START 9613502.2219

0045534

W0967-QES

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
3350 George Washington Way
Richland, Washington 99352

May 16, 1996

Attention: Joan Kessner

MAY 1996 RECEIVED Data Log In

Project number	:	550.123
Date Received by Lab	:	April 2, 1996
Number of Samples	:	Three (3)
Sample Type	:	Water
SDG Number	:	W0967
Data Deliverable	:	Summary

OCT 1996 RECEIVED EDMC

I. Introduction

On April 2, 1996, three (3) water samples were received by Quanterra, Richland and transferred to Quanterra, St. Louis for chemical analysis. Upon receipt, the samples were given the following laboratory ID numbers to correspond with the specific client IDs:

St Louis ID	WHC ID	Richland ID	Matrix	Date of Receipt
10763-001	B0H0Q6	60403403	Water	04/02/96
10763-002	B0H0Q2	60403401	Water	04/02/96
10763-003	B0H0Q4	60403402	Water	04/02/96

II. Analytical Results/ Methodology

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

Analyses requested: ICAP Metals by EPA 6010. Chloride, Nitrite, Nitrate, Phosphate and Sulfate by EPA method 300.0. Ammonia by EPA Method 350.1. Nitrate/Nitrite by EPA Method 353.1. Sulfide by EPA Method 9030.

Quanterra
Environmental Services

III. Quality Control

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

IV. Definitions

The following codes are used to denote laboratory quality control samples and can be found in the data summary section of this report:

QCBLK- Quality Control Blank, Method Blank
QCLCS- Quality Control Laboratory Control Sample, Blank Spike

V. Comments

Shipping and Receiving
There are no comments or nonconformances associated with this analysis.

Metals
The recovery of the Matrix Spike Duplicate for Chromium (79.8%) did not meet the 80% criteria, therefore all associated data was flagged with an " N ".

Wet Chemistry
The Relative Percent Difference could not be calculated due to the values being below the detection limits on the Ammonia analysis.

The Relative Percent Difference could not be calculated due to the values being below the detection limits on the Phosphate and Nitrite analyses.

The Relative Percent Difference could not be calculated due to the values being below the detection limits on the Sulfide analysis.

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The Matrix Spike recovery was outside of the suggested QC limits of 75-125% for the Nitrate/Nitrite analysis by EPA Method 353.1, but the sample concentration was greater than four times the spike amount.

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\hanw0967.nar

Quanterra April 03, 1996 03:17 pm
Account: 10722 Project: 550.123 Quanterra-Richland QAS No. 550.123 Rev. 0
Master Sample Login: 10763

Project Manager: W. Price

Draft: Final: Entered and Reviewed by: Sue Wilson PM Review: Abby Wolden

Sample Header Template:

Sample No. / Comments / Data:	Client ID	C-Matrix	Date: Collected	Received	Due	Shipper	Rad Category	Rad Sample No.
10763-001	B0H0Q6	Water	01-APR-96 12:50	02-APR-96 09:40	07-MAY-96	FED-EX	1	Screening not Required
NOTE: RICHLAND ID 60403403								

#	Container Type	Analysis	Class	Preservative	Anal. Due Date	Hold Date	Site	(Container Numbers:% Filled)
1	AN - Amber Glass-500ml	CL/300.0/Q4	S	COLD	30-APR-96	29-APR-96	T13A	(223127:99)
1		ICAP/6010/Q4	S	HNO3	30-APR-96	28-SEP-96	T13A	(223126:100)
1		NO2/300.0/Q4	S	COLD	30-APR-96	03-APR-96	T13A	(223127:99)
1		NO3/300.0/Q4	S	COLD	30-APR-96	03-APR-96	T13A	(223127:99)
1		OPHOS/300.0/Q4	S	COLD	30-APR-96	03-APR-96	T13A	(223127:99)
1		SO4/300.0/Q4	S	COLD	30-APR-96	29-APR-96	T13A	(223127:99)
1	PN - Plastic-500ml	NH3/350.1/Q4	S	H2SO4	30-APR-96	29-APR-96	T13A	(223132:98)
1		NO3/353.1/Q4	S	H2SO4	30-APR-96	29-APR-96	T13A	(223128:100)
3		S/9030/Q4	S	NAOH	30-APR-96	08-APR-96	T13A	(223129:99 223130:99 223131:50)

10763-001DUP	B0H0Q6	Water	01-APR-96 12:50	02-APR-96 09:40	07-MAY-96	FED-EX	1	Screening not Required
NOTE: RICHLAND ID 60403403								

#	Container Type	Analysis	Class	Preservative	Anal. Due Date	Hold Date	Site	(Container Numbers:% Filled)
1	AN - Amber Glass-500ml	CL/300.0/Q4	S	COLD	30-APR-96	29-APR-96	T13A	(223127:99)
1		NO2/300.0/Q4	S	COLD	30-APR-96	03-APR-96	T13A	(223127:99)
1		NO3/300.0/Q4	S	COLD	30-APR-96	03-APR-96	T13A	(223127:99)
1		OPHOS/300.0/Q4	S	COLD	30-APR-96	03-APR-96	T13A	(223127:99)
1		SO4/300.0/Q4	S	COLD	30-APR-96	29-APR-96	T13A	(223127:99)
1	PN - Plastic-500ml	NH3/350.1/Q4	S	H2SO4	30-APR-96	29-APR-96	T13A	(223132:98)
1		NO3/353.1/Q4	S	H2SO4	30-APR-96	29-APR-96	T13A	(223128:100)
3		S/9030/Q4	S	NAOH	30-APR-96	08-APR-96	T13A	(223129:99 223130:99 223131:50)

10763-001MS	B0H0Q6	Water	01-APR-96 12:50	02-APR-96 09:40	07-MAY-96	FED-EX	1	Screening not Required
NOTE: RICHLAND ID 60403403								

#	Container Type	Analysis	Class	Preservative	Anal. Due Date	Hold Date	Site	(Container Numbers:% Filled)
1	AN - Amber Glass-500ml	CL/300.0/Q4	S	COLD	30-APR-96	29-APR-96	T13A	(223127:99)
1		ICAP/6010/Q4	S	HNO3	30-APR-96	28-SEP-96	T13A	(223126:100)
1		NO2/300.0/Q4	S	COLD	30-APR-96	03-APR-96	T13A	(223127:99)
1		NO3/300.0/Q4	S	COLD	30-APR-96	03-APR-96	T13A	(223127:99)
1		OPHOS/300.0/Q4	S	COLD	30-APR-96	03-APR-96	T13A	(223127:99)
1		SO4/300.0/Q4	S	COLD	30-APR-96	29-APR-96	T13A	(223127:99)
1	PN - Plastic-500ml	NH3/350.1/Q4	S	H2SO4	30-APR-96	29-APR-96	T13A	(223132:98)
1		NO3/353.1/Q4	S	H2SO4	30-APR-96	29-APR-96	T13A	(223128:100)
3		S/9030/Q4	S	NAOH	30-APR-96	08-APR-96	T13A	(223129:99 223130:99 223131:50)

10763-001MSD	B0H0Q6	Water	01-APR-96 12:50	02-APR-96 09:40	07-MAY-96	FED-EX	1	Screening not Required
NOTE: RICHLAND ID 60403403								

#	Container Type	Analysis	Class	Preservative	Anal. Due Date	Hold Date	Site	(Container Numbers:% Filled)
1	AN - Amber Glass-500ml	ICAP/6010/Q4	S	HNO3	30-APR-96	28-SEP-96	T13A	(223126:100)

3*=Sample has not been rad screened.

00004

9613502.2222

Quanterra April 03, 1996 03:17 pm
Account: 10722 Project: 550.123 Quanterra-Richland QAS No. 550.123 Rev. 0
Master Sample Login: 10763

Project Manager: W. Price

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

Sample Header Template: _____

Sample No. / Comments	Client ID	C-Matrix	Date: Collected	Received	Due	Shipper	Rad Category	Rad Sample No.
10763-002	B0H0Q2	Water	01-APR-96 11:25	02-APR-96 09:40	07-MAY-96	FED-EX	1	Screening not Required
NOTE: RICHLAND ID 60403401								

#	Container Type	Analysis	Class	Preservative	Anal. Due Date	Hold Date	Site	(Container Numbers:% Filled)
1	AN - Amber Glass-500ml	CL/300.0/Q4	S	COLD	30-APR-96	29-APR-96	T13A	(223134:99)
1		ICAP/6010/Q4	S	HNO3	30-APR-96	28-SEP-96	T13A	(223133:100)
1		NO2/300.0/Q4	S	COLD	30-APR-96	03-APR-96	T13A	(223134:99)
1		NO3/300.0/Q4	S	COLD	30-APR-96	03-APR-96	T13A	(223134:99)
1		OPHOS/300.0/Q4	S	COLD	30-APR-96	03-APR-96	T13A	(223134:99)
1		SO4/300.0/Q4	S	COLD	30-APR-96	29-APR-96	T13A	(223134:99)
1	PN - Plastic-500ml	NH3/350.1/Q4	S	H2SO4	30-APR-96	29-APR-96	T13A	(223139:98)
1		NO3/353.1/Q4	S	H2SO4	30-APR-96	29-APR-96	T13A	(223135:100)
3		S/9030/Q4	S	NAOH	30-APR-96	08-APR-96	T13A	(223136:99 223137:99 223138:50)

10763-003	B0H0Q4	Water	01-APR-96 12:10	02-APR-96 09:40	07-MAY-96	FED-EX	1	Screening not Required
NOTE: RICHLAND ID 60403402								

1	AN - Amber Glass-500ml	CL/300.0/Q4	S	COLD	30-APR-96	29-APR-96	T13A	(223141:99)
1		ICAP/6010/Q4	S	HNO3	30-APR-96	28-SEP-96	T13A	(223140:100)
1		NO2/300.0/Q4	S	COLD	30-APR-96	03-APR-96	T13A	(223141:99)
1		NO3/300.0/Q4	S	COLD	30-APR-96	03-APR-96	T13A	(223141:99)
1		OPHOS/300.0/Q4	S	COLD	30-APR-96	03-APR-96	T13A	(223141:99)
1		SO4/300.0/Q4	S	COLD	30-APR-96	29-APR-96	T13A	(223141:99)
1	PN - Plastic-500ml	NH3/350.1/Q4	S	H2SO4	30-APR-96	29-APR-96	T13A	(223146:98)
1		NO3/353.1/Q4	S	H2SO4	30-APR-96	29-APR-96	T13A	(223142:100)
3		S/9030/Q4	S	NAOH	30-APR-96	08-APR-96	T13A	(223143:99 223144:99 223145:50)

9613502.2223

3*=Sample has not been rad screened.

00005

Temp 3°C CUR# 6886

Chain of Custody Record

To: ST Louis

Quanterra Environmental Services

QUA-4124-1

Client: Bechtel Hanford	Project Manager	Date: 4-2-96	Chain Of Custody Number: 54310
Address	Telephone Number (Area Code)/Fax Number	Lab Number	Page 1 of 1
City / State / Zip Code	Site Contact / Lab Contact		
Project Name: SAF B96-048	Carrier/Waybill Number		
Contract/Purchase Order/Quote No.			

Analysis (Attach list if more space is needed): 250 ml-poly; 1 liter; Conductivity; SEE COC

Special Instructions/ Conditions of Receipt: 9613502.2224

Sample I.D. No. and Description (Containers for each sample may be combined on one line)	Date	Time	Aqueous	Sed.	Soil		Unpres.	H2SO4	HNO3	HCl	NaOH	ZnAc/ NaOH	Cold	250 ml-poly	1 liter	Conductivity								
60403401 BOHOQ2		SEE				COC																		
↓ 2 ↓ Q4																								
3 Q6																								
Jm Recv																								
BOH678 60400802	3-29-96	09:23	✓										✓	✓	✓	✓								

Possible Hazard Identification: ☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☑ Unknown

Sample Disposal: ☑ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months (A fee may be assessed if samples are retained longer than 3 months)

Turn Around Time Required: ☐ 24 Hours ☐ 48 Hours ☐ 7 Days ☐ 14 Days ☐ 21 Days ☑ Other _____

QC Requirements (Specify): SDG-W0967

	Date	Time		Date	Time
1. Relinquished By: Heidelberg Quanterra	4-2-96	16:00	1. Received By: 2nd Mitchell	4-3-96	0:845
2. Relinquished By			2. Received By		
3. Relinquished By			3. Received By		

Comments

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

00006

Bechtel Hanford, Inc.

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

Page 1 of 1

Data Turnaround
☐ Priority
■ Normal

Collector: M. Mehlhorn	Company Contact: Bob Raidl	Telephone: (509) 372-9641
Project Designation: 100-HR-3 Groundwater Sampling, Round 10, Phase 2	Sampling Location: 100 D	SAF No.: B96-048
Ice Chest No.: ER-210	Field Logbook No.: EL-1289	Method of Shipment: Hand Delivered
Shipped To: Quanterra	Offsite Property No.: NA PH 1 1 12	Bill of Lading/Air Bill No.: NA /
Possible Sample Hazards/Remarks		

SAMPLE ANALYSIS: 60403403 SDL W0967

Preservation	HNO_3	Cool 4°C	H_2SO_4	*1	H_2SO_4	HNO_3	Cool 4°C	Cool 4°C		HNO_3
Type of Container	A G	A G	P/G	P	P/G	P/G	G	P/G		G
No. of Container(s)	1	1	1	3	1	4	3	1		1
Volume	500mL	500mL	500mL	500mL	500mL	1L	1L	20mL		500mL
	ICP Metals (Unfiltered)	Anions (IC) - Cl, SO_4, NO_2, NO_3, PO_4	NO_2 - NO_3	Sulfide	Ammonia	Gross Alpha, Gross Beta, Sr-90 60403503	Tritium, C-14	Activity Scan		ICP Metals (Filtered)

Sample No.	Matrix*	Date Sampled	Time Sampled	ICP Metals (Unfiltered)	Anions (IC)	NO_2 - NO_3	Sulfide	Ammonia	Gross Alpha, Gross Beta, Sr-90	Tritium, C-14	Activity Scan		ICP Metals (Filtered)
B0H0Q6	W	4-1-96	1250	X	X	X	X	X	X	X	X		
~~B0H0Q7~~ 3/28/96	W												
				100	100	100	3X100	100					

CHAIN OF POSSESSION	Sign/Print Names	Date/Time	Received By	Date/Time
Relinquished By	M. Mehlhorn	4-1-96 1530	K. Trapp	4/1/96 1530
Relinquished By	K. Trapp	4/2/96 0940	Quanterra	0940 4-2-96
Relinquished By			Received By	Date/Time
Relinquished By			Received By	Date/Time

SPECIAL INSTRUCTIONS
*1 ZnAc + NaOH

Sample analysis for phosphate, nitrate, and nitrite by EPA 300.0 is being requested for information only. The ERC Contractor acknowledges that the 48-hour holding time will not be met.

The Activity Scan is for all samples listed on this chain of custody.

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

96135012.2225

00002

Bechtel Hanford, Inc.

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

Page 1 of 1

Data Turnaround: ☐ Priority ■ Normal

Collector: M. Mehlhorn	Company Contact: Bob Raidl	Telephone: (509) 372-9641
Project Designation: 100-HR-3 Groundwater Sampling, Round 10, Phase 2	Sampling Location: 100 D	SAF No.: B96-048
Ice Chest No.: ER-210	Field Logbook No.: EL-1289	Method of Shipment: Hand Delivered
Shipped To: Quanterra	Offsite Property No.: NA PH / / 12	Bill of Lading/Air Bill No.: NA /
Possible Sample Hazards/Remarks		
Special Handling and/or Storage: Maintain samples between 2°C and 6°C.		

SAMPLE ANALYSIS: 60403401 SDL W0967

Sample No.	Matrix*	Date Sampled	Time Sampled	ICP Metals (Unfiltered)	Anions (IC) - Cl, SO_4, NO_2, NO_3, PO_4	NO_2 - NO_3	Sulfide	Ammonia	Gross Alpha, Gross Beta, Sr-90 60403501	Tritium, C-14	Activity Scan		ICP Metals (Filtered)
Preservation				HNO_3	Cool 4°C	H_2SO_4	*1	H_2SO_4	HNO_3	Cool 4°C	Cool 4°C		HNO_3
Type of Container				A G	A G	P/G	P	P	P/G	G	P/G		G
No. of Container(s)				1	1	1	3	1	4	3	1		1
Volume				500mL	500mL	500mL	500mL	500mL	1L	1L	20mL		500mL
B0H0Q2	W	4-1-96	1125	X	X	X	X	X	X	X	X		
~~B0H0Q3~~ NA 3/27/96	W												
				100	100	100	3X100	100					

CHAIN OF POSSESSION	Sign/Print Names		
Relinquished By: M. Mehlhorn	Date/Time: 4-1-96 1525	Received By: K. Jopp / K. Tripp	Date/Time: 1525 4/1/96
Relinquished By: K. Jopp / K. Tripp	Date/Time: 0940 4/2/96	Received By: Guarlera / Karen Schulwig	Date/Time: 0940 4-2-96
Relinquished By	Date/Time	Received By	Date/Time: Lab Chem 100 Phr
Relinquished By	Date/Time	Received By	Date/Time

SPECIAL INSTRUCTIONS

*1 ZnAc + NaOH

Sample analysis for phosphate, nitrate, and nitrite by EPA 300.0 is being requested for information only. The ERC Contractor acknowledges that the 48-hour holding time will not be met.

The Activity Scan is for all samples listed on this chain of custody.

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

80000

9613502.2226

Bechtel Hanford, Inc.

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

Page 1 of 1

Data Turnaround: ☐ Priority ■ Normal

Collector: M. Mehlhorn	Company Contact: Bob Raidl	Telephone: (509) 372-9641
Project Designation: 100-HR-3 Groundwater Sampling, Round 10, Phase 2	Sampling Location: 100 D	SAF No.: B96-048
Ice Chest No.: ER-17	Field Logbook No.: EL-1289	Method of Shipment: Hand Delivered
Shipped To: Quanterra	Offsite Property No.: NA PA 1 1 12	Bill of Lading/Air Bill No.: NA 1
Possible Sample Hazards/Remarks		
Special Handling and/or Storage: Maintain samples between 2°C and 6°C.		

SAMPLE ANALYSIS: 60403402 SDG W0967

Sample No.	Matrix*	Date Sampled	Time Sampled	ICP Metals (Unfiltered)	Anions (IC) - Cl, SO_4, NO_2, NO_3, PO_4	NO_2 - NO_3	Sulfide	Ammonia	Gross Alpha, Gross Beta, Sr-90	Tritium, C-14	Activity Scan		ICP Metals (Filtered)
Preservation				HNO_3	Cool 4°C	H_2SO_4	*1	H_2SO_4	HNO_3	Cool 4°C	Cool 4°C		HNO_3
Type of Container				A G	A G	P/P	P	P/P	P/G	G	P/G		G
No. of Container(s)				1	1	1	3	1	4	3	1		1
Volume				500mL	500mL	500mL	500mL	500mL	1L	1L	20mL		500mL
B0H0Q4	W	4-1-96	1210	X	X	X	X	X	X	X	X		
~~B0H0D5~~ 5/28/96 OK ~~[illegible]~~	W			|	|	|	|	|					
				100	100	100	3x100	100					

60403502

CHAIN OF POSSESSION	Sign/Print Names		
Relinquished By: M. Mehlhorn	Date/Time: 4-1-96 1530	Received By: K. Trapp / K. Trapp	Date/Time: 1530 4/1/96
Relinquished By: K. Trapp / K. Trapp	Date/Time: 4/2/96 0940	Received By: Karen Settenberg	Date/Time: 0940 4-2-96
Relinquished By	Date/Time	Received By	Date/Time
Relinquished By	Date/Time	Received By	Date/Time

SPECIAL INSTRUCTIONS

*1 ZnAc + NaOH

Sample analysis for phosphate, nitrate, and nitrite by EPA 300.0 is being requested for information only. The ERC Contractor acknowledges that the 48-hour holding time will not be met.

The Activity Scan is for all samples listed on this chain of custody.

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

96135012.2227

00009

Client Sample Screening Results

02-Apr-96

(F3) 4/2/96

CLIENT CODE ID	MATRIX	RECEIVED	DETECTOR	ACQ DATE	SAMPLE	MINUTES	CNTS A	NET CPM A	CNTS B	NET CPM B
WHC B0H0Q2		4/2/96 10:00:00 AM	QUAD21B	4/2/96 1:45:00 PM	B0H0Q2	30	11	0.31166667	74	1.5179167
	LIQUID		Bkg:	4/2/96 4:33:53 AM	BKG	800	44	0.055	759	0.94875

Anl Date: 4/2/96	Tot Sa, Alq: 5.00E+00	, 1.00E+01	Alp;	(Dpm/ 9.69E-01	(uCi/ 2.18E-04	(pCi/ 4.37E+01	± 2.5E+01	CAT I	5.7E-01	Lab Alq Lig
Ppt mg: 3.7	Units: L	, ml	Bet;	Alq): 2.77E+00	Sa): 6.24E-04	Lig): 1.25E+02	± 2.5E+01		4.0E-01	

CLIENT CODE ID	MATRIX	RECEIVED	DETECTOR	ACQ DATE	SAMPLE	MINUTES	CNTS A	NET CPM A	CNTS B	NET CPM B
WHC B0H0Q4		4/2/96 10:00:00 AM	QUAD21C	4/2/96 1:45:00 PM	B0H0Q4	30	23	0.71791667	94	2.1870833
	LIQUID		Bkg:	4/2/96 4:33:53 AM	BKG	800	39	0.04875	757	0.94625

Anl Date: 4/2/96	Tot Sa, Alq: 5.00E+00	, 1.00E+01	Alp;	(Dpm/ 2.10E+00	(uCi/ 4.74E-04	(pCi/ 9.48E+01	± 2.7E+01	CAT I	2.6E-01	Lab Alq Lig
Ppt mg: 2.7	Units: L	, ml	Bet;	Alq): 3.90E+00	Sa): 8.79E-04	Lig): 1.76E+02	± 2.8E+01		2.8E-01	

CLIENT CODE ID	MATRIX	RECEIVED	DETECTOR	ACQ DATE	SAMPLE	MINUTES	CNTS A	NET CPM A	CNTS B	NET CPM B
WHC B0H0Q6		4/2/96 10:00:00 AM	QUAD21D	4/2/96 1:45:00 PM	B0H0Q6	30	19	0.57958333	107	2.5116667
	LIQUID		Bkg:	4/2/96 4:33:53 AM	BKG	800	43	0.05375	844	1.055

Anl Date: 4/2/96	Tot Sa, Alq: 5.00E+00	, 1.00E+01	Alp;	(Dpm/ 1.82E+00	(uCi/ 4.10E-04	(pCi/ 8.20E+01	± 2.9E+01	CAT I	3.0E-01	Lab Alq Lig
Ppt mg: 5.2	Units: L	, ml	Bet;	Alq): 4.65E+00	Sa): 1.05E-03	Lig): 2.10E+02	± 3.0E+01		2.4E-01	

961350 2228

00010

9613502.2229

028288

Environmental Restoration Contractor **ERC Team**

Interoffice Memorandum

Job No. 22192
Written Response Required: NO
CCN: N/A
OU: N/A
TSD: N/A
ERA: N/A
Subject Code: 2830

TO:	W. S. Thompson	N1-28	DATE:	February 29, 1996
	G. C. Henckel	H4-80		
COPIES:	K. A. Smith	X0-23	FROM:	S. K. De Mers
	T. L. Lafreniere	X0-23		Radiological Controls
	D. E. Gergely	X0-23		T7-05/373-1913

SUBJECT: **Total Activities for Off-Site Shipments of Groundwater Samples to NRC Licensed Laboratories**

There is no need to perform total activities prior to offsite shipment to NRC licensed labs of samples taken from ground water wells located on the Hanford Site.

All wells reviewed to date for radiological content have shown no well with a total activity in excess of 2,000,000 pCi/l (2,000 pCi/gm), the Department Of Transportation limit for radioactive material. The highest activity in any known well is 1.56×10^6 pCi/l H^3.

While this does not constitute any release from radiological controls for worker protection, it does allow samples to be shipped based on historical laboratory data and save the expense of doing radiochemical analysis.

A copy of the most recent analytical data should be provided to the NRC licensed laboratory with the samples being shipped or if no data is available for new wells, the most recent data from adjacent wells.

Figure 1

SAMPLE CHECK-IN LIST

(1 Per Shipping Container)

Date/Time Received 4/2/96 0940 Client Name BHI

Project/Client # B96-048 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 [X] Dry [ ] _____
6. Each sample is in a plastic bag? Yes [X] No [ ] _____
7. Number of sample containers in cooler: 15
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 Ackerlund Date/Time 4-2-96 4/2/96 0940

Figure 1

SAMPLE CHECK-IN LIST

(1 Per Shipping Container)

Date/Time Received 4-2-96 0940 Client Name BHI

Project/Client # B96-048 Batch or Case # _____

Cooler ID (if noted on outside of cooler) ER-210

1. Condition of shipping container? O.K.
2. Custody Seals on cooler intact? Yes [X] No [ ]
3. Custody Seals dated and signed? Yes [X] No [ ]
4. Chain of Custody record is taped on inside of cooler lid? Yes [ ] No [X]
5. Vermiculite/packing material is: Wet [X] Dry [ ] _____
6. Each sample is in a plastic bag? Yes [X] No [ ] _____
7. Number of sample containers in cooler: 30
8. Samples have:
   - X tape
   - X custody seals
   - ___ hazard labels
   - ___ appropriate sample labels
9. Samples are:
   - X in good condition
   - ___ broken
   - ___ other
   - ___ leaking
   - ___ have air bubbles
10. Coolant Present? Yes [X] No [ ] Sample Temperature 4°C
11. The following paperwork should be accounted for (N/A if not applicable):
    - Chain of Custody #(s) N/A
    - Request for Analysis #(s) ✓
    - Airbill # ✓ Carrier N/A
12. Have any anomalies been identified above? Yes [ ] No [X]
13. Memos have been initiated for all anomalies identified above? Yes [X]

Printed Name/Signature Karen Stittenburg Date/Time 4-2-96 0940

9613502.2232

Quanterra
Environmental Services

BW 4-3-96
1115
BY: JW

Login No.: 10763

Condition Upon Receipt Variance Report
St. Louis Laboratory

Client: Richland

Date: 4-3-96 Time: 0945

Project No: 550.123

Initiated by: Fred Mather

Shipper/No: FedEx 285 1905 883

RFA/COC Numbers: 54310

Condition/Variance (Check all that apply):

1. ☐ Sample received broken/leaking.
2. ☐ Sample received without proper preservative.
   - ☐ Cooler temperature not within 4°C ± 2°C
     Record temperature: _____
   - ☐ pH _____
   - ☐ other: _____
3. ☐ Sample received in improper container.
4. ☑ Sample received without proper paperwork. Explain:
   BOH678 "Conductivity" "COC 4-2-96" OK 4/4/96
5. ☐ Paperwork received without sample.
6. ☐ No sample ID on sample container.
7. ☐ Custody tape disturbed/broken/missing.
8. ☐ Sample ID on container does not match sample ID on paperwork. Explain: _____
9. ☐ All coolers on airbill not received with shipment.
10. ☐ Other (explain below):

☐ No variances were noted during sample receipt.

Cooler Temperature Upon Receipt: 3°C

Notes:

Corrective Action:

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

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

☐ Sample(s) processed "as is".

☐ Sample(s) on hold until: _____ If released, notify: _____

Sample Control Supervisor Review: (or designate) Fred Mather Date: 4-3-96

Project Management Review: Abby Wolo Date: 4-4-96

SIGNED ORIGINAL MUST BE RETAINED IN THE PROJECT FILE

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

Quanterra-Richland
3350 George Washington Way
Richland, WA 99352

Project: 550.123

Category: ICP Metals-6010 (TAL)
Method: EPA 6010
Matrix: LIQUID

Sample Date : 04/01/96
Receipt Date : 04/02/96
Report Date : 05/13/96

Client ID: B0H0Q6

Quanterra ID : 10763-001

Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit	Dilution
Aluminum	7429-90-5	QCBLK97022-1	04/14/96	04/15/96	80.8	UG/L	B	200	1
Antimony	7440-36-0	QCBLK97022-1	04/14/96	04/15/96	34.6	UG/L	U	60.0	1
Barium	7440-39-3	QCBLK97022-1	04/14/96	04/15/96	114	UG/L	B	200	1
Beryllium	7440-41-7	QCBLK97022-1	04/14/96	04/15/96	0.50	UG/L	U	5.0	1
Cadmium	7440-43-9	QCBLK97022-1	04/14/96	04/15/96	2.4	UG/L	U	5.0	1
Calcium	7440-70-2	QCBLK97022-1	04/14/96	04/15/96	88300	UG/L		5000	1
Chromium	7440-47-3	QCBLK97022-1	04/14/96	04/15/96	347	UG/L	N	10.0	1
Cobalt	7440-48-4	QCBLK97022-1	04/14/96	04/15/96	4.8	UG/L	U	50.0	1
Copper	7440-50-8	QCBLK97022-1	04/14/96	04/15/96	29.6	UG/L		25.0	1
Iron	7439-89-6	QCBLK97022-1	04/14/96	04/15/96	67.9	UG/L	B	100	1
Magnesium	7439-95-4	QCBLK97022-1	04/14/96	04/15/96	27600	UG/L		5000	1
Manganese	7439-96-5	QCBLK97022-1	04/14/96	04/15/96	4.2	UG/L	B	15.0	1
Nickel	7440-02-0	QCBLK97022-1	04/14/96	04/15/96	10.5	UG/L	B	40.0	1
Potassium	7440-09-7	QCBLK97022-1	04/14/96	04/15/96	6380	UG/L		5000	1
Silver	7440-22-4	QCBLK97022-1	04/14/96	04/15/96	5.9	UG/L	U	10.0	1
Sodium	7440-23-5	QCBLK97022-1	04/14/96	04/15/96	15700	UG/L		5000	1
Vanadium	7440-62-2	QCBLK97022-1	04/14/96	04/15/96	18.0	UG/L	B	50.0	1
Zinc	7440-66-6	QCBLK97022-1	04/14/96	04/15/96	153	UG/L		20.0	1

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Quanterra-Richland
3350 George Washington Way
Richland, WA 99352

Project: 550.123

Category: ICP Metals-6010 (TAL)
Method: EPA 6010
Matrix: LIQUID

Sample Date : 04/01/96
Receipt Date : 04/02/96
Report Date : 05/13/96

Client ID: B0H0Q6

Quanterra ID : 10763-001MS

Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit	Dilution
Aluminum	7429-90-5	QCBLK97022-1	04/14/96	04/15/96	101	%REC			1
Antimony	7440-36-0	QCBLK97022-1	04/14/96	04/15/96	97	%REC			1
Barium	7440-39-3	QCBLK97022-1	04/14/96	04/15/96	97	%REC			1
Beryllium	7440-41-7	QCBLK97022-1	04/14/96	04/15/96	100	%REC			1
Cadmium	7440-43-9	QCBLK97022-1	04/14/96	04/15/96	87	%REC			1
Calcium	7440-70-2	QCBLK97022-1	04/14/96	04/15/96	94	%REC			1
Chromium	7440-47-3	QCBLK97022-1	04/14/96	04/15/96	86	%REC			1
Cobalt	7440-48-4	QCBLK97022-1	04/14/96	04/15/96	95	%REC			1
Copper	7440-50-8	QCBLK97022-1	04/14/96	04/15/96	100	%REC			1
Iron	7439-89-6	QCBLK97022-1	04/14/96	04/15/96	100	%REC			1
Magnesium	7439-95-4	QCBLK97022-1	04/14/96	04/15/96	98	%REC			1
Manganese	7439-96-5	QCBLK97022-1	04/14/96	04/15/96	95	%REC			1
Nickel	7440-02-0	QCBLK97022-1	04/14/96	04/15/96	94	%REC			1
Potassium	7440-09-7	QCBLK97022-1	04/14/96	04/15/96	100	%REC			1
Silver	7440-22-4	QCBLK97022-1	04/14/96	04/15/96	94	%REC			1
Sodium	7440-23-5	QCBLK97022-1	04/14/96	04/15/96	101	%REC			1
Vanadium	7440-62-2	QCBLK97022-1	04/14/96	04/15/96	96	%REC			1
Zinc	7440-66-6	QCBLK97022-1	04/14/96	04/15/96	97	%REC			1

Quanterra-Richland
3350 George Washington Way
Richland, WA 99352

Project: 550.123

Category: ICP Metals-6010 (TAL)
Method: EPA 6010
Matrix: LIQUID

Sample Date : 04/01/96
Receipt Date : 04/02/96
Report Date : 05/13/96

Client ID: BOH0Q6

Quanterra ID : 10763-001MSD

Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit	Dilution
Aluminum	7429-90-5	QCBLK97022-1	04/14/96	04/15/96	99	%REC			1
Antimony	7440-36-0	QCBLK97022-1	04/14/96	04/15/96	97	%REC			1
Barium	7440-39-3	QCBLK97022-1	04/14/96	04/15/96	95	%REC			1
Beryllium	7440-41-7	QCBLK97022-1	04/14/96	04/15/96	97	%REC			1
Cadmium	7440-43-9	QCBLK97022-1	04/14/96	04/15/96	86	%REC			1
Calcium	7440-70-2	QCBLK97022-1	04/14/96	04/15/96	89	%REC			1
Chromium	7440-47-3	QCBLK97022-1	04/14/96	04/15/96	80	%REC	N		1
Cobalt	7440-48-4	QCBLK97022-1	04/14/96	04/15/96	93	%REC			1
Copper	7440-50-8	QCBLK97022-1	04/14/96	04/15/96	98	%REC			1
Iron	7439-89-6	QCBLK97022-1	04/14/96	04/15/96	98	%REC			1
Magnesium	7439-95-4	QCBLK97022-1	04/14/96	04/15/96	96	%REC			1
Manganese	7439-96-5	QCBLK97022-1	04/14/96	04/15/96	93	%REC			1
Nickel	7440-02-0	QCBLK97022-1	04/14/96	04/15/96	93	%REC			1
Potassium	7440-09-7	QCBLK97022-1	04/14/96	04/15/96	99	%REC			1
Silver	7440-22-4	QCBLK97022-1	04/14/96	04/15/96	93	%REC			1
Sodium	7440-23-5	QCBLK97022-1	04/14/96	04/15/96	99	%REC			1
Vanadium	7440-62-2	QCBLK97022-1	04/14/96	04/15/96	94	%REC			1
Zinc	7440-66-6	QCBLK97022-1	04/14/96	04/15/96	95	%REC			1

Quanterra-Richland
3350 George Washington Way
Richland, WA 99352

Project: 550.123

Category: ICP Metals-6010 (TAL)
Method: EPA 6010
Matrix: LIQUID

Sample Date : 04/01/96
Receipt Date : 04/02/96
Report Date : 05/13/96

Client ID: B0H0Q2

Quanterra ID : 10763-002

Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit	Dilution
Aluminum	7429-90-5	QCBLK97022-1	04/14/96	04/15/96	53.2	UG/L	U	200	1
Antimony	7440-36-0	QCBLK97022-1	04/14/96	04/15/96	34.6	UG/L	U	60.0	1
Barium	7440-39-3	QCBLK97022-1	04/14/96	04/15/96	96.1	UG/L	B	200	1
Beryllium	7440-41-7	QCBLK97022-1	04/14/96	04/15/96	0.50	UG/L	U	5.0	1
Cadmium	7440-43-9	QCBLK97022-1	04/14/96	04/15/96	2.4	UG/L	U	5.0	1
Calcium	7440-70-2	QCBLK97022-1	04/14/96	04/15/96	60100	UG/L		5000	1
Chromium	7440-47-3	QCBLK97022-1	04/14/96	04/15/96	1000	UG/L	N	10.0	1
Cobalt	7440-48-4	QCBLK97022-1	04/14/96	04/15/96	4.8	UG/L	U	50.0	1
Copper	7440-50-8	QCBLK97022-1	04/14/96	04/15/96	5.6	UG/L	U	25.0	1
Iron	7439-89-6	QCBLK97022-1	04/14/96	04/15/96	50.0	UG/L	B	100	1
Magnesium	7439-95-4	QCBLK97022-1	04/14/96	04/15/96	18900	UG/L		5000	1
Manganese	7439-96-5	QCBLK97022-1	04/14/96	04/15/96	2.5	UG/L	B	15.0	1
Nickel	7440-02-0	QCBLK97022-1	04/14/96	04/15/96	9.1	UG/L	U	40.0	1
Potassium	7440-09-7	QCBLK97022-1	04/14/96	04/15/96	5690	UG/L		5000	1
Silver	7440-22-4	QCBLK97022-1	04/14/96	04/15/96	5.9	UG/L	U	10.0	1
Sodium	7440-23-5	QCBLK97022-1	04/14/96	04/15/96	16900	UG/L		5000	1
Vanadium	7440-62-2	QCBLK97022-1	04/14/96	04/15/96	18.2	UG/L	B	50.0	1
Zinc	7440-66-6	QCBLK97022-1	04/14/96	04/15/96	38.4	UG/L		20.0	1

Quanterra-Richland
3350 George Washington Way
Richland, WA 99352

Project: 550.123

Category: ICP Metals-6010 (TAL)
Method: EPA 6010
Matrix: LIQUID

Sample Date : 04/01/96
Receipt Date : 04/02/96
Report Date : 05/13/96

Client ID: B0H0Q4

Quanterra ID : 10763-003

Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit	Dilution
Aluminum	7429-90-5	QCBLK97022-1	04/14/96	04/15/96	53.2	UG/L	U	200	1
Antimony	7440-36-0	QCBLK97022-1	04/14/96	04/15/96	34.6	UG/L	U	60.0	1
Barium	7440-39-3	QCBLK97022-1	04/14/96	04/15/96	77.5	UG/L	B	200	1
Beryllium	7440-41-7	QCBLK97022-1	04/14/96	04/15/96	0.50	UG/L	U	5.0	1
Cadmium	7440-43-9	QCBLK97022-1	04/14/96	04/15/96	2.4	UG/L	U	5.0	1
Calcium	7440-70-2	QCBLK97022-1	04/14/96	04/15/96	54700	UG/L		5000	1
Chromium	7440-47-3	QCBLK97022-1	04/14/96	04/15/96	711	UG/L	N	10.0	1
Cobalt	7440-48-4	QCBLK97022-1	04/14/96	04/15/96	4.8	UG/L	U	50.0	1
Copper	7440-50-8	QCBLK97022-1	04/14/96	04/15/96	126	UG/L		25.0	1
Iron	7439-89-6	QCBLK97022-1	04/14/96	04/15/96	47.5	UG/L	B	100	1
Magnesium	7439-95-4	QCBLK97022-1	04/14/96	04/15/96	15700	UG/L		5000	1
Manganese	7439-96-5	QCBLK97022-1	04/14/96	04/15/96	2.9	UG/L	B	15.0	1
Nickel	7440-02-0	QCBLK97022-1	04/14/96	04/15/96	9.1	UG/L	U	40.0	1
Potassium	7440-09-7	QCBLK97022-1	04/14/96	04/15/96	3930	UG/L	B	5000	1
Silver	7440-22-4	QCBLK97022-1	04/14/96	04/15/96	5.9	UG/L	U	10.0	1
Sodium	7440-23-5	QCBLK97022-1	04/14/96	04/15/96	13500	UG/L		5000	1
Vanadium	7440-62-2	QCBLK97022-1	04/14/96	04/15/96	15.4	UG/L	B	50.0	1
Zinc	7440-66-6	QCBLK97022-1	04/14/96	04/15/96	69.0	UG/L		20.0	1

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

B0H0Q2

Lab Name: QUANTERRA_MO Contract: 550.123

Lab Code: ITMO Case No.: SAS No.: SDG No.: W0967

Matrix (soil/water): WATER Lab Sample ID: 10763-002

Level (low/med): LOW Date Received: 04/02/96

% Solids: 0.0

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	53.2	U		P
7440-36-0	Antimony	34.6	U		P
7440-39-3	Barium	96.1	B		P
7440-41-7	Beryllium	0.50	U		P
7440-43-9	Cadmium	2.4	U		P
7440-70-2	Calcium	60100			P
7440-47-3	Chromium	1000		N	P
7440-48-4	Cobalt	4.8	U		P
7440-50-8	Copper	5.6	U		P
7439-89-6	Iron	50.0	B		P
7439-95-4	Magnesium	18900			P
7439-96-5	Manganese	2.5	B		P
7440-02-0	Nickel	9.1	U		P
7440-09-7	Potassium	5690			P
7440-22-4	Silver	5.9	U		P
7440-23-5	Sodium	16900			P
7440-62-2	Vanadium	18.2	B		P
7440-66-6	Zinc	38.4			P

Color Before: Clarity Before: Texture:

Color After: Clarity After: Artifacts:

Comments:

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

B0H0Q4

Lab Name: QUANTERRA_MO Contract: 550.123

Lab Code: ITMO Case No.: SAS No.: SDG No.: W0967

Matrix (soil/water): WATER Lab Sample ID: 10763-003

Level (low/med): LOW Date Received: 04/02/96

% Solids: 0.0

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	53.2	U		P
7440-36-0	Antimony	34.6	U		P
7440-39-3	Barium	77.5	B		P
7440-41-7	Beryllium	0.50	U		P
7440-43-9	Cadmium	2.4	U		P
7440-70-2	Calcium	54700			P
7440-47-3	Chromium	711		N	P
7440-48-4	Cobalt	4.8	U		P
7440-50-8	Copper	126			P
7439-89-6	Iron	47.5	B		P
7439-95-4	Magnesium	15700			P
7439-96-5	Manganese	2.9	B		P
7440-02-0	Nickel	9.1	U		P
7440-09-7	Potassium	3930	B		P
7440-22-4	Silver	5.9	U		P
7440-23-5	Sodium	13500			P
7440-62-2	Vanadium	15.4	B		P
7440-66-6	Zinc	69.0			P

Color Before: Clarity Before: Texture:

Color After: Clarity After: Artifacts:

Comments:

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

B0H0Q6

Lab Name: QUANTERRA_MO Contract: 550.123

Lab Code: ITMO Case No.: SAS No.: SDG No.: W0967

Matrix (soil/water): WATER Lab Sample ID: 10763-001

Level (low/med): LOW Date Received: 04/02/96

% Solids: 0.0

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	80.8	B		P
7440-36-0	Antimony	34.6	U		P
7440-39-3	Barium	114	B		P
7440-41-7	Beryllium	0.50	U		P
7440-43-9	Cadmium	2.4	U		P
7440-70-2	Calcium	88300			P
7440-47-3	Chromium	347		N	P
7440-48-4	Cobalt	4.8	U		P
7440-50-8	Copper	29.6			P
7439-89-6	Iron	67.9	B		P
7439-95-4	Magnesium	27600			P
7439-96-5	Manganese	4.2	B		P
7440-02-0	Nickel	10.5	B		P
7440-09-7	Potassium	6380			P
7440-22-4	Silver	5.9	U		P
7440-23-5	Sodium	15700			P
7440-62-2	Vanadium	18.0	B		P
7440-66-6	Zinc	153			P

Color Before: Clarity Before: Texture:

Color After: Clarity After: Artifacts:

Comments:

FORM I - IN

9613502.2241

Quanterra-Richland
3350 George Washington Way
Richland, WA 99352

Project: 550.123

Category: Ammonia (350.1)
Method: EPA 7841
Matrix: LIQUID

Sample Date : 04/01/96
Receipt Date : 04/02/96
Report Date : 05/13/96

Client ID	Quanterra ID	Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit	Dil.
B0H0Q6	10763-001	Ammonia	7664-41-7	QCBLK96080-1	04/04/96	04/04/96	0.050	MG/L	U	0.050	1
B0H0Q6	10763-001DUP	Ammonia	7664-41-7	QCBLK96080-1	04/04/96	04/04/96	0.050	MG/L	U	0.050	1
B0H0Q6	10763-001MS	Ammonia	7664-41-7	QCBLK96080-1	04/04/96	04/04/96	101	%REC			1
B0H0Q2	10763-002	Ammonia	7664-41-7	QCBLK96080-1	04/04/96	04/04/96	0.050	MG/L	U	0.050	1
B0H0Q4	10763-003	Ammonia	7664-41-7	QCBLK96080-1	04/04/96	04/04/96	0.050	MG/L	U	0.050	1
NA	QCBLK96080-1	Ammonia	7664-41-7	QCBLK96080-1	04/04/96	04/04/96	0.050	MG/L	U	0.050	1
NA	QCLCS96080-1	Ammonia	7664-41-7	QCBLK96080-1	04/04/96	04/04/96	101	%REC			1

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Quanterra-Richland
3350 George Washington Way
Richland, WA 99352

Project: 550.123

Category: Chloride
Method: EPA 300.0
Matrix: LIQUID

Sample Date : 04/01/96
Receipt Date : 04/02/96
Report Date : 05/13/96

Client ID	Quanterra ID	Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit	Dil.
B0H0Q6	10763-001	Chloride	16887-00-6	QCBLK96262-1	04/04/96	04/04/96	22.9	MG/L		5.00	25
B0H0Q6	10763-001DUP	Chloride	16887-00-6	QCBLK96262-1	04/04/96	04/04/96	23.0	MG/L		5.00	25
B0H0Q6	10763-001MS	Chloride	16887-00-6	QCBLK96262-1	04/04/96	04/04/96	80	%REC			25
B0H0Q2	10763-002	Chloride	16887-00-6	QCBLK96262-1	04/04/96	04/04/96	21.1	MG/L		2.00	10
B0H0Q4	10763-003	Chloride	16887-00-6	QCBLK96262-1	04/04/96	04/04/96	12.7	MG/L		2.00	10
NA	QCBLK96262-1	Chloride	16887-00-6	QCBLK96262-1	04/04/96	04/04/96	0.20	MG/L	U	0.20	1
NA	QCLCS96262-1	Chloride	16887-00-6	QCBLK96262-1	04/04/96	04/04/96	93	%REC			1

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Quanterra-Richland
3350 George Washington Way
Richland, WA 99352

Project: 550.123

Category: Nitrate
Method: EPA 300.0
Matrix: LIQUID

Sample Date : 04/01/96
Receipt Date : 04/02/96
Report Date : 05/13/96

Client ID	Quanterra ID	Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit	Dil.
B0H0Q6	10763-001	Nitrate	NO3-N	QCBLK96262-1	04/04/96	04/04/96	18.9	MG/L		0.50	25
B0H0Q6	10763-001DUP	Nitrate	NO3-N	QCBLK96262-1	04/04/96	04/04/96	19.2	MG/L		0.50	25
B0H0Q6	10763-001MS	Nitrate	NO3-N	QCBLK96262-1	04/04/96	04/04/96	75	%REC			25
B0H0Q2	10763-002	Nitrate	NO3-N	QCBLK96262-1	04/04/96	04/04/96	14.3	MG/L		0.50	25
B0H0Q4	10763-003	Nitrate	NO3-N	QCBLK96262-1	04/04/96	04/04/96	9.53	MG/L		0.40	20
NA	QCBLK96262-1	Nitrate	NO3-N	QCBLK96262-1	04/04/96	04/04/96	0.020	MG/L	U	0.020	1
NA	QCLCS96262-1	Nitrate	NO3-N	QCBLK96262-1	04/04/96	04/04/96	97	%REC			1

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Quanterra-Richland
3350 George Washington Way
Richland, WA 99352

Project: 550.123

Category: Nitrite
Method: EPA 300.0
Matrix: LIQUID

Sample Date : 04/01/96
Receipt Date : 04/02/96
Report Date : 05/13/96

Client ID	Quanterra ID	Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit	Dil.
B0H0Q6	10763-001	Nitrite	NO2-N	QCBLK96262-1	04/04/96	04/04/96	0.020	MG/L	U	0.020	1
B0H0Q6	10763-001DUP	Nitrite	NO2-N	QCBLK96262-1	04/04/96	04/04/96	0.020	MG/L	U	0.020	1
B0H0Q6	10763-001MS	Nitrite	NO2-N	QCBLK96262-1	04/04/96	04/04/96	100	%REC			5
B0H0Q2	10763-002	Nitrite	NO2-N	QCBLK96262-1	04/04/96	04/04/96	0.020	MG/L	U	0.020	1
B0H0Q4	10763-003	Nitrite	NO2-N	QCBLK96262-1	04/04/96	04/04/96	0.020	MG/L	U	0.020	1
NA	QCBLK96262-1	Nitrite	NO2-N	QCBLK96262-1	04/04/96	04/04/96	0.020	MG/L	U	0.020	1
NA	QCLCS96262-1	Nitrite	NO2-N	QCBLK96262-1	04/04/96	04/04/96	101	%REC			1

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Quanterra-Richland
3350 George Washington Way
Richland, WA 99352

Project: 550.123

Category: Orthophosphate
Method: EPA 300.0
Matrix: LIQUID

Sample Date : 04/01/96
Receipt Date : 04/02/96
Report Date : 05/13/96

Client ID	Quanterra ID	Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit	Dil.
B0H0Q6	10763-001	Ortho-Phosphate	14265-44-2	QCBLK96262-1	04/04/96	04/04/96	0.50	MG/L	U	0.50	1
B0H0Q6	10763-001DUP	Ortho-Phosphate	14265-44-2	QCBLK96262-1	04/04/96	04/04/96	0.50	MG/L	U	0.50	1
B0H0Q6	10763-001MS	Ortho-Phosphate	14265-44-2	QCBLK96262-1	04/04/96	04/04/96	102	%REC			1
B0H0Q2	10763-002	Ortho-Phosphate	14265-44-2	QCBLK96262-1	04/04/96	04/04/96	0.50	MG/L	U	0.50	1
B0H0Q4	10763-003	Ortho-Phosphate	14265-44-2	QCBLK96262-1	04/04/96	04/04/96	0.50	MG/L	U	0.50	1
NA	QCBLK96262-1	Ortho-Phosphate	14265-44-2	QCBLK96262-1	04/04/96	04/04/96	0.50	MG/L	U	0.50	1
NA	QCLCS96262-1	Ortho-Phosphate	14265-44-2	QCBLK96262-1	04/04/96	04/04/96	100	%REC			1

Quanterra-Richland
3350 George Washington Way
Richland, WA 99352

Project: 550.123

Category: Sulfate
Method: EPA 300.0
Matrix: LIQUID

Sample Date : 04/01/96
Receipt Date : 04/02/96
Report Date : 05/13/96

Client ID	Quanterra ID	Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit	Dil.
B0H0Q6	10763-001	Sulfate	14808-79-8	QCBLK96262-1	04/04/96	04/04/96	150	MG/L		12.5	25
B0H0Q6	10763-001DUP	Sulfate	14808-79-8	QCBLK96262-1	04/04/96	04/04/96	151	MG/L		12.5	25
B0H0Q6	10763-001MS	Sulfate	14808-79-8	QCBLK96262-1	04/04/96	04/04/96	110	%REC			50
B0H0Q2	10763-002	Sulfate	14808-79-8	QCBLK96262-1	04/04/96	04/04/96	113	MG/L		5.00	10
B0H0Q4	10763-003	Sulfate	14808-79-8	QCBLK96262-1	04/04/96	04/04/96	75.0	MG/L		5.00	10
NA	QCBLK96262-1	Sulfate	14808-79-8	QCBLK96262-1	04/04/96	04/04/96	0.50	MG/L	U	0.50	1
NA	QCLCS96262-1	Sulfate	14808-79-8	QCBLK96262-1	04/04/96	04/04/96	96	%REC			1

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Quanterra-Richland
3350 George Washington Way
Richland, WA 99352

Project: 550.123

Category: NO2/NO3 (353.1)
Method: EPA 353.1
Matrix: LIQUID

Sample Date : 04/01/96
Receipt Date : 04/02/96
Report Date : 05/13/96

Client ID	Quanterra ID	Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit	Dil.
B0H0Q6	10763-001	Nitrate/Nitrite	NO2+NO3-N	QCBLK96043-1	04/04/96	04/04/96	18.9	MG/L		2.5	50
B0H0Q6	10763-001DUP	Nitrate/Nitrite	NO2+NO3-N	QCBLK96043-1	04/04/96	04/04/96	18.3	MG/L		2.5	50
B0H0Q6	10763-001MS	Nitrate/Nitrite	NO2+NO3-N	QCBLK96043-1	04/04/96	04/04/96	0	%REC			50
B0H0Q2	10763-002	Nitrate/Nitrite	NO2+NO3-N	QCBLK96043-1	04/04/96	04/04/96	14.0	MG/L		2.5	50
B0H0Q4	10763-003	Nitrate/Nitrite	NO2+NO3-N	QCBLK96043-1	04/04/96	04/04/96	9.62	MG/L		2.5	50
NA	QCBLK96043-1	Nitrate/Nitrite	NO2+NO3-N	QCBLK96043-1	04/04/96	04/04/96	0.050	MG/L	U	0.050	1
NA	QCLCS96043-1	Nitrate/Nitrite	NO2+NO3-N	QCBLK96043-1	04/04/96	04/04/96	99	%REC			1

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Quanterra-Richland
3350 George Washington Way
Richland, WA 99352

Project: 550.123

Category: Sulfide (9030)
Method: EPA 9030
Matrix: LIQUID

Sample Date : 04/01/96
Receipt Date : 04/02/96
Report Date : 05/13/96

Client ID	Quanterra ID	Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit	Dil.
B0H0Q6	10763-001	Sulfide	18496-25-8	QCBLK96103-1	04/04/96	04/04/96	0.38	MG/L	U	0.38	1
B0H0Q6	10763-001DUP	Sulfide	18496-25-8	QCBLK96103-1	04/04/96	04/04/96	0.39	MG/L	U	0.39	1
B0H0Q6	10763-001MS	Sulfide	18496-25-8	QCBLK96103-1	04/04/96	04/04/96	98	%REC			1
B0H0Q2	10763-002	Sulfide	18496-25-8	QCBLK96103-1	04/04/96	04/04/96	0.38	MG/L	U	0.38	1
B0H0Q4	10763-003	Sulfide	18496-25-8	QCBLK96103-1	04/04/96	04/04/96	0.46	MG/L		0.38	1
NA	QCBLK96103-1	Sulfide	18496-25-8	QCBLK96103-1	04/04/96	04/04/96	1.00	MG/L	U	1.00	1
NA	QCLCS96103-1	Sulfide	18496-25-8	QCBLK96103-1	04/04/96	04/04/96	88	%REC			1

Quanterra
Environmental Services

Quanterra Incorporated
2800 George Washington Way
Richland, Washington 99352

509 375-3131 Telephone
509 375-5590 Fax

CERTIFICATE OF ANALYSIS

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

May 31, 1996

Attention: Joan Kessner

MAY 1996
RECEIVED
Data
Log In

SAF Number	:	B96-048
Date SDG Closed	:	April 16, 1996
Number of Samples	:	Three (3)
Sample Type	:	Water
SDG Number	:	W0967
Data Deliverable	:	Summary

I. Introduction

On April 2, 1996, a total of three water 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
60403501	B0H0Q2	WATER	04/02/96
60403502	B0H0Q4	WATER	04/02/96
60403503	B0H0Q6	WATER	04/02/96

II. Analytical Results/Methodology

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

Quanterra
Environmental Services

The requested analyses were:

Gas Proportional Counting
Gross Alpha by method ITAS-RD-3214
Gross Beta by method ITAS-RD-3214
Strontium-89/90 by method RICHRC-5006
Liquid Scintillation Counting
Carbon-14 by method RICHRC-5022
Tritium by method RICHRC-5007

III. Quality Control

The analytical results for each analysis performed under SDG W0967 include a minimum of one Laboratory Control Sample (LCS), one method (reagent) blank, and one duplicate. Any exceptions have been noted in the "Comments" section.

Quality control sample results are reported in the same units as sample results.

IV. Comments

Gas Proportional Counting

Gross Alpha by method ITAS-RD-3214
Sample sizes were reduced for some of the samples in this batch due to high dissolved solids. The reduction in sample sizes was required to keep the planchet weight within the calibration range of the instrument and of the contract. The samples meet the RDL requirement at the reduced volume. The LCS, batch blank, sample and sample duplicate (B0H0Q4) results are within contractual requirements.

Gross Beta by method ITAS-RD-3214
The LCS, batch blank, sample and sample duplicate (B0H0Q4) results are within contractual requirements.

Strontium-89/90 (Total) by method RICHRC-5006
The LCS, batch blank, sample and sample duplicate (B0H0Q6) results are within contractual requirements.

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Environmental Services

Liquid Scintillation Counting

Carbon-14 by method RICHRC-5022
The LCS, batch blank, sample and sample duplicate (B0H0Q6) results are within contractual requirements.

Tritium by method RICHRC-5007
The LCS, batch blank, sample and sample duplicate (B0H0Q2) results are within contractual requirements.

I certify that this Certificate of Analysis is in compliance with the SOW, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hard copy data package has been authorized by the Laboratory Manager or a designee, as verified by the following signature.

Reviewed and approved:

Suzanne Gaines

Suzanne Gaines
Project Manager

Quanterra
Environmental Services

SAMPLE RESULTS

LAB NAME:	ITAS-RICHLAND	**SDG:**	W0967
LAB SAMPLE ID:	60403501	**MATRIX:**	WATER
CLIENT ID:	B0H0Q2	**DATE RECEIVED:**	4/2/96 9:40:00 AM

ISOTOPE	RESULT	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA	REPORT UNIT	YIELD	METHOD NUMBER
ALPHA	1.57E+00	1.0E+00	1.0E+00	1.35E+00	pCi/L	100.00%	RD3214
BETA	5.69E+00	2.0E+00	2.0E+00	3.45E+00	pCi/L	100.00%	RD3214
STRONTIUM	-7.14E-01	3.6E-01	3.8E-01	1.16E+00	pCi/L	73.20%	RICHRC5006
C-14	4.19E+00	1.6E+00	3.2E+00	3.49E+00	pCi/L	100.00%	RICHRC5022
TRITIUM	5.53E+03	3.4E+02	5.9E+02	3.11E+02	pCi/L	88.10%	RICHRC5007

Number of Results: 5

Quanterra
Environmental Services

SAMPLE RESULTS

LAB NAME:	ITAS-RICHLAND	**SDG:**	W0967
LAB SAMPLE ID:	60403502	**MATRIX:**	WATER
CLIENT ID:	B0H0Q4	**DATE RECEIVED:**	4/2/96 9:40:00 AM

ISOTOPE	RESULT	COUNTING ERROR (2 s)	TOTAL ERROR (2 s)	MDA	REPORT UNIT	YIELD	METHOD NUMBER
ALPHA	2.92E+00	1.2E+00	1.3E+00	1.34E+00	pCi/L	100.00%	RD3214
BETA	8.71E+00	2.2E+00	2.3E+00	3.50E+00	pCi/L	100.00%	RD3214
STRONTIUM	7.78E-01	4.5E-01	6.8E-01	9.71E-01	pCi/L	89.40%	RICHRC5006
C-14	2.07E+00	1.5E+00	3.1E+00	3.49E+00	pCi/L	100.00%	RICHRC5022
TRITIUM	5.23E+03	3.3E+02	5.7E+02	3.11E+02	pCi/L	88.10%	RICHRC5007

Number of Results: 5

Quanterra
Environmental Services

SAMPLE RESULTS

LAB NAME:	ITAS-RICHLAND	**SDG:**	W0967
LAB SAMPLE ID:	60403503	**MATRIX:**	WATER
CLIENT ID:	B0H0Q6	**DATE RECEIVED:**	4/2/96 9:40:00 AM

ISOTOPE	RESULT	COUNTING ERROR (2 s)	TOTAL ERROR (2 s)	MDA	REPORT UNIT	YIELD	METHOD NUMBER
ALPHA	4.61E+00	1.8E+00	1.9E+00	1.71E+00	pCi/L	100.00%	RD3214
BETA	9.40E+00	2.2E+00	2.4E+00	3.48E+00	pCi/L	100.00%	RD3214
STRONTIUM	1.95E-01	4.7E-01	5.6E-01	1.17E+00	pCi/L	65.00%	RICHRC5006
C-14	1.89E+01	1.8E+00	3.6E+00	3.49E+00	pCi/L	100.00%	RICHRC5022
TRITIUM	2.20E+04	6.5E+02	1.8E+03	3.11E+02	pCi/L	88.10%	RICHRC5007

Number of Results: 5

9613502.2255

Quanterra Data Review Checklist
RADIOCHEMISTRY

Work Order number (s):	604035
Client ID:	B4 I
Due Date:	5/31/96
Lab Sample Number or SDG:	W0967
Method Test Parameters:	α
Matrix:	Water

Review Item	Yes (✓)	No (✓)	N/A (✓)	2nd Level Review (✓)
A. Calibration 1. Is the calibration documentation included where applicable?			✓	✓
B. Sample Analysis 1. Are the sample yields within acceptance criteria?			✓	✓
2. Were all sample holding times met?	✓			✓
3. Is the sample Minimum Detectable Activity < the Contract Detection Limit?	✓			✓
C. QC Samples 1. Is the blank yield within acceptance criteria			✓	✓
2. Is the Minimum Detectable Activity for the blank result ≤ the Contract Detection Limit?	✓			✓
3. Is the blank result < 1/2 the Contract Detection Limit?	✓			✓
4. Is the blank > 1/2 the Contract Detection Limit but < Contract Detection Limit?			✓	✓
5. Is the blank result > the Contract Detection Limit but the sample result < the Contract Detection Limit?			✓	✓
6. Is the LCS result within acceptance criteria?	✓			✓
7. Is the LCS yield within acceptance criteria			✓	✓
8. Is the LCS Minimum Detectable Activity ≤ the Contract Detection Limit?	✓			✓
9. MS/MSD results and yield meet acceptance criteria?			✓	✓
10. Duplicate sample results and yield meet acceptance criteria?	✓			✓
D. Other 1. Are all Nonconformances included and noted?			✓	✓
2. Are all required forms filed out?	✓			✓
3. Correct methodology used?	✓			✓
4. Transcription checked? (E) 4/25/96	✓			TR
5. Were all calculations checked at a minimum frequency?	✓			✓
6. Units checked?	✓			✓

Comments on any "No' response: _____

First Level Review: Joel Benjamin Date: 5-15-96

Second Level Review: Suzy Haines Date: 5/31/96

Form #: LS-038,2 /96, Rev.4

9613502.2256

Quanterra Data Review Checklist
RADIOCHEMISTRY

Work Order number (s):	604035
Client ID:	B4I
Due Date:	5/31/96
Lab Sample Number or SDG:	W0967
Method Test Parameters:	B
Matrix:	Water

Review Item	Yes (✓)	No (✓)	N/A (✓)	2nd Level Review (✓)
A. Calibration 1. Is the calibration documentation included where applicable?			✓	✓
B. Sample Analysis 1. Are the sample yields within acceptance criteria?			✓	✓
2. Were all sample holding times met?	✓			✓
3. Is the sample Minimum Detectable Activity < the Contract Detection Limit?	✓			✓
C. QC Samples 1. Is the blank yield within acceptance criteria			✓	✓
2. Is the Minimum Detectable Activity for the blank result ≤ the Contract Detection Limit?	✓			✓
3. Is the blank result < 1/2 the Contract Detection Limit?	✓			✓
4. Is the blank > 1/2 the Contract Detection Linit but < Contract Detection Limit?			✓	✓
5. Is the blank result > the Contract Detection Limit but the sample result < the Contract Detection Limit?			✓	✓
6. Is the LCS result within acceptance criteria?	✓			✓
7. Is the LCS yield within acceptance criteria			✓	✓
8. Is the LCS Minimum Detectable Activity ≤ the Contract Detection Limit?	✓			✓
9. MS/MSD results and yield meet acceptance criteria?			✓	✓
10. Duplicate sample results and yield meet acceptance criteria?	✓			✓
D. Other 1. Are all Nonconformances included and noted?			✓	✓
2. Are all required forms filed out?	✓			✓
3. Correct methodology used?	✓			✓
4. Transcription checked? 4/25/96	✓			TTR
5. Were all calculations checked at a minimum frequency?	✓			✓
6. Units checked?	✓			✓

Comments on any "No' response: _____

First Level Review: [signature] Date: 5-15-96

Second Level Review: Suzy Davies Date: 5/31/96

Form #: LS-038,2 /96, Rev.4

9613502.2257

Quanterra Data Review Checklist
RADIOCHEMISTRY

Work Order number (s):	604035
Client ID:	BHI
Due Date:	5-31-96
Lab Sample Number or SDG:	10967 04-035
Method Test Parameters:	TOTAL-SR
Matrix:	water

Review Item	Yes (✓)	No (✓)	N/A (✓)	2nd Level Review (✓)
A. Calibration 1. Is the calibration documentation included where applicable?			X	✓
B. Sample Analysis 1. Are the sample yields within acceptance criteria?	X			✓
2. Were all sample holding times met?			X	✓
3. Is the sample Minimum Detectable Activity < the Contract Detection Limit?	X			✓
C. QC Samples 1. Is the blank yield within acceptance criteria	X			✓
2. Is the Minimum Detectable Activity for the blank result ≤ the Contract Detection Limit?	X			✓
3. Is the blank result < 1/2 the Contract Detection Limit?	X			✓
4. Is the blank > 1/2 the Contract Detection Limit but < Contract Detection Limit?			X	✓
5. Is the blank result > the Contract Detection Limit but the sample result < the Contract Detection Limit?			X	✓
6. Is the LCS result within acceptance criteria?	X			✓
7. Is the LCS yield within acceptance criteria	X			✓
8. Is the LCS Minimum Detectable Activity ≤ the Contract Detection Limit?	X			✓
9. MS/MSD results and yield meet acceptance criteria?			X	✓
10. Duplicate sample results and yield meet acceptance criteria?	X			✓
D. Other 1. Are all Nonconformances included and noted?			X	✓
2. Are all required forms filed out?	X			✓
3. Correct methodology used?	X			✓
4. Transcription checked? 4-25-96	✓			✓
5. Were all calculations checked at a minimum frequency?	X			✓
6. Units checked?	X			✓

Comments on any "No' response: _____

First Level Review: Thomas E. Ashland Date: 9/7/96

Second Level Review: Sey Jaiser Date: 5/31/96

Form #: LS-038,2 /96, Rev.4

9613502.2258

Quanterra Data Review Checklist
RADIOCHEMISTRY

Work Order number (s):	604035
Client ID:	BHI
Due Date:	5-31-96
Lab Sample Number or SDG:	W0967-04-035
Method Test Parameters:	C 14
Matrix:	Water

Review Item	Yes (✓)	No (✓)	N/A (✓)	2nd Level Review (✓)
A. Calibration 1. Is the calibration documentation included where applicable?			X	✓
B. Sample Analysis 1. Are the sample yields within acceptance criteria?			X	✓
2. Were all sample holding times met?		X		✓
3. Is the sample Minimum Detectable Activity < the Contract Detection Limit?		X		✓
C. QC Samples 1. Is the blank yield within acceptance criteria			X	✓
2. Is the Minimum Detectable Activity for the blank result ≤ the Contract Detection Limit?		X		✓
3. Is the blank result < 1/2 the Contract Detection Limit?		X		✓
4. Is the blank > 1/2 the Contract Detection Limit but < Contract Detection Limit?			X	✓
5. Is the blank result > the Contract Detection Limit but the sample result < the Contract Detection Limit?			X	✓
6. Is the LCS result within acceptance criteria?		X		✓
7. Is the LCS yield within acceptance criteria		X		✓
8. Is the LCS Minimum Detectable Activity ≤ the Contract Detection Limit?		X		✓
9. MS/MSD results and yield meet acceptance criteria?			X	✓
10. Duplicate sample results and yield meet acceptance criteria?		X		✓
D. Other 1. Are all Nonconformances included and noted?			X	✓
2. Are all required forms filed out?	X			✓
3. Correct methodology used?	X			✓
4. Transcription checked? M. [illegible] 4/24/96	✓			✓
5. Were all calculations checked at a minimum frequency?	X			✓
6. Units checked?	X			✓

Comments on any "No' response: _____

First Level Review: [signature] Date: 4/24/96

Second Level Review: [signature] Date: 5/31/96

Form #: LS-038,2 /96, Rev.4

9613502.2259

Quanterra Data Review Checklist
RADIOCHEMISTRY

Work Order number (s): 603388, 604035

Client ID: BNI

Due Date: 5-26-96

Lab Sample Number or SDG: W0959, W0967

Method Test Parameters: Tritium

Matrix: Water

Review Item	Yes (✓)	No (✓)	N/A (✓)	2nd Level Review (✓)
A. Calibration 1. Is the calibration documentation included where applicable?			X	✓
B. Sample Analysis 1. Are the sample yields within acceptance criteria?			X	✓
2. Were all sample holding times met?			X	✓
3. Is the sample Minimum Detectable Activity < the Contract Detection Limit?	X			✓
C. QC Samples 1. Is the blank yield within acceptance criteria			X	✓
2. Is the Minimum Detectable Activity for the blank result ≤ the Contract Detection Limit?	X			✓
3. Is the blank result < 1/2 the Contract Detection Limit?	X			✓
4. Is the blank > 1/2 the Contract Detection Limit but < Contract Detection Limit?			X	✓
5. Is the blank result > the Contract Detection Limit but the sample result < the Contract Detection Limit?			X	✓
6. Is the LCS result within acceptance criteria?	X			✓
7. Is the LCS yield within acceptance criteria	X			✓
8. Is the LCS Minimum Detectable Activity ≤ the Contract Detection Limit?	X			✓
9. MS/MSD results and yield meet acceptance criteria?			X	✓
10. Duplicate sample results and yield meet acceptance criteria?	X			✓
D. Other 1. Are all Nonconformances included and noted?			X	✓
2. Are all required forms filed out?	X			✓
3. Correct methodology used?	X			✓
4. Transcription checked? 4-29-96	X			✓
5. Were all calculations checked at a minimum frequency?	X			✓
6. Units checked?	X			✓

Comments on any "No' response:

First Level Review: [signature] Date: 5/13/96

Second Level Review: Sey James Date: 5/13/96

Form #: LS-038,2 /96, Rev.4

9613502.2260

CHAIN OF

CUSTODY FORMS

Bechtel Hanford, Inc.

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

Page 1 of 1

Data Turnaround
☐ Priority
■ Normal

Collector: M. Mehlhorn	Company Contact: Bob Raidl	Telephone: (509) 372-9641
Project Designation: 100-HR-3 Groundwater Sampling, Round 10, Phase 2	Sampling Location: 100 D	SAF No.: B96-048
Ice Chest No.: ER-210	Field Logbook No.: EL-1289	Method of Shipment: Hand Delivered
Shipped To: Quanterra	Offsite Property No.: NA	Bill of Lading/Air Bill No.: NA
Possible Sample Hazards/Remarks		

Preservation	HNO_3	Cool 4°C	H_2SO_4	*1	H_2SO_4	HNO_3	Cool 4°C	Cool 4°C		HNO_3
Type of Container	G	G	P/G	P	P/G	P/G	G	P/G		G
No. of Container(s)	1	1	1	3	1	4	3	1		1
Volume	500mL	500mL	500mL	500mL	500mL	1L	1L	20mL		500mL
SAMPLE ANALYSIS 60403401 SDL W0967	ICP Metals (Unfiltered)	Anions (IC) - Cl, SO_4, NO_2, NO_3, PO_4	NO_2 - NO_3	Sulfide	Ammonia	Gross Alpha, Gross Beta, Sr-90 60403501	Tritium, C-14	Activity Scan		ICP Metals (Filtered)

Special Handling and/or Storage
Maintain samples between 2°C and 6°C.

Sample No.	Matrix*	Date Sampled	Time Sampled										
B0H0Q2	W	4-1-96	1125	X	X	X	X	X	X	X	X		
~~B0H0Q3~~ NA 3/27/96	W												

CHAIN OF POSSESSION	Sign/Print Names		
Relinquished By	Date/Time	Received By	Date/Time
M. Mehlhorn	4-1-96 1525	K. Jropp / K. Tropp	4/1/96 1525
K. Jropp / K. Tropp	4/2/96 0940	Quanterra	0940 4-2-96
		Karen Ostenberg	
Relinquished By	Date/Time	Received By	Date/Time
Relinquished By	Date/Time	Received By	Date/Time

SPECIAL INSTRUCTIONS
*1 ZnAc + NaOH

Sample analysis for phosphate, nitrate, and nitrite by EPA 300.0 is being requested for information only. The ERC Contractor acknowledges that the 48-hour holding time will not be met.

The Activity Scan is for all samples listed on this chain of custody.

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

9613502.2261

000021

Bechtel Hanford, Inc.

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

Page 1 of 1

Data Turnaround
☐ Priority
■ Normal

Collector: M. Mehlhorn	Company Contact: Bob Reidl	Telephone: (509) 372-9641
Project Designation: 100-HR-3 Groundwater Sampling, Round 10, Phase 2	Sampling Location: 100 D	SAF No.: B96-048
Ice Chest No.: ER-17	Field Logbook No.: EL-1289	Method of Shipment: Hand Delivered
Shipped To: Quanterra	Offsite Property No.: NA	Bill of Lading/Air Bill No.: NA
Possible Sample Hazards/Remarks		

Special Handling and/or Storage: Maintain samples between 2°C and 6°C.

SAMPLE ANALYSIS: 60403402 SDG W0967

Preservation	HNO_3	Cool 4°C	H_2SO_4	*1	H_2SO_4	HNO_3	Cool 4°C	Cool 4°C		HNO_3
Type of Conteiner	G	G	P/G	P	P/G	P/G	G	P/G		G
No. of Container(s)	1	1	1	3	1	4	3	1		1
Volume	500mL	500mL	500mL	500mL	500mL	1L	1L	20mL		500mL
	ICP Metals (Unfiltered)	Anions (IC) - Cl, SO_4, NO_2, NO_3, PO_4	NO_2 - NO_3	Sulfide	Ammonia	Gross Alpha, Gross Beta, Sr-90 60403502	Tritium, C-14	Activity Scan		ICP Metals (Filtered)

Sample No.	Matrix*	Date Sampled	Time Sampled										
B0H0Q4	W	4-1-96	1210	X	X	X	X	X	X	X	X		
~~B0H0Q5~~ 3/28/96 OK [illegible]	W												

CHAIN OF POSSESSION	Sign/Print Names		
Relinquished By: M. Mehlhorn	Date/Time: 4-1-96 1530	Received By: K. J. Mapp / K. Trapp	Date/Time: 1530 4/1/96
Relinquished By: K. J. Mapp / K. Trapp	Date/Time: 4/2/96 0940	Received By: Karen Ostrowski	Date/Time: 0940 4-2-96
Relinquished By	Date/Time	Received By	Date/Time
Relinquished By	Date/Time	Received By	Date/Time

SPECIAL INSTRUCTIONS
*1 ZnAc + NaOH

Sample analysis for phosphate, nitrate, and nitrite by EPA 300.0 is being requested for information only. The ERC Contractor acknowledges that the 48-hour holding time will not be met.

The Activity Scan is for all samples listed on this chain of custody.

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

9613502.2262

00022

Bechtel Hanford, Inc.

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

Page 1 of 1

Data Turnaround
☐ Priority
■ Normal

Collector: M. Mehlhorn	Company Contact: Bob Raidl	Telephone: (509) 372-9641
Project Designation: 100-HR-3 Groundwater Sampling, Round 10, Phase 2	Sampling Location: 100 D	SAF No.: B96-048
Ice Chest No.: ER-210	Field Logbook No.: EL-1289	Method of Shipment: Hand Delivered
Shipped To: Quanterra	Offsite Property No.: NA	Bill of Lading/Air Bill No.: NA
Possible Sample Hazards/Remarks		
Special Handling and/or Storage: Maintain samples between 2°C and 6°C.		

SAMPLE ANALYSIS: 60403403 SDL W0967

Preservation	HNO_3	Cool 4°C	H_2SO_4	*1	H_2SO_4	HNO_3	Cool 4°C	Cool 4°C		HNO_3
Type of Container	G	G	P/G	P	P/G	P/G	G	P/G		G
No. of Container(s)	1	1	1	3	1	4	3	1		1
Volume	500mL	500mL	500mL	500mL	500mL	1L	1L	20mL		500mL
SAMPLE ANALYSIS	ICP Metals (Unfiltered)	Anions (IC) - Cl, SO_4, NO_2, NO_3, PO_4	NO_2 - NO_3	Sulfide	Ammonia	Gross Alpha, Gross Beta, Sr-90 60403503	Tritium, C-14	Activity Scan		ICP Metals (Filtered)

Sample No.	Matrix*	Date Sampled	Time Sampled	ICP Metals (Unfiltered)	Anions (IC)	NO_2 - NO_3	Sulfide	Ammonia	Gross Alpha, Gross Beta, Sr-90	Tritium, C-14	Activity Scan		ICP Metals (Filtered)
B0H0Q6	W	4-1-96	1250	X	X	X	X	X	X	X	X		
~~B0H0Q7~~ 3/26/96	W												

CHAIN OF POSSESSION	Sign/Print Names	Date/Time
Relinquished By	M. Mehlhorn	4-1-96 1530
Received By	K. Trapp	1530 4/1/96
Relinquished By	K. Trapp	0940 4/2/96
Received By	Karen Ashtenley	0940 4-2-96
Relinquished By		
Received By		Less than 10°C
Relinquished By		
Received By		

SPECIAL INSTRUCTIONS
*1 ZnAc + NaOH

Sample analysis for phosphate, nitrate, and nitrite by EPA 300.0 is being requested for information only. The ERC Contractor acknowledges that the 48-hour holding time will not be met.

The Activity Scan is for all samples listed on this chain of custody.

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

9613512.2263

00023

Environmental Restoration Contractor **ERC Team**

Interoffice Memorandum

Job No. 22192
Written Response Required: NO
CCN: N/A
OU: N/A
TSD: N/A
ERA: N/A
Subject Code: 5830

TO:	W. S. Thompson	N1-28	DATE:	February 29, 1996
	G. C. Henckel	H4-80		
COPIES:	K. A. Smith	X0-23	FROM:	S. K. De Mers
	T. L. Lafreniere	X0-23		Radiological Controls
	D. E. Gergely	X0-23		T7-05/373-1913

SUBJECT: **Total Activities for Off-Site Shipments of Groundwater Samples to NRC Licensed Laboratories**

There is no need to perform total activities prior to offsite shipment to NRC licensed labs of samples taken from ground water wells located on the Hanford Site.

All wells reviewed to date for radiological content have shown no well with a total activity in excess of 2,000,000 pCi/l (2,000 pCi/gm), the Department Of Transportation limit for radioactive material. The highest activity in any known well is 1.56×10^6 pCi/l H^3.

While this does not constitute any release from radiological controls for worker protection, it does allow samples to be shipped based on historical laboratory data and save the expense of doing radiochemical analysis.

A copy of the most recent analytical data should be provided to the NRC licensed laboratory with the samples being shipped or if no data is available for new wells, the most recent data from adjacent wells.

SDL W0967

9613502.2265

Figure 1

SAMPLE CHECK-IN LIST

(1 Per Shipping Container)

Date/Time Received 4/2/96 0940 Client Name BHI

Project/Client # B96-048 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 [X] Dry [ ] _____
6. Each sample is in a plastic bag? Yes [X] No [ ] _____
7. Number of sample containers in cooler: 15
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 Ackerlund Date/Time ~~3~~ 4/2/96 0940 KA 4-2-96

00025

SDL W0967

9613502.2266

Figure 1

SAMPLE CHECK-IN LIST

(1 Per Shipping Container)

Date/Time Received 4-2-96 0940 Client Name BHI

Project/Client # B96-048 Batch or Case # _____

Cooler ID (if noted on outside of cooler) ER-210

1. Condition of shipping container? O.K.
2. Custody Seals on cooler intact? Yes [X] No [ ]
3. Custody Seals dated and signed? Yes [X] No [ ]
4. Chain of Custody record is taped on inside of cooler lid? Yes [ ] No [X]
5. Vermiculite/packing material is: Wet [X] Dry [ ] _____
6. Each sample is in a plastic bag? Yes [X] No [ ] _____
7. Number of sample containers in cooler: 30
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 Stettenberg Date/Time 4-2-96 0940

SDG W0967

604034 - RChem
604035 - Rad
DH 4/3/96

Client Sample Screening Results

02-Apr-96

B 4/2/96

CLIENT CODE ID	MATRIX	RECEIVED	DETECTOR	ACQ DATE	SAMPLE	MINUTES	CNTS A	NET CPM A	CNTS B	NET CPM B
WHC B0H0Q2		4/2/96 10:00:00 AM	QUAD21B	4/2/96 1:45:00 PM	B0H0Q2	30	11	0.31166667	74	1.5179167
01	LIQUID		Bkg:	4/2/96 4:33:53 AM	BKG	800	44	0.055	759	0.94875

Anl Date: 4/2/96	Tot Sa, Alq: 5.00E+00	, 1.00E+01	Alp;	(Dpm/ 9.69E-01	(uCi/ 2.18E-04	(pCi/ 4.37E+01	± 2.5E+01	CAT I	5.7E-01	Lab Alq
Ppt mg: 3.7	Units: L	, ml	Bet;	Alq): 2.77E+00	Sa): 6.24E-04	L|g): 1.25E+02	± 2.5E+01		4.0E-01	L|g

CLIENT CODE ID	MATRIX	RECEIVED	DETECTOR	ACQ DATE	SAMPLE	MINUTES	CNTS A	NET CPM A	CNTS B	NET CPM B
WHC B0H0Q4		4/2/96 10:00:00 AM	QUAD21C	4/2/96 1:45:00 PM	B0H0Q4	30	23	0.71791667	94	2.1870833
02	LIQUID		Bkg:	4/2/96 4:33:53 AM	BKG	800	39	0.04875	757	0.94625

Anl Date: 4/2/96	Tot Sa, Alq: 5.00E+00	, 1.00E+01	Alp;	(Dpm/ 2.10E+00	(uCi/ 4.74E-04	(pCi/ 9.48E+01	± 2.7E+01	CAT I	2.6E-01	Lab Alq
Ppt mg: 2.7	Units: L	, ml	Bet;	Alq): 3.90E+00	Sa): 8.79E-04	L|g): 1.76E+02	± 2.8E+01		2.8E-01	L|g

CLIENT CODE ID	MATRIX	RECEIVED	DETECTOR	ACQ DATE	SAMPLE	MINUTES	CNTS A	NET CPM A	CNTS B	NET CPM B
WHC B0H0Q6		4/2/96 10:00:00 AM	QUAD21D	4/2/96 1:45:00 PM	B0H0Q6	30	19	0.57958333	107	2.5116667
03	LIQUID		Bkg:	4/2/96 4:33:53 AM	BKG	800	43	0.05375	844	1.055

Anl Date: 4/2/96	Tot Sa, Alq: 5.00E+00	, 1.00E+01	Alp;	(Dpm/ 1.82E+00	(uCi/ 4.10E-04	(pCi/ 8.20E+01	± 2.9E+01	CAT I	3.0E-01	Lab Alq
Ppt mg: 5.2	Units: L	, ml	Bet;	Alq): 4.65E+00	Sa): 1.05E-03	L|g): 2.10E+02	± 3.0E+01		2.4E-01	L|g

96135022267

00027

*** ALPHA ***

96135P2-2260

CHAIN-OF-CUSTODY BATCH ANALYSIS RECORD

2-Apr-1996
Page 1

CUSTOMER: BHI SAF

MATRIX : WATER B96-048

SAMPLE DELIVERY GROUP W0967

BATCH NUMBER D4-035

	ITAS ID	DUP	ACCOUNT	CUSTOMER ID	COMMENTS
	P0403518				
	P0403515	EQEG 1135			
1)	60403501		BHI	BOHOQ2	REDUCED ALIQUOT: HIGH DISSOLVED SOLIDS pH <2
2)	60403502		BHI	BOHOQ4	<2
	C0403502	DUP			
3)	60403503		BHI	BOHOQ6	REDUCED ALIQUOT: HIGH DISSOLVED SOLIDS <2

ACTIONS (Initial & Date)

1) INITIATED RD2800 JH 4/2/96 RD 3214

2) PREP LAB RECEIVED 4-19-96 ✓

3) SAMPLE REMAINDER STORED 4-24-96 ✓

4) SEPARATION LAB RECEIVED n/a

5) COUNTING/MEASUREMENT LAB OD 4/24/96 RICHRD0003Re

6) DATA REVIEWED AND ANALYTICAL PREP STORED JK 5-15-96 RICHRC0002 Rev 1

*** BETA ***

9613502.3269

CHAIN OF CUSTODY BATCH ANALYSIS RECORD

2-Apr-1996
Page 1

CUSTOMER: BHI SAF

SAMPLE DELIVERY GROUP W0967

MATRIX : WATER B96-048

BATCH NUMBER 04-035

	ITAS ID	DUP	ACCOUNT	CUSTOMER ID	COMMENTS
	P04035 1B				
	P04035 1S	EQAH 2935			
1)	60403501		BHI	BOHOQ2	pH <2
2)	60403502		BHI	BOHOQ4	<2
	C0403502	Dup			
3)	60403503		BHI	BOHOQ6	<2

ACTIONS (Initial & Date)

1) INITIATED RD2800 JH 4/2/96 RD3214

2) PREP LAB RECEIVED 4-19-96 S

3) SAMPLE REMAINDER STORED 4-24-96 S

4) SEPARATION LAB RECEIVED n/a

5) COUNTING/MEASUREMENT LAB OAD 4/24/96 OAD RD4607 Rev 1

6) DATA REVIEWED AND ANALYTICAL PREP STORED JK 5-15-96 RICHRC0002 Rev

*** TOTAL-SR ***

9613502.2270

CHAIN-OF-CUSTODY BATCH ANALYSIS RECORD

2-Apr-1996
Page 1

CUSTOMER: BHI SAF

SAMPLE DELIVERY GROUP W0967

MATRIX : WATER B96-048

BATCH NUMBER D4-035

	ITAS ID	DUP	ACCOUNT	CUSTOMER ID	COMMENTS
	P040351B				ESF11649
	P040351S		EQL 1441	30.121 ± 4.2486E-01	EQL 1441
1)	60403501		BHI	BOHOQ2	ESF11650 PR 2/1/96 EX 2/1/97
2)	60403502		BHI	BOHOQ4	ESF11651 PR 2/1/96 EX 2/1/97
3)	60403503		BHI	BOHOQ6	ESF11652 PR 2/1/96 EX 2/1/97
	C0403503				ESF11653 PR.2/1/96 EX.2/1/97

ACTIONS (Initial & Date)

1) INITIATED RD2800 JH 4/2/96

2) PREP LAB RECEIVED 4-17-96 pm

3) SAMPLE REMAINDER STORED N/A

4) SEPARATION LAB RECEIVED 4-22-96 pm
RICHRC5006

5) COUNTING/MEASUREMENT LAB SK 4-23-96
RD4607

6) DATA REVIEWED AND ANALYTICAL PREP STORED SK 5/7/96
RICHRC0002
Rev1

9613502.2271

CHAIN-OF-CUSTODY BATCH ANALYSIS RECORD

2-Apr-1996
Page 1

CUSTOMER: BHI SAF

SAMPLE DELIVERY GROUP W0967

MATRIX : WATER B96-048

BATCH NUMBER D4-035

	ITAS ID	DUP	ACCOUNT	CUSTOMER ID	COMMENTS
	P040351N-2N-TX				
	P040351S				
1)	60403501		BHI	BOHOQ2	
2)	60403502		BHI	BOHOQ4	
3)	60403503		BHI	BOHOQ6	
	C0403503				

ACTIONS (Initial & Date)

1) INITIATED RD2800 JH 4/2/96

2) PREP LAB RECEIVED 4-17-96 DM

3) SAMPLE REMAINDER STORED

4) SEPARATION LAB RECEIVED

RKHRC5022

5) COUNTING/MEASUREMENT LAB DD 4/22/96
RD4600 Rev'

6) DATA REVIEWED AND ANALYTICAL PREP STORED 4/24/96
RKHRC0002

9615902222

CHAIN-OF-CUSTODY BATCH ANALYSIS RECORD

2-Apr-1996
Page 1

CUSTOMER: BHI SAF

SAMPLE DELIVERY GROUP W0967

MATRIX : WATER B96-048

BATCH NUMBER D4-035

	ITAS ID	DUP	ACCOUNT	CUSTOMER ID	COMMENTS
1)	60403501 C0403501 dup		BHI	BOHOQ2	
2)	60403502		BHI	BOHOQ4	
3)	60403503 P040351 X P040351 m P040351 2		BHI	BOHOQ6	60.163 ± 0.5646 # 3549

ACTIONS (Initial & Date)

1) INITIATED RD2800 JH 4/2/96
RICHRC 5007

2) PREP LAB RECEIVED BAB 4/24/96

3) SAMPLE REMAINDER STORED NA

4) SEPARATION LAB RECEIVED ↓

5) COUNTING/MEASUREMENT LAB OD 4/24/96
RD4600 Rev 1

6) DATA REVIEWED AND ANALYTICAL PREP STORED _____