
5. Vermiculite/packing material is: Wet [ ] Dry [X] _____
6. Each sample is in a plastic bag? Yes [X] No [ ] _____
7. Number of sample containers in cooler: 64
8. Samples have: X tape ____ hazard labels
   X custody seals ____ appropriate sample labels
9. Samples are: X in good condition ____ leaking
   ____ broken ____ have air bubbles
   ____ other
10. Coolant Present? Yes [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 Dettenberg Date/Time 1-10-96 10:30

9613477.2282

U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

B0H0H0

Lab Name: QUANTERRA_MO Contract: 550.118

Lab Code: ITMO Case No.: SAS No.: SDG No.: W0871

Matrix (soil/water): WATER Lab Sample ID: P10125-001

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

% Solids: 0.0

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

CAS No.	Analyte	Concentration	C	Q	M
7440-38-2	Arsenic	65.5	U	N	P
7440-39-3	Barium	276		N	P
7440-43-9	Cadmium	3.4	U	N	P
7440-47-3	Chromium	4.4	U	N	P
7439-92-1	Lead	34.3	U	N	P
7439-97-6	Mercury	0.10	U		CV
7782-49-2	Selenium	47.0	U	N	P
7440-22-4	Silver	5.0	U		P

Color Before: Clarity Before: Texture:

Color After: Clarity After: Artifacts:

Comments:

FORM I - IN

TCLP

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U.S. EPA - CLP

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

B0H0H0

Lab Name: QUANTERRA_MO Contract: 550.118

Lab Code: ITMO Case No.: SAS No.: SDG No.: W0871

Matrix (soil/water): SOIL Lab Sample ID: 10125-001

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

% Solids: 99.9

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

CAS No.	Analyte	Concentration	C	Q	M
7440-38-2	Arsenic				NR
7440-39-3	Barium				NR
7440-43-9	Cadmium				NR
7440-47-3	Chromium	0.44	U		P
7439-92-1	Lead				NR
7439-97-6	Mercury				NR
7782-49-2	Selenium				NR
7440-22-4	Silver				NR

Color Before: Clarity Before: Texture:

Color After: Clarity After: Artifacts:

Comments:

FORM I - IN

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U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

B0H0H1

Lab Name: QUANTERRA_MO Contract: 550.118

Lab Code: ITMO Case No.: SAS No.: SDG No.: W0871

Matrix (soil/water): WATER Lab Sample ID: P10125-002

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

% Solids: 0.0

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

CAS No.	Analyte	Concentration	C	Q	M
7440-38-2	Arsenic	65.5	U	N	P
7440-39-3	Barium	457		N	P
7440-43-9	Cadmium	3.4	U	N	P
7440-47-3	Chromium	9.1	B	N	P
7439-92-1	Lead	34.3	U	N	P
7439-97-6	Mercury	0.10	U		CV
7782-49-2	Selenium	47.0	U	N	P
7440-22-4	Silver	5.0	U		P

Color Before: Clarity Before: Texture:

Color After: Clarity After: Artifacts:

Comments:

FORM I - IN

TCLP

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U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

B0H0H1

Lab Name: QUANTERRA_MO Contract: 550.118

Lab Code: ITMO Case No.: SAS No.: SDG No.: W0871

Matrix (soil/water): SOIL Lab Sample ID: 10125-002

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

% Solids: 94.5

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

CAS No.	Analyte	Concentration	C	Q	M
7440-38-2	Arsenic				NR
7440-39-3	Barium				NR
7440-43-9	Cadmium				NR
7440-47-3	Chromium	10.0			P
7439-92-1	Lead				NR
7439-97-6	Mercury				NR
7782-49-2	Selenium				NR
7440-22-4	Silver				NR

Color Before: Clarity Before: Texture:

Color After: Clarity After: Artifacts:

Comments:

FORM I - IN

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1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

B0H0H2

Lab Name: QUANTERRA_MO Contract: 550.118

Lab Code: ITMO Case No.: SAS No.: SDG No.: W0871

Matrix (soil/water): WATER Lab Sample ID: P10125-003

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

% Solids: 0.0

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

CAS No.	Analyte	Concentration	C	Q	M
7440-38-2	Arsenic	65.5	U	N	P
7440-39-3	Barium	459		N	P
7440-43-9	Cadmium	3.4	U	N	P
7440-47-3	Chromium	4.4	U	N	P
7439-92-1	Lead	34.3	U	N	P
7439-97-6	Mercury	0.10	U		CV
7782-49-2	Selenium	47.0	U	N	P
7440-22-4	Silver	5.0	U		P

Color Before: Clarity Before: Texture:

Color After: Clarity After: Artifacts:

Comments:

FORM I - IN

TCLP

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U.S. EPA - CLP

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

B0H0H2

Lab Name: QUANTERRA_MO Contract: 550.118

Lab Code: ITMO Case No.: SAS No.: SDG No.: W0871

Matrix (soil/water): SOIL Lab Sample ID: 10125-003

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

% Solids: 92.7

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

CAS No.	Analyte	Concentration	C	Q	M
7440-38-2	Arsenic				NR
7440-39-3	Barium				NR
7440-43-9	Cadmium				NR
7440-47-3	Chromium	13.9			P
7439-92-1	Lead				NR
7439-97-6	Mercury				NR
7782-49-2	Selenium				NR
7440-22-4	Silver				NR

Color Before: Clarity Before: Texture:

Color After: Clarity After: Artifacts:

Comments:

FORM I - IN

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1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

B0H0H3

Lab Name: QUANTERRA_MO Contract: 550.118

Lab Code: ITMO Case No.: SAS No.: SDG No.: W0871

Matrix (soil/water): WATER Lab Sample ID: P10125-004

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

% Solids: 0.0

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

CAS No.	Analyte	Concentration	C	Q	M
7440-38-2	Arsenic	65.5	U	N	P
7440-39-3	Barium	436		N	P
7440-43-9	Cadmium	3.4	U	N	P
7440-47-3	Chromium	4.4	U	N	P
7439-92-1	Lead	34.3	U	N	P
7439-97-6	Mercury	0.10	U		CV
7782-49-2	Selenium	47.0	U	N	P
7440-22-4	Silver	5.0	U		P

Color Before: Clarity Before: Texture:

Color After: Clarity After: Artifacts:

Comments:

FORM I - IN

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1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

B0H0H3

Lab Name: QUANTERRA_MO Contract: 550.118

Lab Code: ITMO Case No.: SAS No.: SDG No.: W0871

Matrix (soil/water): SOIL Lab Sample ID: 10125-004

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

% Solids: 94.5

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

CAS No.	Analyte	Concentration	C	Q	M
7440-38-2	Arsenic				NR
7440-39-3	Barium				NR
7440-43-9	Cadmium				NR
7440-47-3	Chromium	5.5			P
7439-92-1	Lead				NR
7439-97-6	Mercury				NR
7782-49-2	Selenium				NR
7440-22-4	Silver				NR

Color Before: Clarity Before: Texture:

Color After: Clarity After: Artifacts:

Comments:

FORM I - IN

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U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

B0H0H4

Lab Name: QUANTERRA_MO Contract: 550.118

Lab Code: ITMO Case No.: SAS No.: SDG No.: W0871

Matrix (soil/water): WATER Lab Sample ID: P10125-005

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

% Solids: 0.0

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

CAS No.	Analyte	Concentration	C	Q	M
7440-38-2	Arsenic	65.5	U	N	P
7440-39-3	Barium	387		N	P
7440-43-9	Cadmium	3.4	U	N	P
7440-47-3	Chromium	4.4	U	N	P
7439-92-1	Lead	34.3	U	N	P
7439-97-6	Mercury	0.10	U		CV
7782-49-2	Selenium	47.0	U	N	P
7440-22-4	Silver	5.0	U		P

Color Before: Clarity Before: Texture:

Color After: Clarity After: Artifacts:

Comments:

FORM I - IN

TCLP

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U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

B0H0H4

Lab Name: QUANTERRA_MO Contract: 550.118

Lab Code: ITMO Case No.: SAS No.: SDG No.: W0871

Matrix (soil/water): SOIL Lab Sample ID: 10125-005

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

% Solids: 95.0

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

CAS No.	Analyte	Concentration	C	Q	M
7440-38-2	Arsenic				NR
7440-39-3	Barium				NR
7440-43-9	Cadmium				NR
7440-47-3	Chromium	6.0			P
7439-92-1	Lead				NR
7439-97-6	Mercury				NR
7782-49-2	Selenium				NR
7440-22-4	Silver				NR

Color Before: Clarity Before: Texture:

Color After: Clarity After: Artifacts:

Comments:

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1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

B0H0H5

Lab Name: QUANTERRA_MO Contract: 550.118

Lab Code: ITMO Case No.: SAS No.: SDG No.: W0871

Matrix (soil/water): WATER Lab Sample ID: P10125-006

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

% Solids: 0.0

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

CAS No.	Analyte	Concentration	C	Q	M
7440-38-2	Arsenic	65.5	U	N	P
7440-39-3	Barium	430		N	P
7440-43-9	Cadmium	3.4	U	N	P
7440-47-3	Chromium	4.4	U	N	P
7439-92-1	Lead	34.3	U	N	P
7439-97-6	Mercury	0.10	U		CV
7782-49-2	Selenium	47.0	U	N	P
7440-22-4	Silver	5.0	U		P

Color Before: Clarity Before: Texture:

Color After: Clarity After: Artifacts:

Comments:

FORM I - IN

TCLP

9613477.2293

U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

B0H0H5

Lab Name: QUANTERRA_MO Contract: 550.118

Lab Code: ITMO Case No.: SAS No.: SDG No.: W0871

Matrix (soil/water): SOIL Lab Sample ID: 10125-006

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

% Solids: 94.2

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

CAS No.	Analyte	Concentration	C	Q	M
7440-38-2	Arsenic				NR
7440-39-3	Barium				NR
7440-43-9	Cadmium				NR
7440-47-3	Chromium	7.5			P
7439-92-1	Lead				NR
7439-97-6	Mercury				NR
7782-49-2	Selenium				NR
7440-22-4	Silver				NR

Color Before: Clarity Before: Texture:

Color After: Clarity After: Artifacts:

Comments:

FORM I - IN

TCLP

9613477.2294

U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

B0H0H6

Lab Name: QUANTERRA_MO Contract: 550.118

Lab Code: ITMO Case No.: SAS No.: SDG No.: W0871

Matrix (soil/water): WATER Lab Sample ID: P10125-007

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

% Solids: 0.0

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

CAS No.	Analyte	Concentration	C	Q	M
7440-38-2	Arsenic	65.5	U	N	P
7440-39-3	Barium	430		N	P
7440-43-9	Cadmium	3.4	U	N	P
7440-47-3	Chromium	4.4	U	N	P
7439-92-1	Lead	34.3	U	N	P
7439-97-6	Mercury	0.10	U		CV
7782-49-2	Selenium	47.0	U	N	P
7440-22-4	Silver	5.0	U		P

Color Before: Clarity Before: Texture:

Color After: Clarity After: Artifacts:

Comments:

FORM I - IN

TCLP

9613477.2295

U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

B0H0H6

Lab Name: QUANTERRA_MO Contract: 550.118

Lab Code: ITMO Case No.: SAS No.: SDG No.: W0871

Matrix (soil/water): SOIL Lab Sample ID: 10125-007

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

% Solids: 95.0

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

CAS No.	Analyte	Concentration	C	Q	M
7440-38-2	Arsenic				NR
7440-39-3	Barium				NR
7440-43-9	Cadmium				NR
7440-47-3	Chromium	10.9			P
7439-92-1	Lead				NR
7439-97-6	Mercury				NR
7782-49-2	Selenium				NR
7440-22-4	Silver				NR

Color Before: Clarity Before: Texture:

Color After: Clarity After: Artifacts:

Comments:

FORM I - IN

TCLP

9613477.2296

U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

B0H0H7

Lab Name: QUANTERRA_MO Contract: 550.118

Lab Code: ITMO Case No.: SAS No.: SDG No.: W0871

Matrix (soil/water): WATER Lab Sample ID: P10125-008

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

% Solids: 0.0

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

CAS No.	Analyte	Concentration	C	Q	M
7440-38-2	Arsenic	65.5	U	N	P
7440-39-3	Barium	451		N	P
7440-43-9	Cadmium	3.4	U	N	P
7440-47-3	Chromium	4.4	U	N	P
7439-92-1	Lead	34.3	U	N	P
7439-97-6	Mercury	0.10	U		CV
7782-49-2	Selenium	47.0	U	N	P
7440-22-4	Silver	5.0	U		P

Color Before: Clarity Before: Texture:

Color After: Clarity After: Artifacts:

Comments:

FORM I - IN

TCLP

9613477.2297

U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

B0H0H7

Lab Name: QUANTERRA_MO Contract: 550.118

Lab Code: ITMO Case No.: SAS No.: SDG No.: W0871

Matrix (soil/water): SOIL Lab Sample ID: 10125-008

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

% Solids: 94.4

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

CAS No.	Analyte	Concentration	C	Q	M
7440-38-2	Arsenic				NR
7440-39-3	Barium				NR
7440-43-9	Cadmium				NR
7440-47-3	Chromium	8.1			P
7439-92-1	Lead				NR
7439-97-6	Mercury				NR
7782-49-2	Selenium				NR
7440-22-4	Silver				NR

Color Before: Clarity Before: Texture:

Color After: Clarity After: Artifacts:

Comments:

FORM I - IN

TCLP

9615477.2298

Quanterra Environmental Services

CHAIN-OF-CUSTODY FORM

ANALYSIS: CR +6 **CLIENT:** BHI **DATE DUE:** 1-25-96

SAMPLE DELIVERY GROUP: W0871 **BATCH NO.:** 01-136

LABORATORY ID	CLIENT ID	COMMENTS
60113601	BOHOHO	SAF B96-052
2	H1	
3	H2	
4	H3	
5	H4	
6	H5	
7	H6	
8	H7	

	INITIALS	DATE	SOP#
COC INITIATED	JH	1/10/96	NA
SAMPLE PREPARATION	RB	1/11/96	RICHWC5005
SAMPLE ANALYSIS	RB	1/11/96	RICHWC5005
DATA REVIEW	RK	1/22/96	RICHRC002

Form No.: RC-075, 1/96, Rev. 2

000786

9613477.2299

HEXAVALENT CHROMIUM DATA SUMMARY

SDG: W0871

ANALYSIS DATE: 1/12/96

MATRIX: SOIL

MDL: 0.57 mg/kg

SAMPLE LAB. ID	CLIENT ID	SAMPLE RESULT	UNITS	SPIKE ADDED	UNITS	SPIKE RECOVERED	UNITS	PERCENT RECOVERY
Preparation Blank		0.001	mg/L					
LCS		0.876	mg/L	1.000	mg/L	0.876	mg/L	87.6
60113601	B0H0H0	<0.57	mg/kg					
60113602	B0H0H1	<0.57	mg/kg					
60113603	B0H0H2	<0.57	mg/kg					
60113604	B0H0H3	<0.57	mg/kg					
60113605	B0H0H4	<0.57	mg/kg					
60113606	B0H0H5	<0.57	mg/kg					
60113607	B0H0H6	<0.57	mg/kg					
60113608	B0H0H7	<0.57	mg/kg					
60113608 DUP	B0H0H7	<0.57	mg/kg					
60113608 MS	B0H0H7	33.36	mg/kg	40.0	mg/kg	33.36	mg/kg	83.4
60113608 PbCrO4 MS	B0H0H7	896.0	mg/kg	926.72	mg/kg	896.0	mg/kg	96.7

COMMENTS:

To convert preparation blank in mg/L to mg/kg: mg/kg = (mg/L * 0.1 L) / 0.01 kg

(Rg) 1-15-96

Form No.: CG-196, 8/95, Rev. 0

00078C

9613477.2500

Quanterra
Environmental Services

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

Project: 550.118

Category: CHLORIDE
Method: EPA 300.0
Matrix: SOLID

Sample Date : 01/08/96
Receipt Date : 01/10/96
Report Date : 01/22/96

Client ID	Quanterra ID	Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit	Di
BOHOH0	10125-001	Chloride	16887-00-6	QCBLK88682-2	01/12/96	01/12/96	3.41	UG/G		2.00	
BOHOH0	10125-001DUP	Chloride	16887-00-6	QCBLK88682-2	01/12/96	01/12/96	3.57	UG/G		1.99	
BOHOH0	10125-001MS	Chloride	16887-00-6	QCBLK88682-2	01/12/96	01/12/96	95	%REC			
BOHOH1	10125-002	Chloride	16887-00-6	QCBLK88682-2	01/12/96	01/12/96	2.11	UG/G	U	2.11	
BOHOH2	10125-003	Chloride	16887-00-6	QCBLK88682-2	01/12/96	01/12/96	2.04	UG/G	U	2.04	
BOHOH3	10125-004	Chloride	16887-00-6	QCBLK88682-2	01/12/96	01/12/96	1.95	UG/G	U	1.95	
BOHOH4	10125-005	Chloride	16887-00-6	QCBLK88682-2	01/12/96	01/12/96	1.88	UG/G	U	1.88	
BOHOH5	10125-006	Chloride	16887-00-6	QCBLK88682-2	01/12/96	01/12/96	1.89	UG/G	U	1.89	
BOHOH6	10125-007	Chloride	16887-00-6	QCBLK88682-2	01/12/96	01/12/96	2.10	UG/G	U	2.10	
BOHOH7	10125-008	Chloride	16887-00-6	QCBLK88682-2	01/12/96	01/12/96	2.04	UG/G	U	2.04	
NA	QCBLK88682-2	Chloride	16887-00-6	QCBLK88682-2	01/12/96	01/12/96	2.00	UG/G	U	2.00	
NA	QCLCS88682-2	Chloride	16887-00-6	QCBLK88682-2	01/12/96	01/12/96	92	%REC			

9613477.2301

Quanterra
Environmental Services

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

Project: 550.118

Category: FLUORIDE
Method: EPA 300.0
Matrix: SOLID

Sample Date : 01/08/96
Receipt Date : 01/10/96
Report Date : 01/22/96

Client ID	Quanterra ID	Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit	Di
BOHOH0	10125-001	Fluoride	16984-48-8	QCBLK88682-2	01/12/96	01/12/96	1.00	UG/G	U	1.00	
BOHOH0	10125-001DUP	Fluoride	16984-48-8	QCBLK88682-2	01/12/96	01/12/96	0.99	UG/G	U	0.99	
BOHOH0	10125-001MS	Fluoride	16984-48-8	QCBLK88682-2	01/12/96	01/12/96	110	%REC			
BOHOH1	10125-002	Fluoride	16984-48-8	QCBLK88682-2	01/12/96	01/12/96	1.06	UG/G	U	1.06	
BOHOH2	10125-003	Fluoride	16984-48-8	QCBLK88682-2	01/12/96	01/12/96	1.40	UG/G		1.02	
BOHOH3	10125-004	Fluoride	16984-48-8	QCBLK88682-2	01/12/96	01/12/96	0.98	UG/G	U	0.98	
BOHOH4	10125-005	Fluoride	16984-48-8	QCBLK88682-2	01/12/96	01/12/96	0.94	UG/G	U	0.94	
BOHOH5	10125-006	Fluoride	16984-48-8	QCBLK88682-2	01/12/96	01/12/96	1.29	UG/G		0.95	
BOHOH6	10125-007	Fluoride	16984-48-8	QCBLK88682-2	01/12/96	01/12/96	1.42	UG/G		1.05	
BOHOH7	10125-008	Fluoride	16984-48-8	QCBLK88682-2	01/12/96	01/12/96	1.02	UG/G	U	1.02	
NA	QCBLK88682-2	Fluoride	16984-48-8	QCBLK88682-2	01/12/96	01/12/96	1.00	UG/G	U	1.00	
NA	QCLCS88682-2	Fluoride	16984-48-8	QCBLK88682-2	01/12/96	01/12/96	~~104 %REC~~ 91%			0.10	

9613477.2502

Quanterra
Environmental Services

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

Project: 550.118

Category: Nitrate
Method: EPA 300.0
Matrix: SOLID

Sample Date : 01/08/96
Receipt Date : 01/10/96
Report Date : 01/22/96

Client ID	Quanterra ID	Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit	Dil
B0H0H0	10125-001	Nitrate	NO3-N	QCBLK88682-2	01/12/96	01/12/96	0.31	UG/G		0.20	
B0H0H0	10125-001DUP	Nitrate	NO3-N	QCBLK88682-2	01/12/96	01/12/96	0.30	UG/G		0.20	
B0H0H0	10125-001MS	Nitrate	NO3-N	QCBLK88682-2	01/12/96	01/12/96	103	%REC			5
B0H0H1	10125-002	Nitrate	NO3-N	QCBLK88682-2	01/12/96	01/12/96	1.41	UG/G		0.21	
B0H0H2	10125-003	Nitrate	NO3-N	QCBLK88682-2	01/12/96	01/12/96	0.57	UG/G		0.20	
B0H0H3	10125-004	Nitrate	NO3-N	QCBLK88682-2	01/12/96	01/12/96	0.29	UG/G		0.20	
B0H0H4	10125-005	Nitrate	NO3-N	QCBLK88682-2	01/12/96	01/12/96	3.57	UG/G		0.19	
B0H0H5	10125-006	Nitrate	NO3-N	QCBLK88682-2	01/12/96	01/12/96	0.38	UG/G		0.19	
B0H0H6	10125-007	Nitrate	NO3-N	QCBLK88682-2	01/12/96	01/12/96	0.40	UG/G		0.21	
B0H0H7	10125-008	Nitrate	NO3-N	QCBLK88682-2	01/12/96	01/12/96	0.41	UG/G		0.20	
NA	QCBLK88682-2	Nitrate	NO3-N	QCBLK88682-2	01/12/96	01/12/96	0.20	UG/G	U	0.20	
NA	QCLCS88682-2	Nitrate	NO3-N	QCBLK88682-2	01/12/96	01/12/96	104	%REC			

9613477.2505

Quanterra Environmental Services

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

Project: 550.118

Category: Nitrite
Method: EPA 300.0
Matrix: SOLID

Sample Date : 01/08/96
Receipt Date : 01/10/96
Report Date : 01/22/96

Client ID	Quanterra ID	Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit	Di
BOHOH0	10125-001	Nitrite-N	14797-65-0	QCBLK88682-2	01/12/96	01/12/96	0.20	UG/G	U	0.20	
BOHOH0	10125-001DUP	Nitrite-N	14797-65-0	QCBLK88682-2	01/12/96	01/12/96	0.20	UG/G	U	0.20	
BOHOH0	10125-001MS	Nitrite-N	14797-65-0	QCBLK88682-2	01/12/96	01/12/96	90	%REC			
BOHOH1	10125-002	Nitrite-N	14797-65-0	QCBLK88682-2	01/12/96	01/12/96	0.21	UG/G	U	0.21	
BOHOH2	10125-003	Nitrite-N	14797-65-0	QCBLK88682-2	01/12/96	01/12/96	0.20	UG/G	U	0.20	
BOHOH3	10125-004	Nitrite-N	14797-65-0	QCBLK88682-2	01/12/96	01/12/96	0.20	UG/G	U	0.20	
BOHOH4	10125-005	Nitrite-N	14797-65-0	QCBLK88682-2	01/12/96	01/12/96	0.19	UG/G	U	0.19	
BOHOH5	10125-006	Nitrite-N	14797-65-0	QCBLK88682-2	01/12/96	01/12/96	0.19	UG/G	U	0.19	
BOHOH6	10125-007	Nitrite-N	14797-65-0	QCBLK88682-2	01/12/96	01/12/96	0.21	UG/G	U	0.21	
BOHOH7	10125-008	Nitrite-N	14797-65-0	QCBLK88682-2	01/12/96	01/12/96	0.20	UG/G	U	0.20	
NA	QCBLK88682-2	Nitrite-N	14797-65-0	QCBLK88682-2	01/12/96	01/12/96	0.20	UG/G	U	0.20	
NA	QCLCS88682-2	Nitrite-N	14797-65-0	QCBLK88682-2	01/12/96	01/12/96	95	%REC			

9613477.2304

Quanterra
Environmental Services

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

Project: 550.118

Category: Orthophosphate
Method: EPA 300.0
Matrix: SOLID

Sample Date : 01/08/96
Receipt Date : 01/10/96
Report Date : 01/22/96

Client ID	Quanterra ID	Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit	Di
BOHOH0	10125-001	Ortho-Phosphate	14265-44-2	QCBLK88682-2	01/12/96	01/12/96	5.00	UG/G	U	5.00	
BOHOH0	10125-001DUP	Ortho-Phosphate	14265-44-2	QCBLK88682-2	01/12/96	01/12/96	4.97	UG/G	U	4.97	
BOHOH0	10125-001MS	Ortho-Phosphate	14265-44-2	QCBLK88682-2	01/12/96	01/12/96	100	%REC			
BOHOH1	10125-002	Ortho-Phosphate	14265-44-2	QCBLK88682-2	01/12/96	01/12/96	5.28	UG/G	U	5.28	
BOHOH2	10125-003	Ortho-Phosphate	14265-44-2	QCBLK88682-2	01/12/96	01/12/96	5.10	UG/G	U	5.10	
BOHOH3	10125-004	Ortho-Phosphate	14265-44-2	QCBLK88682-2	01/12/96	01/12/96	4.88	UG/G	U	4.88	
BOHOH4	10125-005	Ortho-Phosphate	14265-44-2	QCBLK88682-2	01/12/96	01/12/96	4.69	UG/G	U	4.69	
BOHOH5	10125-006	Ortho-Phosphate	14265-44-2	QCBLK88682-2	01/12/96	01/12/96	4.73	UG/G	U	4.73	
BOHOH6	10125-007	Ortho-Phosphate	14265-44-2	QCBLK88682-2	01/12/96	01/12/96	5.24	UG/G	U	5.24	
BOHOH7	10125-008	Ortho-Phosphate	14265-44-2	QCBLK88682-2	01/12/96	01/12/96	5.11	UG/G	U	5.11	
NA	QCBLK88682-2	Ortho-Phosphate	14265-44-2	QCBLK88682-2	01/12/96	01/12/96	5.00	UG/G	U	5.00	
NA	QCLCS88682-2	Ortho-Phosphate	14265-44-2	QCBLK88682-2	01/12/96	01/12/96	104	%REC			

9613477.2305

Quanterra
Environmental Services

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

Project: 550.118

Category: SULFATE
Method: EPA 300.0
Matrix: SOLID

Sample Date : 01/08/96
Receipt Date : 01/10/96
Report Date : 01/22/96

Client ID	Quanterra ID	Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit	Di
BOHOH0	10125-001	Sulfate	14808-79-8	QCBLK88682-2	01/12/96	01/12/96	5.00	UG/G	U	5.00	
BOHOH0	10125-001DUP	Sulfate	14808-79-8	QCBLK88682-2	01/12/96	01/12/96	4.97	UG/G	U	4.97	
BOHOH0	10125-001MS	Sulfate	14808-79-8	QCBLK88682-2	01/12/96	01/12/96	99	%REC			
BOHOH1	10125-002	Sulfate	14808-79-8	QCBLK88682-2	01/12/96	01/12/96	23.8	UG/G		5.28	
BOHOH2	10125-003	Sulfate	14808-79-8	QCBLK88682-2	01/12/96	01/12/96	8.65	UG/G		5.10	
BOHOH3	10125-004	Sulfate	14808-79-8	QCBLK88682-2	01/12/96	01/12/96	4.88	UG/G	U	4.88	
BOHOH4	10125-005	Sulfate	14808-79-8	QCBLK88682-2	01/12/96	01/12/96	8.66	UG/G		4.69	
BOHOH5	10125-006	Sulfate	14808-79-8	QCBLK88682-2	01/12/96	01/12/96	4.73	UG/G	U	4.73	
BOHOH6	10125-007	Sulfate	14808-79-8	QCBLK88682-2	01/12/96	01/12/96	5.24	UG/G	U	5.24	
BOHOH7	10125-008	Sulfate	14808-79-8	QCBLK88682-2	01/12/96	01/12/96	5.11	UG/G	U	5.11	
NA	QCBLK88682-2	Sulfate	14808-79-8	QCBLK88682-2	01/12/96	01/12/96	5.00	UG/G	U	5.00	
NA	QCLCS88682-2	Sulfate	14808-79-8	QCBLK88682-2	01/12/96	01/12/96	89	%REC			

9613477.2306

Quanterra Environmental Services

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

Project: 550.118

Category: Cyanide
Method: EPA 335.2
Matrix: SOLID

Sample Date : 01/08/96
Receipt Date : 01/10/96
Report Date : 01/22/96

Client ID	Quanterra ID	Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit	Di
BOHOH0	10125-001	Cyanide	57-12-5	QCBLK88399-2	01/12/96	01/16/96	0.50	UG/G	U	0.50	
BOHOH0	10125-001DUP	Cyanide	57-12-5	QCBLK88399-2	01/12/96	01/16/96	0.50	UG/G	U	0.50	
BOHOH0	10125-001MS	Cyanide	57-12-5	QCBLK88399-2	01/12/96	01/16/96	94	%REC			
BOHOH1	10125-002	Cyanide	57-12-5	QCBLK88399-2	01/12/96	01/16/96	0.53	UG/G	U	0.53	
BOHOH2	10125-003	Cyanide	57-12-5	QCBLK88399-2	01/12/96	01/16/96	0.54	UG/G	U	0.54	
BOHOH3	10125-004	Cyanide	57-12-5	QCBLK88399-2	01/12/96	01/16/96	0.52	UG/G	U	0.52	
BOHOH4	10125-005	Cyanide	57-12-5	QCBLK88399-2	01/12/96	01/16/96	0.52	UG/G	U	0.52	
BOHOH5	10125-006	Cyanide	57-12-5	QCBLK88399-2	01/12/96	01/16/96	0.53	UG/G	U	0.53	
BOHOH6	10125-007	Cyanide	57-12-5	QCBLK88399-2	01/12/96	01/16/96	0.52	UG/G	U	0.52	
BOHOH7	10125-008	Cyanide	57-12-5	QCBLK88399-2	01/12/96	01/16/96	0.52	UG/G	U	0.52	
NA	QCBLK88399-2	Cyanide	57-12-5	QCBLK88399-2	01/12/96	01/16/96	0.50	UG/G	U	0.50	
NA	QCLCS88399-2	Cyanide	57-12-5	QCBLK88399-2	01/12/96	01/16/96	94	%REC			

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Quanterra Environmental Services

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

Project: 550.118

Category: NO2-NO3
Method: EPA 353.1
Matrix: SOLID

Sample Date : 01/08/96
Receipt Date : 01/10/96
Report Date : 01/22/96

Client ID	Quanterra ID	Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit	Di
BOHOH0	10125-001	Nitrate/Nitrite	NO2+NO3-N	QCBLK88482-1	01/12/96	01/12/96	0.50	UG/G	U	0.50	
BOHOH0	10125-001DUP	Nitrate/Nitrite	NO2+NO3-N	QCBLK88482-1	01/12/96	01/12/96	0.50	UG/G	U	0.50	
BOHOH0	10125-001MS	Nitrate/Nitrite	NO2+NO3-N	QCBLK88482-1	01/12/96	01/12/96	109	%REC			
BOHOH1	10125-002	Nitrate/Nitrite	NO2+NO3-N	QCBLK88482-1	01/12/96	01/12/96	0.95	UG/G		0.53	
BOHOH2	10125-003	Nitrate/Nitrite	NO2+NO3-N	QCBLK88482-1	01/12/96	01/12/96	0.54	UG/G	U	0.54	
BOHOH3	10125-004	Nitrate/Nitrite	NO2+NO3-N	QCBLK88482-1	01/12/96	01/12/96	0.53	UG/G	U	0.53	
BOHOH4	10125-005	Nitrate/Nitrite	NO2+NO3-N	QCBLK88482-1	01/12/96	01/12/96	3.05	UG/G		0.53	
BOHOH5	10125-006	Nitrate/Nitrite	NO2+NO3-N	QCBLK88482-1	01/12/96	01/12/96	0.53	UG/G	U	0.53	
BOHOH6	10125-007	Nitrate/Nitrite	NO2+NO3-N	QCBLK88482-1	01/12/96	01/12/96	0.53	UG/G	U	0.53	
BOHOH7	10125-008	Nitrate/Nitrite	NO2+NO3-N	QCBLK88482-1	01/12/96	01/12/96	0.53	UG/G	U	0.53	
NA	QCBLK88482-1	Nitrate/Nitrite	NO2+NO3-N	QCBLK88482-1	01/12/96	01/12/96	0.50	UG/G	U	0.50	
NA	QCLCS88482-1	Nitrate/Nitrite	NO2+NO3-N	QCBLK88482-1	01/12/96	01/12/96	96	%REC			

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Quanterra
Environmental Services

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

Project: 550.118

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

Sample Date : 01/08/96
Receipt Date : 01/10/96
Report Date : 01/22/96

Client ID	Quanterra ID	Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit	Di
BOHOH0	10125-001	pH	PH	QCBLK88502-1	01/16/96	01/16/96	6.42	PH			
BOHOH0	10125-001DUP	pH	PH	QCBLK88502-1	01/16/96	01/16/96	6.47	PH			
BOHOH1	10125-002	pH	PH	QCBLK88502-1	01/16/96	01/16/96	9.02	PH			
BOHOH2	10125-003	pH	PH	QCBLK88502-1	01/16/96	01/16/96	8.60	PH			
BOHOH3	10125-004	pH	PH	QCBLK88502-1	01/16/96	01/16/96	8.60	PH			
BOHOH4	10125-005	pH	PH	QCBLK88502-1	01/16/96	01/16/96	8.61	PH			
BOHOH5	10125-006	pH	PH	QCBLK88502-1	01/16/96	01/16/96	8.74	PH			
BOHOH6	10125-007	pH	PH	QCBLK88502-1	01/16/96	01/16/96	8.73	PH			
BOHOH7	10125-008	pH	PH	QCBLK88502-1	01/16/96	01/16/96	8.64	PH			
NA	QCBLK88502-1	pH	PH	QCBLK88502-1	01/16/96	01/16/96	4.91	PH			

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

Project: 550.118

Quanterra Environmental Services

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

Sample Date : 01/08/96
Receipt Date : 01/10/96
Report Date : 01/22/96

Client ID	Quanterra ID	Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit	Di
BOHOH0	10125-001	Sulfide	18496-25-8	QCBLK88499-1	01/12/96	01/12/96	10.6	UG/G	U	10.6	
BOHOH0	10125-001DUP	Sulfide	18496-25-8	QCBLK88499-1	01/12/96	01/12/96	10.5	UG/G	U	10.5	
BOHOH0	10125-001MS	Sulfide	18496-25-8	QCBLK88499-1	01/12/96	01/12/96	80	%REC			
BOHOH1	10125-002	Sulfide	18496-25-8	QCBLK88499-1	01/12/96	01/12/96	10.7	UG/G	U	10.7	
BOHOH2	10125-003	Sulfide	18496-25-8	QCBLK88499-1	01/12/96	01/12/96	11.2	UG/G	U	11.2	
BOHOH3	10125-004	Sulfide	18496-25-8	QCBLK88499-1	01/12/96	01/12/96	10.8	UG/G	U	10.8	
BOHOH4	10125-005	Sulfide	18496-25-8	QCBLK88499-1	01/12/96	01/12/96	10.9	UG/G	U	10.9	
BOHOH5	10125-006	Sulfide	18496-25-8	QCBLK88499-1	01/12/96	01/12/96	11.0	UG/G	U	11.0	
BOHOH6	10125-007	Sulfide	18496-25-8	QCBLK88499-1	01/12/96	01/12/96	10.9	UG/G	U	10.9	
BOHOH7	10125-008	Sulfide	18496-25-8	QCBLK88499-1	01/12/96	01/12/96	11.3	UG/G	U	11.3	
NA	QCBLK88499-1	Sulfide	18496-25-8	QCBLK88499-1	01/12/96	01/12/96	10.6	UG/G	U	10.6	
NA	QCLCS88499-1	Sulfide	18496-25-8	QCBLK88499-1	01/12/96	01/12/96	82	%REC			

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Sample Disposition Record

Control #: B96-0033
Revision #: 0
Date Initiated: 01/15/96

Section 1 - BACKGROUND

SAF #: B96-052
OU: N/A
Project ID: 183-H Basin D&D
Task ID: 1
Sampling Event: 183-H SOIL SCREEN/VERIFICATION--LOADING RAMP & BERM PILES
Laboratory: Quanterra
Project Coordinator: ME David
Task Manager: DB Encke

Section 2 - SAMPLE INFORMATION

Number of Samples: 8
ID Numbers: B0H0H0, B0H0H1, B0H0H2, B0H0H3, B0H0H4, B0H0H5, B0H0H6, and B0H0H7
Matrix: Soil
Collection Date: Approximately 01/08/96

Section 3 - ISSUE

Class: Lab Direction
NCR Number: N/A
Type: Revision of Direction--Addition of analyses
Description: Project needs dictate the addition of ICP Metals to all sample numbers associated with SAF B96-052.

N/A
NCR Validation (Print/Sign) Date

Section 4 - DISPOSITION

Type: Rework
Description: Sample numbers B0H0H0, B0H0H1, B0H0H2, B0H0H3, B0H0H4, B0H0H5, B0H0H6, and B0H0H7 will be analyzed for ICP metals in addition to the analyses requested on each sample's respective Chain-of-Custody form.

ME David [signature] 01/15/96
Project Coordinator (Print/Sign) Date

DB Encke DB Encke 1/16/96
Task Manager (Print/Sign) Date

N/A
QA (Print/Sign) Date

Section 5 - INSPECTION (Issue Class: Nonconformance Only)

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

N/A
Inspector (Print/Sign) Date

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Sample Disposition Record

Control #: 96-0035
Revision #: 0
Date Initiated: 01/15/96

Section 1 - BACKGROUND

SAF #: B96-052
OU: N/A
Project ID: 183-H Basin D&D
Task ID: 1
Sampling Event: 183-H SOIL SCREEN/VERIFICATION--LOADING RAMP & BERM PILES
Laboratory: Quanterra
Project Coordinator: ME David
Task Manager: DB Encke

Section 2 - SAMPLE INFORMATION

Number of Samples: 8
ID Numbers: B0H0H0, B0H0H1, B0H0H2, B0H0H3, B0H0H4, B0H0H5, B0H0H6, and B0H0H7.
Matrix: Soil
Collection Date: Approximately 01/08/96

Section 3 - ISSUE

Class: Lab Direction
NCR Number: N/A
Type: Clarification of Direction--Omitted Method Number
Description: The Sample Authorization Form for the 183-H Soil Screen/Verification--Loading Ramp and Berm Piles sampling project omitted the method number for pH.

N/A
NCR Validation (Print/Sign) Date

Section 4 - DISPOSITION

Type: Use As Is
Description: All samples requiring pH analysis are to be analyzed to EPA method 9045 for soils.

ME David [signature] 01/15/96
Project Coordinator (Print/Sign) Date

DB Encke DB Encke 1/16/96
Task Manager (Print/Sign) Date

N/A
QA (Print/Sign) Date

Section 5 - INSPECTION (Issue Class: Nonconformance Only)

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

N/A
Inspector (Print/Sign) Date

9613477.2312

QUANTERRA ISSUE RESOLUTION FORM
FOR CONTRACT MPV-SVV-239000 WITH BHI/WHC

SAF No. **B96-052** Project 183-H Soil Screen/Ramp&Berm Date 1/11/96
SDG: W0871
Sample No. All

Submitted By: Jodie Carnes
Phone No. 509-375-3131 x112
Fax No. 509-375-5590

Submitted To: Karl N. Pool (WHC)
Joan Kessner (BHI)
Phone No. 509-372-2557 (Pool)
509-372-2586 (Kessner)
Fax No. 509-372-2106

ISSUE	PROPOSED RESOLUTION
1) No method is specified for pH analysis.	1) The laboratory will run EPA 9045 unless instructed otherwise.

BHI/WHC COMMENTS

Signature and Date

XC: Doug Swenson
Tami Heidelberg
Wade Price
Suzi Gaines
Van Pettey

1/15/96 mer

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W0871-QES R

Quanterra
Environmental Services

Quanterra Incorporated
2800 George Washington Way
Richland, Washington 99352

509 375-3131 Telephone
509 375-5590 Fax

CERTIFICATE OF ANALYSIS

JAN 1996
RECEIVED
Data
Log In

Bechtel Hanford, Inc.
345 Hills
Richland, WA 99352

January 30, 1996

Attention: Joan Kessner

SAF Number	:	B96-052
Date SDG Closed	:	January 10, 1996
Number of Samples	:	Eight (8)
Sample Type	:	Soil
SDG Number	:	W0871
Data Deliverable	:	Summary

I. Introduction

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

QTESRL ID#	BHI ID#	MATRIX	DATE OF RECEIPT
60113601	B0H0H0	SOIL	1/10/96
60113602	B0H0H1	SOIL	1/10/96
60113603	B0H0H2	SOIL	1/10/96
60113604	B0H0H3	SOIL	1/10/96
60113605	B0H0H4	SOIL	1/10/96
60113606	B0H0H5	SOIL	1/10/96
60113607	B0H0H6	SOIL	1/10/96
60113608	B0H0H7	SOIL	1/10/96

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II. Analytical Results/Methodology

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

The requested analyses were:

Alpha Spectroscopy
Uranium-234, -235, -238 by method RICHRC-5030
Gamma Spectroscopy
Gamma Scan by method RICHRC-5017
Gas Proportional Counting
Gross Alpha by method ITAS-RD-3222
Gross Beta by method ITAS-RD-3222
Liquid Scintillation Counting
Technetium-99 by method ITAS-IT-RS-0001
Total Uranium
Total Uranium by method RICHRC-5058

III. Quality Control

The analytical results for each analysis performed under SDG W0871 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 for all analyses except alpha and beta, where quality control results are reported as pCi/sample.

IV. Comments

Alpha Spectroscopy

Uranium-234, -235, -238 by method RICHRC-5030
The LCS, batch blank, sample and sample duplicate (B0H0H3) results are within contractual requirements.

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Gamma Spectroscopy

Gamma Scan by method RICHRC-5017
The blank matrix is Ottawa Sand and natural products Ra-224DA, Ra-226DA, and U-238DLP are detected and reported. Cd-109 was detected each of the samples. However, the result is not reported because it is false positive detection caused by x-ray lines produced by energy reflection from the detector shielding. The LCS, batch blank, sample and sample duplicate (B0H0H0) results are within contractual requirements.

Gas Proportional Counting

Gross Alpha by method ITAS-RD-3222
The LCS, batch blank, sample and sample duplicate (B0H0H0) results are within contractual requirements.

Gross Beta by method ITAS-RD-3222
The LCS, batch blank, sample and sample duplicate (B0H0H0) results are within contractual requirements.

Liquid Scintillation Counting

Technetium-99 by method ITAS-IT-RS-0001
The matrix spike, LCS, batch blank, sample and sample duplicate (B0H0H7) results are within contractual requirements.

Total Uranium

Total Uranium by method RICHRC-5058
The sample and its duplicate are outside the three sigma control limit (3.9 sigma achieved) due to a possible soil inconsistency or matrix effect. Except as noted, the matrix spike, LCS, batch blank, sample and sample duplicate (B0H0H3) results are within contractual requirements.

9613477.2516

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

for S.L. 1-30-96

Quanterra
Environmental Services

SAMPLE RESULTS

LAB NAME:	ITAS-RICHLAND	**SDG:**	W0871
LAB SAMPLE ID:	60113601	**MATRIX:**	SOIL
CLIENT ID:	B0H0H0	**DATE RECEIVED:**	1/10/96 10:30:00 AM

ISOTOPE	RESULT	COUNTING ERROR (2 s)	TOTAL ERROR (2 s)	MDA	REPORT UNIT	YIELD	METHOD NUMBER
U-234	1.05E+00	1.5E-01	2.2E-01	2.97E-02	pCi/g	80.60%	RICHRC5030
U-235	5.19E-02	3.3E-02	3.4E-02	3.22E-02	pCi/g	80.60%	RICHRC5030
U-238	1.08E+00	1.5E-01	2.3E-01	3.91E-02	pCi/g	80.60%	RICHRC5030
CO-58.	1.29E-02	1.2E-02	1.2E-02	2.03E-02	pCi/g	N/A	RICHRC5017
CO-60.	-3.40E-03	1.2E-02	1.2E-02	1.92E-02	pCi/g	N/A	RICHRC5017
CS-137DA.	1.04E-03	1.1E-02	1.1E-02	1.80E-02	pCi/g	N/A	RICHRC5017
EU-152.	8.16E-03	2.5E-02	2.5E-02	4.24E-02	pCi/g	N/A	RICHRC5017
EU-154.	-4.92E-02	4.1E-02	4.2E-02	6.47E-02	pCi/g	N/A	RICHRC5017
EU-155.	1.41E-02	2.7E-02	2.7E-02	4.32E-02	pCi/g	N/A	RICHRC5017
FE-59.	1.73E-03	3.0E-02	3.0E-02	5.02E-02	pCi/g	N/A	RICHRC5017
K-40.	2.03E+01	5.8E-01	2.1E+00	N/A	pCi/g	N/A	RICHRC5017
RA-224DA.	2.46E-01	2.9E-02	3.8E-02	N/A	pCi/g	N/A	RICHRC5017
RA-226DA.	2.36E-01	4.2E-02	4.8E-02	N/A	pCi/g	N/A	RICHRC5017
RA-228DA.	3.33E-01	7.1E-02	7.9E-02	N/A	pCi/g	N/A	RICHRC5017
U-238DLP.	6.64E-01	4.5E-01	4.5E-01	N/A	pCi/g	N/A	RICHRC5017
ALPHA	1.86E+01	6.2E+00	6.5E+00	5.94E+00	pCi/g	100.00%	RD3222
BETA	7.43E+01	5.8E+00	7.6E+00	3.60E+00	pCi/g	100.00%	RD3222
TC-99	-1.06E-01	3.9E-01	1.1E+00	3.70E-01	pCi/g	100.00%	ITAS-IT-RS-0001
TOTAL-URANIUM	1.36E+00	N/A	1.8E-01	6.05E-04	ug/g	N/A	RICHRC5058

Number of Results: 19

Quanterra
Environmental Services

SAMPLE RESULTS

LAB NAME:	ITAS-RICHLAND	**SDG:**	W0871
LAB SAMPLE ID:	60113602	**MATRIX:**	SOIL
CLIENT ID:	B0H0H1	**DATE RECEIVED:**	1/10/96 10:30:00 AM

ISOTOPE	RESULT	COUNTING ERROR (2 s)	TOTAL ERROR (2 s)	MDA	REPORT UNIT	YIELD	METHOD NUMBER
U-234	1.02E+00	1.5E-01	2.3E-01	3.14E-02	pCi/g	71.80%	RICHRC5030
U-235	5.70E-02	3.7E-02	3.8E-02	3.14E-02	pCi/g	71.80%	RICHRC5030
U-238	9.23E-01	1.5E-01	2.1E-01	2.69E-02	pCi/g	71.80%	RICHRC5030
CO-58.	-3.65E-03	1.1E-02	1.1E-02	1.76E-02	pCi/g	N/A	RICHRC5017
CO-60.	-3.23E-03	1.1E-02	1.1E-02	1.91E-02	pCi/g	N/A	RICHRC5017
CS-137DA.	4.69E-03	1.1E-02	1.1E-02	1.85E-02	pCi/g	N/A	RICHRC5017
EU-152.	-2.25E-02	2.8E-02	2.8E-02	4.35E-02	pCi/g	N/A	RICHRC5017
EU-154.	1.18E-02	3.6E-02	3.6E-02	6.23E-02	pCi/g	N/A	RICHRC5017
EU-155.	5.62E-02	3.4E-02	3.4E-02	5.21E-02	pCi/g	N/A	RICHRC5017
FE-59.	5.52E-03	2.8E-02	2.8E-02	4.59E-02	pCi/g	N/A	RICHRC5017
K-40.	1.26E+01	4.6E-01	1.3E+00	N/A	pCi/g	N/A	RICHRC5017
RA-224DA.	6.14E-01	2.9E-02	6.8E-02	N/A	pCi/g	N/A	RICHRC5017
RA-226DA.	4.62E-01	4.8E-02	6.7E-02	N/A	pCi/g	N/A	RICHRC5017
RA-228DA.	7.39E-01	8.2E-02	1.1E-01	N/A	pCi/g	N/A	RICHRC5017
ALPHA	1.49E+01	5.4E+00	5.6E+00	4.20E+00	pCi/g	100.00%	RD3222
BETA	2.45E+01	3.6E+00	3.9E+00	3.79E+00	pCi/g	100.00%	RD3222
TC-99	5.90E-01	4.1E-01	1.2E+00	3.70E-01	pCi/g	100.00%	ITAS-IT-RS-0001
TOTAL-URANIUM	7.82E-01	N/A	1.1E-01	6.05E-04	ug/g	N/A	RICHRC5058

Number of Results: 18

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Environmental Services

SAMPLE RESULTS

LAB NAME:	ITAS-RICHLAND	**SDG:**	W0871
LAB SAMPLE ID:	60113603	**MATRIX:**	SOIL
CLIENT ID:	B0H0H2	**DATE RECEIVED:**	1/10/96 10:30:00 AM

ISOTOPE	RESULT	COUNTING ERROR (2 s)	TOTAL ERROR (2 s)	MDA	REPORT UNIT	YIELD	METHOD NUMBER
U-235.	4.16E-02	N/A	3.3E-02	2.42E-02	pCi/g	66.70%	
U-234	6.49E-01	1.3E-01	1.7E-01	2.75E-02	pCi/g	66.70%	RICHRC5030
U-238	6.73E-01	1.3E-01	1.7E-01	2.75E-02	pCi/g	66.70%	RICHRC5030
CO-58.	3.37E-04	1.1E-02	1.1E-02	1.77E-02	pCi/g	N/A	RICHRC5017
CO-60.	1.64E-02	1.1E-02	1.1E-02	1.98E-02	pCi/g	N/A	RICHRC5017
CS-137DA.	2.46E-02	1.2E-02	1.2E-02	2.14E-02	pCi/g	N/A	RICHRC5017
EU-152.	1.48E-02	2.8E-02	2.8E-02	4.59E-02	pCi/g	N/A	RICHRC5017
EU-154.	1.46E-02	3.2E-02	3.2E-02	5.55E-02	pCi/g	N/A	RICHRC5017
EU-155.	2.50E-02	2.5E-02	2.6E-02	4.29E-02	pCi/g	N/A	RICHRC5017
FE-59.	5.35E-03	2.7E-02	2.7E-02	4.44E-02	pCi/g	N/A	RICHRC5017
K-40.	1.40E+01	4.8E-01	1.5E+00	N/A	pCi/g	N/A	RICHRC5017
RA-224DA.	6.50E-01	3.1E-02	7.2E-02	N/A	pCi/g	N/A	RICHRC5017
RA-226DA.	5.52E-01	4.3E-02	7.0E-02	N/A	pCi/g	N/A	RICHRC5017
RA-228DA.	6.91E-01	8.3E-02	1.1E-01	N/A	pCi/g	N/A	RICHRC5017
U-238DLP.	3.97E-01	2.6E-01	2.6E-01	N/A	pCi/g	N/A	RICHRC5017
ALPHA	9.58E+00	4.5E+00	4.6E+00	4.74E+00	pCi/g	100.00%	RD3222
BETA	2.64E+01	3.7E+00	4.1E+00	3.83E+00	pCi/g	100.00%	RD3222
TC-99	1.71E-01	4.0E-01	1.2E+00	3.70E-01	pCi/g	100.00%	ITAS-IT-RS-0001
TOTAL-URANIUM	1.16E+00	N/A	1.6E-01	6.05E-04	ug/g	N/A	RICHRC5058

Number of Results: 19

Quanterra
Environmental Services

SAMPLE RESULTS

LAB NAME:	ITAS-RICHLAND	SDG:	W0871
LAB SAMPLE ID:	60113604	MATRIX:	SOIL
CLIENT ID:	B0H0H3	DATE RECEIVED:	1/10/96 10:30:00 AM

ISOTOPE	RESULT	COUNTING ERROR (2 s)	TOTAL ERROR (2 s)	MDA	REPORT UNIT	YIELD	METHOD NUMBER
U-234	5.44E-01	1.1E-01	1.4E-01	3.84E-02	pCi/g	70.20%	RICHRC5030
U-235	2.03E-02	2.3E-02	2.3E-02	3.42E-02	pCi/g	70.20%	RICHRC5030
U-238	5.91E-01	1.2E-01	1.5E-01	3.71E-02	pCi/g	70.20%	RICHRC5030
CO-58.	-6.28E-03	9.2E-03	9.2E-03	1.50E-02	pCi/g	N/A	RICHRC5017
CO-60.	1.10E-02	8.8E-03	8.9E-03	1.63E-02	pCi/g	N/A	RICHRC5017
CS-137DA.	1.44E-03	1.0E-02	1.0E-02	1.67E-02	pCi/g	N/A	RICHRC5017
EU-152.	5.94E-03	2.3E-02	2.3E-02	3.79E-02	pCi/g	N/A	RICHRC5017
EU-154.	-1.19E-02	3.1E-02	3.1E-02	5.01E-02	pCi/g	N/A	RICHRC5017
EU-155.	2.86E-02	2.6E-02	2.6E-02	4.05E-02	pCi/g	N/A	RICHRC5017
FE-59.	-2.82E-02	2.5E-02	2.5E-02	3.96E-02	pCi/g	N/A	RICHRC5017
K-40.	1.21E+01	4.6E-01	1.3E+00	N/A	pCi/g	N/A	RICHRC5017
RA-224DA.	5.39E-01	2.6E-02	6.0E-02	N/A	pCi/g	N/A	RICHRC5017
RA-226DA.	4.85E-01	4.2E-02	6.4E-02	N/A	pCi/g	N/A	RICHRC5017
RA-228DA.	5.71E-01	6.5E-02	8.6E-02	N/A	pCi/g	N/A	RICHRC5017
U-238DLP.	3.24E-01	3.8E-01	3.8E-01	N/A	pCi/g	N/A	RICHRC5017
ALPHA	5.25E+00	3.4E+00	3.5E+00	4.48E+00	pCi/g	100.00%	RD3222
BETA	2.09E+01	3.3E+00	3.6E+00	3.61E+00	pCi/g	100.00%	RD3222
TC-99	-1.94E-01	3.9E-01	1.1E+00	3.70E-01	pCi/g	100.00%	ITAS-IT-RS-0001
TOTAL-URANIUM	8.53E-01	N/A	1.2E-01	6.05E-04	ug/g	N/A	RICHRC5058

Number of Results: 19

Quanterra
Environmental Services

SAMPLE RESULTS

LAB NAME:	ITAS-RICHLAND	**SDG:**	W0871
LAB SAMPLE ID:	60113605	**MATRIX:**	SOIL
CLIENT ID:	B0H0H4	**DATE RECEIVED:**	1/10/96 10:30:00 AM

ISOTOPE	RESULT	COUNTING ERROR (2 s)	TOTAL ERROR (2 s)	MDA	REPORT UNIT	YIELD	METHOD NUMBER
U-234	7.27E-01	1.4E-01	1.9E-01	3.08E-02	pCi/g	61.40%	RICHRC5030
U-235	5.79E-02	4.1E-02	4.2E-02	3.81E-02	pCi/g	61.40%	RICHRC5030
U-238	7.80E-01	1.5E-01	2.0E-01	3.36E-02	pCi/g	61.40%	RICHRC5030
CO-58.	4.58E-03	1.1E-02	1.1E-02	1.95E-02	pCi/g	N/A	RICHRC5017
CO-60.	3.73E-03	1.2E-02	1.2E-02	1.98E-02	pCi/g	N/A	RICHRC5017
CS-137DA.	1.21E-02	1.2E-02	1.2E-02	1.97E-02	pCi/g	N/A	RICHRC5017
EU-152.	-7.45E-03	2.7E-02	2.7E-02	4.44E-02	pCi/g	N/A	RICHRC5017
EU-154.	7.38E-03	3.7E-02	3.7E-02	6.05E-02	pCi/g	N/A	RICHRC5017
EU-155.	1.11E-02	2.9E-02	2.9E-02	4.62E-02	pCi/g	N/A	RICHRC5017
FE-59.	-3.47E-02	2.9E-02	2.9E-02	4.55E-02	pCi/g	N/A	RICHRC5017
K-40.	1.45E+01	5.4E-01	1.5E+00	N/A	pCi/g	N/A	RICHRC5017
RA-224DA.	6.35E-01	3.1E-02	7.1E-02	N/A	pCi/g	N/A	RICHRC5017
RA-226DA.	5.97E-01	4.6E-02	7.5E-02	N/A	pCi/g	N/A	RICHRC5017
RA-228DA.	7.18E-01	8.4E-02	1.1E-01	N/A	pCi/g	N/A	RICHRC5017
U-238DLP.	4.71E-01	3.9E-01	4.0E-01	N/A	pCi/g	N/A	RICHRC5017
ALPHA	1.05E+01	4.6E+00	4.7E+00	4.05E+00	pCi/g	100.00%	RD3222
BETA	2.53E+01	3.6E+00	4.0E+00	3.74E+00	pCi/g	100.00%	RD3222
TC-99	4.64E-01	4.1E-01	1.2E+00	3.70E-01	pCi/g	100.00%	ITAS-IT-RS-0001
TOTAL-URANIUM	1.14E+00	N/A	1.5E-01	6.05E-04	ug/g	N/A	RICHRC5058

Number of Results: 19

Quanterra
Environmental Services

SAMPLE RESULTS

LAB NAME:	ITAS-RICHLAND	SDG:	W0871
LAB SAMPLE ID:	60113606	MATRIX:	SOIL
CLIENT ID:	B0H0H5	DATE RECEIVED:	1/10/96 10:30:00 AM

ISOTOPE	RESULT	COUNTING ERROR (2 s)	TOTAL ERROR (2 s)	MDA	REPORT UNIT	YIELD	METHOD NUMBER
U-234	7.21E-01	1.3E-01	1.8E-01	3.27E-02	pCi/g	65.90%	RICHRC5030
U-235	3.94E-02	3.3E-02	3.3E-02	3.79E-02	pCi/g	65.90%	RICHRC5030
U-238	8.07E-01	1.4E-01	2.0E-01	4.78E-02	pCi/g	65.90%	RICHRC5030
CO-58.	5.12E-03	1.0E-02	1.0E-02	1.73E-02	pCi/g	N/A	RICHRC5017
CO-60.	5.30E-03	1.1E-02	1.1E-02	1.83E-02	pCi/g	N/A	RICHRC5017
CS-137DA.	3.12E-02	1.3E-02	1.3E-02	N/A	pCi/g	N/A	RICHRC5017
EU-152.	-4.43E-03	2.5E-02	2.5E-02	4.04E-02	pCi/g	N/A	RICHRC5017
EU-154.	-6.82E-03	3.4E-02	3.4E-02	5.47E-02	pCi/g	N/A	RICHRC5017
EU-155.	3.44E-02	2.8E-02	2.8E-02	4.52E-02	pCi/g	N/A	RICHRC5017
FE-59.	6.69E-03	2.5E-02	2.5E-02	4.29E-02	pCi/g	N/A	RICHRC5017
K-40.	1.27E+01	4.4E-01	1.3E+00	N/A	pCi/g	N/A	RICHRC5017
RA-224DA.	5.38E-01	3.0E-02	6.2E-02	N/A	pCi/g	N/A	RICHRC5017
RA-226DA.	4.68E-01	4.3E-02	6.3E-02	N/A	pCi/g	N/A	RICHRC5017
RA-228DA.	5.89E-01	7.5E-02	9.5E-02	N/A	pCi/g	N/A	RICHRC5017
U-238DLP.	6.61E-01	4.9E-01	4.9E-01	N/A	pCi/g	N/A	RICHRC5017
ALPHA	8.60E+00	4.5E+00	4.6E+00	5.93E+00	pCi/g	100.00%	RD3222
BETA	2.48E+01	3.5E+00	3.9E+00	3.60E+00	pCi/g	100.00%	RD3222
TC-99	-2.48E-01	3.9E-01	1.1E+00	3.70E-01	pCi/g	100.00%	ITAS-IT-RS-0001
TOTAL-URANIUM	2.10E+00	N/A	2.8E-01	6.05E-04	ug/g	N/A	RICHRC5058

Number of Results: 19

Quanterra
Environmental Services

SAMPLE RESULTS

LAB NAME:	ITAS-RICHLAND	**SDG:**	W0871
LAB SAMPLE ID:	60113607	**MATRIX:**	SOIL
CLIENT ID:	B0H0H6	**DATE RECEIVED:**	1/10/96 10:30:00 AM

ISOTOPE	RESULT	COUNTING ERROR (2 s)	TOTAL ERROR (2 s)	MDA	REPORT UNIT	YIELD	METHOD NUMBER
U-234	5.70E-01	1.1E-01	1.5E-01	3.30E-02	pCi/g	75.90%	RICHRC5030
U-235	2.56E-02	2.5E-02	2.5E-02	3.14E-02	pCi/g	75.90%	RICHRC5030
U-238	6.00E-01	1.2E-01	1.5E-01	2.24E-02	pCi/g	75.90%	RICHRC5030
CO-58.	3.70E-04	1.2E-02	1.2E-02	1.98E-02	pCi/g	N/A	RICHRC5017
CO-60.	9.72E-03	1.1E-02	1.1E-02	2.03E-02	pCi/g	N/A	RICHRC5017
CS-137DA.	2.06E-02	1.2E-02	1.2E-02	2.12E-02	pCi/g	N/A	RICHRC5017
EU-152.	-1.58E-02	2.9E-02	2.9E-02	4.69E-02	pCi/g	N/A	RICHRC5017
EU-154.	2.49E-02	3.7E-02	3.7E-02	6.50E-02	pCi/g	N/A	RICHRC5017
EU-155.	7.01E-03	3.3E-02	3.3E-02	5.41E-02	pCi/g	N/A	RICHRC5017
FE-59.	-2.99E-02	3.1E-02	3.1E-02	5.01E-02	pCi/g	N/A	RICHRC5017
K-40.	1.47E+01	5.3E-01	1.6E+00	N/A	pCi/g	N/A	RICHRC5017
RA-224DA.	6.10E-01	3.2E-02	6.9E-02	N/A	pCi/g	N/A	RICHRC5017
RA-226DA.	5.12E-01	4.9E-02	7.1E-02	N/A	pCi/g	N/A	RICHRC5017
RA-228DA.	6.37E-01	8.0E-02	1.0E-01	N/A	pCi/g	N/A	RICHRC5017
ALPHA	1.35E+01	5.2E+00	5.4E+00	4.35E+00	pCi/g	100.00%	RD3222
BETA	2.49E+01	3.6E+00	4.0E+00	3.91E+00	pCi/g	100.00%	RD3222
TC-99	-1.13E-02	3.9E-01	1.1E+00	3.70E-01	pCi/g	100.00%	ITAS-IT-RS-0001
TOTAL-URANIUM	1.00E+00	N/A	1.4E-01	6.05E-04	ug/g	N/A	RICHRC5058

Number of Results: 18

Quanterra
Environmental Services

SAMPLE RESULTS

LAB NAME:	ITAS-RICHLAND	**SDG:**	W0871
LAB SAMPLE ID:	60113608	**MATRIX:**	SOIL
CLIENT ID:	B0H0H7	**DATE RECEIVED:**	1/10/96 10:30:00 AM

ISOTOPE	RESULT	COUNTING ERROR (2 s)	TOTAL ERROR (2 s)	MDA	REPORT UNIT	YIELD	METHOD NUMBER
U-234	5.98E-01	1.1E-01	1.4E-01	1.96E-02	pCi/g	82.50%	RICHRC5030
U-235	1.87E-02	1.9E-02	2.0E-02	2.22E-02	pCi/g	82.50%	RICHRC5030
U-238	6.26E-01	1.1E-01	1.5E-01	2.43E-02	pCi/g	82.50%	RICHRC5030
CO-58.	-6.21E-04	1.2E-02	1.2E-02	1.95E-02	pCi/g	N/A	RICHRC5017
CO-60.	3.86E-03	1.3E-02	1.3E-02	2.18E-02	pCi/g	N/A	RICHRC5017
CS-137DA.	6.51E-03	1.2E-02	1.2E-02	1.96E-02	pCi/g	N/A	RICHRC5017
EU-152.	2.62E-03	2.9E-02	2.9E-02	4.55E-02	pCi/g	N/A	RICHRC5017
EU-154.	-3.31E-02	3.6E-02	3.6E-02	5.83E-02	pCi/g	N/A	RICHRC50[illegible]7
EU-155.	4.98E-02	3.5E-02	3.5E-02	5.33E-02	pCi/g	N/A	RICHRC5017
FE-59.	6.18E-04	3.1E-02	3.1E-02	5.05E-02	pCi/g	N/A	RICHRC5017
K-40.	1.35E+01	5.1E-01	1.4E+00	N/A	pCi/g	N/A	RICHRC5017
RA-224DA.	5.46E-01	2.9E-02	6.2E-02	N/A	pCi/g	N/A	RICHRC5017
RA-226DA.	4.08E-01	5.1E-02	6.5E-02	N/A	pCi/g	N/A	RICHRC5017
RA-228DA.	5.33E-01	9.0E-02	1.0E-01	N/A	pCi/g	N/A	RICHRC5017
ALPHA	1.04E+01	4.6E+00	4.7E+00	4.21E+00	pCi/g	100.00%	RD3222
BETA	2.28E+01	3.5E+00	3.8E+00	3.79E+00	pCi/g	100.00%	RD3222
TC-99	2.18E-01	4.0E-01	1.2E+00	3.70E-01	pCi/g	100.00%	ITAS-IT-RS-0001
TOTAL-URANIUM	1.37E+00	N/A	1.9E-01	6.05E-04	ug/g	N/A	RICHRC5058

Number of Results: 18

AMPLE STATUS REPORT FOR N 6195. RAD SCREEN BOHOH1 TIME: 1/10/96 7:39D
ISPATCHED: 1/ 5/96 10:36 SAMPLE HAS NOT BEEN SLURPED PAGE 1
RECEIVED: 1/ 8/96 16: 0

EXT.	DETER.	RESULTS OR STATUS	OUT OF RANGE?	GOOD ANS?	CHARGE CODE
****	********	**********	***	***	******
4271	TOT-ACT	< 5.00000E 01 pCi/G	N	Y	PV5AB

END OF REPORT

PRESS ANY KEY TO CONTINUE

AMPLE STATUS REPORT FOR N 6196. RAD.SCREEN BOHOH2 TIME: 1/10/96 7:40D
ISPATCHED: 1/ 5/96 10:36 SAMPLE HAS NOT BEEN SLURPED PAGE 1
RECEIVED: 1/ 8/96 16: 0

EXT.	DETER.	RESULTS OR STATUS	OUT OF RANGE?	GOOD ANS?	CHARGE CODE
****	********	**********	***	***	******
4271	TOT-ACT	< 5.00000E 01 pCi/G	N	Y	PV5AB

END OF REPORT

PRESS ANY KEY TO CONTINUE

AMPLE STATUS REPORT FOR N 6197. RAD SCREEN BOHOH3 TIME: 1/10/96 7:41D
ISPATCHED: 1/ 5/96 10:36 SAMPLE HAS NOT BEEN SLURPED PAGE 1
RECEIVED: 1/ 8/96 16: 0

EXT.	DETER.	RESULTS OR STATUS	OUT OF RANGE?	GOOD ANS?	CHARGE CODE
****	********	**********	***	***	******
4271	TOT-ACT	< 5.00000E 01 pCi/G	N	Y	PV5AB

END OF REPORT

PRESS ANY KEY TO CONTINUE

AMPLE STATUS REPORT FOR N 6198. RAD SCREEN BOHOH4 TIME: 1/10/96 7:41D
ISPATCHED: 1/ 5/96 10:36 SAMPLE HAS NOT BEEN SLURPED PAGE 1
RECEIVED: 1/ 8/96 16: 0

EXT.	DETER.	RESULTS OR STATUS	OUT OF RANGE?	GOOD ANS?	CHARGE CODE
4271	TOT-ACT	< 5.00000E 01 pCi/G	N	Y	PV5AB

END OF REPORT

PRESS ANY KEY TO CONTINUE

AMPLE STATUS REPORT FOR N 6I99. RAD SCREEN BOHOH5 TIME: 1/10/96 7:42D
ISPATCHED: 1/ 5/96 10:37 SAMPLE HAS NOT BEEN SLURPED PAGE 1
RECEIVED: 1/ 8/96 16: 0

EXT.	DETER.	RESULTS OR STATUS	OUT OF RANGE?	GOOD ANS?	CHARGE CODE
4271	TOT-ACT	< 5.00000E 01 pCi/G	N	Y	PV5AB

END OF REPORT

PRESS ANY KEY TO CONTINUE

AMPLE STATUS REPORT FOR N 6201. RAD SCREEN BOHOH7 TIME: 1/10/96 7:42D
ISPATCHED: 1/ 5/96 10:37 SAMPLE HAS NOT BEEN SLURPED PAGE 1
RECEIVED: 1/ 8/96 16: 0

EXT.	DETER.	RESULTS OR STATUS	OUT OF RANGE?	GOOD ANS?	CHARGE CODE
4271	TOT-ACT	< 5.00000E 01 pCi/G	N	Y	PV5AB

END OF REPORT

PRESS ANY KEY TO CONTINUE

9613477.2331

SDL W08711

Figure 1

SAMPLE CHECK-IN LIST

(1 Per Shipping Container)

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

Project/Client # B96-052 Batch or Case # _____

Cooler ID (if noted on outside of cooler) ER-17

1. Condition of shipping container? O.K.
2. Custody Seals on cooler intact? Yes [X] No [ ]
3. Custody Seals dated and signed? Yes [X] No [ ]
4. Chain of Custody record is taped on inside of cooler lid? Yes [ ] No [X]
5. Vermiculite/packing material is: Wet [ ] Dry [X] _____
6. Each sample is in a plastic bag? Yes [X] No [ ] _____
7. Number of sample containers in cooler: 64
8. Samples have: X tape ____ hazard labels
   X custody seals ____ appropriate sample labels
9. Samples are: X in good condition ____ leaking
   ____ broken ____ have air bubbles
   ____ other
10. Coolant Present? Yes [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 Dettenbeck Date/Time 1-10-96 10:30

000036

SDG W0871

601135 Chem
601136 Rad

1-10-96

CLIENT CODE ID	MATRIX	RECEIVED	DETECTOR	ACQ DATE	SAMPLE	MINUTES	CNTS A	NET CPM A	CNTS B	NET CPM B
BHI B0H0H0		1/10/96 10:30:00 AM	QUAD21B	1/10/96 1:44:04 PM	B0H0H0	30	4	0.07208333	63	1.205
01	SOLID		Bkg:	1/10/96 5:05:48 AM	BKG	800	49	0.06125	716	0.895

Anl Date: 1/10/96 Tot Sa, Alq: 1.46E+03 , 4.68E+01 Alp; (Dpm/ 2.96E-01 (uCi/ 4.16E-03 (pCi/ 2.84E+00 ± 7.3E+00 CAT I 1.8E+01 Lab Alq
Ppt mg: 46.8 Units: g , mg Bet; Alq): 2.48E+00 Sa): 3.49E-02 L|g): 2.39E+01 ± 5.4E+00 4.2E+00 L|g

BHI B0H0H1		1/10/96 10:30:00 AM	QUAD21C	1/10/96 1:44:04 PM	B0H0H1	30	8	0.20166667	74	1.5666667
02	SOLID		Bkg:	1/10/96 5:05:48 AM	BKG	800	52	0.065	720	0.9

Anl Date: 1/10/96 Tot Sa, Alq: 1.55E+03 , 8.46E+01 Alp; (Dpm/ 1.20E+00 (uCi/ 9.94E-03 (pCi/ 6.41E+00 ± 5.5E+00 CAT I 7.8E+00 Lab Alq
Ppt mg: 84.6 Units: g , mg Bet; Alq): 3.34E+00 Sa): 2.76E-02 L|g): 1.78E+01 ± 3.4E+00 5.6E+00 L|g

BHI B0H0H2		1/10/96 10:30:00 AM	QUAD21D	1/10/96 1:44:04 PM	B0H0H2	30	7	0.15833333	72	1.42125
03	SOLID		Bkg:	1/10/96 5:05:48 AM	BKG	800	60	0.075	783	0.97875

Anl Date: 1/10/96 Tot Sa, Alq: 1.57E+03 , 6.74E+01 Alp; (Dpm/ 8.25E-01 (uCi/ 8.66E-03 (pCi/ 5.51E+00 ± 6.3E+00 CAT I 9.1E+00 Lab Alq
Ppt mg: 67.4 Units: g , mg Bet; Alq): 3.01E+00 Sa): 3.16E-02 L|g): 2.01E+01 ± 4.1E+00 5.0E+00 L|g

BHI B0H0H3		1/10/96 10:30:00 AM	QUAD22A	1/10/96 1:44:08 PM	B0H0H3	30	5	0.13166667	60	0.92875
04	SOLID		Bkg:	1/10/96 5:05:58 AM	BKG	800	28	0.035	857	1.07125

Anl Date: 1/10/96 Tot Sa, Alq: 1.48E+03 , 7.15E+01 Alp; (Dpm/ 7.13E-01 (uCi/ 6.66E-03 (pCi/ 4.49E+00 ± 5.9E+00 CAT I 1.1E+01 Lab Alq
Ppt mg: 71.5 Units: g , mg Bet; Alq): 1.87E+00 Sa): 1.75E-02 L|g): 1.18E+01 ± 3.4E+00 8.5E+00 L|g

BHI B0H0H4		1/10/96 10:30:00 AM	QUAD22B	1/10/96 1:44:08 PM	B0H0H4	30	4	0.07583333	61	1.1445833
05	SOLID		Bkg:	1/10/96 5:05:58 AM	BKG	800	46	0.0575	711	0.88875

Anl Date: 1/10/96 Tot Sa, Alq: 1.48E+03 , 5.63E+01 Alp; (Dpm/ 3.40E-01 (uCi/ 4.01E-03 (pCi/ 2.72E+00 ± 6.2E+00 CAT I 1.8E+01 Lab Alq
Ppt mg: 56.3 Units: g , mg Bet; Alq): 2.31E+00 Sa): 2.73E-02 L|g): 1.85E+01 ± 4.3E+00 5.4E+00 L|g

BHI B0H0H5		1/10/96 10:30:00 AM	QUAD22C	1/10/96 1:44:08 PM	B0H0H5	30	6	0.14625	65	1.2604167
06	SOLID		Bkg:	1/10/96 5:05:58 AM	BKG	800	43	0.05375	725	0.90625

Anl Date: 1/10/96 Tot Sa, Alq: 1.46E+03 , 8.28E+01 Alp; (Dpm/ 8.20E-01 (uCi/ 6.51E-03 (pCi/ 4.46E+00 ± 5.1E+00 CAT I 1.1E+01 Lab Alq
Ppt mg: 82.8 Units: g , mg Bet; Alq): 2.63E+00 Sa): 2.09E-02 L|g): 1.43E+01 ± 3.2E+00 7.0E+00 L|g

000037

B 1-10-96

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

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

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

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

Due 1-25-96

*** UISO ***

CHAIN-OF-CUSTODY BATCH ANALYSIS RECORD

10-Jan-1996
Page 1

CUSTOMER: BHI SAF

SAMPLE DELIVERY GROUP 140871

MATRIX : SOIL B96-052

BATCH NUMBER 01-136

	ITAS ID	DUP	ACCOUNT	CUSTOMER ID	COMMENTS
*)	P011361B		BHI		
*)	P011361S	EQIE 182	BHI		
3)	60113601		BHI	BOHOH0	
4)	60113602		BHI	BOHOH1	
5)	60113603		BHI	BOHOH2	
6)	60113604 C0113604	DUP	BHI	BOHOH3	
7)	60113605		BHI	BOHOH4	
8)	60113606		BHI	BOHOH5	
9)	60113607		BHI	BOHOH6	
10)	60113608		BHI	BOHOH7	

ACTIONS (Initial & Date)

1) INITIATED 1/11/96

2) PREP LAB RECEIVED 1-11-96 RICHRC5013
JN REC 1-16-96 RICHRC5019

3) SAMPLE REMAINDER STORED 1-18-96

4) SEPARATION LAB RECEIVED 01-19-96
RICHRC 5030

5) COUNTING/MEASUREMENT LAB 1/24/96 R04610

6) DATA REVIEWED AND ANALYTICAL PREP STORED 1-24-96
RICHRC

RichRC 5030 EXTRATION 1st
1/22/96 M.U. Rev0
1-26-96 M.U. 5030 Rev 5-96
~~5030~~ RichRC ~~M.U.~~ Rev0 2ND EXTRACTION
M.U. 1/23/96
RichRC 1/24/96 M.U.
5039 Rev1 (E.D.)

000039

9613477.2335

Rec'd 1-25-96

*** GAMMA ***

CHAIN-OF-CUSTODY BATCH ANALYSIS RECORD

10-Jan-1996
Page 1

CUSTOMER: BHI SAF

SAMPLE DELIVERY GROUP W0871

MATRIX : SOIL B96-052

BATCH NUMBER 01-136

	ITAS ID	DUP	ACCOUNT	CUSTOMER ID	COMMENTS
*)	P011361B		BHI ~~CAL 827~~ SW 1-16-96	"OSBK"	
*)	P011361S		BHI CAL 491		
3)	60113601 C0113601		BHI	BOHOHO	
4)	60113602		BHI	BOHOH1	
5)	60113603		BHI	BOHOH2	
6)	60113604		BHI	BOHOH3	
7)	60113605		BHI	BOHOH4	
8)	60113606		BHI	BOHOH5	
9)	60113607		BHI	BOHOH6	
10)	60113608		BHI	BOHOH7	

ACTIONS (Initial & Date)

1) INITIATED JH 1/11/96

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

3) SAMPLE REMAINDER STORED JN 1-16-96 RICHRC5017

4) SEPARATION LAB RECEIVED NA

5) COUNTING/MEASUREMENT LAB AB 1-16-96

6) DATA REVIEWED AND ANALYTICAL PREP STORED JR 1-24-96 RICHRC0002 Rev Ø

PRIORITY

000040

9615477.2356

Due 1-25-96

*** ALPHA ***

CHAIN-OF-CUSTODY BATCH ANALYSIS RECORD

10-Jan-1996
Page 1

CUSTOMER: BHI SAF

SAMPLE DELIVERY GROUP 100871

MATRIX : SOIL B96-052

BATCH NUMBER 01-136

	ITAS ID	DUP	ACCOUNT	CUSTOMER ID	COMMENTS
*)	P011361B		BHI		
*)	P011361S		BHI	EQEG 1050	
3)	60113601		BHI	BOHOHO	
	60113601	Dup			
4)	60113602		BHI	BOHOH1	
5)	60113603		BHI	BOHOH2	
6)	60113604		BHI	BOHOH3	
7)	60113605		BHI	BOHOH4	
8)	60113606		BHI	BOHOH5	
9)	60113607		BHI	BOHOH6	
10)	60113608		BHI	BOHOH7	

ACTIONS (Initial & Date)

1) INITIATED 1/11/96

2) PREP LAB RECEIVED 1-11-96 RICHRC5013 SOP RD3222

3) SAMPLE REMAINDER STORED 1-18-96

4) SEPARATION LAB RECEIVED

5) COUNTING/MEASUREMENT LAB RICHRD005 AS 1-18-96

6) DATA REVIEWED AND ANALYTICAL PREP STORED 1-23-96 RICHRC0002

000041

9613477.2552 *** BETA ***

Due 1-25-96

CHAIN-OF-CUSTODY BATCH ANALYSIS RECORD

10-Jan-1996
Page 1

CUSTOMER: BHI SAF

SAMPLE DELIVERY GROUP 100871

MATRIX : SOIL B96-052

BATCH NUMBER 01-136

	ITAS ID	DUP	ACCOUNT	CUSTOMER ID	COMMENTS
*)	P011361B		BHI		
*)	P011361S		BHI	EGHO470	30.421 ± 0.37965 DPM
3)	60113601 C011360	D-P	BHI	BOHOHO	
4)	60113602		BHI	BOHOH1	
5)	60113603		BHI	BOHOH2	
6)	60113604		BHI	BOHOH3	
7)	60113605		BHI	BOHOH4	
8)	60113606		BHI	BOHOH5	
9)	60113607		BHI	BOHOH6	
10)	60113608		BHI	BOHOH7	

ACTIONS (Initial & Date)

1) INITIATED AI 1/11/96

2) PREP LAB RECEIVED JAV 1-11-96 RICHRC0013 SCP: RD5222

3) SAMPLE REMAINDER STORED 1-18-96

4) SEPARATION LAB RECEIVED

5) COUNTING/MEASUREMENT LAB RD4607 AB 1-18-96

6) DATA REVIEWED AND ANALYTICAL PREP STORED JRC 1-22-96 RICHRC00 RLUP

000042

9615477.2338 *** TC-99 ***

Rec'd 1-22-96

CHAIN-OF-CUSTODY BATCH ANALYSIS RECORD

10-Jan-1996
Page 1

CUSTOMER: BHI SAF

SAMPLE DELIVERY GROUP W0871

MATRIX : SOIL B96-052

BATCH NUMBER C1-136

	ITAS ID	DUP	ACCOUNT	CUSTOMER ID	COMMENTS
	P011361N		P011361B	P011360 1	P011363 R
	P011362N		P011361S	C011360 8	P011364 R
1)	60113601		BHI	BOHOH0	
2)	60113602		BHI	BOHOH1	
3)	60113603		BHI	BOHOH2	
4)	60113604		BHI	BOHOH3	
5)	60113605		BHI	BOHOH4	
6)	60113606		BHI	BOHOH5	
7)	60113607		BHI	BOHOH6	
8)	60113608		BHI	BOHOH7	

ACTIONS (Initial & Date)

1) INITIATED JK 1/11/96

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

3) SAMPLE REMAINDER STORED 1/19/96 MM

4) SEPARATION LAB RECEIVED 1/12/96 MM ITAS IT-RS 0001

5) COUNTING/MEASUREMENT LAB CD 1/22/96 RD4600 Rev 0

6) DATA REVIEWED AND ANALYTICAL PREP STORED JC 1-25-96 RICHRC0002 Rev 4

000043

Due 1-25-96

9613477.2330 *** URANIUM ***

CHAIN-OF-CUSTODY BATCH ANALYSIS RECORD

10-Jan-1996
Page 1

CUSTOMER: BHI SAF

SAMPLE DELIVERY GROUP 120871

MATRIX : SOIL B96-052

BATCH NUMBER 01-136

	ITAS ID	DUP	ACCOUNT	CUSTOMER ID	COMMENTS
*)	P011361B		BHI		
*)	P011361S	EGIK 167	BHI		
3)	60113601		BHI	BOHOH0	
4)	60113602		BHI	BOHOH1	
5)	60113603		BHI	BOHOH2	
6)	60113604 C0113604	DUP	BHI	BOHOH3	
7)	60113605		BHI	BOHOH4	
8)	60113606		BHI	BOHOH5	
9)	60113607		BHI	BOHOH6	
10.	60113608 A0113608	EGIK 168	BHI	BOHOH7	

ACTIONS (Initial & Date)

1) INITIATED DH 1/11/96

2) PREP LAB RECEIVED 1-11-96 RICHRC5013
REC 1-16-96 RICHRC5019

3) SAMPLE REMAINDER STORED 1-15-96

4) SEPARATION LAB RECEIVED 1/20/96 RCD 5059

5) COUNTING/MEASUREMENT LAB RICH RC 5055 1/23/96

6) DATA REVIEWED AND ANALYTICAL PREP STORED RK 1-24-96 RICHRC002

000044

9613477.2340

Golder Associates Inc.

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

Golder Associates

MAR 1996
RECEIVED
Validation
Log In

March 25, 1996

Our ref: 943-1610.125.0400
94-1610/O/488

CH2M Hill
1022 Lee Blvd.
Richland, Washington 99352

ATTENTION: Ms. Jeanette Duncan

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

Dear Ms. Duncan:

This letter is to transmit the following data validation package:

SAF#	Project	Data Package	Analyses
B96-052	183-H Basin D&D Soil Screening/ Verification	W0871-QES	Radiochemistry, Inorganics, General Chemistry

Please call if you have any questions.

Sincerely,

GOLDER ASSOCIATES INC.

Tom Stapp

Thomas M. Stapp
Project Manager

Enclosures

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

9613477.2341

MEMORANDUM

TO: 183-H Basin D&D, Soil Screen/Verification Project QA Record

March 25, 1996

FR: Heidi Gregerson, Golder Associates Inc. HG

RE: INORGANIC DATA VALIDATION SUMMARY FOR DATA PACKAGE W0871-QES (943-1610.125 871INO.HB)

INTRODUCTION

This memo presents the results of data validation for the analyses specified below on data package W0871-QES prepared by Quanterra Environmental Services. Sample information is provided in the following table.

SAMPLE ID	COMMENTS	ANALYSIS	MEDIA
B0H0H0		TCLP METALS	SOIL
B0H0H1		TOTAL CHROMIUM	SOIL
B0H0H2		HEXAVALENT CHROMIUM	SOIL
B0H0H3			SOIL
B0H0H4		SEE ATTACHMENT 4	SOIL
B0H0H5			SOIL
B0H0H6			SOIL
B0H0H7			SOIL

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

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

DATA QUALITY OBJECTIVES

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

Precision. Goals for precision were met.

Accuracy. Goals for accuracy were met.

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

Completeness. The data package was complete for all requested analyses. A total of eight samples were validated in this data package with a total of 72 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:

Blanks

- Barium was detected in the TCLP blank. 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.

9613477.2343

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.

9613477.2345

ATTACHMENT 2

SUMMARY OF DATA QUALIFICATIONS

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

DATA QUALIFICATION SUMMARY - FORM B-7

SDG:W0871-QES	REVIEWER: H. Gregerson	DATE: 3-25-96	PAGE 1 OF 1
COMMENTS: TCLP METALS /TOTAL CHROMIUM/HEXAVALENT CHROMIUM			
COMPOUND/ANALYTE	QUALIFIER	SAMPLES AFFECTED	REASON
BARIUM	U	B0H0H0	DETECTED IN TCLP BLANK

9613477.2347

ATTACHMENT 3

QUALIFIED DATA SUMMARY and ANNOTATED LABORATORY REPORTS

Validated Data Summary, Data Package: W0871-QES

	Sample #	B0H0H0		B0H0H1		B0H0H2		B0H0H3		B0H0H4		B0H0H5		B0H0H6		B0H0H7	
	Date	1/8/96		1/8/96		1/8/96		1/8/96		1/8/96		1/8/96		1/8/96		1/8/96	
	Location																
	Depth																
	Type	Soil		Soil		Soil		Soil		Soil		Soil		Soil		Soil	
	Comments																
Parameter	Units	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
TCLP ARSENIC	UG/L	65.500	U	65.500	U	65.500	U	65.500	U	65.500	U	65.500	U	65.500	U	65.500	U
TCLP BARIUM	UG/L	276.000	U	457.000		459.000		436.000		387.000		430.000		430.000		451.000	
TCLP CADMIUM	UG/L	3.400	U	3.400	U	3.400	U	3.400	U	3.400	U	3.400	U	3.400	U	3.400	U
TCLP CHROMIUM	UG/L	4.400	U	9.100	B	4.400	U	4.400	U	4.400	U	4.400	U	4.400	U	4.400	U
TCLP LEAD	UG/L	34.300	U	34.300	U	34.300	U	34.300	U	34.300	U	34.300	U	34.300	U	34.300	U
TCLP MERCURY	UG/L	0.100	U	0.100	U	0.100	U	0.100	U	0.100	U	0.100	U	0.100	U	0.100	U
TCLP SELENIUM	UG/L	47.000	U	47.000	U	47.000	U	47.000	U	47.000	U	47.000	U	47.000	U	47.000	U
TCLP SILVER	UG/L	5.000	U	5.000	U	5.000	U	5.000	U	5.000	U	5.000	U	5.000	U	5.000	U
HEXAVALENT CHROMIUM	MG/KG	0.570	U	0.570	U	0.570	U	0.570	U	0.570	U	0.570	U	0.570	U	0.570	U
TOTAL CHROMIUM	MG/KG	0.440	U	10.000		13.900		5.500		6.000		7.500		10.900		8.100	

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

Verified HRG
3/25/96

96154772.0348

9613477.2349

U.S. EPA - CLP

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

B0H0H0

ab Name: QUANTERRA_MO Contract: 550.118

ab Code: ITMO Case No.: SAS No.: SDG No.: W0871

atrix (soil/water): WATER Lab Sample ID: P10125-001

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

Solids: 0.0

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

CAS No.	Analyte	Concentration	C	Q	M
7440-38-2	Arsenic	65.5	U	N	P
7440-39-3	Barium	276	/	N	P U
7440-43-9	Cadmium	3.4	U	N	P
7440-47-3	Chromium	4.4	U	N	P
7439-92-1	Lead	34.3	U	N	P
7439-97-6	Mercury	0.10	U		CV
7782-49-2	Selenium	47.0	U	N	P
7440-22-4	Silver	5.0	U		P

olor Before: Clarity Before: Texture:

olor After: Clarity After: Artifacts:

omments:

FORM I - IN

TCLP

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U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

B0H0H0

ab Name: QUANTERRA_MO Contract: 550.118

ab Code: ITMO Case No.: SAS No.: SDG No.: W0871

atrix (soil/water): SOIL Lab Sample ID: 10125-001

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

Solids: 99.9

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

CAS No.	Analyte	Concentration	C	Q	M
7440-38-2	Arsenic				NR
7440-39-3	Barium				NR
7440-43-9	Cadmium				NR
7440-47-3	Chromium	0.44	U		P
7439-92-1	Lead				NR
7439-97-6	Mercury				NR
7782-49-2	Selenium				NR
7440-22-4	Silver				NR

olor Before: Clarity Before: Texture:

olor After: Clarity After: Artifacts:

omments:

FORM I - IN

TCLP

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HRG 3/25/96

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U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

B0H0H1

ab Name: QUANTERRA_MO Contract: 550.118

ab Code: ITMO Case No.: SAS No.: SDG No.: W0871

atrix (soil/water): WATER Lab Sample ID: P10125-002

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

Solids: 0.0

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

CAS No.	Analyte	Concentration	C	Q	M
7440-38-2	Arsenic	65.5	U	N	P
7440-39-3	Barium	457		N	P
7440-43-9	Cadmium	3.4	U	N	P
7440-47-3	Chromium	9.1	B	N	P
7439-92-1	Lead	34.3	U	N	P
7439-97-6	Mercury	0.10	U		CV
7782-49-2	Selenium	47.0	U	N	P
7440-22-4	Silver	5.0	U		P

olor Before: Clarity Before: Texture:

olor After: Clarity After: Artifacts:

omments:

FORM I - IN

TCLP

011 HRG 3/25/96

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9613477.2352

U.S. EPA - CLP

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

B0H0H1

ab Name: QUANTERRA_MO Contract: 550.118

ab Code: ITMO Case No.: SAS No.: SDG No.: W0871

atrix (soil/water): SOIL Lab Sample ID: 10125-002

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

Solids: 94.5

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

CAS No.	Analyte	Concentration	C	Q	M
7440-38-2	Arsenic				NR
7440-39-3	Barium				NR
7440-43-9	Cadmium				NR
7440-47-3	Chromium	10.0			P
7439-92-1	Lead				NR
7439-97-6	Mercury				NR
7782-49-2	Selenium				NR
7440-22-4	Silver				NR

olor Before: Clarity Before: Texture:

olor After: Clarity After: Artifacts:

omments:

FORM I - IN

TCLP

012 HRG 3/25/96

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9613477.2353

U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

B0H0H2

ıb Name: QUANTERRA_MO Contract: 550.118

ıb Code: ITMO Case No.: SAS No.: SDG No.: W0871

ıtrix (soil/water): WATER Lab Sample ID: P10125-003

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

Solids: 0.0

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

CAS No.	Analyte	Concentration	C	Q	M
7440-38-2	Arsenic	65.5	U	N	P
7440-39-3	Barium	459		N	P
7440-43-9	Cadmium	3.4	U	N	P
7440-47-3	Chromium	4.4	U	N	P
7439-92-1	Lead	34.3	U	N	P
7439-97-6	Mercury	0.10	U		CV
7782-49-2	Selenium	47.0	U	N	P
7440-22-4	Silver	5.0	U		P

ɔlor Before: Clarity Before: Texture:

ɔlor After: Clarity After: Artifacts:

ɔmments:

FORM I - IN

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013 HRG 3/25/96 ~~00056~~

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U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

B0H0H2

ab Name: QUANTERRA_MO Contract: 550.118

ab Code: ITMO Case No.: SAS No.: SDG No.: W0871

atrix (soil/water): SOIL Lab Sample ID: 10125-003

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

Solids: 92.7

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

CAS No.	Analyte	Concentration	C	Q	M
7440-38-2	Arsenic				NR
7440-39-3	Barium				NR
7440-43-9	Cadmium				NR
7440-47-3	Chromium	13.9			P
7439-92-1	Lead				NR
7439-97-6	Mercury				NR
7782-49-2	Selenium				NR
7440-22-4	Silver				NR

olor Before: Clarity Before: Texture:

olor After: Clarity After: Artifacts:

omments:

FORM I - IN

TCLP

014 HRG 3/25/96
~~00057~~

9613477.2355

U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

B0H0H3

ab Name: QUANTERRA_MO Contract: 550.118

ab Code: ITMO Case No.: SAS No.: SDG No.: W0871

atrix (soil/water): WATER Lab Sample ID: P10125-004

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

Solids: 0.0

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

CAS No.	Analyte	Concentration	C	Q	M
7440-38-2	Arsenic	65.5	U	N	P
7440-39-3	Barium	436		N	P
7440-43-9	Cadmium	3.4	U	N	P
7440-47-3	Chromium	4.4	U	N	P
7439-92-1	Lead	34.3	U	N	P
7439-97-6	Mercury	0.10	U		CV
7782-49-2	Selenium	47.0	U	N	P
7440-22-4	Silver	5.0	U		P

olor Before: Clarity Before: Texture:

olor After: Clarity After: Artifacts:

omments:

FORM I - IN

TCLP

HRG 3/25/96

9613477.2356

U.S. EPA - CLP

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

B0H0H3

ab Name: QUANTERRA_MO Contract: 550.118

ab Code: ITMO Case No.: SAS No.: SDG No.: W0871

atrix (soil/water): SOIL Lab Sample ID: 10125-004

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

Solids: 94.5

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

CAS No.	Analyte	Concentration	C	Q	M
7440-38-2	Arsenic				NR
7440-39-3	Barium				NR
7440-43-9	Cadmium				NR
7440-47-3	Chromium	5.5			P
7439-92-1	Lead				NR
7439-97-6	Mercury				NR
7782-49-2	Selenium				NR
7440-22-4	Silver				NR

olor Before: Clarity Before: Texture:

olor After: Clarity After: Artifacts:

omments:

FORM I - IN

TCLP

016 HRG 3/25/96

~~00059~~

9613477.2357

U.S. EPA - CLP

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

B0H0H4

ab Name: QUANTERRA_MO Contract: 550.118

ab Code: ITMO Case No.: SAS No.: SDG No.: W0871

atrix (soil/water): WATER Lab Sample ID: P10125-005

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

Solids: 0.0

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

CAS No.	Analyte	Concentration	C	Q	M
7440-38-2	Arsenic	65.5	U	N	P
7440-39-3	Barium	387		N	P
7440-43-9	Cadmium	3.4	U	N	P
7440-47-3	Chromium	4.4	U	N	P
7439-92-1	Lead	34.3	U	N	P
7439-97-6	Mercury	0.10	U		CV
7782-49-2	Selenium	47.0	U	N	P
7440-22-4	Silver	5.0	U		P

olor Before: Clarity Before: Texture:

olor After: Clarity After: Artifacts:

omments:

FORM I - IN

TCLP

017 HRG 3/25/96

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9613477.2358

U.S. EPA - CLP

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

B0H0H4

ab Name: QUANTERRA_MO Contract: 550.118

ab Code: ITMO Case No.: SAS No.: SDG No.: W0871

atrix (soil/water): SOIL Lab Sample ID: 10125-005

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

Solids: 95.0

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

CAS No.	Analyte	Concentration	C	Q	M
7440-38-2	Arsenic				NR
7440-39-3	Barium				NR
7440-43-9	Cadmium				NR
7440-47-3	Chromium	6.0			P
7439-92-1	Lead				NR
7439-97-6	Mercury				NR
7782-49-2	Selenium				NR
7440-22-4	Silver				NR

olor Before: Clarity Before: Texture:

olor After: Clarity After: Artifacts:

omments:

FORM I - IN

TCLP

018 HRG 3/25/96

~~00061~~

9613477.2359

U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

B0H0H5

ab Name: QUANTERRA_MO Contract: 550.118

ab Code: ITMO Case No.: SAS No.: SDG No.: W0871

atrix (soil/water): WATER Lab Sample ID: P10125-006

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

Solids: 0.0

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

CAS No.	Analyte	Concentration	C	Q	M
7440-38-2	Arsenic	65.5	U	N	P
7440-39-3	Barium	430		N	P
7440-43-9	Cadmium	3.4	U	N	P
7440-47-3	Chromium	4.4	U	N	P
7439-92-1	Lead	34.3	U	N	P
7439-97-6	Mercury	0.10	U		CV
7782-49-2	Selenium	47.0	U	N	P
7440-22-4	Silver	5.0	U		P

olor Before: Clarity Before: Texture:

olor After: Clarity After: Artifacts:

omments:

FORM I - IN

TCLP

HRG 3/25/96

9613477.2360

U.S. EPA - CLP

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

B0H0H5

ab Name: QUANTERRA_MO Contract: 550.118

ab Code: ITMO Case No.: SAS No.: SDG No.: W0871

atrix (soil/water): SOIL Lab Sample ID: 10125-006

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

Solids: 94.2

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

CAS No.	Analyte	Concentration	C	Q	M
7440-38-2	Arsenic				NR
7440-39-3	Barium				NR
7440-43-9	Cadmium				NR
7440-47-3	Chromium	7.5			P
7439-92-1	Lead				NR
7439-97-6	Mercury				NR
7782-49-2	Selenium				NR
7440-22-4	Silver				NR

olor Before: Clarity Before: Texture:

olor After: Clarity After: Artifacts:

omments:

FORM I - IN

TCLP

020

HRG 3/25/96

~~00063~~

9613477.2361

U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

B0H0H6

ab Name: QUANTERRA_MO Contract: 550.118

ab Code: ITMO Case No.: SAS No.: SDG No.: W0871

atrix (soil/water): WATER Lab Sample ID: P10125-007

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

Solids: 0.0

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

CAS No.	Analyte	Concentration	C	Q	M
7440-38-2	Arsenic	65.5	U	N	P
7440-39-3	Barium	430		N	P
7440-43-9	Cadmium	3.4	U	N	P
7440-47-3	Chromium	4.4	U	N	P
7439-92-1	Lead	34.3	U	N	P
7439-97-6	Mercury	0.10	U		CV
7782-49-2	Selenium	47.0	U	N	P
7440-22-4	Silver	5.0	U		P

olor Before: Clarity Before: Texture:

olor After: Clarity After: Artifacts:

omments:

FORM I - IN

TCLP

021 HRG 3/25/96

~~00064~~

9613477.2362

U.S. EPA - CLP

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

B0H0H6

ab Name: QUANTERRA_MO Contract: 550.118

ab Code: ITMO Case No.: SAS No.: SDG No.: W0871

atrix (soil/water): SOIL Lab Sample ID: 10125-007

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

Solids: 95.0

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

CAS No.	Analyte	Concentration	C	Q	M
7440-38-2	Arsenic				NR
7440-39-3	Barium				NR
7440-43-9	Cadmium				NR
7440-47-3	Chromium	10.9			P
7439-92-1	Lead				NR
7439-97-6	Mercury				NR
7782-49-2	Selenium				NR
7440-22-4	Silver				NR

olor Before: Clarity Before: Texture:

olor After: Clarity After: Artifacts:

omments:

FORM I - IN

TCLP

022 HRG 3/25/96

~~00065~~

9613477.2363

U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

B0H0H7

ab Name: QUANTERRA_MO Contract: 550.118

ab Code: ITMO Case No.: SAS No.: SDG No.: W0871

atrix (soil/water): WATER Lab Sample ID: P10125-008

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

Solids: 0.0

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

CAS No.	Analyte	Concentration	C	Q	M
7440-38-2	Arsenic	65.5	U	N	P
7440-39-3	Barium	451		N	P
7440-43-9	Cadmium	3.4	U	N	P
7440-47-3	Chromium	4.4	U	N	P
7439-92-1	Lead	34.3	U	N	P
7439-97-6	Mercury	0.10	U		CV
7782-49-2	Selenium	47.0	U	N	P
7440-22-4	Silver	5.0	U		P

olor Before: Clarity Before: Texture:

olor After: Clarity After: Artifacts:

omments:

FORM I - IN

TCLP

023 HRG 3/25/96
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U.S. EPA - CLP

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

B0H0H7

ab Name: QUANTERRA_MO Contract: 550.118

ab Code: ITMO Case No.: SAS No.: SDG No.: W0871

atrix (soil/water): SOIL Lab Sample ID: 10125-008

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

Solids: 94.4

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

CAS No.	Analyte	Concentration	C	Q	M
7440-38-2	Arsenic				NR
7440-39-3	Barium				NR
7440-43-9	Cadmium				NR
7440-47-3	Chromium	8.1			P
7439-92-1	Lead				NR
7439-97-6	Mercury				NR
7782-49-2	Selenium				NR
7440-22-4	Silver				NR

olor Before: Clarity Before: Texture:

olor After: Clarity After: Artifacts:

omments:

FORM I - IN

TCLP

024 HRG 3/25/96

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HEXAVALENT CHROMIUM DATA SUMMARY

SDG: W0871

ANALYSIS DATE: 1/12/96

MATRIX: SOIL

MDL: 0.57 mg/kg

SAMPLE LAB. ID	CLIENT ID	SAMPLE RESULT	UNITS	SPIKE ADDED	UNITS	SPIKE RECOVERED	UNITS	PERCENT RECOVERY
Preparation Blank		0.001	mg/L					
LCS		0.876	mg/L	1.000	mg/L	0.876	mg/L	87.6
60113601	B0H0H0	<0.57	mg/kg					
60113602	B0H0H1	<0.57	mg/kg					
60113603	B0H0H2	<0.57	mg/kg					
60113604	B0H0H3	<0.57	mg/kg					
60113605	B0H0H4	<0.57	mg/kg					
60113606	B0H0H5	<0.57	mg/kg					
60113607	B0H0H6	<0.57	mg/kg					
60113608	B0H0H7	<0.57	mg/kg					
60113608 DUP	B0H0H7	<0.57	mg/kg					
60113608 MS	B0H0H7	33.36	mg/kg	40.0	mg/kg	33.36	mg/kg	83.4
60113608 PbCrO4 MS	B0H0H7	896.0	mg/kg	926.72	mg/kg	896.0	mg/kg	96.7

COMMENTS:

To convert preparation blank in mg/L to mg/kg: mg/kg = (mg/L * 0.1 L) / 0.01 kg

(RG) 1-15-96

Form No.:CG-196, 8/95, Rev. 0

025

HRG 3/25/96

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9613477.2366

ATTACHMENT 4

LABORATORY NARRATIVE and CHAIN-OF-CUSTODY DOCUMENTATION

9613477.2367

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

JAN 1996
RECEIVED
Data
Log In

January 24, 1996

Attention: Joan Kessner

Project number	:	550.118
Date Received by Lab	:	January 10, 1996
Number of Samples	:	Eight (8)
Sample Type	:	Soil
SDG Number	:	W0871
Data Deliverable	:	Summary

I. Introduction

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

St Louis ID	WHC ID	Richland ID	Matrix	Date of Receipt
10125-001	B0H0H0	60113501	Soil	01/10/96
10125-002	B0H0H1	60113502	Soil	01/10/96
10125-003	B0H0H2	60113503	Soil	01/10/96
10125-004	B0H0H3	60113504	Soil	01/10/96
10125-005	B0H0H4	60113505	Soil	01/10/96
10125-006	B0H0H5	60113506	Soil	01/10/96
10125-007	B0H0H6	60113507	Soil	01/10/96
10125-008	B0H0H7	60113508	Soil	01/10/96

HLG 3/25/96
~~00002~~

Quanterra
Environmental Services

II. Analytical Results/ Methodology

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

Analyses requested: ICP Metals by EPA method 6010 and Mercury by EPA method 7470 following TCLP Extraction by EPA method 1311. Chromium by EPA method 6010. pH by EPA method 9045. Cyanide by EPA Method 335.2. Chloride, Fluoride, Nitrite, Nitrate, Phosphate and Sulfate by EPA Method 300.0. Nitrate/Nitrite by EPA Method 353.1. Sulfide by EPA Method 9030. Hexavalent Chromium by EPA method 3060A performed at QTESRL.

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 were performed per the protocol for the analyses in this SDG. pH analysis uses only Sample Duplicate for matrix QC.

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

HRG 3/25/96
~~2203~~

Quanterra
Environmental Services

Bechtel Hanford Incorporated
January 24, 1996
Project Number: 550.118
SDG: W0871

V. Comments

Total Chromium analysis was added after the samples were received and therefore does not appear on the Chain of Custody.

Metals
Due to software limitations all the forms in the SDG W0871 package are labelled "TCLP " even though both Total and TCLP results were reported.

TCLP:
The recoveries of the Matrix Spike Duplicate for the following list of elements was less than 80%, therefore all associated data was flagged with an " N ". All the recoveries for the Matrix Spike were within the 80%-120% range. See NCM # SL-2387.

	% REC
Arsenic	76.4
Barium	76.6
Cadmium	78.7
Chromium	78.7
Lead	78.5
Selenium	78.7

Chromium:
There are no comments or nonconformances associated with the Total Chromium analysis.

HRG 3/25/96
~~CCCC4~~

Quanterra
Environmental Services

Wet Chemistry

The Relative Percent Differences could not be calculated for the Fluoride, Sulfate, Phosphate and Nitrite analyses due to the values being below the detection limits for sample 10125-001 and its duplicate.

The Relative Percent Differences could not be calculated for the Nitrate/Nitrite analysis due to the values being below the detection limits for sample 10125-001 and its duplicate.

The Relative Percent Differences could not be calculated for the Cyanide analysis due to the values being below the detection limits for sample 10125-001 and its duplicate.

The Relative Percent Differences could not be calculated for the Sulfide analysis due to the values being below the detection limits for sample 10125-001 and its duplicate.

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\hanw0871.nar

HRG 3/25/96
~~CCCCS~~

Bechtel Hanford, Inc.

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

Data Turnaround: X Priority / Normal

Collector: Doug Bowers	Company Contact: D. B. Encke	Telephone: 373-3461
Project Designation: 183-H Soil Screen/Verification (Loading ramp/Berm pile)	Sampling Location: 183-H Solar Basin	SAF No.: B96-052
Ice Chest No.: ER-17	Field Logbook No.: EFL-1133-1	Method of Shipment: Hand deliver
Shipped To: Quanterra	Offsite Property No.	Bill of Lading/Air Bill No.
Possible Sample Hazards/Remarks: none		
Special Handling and/or Storage		

Preservation	none	cool to 4C	cool to 4C	cool to 4C	cool to 4C	cool to 4C	none	none		
Type of Container	P/G	P/G	P/G	P/G	P/G	P/G	P/G	P/G		
No. of Container(s)	1	1	1	1	1	1	2	1		
Volume	120 mL	250 mL	60 mL	60 mL	60 mL	60 ml	1 L	20 mL		
SAMPLE ANALYSIS 601135 SDG W08871 %	100 TCLP Metals	100 Cyanide	100 Sulfide	100 See Item #1 below	100 NO2-NO3	Chromium Hex	601136 See Item #2 below	Activity Scan		

Sample No.	Matrix*	Date Sampled	Time Sampled	TCLP Metals	Cyanide	Sulfide	See Item #1 below	NO2-NO3	Chromium Hex	See Item #2 below	Activity Scan		
B0H0H0 01	S	1-8-96	1137	X	X	X	X	X	X	X	X	N6	195
B0H0H1 02	S	1-8-96	1158	X	X	X	X	X	X	X	X	N6	196
B0H0H2 03	S	1-8-96	1236	X	X	X	X	X	X	X	X	N6	196
B0H0H3 04	S	1-8-96	1303	X	X	X	X	X	X	X	X	N6	197
B0H0H4 05	S	1-8-96	1352	X	X	X	X	X	X	X	X	N6	198
B0H0H5 06	S	1-8-96	1415	X	X	X	X	X	X	X	X	N6	199

CHAIN OF POSSESSION

Sign/Print Names

Relinquished By	Date/Time	Received By	Date/Time
Doug Bowers	1-9-96/0800	ER / B. Britton	0800 1-9-96
ER / B. Britton	10:30 1-10-96	Duane Sullivan	10:30 1-10-96

SPECIAL INSTRUCTIONS

Hexavalent chrom must be extracted per SW-846 3060A with a holding time of 96 hours.

Sample analysis for nitrate, nitrite, and phosphate by EPA 300.0 are being requested for Information only. The ERC Contractor acknowledges the holding times will not be met.

Item #1; Anions - IC F, Cl, SO4, PO4, NO2, NO3, pH

Item #2; Gross Alpha/Beta, U-234, -235, -238, Tc-99, Total U, 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

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

HOD3/96

Bechtel Hanford, Inc.

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

Data Turnaround: X Priority / Normal

Collector: Doug Bowers	Company Contact: D. B. Encke	Telephone: 373-3461
Project Designation: 183-H Soil Screen/Verification (Loading ramp/Berm pile)	Sampling Location: 183-H Solar Basin	SAF No.: B96-052
Ice Chest No.: ER-17	Field Logbook No.	Method of Shipment: Hand deliver
Shipped To: Quanterra	Offsite Property No.	Bill of Lading/Air Bill No.

Possible Sample Hazards/Remarks: none

Special Handling and/or Storage

SAMPLE ANALYSIS: 601135

SDG W0871

Preservation	none	cool to 4C	cool to 4C	cool to 4C	cool to 4C	cool to 4C	none	none		
Type of Container	P/G	P/G	P/G	P/G	P/G	P/G	P/G	P/G		
No. of Container(s)	1	1	1	1	1	1	2	1		
Volume	120 mL	250 mL	60 mL	60 mL	60 mL	60 ml	1 L	20 mL		
%	100	100	100	100	100		601136			
	TCLP Metals	Cyanide	Sulfide	See Item #1 below	NO2-NO3	Chromium Hex	See Item #2 below	Activity Scan		

Sample No.	Matrix*	Date Sampled	Time Sampled	TCLP Metals	Cyanide	Sulfide	See Item #1 below	NO2-NO3	Chromium Hex	See Item #2 below	Activity Scan		
B0H0H6 07	S	1-8-96	1415	X	X	X	X	X	X	X	X	N 6199	
B0H0H7 08	S	1-8-96	1452	X	X	X	X	X	X	X	X	N 6201	

CHAIN OF POSSESSION

Relinquished By	Date/Time	Received By	Date/Time
Doug Bowers	1-8-96/0800	ERC B. Watts	1-8-96 0800
ERC B. Watts	1-10-96 10:30	Karen Stenberg	1-10-96 10:30

Sign/Print Names

SPECIAL INSTRUCTIONS

Hexavalent chrom must be extracted per SW-846 3060A with a holding time of 96 hours.

Sample analysis for nitrate, nitrite, and phosphate by EPA 300.0 are being requested for Information only. The ERC Contractor acknowledges the holding times will not be met.

Item #1; Anions - IC F, Cl, SO4, PO4, NO2, NO3, pH

Item #2; Gross Alpha/Beta, U-234, -235, -238, Tc-99, Total U, 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

LABORATORY SECTION: Received By | Title | Date/Time

FINAL SAMPLE DISPOSITION: Disposal Method | Disposed By | Date/Time

032

HCG 3/25/96

9613477.2373

ATTACHMENT 5

DATA VALIDATION SUPPORTING DOCUMENTATION

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: 183-H Basin D&D			DATA PACKAGE:		
VALIDATOR: H. GREGERSON		LAB: QUANTERRA		DATE: 3/25/96	
CASE:			SDG: W0871-QES		
ANALYSES PERFORMED					
☐ CLP/ICP	☐ CLP/GFAA	☐ CLP/Hg	☐ CLP/Cyanide	☒ TCLP-Metals	☒ TCLP/Hg
☐ SW-846/ICP	☐ SW-846/GFAA	☐ SW-846/Hg	☐ SW-846 Cyanide	☒ Cr/ICP Total	☒ Hexavalent Cr
SAMPLES/MATRIX	B0H0H0	B0H0H1	B0H0H2	B0H0H3	B0H0H4
B0H0H5	B0H0H6	B0H0H7 / SOIL			

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

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

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

Comments:

2. HOLDING TIMES

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

Comments:

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

3. INSTRUMENT PERFORMANCE AND CALIBRATIONS

Were initial calibrations performed on all instruments? . . . . Yes No N/A

Are initial calibrations acceptable? . . . . . Yes No N/A

Are ICP interference checks acceptable? . . . . . Yes No N/A

Were ICV and CCV checks performed on all instruments? . . . . . Yes No N/A

Are ICV and CCV checks acceptable? . . . . . Yes No N/A

Comments:

4. BLANKS

HRG 3/25/96

Were ICB and CCB checks performed for all applicable analyses? ~~Yes~~ No N/A

Are ICB and CCB results acceptable? . . . . . Yes No N/A

Were preparation blanks analyzed? . . . . . Yes No 1. N/A

Are preparation blank results acceptable? . . . . . 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. Ba detected in TCLP blank and associated samples were qualified. See supporting document.

5. ACCURACY

Were spike samples analyzed? . . . . . Yes No N/A

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

Were laboratory control samples (LCS) analyzed? . . . . . Yes No N/A

Are LCS recoveries acceptable? . . . . . Yes No N/A

Comments:

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

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

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

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

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

Comments:_____

HOLDING TIME SUMMARY

SDG: W0871-QES | VALIDATOR: HEIDI GREGERSON | DATE: 3/25/96 | PAGE 1 OF 1

COMMENTS:

FIELD SAMPLE ID	ANALYSIS TYPE	DATE SAMPLED	DATE PREPARED	DATE ANALYZED	PREP. HOLDING TIME, DAYS	ANALYSIS HOLDING TIME, DAYS	QUALIFIER
B0H0H0	TCLP	1/8/96	1/14/96	HG 3/25/96 1/16/96	6	2	none
	Cr		1/18/96	1/19/96	10	1	none
B0H0H1	TCLP		1/14/96	HG 3/25/96 1/16/96	6	2	none
	Cr		1/18/96	1/19/96	10	1	none
B0H0H2	TCLP		1/14/96	1/16/96	6	2	none
	Cr		1/18/96	HG 3/25/96 1/19/96	10	1	none
B0H0H3	TCLP		1/14/96	1/16/96	6	2	none
	Cr		1/18/96	1/18/96	10	1	none
B0H0H4	TCLP		1/14/96	1/16/96	6	2	none
	Cr		1/18/96	HG 3/25/96 1/19/96	10	1	none
B0H0H5	TCLP		1/14/96	1/16/96	6	2	none
	Cr		1/18/96	1/19/96	10	1	none
B0H0H6	TCLP		1/14/96	1/16/96	6	2	none
HG 3/25/96 X	Cr		1/18/96	1/19/96	10	1	none
B0H0H7	TCLP		1/14/96	1/16/96	6	2	none
	Cr.	↓	1/18/96	1/19/96	10	1	none

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U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

PBT88513

ab Name: QUANTERRA_MO Contract: 550.118

ab Code: ITMO Case No.: SAS No.: SDG No.: W0871

atrix (soil/water): WATER Lab Sample ID: PBT88513

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

Solids: 0.0

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

CAS No.	Analyte	Concentration	C	Q	M
7440-38-2	Arsenic	65.5	U	N	P
7440-39-3	Barium	60.1	B	N	P
7440-43-9	Cadmium	3.4	U	N	P
7440-47-3	Chromium	4.4	U	N	P
7439-92-1	Lead	34.3	U	N	P
7439-97-6	Mercury	0.10	U		CV
7782-49-2	Selenium	47.0	U	N	P
7440-22-4	Silver	5.0	U		P

olor Before: Clarity Before: Texture:

olor After: Clarity After: Artifacts:

omments:

FORM I - IN Sample Affected: BOHOHO TCLP

038 HRG 3/25/96
~~00068~~

MEMORANDUM

TO: 183-H Basin D&D, Soil Screen/Verification Project QA Record March 25, 1996

FR: Heidi Gregerson, Golder Associates Inc. HRG

RE: GENERAL CHEMISTRY DATA VALIDATION SUMMARY FOR DATA PACKAGE W0871-QES (943-1610.125 871GEN.HB)

INTRODUCTION

This memo presents the results of data validation for the analysis indicated below on data package W0871-QES prepared by Quanterra Environmental Services. Sample information is provided in the following table.

SAMPLE ID	COMMENTS	ANALYSIS	MEDIA
B0H0H0		GENERAL CHEMISTRY	SOIL
B0H0H1			SOIL
B0H0H2		SEE ATTACHMENT 4	SOIL
B0H0H3			SOIL
B0H0H4			SOIL
B0H0H5			SOIL
B0H0H6			SOIL
B0H0H7			SOIL

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

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

DATA QUALITY OBJECTIVES

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

Precision. Goals for precision were met.

Accuracy. Goals for accuracy were met.

Completeness. The data package was complete for all requested analyses. A total of eight samples were validated in this data package with a total of 80 determinations reported, all of which were deemed valid. This results in a completeness of 100 percent, which meets the 90% objective of the work plan.

Detection Limits. Detection limit goals were met for all the sample results, with the exception of chloride and ortho-phosphate. Qualification is not required.

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:

Holding Times

- The holding time for pH, nitrate, nitrite, and ortho-phosphate was exceeded. Attachments 2 and 5 provide a summary of 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.

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ATTACHMENT 1

GLOSSARY OF DATA REPORTING QUALIFIERS

Glossary of Inorganic Data Reporting Qualifiers.

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

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

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

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

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

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

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

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ATTACHMENT 2

SUMMARY OF DATA QUALIFICATIONS

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

DATA QUALIFICATION SUMMARY - FORM B-7

SDG: W0871-QES	REVIEWER: Heidi Gregerson	DATE: 3-25-96	PAGE 1 OF 1
COMMENTS: GENERAL CHEMISTRY			
COMPOUND/ANALYTE	QUALIFIER	SAMPLES AFFECTED	REASON
pH	J	ALL SAMPLES	HOLDING TIME EXCEEDED
NITRATE-N	J	ALL SAMPLES	HOLDING TIME EXCEEDED
NITRITE-N	UJ	ALL SAMPLES	HOLDING TIME EXCEEDED
ORTHO-PHOSPHATE	UJ	ALL SAMPLES	HOLDING TIME EXCEEDED

ATTACHMENT 3

QUALIFIED DATA SUMMARY and ANNOTATED LABORATORY REPORTS

Validated Data Summary, Data Package: W0871-QES

	Sample #	B0H0H0		B0H0H1		B0H0H2		B0H0H3		B0H0H4		B0H0H5		B0H0H6		B0H0H7	
	Date	1/8/96		1/8/96		1/8/96		1/8/96		1/8/96		1/8/96		1/8/96		1/8/96	
	Location																
	Depth																
	Type	Soil		Soil		Soil		Soil		Soil		Soil		Soil		Soil	
	Comments																
Parameter	Units	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
CYANIDE	UG/G	0.500	U	0.530	U	0.540	U	0.520	U	0.520	U	0.530	U	0.520	U	0.520	U
SULFIDE	UG/G	10.600	U	10.700	U	11.200	U	10.800	U	10.900	U	11.000	U	10.900	U	11.300	U
CHLORIDE	UG/G	3.410		2.110	U	2.040	U	1.950	U	1.880	U	1.890	U	2.100	U	2.040	U
FLUORIDE	UG/G	1.000	U	1.060	U	1.400		0.980	U	0.940	U	1.290		1.420		1.020	U
NITRATE-N	UG/G	0.310	J	1.410	J	0.570	J	0.290	J	3.570	J	0.380	J	0.400	J	0.410	J
NITRITE-N	UG/G	0.200	UJ	0.210	UJ	0.200	UJ	0.200	UJ	0.190	UJ	0.190	UJ	0.210	UJ	0.200	UJ
ORTHO-PHOSPHATE	UG/G	5.000	UJ	5.280	UJ	5.100	UJ	4.880	UJ	4.690	UJ	4.730	UJ	5.240	UJ	5.110	UJ
SULFATE	UG/G	5.000	U	23.800		8.650		4.880	U	8.660		4.730	U	5.240	U	5.110	U
PH	PH	6.420	J	9.020	J	8.600	J	8.600	J	8.610	J	8.740	J	8.730	J	8.640	J
NITRATE/NITRITE-N	UG/G	0.5	U	0.95		0.54	U	0.53	U	3.05		0.53	U	0.53	U	0.53	U

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

Verified HRG
3/25/96

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Quanterra Environmental Services

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

Project: 550.118

Category: Cyanide
Method: EPA 335.2
Matrix: SOLID

Sample Date : 01/08/96
Receipt Date : 01/10/96
Report Date : 01/22/96

Client ID	Quanterra ID	Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit	Dil
B0H0H0	10125-001	Cyanide	57-12-5	QCBLK88399-2	01/12/96	01/16/96	0.50	UG/G	U	0.50	1
B0H0H0	10125-001DUP	Cyanide	57-12-5	QCBLK88399-2	01/12/96	01/16/96	0.50	UG/G	U	0.50	1
B0H0H0	10125-001MS	Cyanide	57-12-5	QCBLK88399-2	01/12/96	01/16/96	94	%REC			1
B0H0H1	10125-002	Cyanide	57-12-5	QCBLK88399-2	01/12/96	01/16/96	0.53	UG/G	U	0.53	1
B0H0H2	10125-003	Cyanide	57-12-5	QCBLK88399-2	01/12/96	01/16/96	0.54	UG/G	U	0.54	1
B0H0H3	10125-004	Cyanide	57-12-5	QCBLK88399-2	01/12/96	01/16/96	0.52	UG/G	U	0.52	1
B0H0H4	10125-005	Cyanide	57-12-5	QCBLK88399-2	01/12/96	01/16/96	0.52	UG/G	U	0.52	1
B0H0H5	10125-006	Cyanide	57-12-5	QCBLK88399-2	01/12/96	01/16/96	0.53	UG/G	U	0.53	1
B0H0H6	10125-007	Cyanide	57-12-5	QCBLK88399-2	01/12/96	01/16/96	0.52	UG/G	U	0.52	1
B0H0H7	10125-008	Cyanide	57-12-5	QCBLK88399-2	01/12/96	01/16/96	0.52	UG/G	U	0.52	1
NA	QCBLK88399-2	Cyanide	57-12-5	QCBLK88399-2	01/12/96	01/16/96	0.50	UG/G	U	0.50	1
NA	QCLCS88399-2	Cyanide	57-12-5	QCBLK88399-2	01/12/96	01/16/96	94	%REC			1

HRG 3/25/96

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Quanterra Environmental Services

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

Project: 550.118

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

Sample Date : 01/08/96
Receipt Date : 01/10/96
Report Date : 01/22/96

Client ID	Quanterra ID	Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit
BOHOH0	10125-001	Sulfide	18496-25-8	QCBLK88499-1	01/12/96	01/12/96	10.6	UG/G	U	10.6
BOHOH0	10125-001DUP	Sulfide	18496-25-8	QCBLK88499-1	01/12/96	01/12/96	10.5	UG/G	U	10.5
BOHOH0	10125-001MS	Sulfide	18496-25-8	QCBLK88499-1	01/12/96	01/12/96	80	%REC		
BOHOH1	10125-002	Sulfide	18496-25-8	QCBLK88499-1	01/12/96	01/12/96	10.7	UG/G	U	10.7
BOHOH2	10125-003	Sulfide	18496-25-8	QCBLK88499-1	01/12/96	01/12/96	11.2	UG/G	U	11.2
BOHOH3	10125-004	Sulfide	18496-25-8	QCBLK88499-1	01/12/96	01/12/96	10.8	UG/G	U	10.8
BOHOH4	10125-005	Sulfide	18496-25-8	QCBLK88499-1	01/12/96	01/12/96	10.9	UG/G	U	10.9
BOHOH5	10125-006	Sulfide	18496-25-8	QCBLK88499-1	01/12/96	01/12/96	11.0	UG/G	U	11.0
BOHOH6	10125-007	Sulfide	18496-25-8	QCBLK88499-1	01/12/96	01/12/96	10.9	UG/G	U	10.9
BOHOH7	10125-008	Sulfide	18496-25-8	QCBLK88499-1	01/12/96	01/12/96	11.3	UG/G	U	11.3
NA	QCBLK88499-1	Sulfide	18496-25-8	QCBLK88499-1	01/12/96	01/12/96	10.6	UG/G	U	10.6
NA	QCLCS88499-1	Sulfide	18496-25-8	QCBLK88499-1	01/12/96	01/12/96	82	%REC		

HRG 3/25/96
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Quanterra Environmental Services

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

Project: 550.118

Category: CHLORIDE
Method: EPA 300.0
Matrix: SOLID

Sample Date : 01/08/96
Receipt Date : 01/10/96
Report Date : 01/22/96

Client ID	Quanterra ID	Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit
BOHOH0	10125-001	Chloride	16887-00-6	QCBLK88682-2	01/12/96	01/12/96	3.41	UG/G		2.00
BOHOH0	10125-001DUP	Chloride	16887-00-6	QCBLK88682-2	01/12/96	01/12/96	3.57	UG/G		1.99
BOHOH0	10125-001MS	Chloride	16887-00-6	QCBLK88682-2	01/12/96	01/12/96	95	%REC		
BOHOH1	10125-002	Chloride	16887-00-6	QCBLK88682-2	01/12/96	01/12/96	2.11	UG/G	U	2.11
BOHOH2	10125-003	Chloride	16887-00-6	QCBLK88682-2	01/12/96	01/12/96	2.04	UG/G	U	2.04
BOHOH3	10125-004	Chloride	16887-00-6	QCBLK88682-2	01/12/96	01/12/96	1.95	UG/G	U	1.95
BOHOH4	10125-005	Chloride	16887-00-6	QCBLK88682-2	01/12/96	01/12/96	1.88	UG/G	U	1.88
BOHOH5	10125-006	Chloride	16887-00-6	QCBLK88682-2	01/12/96	01/12/96	1.89	UG/G	U	1.89
BOHOH6	10125-007	Chloride	16887-00-6	QCBLK88682-2	01/12/96	01/12/96	2.10	UG/G	U	2.10
BOHOH7	10125-008	Chloride	16887-00-6	QCBLK88682-2	01/12/96	01/12/96	2.04	UG/G	U	2.04
NA	QCBLK88682-2	Chloride	16887-00-6	QCBLK88682-2	01/12/96	01/12/96	2.00	UG/G	U	2.00
NA	QCLCS88682-2	Chloride	16887-00-6	QCBLK88682-2	01/12/96	01/12/96	92	%REC		

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Quanterra
Environmental Services

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

Project: 550.118

Category: FLUORIDE
Method: EPA 300.0
Matrix: SOLID

Sample Date : 01/08/96
Receipt Date : 01/10/96
Report Date : 01/22/96

Client ID	Quanterra ID	Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit
BOHOH0	10125-001	Fluoride	16984-48-8	QCBLK88682-2	01/12/96	01/12/96	1.00	UG/G	U	1.00
BOHOH0	10125-001DUP	Fluoride	16984-48-8	QCBLK88682-2	01/12/96	01/12/96	0.99	UG/G	U	0.99
BOHOH0	10125-001MS	Fluoride	16984-48-8	QCBLK88682-2	01/12/96	01/12/96	110	%REC		
BOHOH1	10125-002	Fluoride	16984-48-8	QCBLK88682-2	01/12/96	01/12/96	1.06	UG/G	U	1.06
BOHOH2	10125-003	Fluoride	16984-48-8	QCBLK88682-2	01/12/96	01/12/96	1.40	UG/G		1.02
BOHOH3	10125-004	Fluoride	16984-48-8	QCBLK88682-2	01/12/96	01/12/96	0.98	UG/G	U	0.98
BOHOH4	10125-005	Fluoride	16984-48-8	QCBLK88682-2	01/12/96	01/12/96	0.94	UG/G	U	0.94
BOHOH5	10125-006	Fluoride	16984-48-8	QCBLK88682-2	01/12/96	01/12/96	1.29	UG/G		0.95
BOHOH6	10125-007	Fluoride	16984-48-8	QCBLK88682-2	01/12/96	01/12/96	1.42	UG/G		1.05
BOHOH7	10125-008	Fluoride	16984-48-8	QCBLK88682-2	01/12/96	01/12/96	1.02	UG/G	U	1.02
NA	QCBLK88682-2	Fluoride	16984-48-8	QCBLK88682-2	01/12/96	01/12/96	1.00	UG/G	U	1.00
NA	QCLCS88682-2	Fluoride	16984-48-8	QCBLK88682-2	01/12/96	01/12/96	~~104~~ 91%	%REC		0.10

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HRG 3/25/96

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Quanterra Environmental Services

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

Project: 550.118

Category: Nitrate
Method: EPA 300.0
Matrix: SOLID

Sample Date : 01/08/96
Receipt Date : 01/10/96
Report Date : 01/22/96

Client ID	Quanterra ID	Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit
BOHOH0	10125-001	Nitrate	NO3-N	QCBLK88682-2	01/12/96	01/12/96	0.31	UG/G	J	0.20
BOHOH0	10125-001DUP	Nitrate	NO3-N	QCBLK88682-2	01/12/96	01/12/96	0.30	UG/G		0.20
BOHOH0	10125-001MS	Nitrate	NO3-N	QCBLK88682-2	01/12/96	01/12/96	103	%REC		
BOHOH1	10125-002	Nitrate	NO3-N	QCBLK88682-2	01/12/96	01/12/96	1.41	UG/G	J	0.21
BOHOH2	10125-003	Nitrate	NO3-N	QCBLK88682-2	01/12/96	01/12/96	0.57	UG/G	J	0.20
BOHOH3	10125-004	Nitrate	NO3-N	QCBLK88682-2	01/12/96	01/12/96	0.29	UG/G	J	0.20
BOHOH4	10125-005	Nitrate	NO3-N	QCBLK88682-2	01/12/96	01/12/96	3.57	UG/G	J	0.19
BOHOH5	10125-006	Nitrate	NO3-N	QCBLK88682-2	01/12/96	01/12/96	0.38	UG/G	J	0.19
BOHOH6	10125-007	Nitrate	NO3-N	QCBLK88682-2	01/12/96	01/12/96	0.40	UG/G	J	0.21
BOHOH7	10125-008	Nitrate	NO3-N	QCBLK88682-2	01/12/96	01/12/96	0.41	UG/G	J	0.20
NA	QCBLK88682-2	Nitrate	NO3-N	QCBLK88682-2	01/12/96	01/12/96	0.20	UG/G	U	0.20
NA	QCLCS88682-2	Nitrate	NO3-N	QCBLK88682-2	01/12/96	01/12/96	104	%REC		

HRG 3/25/96

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

Project: 550.118

Quanterra Environmental Services

Category: Nitrite
Method: EPA 300.0
Matrix: SOLID

Sample Date : 01/08/96
Receipt Date : 01/10/96
Report Date : 01/22/96

Client ID	Quanterra ID	Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit
BOHOH0	10125-001	Nitrite-N	14797-65-0	QCBLK88682-2	01/12/96	01/12/96	0.20	UG/G	~~U~~ UJ	0.20
BOHOH0	10125-001DUP	Nitrite-N	14797-65-0	QCBLK88682-2	01/12/96	01/12/96	0.20	UG/G	U	0.20
BOHOH0	10125-001MS	Nitrite-N	14797-65-0	QCBLK88682-2	01/12/96	01/12/96	90	%REC		
BOHOH1	10125-002	Nitrite-N	14797-65-0	QCBLK88682-2	01/12/96	01/12/96	0.21	UG/G	~~U~~ UJ	0.21
BOHOH2	10125-003	Nitrite-N	14797-65-0	QCBLK88682-2	01/12/96	01/12/96	0.20	UG/G	~~U~~ UJ	0.20
BOHOH3	10125-004	Nitrite-N	14797-65-0	QCBLK88682-2	01/12/96	01/12/96	0.20	UG/G	~~U~~ UJ	0.20
BOHOH4	10125-005	Nitrite-N	14797-65-0	QCBLK88682-2	01/12/96	01/12/96	0.19	UG/G	~~U~~ UJ	0.19
BOHOH5	10125-006	Nitrite-N	14797-65-0	QCBLK88682-2	01/12/96	01/12/96	0.19	UG/G	~~U~~ UJ	0.19
BOHOH6	10125-007	Nitrite-N	14797-65-0	QCBLK88682-2	01/12/96	01/12/96	0.21	UG/G	~~U~~ UJ	0.21
BOHOH7	10125-008	Nitrite-N	14797-65-0	QCBLK88682-2	01/12/96	01/12/96	0.20	UG/G	~~U~~ UJ	0.20
NA	QCBLK88682-2	Nitrite-N	14797-65-0	QCBLK88682-2	01/12/96	01/12/96	0.20	UG/G	U	0.20
NA	QCLCS88682-2	Nitrite-N	14797-65-0	QCBLK88682-2	01/12/96	01/12/96	95	%REC		

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~~00083~~

9613477.2393

Quanterra Environmental Services

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

Project: 550.118

Category: Orthophosphate
Method: EPA 300.0
Matrix: SOLID

Sample Date : 01/08/96
Receipt Date : 01/10/96
Report Date : 01/22/96

Client ID	Quanterra ID	Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit
BOHOH0	10125-001	Ortho-Phosphate	14265-44-2	QCBLK88682-2	01/12/96	01/12/96	5.00	UG/G	~~U~~ UJ	5.00
BOHOH0	10125-001DUP	Ortho-Phosphate	14265-44-2	QCBLK88682-2	01/12/96	01/12/96	4.97	UG/G	U	4.97
BOHOH0	10125-001MS	Ortho-Phosphate	14265-44-2	QCBLK88682-2	01/12/96	01/12/96	100	%REC		
BOHOH1	10125-002	Ortho-Phosphate	14265-44-2	QCBLK88682-2	01/12/96	01/12/96	5.28	UG/G	~~U~~ UJ	5.28
BOHOH2	10125-003	Ortho-Phosphate	14265-44-2	QCBLK88682-2	01/12/96	01/12/96	5.10	UG/G	~~U~~ UJ	5.10
BOHOH3	10125-004	Ortho-Phosphate	14265-44-2	QCBLK88682-2	01/12/96	01/12/96	4.88	UG/G	~~U~~ UJ	4.88
BOHOH4	10125-005	Ortho-Phosphate	14265-44-2	QCBLK88682-2	01/12/96	01/12/96	4.69	UG/G	~~U~~ UJ	4.69
BOHOH5	10125-006	Ortho-Phosphate	14265-44-2	QCBLK88682-2	01/12/96	01/12/96	4.73	UG/G	~~U~~ UJ	4.73
BOHOH6	10125-007	Ortho-Phosphate	14265-44-2	QCBLK88682-2	01/12/96	01/12/96	5.24	UG/G	~~U~~ UJ	5.24
BOHOH7	10125-008	Ortho-Phosphate	14265-44-2	QCBLK88682-2	01/12/96	01/12/96	5.11	UG/G	~~U~~ UJ	5.11
NA	QCBLK88682-2	Ortho-Phosphate	14265-44-2	QCBLK88682-2	01/12/96	01/12/96	5.00	UG/G	U	5.00
NA	QCLCS88682-2	Ortho-Phosphate	14265-44-2	QCBLK88682-2	01/12/96	01/12/96	104	%REC		

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

Quanterra Environmental Services

Project: 550.118

Category: SULFATE
Method: EPA 300.0
Matrix: SOLID

Sample Date : 01/08/96
Receipt Date : 01/10/96
Report Date : 01/22/96

Client ID	Quanterra ID	Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit
BOHOH0	10125-001	Sulfate	14808-79-8	QCBLK88682-2	01/12/96	01/12/96	5.00	UG/G	U	5.00
BOHOH0	10125-001DUP	Sulfate	14808-79-8	QCBLK88682-2	01/12/96	01/12/96	4.97	UG/G	U	4.97
BOHOH0	10125-001MS	Sulfate	14808-79-8	QCBLK88682-2	01/12/96	01/12/96	99	%REC		
BOHOH1	10125-002	Sulfate	14808-79-8	QCBLK88682-2	01/12/96	01/12/96	23.8	UG/G		5.28
BOHOH2	10125-003	Sulfate	14808-79-8	QCBLK88682-2	01/12/96	01/12/96	8.65	UG/G		5.10
BOHOH3	10125-004	Sulfate	14808-79-8	QCBLK88682-2	01/12/96	01/12/96	4.88	UG/G	U	4.88
BOHOH4	10125-005	Sulfate	14808-79-8	QCBLK88682-2	01/12/96	01/12/96	8.66	UG/G		4.69
BOHOH5	10125-006	Sulfate	14808-79-8	QCBLK88682-2	01/12/96	01/12/96	4.73	UG/G	U	4.73
BOHOH6	10125-007	Sulfate	14808-79-8	QCBLK88682-2	01/12/96	01/12/96	5.24	UG/G	U	5.24
BOHOH7	10125-008	Sulfate	14808-79-8	QCBLK88682-2	01/12/96	01/12/96	5.11	UG/G	U	5.11
NA	QCBLK88682-2	Sulfate	14808-79-8	QCBLK88682-2	01/12/96	01/12/96	5.00	UG/G	U	5.00
NA	QCLCS88682-2	Sulfate	14808-79-8	QCBLK88682-2	01/12/96	01/12/96	89	%REC		

HRG 3/25/96

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Quanterra Environmental Services

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

Project: 550.118

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

Sample Date : 01/08/96
Receipt Date : 01/10/96
Report Date : 01/22/96

Client ID	Quanterra ID	Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit	D
BOHOH0	10125-001	pH	PH	QCBLK88502-1	01/16/96	01/16/96	6.42	PH	J		
BOHOH0	10125-001DUP	pH	PH	QCBLK88502-1	01/16/96	01/16/96	6.47	PH			
BOHOH1	10125-002	pH	PH	QCBLK88502-1	01/16/96	01/16/96	9.02	PH	J		
BOHOH2	10125-003	pH	PH	QCBLK88502-1	01/16/96	01/16/96	8.60	PH	J		
BOHOH3	10125-004	pH	PH	QCBLK88502-1	01/16/96	01/16/96	8.60	PH	J		
BOHOH4	10125-005	pH	PH	QCBLK88502-1	01/16/96	01/16/96	8.61	PH	J		
BOHOH5	10125-006	pH	PH	QCBLK88502-1	01/16/96	01/16/96	8.74	PH	J		
BOHOH6	10125-007	pH	PH	QCBLK88502-1	01/16/96	01/16/96	8.73	PH	J		
BOHOH7	10125-008	pH	PH	QCBLK88502-1	01/16/96	01/16/96	8.64	PH	J		
NA	QCBLK88502-1	pH	PH	QCBLK88502-1	01/16/96	01/16/96	4.91	PH			

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Quanterra Environmental Services

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

Project: 550.118

Category: NO2-NO3
Method: EPA 353.1
Matrix: SOLID

Sample Date : 01/08/96
Receipt Date : 01/10/96
Report Date : 01/22/96

Client ID	Quanterra ID	Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit
BOHOH0	10125-001	Nitrate/Nitrite	NO2+NO3-N	QCBLK88482-1	01/12/96	01/12/96	0.50	UG/G	U	0.50
BOHOH0	10125-001DUP	Nitrate/Nitrite	NO2+NO3-N	QCBLK88482-1	01/12/96	01/12/96	0.50	UG/G	U	0.50
BOHOH0	10125-001MS	Nitrate/Nitrite	NO2+NO3-N	QCBLK88482-1	01/12/96	01/12/96	109	%REC		
BOHOH1	10125-002	Nitrate/Nitrite	NO2+NO3-N	QCBLK88482-1	01/12/96	01/12/96	0.95	UG/G		0.53
BOHOH2	10125-003	Nitrate/Nitrite	NO2+NO3-N	QCBLK88482-1	01/12/96	01/12/96	0.54	UG/G	U	0.54
BOHOH3	10125-004	Nitrate/Nitrite	NO2+NO3-N	QCBLK88482-1	01/12/96	01/12/96	0.53	UG/G	U	0.53
BOHOH4	10125-005	Nitrate/Nitrite	NO2+NO3-N	QCBLK88482-1	01/12/96	01/12/96	3.05	UG/G		0.53
BOHOH5	10125-006	Nitrate/Nitrite	NO2+NO3-N	QCBLK88482-1	01/12/96	01/12/96	0.53	UG/G	U	0.53
BOHOH6	10125-007	Nitrate/Nitrite	NO2+NO3-N	QCBLK88482-1	01/12/96	01/12/96	0.53	UG/G	U	0.53
BOHOH7	10125-008	Nitrate/Nitrite	NO2+NO3-N	QCBLK88482-1	01/12/96	01/12/96	0.53	UG/G	U	0.53
NA	QCBLK88482-1	Nitrate/Nitrite	NO2+NO3-N	QCBLK88482-1	01/12/96	01/12/96	0.50	UG/G	U	0.50
NA	QCLCS88482-1	Nitrate/Nitrite	NO2+NO3-N	QCBLK88482-1	01/12/96	01/12/96	96	%REC		

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ATTACHMENT 4

LABORATORY NARRATIVE and CHAIN-OF-CUSTODY DOCUMENTATION

9613477.2398

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

JAN 1996
RECEIVED
Data
Log In

January 24, 1996

Attention: Joan Kessner

Project number	:	550.118
Date Received by Lab	:	January 10, 1996
Number of Samples	:	Eight (8)
Sample Type	:	Soil
SDG Number	:	W0871
Data Deliverable	:	Summary

I. Introduction

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

St Louis ID	WHC ID	Richland ID	Matrix	Date of Receipt
10125-001	B0H0H0	60113501	Soil	01/10/96
10125-002	B0H0H1	60113502	Soil	01/10/96
10125-003	B0H0H2	60113503	Soil	01/10/96
10125-004	B0H0H3	60113504	Soil	01/10/96
10125-005	B0H0H4	60113505	Soil	01/10/96
10125-006	B0H0H5	60113506	Soil	01/10/96
10125-007	B0H0H6	60113507	Soil	01/10/96
10125-008	B0H0H7	60113508	Soil	01/10/96

HRG 3/25/96
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Quanterra
Environmental Services

II. Analytical Results/ Methodology

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

Analyses requested: ICP Metals by EPA method 6010 and Mercury by EPA method 7470 following TCLP Extraction by EPA method 1311. Chromium by EPA method 6010. pH by EPA method 9045. Cyanide by EPA Method 335.2. Chloride, Fluoride, Nitrite, Nitrate, Phosphate and Sulfate by EPA Method 300.0. Nitrate/Nitrite by EPA Method 353.1. Sulfide by EPA Method 9030. Hexavalent Chromium by EPA method 3060A performed at QTESRL.

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 were performed per the protocol for the analyses in this SDG. pH analysis uses only Sample Duplicate for matrix QC.

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

HRG 3/25/96
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Quanterra
Environmental Services

Bechtel Hanford Incorporated
January 24, 1996
Project Number: 550.118
SDG: W0871
Page 3

V. Comments

Total Chromium analysis was added after the samples were received and therefore does not appear on the Chain of Custody.

Metals
Due to software limitations all the forms in the SDG W0871 package are labelled "TCLP " even though both Total and TCLP results were reported.

TCLP:
The recoveries of the Matrix Spike Duplicate for the following list of elements was less than 80%, therefore all associated data was flagged with an " N ". All the recoveries for the Matrix Spike were within the 80%-120% range. See NCM # SL-2387.

	% REC
Arsenic	76.4
Barium	76.6
Cadmium	78.7
Chromium	78.7
Lead	78.5
Selenium	78.7

Chromium:
There are no comments or nonconformances associated with the Total Chromium analysis.

HRG 3/25/96
~~CCCCC~~

Quanterra
Environmental Services

Wet Chemistry

The Relative Percent Differences could not be calculated for the Fluoride, Sulfate, Phosphate and Nitrite analyses due to the values being below the detection limits for sample 10125-001 and its duplicate.

The Relative Percent Differences could not be calculated for the Nitrate/Nitrite analysis due to the values being below the detection limits for sample 10125-001 and its duplicate.

The Relative Percent Differences could not be calculated for the Cyanide analysis due to the values being below the detection limits for sample 10125-001 and its duplicate.

The Relative Percent Differences could not be calculated for the Sulfide analysis due to the values being below the detection limits for sample 10125-001 and its duplicate.

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\hanw0871.nar

HRG 3/25/96
~~00005~~

Bechtel Hanford, Inc.

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

Page 1 of 2

Data Turnaround: X Priority / Normal

Collector: Doug Bowers	Company Contact: D. B. Encke	Telephone: 373-3461
Project Designation: 183-H Soil Screen/Verification (Loading ramp/Berm pile)	Sampling Location: 183-H Solar Basin	SAF No.: B96-052
Ice Chest No.: ER-17	Field Logbook No.: EFL-1133-1	Method of Shipment: Hand deliver
Shipped To: Quanterra	Offsite Property No.	Bill of Lading/Air Bill No.
Possible Sample Hazards/Remarks: none		
Special Handling and/or Storage		

SAMPLE ANALYSIS 601135 SDG W0871

Sample No.	Matrix*	Date Sampled	Time Sampled	TCLP Metals	Cyanide	Sulfide	See Item #1 below	NO2-NO3	Chromium Hex	See Item #2 below	Activity Scan		
Preservation				none	cool to 4C	cool to 4C	cool to 4C	cool to 4C	cool to 4C	none	none		
Type of Container				P/G	P/G	P/G	P/G	P/G	P/G	P/G	P/G		
No. of Container(s)				1	1	1	1	1	1	2	1		
Volume				120 mL	250 mL	60 mL	60 mL	60 mL	60 ml	1 L	20 mL		
%				100	100	100	100	100		601136			
BOHOHØ 01	S	1-8-96	1137	X	X	X	X	X	X	X	X	N6	195
BOHOH1 02	S	1-8-96	1158	X	X	X	X	X	X	X	X	N6	195
BOHOH2 03	S	1-8-96	1236	X	X	X	X	X	X	X	X	N6	196
BOHOH3 04	S	1-8-96	1303	X	X	X	X	X	X	X	X	N6	197
BOHOH4 05	S	1-8-96	1352	X	X	X	X	X	X	X	X	N6	198
BOHOH5 06	S	1-8-96	1415	X	X	X	X	X	X	X	X	N6	199

SPECIAL INSTRUCTIONS

Hexavalent chrom must be extracted per SW-846 3060A with a holding time of 96 hours.

Sample analysis for nitrate, nitrite, and phosphate by EPA 300.0 are being requested for Information only. The ERC Contractor acknowledges the holding times will not be met.

Item #1; Anions - IC F, Cl, SO4, PO4, NO2, NO3, pH

Item #2; Gross Alpha/Beta, U-234, -235, -238, Tc-99, Total U, 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

CHAIN OF POSSESSION — Sign/Print Names

Relinquished By	Date/Time	Received By	Date/Time
Doug Bowers	1-9-96/0800	EK / B Britton	0800 / 1-9-96
EKR / B Britton	10:30 / 1-10-96	[illegible]	10:30 / 1-10-96

LABORATORY SECTION: Received By | Title | Date/Time

FINAL SAMPLE DISPOSITION: Disposal Method | Disposed By | Date/Time

Bechtel Hanford, Inc.

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

Data Turnaround: X Priority / Normal

Collector: Doug Bowers	Company Contact: D. B. Encke	Telephone: 373-3461
Project Designation: 183-H Soil Screen/Verification (Loading ramp/Berm pile)	Sampling Location: 183-H Solar Basin	SAF No.: B96-052
Ice Chest No.: ER-17	Field Logbook No.	Method of Shipment: Hand deliver
Shipped To: Quanterra	Offsite Property No.	Bill of Lading/Air Bill No.
Possible Sample Hazards/Remarks: none		

Preservation	none	cool to 4C	cool to 4C	cool to 4C	cool to 4C	cool to 4C	none	none		
Type of Container	P/G	P/G	P/G	P/G	P/G	P/G	P/G	P/G		
No. of Container(s)	1	1	1	1	1	1	2	1		
Volume	120 mL	250 mL	60 mL	60 mL	60 mL	60 ml	1 L	20 mL		
SAMPLE ANALYSIS 601135 SDG W0871 %	100 TCLP Metals	100 Cyanide	100 Sulfide	100 See Item #1 below	100 NO2-NO3	Chromium Hex	601136 See Item #2 below	Activity Scan		

Sample No.	Matrix*	Date Sampled	Time Sampled	TCLP Metals	Cyanide	Sulfide	See Item #1 below	NO2-NO3	Chromium Hex	See Item #2 below	Activity Scan		
B0H0H6 07	S	1-8-96	1415	X	X	X	X	X	X	X	X	N 6199	
B0H0H7 08	S	1-8-96	1452	X	X	X	X	X	X	X	X	N 6201	

CHAIN OF POSSESSION

Relinquished By	Date/Time	Received By	Date/Time
Doug Bowers	1-9-96/0800	Kim Wheeler / B. Wheeler	1-9-96 0800
Kim Wheeler / B. Wheeler	1-10-96 10:30	Kim Wheeler / B. Wheeler	1-10-96 10:30

Sign/Print Names

SPECIAL INSTRUCTIONS

Hexavalent chrom must be extracted per SW-846 3060A with a holding time of 96 hours.

Sample analysis for nitrate, nitrite, and phosphate by EPA 300.0 are being requested for Information only. The ERC Contractor acknowledges the holding times will not be met.

Item #1; Anions - IC F, Cl, SO4, PO4, NO2, NO3, pH

Item #2; Gross Alpha/Beta, U-234, -235, -238, Tc-99, Total U, 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

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

025

HLG 3/25/96

9613477.2404

ATTACHMENT 5

DATA VALIDATION SUPPORTING DOCUMENTATION

GENERAL CHEMISTRY DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	(C)	D	E

PROJECT: 183-H Basin D+D		DATA PACKAGE:
VALIDATOR: H. GREGERSON	LAB: QUANTERRA	DATE: 3/25/96
CASE:		SDG: W0871-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 B0H0H0 B0H0H1 B0H0H2 B0H0H3
B0H0H4 B0H0H5 B0H0H6 B0H0H7/SOIL

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

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

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

Comments:

2. HOLDING TIMES

Are sample holding times acceptable? . . . . . Yes (No) N/A 1.

Comments:

1. The holding time for Nitrate, nitrite, ~~and~~ pH, and ortho-phosphate were exceeded and all samples were qualified. See supporting document.

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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:_____

4. BLANKS

Were laboratory blanks analyzed? . . . . . Yes No N/A

Are laboratory blank results acceptable? . . . . . Yes No N/A

Were field/trip blanks analyzed? . . . . . Yes No N/A

Are field/trip blank results acceptable? . . . . . Yes No N/A

Comments:_____

5. ACCURACY

Were spike samples analyzed at the required frequency? . . . . Yes No N/A

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:_____

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

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GENERAL CHEMISTRY DATA VALIDATION CHECKLIST

Comments:

7. ANALYTE QUANTITATION

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

Comments:

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? . . . . . Yes No N/A

Comments:

The CRDLs for Cl and PO4 were exceeded for all sample results. Qualification of data is not required.

HOLDING TIME SUMMARY

SDG: W0871-QES	VALIDATOR: HEIDI GREGERSON	DATE: 3/25/96	PAGE 1 OF 2
COMMENTS:			

FIELD SAMPLE ID	ANALYSIS TYPE	DATE SAMPLED	DATE PREPARED	DATE ANALYZED	PREP. HOLDING TIME, DAYS	ANALYSIS HOLDING TIME, DAYS	QUALIFIER
B0H0H0	Anions, Sulfide NO2/NO3	1/8/96	1/12/96	1/12/96	4	4	NO3, NO2, PO4 J/UJ
↓	pH	↓	1/16/96	1/16/96	8	8	J
↓	CN	↓	1/12/96	1/16/96	4	8	none
B0H0H1	Anions, Sulfide NO3/NO2	↓	1/12/96	1/12/96	4	4	NO3, NO2, PO4 J/UJ
↓	pH	↓	1/16/96	1/16/96	8	8	J
↓	CN	↓	1/12/96	1/16/96	4	8	none
B0H0H2	Anions, sulfide, NO2/NO3	↓	1/12/96	1/12/96	4	4	NO3, NO2, PO4 J/UJ
↓	pH	↓	HCG 3/25/96 1/16/96	1/16/96	8	8	J
↓	CN	↓	1/12/96	1/16/96	4	8	none
B0H0H3	Anions, sulfide NO2/NO3	↓	1/12/96	1/12/96	4	4	NO3, NO2, PO4 J/UJ
↓	pH	↓	1/16/96	1/16/96	8	8	J
↓	CN	↓	1/12/96	1/16/96	4	8	none
B0H0H4	Anions, sulfide, NO2/NO3	↓	1/12/96	1/12/96	4	4	NO3, NO2, PO4 J/UJ
↓	pH	↓	1/16/96	1/16/96	8	8	J
↓	CN	↓	1/12/96	1/16/96	4	8	none
B0H0H5	Anions, sulfide, NO2/NO3	↓	1/12/96	1/12/96	4	4	NO3/NO2/PO4 J/UJ
↓	pH	↓	1/16/96	1/16/96	8	8	J

HOLDING TIME SUMMARY

SDG: W0871-QES | VALIDATOR: HEIDI GREGERSON | DATE: 3/25/96 | PAGE 2 OF 2

COMMENTS:

FIELD SAMPLE ID	ANALYSIS TYPE	DATE SAMPLED	DATE PREPARED	DATE ANALYZED	PREP. HOLDING TIME, DAYS	ANALYSIS HOLDING TIME, DAYS	QUALIFIER
B0H0H5	CN	1/8/96	1/12/96	1/16/96	3/25/96 HG ~~8~~ 4	8	none
B0H0H6	Anions, sulfide, NO2/NO3		1/12/96	1/12/96	4	4	NO3, NO2, PO4 J, UJ
	pH		1/16/96	1/16/96	8	8	J
	CN		1/12/96	1/16/96	3/25/96 HG ~~8~~ 4	8	none
B0H0H7	Anions, sulfide, NO2/NO3		1/12/96	1/12/96	4	4	NO3, NO2, PO4 J/UJ
	pH		1/16/96	1/16/96	8	8	J
	CN		1/12/96	1/16/96	3/25/96 HG ~~8~~ 4	8	none

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

9613477.2410

MEMORANDUM

TO: 183-H Soil Screen Verification/
Loading Ramp and Berm Piles Project QA Record

March 25, 1996

FR: Tom Stapp, Golder Associates Inc. TOS

RE: RADIOCHEMISTRY DATA VALIDATION SUMMARY FOR DATA PACKAGE W0871-QES (943-1610.125 871RAD.HB)

INTRODUCTION

This memo presents the results of data validation for the analysis specified below on data package W0871-QES prepared by Quanterra Environmental Services. Sample information is provided in the following table.

SAMPLE ID	COMMENTS	ANALYSIS	MEDIA
B0H0H0		RADIOCHEMISTRY	SOIL
B0H0H1			SOIL
B0H0H2		SEE ATTACHMENT 4	SOIL
B0H0H3			SOIL
B0H0H4			SOIL
B0H0H5			SOIL
B0H0H6			SOIL
B0H0H7			SOIL

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

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

DATA QUALITY OBJECTIVES

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

Precision. Goals for precision were met.

Accuracy. Goals for accuracy were met.

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

Completeness. The data package was complete for all requested analyses. A total of eight samples were validated in this data package with a total of 149 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

No minor deficiencies were identified during data validation which required qualification of data:

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.

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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.

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ATTACHMENT 2

SUMMARY OF DATA QUALIFICATIONS

DATA QUALIFICATION SUMMARY - FORM B-7

SDG: W0871-QES	REVIEWER: T. Stapp	DATE: 03-25-96	PAGE 1 OF 1
COMMENTS: RADIOCHEMISTRY			
COMPOUND/ANALYTE	QUALIFIER	SAMPLES AFFECTED	REASON
NO QUALIFICATIONS REQUIRED			

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ATTACHMENT 3

QUALIFIED DATA SUMMARY and ANNOTATED LABORATORY REPORTS

Validated Data Summary, Data Package: W0871-QES

	Sample #	B0H0H0		B0H0H1		B0H0H2		B0H0H3		B0H0H4		B0H0H5		B0H0H6		B0H0H7	
	Date	1/8/96		1/8/96		1/8/96		1/8/96		1/8/96		1/8/96		1/8/96		1/8/96	
	Location																
	Depth																
	Type	Soil		Soil		Soil		Soil		Soil		Soil		Soil		Soil	
	Comments																
Parameter	Units	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
URANIUM-234	pCi/G	1.050		1.020		0.042		0.544		0.727		0.721		0.570		0.598	
URANIUM-235	pCi/G	0.052		0.057		0.649		0.020	U	0.058		0.039		0.026	U	0.019	U
URANIUM-238	pCi/G	1.080		0.923		0.673		0.591		0.780		0.807		0.600		0.626	
COBALT-58	pCi/G	0.013	U	-0.004	U	0.000	U	-0.006	U	0.005	U	0.005	U	0.000	U	-0.001	U
COBALT-60	pCi/G	-0.003	U	-0.003	U	0.016	U	0.011	U	0.004	U	0.005	U	0.010	U	0.004	U
CESIUM-137DA	pCi/G	0.001	U	0.005	U	0.025		0.001	U	0.012	U	0.031		0.021	U	0.007	U
EUROPIUM-152	pCi/G	0.008	U	-0.023	U	0.015	U	0.006	U	-0.007	U	-0.004	U	-0.016	U	0.003	U
EUROPIUM-154	pCi/G	-0.049	U	0.012	U	0.015	U	-0.012	U	0.007	U	-0.007	U	0.025	U	-0.033	U
EUROPIUM-155	pCi/G	0.014	U	0.056		0.025	U	0.029	U	0.011	U	0.034	U	0.007	U	0.050	U
IRON-59	pCi/G	0.002	U	0.006	U	0.005	U	-0.028	U	-0.035	U	0.007	U	-0.030	U	0.001	U
POTASSIUM-40	pCi/G	20.300		12.600		14.000		12.100		14.500		12.700		14.700		13.500	
RADIUM-224DA	pCi/G	0.246		0.614		0.650		0.539		0.635		0.538		0.610		0.546	
RADIUM-226DA	pCi/G	0.236		0.462		0.552		0.485		0.597		0.468		0.512		0.408	
RADIUM-228DA	pCi/G	0.333		0.739		0.691		0.571		0.718		0.589		0.637		0.533	
URANIUM-238DLP	pCi/G	0.664				0.397		0.324		0.471		0.661					
GROSS ALPHA	pCi/G	18.600		14.900		9.580		5.250		10.500		8.600		13.500		10.400	
GROSS BETA	pCi/G	74.300		24.500		26.400		20.900		25.300		24.800		24.900		22.800	
TECHNETIUM-99	pCi/G	-0.106	U	0.590		0.171	U	-0.194	U	0.464		-0.248	U	-0.011	U	0.218	U
TOTAL URANIUM	UG/GM	1.360		0.782		1.160		0.853		1.140		2.100		1.000		1.370	

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

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Quanterra Environmental Services

SAMPLE RESULTS

LAB NAME:	ITAS-RICHLAND	SDG:	W0871
LAB SAMPLE ID:	60113601	MATRIX:	SOIL
CLIENT ID:	B0H0H0	DATE RECEIVED:	1/10/96 10:30:00 AM

ISOTOPE	RESULT	COUNTING ERROR (2 s)	TOTAL ERROR (2 s)	MDA	REPORT UNIT	YIELD	METHOD NUMBER
U-234	1.05E+00	1.5E-01	2.2E-01	2.97E-02	pCi/g	80.60%	RICHRC5030
U-235	5.19E-02	3.3E-02	3.4E-02	3.22E-02	pCi/g	80.60%	RICHRC5030
U-238	1.08E+00	1.5E-01	2.3E-01	3.91E-02	pCi/g	80.60%	RICHRC5030
CO-58.	1.29E-02 U	1.2E-02	1.2E-02	2.03E-02	pCi/g	N/A	RICHRC5017
CO-60.	-3.40E-03 U	1.2E-02	1.2E-02	1.92E-02	pCi/g	N/A	RICHRC5017
CS-137DA.	1.04E-03 U	1.1E-02	1.1E-02	1.80E-02	pCi/g	N/A	RICHRC5017
EU-152.	8.16E-03 U	2.5E-02	2.5E-02	4.24E-02	pCi/g	N/A	RICHRC5017
EU-154.	-4.92E-02 U	4.1E-02	4.2E-02	6.47E-02	pCi/g	N/A	RICHRC5017
EU-155.	1.41E-02 U	2.7E-02	2.7E-02	4.32E-02	pCi/g	N/A	RICHRC5017
FE-59.	1.73E-03 U	3.0E-02	3.0E-02	5.02E-02	pCi/g	N/A	RICHRC5017
K-40.	2.03E+01	5.8E-01	2.1E+00	N/A	pCi/g	N/A	RICHRC5017
RA-224DA.	2.46E-01	2.9E-02	3.8E-02	N/A	pCi/g	N/A	RICHRC5017
RA-226DA.	2.36E-01	4.2E-02	4.8E-02	N/A	pCi/g	N/A	RICHRC5017
RA-228DA.	3.33E-01	7.1E-02	7.9E-02	N/A	pCi/g	N/A	RICHRC5017
U-238DLP.	6.64E-01	4.5E-01	4.5E-01	N/A	pCi/g	N/A	RICHRC5017
ALPHA	1.86E+01	6.2E+00	6.5E+00	5.94E+00	pCi/g	100.00%	RD3222
BETA	7.43E+01	5.8E+00	7.6E+00	3.60E+00	pCi/g	100.00%	RD3222
TC-99	-1.06E-01 U	3.9E-01	1.1E+00	3.70E-01	pCi/g	100.00%	ITAS-IT-RS-0001
TOTAL-URANIUM	1.36E+00	N/A	1.8E-01	6.05E-04	ug/g	N/A	RICHRC5058

Number of Results: 19

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Quanterra Environmental Services

SAMPLE RESULTS

LAB NAME:	ITAS-RICHLAND	SDG:	W0871
LAB SAMPLE ID:	60113602	MATRIX:	SOIL
CLIENT ID:	B0H0H1	DATE RECEIVED:	1/10/96 10:30:00 AM

ISOTOPE	RESULT	COUNTING ERROR (2 s)	TOTAL ERROR (2 s)	MDA	REPORT UNIT	YIELD	METHOD NUMBER
U-234	1.02E+00	1.5E-01	2.3E-01	3.14E-02	pCi/g	71.80%	RICHRC5030
U-235	5.70E-02	3.7E-02	3.8E-02	3.14E-02	pCi/g	71.80%	RICHRC5030
U-238	9.23E-01	1.5E-01	2.1E-01	2.69E-02	pCi/g	71.80%	RICHRC5030
CO-58.	-3.65E-03 U	1.1E-02	1.1E-02	1.76E-02	pCi/g	N/A	RICHRC5017
CO-60.	-3.23E-03 U	1.1E-02	1.1E-02	1.91E-02	pCi/g	N/A	RICHRC5017
CS-137DA.	4.69E-03 U	1.1E-02	1.1E-02	1.85E-02	pCi/g	N/A	RICHRC5017
EU-152.	-2.25E-02 U	2.8E-02	2.8E-02	4.35E-02	pCi/g	N/A	RICHRC5017
EU-154.	1.18E-02 U	3.6E-02	3.6E-02	6.23E-02	pCi/g	N/A	RICHRC5017
EU-155.	5.62E-02	3.4E-02	3.4E-02	5.21E-02	pCi/g	N/A	RICHRC5017
FE-59.	5.52E-03 U	2.8E-02	2.8E-02	4.59E-02	pCi/g	N/A	RICHRC5017
K-40.	1.26E+01	4.6E-01	1.3E+00	N/A	pCi/g	N/A	RICHRC5017
RA-224DA.	6.14E-01	2.9E-02	6.8E-02	N/A	pCi/g	N/A	RICHRC5017
RA-226DA.	4.62E-01	4.8E-02	6.7E-02	N/A	pCi/g	N/A	RICHRC5017
RA-228DA.	7.39E-01	8.2E-02	1.1E-01	N/A	pCi/g	N/A	RICHRC5017
ALPHA	1.49E+01	5.4E+00	5.6E+00	4.20E+00	pCi/g	100.00%	RD3222
BETA	2.45E+01	3.6E+00	3.9E+00	3.79E+00	pCi/g	100.00%	RD3222
TC-99	5.90E-01	4.1E-01	1.2E+00	3.70E-01	pCi/g	100.00%	ITAS-IT-RS-0001
TOTAL-URANIUM	7.82E-01	N/A	1.1E-01	6.05E-04	ug/g	N/A	RICHRC5058

Number of Results: 18

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Quanterra Environmental Services

SAMPLE RESULTS

LAB NAME:	ITAS-RICHLAND	SDG:	W0871
LAB SAMPLE ID:	60113603	MATRIX:	SOIL
CLIENT ID:	B0H0H2	DATE RECEIVED:	1/10/96 10:30:00 AM

ISOTOPE	RESULT	COUNTING ERROR (2 s)	TOTAL ERROR (2 s)	MDA	REPORT UNIT	YIELD	METHOD NUMBER
U-235.	4.16E-02	N/A	3.3E-02	2.42E-02	pCi/g	66.70%	
U-234	6.49E-01	1.3E-01	1.7E-01	2.75E-02	pCi/g	66.70%	RICHRC5030
U-238	6.73E-01	1.3E-01	1.7E-01	2.75E-02	pCi/g	66.70%	RICHRC5030
CO-58.	3.37E-04 U	1.1E-02	1.1E-02	1.77E-02	pCi/g	N/A	RICHRC5017
CO-60.	1.64E-02 U	1.1E-02	1.1E-02	1.98E-02	pCi/g	N/A	RICHRC5017
CS-137DA.	2.46E-02	1.2E-02	1.2E-02	2.14E-02	pCi/g	N/A	RICHRC5017
EU-152.	1.48E-02 U	2.8E-02	2.8E-02	4.59E-02	pCi/g	N/A	RICHRC5017
EU-154.	1.46E-02 U	3.2E-02	3.2E-02	5.55E-02	pCi/g	N/A	RICHRC5017
EU-155.	2.50E-02 U	2.5E-02	2.6E-02	4.29E-02	pCi/g	N/A	RICHRC5017
FE-59.	5.35E-03 U	2.7E-02	2.7E-02	4.44E-02	pCi/g	N/A	RICHRC5017
K-40.	1.40E+01	4.8E-01	1.5E+00	N/A	pCi/g	N/A	RICHRC5017
RA-224DA.	6.50E-01	3.1E-02	7.2E-02	N/A	pCi/g	N/A	RICHRC5017
RA-226DA.	5.52E-01	4.3E-02	7.0E-02	N/A	pCi/g	N/A	RICHRC5017
RA-228DA.	6.91E-01	8.3E-02	1.1E-01	N/A	pCi/g	N/A	RICHRC5017
U-238DLP.	3.97E-01	2.6E-01	2.6E-01	N/A	pCi/g	N/A	RICHRC5017
ALPHA	9.58E+00	4.5E+00	4.6E+00	4.74E+00	pCi/g	100.00%	RD3222
BETA	2.64E+01	3.7E+00	4.1E+00	3.83E+00	pCi/g	100.00%	RD3222
TC-99	1.71E-01 U	4.0E-01	1.2E+00	3.70E-01	pCi/g	100.00%	ITAS-IT-RS-0001
TOTAL-URANIUM	1.16E+00	N/A	1.6E-01	6.05E-04	ug/g	N/A	RICHRC5058

Number of Results: 19

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Quanterra Environmental Services

SAMPLE RESULTS

LAB NAME:	ITAS-RICHLAND	SDG:	W0871
LAB SAMPLE ID:	60113604	MATRIX:	SOIL
CLIENT ID:	B0H0H3	DATE RECEIVED:	1/10/96 10:30:00 AM

ISOTOPE	RESULT	COUNTING ERROR (2 s)	TOTAL ERROR (2 s)	MDA	REPORT UNIT	YIELD	METHOD NUMBER
U-234	5.44E-01	1.1E-01	1.4E-01	3.84E-02	pCi/g	70.20%	RICHRC5030
U-235	2.03E-02 U	2.3E-02	2.3E-02	3.42E-02	pCi/g	70.20%	RICHRC5030
U-238	5.91E-01 U	1.2E-01	1.5E-01	3.71E-02	pCi/g	70.20%	RICHRC5030
CO-58.	-6.28E-03 U	9.2E-03	9.2E-03	1.50E-02	pCi/g	N/A	RICHRC5017
CO-60.	1.10E-02 U	8.8E-03	8.9E-03	1.63E-02	pCi/g	N/A	RICHRC5017
CS-137DA.	1.44E-03 U	1.0E-02	1.0E-02	1.67E-02	pCi/g	N/A	RICHRC5017
EU-152.	5.94E-03 U	2.3E-02	2.3E-02	3.79E-02	pCi/g	N/A	RICHRC5017
EU-154.	-1.19E-02 U	3.1E-02	3.1E-02	5.01E-02	pCi/g	N/A	RICHRC5017
EU-155.	2.86E-02 U	2.6E-02	2.6E-02	4.05E-02	pCi/g	N/A	RICHRC5017
FE-59.	-2.82E-02 U	2.5E-02	2.5E-02	3.96E-02	pCi/g	N/A	RICHRC5017
K-40.	1.21E+01	4.6E-01	1.3E+00	N/A	pCi/g	N/A	RICHRC5017
RA-224DA.	5.39E-01	2.6E-02	6.0E-02	N/A	pCi/g	N/A	RICHRC5017
RA-226DA.	4.85E-01	4.2E-02	6.4E-02	N/A	pCi/g	N/A	RICHRC5017
RA-228DA.	5.71E-01	6.5E-02	8.6E-02	N/A	pCi/g	N/A	RICHRC5017
U-238DLP.	3.24E-01	3.8E-01	3.8E-01	N/A	pCi/g	N/A	RICHRC5017
ALPHA	5.25E+00	3.4E+00	3.5E+00	4.48E+00	pCi/g	100.00%	RD3222
BETA	2.09E+01	3.3E+00	3.6E+00	3.61E+00	pCi/g	100.00%	RD3222
TC-99	-1.94E-01 U	3.9E-01	1.1E+00	3.70E-01	pCi/g	100.00%	ITAS-IT-RS-0001
TOTAL-URANIUM	8.53E-01	N/A	1.2E-01	6.05E-04	ug/g	N/A	RICHRC5058

Number of Results: 19

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Quanterra
Environmental Services

SAMPLE RESULTS

LAB NAME:	ITAS-RICHLAND	SDG:	W0871
LAB SAMPLE ID:	60113605	MATRIX:	SOIL
CLIENT ID:	B0H0H4	DATE RECEIVED:	1/10/96 10:30:00 AM

ISOTOPE	RESULT	COUNTING ERROR (2 s)	TOTAL ERROR (2 s)	MDA	REPORT UNIT	YIELD	METHOD NUMBER
U-234	7.27E-01	1.4E-01	1.9E-01	3.08E-02	pCi/g	61.40%	RICHRC5030
U-235	5.79E-02	4.1E-02	4.2E-02	3.81E-02	pCi/g	61.40%	RICHRC5030
U-238	7.80E-01	1.5E-01	2.0E-01	3.36E-02	pCi/g	61.40%	RICHRC5030
CO-58.	4.58E-03 U	1.1E-02	1.1E-02	1.95E-02	pCi/g	N/A	RICHRC5017
CO-60.	3.73E-03 U	1.2E-02	1.2E-02	1.98E-02	pCi/g	N/A	RICHRC5017
CS-137DA.	1.21E-02 U	1.2E-02	1.2E-02	1.97E-02	pCi/g	N/A	RICHRC5017
EU-152.	-7.45E-03 U	2.7E-02	2.7E-02	4.44E-02	pCi/g	N/A	RICHRC5017
EU-154.	7.38E-03 U	3.7E-02	3.7E-02	6.05E-02	pCi/g	N/A	RICHRC5017
EU-155.	1.11E-02 U	2.9E-02	2.9E-02	4.62E-02	pCi/g	N/A	RICHRC5017
FE-59.	-3.47E-02 U	2.9E-02	2.9E-02	4.55E-02	pCi/g	N/A	RICHRC5017
K-40.	1.45E+01	5.4E-01	1.5E+00	N/A	pCi/g	N/A	RICHRC5017
RA-224DA.	6.35E-01	3.1E-02	7.1E-02	N/A	pCi/g	N/A	RICHRC5017
RA-226DA.	5.97E-01	4.6E-02	7.5E-02	N/A	pCi/g	N/A	RICHRC5017
RA-228DA.	7.18E-01	8.4E-02	1.1E-01	N/A	pCi/g	N/A	RICHRC5017
U-238DLP.	4.71E-01	3.9E-01	4.0E-01	N/A	pCi/g	N/A	RICHRC5017
ALPHA	1.05E+01	4.6E+00	4.7E+00	4.05E+00	pCi/g	100.00%	RD3222
BETA	2.53E+01	3.6E+00	4.0E+00	3.74E+00	pCi/g	100.00%	RD3222
TC-99	4.64E-01	4.1E-01	1.2E+00	3.70E-01	pCi/g	100.00%	ITAS-IT-RS-0001
TOTAL-URANIUM	1.14E+00	N/A	1.5E-01	6.05E-04	ug/g	N/A	RICHRC5058

Number of Results: 19

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Quanterra Environmental Services

SAMPLE RESULTS

LAB NAME:	ITAS-RICHLAND	SDG:	W0871
LAB SAMPLE ID:	60113606	MATRIX:	SOIL
CLIENT ID:	B0H0H5	DATE RECEIVED:	1/10/96 10:30:00 AM

ISOTOPE	RESULT	COUNTING ERROR (2 s)	TOTAL ERROR (2 s)	MDA	REPORT UNIT	YIELD	METHOD NUMBER
U-234	7.21E-01	1.3E-01	1.8E-01	3.27E-02	pCi/g	65.90%	RICHRC5030
U-235	3.94E-02	3.3E-02	3.3E-02	3.79E-02	pCi/g	65.90%	RICHRC5030
U-238	8.07E-01	1.4E-01	2.0E-01	4.78E-02	pCi/g	65.90%	RICHRC5030
CO-58.	5.12E-03 U	1.0E-02	1.0E-02	1.73E-02	pCi/g	N/A	RICHRC5017
CO-60.	5.30E-03 U	1.1E-02	1.1E-02	1.83E-02	pCi/g	N/A	RICHRC5017
CS-137DA.	3.12E-02	1.3E-02	1.3E-02	N/A	pCi/g	N/A	RICHRC5017
EU-152.	-4.43E-03 U	2.5E-02	2.5E-02	4.04E-02	pCi/g	N/A	RICHRC5017
EU-154.	-6.82E-03 U	3.4E-02	3.4E-02	5.47E-02	pCi/g	N/A	RICHRC5017
EU-155.	3.44E-02 U	2.8E-02	2.8E-02	4.52E-02	pCi/g	N/A	RICHRC5017
FE-59.	6.69E-03 U	2.5E-02	2.5E-02	4.29E-02	pCi/g	N/A	RICHRC5017
K-40.	1.27E+01	4.4E-01	1.3E+00	N/A	pCi/g	N/A	RICHRC5017
RA-224DA.	5.38E-01	3.0E-02	6.2E-02	N/A	pCi/g	N/A	RICHRC5017
RA-226DA.	4.68E-01	4.3E-02	6.3E-02	N/A	pCi/g	N/A	RICHRC5017
RA-228DA.	5.89E-01	7.5E-02	9.5E-02	N/A	pCi/g	N/A	RICHRC5017
U-238DLP.	6.61E-01	4.9E-01	4.9E-01	N/A	pCi/g	N/A	RICHRC5017
ALPHA	8.60E+00	4.5E+00	4.6E+00	5.93E+00	pCi/g	100.00%	RD3222
BETA	2.48E+01	3.5E+00	3.9E+00	3.60E+00	pCi/g	100.00%	RD3222
TC-99	-2.48E-01 U	3.9E-01	1.1E+00	3.70E-01	pCi/g	100.00%	ITAS-IT-RS-0001
TOTAL-URANIUM	2.10E+00	N/A	2.8E-01	6.05E-04	ug/g	N/A	RICHRC5058

Number of Results: 19

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Quanterra Environmental Services

SAMPLE RESULTS

LAB NAME:	ITAS-RICHLAND	SDG:	W0871
LAB SAMPLE ID:	60113607	MATRIX:	SOIL
CLIENT ID:	B0H0H6	DATE RECEIVED:	1/10/96 10:30:00 AM

ISOTOPE	RESULT	COUNTING ERROR (2 s)	TOTAL ERROR (2 s)	MDA	REPORT UNIT	YIELD	METHOD NUMBER
U-234	5.70E-01	1.1E-01	1.5E-01	3.30E-02	pCi/g	75.90%	RICHRC5030
U-235	2.56E-02 U	2.5E-02	2.5E-02	3.14E-02	pCi/g	75.90%	RICHRC5030
U-238	6.00E-01	1.2E-01	1.5E-01	2.24E-02	pCi/g	75.90%	RICHRC5030
CO-58.	3.70E-04 U	1.2E-02	1.2E-02	1.98E-02	pCi/g	N/A	RICHRC5017
CO-60.	9.72E-03 U	1.1E-02	1.1E-02	2.03E-02	pCi/g	N/A	RICHRC5017
CS-137DA.	2.06E-02 U	1.2E-02	1.2E-02	2.12E-02	pCi/g	N/A	RICHRC5017
EU-152.	-1.58E-02 U	2.9E-02	2.9E-02	4.69E-02	pCi/g	N/A	RICHRC5017
EU-154.	2.49E-02 U	3.7E-02	3.7E-02	6.50E-02	pCi/g	N/A	RICHRC5017
EU-155.	7.01E-03 U	3.3E-02	3.3E-02	5.41E-02	pCi/g	N/A	RICHRC5017
FE-59.	-2.99E-02 U	3.1E-02	3.1E-02	5.01E-02	pCi/g	N/A	RICHRC5017
K-40.	1.47E+01	5.3E-01	1.6E+00	N/A	pCi/g	N/A	RICHRC5017
RA-224DA.	6.10E-01	3.2E-02	6.9E-02	N/A	pCi/g	N/A	RICHRC5017
RA-226DA.	5.12E-01	4.9E-02	7.1E-02	N/A	pCi/g	N/A	RICHRC5017
RA-228DA.	6.37E-01	8.0E-02	1.0E-01	N/A	pCi/g	N/A	RICHRC5017
ALPHA	1.35E+01	5.2E+00	5.4E+00	4.35E+00	pCi/g	100.00%	RD3222
BETA	2.49E+01	3.6E+00	4.0E+00	3.91E+00	pCi/g	100.00%	RD3222
TC-99	-1.13E-02 U	3.9E-01	1.1E+00	3.70E-01	pCi/g	100.00%	ITAS-IT-RS-0001
TOTAL-URANIUM	1.00E+00	N/A	1.4E-01	6.05E-04	ug/g	N/A	RICHRC5058

Number of Results: 18

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Quanterra Environmental Services

SAMPLE RESULTS

LAB NAME:	ITAS-RICHLAND	SDG:	W0871
LAB SAMPLE ID:	60113608	MATRIX:	SOIL
CLIENT ID:	B0H0H7	DATE RECEIVED:	1/10/96 10:30:00 AM

ISOTOPE	RESULT	Q	COUNTING ERROR (2 s)	TOTAL ERROR (2 s)	MDA	REPORT UNIT	YIELD	METHOD NUMBER
U-234	5.98E-01		1.1E-01	1.4E-01	1.96E-02	pCi/g	82.50%	RICHRC5030
U-235	1.87E-02	U	1.9E-02	2.0E-02	2.22E-02	pCi/g	82.50%	RICHRC5030
U-238	6.26E-01		1.1E-01	1.5E-01	2.43E-02	pCi/g	82.50%	RICHRC5030
CO-58.	-6.21E-04	U	1.2E-02	1.2E-02	1.95E-02	pCi/g	N/A	RICHRC5017
CO-60.	3.86E-03	U	1.3E-02	1.3E-02	2.18E-02	pCi/g	N/A	RICHRC5017
CS-137DA.	6.51E-03	U	1.2E-02	1.2E-02	1.96E-02	pCi/g	N/A	RICHRC5017
EU-152.	2.62E-03	U	2.9E-02	2.9E-02	4.55E-02	pCi/g	N/A	RICHRC5017
EU-154.	-3.31E-02	U	3.6E-02	3.6E-02	5.83E-02	pCi/g	N/A	RICHRC5017
EU-155.	4.98E-02	U	3.5E-02	3.5E-02	5.33E-02	pCi/g	N/A	RICHRC5017
FE-59.	6.18E-04	U	3.1E-02	3.1E-02	5.05E-02	pCi/g	N/A	RICHRC5017
K-40.	1.35E+01		5.1E-01	1.4E+00	N/A	pCi/g	N/A	RICHRC5017
RA-224DA.	5.46E-01		2.9E-02	6.2E-02	N/A	pCi/g	N/A	RICHRC5017
RA-226DA.	4.08E-01		5.1E-02	6.5E-02	N/A	pCi/g	N/A	RICHRC5017
RA-228DA.	5.33E-01		9.0E-02	1.0E-01	N/A	pCi/g	N/A	RICHRC5017
ALPHA	1.04E+01		4.6E+00	4.7E+00	4.21E+00	pCi/g	100.00%	RD3222
BETA	2.28E+01		3.5E+00	3.8E+00	3.79E+00	pCi/g	100.00%	RD3222
TC-99	2.18E-01	U	4.0E-01	1.2E+00	3.70E-01	pCi/g	100.00%	ITAS-IT-RS-0001
TOTAL-URANIUM	1.37E+00		N/A	1.9E-01	6.05E-04	ug/g	N/A	RICHRC5058

Number of Results: 18

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ATTACHMENT 4

LABORATORY NARRATIVE and CHAIN-OF-CUSTODY DOCUMENTATION

9613477.2427

Quanterra
Environmental Services

Quanterra Incorporated
2800 George Washington Way
Richland, Washington 99352

509 375-3131 Telephone
509 375-5590 Fax

CERTIFICATE OF ANALYSIS

JAN 1996
RECEIVED
Data
Log In

Bechtel Hanford, Inc.
345 Hills
Richland, WA 99352

January 30, 1996

Attention: Joan Kessner

SAF Number	:	B96-052
Date SDG Closed	:	January 10, 1996
Number of Samples	:	Eight (8)
Sample Type	:	Soil
SDG Number	:	W0871
Data Deliverable	:	Summary

I. Introduction

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

QTESRL ID#	BHI ID#	MATRIX	DATE OF RECEIPT
60113601	B0H0H0	SOIL	1/10/96
60113602	B0H0H1	SOIL	1/10/96
60113603	B0H0H2	SOIL	1/10/96
60113604	B0H0H3	SOIL	1/10/96
60113605	B0H0H4	SOIL	1/10/96
60113606	B0H0H5	SOIL	1/10/96
60113607	B0H0H6	SOIL	1/10/96
60113608	B0H0H7	SOIL	1/10/96

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Quanterra
Environmental Services

II. Analytical Results/Methodology

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

The requested analyses were:

Alpha Spectroscopy
Uranium-234, -235, -238 by method RICHRC-5030
Gamma Spectroscopy
Gamma Scan by method RICHRC-5017
Gas Proportional Counting
Gross Alpha by method ITAS-RD-3222
Gross Beta by method ITAS-RD-3222
Liquid Scintillation Counting
Technetium-99 by method ITAS-IT-RS-0001
Total Uranium
Total Uranium by method RICHRC-5058

III. Quality Control

The analytical results for each analysis performed under SDG W0871 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 for all analyses except alpha and beta, where quality control results are reported as pCi/sample.

IV. Comments

Alpha Spectroscopy

Uranium-234, -235, -238 by method RICHRC-5030
The LCS, batch blank, sample and sample duplicate (B0H0H3) results are within contractual requirements.

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Gamma Spectroscopy

Gamma Scan by method RICHRC-5017
The blank matrix is Ottawa Sand and natural products Ra-224DA, Ra-226DA, and U-238DLP are detected and reported. Cd-109 was detected each of the samples. However, the result is not reported because it is false positive detection caused by x-ray lines produced by energy reflection from the detector shielding. The LCS, batch blank, sample and sample duplicate (B0H0H0) results are within contractual requirements.

Gas Proportional Counting

Gross Alpha by method ITAS-RD-3222
The LCS, batch blank, sample and sample duplicate (B0H0H0) results are within contractual requirements.

Gross Beta by method ITAS-RD-3222
The LCS, batch blank, sample and sample duplicate (B0H0H0) results are within contractual requirements.

Liquid Scintillation Counting

Technetium-99 by method ITAS-IT-RS-0001
The matrix spike, LCS, batch blank, sample and sample duplicate (B0H0H7) results are within contractual requirements.

Total Uranium

Total Uranium by method RICHRC-5058
The sample and its duplicate are outside the three sigma control limit (3.9 sigma achieved) due to a possible soil inconsistency or matrix effect. Except as noted, the matrix spike, LCS, batch blank, sample and sample duplicate (B0H0H3) results are within contractual requirements.

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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

for S.L. 1-30-96

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Bechtel Hanford, Inc.

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

Data Turnaround: X Priority / Normal

Collector: Doug Bowers	Company Contact: D. B. Encke	Telephone: 373-3461
Project Designation: 183-H Soil Screen/Verification (Loading ramp/Berm pile)	Sampling Location: 183-H Solar Basin	SAF No.: B96-052
Ice Chest No.: ER-17	Field Logbook No.: EFL-1133-1	Method of Shipment: Hand deliver
Shipped To: Quanterra	Offsite Property No.	Bill of Lading/Air Bill No.
Possible Sample Hazards/Remarks: none		
Special Handling and/or Storage		

SAMPLE ANALYSIS 601135 SDG W0871

Preservation	none	cool to 4C	cool to 4C	cool to 4C	cool to 4C	cool to 4C	none	none		
Type of Container	P/G	P/G	P/G	P/G	P/G	P/G	P/G	P/G		
No. of Container(s)	1	1	1	1	1	1	2	1		
Volume	120 mL	250 mL	60 mL	60 mL	60 mL	60 ml	1 L	20 mL		
%	100	100	100	100	100		601136			
	TCLP Metals	Cyanide	Sulfide	See Item #1 below	NO2-NO3	Chromium Hex	See Item #2 below	Activity Scan		

Sample No.	Matrix*	Date Sampled	Time Sampled	TCLP Metals	Cyanide	Sulfide	See Item #1 below	NO2-NO3	Chromium Hex	See Item #2 below	Activity Scan		
B0H0H0 01	S	1-8-96	1137	X	X	X	X	X	X	X	X	N6	195
B0H0H1 02	S	1-8-96	1158	X	X	X	X	X	X	X	X	N6	195
B0H0H2 03	S	1-8-96	1236	X	X	X	X	X	X	X	X	N6	196
B0H0H3 04	S	1-8-96	1303	X	X	X	X	X	X	X	X	N6	197
B0H0H4 05	S	1-8-96	1352	X	X	X	X	X	X	X	X	N6	198
B0H0H5 06	S	1-8-96	1415	X	X	X	X	X	X	X	X	N6	199

CHAIN OF POSSESSION	Sign/Print Names	Date/Time		Date/Time
Relinquished By	Doug Bowers	1-9-96/0800	Received By	EC / B. Griffith 1-9-96 0800
Relinquished By	EC / B. Griffith	1-10-96 10:30	Received By	[illegible] 1-10-96 10:30
Relinquished By			Received By	
Relinquished By			Received By	

SPECIAL INSTRUCTIONS

Hexavalent chrom must be extracted per SW-846 3060A with a holding time of 96 hours.

Sample analysis for nitrate, nitrite, and phosphate by EPA 300.0 are being requested for Information only. The ERC Contractor acknowledges the holding times will not be met.

Item #1; Anions - IC F, Cl, SO4, PO4, NO2, NO3, pH

Item #2; Gross Alpha/Beta, U-234, -235, -238, Tc-99, Total U, 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

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

96-2947-2142

02-96-0032

Bechtel Hanford, Inc.

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

Data Turnaround: X Priority / Normal

Collector: Doug Bowers	Company Contact: D. B. Encke	Telephone: 373-3461
Project Designation: 183-H Soil Screen/Verification (Loading ramp/Berm pile)	Sampling Location: 183-H Solar Basin	SAF No.: B96-052
Ice Chest No.: ER-17	Field Logbook No.	Method of Shipment: Hand deliver
Shipped To: Quanterra	Offsite Property No.	Bill of Lading/Air Bill No.
Possible Sample Hazards/Remarks: none		

Special Handling and/or Storage											
	Preservation	none	cool to 4C	cool to 4C	cool to 4C	cool to 4C	cool to 4C	none	none		
	Type of Container	P/G	P/G	P/G	P/G	P/G	P/G	P/G	P/G		
	No. of Container(s)	1	1	1	1	1	1	2	1		
	Volume	120 mL	250 mL	60 mL	60 mL	60 mL	60 ml	1 L	20 mL		
SAMPLE ANALYSIS 601135 SDG W0871	%	100	100	100	100	100		601136			
		TCLP Metals	Cyanide	Sulfide	See Item #1 below	NO2-NO3	Chromium Hex	See Item #2 below	Activity Scan		
Sample No.	Matrix*	Date Sampled	Time Sampled								
B0H0H6 07	S	1-8-96	1415	X	X	X	X	X	X	X	X	N 6199
B0H0H7 08	S	1-8-96	1452	X	X	X	X	X	X	X	X	N 6201

CHAIN OF POSSESSION	Sign/Print Names		
Relinquished By: Doug Bowers	Date/Time: 1-9-96/0800	Received By: ERC B. Watts	Date/Time: 1-9-96 0800
Relinquished By: ERC B. Watts	Date/Time: 1-10-96 10:30	Received By: Karen Stenberg	Date/Time: 1-10-96 10:30
Relinquished By	Date/Time	Received By	Date/Time
Relinquished By	Date/Time	Received By	Date/Time

SPECIAL INSTRUCTIONS

Hexavalent chrom must be extracted per SW-846 3060A with a holding time of 96 hours.

Sample analysis for nitrate, nitrite, and phosphate by EPA 300.0 are being requested for Information only. The ERC Contractor acknowledges the holding times will not be met.

Item #1; Anions - IC F, Cl, SO4, PO4, NO2, NO3, pH

Item #2; Gross Alpha/Beta, U-234, -235, -238, Tc-99, Total U, 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

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

023

15 minute

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ATTACHMENT 5

DATA VALIDATION SUPPORTING DOCUMENTATION

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RADIOCHEMICAL DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E

PROJECT: 183 H SOIL SCREEN VERIF	DATA PACKAGE: W0871-GES
VALIDATOR: T. STAPP / LAB: QUANTERRA	DATE: 960322
CASE:	SDG:

ANALYSES PERFORMED

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

SAMPLES/MATRIX	
B0H0H0 / SOIL	B0H0H5 / SOIL
H0H1 /	B0H0H6 /
H0H2 /	B0H0H7 /
H0H3 /	
H0H4 /	

1. Completeness . . . . . ☐ N/A

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

Comments:

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

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

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

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

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

Comments:

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

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

Comments:

4. Blanks . . . . . ☐ N/A

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

Comments: ① Total U reported above MDA however, both are well below the RDL of 1 ug/gm and qualification will not be applied. Sample results are greater than five times the blank value.

5. Matrix Spikes . . . . . ☐ N/A

Matrix spike analyzed? . . . . NOTE ① . . . . . (Yes) No N/A
Spike recoveries acceptable? . . . . . (Yes) No N/A
Spike source traceable? . . . . . Yes No (N/A)
Spike source expired? . . . . . Yes No (N/A)
Transcription/Calculation Errors? . . . . . Yes (No) N/A

Comments: ① Tc-99 and total U were analyzed for MS recoveries. No qualifications were applied.

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

Comments:_____

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9. Field QC Samples . . . . . ☐ N/A

Field duplicate sample(s) analyzed? . . NOTE ① . . . . . 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: ① Field QC was not identified for this sample set.

10. Holding Times

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

Comments: Collected/Analyzed: Iso U Gamma Gr α β
All Samples: 01-08-96/ 1-25-96 1-24-96 1-23-96 1-22-96
Tc-99 Total U
1-25-96 1-24-96

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 TMK 960322
MDA's meet required detection limits? . . . . . Yes No N/A
Transcription/calculation errors? . . . . . Yes No N/A

Comments:

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Comments:

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