W02607-42
R

Quanterra

0050817

Analytical Data Package Prepared For

Bechtel Hanford

FEB 1999
RECEIVED
Data
Log In

Analysis By

Quanterra Analytical Services

Richland Laboratory

Report Nbr: 7056

SDG No.	SAF No.	CLIENT ID No.	QUANTERRA ID No.
W02607	C99-008	B0T042	81124301

0001

Comments:

Quanterra

CERTIFICATE OF ANALYSIS

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

February 16, 1999

Attention: Joan Kessner

FEB 1999
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Data
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SAF Number	:	C99-008
Date SDG Closed	:	November 16, 1998
Number of Samples	:	One (1)
Sample Type	:	Water
SDG Number	:	W02607
Data Deliverable	:	45-Day Summary

I. Introduction

On November 16, 1998, one water sample was received by the Quanterra Environmental Services Richland Laboratory (QTESRL) for radiochemical analysis. Upon receipt, the sample was assigned the following laboratory ID number to correspond with the Bechtel Hanford (BHI) specific ID:

QTESRL ID#	BHI ID#	MATRIX	DATE OF RECEIPT
81124301	B0T042	Water	11-16-98

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:

Gas Proportional Counting
Total Strontium by method RICH-RC-5071
Liquid Scintillation Counting
Tritium by method RICH-RC-5037
Technetium by method RICH-RC-5078

Laser Phosohorimetry Counting
Uranium by method RICH-RC-5058

III. Quality Control

The analytical results for each analysis performed under SDG W02607 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

Total Strontium by method RICH-RC-5071
The LCS, batch blank, sample and sample duplicate (B0T042) results are within contractual requirements.

Liquid Scintillation Counting

Tritium by method RICH-RC-5037
The LCS, batch blank, sample and sample duplicates (B0T042) results are within contractual requirements.

Technetium by method RICH-RC-5078
The LCS, batch blank, sample and sample duplicates (B0T042) results are within contractual requirements.

Laser Phosohorimetry Counting
Uranium by method RICH-RC-5058
The Sample and it's QC was reanalyzed due failure of the matrix spike and the LCS the reanalysis results were within contractual ranges and are reported. The LCS, batch blank, sample and sample duplicates (B0T042) 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:

Doug Swenson
Project Manager

Quanterra

SAMPLE RESULTS

LAB NAME:	**QUANTERRA, Richland**	**SDG: /RPT GRP:**	W02607 / 7056
LAB SAMPLE ID:	81124301	**MATRIX:**	WATER
CLIENT ID:	B0T042	**DATE RECEIVED:**	11/16/98 2:10:00 PM

ANALYTE	RESULT	Q	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA/IDL	REPORT UNIT	YIELD	METHOD NUMBER
SR-90	3.62E-02	U	2.2E-01	2.2E-01	4.82E-01	pCi/L	87.00%	RICHRC5071
TC-99	9.02E+01		7.0E+00	2.3E+01	1.18E+01	pCi/L	95.10%	RICHRC5078
TRITIUM	2.79E+03		2.6E+02	3.9E+02	3.06E+02	pCi/L	88.10%	RICHRC5007
TOTAL-URANIUM	1.11E+01		N/A	2.5E+00	7.29E-02	ug/L	N/A	RICHRC5058

Number of Results: 4

Result = IDL When Not Detected

(Q)ualifiers: U = Analyte result < MDA/IDL,
J = No U qualifier and result <

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DUPLICATE RESULTS

LAB NAME:	**QUANTERRA, Richland**	**SDG: /RPT GRP:**	W02607 / 7056
LAB SAMPLE ID:	D1124301	**MATRIX:**	WATER
CLIENT ID:	B0T042	**DATE RECEIVED:**	11/16/98 2:10:00 P
ORIG LAB SAMPLE ID:	81124301		

ANALYTE	DUP RESULT	Q	COUNTING ERROR (2 s)	TOTAL ERROR (2 s)	MDA/ IDL	REPORT UNIT	YIELD	METHOD NUMBER	ORIG RESULT	RPD
SR-90	1.23E-01	U	2.9E-01	2.9E-01	6.25E-01	pCi/L	67.80%	RICHRC5071	3.62E-02	108.98%
TC-99	8.61E+01		6.9E+00	2.3E+01	1.18E+01	pCi/L	95.10%	RICHRC5078	9.02E+01	4.69%
TRITIUM	2.88E+03		2.6E+02	4.0E+02	3.06E+02	pCi/L	88.10%	RICHRC5007	2.79E+03	2.89%
TOTAL-URANIUM	1.13E+01		N/A	2.5E+00	1.62E-03	ug/L	N/A	RICHRC5058	1.11E+01	1.94%

Number of Results: 4

Result = IDL When Not Detecte

(Q)ualifiers: U = Analyte result < MDA/IDL,
J = No U qualifier and result < RDL.

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BLANK RESULTS

LAB NAME: QUANTERRA, Richland **SDG /RPT GRP:** W02607 / 7056

LAB SAMPLE ID: J112431B **MATRIX:** WATER

ANALYTE	RESULT	Q	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA/IDL	REPORT UNIT	YIELD	METHOD NUMBER
SR-90	7.33E-02	U	2.2E-01	2.2E-01	4.89E-01	pCi/L	81.80%	RICHRC5071
TC-99	1.29E+00	U	5.0E+00	1.6E+01	1.18E+01	pCi/L	95.10%	RICHRC5078

Number of Results: 2

Result = IDL When Not Detected

(Q)ualifiers: U = Analyte result < MDA/IDL,
J = No U qualifier and result < RDL

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rptChemRadBlank; v3.41

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BLANK RESULTS

LAB NAME: QUANTERRA, Richland **SDG /RPT GRP:** W02607 / 7056

LAB SAMPLE ID: J112431X **MATRIX:** WATER

ANALYTE	RESULT	Q	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA/IDL	REPORT UNIT	YIELD	METHOD NUMBER
TRITIUM	2.42E+01	U	1.3E+02	2.0E+02	3.06E+02	pCi/L	88.10%	RICHRC5007

Number of Results: 1

Result = IDL When Not Detected

(Q)ualifiers: U = Analyte result < MDA/IDL,
J = No U qualifier and result < RDL

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rptChemRadBlank; v3.41

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BLANK RESULTS

LAB NAME: QUANTERRA, Richland **SDG /RPT GRP:** W02607 / 7056

LAB SAMPLE ID: J112432B **MATRIX:** WATER

ANALYTE	RESULT	Q	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA/IDL	REPORT UNIT	YIELD	METHOD NUMBER
TOTAL-URANIUM	2.49E-03	J	N/A	7.0E-04	1.62E-03	ug/L	N/A	RICHRC5058

Number of Results: 1

Result = IDL When Not Detected

(Q)ualifiers: U = Analyte result < MDA/IDL,
J = No U qualifier and result < RDL

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LABORATORY CONTROL SAMPLE

LAB NAME:	**QUANTERRA, Richland**	**SDG: /RPT GRP:**	W02607 / 7056
LAB SAMPLE ID:	J112431M	**MATRIX:**	WATER

ANALYTE	RESULT	Q	COUNTING ERROR (2 s)	TOTAL ERROR (2 s)	MDA/ IDL	REPORT UNIT	YIELD	EXPECTED	RECOVERY
TRITIUM	2.82E+03		2.6E+02	3.9E+02	3.06E+02	pCi/L	88.10%	2.74E+03	102.99%

Number of Results: 1

Result = IDL When Not Detecte

(Q)ualifiers: U = Analyte result < MDA/IDL,
J = No U qualifier and result < RDL.

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LABORATORY CONTROL SAMPLE

LAB NAME:	**QUANTERRA, Richland**	**SDG: /RPT GRP:**	W02607 / 7056
LAB SAMPLE ID:	J112431S	**MATRIX:**	WATER

ANALYTE	RESULT	Q	COUNTING ERROR (2 s)	TOTAL ERROR (2 s)	MDA/ IDL	REPORT UNIT	YIELD	EXPECTED	RECOVERY
SR-90	1.37E+01		1.1E+00	2.7E+00	4.78E-01	pCi/L	86.80%	1.38E+01	99.52%
TC-99	4.64E+02		1.2E+01	6.2E+01	1.18E+01	pCi/L	95.10%	5.42E+02	85.61%
TRITIUM	2.88E+03		2.7E+02	4.0E+02	3.06E+02	pCi/L	88.10%	2.74E+03	105.09%

Number of Results: 3

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LABORATORY CONTROL SAMPLE

LAB NAME:	**QUANTERRA, Richland**	**SDG: /RPT GRP:**	W02607 / 7056
LAB SAMPLE ID:	J112432S	**MATRIX:**	WATER

ANALYTE	RESULT	Q	COUNTING ERROR (2 s)	TOTAL ERROR (2 s)	MDA/ IDL	REPORT UNIT	YIELD	EXPECTED	RECOVERY
TOTAL-URANIUM	8.78E-01		N/A	1.2E-01	1.62E-03	ug/L	N/A	9.17E-01	95.67%

Number of Results: 1

Result = IDL When Not Detecte

(Q)ualifiers: U = Analyte result < MDA/IDL,
J = No U qualifier and result < RDL.

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rptChemRadLcs; v3.41

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MATRIX SPIKE RESULTS

LAB NAME: QUANTERRA, Richland **SDG: /RPT GRP:** W02607 / 7056

LAB SAMPLE ID: W1124301 **MATRIX:** WATER

ANALYTE	SPIKE RESULT*	Q	COUNTING ERROR (2 s)	TOTAL ERROR (2 s)	MDA/IDL	REPORT UNIT	SAMPLE RESULT	EXPECTED	RECOVERY
TC-99	3.30E+03		3.0E+01	3.7E+02	1.18E+01	pCi/L	9.02E+01	3.61E+03	91.22%
TOTAL-URANIUM	2.94E+01		N/A	9.4E+00	7.29E-02	ug/L	1.11E+01	3.02E+01	97.42%

Number of Results: 2

*Spike Result Corrected For Sample Result

Result = IDL When Not Detecte

(Q)ualifiers: U = Analyte result < MDA/IDL,
J = No U qualifier and result < RDL.

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rptChemRadMatrixSpike; v3.41

Quanterra Data Review Checklist
RADIOCHEMISTRY

Work Order number(s): 811243

Client ID: BHI

Due Date: 1-14-99

Lab Sample Number or SDG: W02607

Method Test Parameters: Sr-90

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 filled out?	X			
3. Correct methodology used?	X			
4. Transcription checked? zm 1-14-99	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: 1/14/98

Second Level Review: [signature] Date: 2/16/98

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

Quanterra Data Review Checklist
RADIOCHEMISTRY

Work Order number(s): 811243

Client ID: BNT

Due Date: 1/14/99

Lab Sample Number or SDG: LN02607

Method Test Parameters: TC-99

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		X SBC 1/19/99	
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 filled out?	X			
3. Correct methodology used?	X			
4. Transcription checked? SCK 1/19/99	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: 1/19/99

Second Level Review: [signature] Date: 2/16/99

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

Quanterra Data Review Checklist
RADIOCHEMISTRY

Work Order number(s): 811243

Client ID: BHI

Due Date: 1-14-99

Lab Sample Number or SDG: WQ2607

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 filled out?	X			
3. Correct methodology used?	X			
4. Transcription checked? JM 1-21-99	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: 1/21/99

Second Level Review: [signature] Date: 2/16/99

Form #: LS-033.2/96, Rev.4

Quanterra Data Review Checklist
RADIOCHEMISTRY

Work Order number(s):	811243
Client ID:	BHI
Due Date:	1-14-99
Lab Sample Number or SDG:	W83607
Method Test Parameters:	Uranium
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?	✓			
5. Were all calculations checked at a minimum frequency?	✓			
6. Units checked?	✓			

Comments on any "No" response: NCM on reanalysis cause [illegible] PK 2-1-99

First Level Review: Pam Kentlyn Date: 2-16-99

Second Level Review: [illegible] Date: 2/16/99

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

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QUANTERRA LABORATORY NONCONFORMANCE MEMO (NCM)

LOG #: RD-99-_____

Project ID: BHI

NCM Initiated by: PKenitzer 1-29-99

Sample Numbers: 811243

Tests: uranium

Matrix: water W02607

Analytical Area (check appropriate area):

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

Nonconformance (check appropriate area):

Holding Time Violations (exceeded by _____ days)

Category I: Laboratory Independent

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

Category II: Laboratory Dependent

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

Category III: Analysis Reruns (QA/QC)

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

Category IV: Analysis Reruns (Confirmation)

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

Quality Assurance/Quality Control

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

Incorrect or Incomplete Client Deliverable

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

Reported detection limits elevated due to:

- ☐ 24. Sample matrix
- ☐ 25. Insufficient sample volume
- ☐ 26. Other (complete description required)

☐ 27. ***Other (specify):*** _____

Comments/Explanation: matrix spike out, LCS out

Notification (check appropriate area):

Client notified by (name and date): _____

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

Client's name and response: _____

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

Project Manager (signature and date): [signature] 2/16/99

A017A

QUANTERRA LABORATORY NONCONFORMANCE MEMO (NCM)

LOG#: RD-99-_____

Corrective Action

Root Cause Initial and date: JW 2/23/99

Unknown

Corrective Action Initial and Date: PK 1-31-99

reanalysis - good data accepted

Responsibility for performing CA assigned to: _____

Actions to prevent recurrence Initial and Date: _____

N/A

First Level Supervisor: Pam Kenyon Date: 1-31-99

Responsible Manager: Jacqueline Waddell Date: 2/23/99

Quality Assurance Review

☐ Anomaly ☐ Deficiency ☒ Rerun

☐ Further action required: _____

Assigned to: _____

QA signature: Jodie Co Date: 2/23/99

Corrective Action Verification

☐ Verified

☐ Cannot Verify (specify reason): N/A

Nonconformance Memo Closure

QA signature/date: Jodie Co 2/23/99

00178

CHAIN OF

CUSTODY FORMS

PNNL

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

C.O.C. # C99-008-55

Page 1 of 1

Collector: RR FOX (RFS)	Contact/Requester: JH KESSNER	Telephone No.: (509) 372-9538 MSIN FAX
AF No.: C99-008	Sampling Origin: HANFORD SITE	Purchase Order/Charge Code
Project Title: 100-HR3-IAM (1) GW SAMPLING, NOVEMBER 1998	Logbook No.: WM 5022 · 14 18	Ice Chest No.: FR 40 Temp.: 4 °C
Shipped To (Lab): Quanterra Incorporated	Method of Shipment: GOVT. VEHICLE	Bill of Lading/Air Bill No.: N/A
Protocol: CERCLA	Data Turnaround: 45 Days	Offsite Property No.

POSSIBLE SAMPLE HAZARDS/REMARKS

811243201

SDG W026D7

SPECIAL INSTRUCTIONS Hold Time Total Activity Exemption: Yes ☒ No ☐

SUBMIT INVOICES & DELIVERABLES TO JH KESSNER, BHI

FAX COPIES OF TMA & QES LOG-INS TO DL STEWART (372-1704) & JM DUNCAN (372-9052)

Sample No.	Lab ID	*	Date	Time	No/Type Container	Sample Analysis	Preservative
30T042		W	11-16-98	1102	1x20-mL P	Activity Scan	None
30T042		W	↓	↓	3x1000-mL G/P	Strontium-89,90 -- Sr-90	HNO3 to pH <2
30T042		W	↓	↓	3x1000-mL G/P	Technetium-99	HCl to pH <2
30T042		W	↓	↓	1x1000-mL P	Tritium - H3	None
30T042		W	↓	↓	1x500-mL G/P	Total Uranium	HNO3 to pH <2

Relinquished By	Print	Sign	Date/Time	Received By	Print	Sign	Date/Time
RR FOX (RFS)		NOV 16 1998	1410		Hiddlberg	NOV 16 1998	1410
Relinquished By			Date/Time	Received By			Date/Time
Relinquished By			Date/Time	Received By			Date/Time
Relinquished By			Date/Time	Received By			Date/Time

Matrix *

S = Soil		DS = Drum Solid	
SE = Sediment		DL = Drum Liqui	
SO = Solid		T = Tissue	
SL = Sludge		WI = Wine	
W = Water		L = Liquid	
O = Oil		V = Vegetation	
A = Air		X = Other	

FINAL SAMPLE DISPOSITION: Disposal Method (e.g., Return to customer, per lab procedure, used in process) Disposed By Date/Time

Figure 1

SAMPLE CHECK-IN LIST

Date/Time Received: 11/16 1410 SG#: W02607

Work Order Number: 811242 SAF #: C99-009 C99-008 S99-011

Shipping Container ID: ER 40 Chain of Custody # C99-009-77 +54 +61 S99-011-18 +24

1. Custody Seals on shipping container intact? Yes [✓] No [ ]
2. Custody Seals dated and signed? Yes [✓] No [ ]
3. Chain-of-Custody record present? Yes [✓] No [ ]
4. Cooler temperature na
5. Vermiculite/packing materials is Wet [ ] Dry na
6. Number of samples in shipping container: 24
7. Sample holding times exceeded? Yes [ ] No [✓]

8. Samples have:
   - ✓ tape
   - ✓ custody seals
   - ____ hazard labels
   - ____ appropriate sample labels

9. Samples are:
   - ✓ in good condition
   - ____ broken
   - ____ leaking
   - ____ have air bubbles

10. Where any anomalies identified in sample receipt? Yes [ ] No [✓]

11. Description of anomalies (include sample numbers): _____

Sample Custodian/Laboratory D. Heidelberg Date: 11-16-98

Telephoned To: _____ On _____ By _____

811243 Rad.

Client Sample Screening Results

17-Nov-98

11/17/98

CLIENT CODE ID	MATRIX	RECEIVED	DETECTOR	ACQ DATE	SAMPLE	MINUTES	CNTS A	NET CPM A	CNTS B	NET CPM B
BHI B0M4H6		11 16 98 1:45:00 PM	QUAD21C	11 17 98 11:04:09 AM	B0M4H6	30	6	0.125	270	7.9275
	LIQUID		Bkg:	11 17 98 12:47:16 AM	BKG	400	30	0.075	429	1.0725

Anl Date: 11 17 98 Tot Sa, Alq: 5.00E-01 , 1.00E+01 Alp; (Dpm/ 1.37E-01 (uCi/ 3.09E-06 (pCi/ 6.17E+00 ± 2.2E+01 CAT I 4.0E+00 Lab Alq
Ppt mg: 2.8 Units: L , ml Bet; Alq): 1.56E+01 Sa): 3.50E-04 L|g): 7.01E+02 ± 4.9E+01 7.1E-02 L|g

BHI B0M4H7		11 16 98 1:45:00 PM	QUAD22A	11 17 98 11:04:13 AM	B0M4H7	30	16	0.44333333	1334	43.336667
	LIQUID		Bkg:	11 17 98 12:47:24 AM	BKG	400	36	0.09	452	1.13

Anl Date: 11 17 98 Tot Sa, Alq: 5.00E-01 , 1.00E+01 Alp; (Dpm/ 6.33E-02 (uCi/ 1.43E-06 (pCi/ 2.85E+00 ± 2.1E+01 CAT I 8.8E+00 Lab Alq
Ppt mg: 2.6 Units: L , ml Bet; Alq): 8.07E+01 Sa): 1.82E-03 L|g): 3.64E+03 ± 1.0E+02 1.4E-02 L|g

BHI B0M4H8		11 16 98 1:45:00 PM	QUAD22B	11 17 98 11:04:13 AM	B0M4H8	30	7	0.14083333	264	7.4125
	LIQUID		Bkg:	11 17 98 12:47:24 AM	BKG	400	37	0.0925	555	1.3875

Anl Date: 11 17 98 Tot Sa, Alq: 5.00E-01 , 1.00E+01 Alp; (Dpm/ 2.27E-01 (uCi/ 5.11E-06 (pCi/ 1.02E+01 ± 2.5E+01 CAT I 2.4E+00 Lab Alq
Ppt mg: 2.9 Units: L , ml Bet; Alq): 1.41E+01 Sa): 3.17E-04 L|g): 6.34E+02 ± 4.7E+01 7.9E-02 L|g

BHI B0T042		11 16 98 1:45:00 PM	QUAD22C	11 17 98 11:04:13 AM	B0T042	30	4	0.03083333	53	0.5416667
01	LIQUID		Bkg:	11 17 98 12:47:24 AM	BKG	400	41	0.1025	490	1.225

Anl Date: 11 17 98 Tot Sa, Alq: 7.50E+00 , 1.00E+01 Alp; (Dpm/ 7.58E-02 (uCi/ 2.56E-05 (pCi/ 3.41E+00 ± 2.3E+01 CAT I 7.3E+00 Lab Alq
Ppt mg: 3.8 Units: L , ml Bet; Alq): 9.99E-01 Sa): 3.38E-04 L|g): 4.50E+01 ± 2.1E+01 1.1E+00 L|g

BHI B0T127		11 16 98 1:45:00 PM	QUAD23A	11 17 98 11:04:17 AM	B0T127	30	4	0.06583333	61	1.0683333
	LIQUID		Bkg:	11 17 98 12:47:32 AM	BKG	400	27	0.0675	386	0.965

Anl Date: 11 17 98 Tot Sa, Alq: 2.00E+00 , 1.00E+01 Alp; (Dpm/ 1.75E-01 (uCi/ 1.58E-05 (pCi/ 7.89E+00 ± 2.1E+01 CAT I 3.2E+00 Lab Alq
Ppt mg: 4.2 Units: L , ml Bet; Alq): 2.00E+00 Sa): 1.80E-04 L|g): 9.00E+01 ± 2.3E+01 5.6E-01 L|g

BHI B0T1C9		11 16 98 1:45:00 PM	QUAD23D	11 17 98 11:04:17 AM	B0T1C9	30	3	0.06	38	0.2766667
	LIQUID		Bkg:	11 17 98 12:47:32 AM	BKG	400	16	0.04	396	0.99

Anl Date: 11/17/98 Tot Sa, Alq: 2.00E+00 , 1.00E+01 Alp; (Dpm/ 1.80E-01 (uCi/ 1.62E-05 (pCi/ 8.11E+00 ± 2.1E+01 CAT I 3.1E+00 Lab Alq
Ppt mg: 3.8 Units: L , ml Bet; Alq): 4.93E-01 Sa): 4.44E-05 L|g): 2.22E+01 ± 1.8E+01 2.3E+00 L|g

C021

Rec 1-14-99

CHAIN-OF-CUSTODY BATCH ANALYSIS RECORD

17-Nov-1998
Page 1

CUSTOMER: BHI SAMPLE DELIVERY GROUP W02607

MATRIX : WATER C99-008 BATCH NUMBER 11-243

	QES ID	DUP	ACCOUNT	CUSTOMER ID	COMMENTS
	J112431B				
	J112431S				
1)	81124301		BHI	BOT042	
	D1124301				

ACTIONS (Initial & Date)

1) INITIATED JH 11/17/98
SOP(S) # RD8800

2) PREP LAB RECEIVED [illegible] 12-22-98
SOP(S) # RICHRC5006

3) SAMPLE REMAINDER STORED _____
SOP(S) # _____

4) SEPARATION LAB RECEIVED RTM 1/8/99
SOP(S) # RICHRC5071/0

5) COUNTING/MEASUREMENT LAB DD 1/11/99
SOP(S) # RICHRC0003 Rev

6) DATA REVIEWED AND ANALYTICAL PREP STORED SGS 1/14/99
SOP(S) # RICHRC0002 Rev 2

1-14-99

CHAIN-OF-CUSTODY BATCH ANALYSIS RECORD

17-Nov-1998
Page 1

CUSTOMER: BHI

SAMPLE DELIVERY GROUP W02607

MATRIX : WATER C99-008

BATCH NUMBER 11-243

	QES ID	DUP	ACCOUNT	CUSTOMER ID	COMMENTS
1)	81124301		BHI	BOT042	

ACTIONS (Initial & Date)

1) INITIATED JH 11/17/98

SOP(S) # RD XXXX

2) PREP LAB RECEIVED _____

SOP(S) # _____

3) SAMPLE REMAINDER STORED _____

SOP(S) # _____

4) SEPARATION LAB RECEIVED RTM 1/18/99

SOP(S) # RichRC5078

5) COUNTING/MEASUREMENT LAB [illegible] 1/19/99

SOP(S) # RichRC0002

6) DATA REVIEWED AND ANALYTICAL PREP STORED SCL 1/19/99

SOP(S) # RICHRC0002 Rev2

Due 1-14-99

CHAIN-OF-CUSTODY BATCH ANALYSIS RECORD

17-Nov-1998
Page 1

CUSTOMER: BHI

MATRIX : WATER

C99-008

SAMPLE DELIVERY GROUP W0026D7

BATCH NUMBER 11-243

	QES ID	DUP	ACCOUNT	CUSTOMER ID	COMMENTS
	J112431N				
	J112432N				
	J112433N				
1)	81124301		BHI	BOT042	
	D1124301- dup				

ACTIONS (Initial & Date)

1) INITIATED JH 11/17/98

SOP(S) # RD7800

2) PREP LAB RECEIVED BAB 1-15-99

SOP(S) # RC 5007

3) SAMPLE REMAINDER STORED NA

SOP(S) #

4) SEPARATION LAB RECEIVED

SOP(S) #

5) COUNTING/MEASUREMENT LAB 1/15/99

SOP(S) # RICHRD0001

6) DATA REVIEWED AND ANALYTICAL PREP STORED GEJ 1/21/99

SOP(S) # RICHRC0002 Rev2

J112430X

J112431S } 60.774 ± 0.6388 dpm/10ml #4202

J112431m

Quanterra Environmental Services

DUE DATE _____

*** REANALYSIS REQUEST ***

CHAIN-OF-CUSTODY BATCH ANALYSIS RECORD

CUSTOMER BHI

ANALYSIS U total

MATRIX water

SAMPLE DELIVERY GROUP W02607

BATCH NUMBER _____

LAB SAMPLE ID	CUSTOMER ID	COMMENTS
1) 81124301		100ml
2) W1124301		EQIJ
3) D1124301		√
4)		
5)		
6)		
7)		
8)		
9)		
10)		
11)		
12)		
13)		
14)		
15)		
16)		
17)		
18)		
19)		
20)		

LAB QC ID		
BLANK) J1124328		
SPIKE) J1124328S		

ACTIONS (Initial & Date)

1) INITIATED PK 1-26-99
SOP(S) # RICHRC000 2-2

2) PREP LAB RECEIVED RB 1/26/99
SOP(S) # 5016 + 3215

3) SAMPLE REMAINDER STORED NA
SOP(S) # 1

4) SEPARATION LAB RECEIVED NA
SOP(S) # 1

5) COUNTING/MEASUREMENT LAB RECEIVED (RG) 1/30/99
SOP(S) # RICHRC5058 R1

6) DATA REVIEWED AND ANALYTICAL PREP STORED PK
SOP(S) # 2-1-99 RICHRC000 2-2

RC-048 10/96 REV 3

Quanterra
Environmental Services

Quanterra Incorporated
13715 Rider Trail North
Earth City, Missouri 63045

314 298-8566 Telephone
314 298-8757 Fax

CASE NARRATIVE

JAN 1999

Bechtel Hanford Incorporated
3350 George Washington Way
Richland, Washington 99352

January 27, 1999

Attention: Joan Kessner

Project Number	:	550.184
SDG	:	W02607
Number of Samples	:	One (1)
Sample Matrix	:	Water
Data Deliverable	:	Summary
Date SDG Closed	:	November 30, 1998

II. Introduction

On November 17, 1998, one (1) "water" sample was received by Quanterra, St. Louis for chemical analysis. There were no comments or nonconformances associated with the shipping or receiving of the samples. Upon receipt, the sample was given the following laboratory ID number to correspond with the specific client ID's:

St. Louis ID	BHI ID	SAF ID	Matrix	Date of Receipt
19406-001	B0T043	C99-008	Water	17-NOV-98

III. 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: Anions by EPA method 300.0, (CL,FL,NO2,NO3,SO4).

Deviation from Request: No Deviation from requested methods.

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
DUP- Laboratory Duplicate
MS- Matrix Spike

V. Comments

General: The samples in this SDG were received at Quanterra, St. Louis but the SDG assignment was made by Quanterra, Richland.

Due to complications with the Quanterra, St. Louis L.I.M.S., new login numbers were issued for certain samples that were already logged into the database. Please note that anywhere the new login number is mentioned it is referring to the original login number listed in the table below:

Original Login Number	New Login Number
19406	20353

The assignment of new login numbers does not alter any of the data results.

Wet Chemistry: A Laboratory Control Sample, Method Blank, Matrix Spike and Laboratory Duplicate were analyzed with each preparation batch per the protocol for this analysis.

Method Blank 193689 had Chloride concentration above the MDL but below the laboratory reporting limit, the value is flagged with a "B". The associated sample data is flagged with a "C".

I certify that this Summary 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:

Shiela Louvier

Shiela M. Louvier
St. Louis Project Manager

W02607

Quanterra November 20, 1998 08:33 am
Account: 10722 Project: 550.184 Quanterra-Richland QAS No. 550.184 Rev. 3
Master Sample Login: 19406

Project Manager: R. White

Reviewed by and Date: Robert E. White

Sample Header Template: SW

Sample No. / #	Client ID / Container Type	C-Matrix / Analysis	Date: Collected / Class	Received / Preservative	Due / Anal. Due Date	Shipper / Hold Date	Site	Rad Category	Rad Sample No. / (Container Numbers:% Filled)
19406-001	B0T043	Water	16-NOV-98 11:02	17-NOV-98 08:00	17-DEC-98	AIRBORNE		2	R8023-001
saf c99-008									
1	PN - Plastic-500ml	CL/300.0/Q4	S	COLD	10-DEC-98	14-DEC-98	S8E		(417261:100)
1		FL/300.0/Q4	S	COLD	10-DEC-98	14-DEC-98	S8E		(417261:100)
1		NO2/300.0/Q4	S	COLD	10-DEC-98	18-NOV-98	S8E		(417261:100)
1		NO3/300.0/Q4	S	COLD	10-DEC-98	18-NOV-98	S8E		(417261:100)
1		SO4/300.0/Q4	S	COLD	10-DEC-98	14-DEC-98	S8E		(417261:100)
1	VI - Vial-20ml	RAD/SCREEN/Q4	S	COLD	10-DEC-98	16-MAY-99	S8E		(417262:100)
19406-001DUP	B0T043	Water	16-NOV-98 11:02	17-NOV-98 08:00	17-DEC-98	AIRBORNE		2	R8023-001
saf c99-008									
1	PN - Plastic-500ml	CL/300.0/Q4	S	COLD	10-DEC-98	14-DEC-98	S8E		(417261:100)
1		FL/300.0/Q4	S	COLD	10-DEC-98	14-DEC-98	S8E		(417261:100)
1		NO2/300.0/Q4	S	COLD	10-DEC-98	18-NOV-98	S8E		(417261:100)
1		NO3/300.0/Q4	S	COLD	10-DEC-98	18-NOV-98	S8E		(417261:100)
1		SO4/300.0/Q4	S	COLD	10-DEC-98	14-DEC-98	S8E		(417261:100)
19406-001MS	B0T043	Water	16-NOV-98 11:02	17-NOV-98 08:00	17-DEC-98	AIRBORNE		2	R8023-001
saf c99-008									
1	PN - Plastic-500ml	CL/300.0/Q4	S	COLD	10-DEC-98	14-DEC-98	S8E		(417261:100)
1		FL/300.0/Q4	S	COLD	10-DEC-98	14-DEC-98	S8E		(417261:100)
1		NO2/300.0/Q4	S	COLD	10-DEC-98	18-NOV-98	S8E		(417261:100)
1		NO3/300.0/Q4	S	COLD	10-DEC-98	18-NOV-98	S8E		(417261:100)
1		SO4/300.0/Q4	S	COLD	10-DEC-98	14-DEC-98	S8E		(417261:100)

Data:

*=Sample has not been rad screened.

PNNL

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

C.O.C. # **C99-008-57**

Page 1 of 1

Collector RR FOX (RFS)	**Contact/Requester** JH KESSNER	**Telephone No.** (509) 372-9538) **MSIN** **FAX**
SAF No. C99-008	**Sampling Origin** HANFORD SITE	**Purchase Order/Charge Code**
Project Title 100-HR3-IAM (1) GW SAMPLING NOVEMBER 1998	**Logbook No.** GWT-SIM-H 18	**Ice Chest No.** GW5108 **Temp.** 4 °C
Shipped To (Lab) Quanterra St. Louis	**Method of Shipment** GOVT. VEHICLE	**Bill of Lading/Air Bill No.** 004719584 310
Protocol CERCLA	**Data Turnaround** 45 Days	**Offsite Property No.**

POSSIBLE SAMPLE HAZARDS/REMARKS
** **

SPECIAL INSTRUCTIONS **Hold Time** Total Activity Exemption: Yes ☒ No ☐
SUBMIT INVOICES & DELIVERABLES TO JH KESSNER, BHI
FAX COPIES OF TMA & QES LOG-INS TO DL STEWART (372-1704) & JM DUNCAN (372-9052)

Sample No.	Lab ID	*	Date	Time	No/Type Container	Sample Analysis	Preservative
B0T043		W	11/16/98	1102	1x500-mL P	IC Anions - 300.0 (Chloride, Fluoride, Nitrogen in Nitrate, Nitrogen in Nitrite, Sulfate) 100% 3°c	Cool 4C
B0T043		W	11/16/98	1102	1x20-mL P	Activity Scan 100% 4°c	None
						W02607	

Relinquished By	Print	Sign	Date/Time	Received By	Print	Sign	Date/Time
RR FOX (RFS)		NOV 16 1998	1410		Joe Tecmin		11-17-98 0800
Relinquished By			Date/Time	Received By			Date/Time
Relinquished By			Date/Time	Received By			Date/Time
Relinquished By			Date/Time	Received By			Date/Time

Matrix *

S	= Soil	DS	= Drum Solid
SE	= Sediment	DL	= Drum Liqui
SO	= Solid	T	= Tissue
SL	= Sludge	WI	= Wine
W	= Water	L	= Liquid
O	= Oil	V	= Vegetation
A	= Air	X	= Other

FINAL SAMPLE DISPOSITION Disposal Method (e.g., Return to customer, per lab procedure, used in process) Disposed By Date/Time

Quanterra Environmental Services

017102

Login No.: 19406

Condition Upon Receipt Variance Report
St. Louis Laboratory

Client: Richland

Date: 11-17-98 Time: 0800

Project No: 550.184

Initiated by: Joe Tiemann

Shipper/No: Airborne / 471,9584-310, -413

RFA/COC Numbers: C99-009-57

Condition/Variance (Check all that apply):

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

☒ **No variances were noted during sample receipt.** **Cooler Temperature Upon Receipt:** 4°c, 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) Joe Tiemann Date: 11-17-98

Project Management Review: Robert E. White Date: 11-19-98

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: 550.184

Category: Anions
Method: EPA 300.0
Matrix: LIQUID

Client ID: B0T043

Sample Date : 11/16/98
Receipt Date : 11/17/98
Report Date : 01/13/99

Quanterra ID : 19406-001

Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit	Dilution
Fluoride	16984-48-8	QCBLK193689-1	11/17/98	11/17/98	0.19	MG/L		0.10	1
Chloride	16887-00-6	QCBLK193689-1	11/17/98	11/17/98	8.98	MG/L	C	1.00	5
Sulfate	14808-79-8	QCBLK193689-1	11/17/98	11/17/98	71.5	MG/L		2.50	5
Nitrate	NO3-N	QCBLK193689-1	11/17/98	11/17/98	13.4	MG/L		0.40	20
Nitrite	NO2-N	QCBLK193689-1	11/17/98	11/17/98	0.020	MG/L	U	0.020	1

Quanterra-Richland
3350 George Washington Way
Richland, WA 99352

Project: 550.184

Category: Anions
Method: EPA 300.0
Matrix: LIQUID

Client ID: B0T043

Sample Date : 11/16/98
Receipt Date : 11/17/98
Report Date : 01/13/99

Quanterra ID : 19406-001DUP

Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit	Dilution
Fluoride	16984-48-8	QCBLK193689-1	11/17/98	11/17/98	0.19	MG/L		0.10	1
Chloride	16887-00-6	QCBLK193689-1	11/17/98	11/17/98	9.03	MG/L	C	1.00	5
Sulfate	14808-79-8	QCBLK193689-1	11/17/98	11/17/98	71.7	MG/L		2.50	5
Nitrate	NO3-N	QCBLK193689-1	11/17/98	11/17/98	13.5	MG/L		0.40	20
Nitrite	NO2-N	QCBLK193689-1	11/17/98	11/17/98	0.020	MG/L	U	0.020	1

Quanterra-Richland
3350 George Washington Way
Richland, WA 99352

Project: 550.184

Category: Anions
Method: EPA 300.0
Matrix: LIQUID

Client ID: B0T043

Sample Date : 11/16/98
Receipt Date : 11/17/98
Report Date : 01/13/99

Quanterra ID : 19406-001MS

Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit	Dilution
Fluoride	16984-48-8	QCBLK193689-1	11/17/98	11/17/98	99	%REC			1
Chloride	16887-00-6	QCBLK193689-1	11/17/98	11/17/98	102	%REC			10
Sulfate	14808-79-8	QCBLK193689-1	11/17/98	11/17/98	97	%REC			10
Nitrate	NO3-N	QCBLK193689-1	11/17/98	11/17/98	80	%REC			20
Nitrite	NO2-N	QCBLK193689-1	11/17/98	11/17/98	117	%REC			10