AR TARGET SHEET

The following document was too large to scan as one unit, therefore it has been broken down into sections.

DOCUMENT# BHI-00922, Rev 0

EDMC# 45841

SECTION 2

ATTACHMENT 4

LABORATORY NARRATIVE and CHAIN-OF-CUSTODY DOCUMENTATION

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Quanterra Environmental Services

Quanterra Incorporated
2800 George Washington Way
Richland, Washington 99352

509 375-3131 Telephone
509 375-5590 Fax

CERTIFICATE OF ANALYSIS

OCT 1995
RECEIVED
Data
Log In

Bechtel Hanford, Inc.
345 Hills
Richland, WA 99352

October 17, 1995

Attention: Joan Kessner

SAF Number	:	B95-106
Date SDG Closed	:	October 2, 1995
Number of Samples	:	Ten (10)
Sample Type	:	Other
SDG Number	:	W0747
Data Deliverable	:	Summary

I. Introduction

On October 2, 1995, ten "other" matrix samples were received by the Quanterra Environmental Services Richland Laboratory (QTESRL) for radiochemical analysis. Upon receipt, the samples were assigned the following laboratory ID numbers to correspond with the Bechtel Hanford, Inc. (BHI) specific IDs:

QTESRL ID	BHI ID	Matrix	Date of Receipt
51001101	B0GNX2	Other	10/2/95
51001102	B0GNX3	Other	10/2/95
51001103	B0GNX4	Other	10/2/95
51001104	B0GNX5	Other	10/2/95
51001105	B0GNX6	Other	10/2/95
51001106	B0GNX7	Other	10/2/95
51001107	B0GNX8	Other	10/2/95
51001108	B0GNY0	Other	10/2/95
51001109	B0GNY1	Other	10/2/95
51001110	B0GNY2	Other	10/2/95

022 ~~6002~~

Quanterra
Environmental Services

II. Analytical Results/Methodology

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

The requested analyses were:

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

III. Quality Control

The analytical results for each analysis performed under SDG W0747 include a minimum of one Laboratory Control Sample (LCS), one method (reagent) blank, and one duplicate. Any exceptions have been noted in the "Comments" section.

Quality control sample results are reported in the same units as sample results with the exception of Gross Alpha and Gross Beta QC sample results which are reported in pCi/sample.

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Quanterra
Environmental Services

IV. Comments

Alpha Spectroscopy

Uranium-234, -235, -238 by method ITAS-RD-3234
The sample aliquot sizes were reduced as follows due to high screening activity: B0GNX3 (0.5 g), B0GNX4 (0.9 g), B0GNX5 (0.4 g), B0GNX6 (0.8 g), B0GNX7 (0.8 g), B0GNX8 (0.8 g), B0GNY1 (0.5 g), and B0GNY2 (0.8 g). All of the samples have activity that far exceeds the achieved MDAs. The U-235 recovery for the LCS is unacceptable, however, the U-234 and U-238 results are well within limits and the expected U-235 value is 25 times lower than the RDL due to the abundance of U-235 in the spike, therefore, the LCS is accepted. The tracer yield for sample B0GNX5 is 24.7%. The sample meets the RDL requirements with the low yield and the results are accepted. The cause of the low yield is unknown, possibly a sample matrix effect. All of the batch samples contained U-236. U-235 and U-236 are nearly impossible to resolve because of their similar regions of interest. The computer attempted to define the areas of each but the computer's resolution was questionable, therefore, the analyst combined the U-235 and U-236 region of interest counts for calculation and reporting, and those counts are reported as U-235. The U-235 results for this batch should be flagged as estimates due to the U-236 contribution to the U-235 region of interest which cannot be resolved. The LCS, batch blank, sample and sample duplicate (B0GNX2) results are within contractual requirements.

Gamma Spectroscopy

Gamma Scan by method ITAS-RD-3219
The LCS, batch blank, sample and sample duplicate (B0GNX2) results are within contractual requirements.

Gas Proportional Counting

Gross Alpha by method ITAS-RD-3222
The LCS, batch blank, sample and sample duplicate (B0GNX2) results are within contractual requirements.

Gross Beta by method ITAS-RD-3222
The LCS, batch blank, sample and sample duplicate (B0GNX2) results are within contractual requirements.

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Quanterra
Environmental Services

Bechtel Hanford, Inc.
October 17, 1995
Page 4

Liquid Scintillation Counting

Technetium-99 by method ITAS-IT-RS-0001
The blank quench parameter is slightly below the lower limit of 99.22 with a TSIE of 95.94. The quench curve is fairly flat at the lower end and the system calculates a result based on an extrapolation from the lower point of the curve to the point of the sample. The data are accepted with a blank result far below the RDL and all other batch samples are within the TSIE limits. The matrix spike, LCS, batch blank, sample and sample duplicate (B0GNY2) 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
Project Manager

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0005

Bechtel Hanford, Inc.

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

Page 1 of 2

Date Turnaround: X Priority / Normal

Collector: D. Bowers, M. Mehlhorn, W. Thompson, P. St. John	Company Contact: Dave Encke	Telephone: 373-3461
Project Designation: Concrete Removal Characterization	Sampling Location: 183-H Solar Evaporation Basin Project	SAF No.: B95-108
Ice Chest No.: ER-9	Field Logbook No.: EFL-1133-1	Method of Shipment: Hand Deliver - Government Vehicle
Shipped To: Quanterra	Offsite Property No.	Bill of Lading/Air Bill No.

Possible Sample Hazards/Remarks

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

Preservation	Cool	Cool	Cool	Cool	None	None
Type of Container	A G	A G	A G	A G	G	P
No. of Container(s)	1	1	1	1	1	1
Volume	40 ml.	60 ml.	60 ml.	60 ml.	1 Liter	20 ml.
SAMPLE ANALYSIS	100% ICP Metals include Super-trace	100% Anions See Item 1 Below	100% Cyanide	100% Sulfide	510011 See Item 2 Below	Activity Scan

510010 SDL W01747

Sample No.	Matrix*	Date Sampled	Time Sampled	ICP Metals	Anions	Cyanide	Sulfide	See Item 2 Below	Activity Scan
BOGNX2 01	DS	09-29-95	1345	X	X	X	X	X	X
BOGNX3 02	DS	09-29-95	1404	X	X	X	X	X	X
BOGNX4 03	DS	09-29-95	1420	X	X	X	X	X	X
BOGNX5 04	DS	09-29-95	1437	X	X	X	X	X	X
BOGNX6 05	DS	09-29-95	1455	X	X	X	X	X	X
BOGNX7 06	DS	09-29-95	1459	X	X	X	X	X	X

CHAIN OF POSSESSION — Sign/Print Names

Relinquished By	Date/Time	Received By	Date/Time
[signature]	10-2-95/0808	[signature] EFL Bechtel	10-2-95 0808
[signature] EFL Bechtel	10-2-95 1130	[signature]	10/2/95 1130

SPECIAL INSTRUCTIONS
Item 1 - Anoins - ICF -- F, Cl, SO4, PO4, NO2, NO3, formate and pH
Item 2 - Gross Alpha, Gross Beta; u-234, -235, -238; To-99; Gamma Spec.

Matrix*: S = Soil; SE = Sediment; SO = Solid; SL = Sludge; W = Water; O = Oil; A = Air; DS = Drum Solids; DL = Drum Liquids; T = Tissue; WI = Wipe; L = Liquid; V = Vegetation; X = Other

LABORATORY RECEIPT: Received By | Title | Date/Time

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

G-167

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WRG 12/22/95

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Page 2 of 2

Bechtel Hanford, Inc.

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

Date Turnaround: X Priority / Normal

Collector: D. Bowers, M. Mehlhorn, W. Thompson, D. St. John	Company Contact: Dave Encke	Telephone: 373-3461
Project Designation: Concrete Removal Characterization	Sampling Location: 183-H Solar Evaporation Basin Project	SAF No.: 885-106
Ice Chest No.: ER-9	Field Logbook No.: EFL-1132-1	Method of Shipment: Hand Deliver - Government Vehicle
Shipped To: Quanterra	Offsite Property No.	Bill of Lading/Air Bill No.

Possible Sample Hazards/Remarks

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

SAMPLE ANALYSIS: 510010 SDL 10/11/17

Preservation	Cool	Cool	Cool	Cool	None	None
Type of Container	A G	A G	A G	A G	G	P
No. of Container(s)	1	1	1	1	1	1
Volume	40 ml.	60 ml.	60 ml.	60 ml.	1 Liter	20 ml.
	ICP Metals Include Super-trace	Anions See Item 1 Below	Cyanide	Sulfide	510011 See Item 2 Below	Activity Scan

Sample No.	Matrix*	Date Sampled	Time Sampled	ICP Metals Include Super-trace	Anions See Item 1 Below	Cyanide	Sulfide	See Item 2 Below	Activity Scan
BOGNX8 07	DS	09-29-95	1457	X	X	X	X	X	X
~~BOGNX9~~	9/29/95 DAS								
BOGNY0 08	DS	09-29-95	1515	X	X	X	X	X	X
BOGNY1 09	DS	09-29-95	1513	X	X	X	X	X	X
BOGNY2 10	DS	09-29-95	1515	X	X	X	X	X	X
				100%	100%	100%	100%		

Sign/Print Names

Relinquished By	Date/Time	Received By	Date/Time
Tony Bowers	10-2-95 / 0808	[signature] Bechtel	10-2-95 0808
[signature] Bechtel	10-2-95 1130	[signature]	10/2/95 1130

SPECIAL INSTRUCTIONS
Item 1 - Anoins - ICF -- F, Cl, SO4, PO4, NO2, NO3, formate and pH
Item 2 - Gross Alpha, Gross Beta; u-234, -235, -238; Tc-99; Gamma Spec.

Matrix*: S = Soil; SE = Sediment; SO = Solid; SL = Sludge; W = Water; O = Oil; A = Air; DS = Drum Solids; DL = Drum Liquids; T = Tissue; WI = Wipe; L = Liquid; V = Vegetation; X = Other

Laboratory Sample	Received By	Title	Date/Time
Final Sample	Disposal Method	Disposed By	Date/Time

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ATTACHMENT 5

DATA VALIDATION SUPPORTING DOCUMENTATION

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RADIOCHEMICAL DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E

PROJECT: 183-H Basin D+D		DATA PACKAGE: LU0747-RES
VALIDATOR: H. GREGERSON	LAB: QUANTERRA	DATE: 12/15/95
CASE:		SDG:

ANALYSES PERFORMED

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

SAMPLES/MATRIX	BOGNX2	BOGNX3	BOGNX4	BOGNX5
BOGNX6	BOGNX7	BOGNX8	BOGNY0	BOGNY1
BOGNY2 / DRUM SOLIDS				

1. Completeness . . . . . ☐ N/A

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

Comments:

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

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

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

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

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

Comments:

WHC-SD-EN-SPP-001, Rev. 1

3. Continuing Calibration . . . . . ☑ N/A

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

Comments: _____

4. Blanks . . . . . ☐ N/A

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

Comments: _____

5. Matrix Spikes . . . . . ☑ N/A

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

Comments: _____

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

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

Comments:
1. The %R for U-238DUP and U-235 was outside the control limit and associated samples were qualified.

7. Chemical Recovery . . . . . ☐ N/A

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

Comments:

8. Duplicates . . . . . ☐ N/A

Duplicates Analyzed? . . . . . Yes No 1. N/A
RPD Values Acceptable? . . . . . Yes No N/A
Transcription/Calculation Errors? . . . . . Yes No N/A

Comments:
1. The RPD for U-235 was outside the control limit, ~~and as~~ however ~~the sa~~ the sample results have been qualified "R" due to the LCS %R.

WHC-SD-EN-SPP-001, Rev. 1

9. Field QC Samples . . . . . ☐ N/A

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

Comments:_____

10. Holding Times

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

Comments:_____

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

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

Comments:_____

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HOLDING TIME SUMMARY

SDG: W0747-QES | VALIDATOR: HEIDI GREGERSON | DATE: 12/15/95 | PAGE 1 OF 3

COMMENTS:

FIELD SAMPLE ID	ANALYSIS TYPE	DATE SAMPLED	DATE PREPARED	DATE ANALYZED	PREP. HOLDING TIME, DAYS	ANALYSIS HOLDING TIME, DAYS	QUALIFIER
BOGNX2	Gross α β	9/29/95	10/3/95	10/10/95	4	11	none.
	TC-99		10/3/95	10/11/95		12	
	α Spec		10/3/95	10/16/95		17	
	Gamma Spec		10/3/95	10/5/95		6	
BOGNX3	Gross α β		10/3/95	10/10/95		11	
	TC 99		10/3/95	10/11/95		12	
	α Spec		10/3/95	10/16/95		17	
	Gamma Spec		10/3/95	10/5/95		6	
BOGNX4	Gross α β		10/3/95	10/10/95		11	
	TC 99		10/3/95	10/11/95		12	
	α Spec		10/3/95	10/16/95		17	
	Gamma Spec		10/3/95	10/5/95		6	
BOGNX5	Gross α β		10/3/95	10/10/95		11	
	TC 99		10/3/95	10/11/95		12	
	α Spec		10/3/95	10/16/95		17	
	Gamma Spec		10/3/95	10/5/95		6	
BOGNX6	Gross α β		10/3/95	10/10/95		11	

HOLDING TIME SUMMARY

SDG: WG7417-QES | VALIDATOR: HEIDI GREGERSON | DATE: 12/15/95 | PAGE 2 OF 3

COMMENTS:

FIELD SAMPLE ID	ANALYSIS TYPE	DATE SAMPLED	DATE PREPARED	DATE ANALYZED	PREP. HOLDING TIME, DAYS	ANALYSIS HOLDING TIME, DAYS	QUALIFIER
BOGNX6	TC 99	9/29/95	10/3/95	10/11/95	4	12	none
	α Spec.		10/3/95	10/16/95		17	
	GammaSpec		10/3/95	10/5/95		6	
BOGNX7	Gross β		10/3/95	10/10/95		11	
	TC 99		10/3/95	10/11/95		12	
	α Spec.		10/3/95	10/16/95		17	
	GammaSpec		10/3/95	10/5/95		6	
BOGNX8	Gross β		10/3/95	10/10/95		11	
	TC 99		10/3/95	10/11/95		12	
	α Spec		10/3/95	10/16/95		17	
	GammaSpec		10/3/95	10/5/95		6	
BOGNY0	Gross β		10/3/95	10/10/95		11	
	TC 99		10/3/95	10/11/95		12	
	α Spec		10/3/95	10/16/95		17	
	GammaSpec		10/3/95	10/5/95		6	
BOGNY1	Gross β		10/3/95	10/10/95		11	
	TC 99	✓	10/3/95	10/11/95	✓	12	✓

HOLDING TIME SUMMARY

SDG: W0747-QES | VALIDATOR: HEIDI GREGERSON | DATE: 12/5/95 | PAGE 3 OF 3

COMMENTS:

FIELD SAMPLE ID	ANALYSIS TYPE	DATE SAMPLED	DATE PREPARED	DATE ANALYZED	PREP. HOLDING TIME, DAYS	ANALYSIS HOLDING TIME, DAYS	QUALIFIER
60GN41	α Spec	9/29/95	10/3/95	10/16/95	4	17	none
↓	Gamma Spec.	↓	10/3/95	10/5/95		6	↓
60GN42	Gross β	↓	10/3/95	10/10/95		11	↓
↓	Tc99	↓	10/3/95	10/11/95		12	↓
↓	α Spec	↓	10/3/95	10/16/95		17	↓
↓	Gamma Spec	↓	10/3/95	10/5/95	↓	6	↓

Quanterra
Environmental Services

LABORATORY CONTROL SAMPLE

LAB NAME:	ITAS-RICHLAND	SDG:	W0747
LAB SAMPLE ID:	M100111M	MATRIX:	OTHER

ISOTOPE	RESULT	COUNTING ERROR (2 s)	TOTAL ERROR (2 s)	MDA	REPORT UNIT	YIELD	EXPECTED	RECOVERY
CS-137DA	3.57E-01	3.4E-02	4.9E-02	N/A	pCi/g	N/A	3.39E-01	105.31%
K-40	2.04E+01	7.6E-01	2.2E+00	N/A	pCi/g	N/A	1.95E+01	104.62%
RA-226DA	9.92E-01	7.4E-02	1.2E-01	N/A	pCi/g	N/A	1.16E+00	85.52%
RA-228DA	2.12E+00	1.6E-01	2.7E-01	N/A	pCi/g	N/A	1.87E+00	113.37%
U-238DLP	1.63E+00	9.9E-01	1.0E+00	N/A	pCi/g	N/A	1.05E+00	155.24%
TC-99	8.98E+00	3.4E-01	1.3E+00	3.61E+00	pCi/g	95.10%	9.09E+00	98.79%

All Samples Affected.

Number of Results: 6

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Quanterra
Environmental Services

LABORATORY CONTROL SAMPLE

LAB NAME:	ITAS-RICHLAND	SDG:	W0747
LAB SAMPLE ID:	M100111S	MATRIX:	OTHER

ISOTOPE	RESULT	COUNTING ERROR (2 s)	TOTAL ERROR (2 s)	MDA	REPORT UNIT	YIELD	EXPECTED	RECOVERY
U-235	-1.87E-03	N/A	2.2E-03	3.89E-02	pCi/g	53.40%	3.96E-02	4.72%
U-234	9.40E-01	1.7E-01	2.5E-01	4.62E-02	pCi/g	53.40%	8.68E-01	108.29%
U-238DA	9.88E-01	1.8E-01	2.6E-01	4.16E-02	pCi/g	53.40%	9.09E-01	108.69%
ALPHA	3.81E+00	3.9E-01	7.5E-01	1.08E-01	pCi/sa	100.00%	4.53E+00	84.11%
BETA	1.42E+01	1.2E+00	1.5E+00	8.31E-01	pCi/sa	100.00%	1.37E+01	103.65%

Number of Results: 5

[illegible] samples affected.

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APPENDIX H

VALIDATION REPORT FOR SAMPLE DELIVERY GROUP W0751

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APPENDIX H – CONTENTS

Transmittal of Data Validation Package, Contract No. MSH-SWV-315905 . . . . . H-1

Inorganic Data Validation Summary for Data Package
W0751-QES (943-1610.112 751INO.HBS) H-3
Attachment 1: Glossary of Data Reporting Qualifier H-5
Attachment 2: Summary of Data Qualifications H-9
Attachment 3: Qualified Data Summary and Annotated Laboratory Reports H-13
Attachment 4: Laboratory Narrative and Chain-of-Custody Documentation H-25
Attachment 5: Data Validation Supporting Documentation H-35

General Chemistry Data Validation Summary for Data Package
W0751-QES (943-1610.112 751GEN.HBS) H-45
Attachment 1: Glossary of Data Reporting Qualifiers H-47
Attachment 2: Summary of Data Qualifications H-51
Attachment 3: Qualified Data Summary and Annotated Laboratory Reports H-55
Attachment 4: Laboratory Narrative and Chain-of-Custody Documentation H-71
Attachment 5: Data Validation Supporting Documentation H-81

Radiochemistry Data Validation Summary for Data Package
W0751-QES (943-1610.112 751RAD.HBS) H-91
Attachment 1: Glossary of Data Reporting Qualifiers H-93
Attachment 2: Summary of Data Qualifiers H-97
Attachment 3: Qualified Data Summary and Annotated Laboratory Reports H-101
Attachment 4: Laboratory Narrative and Chain-of-Custody Documentation H-113
Attachment 5: Data Validation Supporting Documentation H-121

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Golder Associates Inc.

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

Golder Associates

December 28, 1995

Our ref: 943-1610.112.0400
94-1610/O/423

ERC
1022 Lee Blvd.
Richland, Washington 99352

ATTENTION: Ms. Jeanette Duncan

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

DEC 1995 RECEIVED Log In

Dear Ms. Duncan:

This letter is to transmit the following data validation package:

SAF#	Project	Data Package	Analyses
B95-106	183 H BASIN D&D Surface Removal Characterization	W0751-QES	Metals, Radiochemistry, General Chemistry

Please call if you have any questions.

Sincerely,

GOLDER ASSOCIATES INC.

Thomas M. Stapp
Task Manager

FOR:
Douglas Mather
Project Manager

Enclosures

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MEMORANDUM

TO: 183-H Basin D&D, Surface Removal Characterization Project QA Record — December 22, 1995

FR: Thomas Stapp, Golder Associates Inc. TMS

RE: INORGANIC DATA VALIDATION SUMMARY FOR DATA PACKAGE W0751-QES (943-1610.112 751INO.HBS)

INTRODUCTION

This memo presents the results of data validation for the analysis indicated below on data package W0751-QES prepared by Quanterra Environmental Services. Sample information is provided in the following table.

SAMPLE ID	COMMENTS	ANALYSIS	MEDIA
B0GNX9		INORGANICS	DRUM SOLIDS
B0GNY3			DRUM SOLIDS
B0GNY4		SEE ATTACHMENT 4	DRUM SOLIDS
B0GNY5			DRUM SOLIDS
B0GNY6			DRUM SOLIDS
B0GNY7			DRUM SOLIDS
B0GNY8			DRUM SOLIDS
B0GNY9			DRUM SOLIDS

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

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

DATA QUALITY OBJECTIVES

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

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

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

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

Completeness. The data package was complete for all requested analyses. A total of eight samples were validated in this data package with a total of 176 determinations reported, 168 of which were deemed valid. This results in a completeness of 95%, which meets the 90% objective of the work plan.

001

Data Package ID: W0751-QES Analysis: INORGANICS

MAJOR DEFICIENCIES

The following major deficiencies were identified during data validation which required qualification of data as unusable:

Matrix Spike Recovery

- Silver percent recovery was less than 30% qualifying associated samples as unusable. Attachments 2 and 5 provide a summary of samples affected, data qualifications applied and supporting documentation.

MINOR DEFICIENCIES

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

Laboratory Blanks

- Beryllium was detected in the initial calibration blank, qualifying associated sample results less than five times the blank value as non-detect (U).

- Thallium and Vanadium were detected at negative concentrations in the method blank qualifying associated non detect results as estimated (UJ). Attachments 2 and 5 provide a summary of samples affected, data qualifications applied and supporting documentation

Matrix Spike Recovery

- Cadmium and vanadium percent recovery was less than 75% qualifying associated samples as estimated. Attachments 2 and 5 provide a summary of samples affected, data qualifications applied and supporting documentation.

Laboratory Duplicates

- The realtive percent difference for cadmium exceeded the 35% limit which qualifies associated samples as estimated. Attachments 2 and 5 provide a summary of samples affected, data qualifications applied and supporting documentation.

REFERENCES

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

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

ATTACHMENT 1

GLOSSARY OF DATA REPORTING QUALIFIERS

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

Glossary of Inorganic Data Reporting Qualifiers.

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

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

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

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

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

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

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

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ATTACHMENT 2

SUMMARY OF DATA QUALIFICATIONS

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

DATA QUALIFICATION SUMMARY - FORM B-7

SDG:W0751-QES	REVIEWER: Tom Stapp	DATE: 12-21-95	PAGE 1 OF 1
COMMENTS: INORGANICS			
COMPOUND/ANALYTE	QUALIFIER	SAMPLES AFFECTED	REASON
VANADIUM	J/UJ	ALL SAMPLES	MS RECOVERY WAS <75% CONTROL LIMIT
CADMIUM	BJ/UJ	ALL SAMPLES	MS RECOVERY WAS <75% CONTROL LIMIT
SILVER	UR	ALL SAMPLES	MS RECOVERY WAS <30% CONTROL LIMIT
BERYLLIUM	U	BOGNY4 BOGNY5 BOGNY6 BOGNY9	CONTAMINANT DETECTED IN THE INITIAL CALIBRATION BLANK
THALLIUM	UJ	BOGNY8	CONTAMINANT DETECTED IN METHOD BLANK AT A NEGATIVE LEVEL
VANADIUM	UJ	B0GNX9 B0GNY3 B0GNY4 B0GNY5 B0GNY6 B0GNY7 B0GNY9	CONTAMINANT DETECTED IN METHOD BLANK AT A NEGATIVE LEVEL
CADMIUM	J	B0GNX9 B0GNY3 B0GNY4 B0GNY6 B0GNY9	RPD EXCEEDED THE 35% CONTROL LIMIT

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ATTACHMENT 3

QUALIFIED DATA SUMMARY and ANNOTATED LABORATORY REPORTS

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Validated Data Summary, Data Package: W0751-QES

	Sample #	B0GNX9		B0GNY3		B0GNY4		B0GNY5	
	Date	10/02/95		10/02/95		10/02/95		10/02/95	
	Location								
	Depth								
	Type	Drum Solid		Drum Solid		Drum Solid		Drum Solid	
	Comments								
Parameter	Units	Results	Q	Results	Q	Results	Q	Results	Q
ALUMINUM	MG/KG	3680.000		4850.000		932.000		3780.000	
ANTIMONY	MG/KG	55.200	U	55.200	U	55.200	U	55.200	U
ARSENIC	MG/KG	40.500		39.000		30.000		28.600	
BARIUM	MG/KG	87.300		127.000		16.900	B	120.000	
BERYLLIUM	MG/KG	0.540	B	0.540	B	0.480	U	0.500	U
CADMIUM	MG/KG	12.100	BJ	5.100	BJ	11.900	BJ	4.600	UJ
CALCIUM	MG/KG	28700.000		35900.000		5310.000		32300.000	
CHROMIUM	MG/KG	979.000		677.000		1450.000		732.000	
COBALT	MG/KG	37.400	B	24.600	B	51.200	B	30.000	B
COPPER	MG/KG	641.000		386.000		892.000		467.000	
IRON	MG/KG	622000.000		402000.000		918000.000		449000.000	
LEAD	MG/KG	3.800	U	84.200		3.800	U	4.900	
MAGNESIUM	MG/KG	3140.000		4760.000		1040.000		3290.000	
MANGANESE	MG/KG	6360.000		4240.000		8820.000		4650.000	
NICKEL	MG/KG	514.000		363.000		653.000		389.000	
POTASSIUM	MG/KG	738.000		921.000		325.000	B	679.000	
SELENIUM	MG/KG	4.300	U	4.300	U	4.300	U	4.300	U
SILVER	MG/KG	12.000	UR	12.000	UR	12.000	UR	12.000	UR
SODIUM	MG/KG	2890.000		5260.000		926.000		3350.000	
THALLIUM	MG/KG	22.500		16.700		30.700		17.600	
VANADIUM	MG/KG	8.600	UJ	8.600	UJ	8.600	UJ	8.600	UJ
ZINC	MG/KG	144.000		108.000		108.000		104.000	

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

Verified HCG 1/5/96

008

Revised HCG 1/5/96

Validated Data Summary, Data Package: W0751-QES

Parameter	Units	B0GNY6 Results	Q	B0GNY7 Results	Q	B0GNY8 Results	Q	B0GNY9 Results	Q
Sample #		B0GNY6		B0GNY7		B0GNY8		B0GNY9	
Date		10/02/95		10/02/95		10/02/95		10/02/95	
Location									
Depth									
Type		Drum Solid		Drum Solid		Drum Solid		Drum Solid	
Comments									
ALUMINUM	MG/KG	906.000		6180.000		10800.000		5060.000	
ANTIMONY	MG/KG	55.200	U	55.200	U	27.600	U	55.200	U
ARSENIC	MG/KG	29.700		26.200		8.900		62.700	
BARIUM	MG/KG	16.500	B	262.000		186.000		79.900	
BERYLLIUM	MG/KG	0.430	U	0.540	B	0.800	B	0.450	U
CADMIUM	MG/KG	13.300	BJ	4.600	UJ	2.300	UJ	6.300	BJ
CALCIUM	MG/KG	5400.000		53600.000		108000.000		49700.000	
CHROMIUM	MG/KG	1410.000		344.000		53.900		512.000	
COBALT	MG/KG	48.700	B	24.000	B	9.200	B	23.100	B
COPPER	MG/KG	836.000		227.000		100.000		2520.000	
IRON	MG/KG	903000.000		265000.000		26700.000		323000.000	
LEAD	MG/KG	3.800	U	59.200		9.800		9.500	
MAGNESIUM	MG/KG	1010.000		5370.000		6010.000		2710.000	
MANGANESE	MG/KG	8680.000		2780.000		562.000		3330.000	
NICKEL	MG/KG	637.000		178.000		19.400		225.000	
POTASSIUM	MG/KG	297.000	B	833.000		1380.000	U	441.000	B
SELENIUM	MG/KG	4.300	U	4.300	U	4.300	U	4.300	U
SILVER	MG/KG	12.000	UR	12.000	UR	6.000	UR	12.000	UR
SODIUM	MG/KG	943.000		1330.000		6980.000		1620.000	
THALLIUM	MG/KG	29.900		11.300		3.600	UJ	14.900	
VANADIUM	MG/KG	8.600	UJ	8.600	UJ	43.800	BJ	8.600	UJ
ZINC	MG/KG	99.600		126.000		106.000		162.000	

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

Verified HRG 1/5/96

009

Revised HRG 1/5/96

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1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

B0GNY3

Lab Name: QUANTERRA_MO Contract: 550.105
Lab Code: ITMO Case No.: SAS No.: SDG No.: W0751
Matrix (soil/water): SOIL Lab Sample ID: 9491-002
Level (low/med): LOW Date Received: 10/03/95
% Solids: 100.0

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

CAS No.	Analyte	Concentration	C	Q	M	Q
7429-90-5	Aluminum	4850			P	
7440-36-0	Antimony	55.2	U	N	P	
7440-38-2	Arsenic	39.0			P	
7440-39-3	Barium	127			P	
7440-41-7	Beryllium	0.54	~~B~~		P	UB TMC 12-21
7440-43-9	Cadmium	5.1	~~B~~	N	P	BJ
7440-70-2	Calcium	35900		E	P	
7440-47-3	Chromium	677			P	
7440-48-4	Cobalt	24.6	B		P	
7440-50-8	Copper	386			P	
7439-89-6	Iron	402000			P	
7439-92-1	Lead	84.2			P	
7439-95-4	Magnesium	4760			P	
7439-96-5	Manganese	4240			P	
7440-02-0	Nickel	363		E	P	
7440-09-7	Potassium	921			P	
7782-49-2	Selenium	4.3	U	N	P	
7440-22-4	Silver	12.0	~~U~~	N	P	UR
7440-23-5	Sodium	5260			P	
7440-28-0	Thallium	16.7			P	
7440-62-2	Vanadium	8.6	~~U~~	N	P	UJ
7440-66-6	Zinc	108		N	P	

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Comments: Verified TMC 12-21-95

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U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

B0GNX9

Lab Name: QUANTERRA_MO
Lab Code: ITMO Case No.:
Matrix (soil/water): SOIL
Level (low/med): LOW
% Solids: 100.0

Contract: 550.105
SAS No.:
SDG No.: W0751
Lab Sample ID: 9491-001
Date Received: 10/03/95

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

CAS No.	Analyte	Concentration	C	Q	M	Q
7429-90-5	Aluminum	3680			P	
7440-36-0	Antimony	55.2	U	N	P	
7440-38-2	Arsenic	40.5			P	
7440-39-3	Barium	87.3			P	
7440-41-7	Beryllium	0.54	~~B~~		P	~~U~~ B TWS 12-21
7440-43-9	Cadmium	12.1	~~B~~	N	P	BJ
7440-70-2	Calcium	28700		E	P	
7440-47-3	Chromium	979			P	
7440-48-4	Cobalt	37.4	B		P	
7440-50-8	Copper	641			P	
7439-89-6	Iron	622000			P	
7439-92-1	Lead	3.8	U		P	
7439-95-4	Magnesium	3140			P	
7439-96-5	Manganese	6360			P	
7440-02-0	Nickel	514		E	P	
7440-09-7	Potassium	738			P	
7782-49-2	Selenium	4.3	U	N	P	
7440-22-4	Silver	12.0	~~U~~	N	P	UR
7440-23-5	Sodium	2890			P	
7440-28-0	Thallium	22.5			P	
7440-62-2	Vanadium	8.6	~~U~~	N	P	UJ
7440-66-6	Zinc	144		N	P	

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Comments: Verified TWS 12-21-95

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

B0GNY4

Lab Name: QUANTERRA MO Contract: 550.105
Lab Code: ITMO Case No.: SAS No.: SDG No.: W0751
Matrix (soil/water): SOIL Lab Sample ID: 9491-003
Level (low/med): LOW Date Received: 10/03/95
% Solids: 100.0

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

CAS No.	Analyte	Concentration	C	Q	M	Q
7429-90-5	Aluminum	932			P	
7440-36-0	Antimony	55.2	U	N	P	
7440-38-2	Arsenic	30.0			P	
7440-39-3	Barium	16.9	B		P	
7440-41-7	Beryllium	0.48	~~B~~		P	U
7440-43-9	Cadmium	11.9	~~B~~	N	P	BJ
7440-70-2	Calcium	5310		E	P	
7440-47-3	Chromium	1450			P	
7440-48-4	Cobalt	51.2	B		P	
7440-50-8	Copper	892			P	
7439-89-6	Iron	918000			P	
7439-92-1	Lead	3.8	U		P	
7439-95-4	Magnesium	1040			P	
7439-96-5	Manganese	8820			P	
7440-02-0	Nickel	653		E	P	
7440-09-7	Potassium	325	B		P	
7782-49-2	Selenium	4.3	U	N	P	
7440-22-4	Silver	12.0	~~U~~	N	P	UR
7440-23-5	Sodium	926			P	
7440-28-0	Thallium	30.7			P	
7440-62-2	Vanadium	8.6	~~U~~	N	P	UJ
7440-66-6	Zinc	108		N	P	

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

B0GNY5

Lab Name: QUANTERRA_MO
Lab Code: ITMO Case No.:
Matrix (soil/water): SOIL
Level (low/med): LOW
% Solids: 100.0

Contract: 550.105
SAS No.:
SDG No.: W0751
Lab Sample ID: 9491-004
Date Received: 10/03/95

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

CAS No.	Analyte	Concentration	C	Q	M	Q
7429-90-5	Aluminum	3780			P	
7440-36-0	Antimony	55.2	U	N	P	
7440-38-2	Arsenic	28.6			P	
7440-39-3	Barium	120			P	
7440-41-7	Beryllium	0.50	~~B~~		P	U
7440-43-9	Cadmium	4.6	~~U~~	N	P	UJ
7440-70-2	Calcium	32300		E	P	
7440-47-3	Chromium	732			P	
7440-48-4	Cobalt	30.0	B		P	
7440-50-8	Copper	467			P	
7439-89-6	Iron	449000			P	
7439-92-1	Lead	4.9			P	
7439-95-4	Magnesium	3290			P	
7439-96-5	Manganese	4650			P	
7440-02-0	Nickel	389		E	P	
7440-09-7	Potassium	679			P	
7782-49-2	Selenium	4.3	U	N	P	
7440-22-4	Silver	12.0	~~U~~	N	P	UR
7440-23-5	Sodium	3350			P	
7440-28-0	Thallium	17.6			P	
7440-62-2	Vanadium	8.6	~~U~~	N	P	UJ
7440-66-6	Zinc	104		N	P	

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

B0GNY6

Lab Name: QUANTERRA_MO Contract: 550.105
Lab Code: ITMO Case No.: SAS No.: SDG No.: W0751
Matrix (soil/water): SOIL Lab Sample ID: 9491-005
Level (low/med): LOW Date Received: 10/03/95
% Solids: 100.0

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

CAS No.	Analyte	Concentration	C	Q	M	Q
7429-90-5	Aluminum	906			P	
7440-36-0	Antimony	55.2	U	N	P	
7440-38-2	Arsenic	29.7			P	
7440-39-3	Barium	16.5	B		P	
7440-41-7	Beryllium	0.43	~~B~~		P	U
7440-43-9	Cadmium	13.3	~~B~~	N	P	BJ
7440-70-2	Calcium	5400		E	P	
7440-47-3	Chromium	1410			P	
7440-48-4	Cobalt	48.7	B		P	
7440-50-8	Copper	836			P	
7439-89-6	Iron	903000			P	
7439-92-1	Lead	3.8	U		P	
7439-95-4	Magnesium	1010			P	
7439-96-5	Manganese	8680			P	
7440-02-0	Nickel	637		E	P	
7440-09-7	Potassium	297	B		P	
7782-49-2	Selenium	4.3	U	N	P	
7440-22-4	Silver	12.0	~~U~~	N	P	UR
7440-23-5	Sodium	943			P	
7440-28-0	Thallium	29.9			P	
7440-62-2	Vanadium	8.6	~~U~~	N	P	UJ
7440-66-6	Zinc	99.6		N	P	

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Comments:

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

B0GNY7

Lab Name: QUANTERRA MO
Lab Code: ITMO Case No.:
Matrix (soil/water): SOIL
Level (low/med): LOW
% Solids: 100.0

Contract: 550.105
SAS No.:
SDG No.: W0751
Lab Sample ID: 9491-006
Date Received: 10/03/95

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

CAS No.	Analyte	Concentration	C	Q	M	Q
7429-90-5	Aluminum	6180			P	
7440-36-0	Antimony	55.2	U	N	P	
7440-38-2	Arsenic	26.2			P	
7440-39-3	Barium	262			P	
7440-41-7	Beryllium	0.54	~~B~~		P	UB TMS 12-21
7440-43-9	Cadmium	4.6	~~U~~	N	P	UJ
7440-70-2	Calcium	53600		E	P	
7440-47-3	Chromium	344			P	
7440-48-4	Cobalt	24.0	B		P	
7440-50-8	Copper	227			P	
7439-89-6	Iron	265000			P	
7439-92-1	Lead	59.2			P	
7439-95-4	Magnesium	5370			P	
7439-96-5	Manganese	2780			P	
7440-02-0	Nickel	178		E	P	
7440-09-7	Potassium	833			P	
7782-49-2	Selenium	4.3	U	N	P	
7440-22-4	Silver	12.0	~~U~~	N	P	UR
7440-23-5	Sodium	1330			P	
7440-28-0	Thallium	11.3			P	
7440-62-2	Vanadium	8.6	~~U~~	N	P	UJ
7440-66-6	Zinc	126		N	P	

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

Comments:

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

B0GNY8

Lab Name: QUANTERRA_MO
Lab Code: ITMO Case No.:
Matrix (soil/water): SOIL
Level (low/med): LOW
% Solids: 100.0

Contract: 550.105
SAS No.:
SDG No.: W0751
Lab Sample ID: 9491-007
Date Received: 10/03/95

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

CAS No.	Analyte	Concentration	C	Q	M	Q
7429-90-5	Aluminum	10800			P	
7440-36-0	Antimony	27.6	U	N	P	
7440-38-2	Arsenic	8.9			P	
7440-39-3	Barium	186			P	
7440-41-7	Beryllium	0.80	~~B~~		P	~~U~~ B TMS 12-21
7440-43-9	Cadmium	2.3	~~U~~	N	P	UJ
7440-70-2	Calcium	108000		E	P	
7440-47-3	Chromium	53.9			P	
7440-48-4	Cobalt	9.2	B		P	
7440-50-8	Copper	100			P	✓
7439-89-6	Iron	26700			P	
7439-92-1	Lead	9.8			P	
7439-95-4	Magnesium	6010			P	
7439-96-5	Manganese	562			P	
7440-02-0	Nickel	19.4		E	P	
7440-09-7	Potassium	1380	U		P	
7782-49-2	Selenium	4.3	U	N	P	
7440-22-4	Silver	6.0	~~U~~	N	P	UR
7440-23-5	Sodium	6980			P	
7440-28-0	Thallium	3.6	~~U~~		P	UJ
7440-62-2	Vanadium	43.8	~~B~~	N	P	BJ
7440-66-6	Zinc	106		N	P	

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

Comments:

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1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

B0GNY9

Lab Name: QUANTERRA MO Contract: 550.105
Lab Code: ITMO Case No.: SAS No.: SDG No.: W0751
Matrix (soil/water): SOIL Lab Sample ID: 9491-008
Level (low/med): LOW Date Received: 10/03/95
% Solids: 100.0

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

CAS No.	Analyte	Concentration	C	Q	M	Q
7429-90-5	Aluminum	5060			P	
7440-36-0	Antimony	55.2	U	N	P	
7440-38-2	Arsenic	62.7			P	
7440-39-3	Barium	79.9			P	
7440-41-7	Beryllium	0.45	~~B~~		P	U
7440-43-9	Cadmium	6.3	~~B~~	N	P	BJ
7440-70-2	Calcium	49700		E	P	
7440-47-3	Chromium	512			P	
7440-48-4	Cobalt	23.1	B		P	
7440-50-8	Copper	2520			P	
7439-89-6	Iron	323000			P	
7439-92-1	Lead	9.5			P	
7439-95-4	Magnesium	2710			P	
7439-96-5	Manganese	3330			P	
7440-02-0	Nickel	225		E	P	
7440-09-7	Potassium	441	B		P	
7782-49-2	Selenium	4.3	U	N	P	
7440-22-4	Silver	12.0	~~U~~	N	P	UR
7440-23-5	Sodium	1620			P	
7440-28-0	Thallium	14.9			P	
7440-62-2	Vanadium	8.6	~~U~~	N	P	UJ
7440-66-6	Zinc	162		N	P	

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

Comments:

FORM I - IN

SW-846

TMS 12-21-95
~~0600040~~

017

ATTACHMENT 4

LABORATORY NARRATIVE and CHAIN-OF-CUSTODY DOCUMENTATION

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Quanterra
Environmental Services

CERTIFICATE OF ANALYSIS

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

October 26, 1995

Attention: Joan Kessner

NOV 1995
RECEIVED
Data
Log In

Project number	:	550.105
Date Received by Lab	:	October 3, 1995
Number of Samples	:	Eight (8)
Sample Type	:	Solid
SDG Number	:	W0751
Data Deliverable	:	Summary

I. Introduction

On October 3, 1995, eight (8) solid samples were received by Quanterra, Richland and transferred to Quanterra, St. Louis for chemical analysis. Upon receipt, the samples were given the following laboratory ID numbers to correspond with the specific client ID's:

St Louis ID	BHI ID	Richland ID	Matrix	Date of Receipt
9491-001	B0GNX9	51003401	Solid	10/03/95
9491-002	B0GNY3	51003402	Solid	10/03/95
9491-003	B0GNY4	51003403	Solid	10/03/95
9491-004	B0GNY5	51003404	Solid	10/03/95
9491-005	B0GNY6	51003405	Solid	10/03/95
9491-006	B0GNY7	51003406	Solid	10/03/95
9491-007	B0GNY8	51003407	Solid	10/03/95
9491-008	B0GNY9	51003408	Solid	10/03/95

019

TMS 12-22-95

Quanterra
Environmental Services

Bechtel Hanford Incorporated
October 26, 1995
Project Number: 550.105
SDG: W0751
Page 2

II. Analytical Results/ Methodology

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

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

III. Quality Control

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

IV. Definitions

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

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

020
TNS 12-22-95
~~000003~~

Quanterra
Environmental Services

Bechtel Hanford Incorporated
October 26, 1995
Project Number: 550.105
SDG: W0751
Page 3

V. Comments

Percent solids was not determined for the samples in SDG W0751. Due to software configuration, the CLP forms list solid sample result units as " dry weight" and % solids as " 100 ". The results on the forms are actually mg/Kg as is and are not corrected for percent solids. The figure of 100 was used as percent solids for calculation purposes only and does not represent measured solids content of the samples.

All the samples in SDG W0751 required dilution due to interelement interferences. The instrument software flagged the undiluted run with an error code indicating that an interferant, in this case Calcium for 9491-007 and Iron for all the other samples , was interfering with the analysis of most of the elements requested. The samples were diluted and reanalyzed without interference errors.

The following list of elements had recoveries outside the 80%-120% range for the Matrix Spike and Matrix Spike Duplicate.

	MS	MSD
Antimony	132.5	0
Cadmium	38.2	67.5
Selenium	79.8	(within range)
Silver	0	0
Vanadium	52.9	61.9
Zinc	(within range)	127.9

The Relative Percent Difference for the serial dilution for Arsenic (16.5), Calcium (10.7), Nickel (14.5) and Thallium (39.3) was greater than 10 therefore all associated data was flagged with an "E".

The Matrix Spike recovery for the Cyanide analysis on sample 9491-001 was outside of the suggested limits of 75-125%.

021
TNS 12-22-95

Quanterra
Environmental Services

Bechtel Hanford Incorporated
October 26, 1995
Project Number: 550.105
SDG: W0751
Page 4

The Relative Percent Difference could not be calculated due to the values being below the detection limits for sample 9491-001 and it's duplicate on the Formate analysis.

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

The Relative Percent Difference could not be calculated due to the values being below the detection limits for sample 9491-001 and it's duplicate on the Phosphate and Bromide analyses.

The Matrix Spike recovery for the Fluoride, Sulfate, and Nitrate analyses on sample 9491-001 were outside of the suggested limits of 75-125% due to the spike concentration exceeding the sample concentration by a factor of four or more.

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

Samples, 9491-003, -006 and -008, were manually integrated for Fluoride to level the baseline.

Samples, 9491-001, -001DUP, -002, -003, -007, and -008, were diluted for Bromide to reduce the interfering Nitrate peak on the ion chromatogram, resulting in a higher detection limit.

TAB 12-22-95
022

Quanterra
Environmental Services

Bechtel Hanford Incorporated
October 26, 1995
Project Number: 550.105
SDG: W0751
Page 5

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\hanw0751.nar

023
12-22-95

Bechtel Hanford, Inc.

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

Page 1 of 2

Date Turnaround: X Priority / Normal

Collector: D Bowers, M. Mehlhorn	Company Contact: Dave Encke	Telephone: 373-3461
Project Designation: Concrete Removal Characterization	Sampling Location: 183-H Solar Evaporation Basin Project	SAF No.: B95-108
Ice Chest No.: ER-20	Field Logbook No.:	Method of Shipment: Hand Deliver - Government Vehicle
Shipped To: Quanterra	Offsite Property No.: N/A	Bill of Lading/Air Bill No.: N/A

Possible Sample Hazards/Remarks

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

Preservation	Cool	Cool	Cool	Cool	None	None				
Type of Container	A-G	A-G	A-G	A-G	G	P				
No. of Container(s)	1	1	1	1	1	1				
Volume	40 ml.	60 ml.	60 ml.	60 ml.	1 Liter	20 ml.				
SAMPLE ANALYSIS	ICP Metals Include Super trace	5/100 Anions See Item 1 Below	3 4 Cyanide	100% Sulfide	5/100 See Item 2 Below	35 Activity Scan				

Sample No.	Matrix*	Date Sampled	Time Sampled	ICP Metals	Anions	Cyanide	Sulfide	See Item 2 Below	Activity Scan				
BOGNX9	DS	10-2-95	1305	✓	✓	✓	✓	✓	✓	01			
BOGNY3	DS	10-2-95	1330	✓	✓	✓	✓	✓	✓	2			
BOGNY4	DS	10-2-95	1353	✓	✓	✓	✓	✓	✓	3			
BOGNY5	DS	10-2-95	1410	✓	✓	✓	✓	✓	✓	4			
BOGNY6	DS	10-2-95	1410	✓	✓	✓	✓	✓	✓	5			
BOGNY7	DS	10-2-95	1435	✓	✓	✓	✓	✓	✓	6			

CHAIN OF POSSESSION — Sign/Print Names

Relinquished By	Date/Time	Received By	Date/Time
Mandy Mehlhorn, Mary Mellen	10-2-95 1700	D St. John, ERC	10-2-95 1700
D St. John, ERC	10-3-95 1140	ERC, B Whitten	10-3-95 1140
ERC, B Whitten	10-3-95 12:10	[illegible]	10-3-95 12:10

SPECIAL INSTRUCTIONS

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

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

SDG W0751

Matrix*: B = 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

12-22-95

024

Bechtel Hanford, Inc.

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

Page 2 of 2

Date Turnaround: X Priority / Normal

Collector	Company Contact: Dave Encke	Telephone: 373-3461
Project Designation: Concrete Removal Characterization	Sampling Location: 183-H Solar Evaporation Basin Project	SAF No.: B95-106
Ice Chest No.: ER-20	Field Logbook No.	Method of Shipment: Hand Deliver - Government Vehicle
Shipped To: Quanterra	Offsite Property No.: N/A	Bill of Lading/Air Bill No.: N/A

Possible Sample Hazards/Remarks

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

Preservation	Cool	Cool	Cool	Cool	None	None				
Type of Container	A-G	A-G	A-G	A-G	G	P				
No. of Container(s)	1	1	1	1	1	1				
Volume	40 ml.	60 ml.	60 ml.	60 ml.	1 Liter	20 ml.				
SAMPLE ANALYSIS	ICP Metals Include Super-trace	510034 Anions See Item 1 Below	Cyanide	Sulfide	510035 See Item 2 Below	Activity Scan				

Sample No.	Matrix*	Date Sampled	Time Sampled										
BOGNY8	DS	10-2-95	1447	✓	✓	✓	✓	✓	✓	7			
BOGNY9	DS	10-2-95	1506	✓	✓	✓	✓	✓	✓	8			
~~BOGN20~~	DS 10-2-95			↓	↓	↓	↓						
~~BOGN21~~				50%	100%	100%	100%						
~~BOGN22~~													

CHAIN OF POSSESSION — Sign/Print Names

Relinquished By	Date/Time	Received By	Date/Time
Randy McKibben Mary McMillan	10-2-95 1700	David S. John ERC	10-2-95 1700
David S. John ERC	10-3-95 1140	ERC B. Whitten	10-3-95 1140
ERC B. Whitten	10-3-95 12:10	[illegible]	10-3-95 12:10

SPECIAL INSTRUCTIONS

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

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

SDG W0751

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

025

H-33

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ATTACHMENT 5

DATA VALIDATION SUPPORTING DOCUMENTATION

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

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: 183-H BASIN D&D			DATA PACKAGE: W0751-QES		
VALIDATOR: T. Stapp		LAB: QUANTERRA		DATE: 12-21-95	
CASE:			SDG:		

TAO 12-21-95 ANALYSES PERFORMED TMS 12-21-95

☒ CLP/ICP	☐ CLP/GFAA	☐ CLP/Hg	☐ CLP/Cyanide	~~☒ ICP; As Pb Se Tl~~	☐
☒ SW-846/ICP	☐ SW-846/GFAA	☐ SW-846/Hg	☐ SW-846 Cyanide	☐	☐

SAMPLES/MATRIX B06NX9 B06NY3 through B06NY9 / Eight Samples / DRUM SOLIDS

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

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

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

Comments:

2. HOLDING TIMES

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

Comments: See support form B-1.

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

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

3. INSTRUMENT PERFORMANCE AND CALIBRATIONS

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

4. BLANKS

Were ICB and CCB checks performed for all applicable analyses? Yes No N/A
Are ICB and CCB results acceptable? . . . . . Yes No N/A
Were preparation blanks analyzed? . . . . . Yes No N/A
Are preparation blank results acceptable? . . . . . Yes No N/A
Were field/trip blanks analyzed? . . . . . Yes No N/A
Are field/trip blank results acceptable? . . . . . Yes No N/A
Comments: Be; ICB affects BC6NY4, -NY5, -NY6 and -NY9 (UJ); Thallium prep. blank affects BC6NY8 (UJ); Vanadium prep. blank affects BC6NX9, BC6NY3, -NY4, -NY5, -NY6, -NY7, and -NY9 (UJ): Prep blank contaminants are negative and > |IDL|, associated results < IDL are qualified as estimated (UJ).

5. ACCURACY

Were spike samples analyzed? . . . . . Yes No N/A
Are spike sample recoveries acceptable? . NOTE ① . . . . . Yes No N/A
Were laboratory control samples (LCS) analyzed? . . . . . Yes No N/A
Are LCS recoveries acceptable? . . . . . NOTE ② . . . . Yes No N/A
Comments: ① MS recovery exceeded for Sb, below 75% for Cd, and V, and < 30% for Silver. Associated results for Sb are qualif. (J) for results > IDL, (J/UJ) for Cd and V results, and (J/UR) for Ag results.

② LCS analysis not required for SW-846 analysis.

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

6. PRECISION

Were laboratory duplicates analyzed? . . . . . Yes No N/A
Are laboratory duplicate samples RPD values acceptable? . . . . Yes No N/A NOTE ①
Were ICP serial dilution samples analyzed? . . . . . Yes No N/A
Are ICP serial dilution %D values acceptable? . . . . . Yes No N/A
Are field duplicate RPD values acceptable? . . . . . Yes No N/A
Are field split RPD values acceptable? . . . . . Yes No N/A

Comments: ① RPD values for Sb and Cd exceeded the ~~20% limit~~ 35% limit and qualify associated sample results as estimated (J). See Form VI. No detected results for antimony (Sb) and no qualifyer is applied. TAD 12-21

7. FURNACE AA QUALITY CONTROL

Were duplicate injections performed as required? . . . . . Yes No N/A
Are duplicate injection %RSD values acceptable? . . . . . Yes No N/A
Were analytical spikes performed as required? . . . . . Yes No N/A
Are analytical spike recoveries acceptable? . . . . . Yes No N/A
Was MSA performed as required? . . . . . Yes No N/A
Are MSA results acceptable? . . . . . Yes No N/A

Comments:

8. REPORTED RESULTS AND DETECTION LIMITS

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

Comments:

029

HOLDING TIME SUMMARY

SDG: W0751-QES	VALIDATOR: T. Stapp	DATE: 12-21-95	PAGE 1 OF 2
COMMENTS:			

FIELD SAMPLE ID	ANALYSIS TYPE	DATE SAMPLED	DATE PREPARED	DATE ANALYZED	PREP. HOLDING TIME, DAYS	ANALYSIS HOLDING TIME, DAYS	QUALIFIER
B0GNY3	ICP	10-02-95	NA	10-10-95	NA	8	NONE
NY5							
NY7							
NY8							
NY9							
B0GNX9	ICP; Al	10-02-95	NA	10-10-95	NA	8	NONE
	Ba, Be, Ca, Mg						
	Ni, K, Na, Zn						
B0GNX9	ICP; Sb, Cd, Cr	10-02-95		10-11-95		9	
	Co, Cu, Fe, Mn						
	Ag, Zn						
B0GNY4	Al, Ba, Be, Ca	10-02-95		10-10-95		8	
	Mg, Ni, K, Na, Zn						
	Sb, Cd, Cr, Cu, Co						
	Mn, Ag, V						
B0GNY4	Fe	10-02-95		10-11-95		9	

HOLDING TIME SUMMARY

SDG: W0751-QES	VALIDATOR: T. STAPP	DATE: 12-21-95	PAGE 2 OF 2
COMMENTS:			

FIELD SAMPLE ID	ANALYSIS TYPE	DATE SAMPLED	DATE PREPARED	DATE ANALYZED	PREP. HOLDING TIME, DAYS	ANALYSIS HOLDING TIME, DAYS	QUALIFIER
B0GNY6	All ICP (Fe Except)	10-02-95	NA	10-10-95	NA	8	NONE
B0GNY6	Fe	10-02-95	↓	10-11-95	↓	9	NONE
B0GNX9	As, Pb, Se, Tl	10-02-95	NA	10-11-95	NA	9	NONE
B0GNY3	↓	↓	↓	↓	↓	↓	↓
NY4							
NY5							
NY6							
NY7							
NY8							
NY9							

U.S. EPA - CLP

3
BLANKS

Lab Name: QUANTERRA_MO_____ Contract: 550.105___

Lab Code: ITMO__ Case No.: _____ SAS No.: _____ SDG No.: W0751_____

Preparation Blank Matrix (soil/water): SOIL_

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

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1 CCB1	C	2 CCB2	C	3 CCB3	C	Preparation Blank	C	M
Aluminum	22.3	U	22.3	U	22.3	U	22.3	U	2.230	U	P
Antimony	27.6	U	27.6	U	27.6	U	27.6	U	2.760	U	P
Arsenic	3.1	U	3.1	U	3.1	U	3.1	U	0.310	U	P
Barium	0.8	U	0.8	U	0.8	U	0.8	U	-0.109	B	P
Beryllium	1.0	B	0.6	U	0.6	U	0.6	B	0.060	U	P
Cadmium	2.3	U	2.3	U	2.3	U	2.3	U	0.230	U	P
Calcium	18.8	U	33.3	B	18.8	U	24.7	B	~~2.806~~	~~B~~	P
Chromium	3.7	U	3.7	U	3.7	U	3.7	U	0.370	U	P
Cobalt	4.2	U	4.2	U	4.2	U	4.2	U	0.420	U	P
Copper	3.6	U	3.6	U	5.5	B	3.6	U	~~-1.736~~	~~B~~	P
Iron	7.8	B	21.1	B	~~25.3~~	B	7.4	B	~~1.232~~	~~B~~	P
Lead	0.8	U	0.8	U	0.8	U	0.8	U	~~0.082~~	~~B~~	P
Magnesium	63.3	U	63.3	U	63.3	U	63.3	U	~~-13.885~~	~~B~~	P
Manganese	1.5	B	1.6	B	~~2.9~~	B	1.5	B	~~-0.098~~	~~B~~	P
Nickel	11.3	U	11.3	U	11.3	U	11.3	U	1.130	U	P
Potassium	1382.4	U	1382.4	U	1382.4	U	1382.4	U	138.240	U	P
Selenium	2.6	U	~~4.5~~	~~B~~	2.6	U	2.6	U	0.260	U	P
Silver	6.0	U	6.0	U	6.0	U	6.0	U	0.600	U	P
Sodium	27.7	U	28.0	B	47.0	B	64.0	B	~~-10.373~~	~~B~~	P
Thallium	4.1	U	-5.8	B	-4.6	B	4.1	U	~~-0.729~~	~~B~~	P
Vanadium	4.3	U	4.3	U	4.3	U	4.3	U	~~-1.007~~	~~B~~	P
Zinc	1.7	U	1.7	U	1.7	U	1.7	U	~~0.246~~	~~B~~	P

Be All except BOGNY8
~~Mn Not applic. CCB2~~
~~CCB1 not applic.~~
~~Se BOGNX9~~
~~NY3,4,5~~
~~Fe BOGNY3~~
~~NY5~~
~~NY7,8,9~~
12-28-95

~~Na J/UJ all <10x~~ ~~Ca All Smpls~~
Tl J/UJ all <10x ~~Cu J/UJ all <10x~~
V J/UJ all <10x ~~Pb all smpls~~ SW-846
~~Zn All smpls~~ ~~Mg J/UJ all <10x~~
~~Mn J/UJ all <10x~~
12-28-95

FORM III - IN

~~0000054~~ 032

U.S. EPA - CLP

5A
SPIKE SAMPLE RECOVERY

EPA SAMPLE NO.

B0GNX9S

Lab Name: QUANTERRA_MO Contract: 550.105

Lab Code: ITMO Case No.: SAS No.: SDG No.: W0751

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

% Solids for Sample: 100.0

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

Analyte	Control Limit %R	Spiked Sample Result (SSR)	C	Sample Result (SR)	C	Spike Added (SA)	%R	Q	M
Aluminum									NR
Antimony	80-120	66.2520	B	55.2000	U	50.00	132.5	N	P
Arsenic	80-120	227.1660		40.4690		200.00	93.3		P
Barium	80-120	282.6390		87.2770		200.00	97.7		P
Beryllium	80-120	5.2710		0.5370	B	5.00	94.7		P
Cadmium	80-120	14.0400	B	12.1280	B	5.00	38.2	N	P
Calcium									NR
Chromium		891.5340		979.1980		20.00	-438.3		P
Cobalt	80-120	88.0300	B	37.4040	B	50.00	101.3		P
Copper		587.5840		641.0640		25.00	-213.9		P
Iron									NR
Lead	80-120	43.5450		3.8200	U	50.00	87.1		P
Magnesium									NR
Manganese		5793.2440		6355.3080		50.00	-1124.1		P
Nickel		524.8460		514.3310		50.00	21.0		P
Potassium									NR
Selenium	80-120	159.5900		4.2600	U	200.00	79.8	N	P
Silver	80-120	12.0000	U	12.0000	U	5.00	0.0	N	P
Sodium									NR
Thallium	80-120	188.0300		22.4510		200.00	82.8		P
Vanadium	80-120	26.4720	B	8.6000	U	50.00	52.9	N	P
Zinc	80-120	198.8040		143.9610		50.00	109.7		P

Comments: All samples in SDG are associated and qualified accordingly. See Section 5.
See MSD recovery acceptable, No qualif. applied.

FORM V (Part 1) - IN SW-846

12-21-95

~~0600261~~ 033

U.S. EPA - CLP

6A
MATRIX SPIKE DUPLICATES

EPA SAMPLE NO.

B0GNX9SD

Lab Name: QUANTERRA MO Contract: 550.105

Lab Code: ITMO Case No.: SAS No.: SDG No.: W0751

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

% Solids: 100.0

Percent recoveries:

Analyte	Control Limit	Matrix Spike (S)	Matrix Spike Duplicate (SD)	RPD	Q	M
Al	20%					NR
Sb	20%	132.50	0.00	200.0		P
As	20%	93.30	96.60	3.5		P
Ba	20%	97.70	108.10	10.1		P
Be	20%	94.70	96.80	2.2		P
Cd	20%	38.20	67.50	55.4		P
Ca	20%					NR
Cr	20%					P
Co	20%	101.30	91.80	9.8		P
Cu	20%					P
Fe	20%					NR
Pb	20%	79.90	84.00	5.0		P
Mg	20%					NR
Mn	20%					P
Ni	20%	~~21.00~~		~~200.0~~		P
K	20%					NR
Se	20%	79.80	83.80	4.9		P
Ag	20%	0.00	0.00			P
Na	20%					NR
Tl	20%	82.80	84.50	2.0		P
V	20%	52.90	61.90	15.7		P
Zn	20%	109.70	127.90	15.3		P

TMJ 12-28-95

TMJ 12-28-95

All Samples in this SDG are associated and are qualified accordingly for above indicated analytes.

FORM VI - IN

TMJ 12-21-95

~~0600283~~

MEMORANDUM

TO: 183-H BASIN D&D SURFACE REMOVAL CHARACTERIZATION Project QA Record December 22, 1995

FR: Thomas Stapp, Golder Associates Inc. TMS

RE: GENERAL CHEMISTRY DATA VALIDATION SUMMARY FOR DATA PACKAGE W0751-QES (943-1610.112 751GEN.HBS)

INTRODUCTION

This memo presents the results of data validation for the analyses indicated below on data package WO751-QES prepared by Quanterra Environmental Services. Sample information is provided in the following table.

SAMPLE ID	COMMENTS	ANALYSIS	MEDIA
BOGNX9		INORGANICS	DRUM SOLID
BOGNY3			DRUM SOLID
BOGNY4		SEE ATTACHMENT 4	DRUM SOLID
BOGNY5			DRUM SOLID
BOGNY6			DRUM SOLID
BOGNY7			DRUM SOLID
BOGNY8			DRUM SOLID
BOGNY9			DRUM SOLID

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

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

DATA QUALITY OBJECTIVES

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

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

Accuracy. Goals for accuracy were met.

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

Completeness. The data package was complete for all requested analyses. Eight samples were validated in this data package with a total of eighty-eight determinations reported,

001

eighty of which were deemed valid. This results in a completeness of 91%, which meets the 90% objective of the work plan.

MAJOR DEFICIENCIES

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

Holding Time

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

MINOR DEFICIENCIES

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

Holding Time

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

Laboratory Duplicates

- Formate duplicate analysis relative percent difference was unacceptable. Attachments 2 and 5 provide a summary of the samples affected, data qualifications applied and supporting documentation.

REFERENCES

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

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

ATTACHMENT 1

GLOSSARY OF DATA REPORTING QUALIFIERS

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

Glossary of Inorganic Data Reporting Qualifiers.

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

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

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

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

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

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

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

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ATTACHMENT 2

SUMMARY OF DATA QUALIFICATIONS

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

DATA QUALIFICATION SUMMARY

SDG: WO751-QES	VALIDATOR: T.Stapp	DATE: 12-20-95	PAGE: 1 OF 1
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
FORMATE	J	ALL SAMPLES	LAB DUPLICATE RPD EXCEEDS 35%
NITRITE	J	ALL SAMPLES	HOLDING TIME IS EXCEEDED BY >2 TIMES THE LIMIT
NITRATE	J	ALL SAMPLES	HOLDING TIME IS EXCEEDED BY >2 TIMES THE LIMIT
ORTHO-PHOSPHATE	UR	ALL SAMPLES	HOLDING TIME IS EXCEEDED BY >2 TIMES THE LIMIT
pH	J	ALL SAMPLES	HOLDING TIME IS EXCEEDED BY <2 TIMES THE LIMIT

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ATTACHMENT 3

QUALIFIED DATA SUMMARY and ANNOTATED LABORATORY REPORTS

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Validated Data Summary, Data Package: W0751-QES

	Sample #	B0GNX9		B0GNY3		B0GNY4		B0GNY5		B0GNY6		B0GNY7		B0GNY8	
	Date	9/29/95		9/29/95		9/29/95		9/29/95		9/29/95		9/29/95		9/29/95	
	Location														
	Depth														
	Type	Drum Solid		Drum Solid		Drum Solid		Drum Solid		Drum Solid		Drum Solid		Drum Solid	
	Comments														
Parameter	Units	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
NO3-N	UG/G	299	J	910	J	262	J	204	J	239	J	43.2	J	535	J
NO2-N	UG/G	3.28	J	3.61	J	5.18	J	1	J	1.1	J	0.91	J	177	J
ORTHO-PO4	UG/G	4.96	UR	4.54	UR	4.83	UR	4.93	UR	5	UR	4.34	UR	5	UR
SO4	UG/G	1010		570		247		144		165		433		745	
CL	UG/G	30.3		10.2		54.8		3.96		4.3		6.07		60.2	
F	UG/G	22.1		22.9		27.1		38.6		42.7		4.68		18.5	
BR	UG/G	24.8	U	22.7	U	4.83	U	2.47	U	2.5	U	2.17	U	12.5	U
pH	pH	10.92	J	10.92	J	11.35	J	10.51	J	10.57	J	11.56	J	11.76	J
SULFIDE	UG/G	43.9		49.8		37.8		38.2		38.3		44		10.2	U
FORMATE	UG/G	19.4	J	50.4	J	24.7	J	10.1	J	10.3	J	42	J	51.2	J
CN	UG/G	1.44		1.25		1.51		0.56		0.5	U	0.53		1.01	

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

Verified HRG 1/5/96

Revised HRG 1/5/96

008

Validated Data Summary, Data Package: W0751-QES

	Sample #	B0GNY9	
	Date	10/2/95	
	Location		
	Depth		
	Type	Drum Solid	
	Comments		
Parameter	Units	Results	Q
NO3-N	UG/G	442	J
NO2-N	UG/G	1.9	J
ORTHO-PO4	UG/G	4.63	UR
SO4	UG/G	134	
CL	UG/G	13.4	
F	UG/G	3.34	
BR	UG/G	11.6	U
pH	pH	11.97	J
SULFIDE	UG/G	41.7	
FORMATE	UG/G	15.2	J
CN	UG/G	1.79	

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

Verified HRG
1/5/96

009
Revised HRG
1/5/96

Quanterra
Environmental Services

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

Project: 550.105

Category: Nitrate
Method: EPA 300.0
Matrix: SOLID

Sample Date : 10/02/95
Receipt Date : 10/03/95
Report Date : 10/17/95

Client ID	Quanterra ID	Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit	Dil.
BOGNX9	9491-001	Nitrate-N	14797-55-8	QCBLK80428-2A	10/12/95	10/12/95	299	UG/G	J	9.92	50
BOGNX9	9491-001DUP	Nitrate-N	14797-55-8	QCBLK80428-2A	10/12/95	10/12/95	266	UG/G		9.96	50
BOGNX9	9491-001MS	Nitrate-N	14797-55-8	QCBLK80428-2A	10/12/95	10/12/95	0	%REC			50
BOGNY3	9491-002	Nitrate-N	14797-55-8	QCBLK80428-2A	10/12/95	10/12/95	910	UG/G	J	36.3	200
BOGNY4	9491-003	Nitrate-N	14797-55-8	QCBLK80428-2A	10/12/95	10/12/95	262	UG/G	J	9.65	50
BOGNY5	9491-004	Nitrate-N	14797-55-8	QCBLK80428-2A	10/12/95	10/12/95	204	UG/G	J	9.86	50
BOGNY6	9491-005	Nitrate-N	14797-55-8	QCBLK80428-2A	10/12/95	10/12/95	239	UG/G	J	9.99	50
BOGNY7	9491-006	Nitrate-N	14797-55-8	QCBLK80428-2A	10/12/95	10/12/95	43.2	UG/G	J	3.47	20
BOGNY8	9491-007	Nitrate-N	14797-55-8	QCBLK80428-2B	10/12/95	10/13/95	535	UG/G	J	20.0	100
BOGNY9	9491-008	Nitrate-N	14797-55-8	QCBLK80428-2B	10/12/95	10/13/95	442	UG/G	J	18.5	100
NA	QCBLK80428-2A	Nitrate-N	14797-55-8	QCBLK80428-2A	10/12/95	10/12/95	0.20	UG/G	U	0.20	1
NA	QCBLK80428-2B	Nitrate-N	14797-55-8	QCBLK80428-2B	10/12/95	10/13/95	0.20	UG/G	U	0.20	1
NA	QCLCS80428-2A	Nitrate-N	14797-55-8	QCBLK80428-2A	10/12/95	10/12/95	100	%REC			1
NA	QCLCS80428-2B	Nitrate-N	14797-55-8	QCBLK80428-2B	10/12/95	10/13/95	100	%REC			1

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Quanterra
Environmental Services

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

Project: 550.105

Category: Nitrite
Method: EPA 300.0
Matrix: SOLID

Sample Date : 10/02/95
Receipt Date : 10/03/95
Report Date : 10/17/95

Client ID	Quanterra ID	Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit	Dil.
B0GNX9	9491-001	Nitrite-N	14797-65-0	QCBLK80428-2A	10/12/95	10/12/95	3.28	UG/G	J	0.20	1
B0GNX9	9491-001DUP	Nitrite-N	14797-65-0	QCBLK80428-2A	10/12/95	10/12/95	2.81	UG/G		0.20	1
B0GNX9	9491-001MS	Nitrite-N	14797-65-0	QCBLK80428-2A	10/12/95	10/12/95	66	%REC			5
B0GNY3	9491-002	Nitrite-N	14797-65-0	QCBLK80428-2A	10/12/95	10/12/95	3.61	UG/G	J	0.18	1
B0GNY4	9491-003	Nitrite-N	14797-65-0	QCBLK80428-2A	10/12/95	10/12/95	5.18	UG/G	J	0.39	2
B0GNY5	9491-004	Nitrite-N	14797-65-0	QCBLK80428-2A	10/12/95	10/12/95	1.00	UG/G	J	0.20	1
B0GNY6	9491-005	Nitrite-N	14797-65-0	QCBLK80428-2A	10/12/95	10/12/95	1.10	UG/G	J	0.20	1
B0GNY7	9491-006	Nitrite-N	14797-65-0	QCBLK80428-2A	10/12/95	10/12/95	0.91	UG/G	J	0.17	1
B0GNY8	9491-007	Nitrite-N	14797-65-0	QCBLK80428-2B	10/12/95	10/13/95	177	UG/G	J	20.0	100
B0GNY9	9491-008	Nitrite-N	14797-65-0	QCBLK80428-2B	10/12/95	10/13/95	1.90	UG/G	J	0.93	5
NA	QCBLK80428-2A	Nitrite-N	14797-65-0	QCBLK80428-2A	10/12/95	10/12/95	0.20	UG/G	U	0.20	1
NA	QCBLK80428-2B	Nitrite-N	14797-65-0	QCBLK80428-2B	10/12/95	10/13/95	0.20	UG/G	U	0.20	1
NA	QCLCS80428-2A	Nitrite-N	14797-65-0	QCBLK80428-2A	10/12/95	10/12/95	106	%REC			1
NA	QCLCS80428-2B	Nitrite-N	14797-65-0	QCBLK80428-2B	10/12/95	10/13/95	102	%REC			1

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Quanterra
Environmental Services

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

Project: 550.105

*Category: Orthophosphate
Method: EPA 300.0
Matrix: SOLID

Sample Date : 10/02/95
Receipt Date : 10/03/95
Report Date : 10/17/95

Client ID	Quanterra ID	Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit	Dil.
BOGNX9	9491-001	Ortho-Phosphate	14265-44-2	QCBLK80428-2A	10/12/95	10/12/95	4.96	UG/G	UR	4.96	1
BOGNX9	9491-001DUP	Ortho-Phosphate	14265-44-2	QCBLK80428-2A	10/12/95	10/12/95	4.98	UG/G	U	4.98	1
BOGNX9	9491-001MS	Ortho-Phosphate	14265-44-2	QCBLK80428-2A	10/12/95	10/12/95	108	%REC			1
BOGNY3	9491-002	Ortho-Phosphate	14265-44-2	QCBLK80428-2A	10/12/95	10/12/95	4.54	UG/G	UR	4.54	1
BOGNY4	9491-003	Ortho-Phosphate	14265-44-2	QCBLK80428-2A	10/12/95	10/12/95	4.83	UG/G	UR	4.83	1
BOGNY5	9491-004	Ortho-Phosphate	14265-44-2	QCBLK80428-2A	10/12/95	10/12/95	4.93	UG/G	UR	4.93	1
BOGNY6	9491-005	Ortho-Phosphate	14265-44-2	QCBLK80428-2A	10/12/95	10/12/95	5.00	UG/G	UR	5.00	1
BOGNY7	9491-006	Ortho-Phosphate	14265-44-2	QCBLK80428-2A	10/12/95	10/12/95	4.34	UG/G	UR	4.34	1
BOGNY8	9491-007	Ortho-Phosphate	14265-44-2	QCBLK80428-2B	10/12/95	10/13/95	5.00	UG/G	UR	5.00	1
BOGNY9	9491-008	Ortho-Phosphate	14265-44-2	QCBLK80428-2B	10/12/95	10/13/95	4.63	UG/G	UR	4.63	1
NA	QCBLK80428-2A	Ortho-Phosphate	14265-44-2	QCBLK80428-2A	10/12/95	10/12/95	5.00	UG/G	U	5.00	1
NA	QCBLK80428-2B	Ortho-Phosphate	14265-44-2	QCBLK80428-2B	10/12/95	10/13/95	5.00	UG/G	U	5.00	1
NA	QCLCS80428-2A	Ortho-Phosphate	14265-44-2	QCBLK80428-2A	10/12/95	10/12/95	103	%REC			1
NA	QCLCS80428-2B	Ortho-Phosphate	14265-44-2	QCBLK80428-2B	10/12/95	10/13/95	97	%REC			1

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TMS 12-20
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Quanterra
Environmental Services

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

Project: 550.105

*Category: SULFATE
Method: EPA 300.0
Matrix: SOLID

Sample Date : 10/02/95
Receipt Date : 10/03/95
Report Date : 10/17/95

Client ID	Quanterra ID	Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit	Dil.
B0GNX9	9491-001	Sulfate	14808-79-8	QCBLK80428-2A	10/12/95	10/12/95	1010	UG/G	~~J~~ TMS	49.6	10
B0GNX9	9491-001DUP	Sulfate	14808-79-8	QCBLK80428-2A	10/12/95	10/12/95	1000	UG/G		49.8	10
B0GNX9	9491-001MS	Sulfate	14808-79-8	QCBLK80428-2A	10/12/95	10/12/95	0	%REC			5
B0GNY3	9491-002	Sulfate	14808-79-8	QCBLK80428-2A	10/12/95	10/12/95	570	UG/G	~~J~~	45.4	10
B0GNY4	9491-003	Sulfate	14808-79-8	QCBLK80428-2A	10/12/95	10/12/95	247	UG/G	~~J~~	9.65	2
B0GNY5	9491-004	Sulfate	14808-79-8	QCBLK80428-2A	10/12/95	10/12/95	144	UG/G	~~J~~	4.93	1
B0GNY6	9491-005	Sulfate	14808-79-8	QCBLK80428-2A	10/12/95	10/12/95	165	UG/G	~~J~~	5.00	1
B0GNY7	9491-006	Sulfate	14808-79-8	QCBLK80428-2A	10/12/95	10/12/95	433	UG/G	~~J~~	86.7	20
B0GNY8	9491-007	Sulfate	14808-79-8	QCBLK80428-2B	10/12/95	10/13/95	745	UG/G	~~J~~	25.0	5
B0GNY9	9491-008	Sulfate	14808-79-8	QCBLK80428-2B	10/12/95	10/13/95	134	UG/G	~~J~~	4.63	1
NA	QCBLK80428-2A	Sulfate	14808-79-8	QCBLK80428-2A	10/12/95	10/12/95	5.00	UG/G	U	5.00	1
NA	QCBLK80428-2B	Sulfate	14808-79-8	QCBLK80428-2B	10/12/95	10/13/95	5.00	UG/G	U	5.00	1
NA	QCLCS80428-2A	Sulfate	14808-79-8	QCBLK80428-2A	10/12/95	10/12/95	93	%REC	TMS 12-21-95		1
NA	QCLCS80428-2B	Sulfate	14808-79-8	QCBLK80428-2B	10/12/95	10/13/95	92	%REC			1

TMS 12-20-95

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Quanterra
Environmental Services

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

Project: 550.105

Category: CHLORIDE
Method: EPA 300.0
Matrix: SOLID

Sample Date : 10/02/95
Receipt Date : 10/03/95
Report Date : 10/17/95

Client ID	Quanterra ID	Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit	Dil.
BOGNX9	9491-001	Chloride	16887-00-6	QCBLK80428-2A	10/12/95	10/12/95	30.3	UG/G		1.98	1
BOGNX9	9491-001DUP	Chloride	16887-00-6	QCBLK80428-2A	10/12/95	10/12/95	25.7	UG/G		1.99	1
BOGNX9	9491-001MS	Chloride	16887-00-6	QCBLK80428-2A	10/12/95	10/12/95	93	%REC			5
BOGNY3	9491-002	Chloride	16887-00-6	QCBLK80428-2A	10/12/95	10/12/95	10.2	UG/G		1.81	1
BOGNY4	9491-003	Chloride	16887-00-6	QCBLK80428-2A	10/12/95	10/12/95	54.8	UG/G		3.86	2
BOGNY5	9491-004	Chloride	16887-00-6	QCBLK80428-2A	10/12/95	10/12/95	3.96	UG/G		1.97	1
BOGNY6	9491-005	Chloride	16887-00-6	QCBLK80428-2A	10/12/95	10/12/95	4.30	UG/G		2.00	1
BOGNY7	9491-006	Chloride	16887-00-6	QCBLK80428-2A	10/12/95	10/12/95	6.07	UG/G		1.73	1
BOGNY8	9491-007	Chloride	16887-00-6	QCBLK80428-2B	10/12/95	10/13/95	60.2	UG/G		10.0	5
BOGNY9	9491-008	Chloride	16887-00-6	QCBLK80428-2B	10/12/95	10/13/95	13.4	UG/G		9.27	5
NA	QCBLK80428-2A	Chloride	16887-00-6	QCBLK80428-2A	10/12/95	10/12/95	2.00	UG/G	U	2.00	1
NA	QCBLK80428-2B	Chloride	16887-00-6	QCBLK80428-2B	10/12/95	10/13/95	2.00	UG/G	U	2.00	1
NA	QCLCS80428-2A	Chloride	16887-00-6	QCBLK80428-2A	10/12/95	10/12/95	98	%REC			1
NA	QCLCS80428-2B	Chloride	16887-00-6	QCBLK80428-2B	10/12/95	10/13/95	98	%REC			1

TMB 12-20-95

TMB 12-20
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Quanterra
Environmental Services

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

Project: 550.105

Category: FLUORIDE
Method: EPA 300.0
Matrix: SOLID

Sample Date : 10/02/95
Receipt Date : 10/03/95
Report Date : 10/17/95

Client ID	Quanterra ID	Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit	Dil.
BOGNX9	9491-001	Fluoride	16984-48-8	QCBLK80428-2A	10/12/95	10/12/95	22.1	UG/G	J	9.92	10
BOGNX9	9491-001DUP	Fluoride	16984-48-8	QCBLK80428-2A	10/12/95	10/12/95	23.2	UG/G		9.96	10
BOGNX9	9491-001MS	Fluoride	16984-48-8	QCBLK80428-2A	10/12/95	10/12/95	160	%REC			5
BOGNY3	9491-002	Fluoride	16984-48-8	QCBLK80428-2A	10/12/95	10/12/95	22.9	UG/G	J	9.07	10
BOGNY4	9491-003	Fluoride	16984-48-8	QCBLK80428-2A	10/12/95	10/12/95	27.1	UG/G	J	1.93	2
BOGNY5	9491-004	Fluoride	16984-48-8	QCBLK80428-2A	10/12/95	10/12/95	38.6	UG/G	J	0.99	1
BOGNY6	9491-005	Fluoride	16984-48-8	QCBLK80428-2A	10/12/95	10/12/95	42.7	UG/G	J	1.00	1
BOGNY7	9491-006	Fluoride	16984-48-8	QCBLK80428-2B	10/12/95	10/13/95	4.68	UG/G	J	1.73	2
BOGNY8	9491-007	Fluoride	16984-48-8	QCBLK80428-2B	10/12/95	10/13/95	18.5	UG/G	J	5.00	5
BOGNY9	9491-008	Fluoride	16984-48-8	QCBLK80428-2B	10/12/95	10/13/95	3.34	UG/G	J	4.63	5
NA	QCBLK80428-2A	Fluoride	16984-48-8	QCBLK80428-2A	10/12/95	10/12/95	1.00	UG/G	U	1.00	1
NA	QCBLK80428-2B	Fluoride	16984-48-8	QCBLK80428-2B	10/12/95	10/13/95	1.00	UG/G	U	1.00	1
NA	QCLCS80428-2A	Fluoride	16984-48-8	QCBLK80428-2A	10/12/95	10/12/95	97	%REC			1
NA	QCLCS80428-2B	Fluoride	16984-48-8	QCBLK80428-2B	10/12/95	10/13/95	95	%REC			1

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12-21-95 TMB

TMB 12-20

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Quanterra
Environmental Services

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

Project: 550.105

Category: Bromide EPA 300.0
Method: EPA 300.0
Matrix: SOLID

Sample Date : 10/02/95
Receipt Date : 10/03/95
Report Date : 10/17/95

Client ID	Quanterra ID	Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit	Dil.
BOGNX9	9491-001	Bromide	24959-67-9	QCBLK80428-2A	10/12/95	10/12/95	24.8	UG/G	U	24.8	10
BOGNX9	9491-001DUP	Bromide	24959-67-9	QCBLK80428-2A	10/12/95	10/12/95	24.9	UG/G	U	24.9	10
BOGNX9	9491-001MS	Bromide	24959-67-9	QCBLK80428-2A	10/12/95	10/12/95	110	%REC			5
BOGNY3	9491-002	Bromide	24959-67-9	QCBLK80428-2A	10/12/95	10/12/95	22.7	UG/G	U	22.7	10
BOGNY4	9491-003	Bromide	24959-67-9	QCBLK80428-2A	10/12/95	10/12/95	4.83	UG/G	U	4.83	2
BOGNY5	9491-004	Bromide	24959-67-9	QCBLK80428-2A	10/12/95	10/12/95	2.47	UG/G	U	2.47	1
BOGNY6	9491-005	Bromide	24959-67-9	QCBLK80428-2A	10/12/95	10/12/95	2.50	UG/G	U	2.50	1
BOGNY7	9491-006	Bromide	24959-67-9	QCBLK80428-2A	10/12/95	10/12/95	2.17	UG/G	U	2.17	1
BOGNY8	9491-007	Bromide	24959-67-9	QCBLK80428-2B	10/12/95	10/13/95	12.5	UG/G	U	12.5	5
BOGNY9	9491-008	Bromide	24959-67-9	QCBLK80428-2B	10/12/95	10/13/95	11.6	UG/G	U	11.6	5
NA	QCBLK80428-2A	Bromide	24959-67-9	QCBLK80428-2A	10/12/95	10/12/95	2.50	UG/G	U	2.50	1
NA	QCBLK80428-2B	Bromide	24959-67-9	QCBLK80428-2B	10/12/95	10/13/95	2.50	UG/G	U	2.50	1
NA	QCLCS80428-2A	Bromide	24959-67-9	QCBLK80428-2A	10/12/95	10/12/95	99	%REC			1
NA	QCLCS80428-2B	Bromide	24959-67-9	QCBLK80428-2B	10/12/95	10/13/95	98	%REC			1

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Quanterra
Environmental Services

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

Project: 550.105

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

Sample Date : 10/02/95
Receipt Date : 10/03/95
Report Date : 10/17/95

Client ID	Quanterra ID	Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit	Dil.
BOGNX9	9491-001	pH	C-006	QCBLK80150-1	10/11/95	10/11/95	10.92	PH	J		1
BOGNX9	9491-001DUP	pH	C-006	QCBLK80150-1	10/11/95	10/11/95	10.83	PH	J		1
BOGNY3	9491-002	pH	C-006	QCBLK80150-1	10/11/95	10/11/95	10.92	PH	J		1
BOGNY4	9491-003	pH	C-006	QCBLK80150-1	10/11/95	10/11/95	11.35	PH	J		1
BOGNY5	9491-004	pH	C-006	QCBLK80150-1	10/11/95	10/11/95	10.51	PH	J		1
BOGNY6	9491-005	pH	C-006	QCBLK80150-1	10/11/95	10/11/95	10.57	PH	J		1
BOGNY7	9491-006	pH	C-006	QCBLK80150-1	10/11/95	10/11/95	11.56	PH	J		1
BOGNY8	9491-007	pH	C-006	QCBLK80150-1	10/11/95	10/11/95	11.76	PH	J		1
BOGNY9	9491-008	pH	C-006	QCBLK80150-1	10/11/95	10/11/95	11.97	PH.	J		1
NA	QCBLK80150-1	pH	C-006	QCBLK80150-1	10/11/95	10/11/95	5.16	PH			1

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Quanterra
Environmental Services

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

Project: 550.105

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

Sample Date : 10/02/95
Receipt Date : 10/03/95
Report Date : 10/17/95

Client ID	Quanterra ID	Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit	Dil.
8OGNX9	9491-001	Sulfide	18496-25-8	QCBLK79927-1	10/09/95	10/09/95	43.9	UG/G		10.4	1
8OGNX9	9491-001DUP	Sulfide	18496-25-8	QCBLK79927-1	10/09/95	10/09/95	45.1	UG/G		10.0	1
8OGNX9	9491-001MS	Sulfide	18496-25-8	QCBLK79927-1	10/09/95	10/09/95	117	%REC			1
8OGNY3	9491-002	Sulfide	18496-25-8	QCBLK79927-1	10/09/95	10/09/95	49.8	UG/G		10.4	1
8OGNY4	9491-003	Sulfide	18496-25-8	QCBLK79927-1	10/09/95	10/09/95	37.8	UG/G		10.1	1
8OGNY5	9491-004	Sulfide	18496-25-8	QCBLK79927-1	10/09/95	10/09/95	38.2	UG/G		10.1	1
8OGNY6	9491-005	Sulfide	18496-25-8	QCBLK79927-1	10/09/95	10/09/95	38.3	UG/G		10.1	1
8OGNY7	9491-006	Sulfide	18496-25-8	QCBLK79927-1	10/09/95	10/09/95	44.0	UG/G		10.3	1
8OGNY8	9491-007	Sulfide	18496-25-8	QCBLK79927-1	10/09/95	10/09/95	10.2	UG/G	U	10.2	1
8OGNY9	9491-008	Sulfide	18496-25-8	QCBLK79927-1	10/09/95	10/09/95	41.7	UG/G		10.0	1
NA	QCBLK79927-1	Sulfide	18496-25-8	QCBLK79927-1	10/09/95	10/09/95	10.6	UG/G	U	10.6	1
NA	QCLCS79927-1	Sulfide	18496-25-8	QCBLK79927-1	10/09/95	10/09/95	107	%REC			1

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Quanterra
Environmental Services

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

Project: 550.105

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

Sample Date : 10/02/95
Receipt Date : 10/03/95
Report Date : 10/17/95

Client ID	Quanterra ID	Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit	Dil.
B0GNX9	9491-001	Formate	00-00-0	QCBLK80179-1	10/09/95	10/11/95	19.4	UG/G	J	4.95	1
B0GNX9	9491-001DUP	Formate	00-00-0	QCBLK80179-1	10/09/95	10/11/95	11.2	UG/G		4.96	1
B0GNX9	9491-001MS	Formate	00-00-0	QCBLK80179-1	10/09/95	10/11/95	85	%REC			1
B0GNY3	9491-002	Formate	00-00-0	QCBLK80179-1	10/09/95	10/11/95	50.4	UG/G	J	4.46	1
B0GNY4	9491-003	Formate	00-00-0	QCBLK80179-1	10/09/95	10/11/95	24.7	UG/G	J	5.00	1
B0GNY5	9491-004	Formate	00-00-0	QCBLK80179-1	10/09/95	10/11/95	10.1	UG/G	J	4.89	1
B0GNY6	9491-005	Formate	00-00-0	QCBLK80179-1	10/09/95	10/11/95	10.3	UG/G	J	4.96	1
B0GNY7	9491-006	Formate	00-00-0	QCBLK80179-1	10/09/95	10/11/95	42.0	UG/G	J	4.86	1
B0GNY8	9491-007	Formate	00-00-0	QCBLK80179-1	10/09/95	10/11/95	51.2	UG/G	J	4.79	1
B0GNY9	9491-008	Formate	00-00-0	QCBLK80179-2	10/09/95	10/11/95	15.2	UG/G	J	4.84	1
NA	QCBLK80179-1	Formate	00-00-0	QCBLK80179-1	10/09/95	10/11/95	5.00	UG/G	U	5.00	1
NA	QCBLK80179-2	Formate	00-00-0	QCBLK80179-2	10/09/95	10/11/95	5.00	UG/G	U	5.00	1
NA	QCLCS80179-1	Formate	00-00-0	QCBLK80179-1	10/09/95	10/11/95	115	%REC			1
NA	QCLCS80179-2	Formate	00-00-0	QCBLK80179-2	10/09/95	10/11/95	112	%REC			1

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Quanterra
Environmental Services

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

Project: 550.105

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

Sample Date : 10/02/95
Receipt Date : 10/03/95
Report Date : 10/17/95

Client ID	Quanterra ID	Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit	Dil.
BOGNX9	9491-001	Cyanide	57-12-5	QCBLK79945-1	10/09/95	10/11/95	1.44	UG/G		0.50	1
BOGNX9	9491-001DUP	Cyanide	57-12-5	QCBLK79945-1	10/09/95	10/11/95	1.30	UG/G		0.49	1
BOGNX9	9491-001MS	Cyanide	57-12-5	QCBLK79945-1	10/09/95	10/11/95	69	%REC			1
BOGNY3	9491-002	Cyanide	57-12-5	QCBLK79945-1	10/09/95	10/11/95	1.25	UG/G		0.50	1
BOGNY4	9491-003	Cyanide	57-12-5	QCBLK79945-1	10/09/95	10/11/95	1.51	UG/G		0.50	1
BOGNY5	9491-004	Cyanide	57-12-5	QCBLK79945-1	10/09/95	10/11/95	0.56	UG/G		0.50	1
BOGNY6	9491-005	Cyanide	57-12-5	QCBLK79945-1	10/09/95	10/11/95	0.50	UG/G	U	0.50	1
BOGNY7	9491-006	Cyanide	57-12-5	QCBLK79945-1	10/09/95	10/11/95	0.53	UG/G		0.50	1
BOGNY8	9491-007	Cyanide	57-12-5	QCBLK79945-1	10/09/95	10/11/95	1.01	UG/G		0.49	1
BOGNY9	9491-008	Cyanide	57-12-5	QCBLK79945-1	10/09/95	10/11/95	1.79	UG/G		0.49	1
NA	QCBLK79945-1	Cyanide	57-12-5	QCBLK79945-1	10/09/95	10/11/95	0.50	UG/G	U	0.50	1
NA	QCLCS79945-1	Cyanide	57-12-5	QCBLK79945-1	10/09/95	10/11/95	96	%REC			1

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ATTACHMENT 4

LABORATORY NARRATIVE and CHAIN-OF-CUSTODY DOCUMENTATION

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Quanterra
Environmental Services

CERTIFICATE OF ANALYSIS

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

October 26, 1995

Attention: Joan Kessner

NOV 1995
RECEIVED
Data
Log In

Project number	:	550.105
Date Received by Lab	:	October 3, 1995
Number of Samples	:	Eight (8)
Sample Type	:	Solid
SDG Number	:	W0751
Data Deliverable	:	Summary

I. Introduction

On October 3, 1995, eight (8) solid samples were received by Quanterra, Richland and transferred to Quanterra, St. Louis for chemical analysis. Upon receipt, the samples were given the following laboratory ID numbers to correspond with the specific client ID's:

St Louis ID	BHI ID	Richland ID	Matrix	Date of Receipt
9491-001	B0GNX9	51003401	Solid	10/03/95
9491-002	B0GNY3	51003402	Solid	10/03/95
9491-003	B0GNY4	51003403	Solid	10/03/95
9491-004	B0GNY5	51003404	Solid	10/03/95
9491-005	B0GNY6	51003405	Solid	10/03/95
9491-006	B0GNY7	51003406	Solid	10/03/95
9491-007	B0GNY8	51003407	Solid	10/03/95
9491-008	B0GNY9	51003408	Solid	10/03/95

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Quanterra
Environmental Services

Bechtel Hanford Incorporated
October 26, 1995
Project Number: 550.105
SDG: W0751
Page 2

II. Analytical Results/ Methodology

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

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

III. Quality Control

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

IV. Definitions

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

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

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TRL 12-20-95
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Quanterra
Environmental Services

Bechtel Hanford Incorporated
October 26, 1995
Project Number: 550.105
SDG: W0751
Page 3

V. Comments

Percent solids was not determined for the samples in SDG W0751. Due to software configuration, the CLP forms list solid sample result units as " dry weight" and % solids as " 100 ". The results on the forms are actually mg/Kg as is and are not corrected for percent solids. The figure of 100 was used as percent solids for calculation purposes only and does not represent measured solids content of the samples.

All the samples in SDG W0751 required dilution due to interelement interferences. The instrument software flagged the undiluted run with an error code indicating that an interferant, in this case Calcium for 9491-007 and Iron for all the other samples , was interfering with the analysis of most of the elements requested. The samples were diluted and reanalyzed without interference errors.

The following list of elements had recoveries outside the 80%-120% range for the Matrix Spike and Matrix Spike Duplicate.

	MS	MSD
Antimony	132.5	0
Cadmium	38.2	67.5
Selenium	79.8	(within range)
Silver	0	0
Vanadium	52.9	61.9
Zinc	(within range)	127.9

The Relative Percent Difference for the serial dilution for Arsenic (16.5), Calcium (10.7), Nickel (14.5) and Thallium (39.3) was greater than 10 therefore all associated data was flagged with an "E".

The Matrix Spike recovery for the Cyanide analysis on sample 9491-001 was outside of the suggested limits of 75-125%.

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Quanterra
Environmental Services

Bechtel Hanford Incorporated
October 26, 1995
Project Number: 550.105
SDG: W0751
Page 4

The Relative Percent Difference could not be calculated due to the values being below the detection limits for sample 9491-001 and it's duplicate on the Formate analysis.

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

The Relative Percent Difference could not be calculated due to the values being below the detection limits for sample 9491-001 and it's duplicate on the Phosphate and Bromide analyses.

The Matrix Spike recovery for the Fluoride, Sulfate, and Nitrate analyses on sample 9491-001 were outside of the suggested limits of 75-125% due to the spike concentration exceeding the sample concentration by a factor of four or more.

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

Samples, 9491-003, -006 and -008, were manually integrated for Fluoride to level the baseline.

Samples, 9491-001, -001DUP, -002, -003, -007, and -008, were diluted for Bromide to reduce the interfering Nitrate peak on the ion chromatogram, resulting in a higher detection limit.

025

TMS 12-2C

Quanterra
Environmental Services

Bechtel Hanford Incorporated
October 26, 1995
Project Number: 550.105
SDG: W0751
Page 5

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:\\priceS\abbydave\hanw0751.nar

026
TNS 12-20

Bechtel Hanford, Inc.

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

Page 1 of 2

Date Turnaround: X Priority / Normal

Collector: D Bowers, M Mehlhorn	Company Contact: Dave Encke	Telephone: 373-3461
Project Designation: Concrete Removal Characterization	Sampling Location: 183-H Solar Evaporation Basin Project	SAF No.: B95-106
Ice Chest No.: EQ-20	Field Logbook No.	Method of Shipment: Hand Deliver - Government Vehicle
Shipped To: Quanterra	Offsite Property No.: N/A	Bill of Lading/Air Bill No.: N/A
Possible Sample Hazards/Remarks		

	Preservation	Cool	Cool	Cool	Cool	None	None				
	Type of Container	A-G	A-G	A-G	A-G	G	P				
	No. of Container(s)	1	1	1	1	1	1				
Special Handling and/or Storage: Cool Samples to 4 Degrees Celsius	Volume	40 ml.	60 ml.	60 ml.	60 ml.	1 Liter	20 ml.				
SAMPLE ANALYSIS		ICP Metals Include Super trace 50%	Anions See Item 1 Below 100%	Cyanide 100%	Sulfide 100%	See Item 2 Below 5/100	Activity Scan 35				
Sample No.	Matrix* / Date Sampled / Time Sampled										
BOGNX9	DS / 10-2-95 / 1305	✓	✓	✓	✓	✓	✓	01			
BOGNY3	DS / 10-2-95 / 1330	✓	✓	✓	✓	✓	✓	2			
BOGNY4	DS / 10-2-95 / 1353	✓	✓	✓	✓	✓	✓	3			
BOGNY5	DS / 10-2-95 / 1410	✓	✓	✓	✓	✓	✓	4			
BOGNY6	DS / 10-2-95 / 1410	✓	✓	✓	✓	✓	✓	5			
BOGNY7	DS / 10-2-95 / 1435	✓	✓	✓	✓	✓	✓	6			

CHAIN OF POSSESSION	Sign/Print Names	Date/Time
Relinquished By: Mandy Mehlhorn	Mandy Mehlhorn	10-2-95 1700
Received By: D Sl. John / ERC		10-2-95 1700
Relinquished By: D Sl. John / ERC		10-3-95 1140
Received By: ERC / Bryhton		10-3-95 1140
Relinquished By: ERC / Bryhton		10-3-95 1210
Received By: Bryhton / Thomas		10-3-95 1210
Relinquished By		
Received By		

SPECIAL INSTRUCTIONS

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

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

SDG W0751

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

H-78

BHI-00922
Rev. 0

027

00000212 12-20-95

Bechtel Hanford, Inc.

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

Page 2 of 2

Date Turnaround: X Priority / Normal

Collector	Company Contact: Dave Encke	Telephone: 373-3461
Project Designation: Concrete Removal Characterization	Sampling Location: 183-H Solar Evaporation Basin Project	SAF No.: B95-106
Ice Chest No.: ER-20	Field Logbook No.	Method of Shipment: Hand Deliver - Government Vehicle
Shipped To: Quanterra	Offsite Property No.: N/A	Bill of Lading/Air Bill No.: N/A
Possible Sample Hazards/Remarks		

	Preservation	Cool	Cool	Cool	Cool	None	None				
	Type of Container	A-G	A-G	A-G	A-G	G	P				
	No. of Container(s)	1	1	1	1	1	1				
Special Handling and/or Storage: Cool Samples to 4 Degrees Celsius	Volume	40 ml.	60 ml.	60 ml.	60 ml.	1 Liter	20 ml.				
SAMPLE ANALYSIS		ICP Metals Include Super-trace	Anions See Item 1 Below	Cyanide	Sulfide	See Item 2 Below	Activity Scan				
Sample No.	Matrix*	Date Sampled	Time Sampled								
BOGNY8	DS	10-2-95	1447	✓	✓	✓	✓	✓	✓	7	
BOGNY9	DS	10-2-95	1506	✓	✓	✓	✓	✓	✓	8	
~~BOGN20~~	MM 10-2-95			↓	↓	↓	↓				
~~BOGN21~~				50%	100%	100%	100%				
~~BOGN22~~											

CHAIN OF POSSESSION	Sign/Print Names	
Relinquished By: Mark Mahlkom / Mark Mahlkom — Date/Time: 10-2-95 1700	Received By: David St John / ERC — Date/Time: 10-2-95 1700	
Relinquished By: David St John / ERC — Date/Time: 10-3-95 1140	Received By: Kirk Ashton / ERC — Date/Time: 10-3-95 1140	
Relinquished By: Kirk Ashton / ERC — Date/Time: 10-3-95 12:10	Received By: Dave Encke / ERC — Date/Time: 10-3-95 12:10	
Relinquished By: — Date/Time:	Received By: — Date/Time:	

SPECIAL INSTRUCTIONS
Item 1 - Anoins - ICF -- F, Cl, SO4, PO4, NO2, NO3, formate and pH
Item 2 - Gross Alpha, Gross Beta; u-234, -235, -238; Tc-99; Gamma Spec.

SDG W0751

Matrix*: B = 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

12-20-95

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ATTACHMENT 5

DATA VALIDATION SUPPORTING DOCUMENTATION

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

GENERAL CHEMISTRY DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E

PROJECT: 100 HR3 BASIN D&D	DATA PACKAGE: W0751-GES	
VALIDATOR: T. Stapp	LAB: Quanterra	DATE: 12-20-95
CASE:	SDG:	

ANALYSES PERFORMED

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

SAMPLES/MATRIX B0GNX9, B0GNY3, B0GNY4, B0GNY5, B0GNY6, B0GNY7, B0GNY8 and B0GNY9 / DRUM SOLIDS

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

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

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

Comments:

2. HOLDING TIMES

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

Comments: pH, O-phosphate, Nitrite & Nitrate analyses exceed Hold time limits by > factor of 2. Associated positive results qualified (J) and non-detect results are qualified as rejected (UR). See Hold time Summary (B1).

~~A-23~~ TMS

030

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

GENERAL CHEMISTRY DATA VALIDATION CHECKLIST

3. INSTRUMENT CALIBRATION

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

4. BLANKS

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

5. ACCURACY

Were spike samples analyzed at the required frequency? . . . Yes No N/A
Are spike recoveries acceptable? . . . NOTE 1 . . . . . Yes No N/A
Were LCS analyses performed at the required frequency? . . . Yes No N/A
Are LCS recoveries acceptable? . . . . . Yes No N/A
Comments: Fluoride, Nitrate Nitrite, and Sulfate MS reccoveries were unacceptable, however LCS reccoveries were within limits and in accordance with data validation guidelines no qualification will be applied.

6. PRECISION

Were laboratory duplicate samples analyzed at the required frequency? . . . . . Yes No N/A
Are laboratory duplicate sample RPD values acceptable? . . . . Yes No N/A NOTE 1
Are field duplicate RPD values acceptable? . . . . . Yes No N/A
Are field split RPD values acceptable? . . . . . Yes No N/A

~~A-24~~ TRD

031

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

GENERAL CHEMISTRY DATA VALIDATION CHECKLIST

Comments: ① Formate RPD is >35% and >2xCRDL and associated positive sample results are qualified as estimated. (J).

7. ANALYTE QUANTITATION

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

Comments: Raw data not available and this function is not part of the level C DV exercise.

8. REPORTED RESULTS AND DETECTION LIMITS

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

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

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

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

Comments: ① CRDL's for solid and soil matrices have not been established. No qualification applies however.

TMB 12-20-95

~~A-25~~

032

HOLDING TIME SUMMARY

SDG: W0751-QES | VALIDATOR: T. Stapp | DATE: 12-20-95 | PAGE 1 OF 4

COMMENTS:

FIELD SAMPLE ID	ANALYSIS TYPE	DATE SAMPLED	DATE PREPARED	DATE ANALYZED	PREP. HOLDING TIME, DAYS	ANALYSIS HOLDING TIME, DAYS	QUALIFIER
B06NX9	pH	10-2-95	10-11-95	10-11-95	9	9	J
	Sulfide		10-9-95	10-9-95	7	7	NONE
	Phosphate		10-12-95	10-12-95	10	10	UR
	Nitrate				10	10	J
	Nitrite				10	10	J
	Anions		10-12-95	10-12-95	10	10	NONE
	CN		10-09-95	10-11-95	7	9	NONE
	FORMATE		10-09-95	10-11-95	7	9	NONE
B06NY3	pH	10-2-95	10-11-95	10-11-95	9	9	J
	Sulfide		10-09-95	10-09-95	7	7	NONE
	Phosphate		10-12-95	10-12-95	10	10	UR
	Nitrate				10	10	J
	Nitrite				10	10	J
	Anions			10-12-95	10	10	NONE
	CN		10-09-95	10-11-95	7	9	NONE
	FORMATE		10-09-95	10-11-95	7	9	NONE

HOLDING TIME SUMMARY

SDG: W0751-QES	VALIDATOR: T. Stapp	DATE: 12-20-95	PAGE 2 OF 4
COMMENTS:			

FIELD SAMPLE ID	ANALYSIS TYPE	DATE SAMPLED	DATE PREPARED	DATE ANALYZED	PREP. HOLDING TIME, DAYS	ANALYSIS HOLDING TIME, DAYS	QUALIFIER
BOGNY4	pH	10-2-95	10-11-95	10-11-95	9	9	J
	Sulfide		10-9-95	10-9-95	7	7	NONE
	Phosphate		10-12-95	10-12-95	10	10	UR
	Nitrate				10	10	J
	Nitrite				10	10	J
	Anions		10-12-95	10-12-95	10	10	NONE
	CN		10-09-95	10-11-95	7	9	NONE
	FORMATE		10-09-95	10-11-95	7	9	NONE
BOGNY5	pH	10-2-95	10-11-95	10-11-95	9	9	J
	Sulfide		10-09-95	10-09-95	7	7	NONE
	Phosphate		10-12-95	10-12-95	10	10	UR
	Nitrate				10	10	J
	Nitrite				10	10	J
	Anions			10-12-95	10	10	NONE
	CN		10-09-95	10-11-95	7	9	NONE
	FORMATE		10-09-95	10-11-95	7	9	NONE

B-1 TMJ

HOLDING TIME SUMMARY

SDG: W0751-QES | VALIDATOR: T. Stapp | DATE: 12-20-95 | PAGE 3 OF 4

COMMENTS:

FIELD SAMPLE ID	ANALYSIS TYPE	DATE SAMPLED	DATE PREPARED	DATE ANALYZED	PREP. HOLDING TIME, DAYS	ANALYSIS HOLDING TIME, DAYS	QUALIFIER
B0GNY6	pH	10-2-95	10-11-95	10-11-95	9	9	J
	Sulfide		10-9-95	10-9-95	7	7	NONE
	Phosphate		10-12-95	10-12-95	10	10	UR
	Nitrate				10	10	J
	Nitrite				10	10	J
	Anions		10-12-95	10-12-95	10	10	NONE
	CN		10-09-95	10-11-95	7	9	NONE
	FORMATE		10-09-95	10-11-95	7	9	NONE
B0GNY7	pH	10-2-95	10-11-95	10-11-95	9	9	J
	Sulfide		10-09-95	10-09-95	7	7	NONE
	Phosphate		10-12-95	10-12-95	10	10	UR
	Nitrate				10	10	J
	Nitrite				10	10	J
	Anions			10-12,13-95	10	10,11	NONE
	CN		10-09-95	10-11-95	7	9	NONE
	FORMATE		10-09-95	10-11-95	7	9	NONE

HOLDING TIME SUMMARY

SDG: W0751-QES | VALIDATOR: T. Stapp | DATE: 12-20-95 | PAGE 4 OF 4

COMMENTS:

FIELD SAMPLE ID	ANALYSIS TYPE	DATE SAMPLED	DATE PREPARED	DATE ANALYZED	PREP. HOLDING TIME, DAYS	ANALYSIS HOLDING TIME, DAYS	QUALIFIER
B0GNY8	pH	10-2-95	10-11-95	10-11-95	9	9	J
	Sulfide		10-9-95	10-9-95	7	7	NONE
	Phosphate		10-12-95	10-13-95	10	11	UR
	Nitrate				10	11	J
	Nitrite				10	11	J
	Anions		10-12-95	10-13-95	10	11	NONE
	CN		10-09-95	10-11-95	7	9	NONE
	FORMATE		10-09-95	10-11-95	7	9	NONE
B0GNY9	pH	10-2-95	10-11-95	10-11-95	9	9	J
	Sulfide		10-09-95	10-09-95	7	7	NONE
	Phosphate		10-12-95	10-13-95	10	11	UR
	Nitrate				10	11	J
	Nitrite				10	11	J
	Anions			10-13-95	10	11	NONE
	CN		10-09-95	10-11-95	7	9	NONE
	FORMATE		10-09-95	10-11-95	7	9	NONE

B-1 TMS

W0751-QES

PRECISION DATA SUMMARY - FORM B-5

SDG:	REVIEWER T. Stapp	DATE: 12-20-95	PAGE 1 OF 1
COMMENTS: GENERAL CHEMISTRY			

COMPOUND	SAMPLE ID: BOGNX9	SAMPLE ID: BOGNX9 Dup	RPD	SAMPLES AFFECTED	QUALIFIER
FORMATE	19.4 ug/g	11.2 ug/gm	54	All Samples	J

TPS 12-20-95

MEMORANDUM

TO: 183-H Basin D&D, Surface Removal Characterization Project QA Record December 27, 1995

FR: Tom Stapp, Golder Associates Inc.

RE: RADIOCHEMISTRY DATA VALIDATION SUMMARY FOR DATA PACKAGE W0751-QES (943-1610.112 751RAD.HBS)

INTRODUCTION

This memo presents the results of data validation for the analysis specified below on data package W0751-QES prepared by Quanterra Environmental Services. Sample information is provided in the following table.

SAMPLE ID	COMMENTS	ANALYSIS	MEDIA
B0GNX9		RADIOCHEMISTRY	DRUM SOLID
B0GNY3			DRUM SOLID
B0GNY4		SEE ATTACHMENT 4	DRUM SOLID
B0GNY5			DRUM SOLID
B0GNY6			DRUM SOLID
B0GNY7			DRUM SOLID
B0GNY8			DRUM SOLID
B0GNY9			DRUM SOLID

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

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

DATA QUALITY OBJECTIVES

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

Precision. Goals for precision were met.

Accuracy. Goals for accuracy were met.

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

001

Data Package ID: W0751-QES Analysis: RADIOCHEMISTRY

Completeness. The data package was complete for all requested analyses. A total of eight samples were validated in this data package with a total of 148 determinations reported, all of which were deemed valid. This results in a completeness of 100 percent, which meets the 90 percent objective of the work plan.

MAJOR DEFICIENCIES

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

MINOR DEFICIENCIES

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

DATA REPORTING

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

REFERENCES

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

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

ATTACHMENT 1

GLOSSARY OF DATA REPORTING QUALIFIERS

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GLOSSARY OF RADIOCHEMISTRY DATA REPORTING QUALIFIERS

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

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

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

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

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

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revised HRG
1/5/96

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ATTACHMENT 2

SUMMARY OF DATA QUALIFICATIONS

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WHC-SD-EN-SPP-002, REV.2
DATA QUALIFICATION SUMMARY - FORM B-7

SDG: W0751-QES	REVIEWER: T. Stapp	DATE: 12-27-95	PAGE 1 OF 1
COMMENTS: RADIOCHEMISTRY			
COMPOUND/ANALYTE	QUALIFIER	SAMPLES AFFECTED	REASON
NO QUALIFICATIONS REQUIRED			

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ATTACHMENT 3

QUALIFIED DATA SUMMARY and ANNOTATED LABORATORY REPORTS

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Validated Data Summary, Data Package: W0751-QES

	Sample #	B0GNX9		B0GNY3		B0GNY4		B0GNY5		B0GNY6		B0GNY7	
	Date	10/2/95		10/3/95		10/3/95		10/3/95		10/3/95		10/3/95	
	Location												
	Depth												
	Type	Drum Solid		Drum Solid		Drum Solid		Drum Solid		Drum Solid		Drum Solid	
	Comments												
Parameter	Units	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
URANIUM-235	pCi/G	0.380		0.048	U	4.480		0.536		0.487		0.293	
URANIUM-234	pCi/G	3.400		1.310		37.600		4.660		3.900		3.240	
URANIUM-238DA	pCi/G	4.590		1.070		46.100		5.140		5.010		2.610	
BERYLLIUM-7	pCi/G												
COBALT-58	pCi/G	-0.005	U	0.002	U	-0.009	U	-0.001	U	-0.001	U	0.001	U
COBALT-60	pCi/G	0.003	U	0.000	U	0.007	U	0.001	U	0.002	U	0.004	U
CESIUM-137DA	pCi/G	0.073		0.127		0.587		0.032		0.030		0.187	
EUROPIUM-152	pCi/G	-0.015	U	-0.004	U	0.015	U	-0.002	U	-0.006	U	-0.008	U
EUROPIUM-154	pCi/G	0.004	U	-0.002	U	-0.016	U	0.002	U	-0.005	U	0.016	U
EUROPIUM-155	pCi/G	0.013	U	0.010	U	0.026	U	-0.002	U	-0.003	U	0.012	U
IRON-59	pCi/G	-0.005	U	-0.012	U	-0.001	U	0.002		-0.003	U	-0.007	U
POTASSIUM-40	pCi/G	2.810		4.820		3.540		0.644		0.685		2.340	
RADIUM-224DA	pCi/G	0.108		0.177		0.149		0.023		0.028		0.111	
RADIUM-226DA	pCi/G	0.126		0.245		0.192		0.032				0.138	
RADIUM-228DA	pCi/G	0.138		0.170		0.149		0.031		0.038		0.142	
URANIUM-235	pCi/G	0.051		0.035		0.799		0.020				0.079	
URANIUM-238DLP	pCi/G	0.768		0.546		9.330						0.457	
GROSS ALPHA	pCi/G	7.050		5.430		53.000		8.970		10.100		9.320	
GROSS BETA	pCi/G	35.200		39.300		141.000		31.900		41.100		20.400	
TECHNETIUM-99	pCi/G	115.000		193.000		468.000		181.000		97.500		46.300	

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

TMS Verified
12-27-95

Validated Data Summary, Data Package: W0751-QES

	Sample #	B0GNY8		B0GNY9	
	Date	10/3/95		10/3/95	
	Location				
	Depth				
	Type	Drum Solid		Drum Solid	
	Comments				
Parameter	Units	Results	Q	Results	Q
URANIUM-235	pCi/G	3.430		5.310	
URANIUM-234	pCi/G	32.400		48.300	
URANIUM-238DA	pCi/G	28.100		51.000	
BERYLLIUM-7	pCi/G	0.267			
COBALT-58	pCi/G	0.008	U	-0.006	U
COBALT-60	pCi/G	0.043		0.024	
CESIUM-137DA	pCi/G	0.855		1.200	
EUROPIUM-152	pCi/G	0.005	U	-0.008	U
EUROPIUM-154	pCi/G	0.018	U	-0.013	U
EUROPIUM-155	pCi/G	0.098		0.064	
IRON-59	pCi/G	-0.014	U	0.006	U
POTASSIUM-40	pCi/G	9.650		3.900	
RADIUM-224DA	pCi/G	0.439		0.169	
RADIUM-226DA	pCi/G	0.504		0.211	
RADIUM-228DA	pCi/G	0.479		0.191	
URANIUM-235	pCi/G	1.200		0.891	
URANIUM-238DLP	pCi/G	19.900		10.700	
GROSS ALPHA	pCi/G	33.600		56.100	
GROSS BETA	pCi/G	59.800		100.000	
TECHNETIUM-99	pCi/G	51.700		142.000	

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

TAT Verified
12-27-95

Quanterra
Environmental Services

SAMPLE RESULTS

LAB NAME:	ITAS-RICHLAND	SDG:	W0751
LAB SAMPLE ID:	51003501	MATRIX:	OTHER
CLIENT ID:	B0GNX9	DATE RECEIVED:	10/3/95 12:10:00 PM

ISOTOPE	RESULT	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA	REPORT UNIT	YIELD	METHOD NUMBER
U-235	3.80E-01	N/A	1.0E-01	3.11E-02	pCi/g	89.10%	RD3234
U-234	3.40E+00	2.5E-01	5.8E-01	2.64E-02	pCi/g	89.10%	RD3234
U-238DA	4.59E+00	2.9E-01	7.7E-01	2.14E-02	pCi/g	89.10%	RD3234
CO-58	-4.77E-03 U	4.8E-03	4.9E-03	7.88E-03	pCi/g	N/A	RD3219
CO-60	2.62E-03 U	6.1E-03	6.1E-03	1.02E-02	pCi/g	N/A	RD3219
CS-137DA	7.31E-02	8.8E-03	1.1E-02	N/A	pCi/g	N/A	RD3219
EU-152	-1.47E-02 U	1.2E-02	1.3E-02	1.88E-02	pCi/g	N/A	RD3219
EU-154	4.00E-03 U	1.6E-02	1.6E-02	2.73E-02	pCi/g	N/A	RD3219
EU-155	1.26E-02 U	1.6E-02	1.6E-02	2.36E-02	pCi/g	N/A	RD3219
FE-59	-4.52E-03 U	1.2E-02	1.2E-02	2.03E-02	pCi/g	N/A	RD3219
K-40	2.81E+00	1.8E-01	3.4E-01	N/A	pCi/g	N/A	RD3219
RA-224DA	1.08E-01	1.4E-02	1.8E-02	N/A	pCi/g	N/A	RD3219
RA-226DA	1.26E-01	2.1E-02	2.4E-02	N/A	pCi/g	N/A	RD3219
RA-228DA	1.38E-01	3.2E-02	3.5E-02	N/A	pCi/g	N/A	RD3219
U-235	5.09E-02	4.6E-02	4.7E-02	N/A	pCi/g	N/A	RD3219
U-238DLP	7.68E-01	3.7E-01	3.8E-01	N/A	pCi/g	N/A	RD3219
ALPHA	7.05E+00	4.0E+00	4.1E+00	5.10E+00	pCi/g	100.00%	RD3222
BETA	3.52E+01	4.2E+00	4.8E+00	3.80E+00	pCi/g	100.00%	RD3222
TC-99	1.15E+02	3.8E+00	1.6E+01	3.70E+00	pCi/g	95.10%	ITAS-IT-RS-0001

Number of Results: 19

TMC 12-22-95
~~0005~~ 010

Quanterra
Environmental Services

SAMPLE RESULTS

LAB NAME:	ITAS-RICHLAND	SDG:	W0751
LAB SAMPLE ID:	51003502	MATRIX:	OTHER
CLIENT ID:	B0GNY3	DATE RECEIVED:	10/3/95 12:10:00 PM

ISOTOPE	RESULT	COUNTING ERROR (2 s)	TOTAL ERROR (2 s)	MDA	REPORT UNIT	YIELD	METHOD NUMBER
U-235	4.76E-02 U	N/A	5.4E-02	7.47E-02	pCi/g	31.50%	RD3234
U-234	1.31E+00	2.6E-01	4.1E-01	7.06E-02	pCi/g	31.50%	RD3234
U-238DA	1.07E+00	2.4E-01	3.5E-01	6.04E-02	pCi/g	31.50%	RD3234
CO-58	1.73E-03 U	4.9E-03	4.9E-03	8.54E-03	pCi/g	N/A	RD3219
CO-60	-4.40E-04 U	6.0E-03	6.0E-03	1.05E-02	pCi/g	N/A	RD3219
CS-137DA	1.27E-01	1.4E-02	1.9E-02	N/A	pCi/g	N/A	RD3219
EU-152	-4.37E-03 U	1.4E-02	1.4E-02	2.31E-02	pCi/g	N/A	RD3219
EU-154	-1.59E-03 U	1.9E-02	1.9E-02	3.23E-02	pCi/g	N/A	RD3219
EU-155	9.81E-03 U	1.7E-02	1.8E-02	2.77E-02	pCi/g	N/A	RD3219
FE-59	-1.20E-02 U	1.4E-02	1.4E-02	2.14E-02	pCi/g	N/A	RD3219
K-40	4.82E+00	2.6E-01	5.5E-01	N/A	pCi/g	N/A	RD3219
RA-224DA	1.77E-01	1.6E-02	2.4E-02	N/A	pCi/g	N/A	RD3219
RA-226DA	2.45E-01	2.3E-02	3.4E-02	N/A	pCi/g	N/A	RD3219
RA-228DA	1.70E-01	4.6E-02	4.9E-02	N/A	pCi/g	N/A	RD3219
U-235	3.52E-02	3.4E-02	3.4E-02	N/A	pCi/g	N/A	RD3219
U-238DLP	5.46E-01	3.0E-01	3.0E-01	N/A	pCi/g	N/A	RD3219
ALPHA	5.43E+00	3.6E+00	3.6E+00	4.87E+00	pCi/g	100.00%	RD3222
BETA	3.93E+01	4.4E+00	5.1E+00	3.96E+00	pCi/g	100.00%	RD3222
TC-99	1.93E+02	4.7E+00	2.4E+01	3.70E+00	pCi/g	95.10%	ITAS-IT-RS-0001

Number of Results: 19

12-22-95
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Quanterra
Environmental Services

SAMPLE RESULTS

LAB NAME:	ITAS-RICHLAND	SDG:	W0751
LAB SAMPLE ID:	51003503	MATRIX:	OTHER
CLIENT ID:	B0GNY4	DATE RECEIVED:	10/3/95 12:10:00 PM

ISOTOPE	RESULT	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA	REPORT UNIT	YIELD	METHOD NUMBER
U-235	4.48E+00	N/A	1.1E+00	1.72E-01	pCi/g	76.00%	RD3234
U-234	3.76E+01	2.2E+00	6.5E+00	2.08E-01	pCi/g	76.00%	RD3234
U-238DA	4.61E+01	2.4E+00	7.9E+00	2.00E-01	pCi/g	76.00%	RD3234
CO-58	-8.81E-03 U	5.6E-03	5.6E-03	8.53E-03	pCi/g	N/A	RD3219
CO-60	7.19E-03 U	5.4E-03	5.5E-03	1.03E-02	pCi/g	N/A	RD3219
CS-137DA	5.87E-01	2.2E-02	6.3E-02	N/A	pCi/g	N/A	RD3219
EU-152	1.52E-02 U	1.6E-02	1.6E-02	2.78E-02	pCi/g	N/A	RD3219
EU-154	-1.63E-02 U	1.6E-02	1.6E-02	2.43E-02	pCi/g	N/A	RD3219
EU-155	2.64E-02 U	2.7E-02	2.7E-02	4.24E-02	pCi/g	N/A	RD3219
FE-59	-6.07E-04 U	9.8E-03	9.8E-03	1.68E-02	pCi/g	N/A	RD3219
K-40	3.54E+00	2.1E-01	4.1E-01	N/A	pCi/g	N/A	RD3219
RA-224DA	1.49E-01	1.6E-02	2.2E-02	N/A	pCi/g	N/A	RD3219
RA-226DA	1.92E-01	2.4E-02	3.1E-02	N/A	pCi/g	N/A	RD3219
RA-228DA	1.49E-01	3.6E-02	3.9E-02	N/A	pCi/g	N/A	RD3219
U-235	7.99E-01	8.0E-02	1.1E-01	N/A	pCi/g	N/A	RD3219
U-238DLP	9.33E+00	6.0E-01	1.1E+00	N/A	pCi/g	N/A	RD3219
ALPHA	5.30E+01	9.9E+00	1.1E+01	4.05E+00	pCi/g	100.00%	RD3222
BETA	1.41E+02	7.8E+00	1.2E+01	3.70E+00	pCi/g	100.00%	RD3222
TC-99	4.68E+02	7.1E+00	5.3E+01	3.70E+00	pCi/g	95.10%	ITAS-IT-RS-0001

Number of Results: 19

TMJ 12-22-95
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Quanterra
Environmental Services

SAMPLE RESULTS

LAB NAME:	ITAS-RICHLAND	SDG:	W0751
LAB SAMPLE ID:	51003504	MATRIX:	OTHER
CLIENT ID:	B0GNY5	DATE RECEIVED:	10/3/95 12:10:00 PM

ISOTOPE	RESULT	COUNTING ERROR (2 s)	TOTAL ERROR (2 s)	MDA	REPORT UNIT	YIELD	METHOD NUMBER
U-235	5.36E-01	N/A	2.1E-01	7.91E-02	pCi/g	70.00%	RD3234
U-234	4.66E+00	5.4E-01	9.4E-01	8.47E-02	pCi/g	70.00%	RD3234
U-238DA	5.14E+00	5.7E-01	1.0E+00	7.91E-02	pCi/g	70.00%	RD3234
CO-58	-9.38E-04 U	2.0E-03	2.0E-03	3.26E-03	pCi/g	N/A	RD3219
CO-60	8.64E-04 U	2.2E-03	2.2E-03	4.04E-03	pCi/g	N/A	RD3219
CS-137DA	3.22E-02	4.5E-03	5.6E-03	N/A	pCi/g	N/A	RD3219
EU-152	-2.42E-03 U	5.6E-03	5.6E-03	8.65E-03	pCi/g	N/A	RD3219
EU-154	1.80E-03 U	6.4E-03	6.4E-03	1.16E-02	pCi/g	N/A	RD3219
EU-155	-2.31E-03 U	6.9E-03	6.9E-03	1.02E-02	pCi/g	N/A	RD3219
FE-59	2.38E-03	4.6E-03	4.6E-03	8.12E-03	pCi/g	N/A	RD3219
K-40	6.44E-01	6.9E-02	9.4E-02	N/A	pCi/g	N/A	RD3219
RA-224DA	2.28E-02	4.6E-03	5.1E-03	N/A	pCi/g	N/A	RD3219
RA-226DA	3.23E-02	6.2E-03	7.0E-03	N/A	pCi/g	N/A	RD3219
RA-228DA	3.14E-02	1.4E-02	1.4E-02	N/A	pCi/g	N/A	RD3219
U-235	1.96E-02	1.6E-02	1.6E-02	N/A	pCi/g	N/A	RD3219
ALPHA	8.97E+00	4.3E+00	4.4E+00	4.35E+00	pCi/g	100.00%	RD3222
BETA	3.19E+01	4.0E+00	4.5E+00	3.92E+00	pCi/g	100.00%	RD3222
TC-99	1.81E+02	4.6E+00	2.3E+01	3.70E+00	pCi/g	95.10%	ITAS-IT-RS-0001

Number of Results: 18

TMS 12-22-95
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Quanterra Environmental Services

SAMPLE RESULTS

LAB NAME:	ITAS-RICHLAND	SDG:	W0751
LAB SAMPLE ID:	51003505	MATRIX:	OTHER
CLIENT ID:	B0GNY6	DATE RECEIVED:	10/3/95 12:10:00 PM

ISOTOPE	RESULT	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA	REPORT UNIT	YIELD	METHOD NUMBER
U-235	4.87E-01	N/A	1.6E-01	5.31E-02	pCi/g	82.30%	RD3234
U-234	3.90E+00	4.1E-01	7.4E-01	7.32E-02	pCi/g	82.30%	RD3234
U-238DA	5.01E+00	4.6E-01	9.2E-01	6.02E-02	pCi/g	82.30%	RD3234
CO-58	-9.06E-04 U	1.8E-03	1.8E-03	3.04E-03	pCi/g	N/A	RD3219
CO-60	1.59E-03 U	2.0E-03	2.0E-03	3.98E-03	pCi/g	N/A	RD3219
CS-137DA	2.95E-02	4.6E-03	5.4E-03	N/A	pCi/g	N/A	RD3219
EU-152	-5.76E-03 U	5.3E-03	5.4E-03	8.31E-03	pCi/g	N/A	RD3219
EU-154	-4.86E-03 U	7.3E-03	7.3E-03	1.17E-02	pCi/g	N/A	RD3219
EU-155	-3.45E-03 U	6.7E-03	6.7E-03	1.04E-02	pCi/g	N/A	RD3219
FE-59	-3.05E-03 U	4.6E-03	4.7E-03	7.66E-03	pCi/g	N/A	RD3219
K-40	6.85E-01	7.1E-02	9.9E-02	N/A	pCi/g	N/A	RD3219
RA-224DA	2.81E-02	5.4E-03	6.1E-03	N/A	pCi/g	N/A	RD3219
RA-228DA	3.80E-02	1.3E-02	1.3E-02	N/A	pCi/g	N/A	RD3219
ALPHA	1.01E+01	4.5E+00	4.6E+00	4.05E+00	pCi/g	100.00%	RD3222
BETA	4.11E+01	4.4E+00	5.2E+00	3.80E+00	pCi/g	100.00%	RD3222
TC-99	9.75E+01	3.5E+00	1.4E+01	3.70E+00	pCi/g	95.10%	ITAS-IT-RS-0001

Number of Results: 16

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Quanterra
Environmental Services

SAMPLE RESULTS

LAB NAME:	ITAS-RICHLAND	SDG:	W0751
LAB SAMPLE ID:	51003506	MATRIX:	OTHER
CLIENT ID:	B0GNY7	DATE RECEIVED:	10/3/95 12:10:00 PM

ISOTOPE	RESULT	COUNTING ERROR (2 s)	TOTAL ERROR (2 s)	MDA	REPORT UNIT	YIELD	METHOD NUMBER
U-235	2.93E-01	N/A	9.2E-02	3.69E-02	pCi/g	79.80%	RD3234
U-234	3.24E+00	2.6E-01	5.8E-01	3.36E-02	pCi/g	79.80%	RD3234
U-238DA	2.61E+00	2.3E-01	4.8E-01	2.79E-02	pCi/g	79.80%	RD3234
CO-58	1.21E-03 U	3.8E-03	3.8E-03	6.41E-03	pCi/g	N/A	RD3219
CO-60	3.96E-03 U	4.4E-03	4.4E-03	8.05E-03	pCi/g	N/A	RD3219
CS-137DA	1.87E-01	1.1E-02	2.2E-02	N/A	pCi/g	N/A	RD3219
EU-152	-8.37E-03 U	1.1E-02	1.1E-02	1.79E-02	pCi/g	N/A	RD3219
EU-154	1.58E-02 U	1.2E-02	1.2E-02	2.24E-02	pCi/g	N/A	RD3219
EU-155	1.15E-02 U	1.2E-02	1.2E-02	2.09E-02	pCi/g	N/A	RD3219
FE-59	-7.27E-03 U	8.8E-03	8.8E-03	1.42E-02	pCi/g	N/A	RD3219
K-40	2.34E+00	1.5E-01	2.8E-01	N/A	pCi/g	N/A	RD3219
RA-224DA	1.11E-01	1.2E-02	1.7E-02	N/A	pCi/g	N/A	RD3219
RA-226DA	1.38E-01	1.5E-02	2.0E-02	N/A	pCi/g	N/A	RD3219
RA-228DA	1.42E-01	2.4E-02	2.8E-02	N/A	pCi/g	N/A	RD3219
U-235	7.88E-02	3.5E-02	3.6E-02	N/A	pCi/g	N/A	RD3219
U-238DLP	4.57E-01	2.4E-01	2.4E-01	N/A	pCi/g	N/A	RD3219
ALPHA	9.32E+00	4.5E+00	4.6E+00	5.11E+00	pCi/g	100.00%	RD3222
BETA	2.04E+01	3.3E+00	3.6E+00	3.80E+00	pCi/g	100.00%	RD3222
TC-99	4.63E+01	2.7E+00	8.5E+00	3.70E+00	pCi/g	95.10%	ITAS-IT-RS-0001

Number of Results: 19

Tmb 12-22-95
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Quanterra
Environmental Services

SAMPLE RESULTS

LAB NAME:	ITAS-RICHLAND	SDG:	W0751
LAB SAMPLE ID:	51003507	MATRIX:	OTHER
CLIENT ID:	B0GNY8	DATE RECEIVED:	10/3/95 12:10:00 PM

ISOTOPE	RESULT	COUNTING ERROR (2 s)	TOTAL ERROR (2 s)	MDA	REPORT UNIT	YIELD	METHOD NUMBER
U-235	3.43E+00	N/A	6.2E-01	3.26E-02	pCi/g	75.90%	RD3234
U-234	3.24E+01	8.4E-01	5.4E+00	3.99E-02	pCi/g	75.90%	RD3234
U-238DA	2.81E+01	7.9E-01	4.7E+00	3.53E-02	pCi/g	75.90%	RD3234
BE-7	2.67E-01	1.6E-01	1.6E-01	N/A	pCi/g	N/A	RD3219
CO-58	8.11E-03 U	1.1E-02	1.2E-02	2.02E-02	pCi/g	N/A	RD3219
CO-60	4.28E-02	1.8E-02	1.8E-02	N/A	pCi/g	N/A	RD3219
CS-137DA	8.55E-01	3.6E-02	9.3E-02	N/A	pCi/g	N/A	RD3219
EU-152	4.93E-03 U	3.1E-02	3.1E-02	4.99E-02	pCi/g	N/A	RD3219
EU-154	1.78E-02 U	3.6E-02	3.6E-02	6.34E-02	pCi/g	N/A	RD3219
EU-155	9.84E-02	5.2E-02	5.2E-02	7.88E-02	pCi/g	N/A	RD3219
FE-59	-1.36E-02 U	2.7E-02	2.7E-02	4.42E-02	pCi/g	N/A	RD3219
K-40	9.65E+00	4.7E-01	1.1E+00	N/A	pCi/g	N/A	RD3219
RA-224DA	4.39E-01	2.9E-02	5.2E-02	N/A	pCi/g	N/A	RD3219
RA-226DA	5.04E-01	5.1E-02	7.2E-02	N/A	pCi/g	N/A	RD3219
RA-228DA	4.79E-01	8.9E-02	1.0E-01	N/A	pCi/g	N/A	RD3219
U-235	1.20E+00	1.3E-01	1.8E-01	N/A	pCi/g	N/A	RD3219
U-238DLP	1.99E+01	1.6E+00	2.5E+00	N/A	pCi/g	N/A	RD3219
ALPHA	3.36E+01	8.0E+00	8.8E+00	4.75E+00	pCi/g	100.00%	RD3222
BETA	5.98E+01	5.2E+00	6.6E+00	3.71E+00	pCi/g	100.00%	RD3222
TC-99	5.17E+01	2.8E+00	9.0E+00	3.70E+00	pCi/g	95.10%	ITAS-IT-RS-0001

Number of Results: 20

12-22-95
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Quanterra
Environmental Services

SAMPLE RESULTS

LAB NAME:	ITAS-RICHLAND	SDG:	W0751
LAB SAMPLE ID:	51003508	MATRIX:	OTHER
CLIENT ID:	B0GNY9	DATE RECEIVED:	10/3/95 12:10:00 PM

ISOTOPE	RESULT	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA	REPORT UNIT	YIELD	METHOD NUMBER
U-235	5.31E+00	N/A	1.1E+00	1.40E-01	pCi/g	76.30%	RD3234
U-234	4.83E+01	2.2E+00	8.2E+00	1.40E-01	pCi/g	76.30%	RD3234
U-238DA	5.10E+01	2.3E+00	8.6E+00	1.40E-01	pCi/g	76.30%	RD3234
CO-58	-5.91E-03 U	6.2E-03	6.3E-03	1.01E-02	pCi/g	N/A	RD3219
CO-60	2.36E-02	7.0E-03	7.4E-03	1.46E-02	pCi/g	N/A	RD3219
CS-137DA	1.20E+00	2.9E-02	1.2E-01	N/A	pCi/g	N/A	RD3219
EU-152	-7.72E-03 U	1.9E-02	1.9E-02	3.08E-02	pCi/g	N/A	RD3219
EU-154	-1.29E-02 U	1.7E-02	1.7E-02	2.78E-02	pCi/g	N/A	RD3219
EU-155	6.35E-02	3.0E-02	3.1E-02	4.95E-02	pCi/g	N/A	RD3219
FE-59	5.85E-03 U	1.2E-02	1.2E-02	2.06E-02	pCi/g	N/A	RD3219
K-40	3.90E+00	2.1E-01	4.5E-01	N/A	pCi/g	N/A	RD3219
RA-224DA	1.69E-01	2.0E-02	2.6E-02	N/A	pCi/g	N/A	RD3219
RA-226DA	2.11E-01	2.6E-02	3.4E-02	N/A	pCi/g	N/A	RD3219
RA-228DA	1.91E-01	3.5E-02	3.9E-02	N/A	pCi/g	N/A	RD3219
U-235	8.91E-01	8.4E-02	1.2E-01	N/A	pCi/g	N/A	RD3219
U-238DLP	1.07E+01	8.6E-01	1.4E+00	N/A	pCi/g	N/A	RD3219
ALPHA	5.61E+01	1.0E+01	1.2E+01	4.87E+00	pCi/g	100.00%	RD3222
BETA	1.00E+02	6.7E+00	9.4E+00	3.96E+00	pCi/g	100.00%	RD3222
TC-99	1.42E+02	4.1E+00	1.8E+01	3.70E+00	pCi/g	95.10%	ITAS-IT-RS-0001

Number of Results: 19

12-22-95
~~0012~~ 017

ATTACHMENT 4

LABORATORY NARRATIVE and CHAIN-OF-CUSTODY DOCUMENTATION

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Quanterra Environmental Services

Quanterra Incorporated
2800 George Washington Way
Richland, Washington 99352

509 375-3131 Telephone
509 375-5590 Fax

CERTIFICATE OF ANALYSIS

OCT 1995
RECEIVED
Data
Log In

Bechtel Hanford, Inc.
345 Hills
Richland, WA 99352

October 18, 1995

Attention: Joan Kessner

SAF Number	:	B95-106
Date SDG Closed	:	October 3, 1995
Number of Samples	:	Eight (8)
Sample Type	:	Other
SDG Number	:	W0751
Data Deliverable	:	Summary

I. Introduction

On October 3, 1995, eight "other" matrix samples were received by the Quanterra Environmental Services Richland Laboratory (QTESRL) for radiochemical analysis. Upon receipt, the samples were assigned the following laboratory ID numbers to correspond with the Bechtel Hanford, Inc. (BHI) specific IDs:

QTESRL ID	BHI ID	Matrix	Date of Receipt
51003501	B0GNX9	Other	10/3/95
51003502	B0GNY3	Other	10/3/95
51003503	B0GNY4	Other	10/3/95
51003504	B0GNY5	Other	10/3/95
51003505	B0GNY6	Other	10/3/95
51003506	B0GNY7	Other	10/3/95
51003507	B0GNY8	Other	10/3/95
51003508	B0GNY9	Other	10/3/95

II. Analytical Results/Methodology

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

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0002 019

Quanterra
Environmental Services

The requested analyses were:

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

III. Quality Control

The analytical results for each analysis performed under SDG W0751 include a minimum of one Laboratory Control Sample (LCS), one method (reagent) blank, and one duplicate. Any exceptions have been noted in the "Comments" section.

Quality control sample results are reported in the same units as sample results with the exception of Gross Alpha and Gross Beta QC sample results which are reported in pCi/sample.

IV. Comments

Alpha Spectroscopy

Uranium-234, -235, -238 by method ITAS-RD-3234
The sample aliquot sizes were reduced as follows due to high screening activity: B0GNY4 (0.3 g), B0GNY5 (0.8 g), B0GNY6 (1.0 g), and B0GNY9 (0.4 g). All of the samples have activity that far exceeds the achieved MDAs. All of the batch samples except B0GNY3 contained U-236. U-235 and U-236 are nearly impossible to resolve because of their similar regions of interest. The computer attempted to define the areas of each but the computer's resolution was questionable, therefore, the analyst combined the U-235 and U-236 region of interest counts for calculation and reporting, and those counts are reported as U-235. The U-235 results for this batch should be flagged as estimates due to the U-236 contribution to the U-235 region of interest which cannot be resolved. The LCS, batch blank, sample and sample duplicate (B0GNX9) results are within contractual requirements.

TMB 12-27-95
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Bechtel Hanford, Inc.

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

Page 1 of 2

Date Turnaround: X Priority / Normal

Collector: D. Bowers, M. Mehlhorn	Company Contact: Dave Encke	Telephone: 373-3461
Project Designation: Concrete Removal Characterization	Sampling Location: 183-H Solar Evaporation Basin Project	SAF No.: B95-106
Ice Chest No.: ER-20	Field Logbook No.	Method of Shipment: Hand Deliver - Government Vehicle
Shipped To: Quanterra	Offsite Property No.: N/A	Bill of Lading/Air Bill No.: N/A
Possible Sample Hazards/Remarks		
Special Handling and/or Storage: Cool Samples to 4 Degrees Celsius		

Preservation	Cool	Cool	Cool	Cool	None	None					
Type of Container	G	G	G	G	G	P					
No. of Container(s)	1	1	1	1	1	1					
Volume	40 ml.	60 ml.	60 ml.	60 ml.	1 Liter	20 ml.					
SAMPLE ANALYSIS	ICP Metals Include Super-trace	5/00 34 Anions See Item 1 Below	Cyanide	Sulfide	5/00 35 See Item 2 Below	Activity Scan					
Sample No. / Matrix* / Date Sampled / Time Sampled											
BOGNX9 / DS / 10-2-95 / 1305	✓	✓	✓	✓	✓	✓	01				
BOGNY3 / DS / 10-2-95 / 1330	✓	✓	✓	✓	✓	✓	2				
BOGNY4 / DS / 10-2-95 / 1353	✓	✓	✓	✓	✓	✓	3				
BOGNY5 / DS / 10-2-95 / 1410	✓	✓	✓	✓	✓	✓	4				
BOGNY6 / DS / 10-2-95 / 1410	✓	✓	✓	✓	✓	✓	5				
BOGNY7 / DS / 10-2-95 / 1435	✓	✓	✓	✓	✓	✓	6				

CHAIN OF POSSESSION — Sign/Print Names

Relinquished By	Date/Time	Received By	Date/Time
Monty Mehlhorn / Monty Mehlhorn	10-2-95 1700	D St. John / ERC	10-2-95 1700
D St. John / ERC	10-2-95 1140	ERC / Bushtrue	10-2-95 1140
ERC / Bushtrue	10-3-95 11:11	Bushtrue / [illegible]	10-3-95
Relinquished By	Date/Time	Received By	Date/Time

SPECIAL INSTRUCTIONS

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

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

SDG W0751

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

H-118

BHI-00922
Rev. 0

Bechtel Hanford, Inc.

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

Page 2 of 2

Date Turnaround: X Priority / Normal

Collector	Company Contact: Dave Encke	Telephone: 373-3461
Project Designation: Concrete Removal Characterization	Sampling Location: 183-H Solar Evaporation Basin Project	SAF No.: B95-106
Ice Chest No.: ER-20	Field Logbook No.	Method of Shipment: Hand Deliver - Government Vehicle
Shipped To: Quanterra	Offsite Property No.: N/A	Bill of Lading/Air Bill No.: N/A
Possible Sample Hazards/Remarks		

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

SAMPLE ANALYSIS	ICP Metals Include Super-trace	Anions See Item 1 Below	Cyanide	Sulfide	See Item 2 Below	Activity Scan					
Preservation	Cool	Cool	Cool	Cool	None	None					
Type of Container	G	G	G	G	G	P					
No. of Container(s)	1	1	1	1	1	1					
Volume	40 ml.	60 ml.	60 ml.	60 ml.	1 Liter	20 ml.					
		510034			510035						

Sample No.	Matrix*	Date Sampled	Time Sampled										
BOGNY8	DS	10-2-95	1447	✓	✓	✓	✓	✓	✓	7			
BOGNY9	DS	10-2-95	1506	✓	✓	✓	✓	✓	✓	8			
~~BOGNZ0~~	mm 10-2-95												
~~BOGNZ1~~													
~~BOGNZ2~~													

CHAIN OF POSSESSION	Sign/Print Names		
Relinquished By: Mandy McKinnon Mandy McKinnon	Date/Time: 10-2-95 1700	Received By: D.S. John Dave Encke ERC	Date/Time: 10-2-95 1700
Relinquished By: David S. John ERC	Date/Time: 10-2-95 1140	Received By: ERC Rick Whitten R. Whitten	Date/Time: 1140 10-3-95
Relinquished By: ERC Rick Whitten R. Whitten	Date/Time: 12:10 10-3-95	Received By: Kevin Gottenberg	Date/Time: 12:10 10-3-95
Relinquished By	Date/Time	Received By	Date/Time

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

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

Lustron 1006 mm

SDG W0751

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

~~0032~~ 12-27-95 022

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BHI-00922
Rev. 0

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ATTACHMENT 5

DATA VALIDATION SUPPORTING DOCUMENTATION

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WHC-SD-EN-SPP-001, Rev. 1

RADIOCHEMICAL DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: 183 H Basin D&D Surface Removal			DATA PACKAGE:		
VALIDATOR: T. Staff		LAB: QUANTERRA		DATE: 12-22-95	
CASE:			SDG: WC751-QES		

ANALYSES PERFORMED

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

SAMPLES/MATRIX				
BOGNY3	BOGNY8	/ Drum Solids		
NY4	NY9	/		
NY5	BOGNX9	/		
NY6				
NY7				

1. Completeness . . . . . ☐ N/A

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

Comments: _____

2. Initial Calibration . . . . . [X] N/A

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

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

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

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

Comments: Raw data not included and not evaluated.

WHC-SD-EN-SPP-001, Rev. 1

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

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

Comments: Raw data not included/evaluated.

4. Blanks . . . . . ☐ N/A

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

Comments: ① U-234 x5 = 0.2 pCi/gm; No samples affected.

5. Matrix Spikes . . . . . ☐ N/A

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

Comments:

WHC-SD-EN-SPP-001, Rev. 1

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

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

Comments:_____

7. Chemical Recovery . . . . . ☐ N/A

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

Comments:_____

8. Duplicates . . . . . ☐ N/A

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

Comments:_____

027

Quanterra
Environmental Services

BLANK RESULTS

LAB NAME:	ITAS-RICHLAND	SDG:	W0751
LAB SAMPLE ID:	M100351B	MATRIX:	OTHER

ISOTOPE	RESULT	COUNTING ERROR (2 s)	TOTAL ERROR (2 s)	MDA	REPORT UNIT	YIELD	METHOD NUMBER
U-235	4.01E-03	N/A	1.1E-02	2.63E-02	pCi/g	79.00%	RD3234
U-234	4.01E-02 *	3.0E-02	3.1E-02	2.98E-02	pCi/g	79.00%	RD3234
U-238DA	1.41E-02	1.8E-02	1.9E-02	2.81E-02	pCi/g	79.00%	RD3234
ALPHA	7.92E-03	3.7E-02	3.7E-02	9.51E-02	pCi/sa	100.00%	RD3222
BETA	1.99E-01	3.7E-01	3.7E-01	8.21E-01	pCi/sa	100.00%	RD3222
TC-99	1.59E-01	1.6E-01	4.4E-01	3.70E+00	pCi/g	95.10%	ITAS-IT-RS-0001

Number of Results: 6

* Associated Samples not affected.

TMS 12-22-95

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APPENDIX I

VALIDATION REPORT FOR SAMPLE DELIVERY GROUP W0755

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APPENDIX I -- CONTENTS

Transmittal of Data Validation Package, Contract No. MSH-SWV-315905 . . . . . I-1

Radiochemistry Data Validation Summary for Data Package
W0755-QES (943-1610.113 755RAD.HBS) I-3
Attachment 1: Glossary of Data Reporting Qualifiers I-5
Attachment 2: Summary of Data Qualifications I-9
Attachment 3: Qualified Data Summary and Annotated Laboratory Reports I-13
Attachment 4: Laboratory Narrative and Chain-of-Custody Documentation I-19
Attachment 5: Data Validation Supporting Documentation I-27

Inorganics Data Validation Summary for Data Package
W0755-QES (943-1610.113 755INO.HBS) I-33
Attachment 1: Glossary of Data Reporting Qualifiers I-35
Attachment 2: Summary of Data Qualifications I-39
Attachment 3: Qualified Data Summary and Annotated Laboratory Reports I-43
Attachment 4: Laboratory Narrative and Chain-of-Custody Documentation I-49
Attachment 5: Data Validation Supporting Documentation I-57

General Chemistry Data Validation Summary for Data Package
W0755-QES (943-1610.113 755GEN.HBS) I-65
Attachment 1: Glossary of Data Reporting Qualifiers I-67
Attachment 2: Summary of Data Qualifications I-71
Attachment 3: Qualified Data Summary and Annotated Laboratory Reports I-75
Attachment 4: Laboratory Narrative and Chain-of-Custody Documentation I-89
Attachment 5: Data Validation Supporting Documentation I-97

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Golder Associates Inc.

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

Golder Associates

December 28, 1995

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

ERC
1022 Lee Blvd.
Richland, Washington 99352

ATTENTION: Ms. Jeanette Duncan

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

DEC 1995
RECEIVED
Validation
Log In

Dear Ms. Duncan:

This letter is to transmit the following data validation package:

SAF#	Project	Data Package	Analyses
B95-106	183 H BASIN D&D Surface Removal Characterization	W0755-QES	Metals, Radiochemistry, General Chemistry

Please call if you have any questions.

Sincerely,

GOLDER ASSOCIATES INC.

Tom Stapp

Thomas M. Stapp
Task Manager

Douglas Mather FOR:
Project Manager

Enclosures

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MEMORANDUM

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

FR: Tom Stapp, Golder Associates Inc.

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

INTRODUCTION

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

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

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

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

DATA QUALITY OBJECTIVES

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

Precision. Goals for precision were met.

Accuracy. Goals for accuracy were met with the exception of the deficiency indicated below.

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

001

Data Package ID: W0755-QES Analysis: RADIOCHEMISTRY

Completeness. The data package was complete for all requested analyses. A total of three samples were validated in this data package with a total of 55 determinations reported, all of which were deemed valid. This results in a completeness of 100 percent, which meets the 90 percent objective of the work plan.

MAJOR DEFICIENCIES

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

MINOR DEFICIENCIES

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

Matrix Spike Samples

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

DATA REPORTING

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

REFERENCES

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

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

ATTACHMENT 1

GLOSSARY OF DATA REPORTING QUALIFIERS

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GLOSSARY OF RADIOCHEMISTRY DATA REPORTING QUALIFIERS

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

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

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

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

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

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revised HKG
4/5/96

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ATTACHMENT 2

SUMMARY OF DATA QUALIFICATIONS

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

DATA QUALIFICATION SUMMARY - FORM B-7

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

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ATTACHMENT 3

QUALIFIED DATA SUMMARY and ANNOTATED LABORATORY REPORTS

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Validated Data Summary, Data Package: W0755-QES

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

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

Verified
TMY
12-28-95

Quanterra
Environmental Services

SAMPLE RESULTS

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

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

Number of Results: 19

TMS 12-27-95

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SAMPLE RESULTS

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

ISOTOPE	RESULT	COUNTING ERROR (2 s)	TOTAL ERROR (2 s)	MDA	REPORT UNIT	YIELD	METHOD NUMBER
U-234	2.40E+00	2.4E-01	4.7E-01	3.79E-02	pCi/g	70.60%	RD3234
U-238DA	1.95E+00	2.1E-01	3.9E-01	3.33E-02	pCi/g	70.60%	RD3234
CO-58	6.12E-03 U	1.1E-02	1.1E-02	1.97E-02	pCi/g	N/A	RD3219
CO-60	1.58E-02 U	1.1E-02	1.1E-02	2.20E-02	pCi/g	N/A	RD3219
CS-137DA	1.54E-01	2.4E-02	2.8E-02	N/A	pCi/g	N/A	RD3219
EU-152	2.34E-02 U	2.8E-02	2.8E-02	4.85E-02	pCi/g	N/A	RD3219
EU-154	-2.29E-02 U	3.4E-02	3.4E-02	5.64E-02	pCi/g	N/A	RD3219
EU-155	-1.55E-02 U	3.3E-02	3.3E-02	5.28E-02	pCi/g	N/A	RD3219
FE-59	-3.56E-03 U	2.7E-02	2.7E-02	4.54E-02	pCi/g	N/A	RD3219
K-40	4.80E+00	4.2E-01	6.4E-01	N/A	pCi/g	N/A	RD3219
RA-224DA	1.89E-01	3.4E-02	3.9E-02	N/A	pCi/g	N/A	RD3219
RA-226DA	2.57E-01	4.5E-02	5.2E-02	N/A	pCi/g	N/A	RD3219
U-235	2.02E-01	7.0E-02	7.8E-02	3.93E-02	pCi/g	70.60%	RD3234 ~~RD3219~~ TMB 12-27-95
U-238DLP	6.25E-01	5.6E-01	5.7E-01	N/A	pCi/g	N/A	RD3219
ALPHA	5.25E+00	3.6E+00	3.6E+00	5.11E+00	pCi/g	100.00%	RD3222
BETA	3.40E+01	4.2E+00	4.7E+00	3.95E+00	pCi/g	100.00%	RD3222
TC-99	8.57E+01 J	1.6E+00	1.0E+01	9.60E-01	pCi/g	95.10%	ITAS-IT-RS-0001

Number of Results: 17

TMB 12-27-95
~~0007~~

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Quanterra
Environmental Services

SAMPLE RESULTS

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

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

Number of Results: 19

TMS 12-27-95
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ATTACHMENT 4

LABORATORY NARRATIVE and CHAIN-OF-CUSTODY DOCUMENTATION

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Quanterra
Environmental Services

Quanterra Incorporated
2800 George Washington Way
Richland, Washington 99352

509 375-3131 Telephone
509 375-5590 Fax

CERTIFICATE OF ANALYSIS

OCT 1995
RECEIVED
Data
Log In

Bechtel Hanford, Inc.
345 Hills
Richland, WA 99352

October 30, 1995

Attention: Joan Kessner

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

I. Introduction

On October 4, 1995, three "other" matrix samples were received by the Quanterra Environmental Services Richland Laboratory (QTESRL) for radiochemical analysis. Upon receipt, the samples were assigned the following laboratory ID numbers to correspond with the Bechtel Hanford, Inc. (BHI) specific IDs:

QTESRL ID	BHI ID	Matrix	Date of Receipt
51003501	B0GNZ0	Other	10/4/95
51003502	B0GNZ1	Other	10/4/95
51003503	B0GNZ2	Other	10/4/95

II. Analytical Results/Methodology

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

TMS 12-27-95
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Quanterra
Environmental Services

The requested analyses were:

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

III. Quality Control

The analytical results for each analysis performed under SDG W0755 include a minimum of one Laboratory Control Sample (LCS), one method (reagent) blank, and one duplicate. Any exceptions have been noted in the "Comments" section.

Quality control sample results are reported in the same units as sample results with the exception of Gross Alpha and Gross Beta QC sample results which are reported in pCi/sample.

IV. Comments

Alpha Spectroscopy

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

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Quanterra
Environmental Services

Gamma Spectroscopy

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

Gas Proportional Counting

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

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

Liquid Scintillation Counting

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

TMR 12-27-95
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Quanterra
Environmental Services

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

Reviewed and approved:

Suzanne Gaines
Project Manager

TMJ 12-27-95
~~0005~~
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Bechtel Hanford, Inc.

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

Page ____ of ____

Date Turnaround: X Priority / Normal

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

Possible Sample Hazards/Remarks

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

			Preservation	Cool	Cool	Cool	Cool	None	None				
			Type of Container	G	G	G	G	G	P				
			No. of Container(s)	1	1	1	1	1	1				
			Volume	40 ml.	60 ml.	60 ml.	60 ml.	1 Liter	20 ml.				
SAMPLE ANALYSIS				ICP Metals Include Super-trace	Anions See Item 1 Below	Cyanide	Sulfide	See Item 2 Below	Activity Scan				
Sample No.	Matrix*	Date Sampled	Time Sampled										
BOGNZ0, N6003	DS	10-3-95	0917	✓	✓	✓	✓	✓	✓	01			
BOGNZ1, N6004	DS	10-3-95	0938	✓	✓	✓	✓	✓	✓	2			
BOGNZ2, N6005	DS	10-3-95	0950	✓	✓	✓	✓	✓	✓	3			
				5100	53			5100	54				

CHAIN OF POSSESSION	Sign/Print Names	
Relinquished By: Doug Bowers, Date/Time: 10-3-95 1255	Received By: [illegible] B. Whitten, Date/Time: 10-3-95 1255	
Relinquished By: [illegible] B. Whitten, Date/Time: 10-4-95 10:15	Received By: [illegible], Date/Time: 10-4-95 10:17	
Relinquished By: Date/Time	Received By: Date/Time	
Relinquished By: Date/Time	Received By: Date/Time	

SPECIAL INSTRUCTIONS

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

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

SDG-W0755

Matrix*: S = Soil; SE = Sediment; SO = Solid; SL = Sludge; W = Water; O = Oil; A = Air; DS = Drum Solids; DL = Drum Liquids; T = Tissue; Wi = Wipe; L = Liquid; V = Vegetation; X = Other

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

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ATTACHMENT 5

DATA VALIDATION SUPPORTING DOCUMENTATION

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WHC-SD-EN-SPP-001, Rev. 1

RADIOCHEMICAL DATA VALIDATION CHECKLIST

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

ANALYSES PERFORMED

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

SAMPLES/MATRIX BOGNZ0, BOGNZ1, BOGNZ2 /

DRUM SOLIDS

1. Completeness . . . . . ☐ N/A

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

Comments:

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

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

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

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

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

Comments: Raw data not provided and not evaluated.

A-1

019

WHC-SD-EN-SPP-001, Rev. 1

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

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

Comments: Raw data not provided and not evaluated.

4. Blanks . . . . . ☐ N/A

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

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

5. Matrix Spikes . . . . . ☐ N/A

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

Comments: ① Recovery % of Tc-99 spike is out of limits. The sample result is close to being 4 times greater than the spike level however the rule does not apply and qualification of associated samples will be applied (~~J/UJ~~) to results ≥ MDA.

WHC-SD-EN-SPP-001, Rev. 1

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

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

Comments:

7. Chemical Recovery . . . . . ☐ N/A

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

Comments:

8. Duplicates . . . . . ☐ N/A

Duplicates Analyzed? . . . . . Yes No N/A
RPD Values Acceptable? . NOTE ① . . . . . Yes No N/A.
Transcription/Calculation Errors? . . . . . Yes No N/A

Comments: ~~① Gamma spec analysis of U-235 for duplicate RPD was out of limits and associated results are qualified (TMD).~~ ① No qualification applied due to transcription error on Duplicate reporting sheet. All RPD are within required control limits. TMD 12-27-95

021

WHC-SD-EN-SPP-001, Rev. 1

9. Field QC Samples . . . . . ☒ N/A

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

Comments: Field QC Samples were not identified in the VSR and evaluation is not performed.

10. Holding Times

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

Comments:

	Collected:	Analyzed:		
BOGNZO	10-03-95	10-18-95	ISO U	≤ 180 DAYS
NZ1	↓	10-19-95	GAMMA	↓
NZ2	↓	10-18-95	GRS α	↓
		10-16-95	GRS β	↓
		10-17-95	TC-99	↓

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

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

Comments:

MEMORANDUM

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

FR: Thomas Stapp, Golder Associates Inc.

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

INTRODUCTION

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

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

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

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

DATA QUALITY OBJECTIVES

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

Precision. Goals for precision were met.

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

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

Data Package ID: W0755-QES Analysis: INORGANICS

Completeness. The data package was complete for all requested analyses. A total of three samples were validated in this data package with a total of 66 determinations reported, all of which were deemed valid. This results in a completeness of 100%, which meets the 90% objective of the work plan.

MAJOR DEFICIENCIES

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

MINOR DEFICIENCIES

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

Method Blanks

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

Matrix Spike Recovery

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

REFERENCES

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

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

ATTACHMENT 1

GLOSSARY OF DATA REPORTING QUALIFIERS

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

Glossary of Inorganic Data Reporting Qualifiers.

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

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

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

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

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

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

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

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ATTACHMENT 2

SUMMARY OF DATA QUALIFICATIONS

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

DATA QUALIFICATION SUMMARY - FORM B-7

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

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ATTACHMENT 3

QUALIFIED DATA SUMMARY and ANNOTATED LABORATORY REPORTS

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Validated Data Summary, Data Package: W0755-QES

	Sample #	BOGNZ0		BOGNZ1		BOGNZ2	
	Date	10/03/95		10/03/95		10/03/95	
	Location						
	Depth						
	Type	Drum Solid		Drum Solid		Drum Solid	
	Comments						
Parameter	Units	Results	Q	Results	Q	Results	Q
ALUMINUM	MG/KG	10800.000		7430.000		12700.000	
ANTIMONY	MG/KG	13.800	U	15.000	B	36.700	B
ARSENIC	MG/KG	34.800		34.700		51.500	
BARIUM	MG/KG	136.000		222.000		146.000	
BERYLLIUM	MG/KG	0.680	B	0.570	B	0.950	B
CADMIUM	MG/KG	1.200	U	1.800	B	2.100	B
CALCIUM	MG/KG	96000.000		53800.000		125000.000	
CHROMIUM	MG/KG	96.200		338.000		251.000	
COBALT	MG/KG	13.000	B	16.600	B	19.400	B
COPPER	MG/KG	88.400		202.000		257.000	
IRON	MG/KG	38900.000		188000.000		184000.000	
LEAD	MG/KG	9.500		228.000		8.300	
MAGNESIUM	MG/KG	6000.000		8160.000		6750.000	
MANGANESE	MG/KG	593.000		2090.000		1970.000	
NICKEL	MG/KG	38.600		173.000		133.000	
POTASSIUM	MG/KG	1730.000	B	1240.000		1830.000	
SELENIUM	MG/KG	0.260	U	0.260	U	0.260	U
SILVER	MG/KG	3.000	U	3.000	U	3.000	U
SODIUM	MG/KG	9740.000		6190.000		4490.000	
THALLIUM	MG/KG	1.500	J	8.500		7.600	
VANADIUM	MG/KG	53.700	J	32.900	J	40.600	J
ZINC	MG/KG	156.000	J	140.000	J	206.000	J

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

Verified
TMS 12-28-95

U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

B0GNZ0

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

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

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

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

Comments:

FORM I - IN

SW-846

TMK 12-28-95
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U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

B0GNZ1

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

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

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

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Color After: Clarity After: Artifacts:

Comments:

FORM I - IN

SW-846

12-28-95

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U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

B0GNZ2

Lab Name: QUANTERRA_MO Contract: 550.105
Lab Code: ITMO Case No.: SAS No.: SDG No.: W0755
Matrix (soil/water): SOIL Lab Sample ID: 9489-003
Level (low/med): LOW Date Received: 10/04/95
% Solids: 100.0

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

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

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Color After: Clarity After: Artifacts:

Comments:

FORM I - IN

SW-846

TMS 12-28-95

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ATTACHMENT 4

LABORATORY NARRATIVE and CHAIN-OF-CUSTODY DOCUMENTATION

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Quanterra
Environmental Services

Quanterra Incorporated
13715 Rider Trail North
Earth City, Missouri 63045

314 298-8566 Telephone
314 298-8757 Fax

CERTIFICATE OF ANALYSIS

OCT 1995
RECEIVED
Data
Log In

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

October 24, 1995

Attention: Joan Kessner

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

I. Introduction

On October 4, 1995, three (3) solid samples were received by Quanterra, Richland and transferred to Quanterra, St. Louis for chemical analysis. Upon receipt, the samples were given the following laboratory ID numbers to correspond with the specific client ID's:

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

II. Analytical Results/ Methodology

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

TMP 12-28-95

013

Quanterra
Environmental Services

Bechtel Hanford Incorporated
October 24, 1995
Project Number: 550.105
SDG: W0755
Page 2

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

III. Quality Control

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

IV. Definitions

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

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

V. Comments

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

TCH 12-28-95
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Quanterra
Environmental Services

Bechtel Hanford Incorporated
October 24, 1995
Project Number: 550.105
SDG: W0755
Page 3

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

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

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

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

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

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

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

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

TNS 12-28-95
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Quanterra
Environmental Services

Bechtel Hanford Incorporated
October 24, 1995
Project Number: 550.105
SDG: W0755
Page 4

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

Reviewed and approved:

Wade H. Price
Project Manager
e:\\price$\abbydave\hanw0755.nar

TMS 12-28-95
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Bechtel Hanford, Inc.

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

Page ____ of ____

Date Turnaround: X Priority / Normal

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

Possible Sample Hazards/Remarks

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

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

Sample No.	Matrix*	Date Sampled	Time Sampled	ICP Metals Include Super-trace	Anions See Item 1 Below	Cyanide	Sulfide	See Item 2 Below	Activity Scan				
BOGNZ0, N6003	DS	10-3-95	0917	✓	✓	✓	✓	✓	✓	01			
BOGNZ1, N6004	DS	10-3-95	0938	✓	✓	✓	✓	✓	✓	2			
BOGNZ2, N6005	DS	10-3-95	0950	✓	✓	✓	✓	✓	✓	3			
				5100	53			5100	54				
				100	100	100	100						

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

SPECIAL INSTRUCTIONS

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

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

SDG W0755

Matrix*: S = Soil; SE = Sediment; SO = Solid; SL = Sludge; W = Water; O = Oil; A = Air; DS = Drum Solids; DL = Drum Liquids; T = Tissue; WI = Wipe; L = Liquid; V = Vegetation; X = Other

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

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ATTACHMENT 5

DATA VALIDATION SUPPORTING DOCUMENTATION

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

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: 183 H Basin D&D Surface Removal			DATA PACKAGE:		
VALIDATOR: T. Stapp		LAB: QUANTERRA		DATE: 12-28-95	
CASE:			SDG: WO755-QES		
ANALYSES PERFORMED					
☐ CLP/ICP	☐ CLP/GFAA	☐ CLP/Hg	☐ CLP/Cyanide	☐	☐
☒ SW-846/ICP	☐ SW-846/GFAA	☐ SW-846/Hg	☐ SW-846 Cyanide	☐	☐
SAMPLES/MATRIX	BOGNZO / DRUM SOLIDS				
	BOGNZ1				
	BOGNZ2				

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

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

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

Comments:

2. HOLDING TIMES

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

Comments:

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

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

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

3. INSTRUMENT PERFORMANCE AND CALIBRATIONS

Were initial calibrations performed on all instruments? . . . . Yes No (N/A)
Are initial calibrations acceptable? . . . . . Yes No (N/A)
Are ICP interference checks acceptable? . . . . . Yes No (N/A)
Were ICV and CCV checks performed on all instruments? . . . . . Yes No (N/A)
Are ICV and CCV checks acceptable? . . . . . Yes No (N/A)
Comments: Raw data not provided and not evaluated.

4. BLANKS

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

5. ACCURACY

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

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

6. PRECISION

Were laboratory duplicates analyzed? . . . . . Yes No N/A
Are laboratory duplicate samples RPD values acceptable? . . . Yes No N/A
Were ICP serial dilution samples analyzed? . . . . . Yes No N/A
Are ICP serial dilution %D values acceptable? . . . . . Yes No N/A
Are field duplicate RPD values acceptable? . . . . . Yes No N/A
Are field split RPD values acceptable? . . . . . Yes No N/A
Comments:

7. FURNACE AA QUALITY CONTROL

Were duplicate injections performed as required? . . . . . Yes No N/A
Are duplicate injection %RSD values acceptable? . . . . . Yes No N/A
Were analytical spikes performed as required? . . . . . Yes No N/A
Are analytical spike recoveries acceptable? . . . . . Yes No N/A
Was MSA performed as required? . . . . . Yes No N/A
Are MSA results acceptable? . . . . . Yes No N/A
Comments:

8. REPORTED RESULTS AND DETECTION LIMITS

Are results reported for all requested analyses? . . . . . Yes No N/A
Are all results supported in the raw data? . . . . . Yes No N/A
Are results calculated properly? . . . . . Yes No N/A
Do results meet the CRDLs? . . . . . Yes No N/A
Comments:

U.S. EPA - CLP

5A
SPIKE SAMPLE RECOVERY
SUMMARY

EPA SAMPLE NO.

B0GNZ0SD

Lab Name: QUANTERRA_MO Contract: 550.105

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

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

% Solids for Sample: 100.0

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

Analyte	Control Limit %R	Spiked Sample Result (SSR)	C	Sample Result (SR)	C	Spike Added (SA)	%R	Q	M
Aluminum									NR
Antimony	80-120	40.9450		13.8000	U	50.00	81.9		P
Arsenic	80-120	233.0390		34.8200		200.00	99.1		P
Barium	80-120	314.2270		136.0490		200.00	89.1		P
Beryllium	80-120	5.3700		0.6800	B	5.00	93.8		P
Cadmium	80-120	4.6460		1.1500	U	5.00	92.9		P
Calcium									NR
Chromium		120.7230		96.1910		20.00	122.7		P
Cobalt	80-120	54.3500		12.9900	B	50.00	82.7		P
Copper	80-120	109.3140		88.4210		25.00	83.6		P
Iron									NR
Lead	80-120	53.6940		9.4970		50.00	88.4		P
Magnesium									NR
Manganese		608.1030		593.0810		50.00	30.0		P
Nickel	80-120	80.5050		38.5550		50.00	83.9		P
Potassium									NR
Selenium	80-120	185.4310		0.2600	U	200.00	92.7		P
Silver	80-120	3.9250	B	3.0000	U	5.00	78.5	N	P
Sodium									NR
Thallium	80-120	187.0930		1.4880		200.00	92.8		P
Vanadium	80-120	83.6550		53.6580		50.00	60.0	N	P
Zinc	80-120	178.2850		155.7980		50.00	45.0	N	P

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

FORM V (Part 1) - IN SW-846

TAS 12-28-95

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U.S. EPA - CLP

3
BLANKS

Lab Name: QUANTERRA_MO Contract: 550.105

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

Preparation Blank Matrix (soil/water): SOIL

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

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

Thallium absolute value = 7.29 and qualifies ~~all~~ Sample result for BOENZO as estimated (J).

FORM III - IN

SW-846

12-28-95

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MEMORANDUM

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

FR: Thomas Stapp, Golder Associates Inc.

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

INTRODUCTION

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

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

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

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

DATA QUALITY OBJECTIVES

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

Precision. Goals for precision were met.

Accuracy. Goals for accuracy were met.

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

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

Data Package ID: W0755-QES Analysis: GENERAL CHEMISTRY

MAJOR DEFICIENCIES

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

Holding Time

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

MINOR DEFICIENCIES

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

Holding Time

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

REFERENCES

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

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

ATTACHMENT 1

GLOSSARY OF DATA REPORTING QUALIFIERS

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

Glossary of Inorganic Data Reporting Qualifiers.

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

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

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

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

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

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

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

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ATTACHMENT 2

SUMMARY OF DATA QUALIFICATIONS

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

DATA QUALIFICATION SUMMARY

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

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ATTACHMENT 3

QUALIFIED DATA SUMMARY and ANNOTATED LABORATORY REPORTS

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Validated Data Summary, Data Package: W0755-QES

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

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

Verified HRG
1/11/96

008
Revised HRG
1/11/96

Quanterra
Environmental Services

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

Project: 550.105

*Category: Orthophosphate
Method: EPA 300.0
Matrix: SOLID

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

Client ID	Quanterra ID	Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit	Dil.
B0GNZ0	9489-001	Ortho-Phosphate	14265-44-2	QCBLK80505-2	10/13/95	10/13/95	4.97	UG/G	~~U~~ UR	4.97	1
B0GNZ0	9489-001DUP	Ortho-Phosphate	14265-44-2	QCBLK80505-2	10/13/95	10/13/95	4.96	UG/G	U	4.96	1
B0GNZ0	9489-001MS	Ortho-Phosphate	14265-44-2	QCBLK80505-2	10/13/95	10/13/95	108	%REC			1
B0GNZ1	9489-002	Ortho-Phosphate	14265-44-2	QCBLK80505-2	10/13/95	10/13/95	4.99	UG/G	~~U~~ UR	4.99	1
B0GNZ2	9489-003	Ortho-Phosphate	14265-44-2	QCBLK80505-3	10/13/95	10/13/95	4.97	UG/G	~~U~~ UR	4.97	1
NA	QCBLK80505-2	Ortho-Phosphate	14265-44-2	QCBLK80505-2	10/13/95	10/13/95	5.00	UG/G	U	5.00	1
NA	QCBLK80505-3	Ortho-Phosphate	14265-44-2	QCBLK80505-3	10/13/95	10/13/95	5.00	UG/G	U	5.00	1
NA	QCLCS80505-2	Ortho-Phosphate	14265-44-2	QCBLK80505-2	10/13/95	10/13/95	97	%REC			1
NA	QCLCS80505-3	Ortho-Phosphate	14265-44-2	QCBLK80505-3	10/13/95	10/13/95	103	%REC			1

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Quanterra
Environmental Services

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

Project: 550.105

Category: SULFATE
Method: EPA 300.0
Matrix: SOLID

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

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

TMB 12-28-95

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010

Quanterra
Environmental Services

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

Project: 550.105

Category: CHLORIDE
Method: EPA 300.0
Matrix: SOLID

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

Client ID	Quanterra ID	Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit	Dil.
B0GNZ0	9489-001	Chloride	16887-00-6	QCBLK80505-2	10/13/95	10/13/95	142	UG/G		9.94	5
B0GNZ0	9489-001DUP	Chloride	16887-00-6	QCBLK80505-2	10/13/95	10/13/95	141	UG/G		9.91	5
B0GNZ0	9489-001MS	Chloride	16887-00-6	QCBLK80505-2	10/13/95	10/13/95	99	%REC			10
B0GNZ1	9489-002	Chloride	16887-00-6	QCBLK80505-2	10/13/95	10/13/95	13.8	UG/G		2.00	1
B0GNZ2	9489-003	Chloride	16887-00-6	QCBLK80505-3	10/13/95	10/13/95	38.5	UG/G		1.99	1
NA	QCBLK80505-2	Chloride	16887-00-6	QCBLK80505-2	10/13/95	10/13/95	2.00	UG/G	U	2.00	1
NA	QCBLK80505-3	Chloride	16887-00-6	QCBLK80505-3	10/13/95	10/13/95	2.00	UG/G	U	2.00	1
NA	QCLCS80505-2	Chloride	16887-00-6	QCBLK80505-2	10/13/95	10/13/95	98	%REC			1
NA	QCLCS80505-3	Chloride	16887-00-6	QCBLK80505-3	10/13/95	10/13/95	86	%REC			1

TMB 12-28-95
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011

Quanterra
Environmental Services

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

Project: 550.105

*Category: FLUORIDE
Method: EPA 300.0
Matrix: SOLID

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

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

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Quanterra
Environmental Services

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

Project: 550.105

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

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

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

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Quanterra
Environmental Services

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

Project: 550.105

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

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

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

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Quanterra
Environmental Services

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

Project: 550.105

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

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

Client ID	Quanterra ID	Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit	Dil.
B0GNZ0	9489-001	Formate	00-00-0	QCBLK80179-1	10/10/95	10/10/95	27.2	UG/G		4.97	1
B0GNZ0	9489-001DUP	Formate	00-00-0	QCBLK80179-1	10/10/95	10/10/95	26.4	UG/G		4.97	1
B0GNZ0	9489-001MS	Formate	00-00-0	QCBLK80179-1	10/10/95	10/10/95	103	%REC			1
B0GNZ1	9489-002	Formate	00-00-0	QCBLK80179-1	10/10/95	10/10/95	38.8	UG/G		4.98	1
B0GNZ2	9489-003	Formate	00-00-0	QCBLK80179-1	10/10/95	10/10/95	8.00	UG/G		4.85	1
NA	QCBLK80179-1	Formate	00-00-0	QCBLK80179-1	10/10/95	10/10/95	5.00	UG/G	U	5.00	1
NA	QCLCS80179-1	Formate	00-00-0	QCBLK80179-1	10/10/95	10/10/95	110	%REC	✓		1

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Quanterra
Environmental Services

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

Project: 550.105

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

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

Client ID	Quanterra ID	Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit	Dil.
B0GNZ0	9489-001	Cyanide	57-12-5	QCBLK79945-1	10/09/95	10/11/95	2.83	UG/G		0.50	1
B0GNZ0	9489-001DUP	Cyanide	57-12-5	QCBLK79945-1	10/09/95	10/11/95	2.39	UG/G		0.50	1
B0GNZ0	9489-001MS	Cyanide	57-12-5	QCBLK79945-1	10/09/95	10/11/95	87	%REC			1
B0GNZ1	9489-002	Cyanide	57-12-5	QCBLK79945-1	10/09/95	10/11/95	0.56	UG/G		0.50	1
B0GNZ2	9489-003	Cyanide	57-12-5	QCBLK79945-2	10/09/95	10/11/95	0.69	UG/G		0.50	1
NA	QCBLK79945-1	Cyanide	57-12-5	QCBLK79945-1	10/09/95	10/11/95	0.50	UG/G	U	0.50	1
NA	QCBLK79945-2	Cyanide	57-12-5	QCBLK79945-2	10/09/95	10/11/95	0.50	UG/G	U	0.50	1
NA	QCLCS79945-1	Cyanide	57-12-5	QCBLK79945-1	10/09/95	10/11/95	96	%REC	✓		1
NA	QCLCS79945-2	Cyanide	57-12-5	QCBLK79945-2	10/09/95	10/11/95	95	%REC	✓		1

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Quanterra
Environmental Services

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

Project: 550.105

Category: Nitrate
Method: EPA 300.0
Matrix: SOLID

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

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

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Quanterra
Environmental Services

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

Project: 550.105

Category: Nitrite
Method: EPA 300.0
Matrix: SOLID

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

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

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ATTACHMENT 4

LABORATORY NARRATIVE and CHAIN-OF-CUSTODY DOCUMENTATION

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Quanterra
Environmental Services

Quanterra Incorporated
13715 Rider Trail North
Earth City, Missouri 63045

314 298-8566 Telephone
314 298-8757 Fax

CERTIFICATE OF ANALYSIS

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

October 24, 1995

Attention: Joan Kessner

OCT 1995
RECEIVED
Data
Log In

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

I. Introduction

On October 4, 1995, three (3) solid samples were received by Quanterra, Richland and transferred to Quanterra. St. Louis for chemical analysis. Upon receipt, the samples were given the following laboratory ID numbers to correspond with the specific client ID's:

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

II. Analytical Results/ Methodology

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

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020

Quanterra
Environmental Services

Bechtel Hanford Incorporated
October 24. 1995
Project Number: 550.105
SDG: W0755
Page 2

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

III. Quality Control

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

IV. Definitions

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

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

V. Comments

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

12-28-95
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Quanterra
Environmental Services

Bechtel Hanford Incorporated
October 24, 1995
Project Number: 550.105
SDG: W0755
Page 3

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

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

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

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

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

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

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

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

12-28-95
022

Quanterra
Environmental Services

Bechtel Hanford Incorporated
October 24, 1995
Project Number: 550.105
SDG: W0755
Page 4

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

Reviewed and approved:

Wade H. Price
Project Manager
e:\\price$\abbydave\hanw0755.nar

TB 12-28-95
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Bechtel Hanford, Inc.

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

Page ____ of ____

Date Turnaround: X Priority / Normal

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

Possible Sample Hazards/Remarks

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

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

Sample No.	Matrix*	Date Sampled	Time Sampled	ICP Metals Include Super-trace	Anions See Item 1 Below	Cyanide	Sulfide	See Item 2 Below	Activity Scan				
BOGNZ0, N6003	DS	10-3-95	0917	✓	✓	✓	✓	✓	✓	01			
BOGNZ1, N6004	DS	10-3-95	0938	✓	✓	✓	✓	✓	✓	2			
BOGNZ2, N6005	DS	10-3-95	0950	✓	✓	✓	✓	✓	✓	3			
				5100	53			5100	54				
				100	100	100	100						

CHAIN OF POSSESSION — Sign/Print Names

Relinquished By	Date/Time	Received By	Date/Time
Doug Bowers	10-1-95 / 1255	Gre B. Whitten	1255 10-3-95
Gre B. Whitten	10-4-95 / 10:15	[illegible]	10-4-95 / 10:13

SPECIAL INSTRUCTIONS

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

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

SDG W0755

Matrix*: S = Soil; SE = Sediment; SO = Solid; SL = Sludge; W = Water; O = Oil; A = Air; DS = Drum Solids; DL = Drum Liquids; T = Tissue; WI = Wipe; L = Liquid; V = Vegetation; X = Other

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

0000009 12-28-95

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ATTACHMENT 5

DATA VALIDATION SUPPORTING DOCUMENTATION

025

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

GENERAL CHEMISTRY DATA VALIDATION CHECKLIST

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

ANALYSES PERFORMED

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

SAMPLES/MATRIX BOGNZO / DRUM SOLIDS
BOGNZ1 ↓ ↓
BOGNZ2 ↓ ↓

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

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

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

Comments:

2. HOLDING TIMES

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

Comments: See Hold Time Summary page B-1.

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

GENERAL CHEMISTRY DATA VALIDATION CHECKLIST

3. INSTRUMENT CALIBRATION

Was initial calibration performed for all applicable analyses? Yes No N/A
Are initial calibration results acceptable? . . . . . Yes No N/A
Was a calibration check performed for all applicable analyses? Yes No N/A
Are calibration check results acceptable? . . . . . Yes No N/A
Comments: Raw data not provided and not evaluated for Level C data validation.

4. BLANKS

Were laboratory blanks analyzed? . . . . . Yes No N/A
Are laboratory blank results acceptable? . . . . . Yes No N/A
Were field/trip blanks analyzed? . . . . . NOTE ① . . . . . Yes No N/A
Are field/trip blank results acceptable? . . . . . Yes No N/A
Comments: ① Field QC was not identified in the USR and has not been evaluated.

5. ACCURACY

Were spike samples analyzed at the required frequency? NOTE ① . . . . Yes No N/A TMS 12-28-9
Are spike recoveries acceptable? . . . . . Yes No N/A
Were LCS analyses performed at the required frequency? . . . . Yes No N/A
Are LCS recoveries acceptable? . . . . . Yes No N/A
Comments: ① Spike samples not required per D.V. procedures.

6. PRECISION

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

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

GENERAL CHEMISTRY DATA VALIDATION CHECKLIST

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

7. ANALYTE QUANTITATION

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

Comments: Raw data not provided.

8. REPORTED RESULTS AND DETECTION LIMITS

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

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

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

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

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

HOLDING TIME SUMMARY

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

COMMENTS: WET CHEM.

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

APPENDIX J

CERTIFICATE OF ANALYSIS AND SAMPLE RESULTS W0759

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APPENDIX J – CONTENTS

Certificate of Analysis J-1
Sample Results J-4
Chain-of-Custody Analysis Request J-5

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Quanterra
Environmental Services

Quanterra Incorporated
2800 George Washington Way
Richland, Washington 99352

509 375-3131 Telephone
509 375-5590 Fax

CERTIFICATE OF ANALYSIS

OCT 1995
RECEIVED
Data
Log In

Bechtel Hanford, Inc.
345 Hills
Richland, WA 99352

October 24, 1995

Attention: Joan Kessner

SAF Number	:	~~B95-049~~ B96-002 per COC DGyes 11/2/95
Date SDG Closed	:	October 9, 1995
Number of Samples	:	One (1)
Sample Type	:	Water
SDG Number	:	W0759
Data Deliverable	:	Summary

I. Introduction

On October 9, 1995, 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, Inc. (BHI) specific ID:

QTESRL ID	BHI ID	Matrix	Date of Receipt
51013001	B0GTS1	Water	10/9/95

II. Analytical Results/Methodology

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

DB
10/26/95
~~0001~~
0002

Quanterra
Environmental Services

The requested analyses were:

Gamma Spectroscopy
Gamma Scan by method ITAS-RD-3219
Gas Proportional Counting
Gross Alpha by method ITAS-RD-3214
Gross Beta by method ITAS-RD-3214
Liquid Scintillation Counting
Technetium-99 by method ITAS-IT-RS-0001
Total Uranium
Total Uranium by method ITAS-RD-4200

III. Quality Control

The analytical results for each analysis performed under SDG W0759 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

Gamma Spectroscopy

Gamma Scan by method ITAS-RD-3219
The LCS, batch blank, sample and sample duplicate (B0GTS1) results are within contractual requirements.

Gas Proportional Counting

Gross Alpha by method ITAS-RD-3214
The LCS, batch blank, sample and sample duplicate (B0GTS1) results are within contractual requirements.

Gross Beta by method ITAS-RD-3214
The batch was analyzed using 35 mL due to high beta screening activity. The LCS and blank were also analyzed using the reduced volume which increased the MDA proportionately. As a result, the blank result and MDA are greater than the RDL. However, the blank result is less than one half the achieved MDA and is essentially background at that volume. The results are accepted and the technician has been instructed to use the full analytical volume for LCS and blank samples even when the sample volume has been reduced. The LCS, batch blank, sample and sample duplicate (B0GTS1) results are within contractual requirements, except as noted.

DB
10/26/95

0003 ~~0002~~

Quanterra
Environmental Services

Liquid Scintillation Counting

Technetium-99 by method ITAS-IT-RS-0001
The matrix spike result is unacceptable. The sample result is approximately 9 times greater than the spike that was added. In addition, the sample was cloudy, indicating that there may be problems with non-homogeneity. The high matrix spike recovery is attributed to matrix effects (high sample activity/hot particles) and the batch is accepted based on acceptable results for all other quality control parameters. The matrix spike, LCS, batch blank, sample and sample duplicate (B0GTS1) results are within contractual requirements, except as noted.

Total Uranium

Total Uranium by method ITAS-RD-4200
The matrix spike is considered lost in analysis due to an unacceptable recovery. The sample activity is more than 100 times greater than the spike that was added, therefore, the unacceptable recovery is attributed to a sample matrix effect (high sample activity). The matrix spike, LCS, batch blank, sample and sample duplicate (B0GTS1) results are within contractual requirements, except as noted.

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

DB.
10/26/95
~~0003~~

0004

Quanterra
Environmental Services

SAMPLE RESULTS

LAB NAME:	ITAS-RICHLAND	SDG:	W0759
LAB SAMPLE ID:	51013001	MATRIX:	WATER
CLIENT ID:	B0GTS1	DATE RECEIVED:	10/9/95 11:00:00 AM

ISOTOPE	RESULT	COUNTING ERROR (2 s)	TOTAL ERROR (2 s)	MDA	REPORT UNIT	YIELD	METHOD NUMBER
CO-58	2.83E+00	2.0E+00	2.0E+00	4.64E+00	pCi/L	N/A	RD3219
CO-60	-2.22E+00	3.4E+00	3.4E+00	5.51E+00	pCi/L	N/A	RD3219
CS-137DA	2.55E+00	2.8E+00	2.8E+00	5.40E+00	pCi/L	N/A	RD3219
EU-152	-1.53E-01	6.3E+00	6.3E+00	1.09E+01	pCi/L	N/A	RD3219
EU-154	-7.13E+00	1.1E+01	1.1E+01	1.83E+01	pCi/L	N/A	RD3219
EU-155	2.69E-01	5.7E+00	5.7E+00	9.44E+00	pCi/L	N/A	RD3219
FE-59	2.33E-01	6.6E+00	6.6E+00	1.19E+01	pCi/L	N/A	RD3219
ALPHA	6.45E+01	1.0E+01	1.3E+01	5.04E+00	pCi/L	100.00%	RD3214
BETA	8.24E+02	2.5E+01	6.3E+01	1.26E+01	pCi/L	100.00%	RD3214
TC-99	2.52E+03	1.6E+01	2.8E+02	3.82E+00	pCi/L	95.10%	ITAS-IT-RS-0001
TOTAL-URANIUM	9.26E+01	N/A	2.1E+01	3.23E-03	ug/L	N/A	RD4200

Number of Results: 11

0005

Westinghouse I ord Company

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

Page 1 of 1

Data Turnaround: [x] Priority [ ] Normal

Collector: Doug Bowers	Company Contact: D. B. Encke	Telephone No.: 373-3461
Project Designation: 183-H Basin Rainwater-2	Sampling Location: 183 solar basin	SAE No.: B96-002
Ice Chest No.: ER-20	Field Logbook No.: EFL-1133-1	Method of Shipment: Hand deliver
Shipped To: Quanterra	Offsite Property No.	Bill of Lading/Air Bill No.

Possible Sample Hazards/Remarks: Unknown

Special Handling and/or Storage

Preservative	HNO3	HCl	none															
Type of Container	P	P	P															
No. of Container(s)	3	3	1															
Volume	1 L	1 L	20 ml															
SAMPLE ANALYSIS	Gross Alpha/Beta, Total Uranium, Gamma Spec	Tc-99	Activity Scan															

Sample No.	Matrix*	Date Sampled	Time Sampled															
BOGTS1	W	10-6-95	1407	✓	✓	✓		N6026										

CHAIN OF POSSESSION — Sign/Print Names

Relinquished By	Date/Time	Received By	Date/Time
Doug Bowers	10-6-95 / 1605	K. Trapp / K. Trapp	10/6/95 1605
K. Trapp / K. Trapp	KT 10/6/95 10/9/95 0826 ~~10/6/9~~	ER	0826
ER	11:00	Quanterra	11:00
B. Whitten	10-9-95	Kevin Ochtenburg	10-9-95

SPECIAL INSTRUCTIONS

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

DISTRIBUTION: Original- Sample Yellow - Sampler

BC-6000-928 (12/92)

2

10-6-95 EFL-183-1
Entered: Monty Mehlhorn
Project: 183-H Solar Basins, Rainwater Sampling
1337 D. Bowers, M. Mehlhorn arrive on site, and sign in at the site trailer.
See p. for site personnel. We are still working under RWP # PS 397.
We prepare labels and preserve the sample bottles. A pre job safety meeting is held
1358 D. Bowers prepares the PDE for sampling.
1408 D. Bowers enters the C.A. to commence sampling. Weather: 65F, Sunny, Calm. Sampling occurs as follows:

Sample # (HEFS)	222-S	Time	Comments
B06TS1	N6026	1407	Basin #9 was the sample location

1420 D. Bowers exits the C.A. Sample Bottle lot #'s: C5186020-11 Plastic, 2-30ml Plastic. The samples were taken with a pre-cleaned, triple-rinsed 500ml glass bottle. The contents were poured into the bottle sets.
1430 We leave the site.
Monty Mehlhorn / Monty Mehlhorn 10-6-95

N/A

OCT 1995
Received
D.B. Eacho

APPENDIX K
VALIDATION REPORT FOR CONCRETE SPLIT SAMPLE BOGRL0

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APPENDIX K – CONTENTS

Supplementary Hexavalent Chromium Information K-1
Transmittal of Data Validation Package, Contract No. MSH-SWV-315905 . . . . . K-5

Radiochemistry Data Validation Summary for Data Package
W0779-QES (943-1610.118 779RAD.HB) K-7
Attachment 1: Glossary of Data Reporting Qualifiers K-9
Attachment 2: Summary of Data Qualifications K-13
Attachment 3: Qualified Data Summary and Annotated Laboratory Reports K-17
Attachment 4: Laboratory Narrative and Chain-of-Custody Documentation K-21
Attachment 5: Data Validation Supporting Documentation K-29

General Chemistry Data Validation Summary for Data Package
W0779-QES (943-1610.118 779GEN.HB) K-37
Attachment 1: Glossary of Data Reporting Qualifiers K-39
Attachment 2: Summary of Data Qualifications K-43
Attachment 3: Qualified Data Summary and Annotated Laboratory Reports K-47
Attachment 4: Laboratory Narrative and Chain-of-Custody Documentation K-59
Attachment 5: Data Validation Supporting Documentation K-67

Inorganic Data Validation Summary for Data Package
W0779-QES (943-1610.118 779INO.HB) K-73
Attachment 1: Glossary of Data Reporting Qualifiers K-75
Attachment 2: Summary of Data Qualifications K-79
Attachment 3: Qualified Data Summary and Annotated Laboratory Reports K-83
Attachment 4: Laboratory Narrative and Chain-of-Custody Documentation K-89
Attachment 5: Data Validation Supporting Documentation K-97

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Supplementary Hexavalent Chromium Information Excluded from the Validation Report

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Quanterra Environmental Services

SAF B96-026

CHAIN-OF-CUSTODY FORM

ANALYSIS CR+G CLIENT BHI DATE DUE 11-9-95

SAMPLE DELIVERY GROUP W0779 BATCH NO. 10-348

ID	CUSTOMER ID	COMMENTS
51034801	BOG-RLD	
		PRIORITY

INITIATED	10/25/95	SEP. LAB	NA
PREP LAB	10/27/95	CR REC'D	NA
QC PREP.	10/27/95	DATA REVIEW	PK 11-5-95
SA. STORED	10/27/95		

Form No: RC-075, 3/93, Rev. 1

HEXAVALENT CHROMIUM DATA SUMMARY

SDG: W0779

ANALYSIS DATE: 10/27/95

MATRIX: SOIL

MDL: 0.15 mg/kg

(B) 10/31/95

SAMPLE LAB. ID	CLIENT ID	SAMPLE RESULT	UNITS	SPIKE ADDED	UNITS	SPIKE RECOVERED	UNITS	PERCENT RECOVERY
PREP. BLANK		0.006	mg/L					
LCS		0.436	mg/L	0.500	mg/L	0.436	mg/L	87.2
51034801	B0GRL0	<0.15	mg/kg					
51034801 DUP	B0GRL0	<0.15	mg/kg					
51034801 MS	B0GRL0	5.49	mg/kg	5.0	mg/kg	5.38	mg/kg	108.0
51034801 MSD	B0GRL0	0.33	mg/kg	5.0	mg/kg	0.22	mg/kg	4.4
51034801 PDS	B0GRL0	0.103	mg/L	1.0	mg/L	0.085	mg/L	8.5

COMMENTS:

MS exhibited irregular behavior when pH was taken too low and readjusted to 2.0 as a red precipitate formed. The MSD exhibited normal behavior and indicates an interference in the sample matrix as does the low post digestive spike (PDS) recovery. Acceptable LCS recovery indicates that the Cr+6 is retained during the digestion in the absence of a reducing agent.

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

PRIORITY

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

Golder Associates Inc.

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

COPY

Golder Associates

January 16, 1996

Our ref: 943-1610.118.0400
94-1610/O/444

JAN 1996 RECEIVED

FEB 1996 Received D.B Encke

ERC
1022 Lee Blvd.
Richland, Washington 99352

ATTENTION: Ms. Jeanette Duncan

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

Dear Ms. Duncan:

This letter is to transmit the following data validation package:

SAF#	Project	Data Package	Analyses
B96-026	183 H Basin D & D Concrete Sampling	W0779-QES	Metals, Radiochemistry, General Chemistry

Please call if you have any questions.

Sincerely,

GOLDER ASSOCIATES INC.

Thomas M. Stapp
Task Manager

TMS/lk

Enclosures

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MEMORANDUM

TO: 183-H Basin D&D, Concrete Sampling Project QA Record January 16, 1996

FR: Heidi Gregerson, Golder Associates Inc. HRG

RE: RADIOCHEMISTRY DATA VALIDATION SUMMARY FOR DATA PACKAGE W0779-QES (943-1610.118 779RAD.HB)

INTRODUCTION

This memo presents the results of data validation for the analysis specified below on data package W0779-QES prepared by Quanterra Environmental Services. Sample information is provided in the following table:

SAMPLE ID	COMMENTS	ANALYSIS	MEDIA
B0GRL0		RADIOCHEMISTRY SEE ATTACHMENT 4	SOLID

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

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

DATA QUALITY OBJECTIVES

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

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

Accuracy. Goals for accuracy were met.

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

001

Data Package ID: W0779-OES Analysis: RADIOCHEMISTRY

Completeness. The data package was complete for all requested analyses. A total of one sample was validated in this data package with a total of 19 determinations reported, all of which were deemed valid. This results in a completeness of 100 percent, which meets the 90 percent objective of the work plan.

MAJOR DEFICIENCIES

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

MINOR DEFICIENCIES

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

Laboratory Duplicate

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

DATA REPORTING

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

REFERENCES

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

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

002

ATTACHMENT 1

GLOSSARY OF DATA REPORTING QUALIFIERS

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GLOSSARY OF RADIOCHEMISTRY DATA REPORTING QUALIFIERS

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

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

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

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

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

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ATTACHMENT 2

SUMMARY OF DATA QUALIFICATIONS

005

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

DATA QUALIFICATION SUMMARY - FORM B-7

SDG: W0779-QES	REVIEWER: H. Gregerson	DATE: 1-16-95	PAGE 1 OF 1
COMMENTS: RADIOCHEMISTRY			
COMPOUND/ANALYTE	QUALIFIER	SAMPLES AFFECTED	REASON
U-235	J	B0GRL0	DUPLICATE RPD WAS OUTSIDE THE CONTROL LIMIT

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ATTACHMENT 3

QUALIFIED DATA SUMMARY and ANNOTATED LABORATORY REPORTS

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Validated Data Summary, Data Package: W0779-QES

	Sample #	B0GRL0	
	Date	10/23/95	
	Location		
	Depth		
	Type	Solid	
	Comments		
Parameter	Units	Results	Q
URANIUM-235	pCi/G	0.122	J
URANIUM-234	pCi/G	5.300	
URANIUM-238	pCi/G	5.020	
COBALT-58	pCi/G	0.000	U
COBALT-60	pCi/G	0.001	U
CESIUM-137DA	pCi/G	0.106	
EUROPIUM-152	pCi/G	0.000	U
EUROPIUM-154	pCi/G	-0.015	U
EUROPIUM-155	pCi/G	0.045	U
IRON-59	pCi/G	0.019	U
RADIUM-224DA	pCi/G	0.455	
RADIUM-226DA	pCi/G	0.437	
RADIUM-228DA	pCi/G	0.549	
URANIUM-235	pCi/G	0.196	
URANIUM-238DLP	pCi/G	2.210	
GROSS ALPHA	pCi/G	9.780	
GROSS BETA	pCi/G	10.800	
TECHNETIUM-99	pCi/G	14.700	
TOTAL URANIUM	UG/G	9.680	

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

Verified HRG
2/7/96

2/9/96
HRG
007A

Quanterra
Environmental Services

SAMPLE RESULTS

LAB NAME:	ITAS-RICHLAND	SDG:	W0779
LAB SAMPLE ID:	51034801	MATRIX:	OTHER
CLIENT ID:	B0GRL0	DATE RECEIVED:	10/25/95 10:30:00 AM

ISOTOPE	RESULT	COUNTING ERROR (2 s)	TOTAL ERROR (2 s)	MDA	REPORT UNIT	YIELD	METHOD NUMBER
U-234	5.30E+00	3.7E-01	9.9E-01	4.77E-02	pCi/g	65.10%	RD3234
U-235	1.22E-01 J	5.6E-02	6.0E-02	1.73E-02	pCi/g	65.10%	RD3234
U-238	5.02E+00	3.6E-01	9.4E-01	5.10E-02	pCi/g	65.10%	RD3234
CO-58.	1.38E-04 U	8.7E-03	8.7E-03	1.49E-02	pCi/g	N/A	RD3219
CO-60.	1.10E-03 U	8.9E-03	8.9E-03	1.57E-02	pCi/g	N/A	RD3219
CS-137DA.	1.06E-01	1.8E-02	2.1E-02	N/A	pCi/g	N/A	RD3219
EU-152.	-4.54E-04 U	2.2E-02	2.2E-02	3.64E-02	pCi/g	N/A	RD3219
EU-154.	-1.45E-02 U	3.1E-02	3.1E-02	5.12E-02	pCi/g	N/A	RD3219
EU-155.	4.54E-02 U	2.8E-02	2.8E-02	4.65E-02	pCi/g	N/A	RD3219
FE-59.	1.94E-02 U	2.0E-02	2.0E-02	3.65E-02	pCi/g	N/A	RD3219
RA-224DA.	4.55E-01	2.7E-02	5.3E-02	N/A	pCi/g	N/A	RD3219
RA-226DA.	4.37E-01	3.8E-02	5.8E-02	N/A	pCi/g	N/A	RD3219
RA-228DA.	5.49E-01	6.6E-02	8.6E-02	N/A	pCi/g	N/A	RD3219
U-235.	1.96E-01	7.0E-02	7.3E-02	N/A	pCi/g	N/A	RD3219
U-238DLP.	2.21E+00	7.3E-01	7.7E-01	N/A	pCi/g	N/A	RD3219
ALPHA	9.78E+00	4.6E+00	4.7E+00	5.11E+00	pCi/g	100.00%	RD3222
BETA	1.08E+01	2.7E+00	2.8E+00	3.93E+00	pCi/g	100.00%	RD3222
TC-99	1.47E+01	7.5E-01	2.6E+00	9.90E-01	pCi/g	95.10%	ITAS-IT-RS-0001
TOTAL-URANIUM	9.68E+00	N/A	1.3E+00	2.04E-03	ug/g	N/A	RD4200

Number of Results: 19

008

HRG 1/16/96

ATTACHMENT 4

LABORATORY NARRATIVE and CHAIN-OF-CUSTODY DOCUMENTATION

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Quanterra Environmental Services

Quanterra Incorporated
2800 George Washington Way
Richland, Washington 99352

509 375-3131 Telephone
509 375-5590 Fax

CERTIFICATE OF ANALYSIS

Bechtel Hanford, Inc.
345 Hills
Richland, WA 99352

November 13, 1995

Attention: Joan Kessner

NOV 1995
RECEIVED
Data
Log In

SAF Number	:	B96-026
Date SDG Closed	:	October 25, 1995
Number of Samples	:	One (1)
Sample Type	:	Other
SDG Number	:	W0779
Data Deliverable	:	Summary

I. Introduction

On October 25, 1995, one "other" matrix sample was received by the Quanterra Environmental Services Richland Laboratory (QTESRL) for radiochemical analysis. Upon receipt, the sample 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
51034801	B0GRL0	Other	10/25/95

II. Analytical Results/Methodology

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

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HRG 1/16/96
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Quanterra
Environmental Services

The requested analyses were:

Alpha Spectroscopy
Uranium-234, -235, -238 by method ITAS-RD-3234
Gamma Spectroscopy
Gamma Scan by method ITAS-RD-3219
Gas Proportional Counting
Gross Alpha by method ITAS-RD-3222
Gross Beta by method ITAS-RD-3222
Liquid Scintillation Counting
Technetium-99 by method ITAS-IT-RS-0001
Total Uranium
Total Uranium by method ITAS-RD-4200

III. Quality Control

The analytical results for each analysis performed under SDG W0779 include a minimum of one Laboratory Control Sample (LCS), one method (reagent) blank, and one duplicate. Any exceptions have been noted in the "Comments" section.

Quality control sample results are reported in the same units as sample results with the exception of Gross Alpha and Gross Beta QC sample results which are reported in pCi/sample.

IV. Comments

Alpha Spectroscopy

Uranium-234, -235, -238 by method ITAS-RD-3234
The spectra for the sample and duplicate show some smearing in the tracer, U-234, and U-238 region of interest. The U-234 peak tails into the U-235 region of interest causing an undefined U-235 peak, and, as a result, the U-235 results reported for the sample and duplicate should be flagged as estimates only. The smearing observed in the sample and duplicate was not present in the spectra for the blank and LCS, therefore, the smearing is believed to be a matrix effect. The LCS, batch blank, sample and sample duplicate (B0GRL0) results are within contractual requirements.

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Quanterra
Environmental Services

Gamma Spectroscopy

Gamma Scan by method ITAS-RD-3219
Ra-224 is detected and reported in the blank. Ra-224 is a natural constituent of the Ottawa Sand matrix material and is not considered to be an indication of batch contamination. The LCS, batch blank, sample and sample duplicate (B0GRL0) results are within contractual requirements.

Gas Proportional Counting

Gross Alpha by method ITAS-RD-3222
The LCS, batch blank, sample and sample duplicate (B0GRL0) results are within contractual requirements.

Gross Beta by method ITAS-RD-3222
The LCS, batch blank, sample and sample duplicate (B0GRL0) results are within contractual requirements.

Liquid Scintillation Counting

Technetium-99 by method ITAS-IT-RS-0001
The matrix spike, LCS, batch blank, sample and sample duplicate (B0GRL0) results are within contractual requirements.

Total Uranium

Total Uranium by method ITAS-RD-4200
The matrix spike was biased low with a 26% recovery. The cause of the low recovery is unknown. All other aspects of the data are within acceptable limits and the data are accepted. The matrix spike, LCS, batch blank, sample and sample duplicate (B0GRL0) results are within contractual requirements, except as noted.

012
HLG 1/16/96
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Quanterra
Environmental Services

Bechtel Hanford, Inc.
November 13, 1995
Page 4

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

013

HRG 1/16/96
~~C000005~~

Westinghouse Hanford Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	C.O.C # 009564 Page 1 of 1

Collector HULSE, KARL	Contact/Requestor ENCKE, DAVID B.	Tel. No. 373-3461 MSIN X5-53 FAX
SAF Number B96-026	Sample Origin 183-H Basin	Purchase Order/Charge Code N/A
Project Title 183-H Basin D&D	Logbook # WHC-N-205 # 47	Ice Chest # Temp.
Shipped To (Lab) Quanterra	Method of Shipment Gov. Vehicle	Bill of Lading/Air Bill No. N/A
Protocol RCRA	Data Turnaround PRIORITY	Offsite Property No. N/A

Sample No.	Lab. ID	*	Date	Time	No/Type Container	Sample Analysis	Perservative
B0GRL0		X	10/23/95	1435	(1) 20 P	ACTIVITY SCAN (Lab Specific)	None
B0GRL0	100%	X	10/23/95	1435	(1) 60 aG	ANIONS--IC (EPA 300.0), F, Cl, SO4, PO4, NO2, NO3, pH (9045) 51034701	4 deg. C
B0GRL0		X	10/23/95	1435	(1) 60 aG	Chromium(Hexavalent) (7195) 34801	Cool to 4 deg. C
B0GRL0	100%	X	10/23/95	1435	(1) 250 P	Cyanide (EPA 335.2) 34701	4 deg. C
B0GRL0		X	10/23/95	1435	(1) 1000 P	Gross Alpha/Beta (ITAS-RD-3222), U-234,-235,-238 (ITAS-RD-3234), Tc-99 (ITAS-IT-RS-0001), Total U (ITAS-RD-4200), Gamma Spec (ITAS-RD-3219) 34801	Cool to 4 C
B0GRL0	100%	X	10/23/95	1435	(1) 60 aG	ICP METALS TAL (6010), Arsenic (7060), Lead (7421), Selenium (7740), Thallium (7841) 34701	Cool to 4 C
B0GRL0	100%	X	10/23/95	1435	(1) 60 P	SULFIDE (9030)	4 deg. C

SDG W0779

POSSIBLE SAMPLE HAZARDS/REMARKS MSDS Yes ☐ No ☒
List all known wastes. Sample matrix Concrete

SPECIAL INSTRUCTIONS Hold Time
Sample analysis for nitrite, nitrate, and phosphate by EPA 300.0 and Chromium-VI by SW-846 7195 are being requested for Information Only. The ERC Contractor acknowledges the holding times will not be met.

Relinquished By	Print	Sign	Date/Time	Received By	Print	Sign	Date/Time
KB Hulse	KB Hulse		10-25-95 0950	K.J. Young	Jon Young		10-25-95 0950
K.J. Young	Jon Young		10-25-95 1030	Karen Achtenburg	Quanterra		10-25-95 10:30

Matrix *

S	Soil	DS	Drum Solids
SE	Sediment	DL	Drum Liquids
SO	Solid	T	Tissue
SL	Sludge	WI	Wipe
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

All samples containing hazardous materials shall be picked up by requester and returned to parent container or site of origin

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Rev. 0

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ATTACHMENT 5

DATA VALIDATION SUPPORTING DOCUMENTATION

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WHC-SD-EN-SPP-001, Rev. 1

RADIOCHEMICAL DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: 183-H Concrete Sampling.			DATA PACKAGE: W0779-QES		
VALIDATOR: H. GREGERSON		LAB: QUANTERRA		DATE: 1/16/96	
CASE:			SDG:		
ANALYSES PERFORMED					
☒ Gross Alpha/Beta	☐ Strontium-90	☒ Technetium-99	☒ Alpha Spectroscopy	☒ Gamma Spectroscopy	
☒ Total Uranium	☐ Radium-22	☐ Tritium	☐		
SAMPLES/MATRIX BOGRUD /SOLID					

1. Completeness . . . . . ☐ N/A

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

Comments:

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

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

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

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

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

Comments:

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

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

Comments:_____

4. Blanks . . . . . ☐ N/A

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

Comments:_____

5. Matrix Spikes . . . . . ☐ N/A

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

Comments:_____

WHC-SD-EN-SPP-001, Rev. 1

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

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

Comments:

7. Chemical Recovery . . . . . ☐ N/A

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

Comments:

8. Duplicates . . . . . ☐ N/A

Duplicates Analyzed? . . . . . Yes No 1, N/A
RPD Values Acceptable? . . . . . Yes No N/A
Transcription/Calculation Errors? . . . . . Yes No N/A

Comments:
1. The RPD for U-235 is outside the control limit and the associated sample was qualified. See supporting document.

018

WHC-SD-EN-SPP-001, Rev. 1

9. Field QC Samples . . . . . ☐ N/A

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

Comments:_____

10. Holding Times

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

Comments:_____

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

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

Comments:_____

HOLDING TIME SUMMARY

SDG: W0779-QES | VALIDATOR: HEIDI GREGERSON | DATE: 1/16/96 | PAGE 1 OF 1

COMMENTS:

FIELD SAMPLE ID	ANALYSIS TYPE	DATE SAMPLED	DATE PREPARED	DATE ANALYZED	PREP. HOLDING TIME, DAYS	ANALYSIS HOLDING TIME, DAYS	QUALIFIER
BXGRLO	Gross α β	10/23/95	10/26/95	10/31/95	3	8	none
	Total Uranium	10/23/95	10/26/95	11/2/95	3	10	none
	Gamma Spec	10/23/95	10/26/95	10/27/95	3	4	none
	α Spec	10/23/95	10/26/95	11/2/95	3	10	none
	Tc-99	10/23/95	10/26/95	11/1/95	3	9	none

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

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Rev. 0

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Quanterra
Environmental Services

DUPLICATE RESULTS

LAB NAME:	ITAS-RICHLAND	SDG:	W0779
LAB SAMPLE ID:	G1034801	MATRIX:	OTHER
CLIENT ID:	B0GRL0	DATE RECEIVED:	10/25/95 10:30:00 A
ORIG LAB SAMPLE ID:	51034801		

ISOTOPE	DUP RESULT	COUNTING ERROR ℓ	TOTAL ERROR ℓ	MDA	REPORT UNIT	YIELD	METHOD NUMBER	ORIG RESULT	RPD
U-234	4.22E+00	3.0E-01	7.5E-01	3.81E-02	pCi/g	77.20%	RD3234	5.30E+00	22.63%
U-235	3.96E-01	9.3E-02	1.1E-01	3.34E-02	pCi/g	77.20%	RD3234	1.22E-01	106.10%
U-238	3.77E+00	2.9E-01	6.8E-01	3.47E-02	pCi/g	77.20%	RD3234	5.02E+00	28.36%
BE-7.	1.00E-01	1.1E-01	1.1E-01	N/A	pCi/g	N/A	RD3219	N/A	
CO-58.	-1.78E-03	9.4E-03	9.4E-03	1.57E-02	pCi/g	N/A	RD3219	1.38E-04	233.62%
CO-60.	3.64E-03	8.9E-03	8.9E-03	1.62E-02	pCi/g	N/A	RD3219	1.10E-03	107.37%
CS-137DA.	9.38E-02	1.6E-02	1.9E-02	N/A	pCi/g	N/A	RD3219	1.06E-01	12.12%
EU-152.	-2.55E-03	2.4E-02	2.4E-02	3.68E-02	pCi/g	N/A	RD3219	-4.54E-04	139.55%
EU-154.	6.52E-03	3.2E-02	3.2E-02	5.53E-02	pCi/g	N/A	RD3219	-1.45E-02	526.36%
EU-155.	2.32E-02	3.1E-02	3.1E-02	4.63E-02	pCi/g	N/A	RD3219	4.54E-02	64.65%
FE-59.	5.74E-03	2.3E-02	2.3E-02	3.84E-02	pCi/g	N/A	RD3219	1.94E-02	108.71%
K-40.	1.09E+01	4.3E-01	1.2E+00	N/A	pCi/g	N/A	RD3219	N/A	
RA-224DA.	4.60E-01	2.4E-02	5.2E-02	N/A	pCi/g	N/A	RD3219	4.55E-01	1.09%
RA-226DA.	4.57E-01	3.9E-02	6.0E-02	N/A	pCi/g	N/A	RD3219	4.37E-01	4.39%
RA-228DA.	3.94E-01	7.8E-02	8.8E-02	N/A	pCi/g	N/A	RD3219	5.49E-01	33.00%
U-235.	1.76E-01	7.6E-02	7.8E-02	N/A	pCi/g	N/A	RD3219	1.96E-01	10.49%
U-238DLP.	2.36E+00	6.5E-01	6.9E-01	N/A	pCi/g	N/A	RD3219	2.21E+00	6.43%
ALPHA	6.07E+00	4.1E+00	4.1E+00	6.21E+00	pCi/g	100.00%	RD3222	9.78E+00	46.90%
BETA	7.21E+00	2.4E+00	2.5E+00	4.01E+00	pCi/g	100.00%	RD3222	1.08E+01	39.92%
TC-99	1.47E+01	7.5E-01	2.6E+00	9.90E-01	pCi/g	95.10%	ITAS-IT-RS-0001	1.47E+01	0.06%
TOTAL-URANIUM	9.63E+00	N/A	1.3E+00	2.04E-03	ug/g	N/A	RD4200	9.68E+00	0.55%

Number of Results: 21

021

HRG 1/16/96

MEMORANDUM

TO: 183-H Basin D&D, Concrete Sampling Project QA Record January 16, 1996

FR: Heidi Gregerson, Golder Associates Inc. HRG

RE: GENERAL CHEMISTRY DATA VALIDATION SUMMARY FOR DATA PACKAGE W0779-QES (943-1610.118 779GEN.HB)

INTRODUCTION

This memo presents the results of data validation for the analysis indicated below on data package W0779-QES prepared by Quanterra Environmental Services. Sample information is provided in the following table.

SAMPLE ID	COMMENTS	ANALYSIS	MEDIA
B0GRL0		GENERAL CHEMISTRY SEE ATTACHMENT 4	SOLID

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

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

DATA QUALITY OBJECTIVES

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

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

Accuracy. Goals for accuracy were met.

Completeness. The data package was complete for all requested analyses. A total of one sample was validated in this data package with a total of nine determinations reported, eight of which were deemed valid. This results in a completeness of 89 percent, which does not meet the 90% objective of the work plan.

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Data Package ID: W0779-QES Analysis: GENERAL CHEMISTRY

Detection Limits. CRDLs have not been established for solid matrices for the 183-H Basin concrete sampling project.

MAJOR DEFICIENCIES

The following major deficiencies were identified during data validation which required qualification of data as unusable:

Holding Times

- The holding time for ortho-phosphate was exceeded by greater than twice the limit and the associated sample was qualified accordingly. Attachments 2 and 5 provide a summary of data qualifications applied and supporting documentation.

MINOR DEFICIENCIES

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

Holding Times

- The holding time for pH, nitrate, and nitrite was exceeded by greater than twice the limit. Attachments 2 and 5 provide a summary of data qualifications applied and supporting documentation.

Laboratory Duplicate

- The RPD for fluoride exceeded the control limit and the associated sample was qualified. Attachments 2 and 5 provide a summary of data qualifications applied and supporting documentation.

DATA REPORTING

- Sample analysis and validation for ortho-phosphate, nitrate, and nitrite was requested for informational purposes only as stated in the validation services request document.

REFERENCES

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

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

ATTACHMENT 1

GLOSSARY OF DATA REPORTING QUALIFIERS

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

Glossary of Inorganic Data Reporting Qualifiers.

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

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

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

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

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

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

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

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ATTACHMENT 2

SUMMARY OF DATA QUALIFICATIONS

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

DATA QUALIFICATION SUMMARY - FORM B-7

SDG: W0779-QES	REVIEWER: Heidi Gregerson	DATE: 1-16-95	PAGE 1 OF 1
COMMENTS: GENERAL CHEMISTRY			
COMPOUND/ANALYTE	QUALIFIER	SAMPLES AFFECTED	REASON
pH	J	B0GRL0	HOLDING TIME EXCEEDED BY GREATER THAN TWICE THE LIMIT
NITRATE-N	J	B0GRL0	HOLDING TIME EXCEEDED BY GREATER THAN TWICE THE LIMIT
NITRITE-N	J	B0GRL0	HOLDING TIME EXCEEDED BY GREATER THAN TWICE THE LIMIT
ORTHO-PHOSPHATE	UR	B0GRL0	HOLDING TIME EXCEEDED BY GREATER THAN TWICE THE LIMIT
FLUORIDE	J	B0GRL0	DUPLICATE RPD EXCEEDED

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ATTACHMENT 3

QUALIFIED DATA SUMMARY and ANNOTATED LABORATORY REPORTS

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Validated Data Summary, Data Package: W0779-QES

	Sample #	B0GRL0	
	Date	10/23/95	
	Location		
	Depth		
	Type	Solid	
	Comments		
Parameter	Units	Results	Q
CYANIDE	UG/G	0.700	
SULFIDE	UG/G	10.700	U
CHLORIDE	UG/G	10.400	
FLUORIDE	UG/G	6.080	J
NITRATE-N	UG/G	168.000	J
NITRITE-N	UG/G	3.010	J
ORTHO-PHOSPHATE	UG/G	5.060	UR
SULFATE	UG/G	220.000	
PH	PH	11.750	J

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

Verified HRG
1/16/96.

Quanterra
Environmental Services

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

Project: Quanterra-Richland

Category: Cyanide EPA 335.2
Method: EPA 335.2
Matrix: SOLID

Sample Date : 10/23/95
Receipt Date : 10/25/95
Report Date : 11/08/95

Client ID	Quanterra ID	Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit	Dil.
BOGRLO	9678-001	Cyanide	57-12-5	QCBLK82080-1	10/31/95	11/01/95	0.70	UG/G		0.51	1
BOGRLO	9678-001DUP	Cyanide	57-12-5	QCBLK82080-1	10/31/95	11/01/95	0.55	UG/G		0.51	1
BOGRLO	9678-001MS	Cyanide	57-12-5	QCBLK82080-1	10/31/95	11/01/95	95	%REC			1
NA	QCBLK82080-1	Cyanide	57-12-5	QCBLK82080-1	10/31/95	11/01/95	0.50	UG/G	U	0.50	1
NA	QCLCS82080-1	Cyanide	57-12-5	QCBLK82080-1	10/31/95	11/01/95	98	%REC			1

009

HCG 1/16/96
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Quanterra Environmental Services

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

Project: Quanterra-Richland

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

Sample Date : 10/23/95
Receipt Date : 10/25/95
Report Date : 11/08/95

Client ID	Quanterra ID	Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit	Dil.
BOGRLO	9678-001	Sulfide	18496-25-8	QCBLK82015-1	10/30/95	10/30/95	10.7	UG/G	U	10.7	1
BOGRLO	9678-001DUP	Sulfide	18496-25-8	QCBLK82015-1	10/30/95	10/30/95	10.8	UG/G	U	10.8	1
BOGRLO	9678-001MS	Sulfide	18496-25-8	QCBLK82015-1	10/30/95	10/30/95	90	%REC			1
NA	QCBLK82015-1	Sulfide	18496-25-8	QCBLK82015-1	10/30/95	10/30/95	10.5	UG/G	U	10.5	1
NA	QCLCS82015-1	Sulfide	18496-25-8	QCBLK82015-1	10/30/95	10/30/95	100	%REC			1

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HCG 1/26/96

Quanterra
Environmental Services

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

Project: Quanterra-Richland

Category: CHLORIDE
Method: EPA 300.0
Matrix: SOLID

Sample Date : 10/23/95
Receipt Date : 10/25/95
Report Date : 11/08/95

Client ID	Quanterra ID	Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit	Dil
BOGRL0	9678-001	Chloride	16887-00-6	QCBLK82248-2	11/01/95	11/01/95	10.4	UG/G		2.02	
BOGRL0	9678-001DUP	Chloride	16887-00-6	QCBLK82248-2	11/01/95	11/01/95	10.4	UG/G		2.03	
BOGRL0	9678-001MS	Chloride	16887-00-6	QCBLK82248-2	11/01/95	11/01/95	101	%REC			5
NA	QCBLK82248-2	Chloride	16887-00-6	QCBLK82248-2	11/01/95	11/01/95	2.00	UG/G	U	2.00	
NA	QCLCS82248-2	Chloride	16887-00-6	QCBLK82248-2	11/01/95	11/01/95	92	%REC			

011

HRG 1/16/96
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Quanterra Environmental Services

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

Project: Quanterra-Richland

Category: FLUORIDE
Method: EPA 300.0
Matrix: SOLID

Sample Date : 10/23/95
Receipt Date : 10/25/95
Report Date : 11/08/95

Client ID	Quanterra ID	Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit	Dil.
BOGRL0	9678-001	Fluoride	16984-48-8	QCBLK82248-2	11/01/95	11/01/95	6.08	UG/G	/ J	2.02	2
BOGRL0	9678-001DUP	Fluoride	16984-48-8	QCBLK82248-2	11/01/95	11/01/95	9.59	UG/G		5.08	5
BOGRL0	9678-001MS	Fluoride	16984-48-8	QCBLK82248-2	11/01/95	11/01/95	119	%REC			5
NA	QCBLK82248-2	Fluoride	16984-48-8	QCBLK82248-2	11/01/95	11/01/95	1.00	UG/G	U	1.00	1
NA	QCLCS82248-2	Fluoride	16984-48-8	QCBLK82248-2	11/01/95	11/01/95	93	%REC			1

012

HCG 1/16/96

Quanterra
Environmental Services

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

Project: Quanterra-Richland

Category: Nitrate
Method: EPA 300.0
Matrix: SOLID

Sample Date : 10/23/95
Receipt Date : 10/25/95
Report Date : 11/08/95

Client ID	Quanterra ID	Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit	Dil.
BOGRLO	9678-001	Nitrate-N	14797-55-8	QCBLK82248-2	11/01/95	11/01/95	168	UG/G		5.06	25
BOGRLO	9678-001DUP	Nitrate-N	14797-55-8	QCBLK82248-2	11/01/95	11/01/95	177	UG/G		5.08	25
BOGRLO	9678-001MS	Nitrate-N	14797-55-8	QCBLK82248-2	11/01/95	11/01/95	75	%REC			25
NA	QCBLK82248-2	Nitrate-N	14797-55-8	QCBLK82248-2	11/01/95	11/01/95	0.20	UG/G	U	0.20	1
NA	QCLCS82248-2	Nitrate-N	14797-55-8	QCBLK82248-2	11/01/95	11/01/95	94	%REC			1

013

HRB 1/16/96
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Quanterra
Environmental Services

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

Project: Quanterra-Richland

Category: Nitrite
Method: EPA 300.0
Matrix: SOLID

Sample Date : 10/23/95
Receipt Date : 10/25/95
Report Date : 11/08/95

Client ID	Quanterra ID	Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit	Dil
BOGRLO	9678-001	Nitrite-N	14797-65-0	QCBLK82248-2	11/01/95	11/01/95	3.01	UG/G	/ J	0.20	1
BOGRLO	9678-001DUP	Nitrite-N	14797-65-0	QCBLK82248-2	11/01/95	11/01/95	3.08	UG/G		0.20	1
BOGRLO	9678-001MS	Nitrite-N	14797-65-0	QCBLK82248-2	11/01/95	11/01/95	94	%REC			5
NA	QCBLK82248-2	Nitrite-N	14797-65-0	QCBLK82248-2	11/01/95	11/01/95	0.20	UG/G	U	0.20	1
NA	QCLCS82248-2	Nitrite-N	14797-65-0	QCBLK82248-2	11/01/95	11/01/95	104	%REC			1

014

HRG 1/16/96
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Quanterra
Environmental Services

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

Project: Quanterra-Richland

Category: Orthophosphate
Method: EPA 300.0
Matrix: SOLID

Sample Date : 10/23/95
Receipt Date : 10/25/95
Report Date : 11/08/95

Client ID	Quanterra ID	Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit	Dil.
B0GRL0	9678-001	Ortho-Phosphate	14265-44-2	QCBLK82248-2	11/01/95	11/01/95	5.06	UG/G	~~U~~ UR Q	5.06	1
B0GRL0	9678-001DUP	Ortho-Phosphate	14265-44-2	QCBLK82248-2	11/01/95	11/01/95	5.08	UG/G	U	5.08	1
B0GRL0	9678-001MS	Ortho-Phosphate	14265-44-2	QCBLK82248-2	11/01/95	11/01/95	135	%REC			1
NA	QCBLK82248-2	Ortho-Phosphate	14265-44-2	QCBLK82248-2	11/01/95	11/01/95	5.00	UG/G	U	5.00	1
NA	QCLCS82248-2	Ortho-Phosphate	14265-44-2	QCBLK82248-2	11/01/95	11/01/95	99	%REC			1

015

HRG 1/16/96
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Quanterra Environmental Services

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

Project: Quanterra-Richland

Category: SULFATE
Method: EPA 300.0
Matrix: SOLID

Sample Date : 10/23/95
Receipt Date : 10/25/95
Report Date : 11/08/95

Client ID	Quanterra ID	Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit	Dil
BOGRL0	9678-001	Sulfate	14808-79-8	QCBLK82248-2	11/01/95	11/01/95	220	UG/G		10.1	2
BOGRL0	9678-001DUP	Sulfate	14808-79-8	QCBLK82248-2	11/01/95	11/01/95	221	UG/G		10.2	2
BOGRL0	9678-001MS	Sulfate	14808-79-8	QCBLK82248-2	11/01/95	11/01/95	78	%REC			5
NA	QCBLK82248-2	Sulfate	14808-79-8	QCBLK82248-2	11/01/95	11/01/95	5.00	UG/G	U	5.00	1
NA	QCLCS82248-2	Sulfate	14808-79-8	QCBLK82248-2	11/01/95	11/01/95	87	%REC			1

016

HRG 1/16/96

Quanterra
Environmental Services

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

Project: Quanterra-Richland

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

Sample Date : 10/23/95
Receipt Date : 10/25/95
Report Date : 11/08/95

Client ID	Quanterra ID	Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit	Dil.
BOGRL0	9678-001	pH	C-006	QCBLK82016-1	10/30/95	10/30/95	11.75	PH	J		1
BOGRL0	9678-001DUP	pH	C-006	QCBLK82016-1	10/30/95	10/30/95	11.70	PH			1
NA	QCBLK82016-1	pH	C-006	QCBLK82016-1	10/30/95	10/30/95	5.32	PH			1

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HRG 1/16/96
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ATTACHMENT 4

LABORATORY NARRATIVE and CHAIN-OF-CUSTODY DOCUMENTATION

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Quanterra
Environmental Services

Quanterra Incorporated
13715 Rider Trail North
Earth City, Missouri 63045

314 298 8566 Telephone
314 298 8757 Fax

CERTIFICATE OF ANALYSIS

NOV 1995
RECEIVED
Data
Log In

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

November 16, 1995

Attention: Joan Kessner

Project number	:	550.108
Date Received by Lab	:	October 25, 1995
Number of Samples	:	One (1)
Sample Type	:	Solid
SDG Number	:	W0779
Data Deliverable	:	Summary

I. Introduction

On October 25, 1995, one (1) solid sample was received by Quanterra, Richland and transferred to Quanterra, St. Louis for chemical analysis. Upon receipt, the sample was given the following laboratory ID number to correspond with the specific client ID:

St Louis ID	BHI ID	Richlard ID	Matrix	Date of Receipt
9678-001	B0GRL0	51034701	Solid	10/25/95

II. Analytical Results/ Methodology

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

019

HRG 1/16/96

Quanterra
Environmental Services

Bechtel Hanford Incorporated
November 16. 1995
Project Number: 550.108
SDG: W0779
Page 2

Analyses requested: ICP Metals by EPA method 6010, Arsenic by EPA method 7060, Lead by EPA method 7421, Selenium by EPA method 7740, and Thallium by EPA method 7841. Chloride, Fluoride, Nitrate, Nitrite, Phosphate, and Sulfate by EPA method 300.0. Cyanide by EPA method 335.2. pH by EPA method 9045. Sulfide by EPA method 9030.

III. Quality Control

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

IV. Definitions

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

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

020

HRG 1/16/96
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Quanterra
Environmental Services

Bechtel Hanford Incorporated
November 16, 1995
Project Number: 550.108
SDG: W0779
Page 3

V. Comments

The Matrix Spike recoveries were outside the acceptable limits for antimony, chromium, lead, selenium and thallium. The Matrix Spike Duplicate recoveries were outside the acceptable limits for antimony, lead selenium, copper and zinc. The associated data for each of these analytes was flagged with an "N" qualifier. The Relative Percent Difference for the Matrix Spike/Matrix Spike Duplicate was above the acceptable limit for chromium, nickel, selenium, vanadium and zinc. The serial dilution result was above the acceptable limit for copper, vanadium and zinc. The associated data for each of the analytes was flagged with an "E" qualifier.

The Relative Percent Difference could not be calculated due to the values being below the detection limits for sample 9678-001 and its duplicate on the Phosphate analysis.

Sample 9678-001, -001DUP and -001MS were reintegrated for Fluoride to even the baseline which was affected by an interfering unknown peak.

The Relative Percent Difference could not be calculated due to the values being below the detection limits for sample 9678-001 and its duplicate for the Sulfide analysis.

The Chromium VI matrix spike and matrix spike duplicate recoveries were low due to sample interference.

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
c:\\price5\abbydave\hanw0779.nar

021

HRG 1/16/96
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Westinghouse Hanford Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	C.O.C # 009564 Page 1 of 1

Collector HULSE, KARL	Contact/Requestor ENCKE, DAVID B.	Tel. No. 373-3461 MSIN X5-53 FAX
SAF Number B96-026	Sample Origin 183-H Basin	Purchase Order/Charge Code N/A
Project Title 183-H Basin D&D	Logbook # WHC-N-205 # 47	Ice Chest # Temp.
Shipped To (Lab) Quanterra	Method of Shipment Gov. Vehicle	Bill of Lading/Air Bill No. N/A
Protocol RCRA	Data Turnaround PRIORITY	Offsite Property No. N/A

Sample No.	Lab. ID % fill	*	Date	Time	No/Type Container	Sample Analysis	Perservative
B0GRL0		X	10/23/95	1435	(1) 20 P	ACTIVITY SCAN (Lab Specific)	None
B0GRL0	100%	X	10/23/95	1435	(1) 60 aG	ANIONS--IC (EPA 300 0), F, Cl, SO4, PO4, NO2, NO3, pH (9045) 51034701	4 deg C
B0GRL0		X	10/23/95	1435	(1) 60 aG	Chronium(Hexavalent) (7195) 34801	Cool to 4 deg C
B0GRL0	100%	X	10/23/95	1435	(1) 250 P	Cyanide (EPA 335 2) 34701	4 deg. C
B0GRL0		X	10/23/95	1435	(1) 1000 P	Gross Alpha/Beta (ITAS-RD-3222), U-234,-235,-238 (ITAS-RD-3234), Tc-99 (ITAS-IT-RS-0001), Total U (ITAS-RD-4200), Gamma Spec (ITAS-RD-3219) 34801	Cool to 4 C
B0GRL0	100%	X	10/23/95	1435	(1) 60 aG	ICP METALS TAL (6010), Arsenic (7060), Lead (7421), Selenium (7740), Thallium (7841)	Cool to 4 C
B0GRL0	100%	X	10/23/95	1435	(1) 60 P	SULFIDE (9030) 34701	4 deg. C

SDG 100779

POSSIBLE SAMPLE HAZARDS/REMARKS MSDS Yes ☐ No ☒
List all known wastes. Sample matrix Concrete

SPECIAL INSTRUCTIONS Hold Time
Sample analysis for nitrite, nitrate, and phosphate by EPA 300 0 and Chromium-VI by SW 846 7195 are being requested for Information Only The ERC Contractor acknowledges the holding times will not be met

Relinquished By	Print	Sign	Date/Time	Received By	Print	Sign	Date/Time
KB Hulse	KB Hulse		10-25-95 0950	K.J. Young	Jon Young		10-25-95 0950
K.J. Young	Jon Young		10-25-95 1030	Karen Achtenberg	Quanterra		10-25-95 10:30

Matrix *

S	Soil	DS	Drum Solids
SE	Sediment	DL	Drum Liquids
SO	Solid	T	Tissue
SL	Sludge	WI	Wipe
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

All samples containing hazardous materials shall be picked up by requestor and returned to parent container or site of origin.

A-6001-500 (07/95)

HCG 1/16/96

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ATTACHMENT 5

DATA VALIDATION SUPPORTING DOCUMENTATION

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

GENERAL CHEMISTRY DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: 183-H Basin Concrete Sampling			DATA PACKAGE: U00779-OES		
VALIDATOR: H. GREGERSON		LAB: QUANTERRA		DATE: 1/16/96	
CASE:			SDG:		

ANALYSES PERFORMED

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

SAMPLES/MATRIX BOGRLO / SOLID

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

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

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

Comments:

2. HOLDING TIMES

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

Comments:

1. The holding times for PO_4, NO_2, NO_3, and pH were exceeded and associated samples were qualified. See supporting documents.

024

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

GENERAL CHEMISTRY DATA VALIDATION CHECKLIST

3. INSTRUMENT CALIBRATION

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

4. BLANKS

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

5. ACCURACY

Were spike samples analyzed at the required frequency? . . . . Yes No N/A
Are spike recoveries acceptable? . . . . . Yes No N/A
Were LCS analyses performed at the required frequency? . . . . Yes No N/A
Are LCS recoveries acceptable? . . . . . Yes No N/A
Comments:

6. PRECISION

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

025

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

GENERAL CHEMISTRY DATA VALIDATION CHECKLIST

Comments:
1. The RPD for F was outside the control limit and the associated sample was qualified.

7. ANALYTE QUANTITATION

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

Comments:

8. REPORTED RESULTS AND DETECTION LIMITS

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

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

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

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

Comments:
1. CRDL's have not been established for solid matrices. No qualification applied.

026

HOLDING TIME SUMMARY

SDG: W0779-QES | VALIDATOR: HEIDI GREGERSON | DATE: 1/16/96 | PAGE 1 OF 1

COMMENTS:

FIELD SAMPLE ID	ANALYSIS TYPE	DATE SAMPLED	DATE PREPARED	DATE ANALYZED	PREP. HOLDING TIME, DAYS	ANALYSIS HOLDING TIME, DAYS	QUALIFIER
BOGRLD	CN	10/23/95	10/31/95	11/1/95	8	9	none
	sulfide	*10/23/95	10/30/95	10/30/95	7	7	none
	Cl, F, NO_3, NO_2, PO_4, SO_4	10/23/95	11/1/95	11/1/95	9	9	PO_4 UR NO_2 J NO_3 J
	pH	10/23/95	10/30/95	10/30/95	7	7	J

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

BHI-00922
Rev. 0

MEMORANDUM

TO: 183-H Basin D&D, Concrete Sampling Project QA Record January 16, 1996

FR: Heidi Gregerson, Golder Associates Inc. HRG

RE: INORGANIC DATA VALIDATION SUMMARY FOR DATA PACKAGE W0779-QES (943-1610.118 779INO.HB)

INTRODUCTION

This memo presents the results of data validation for the analysis specified below on data package W0779-QES prepared by Quanterra Environmental Services. Sample information is provided in the following table.

SAMPLE ID	COMMENTS	ANALYSIS	MEDIA
B0GRL0		INORGANICS SEE ATTACHMENT 4	SOLID

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

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

DATA QUALITY OBJECTIVES

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

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

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

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

Completeness. The data package was complete for all requested analyses. A total of one sample was validated in this data package with a total of 22 determinations reported, 21 of which were deemed valid. This results in a completeness of 95%, which meets the 90% objective of the work plan.

001

Data Package ID: W0779-OES Analysis: INORGANICS

MAJOR DEFICIENCIES

The following major deficiencies were identified during data validation which required qualification of data as unusable:

Spike Sample

- The percent recovery for selenium was less than 30% and associated samples were qualified. Attachments 2 and 5 provide a summary of samples affected, data qualifications applied and supporting documentation.

MINOR DEFICIENCIES

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

Spike Sample

- The percent recoveries for antimony, chromium, copper, lead, thallium, and zinc were outside the control limit and associated samples were qualified. Attachments 2 and 5 provide a summary of samples affected, data qualifications applied and supporting documentation.

Matrix Spike Duplicate

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

REFERENCES

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

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

ATTACHMENT 1

GLOSSARY OF DATA REPORTING QUALIFIERS

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

Glossary of Inorganic Data Reporting Qualifiers.

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

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

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

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

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

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

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

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ATTACHMENT 2

SUMMARY OF DATA QUALIFICATIONS

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

DATA QUALIFICATION SUMMARY - FORM B-7

SDG:W0779-QES	REVIEWER: H. Gregerson	DATE: 1-15-96	PAGE 1 OF 1
COMMENTS: INORGANICS			
COMPOUND/ANALYTE	QUALIFIER	SAMPLES AFFECTED	REASON
ANTIMONY	BJ	B0GRL0	MS RECOVERY WAS BELOW THE CONTROL LIMIT
CHROMIUM	J	B0GRL0	MS RECOVERY AND MS DUPLICATE RPD WAS ABOVE THE CONTROL LIMIT
COPPER	J	B0GRL0	MS RECOVERY WAS ABOVE THE CONTROL LIMIT
LEAD	J	B0GRL0	MS RECOVERY WAS BELOW THE CONTROL LIMIT
SELENIUM	UR	B0GRL0	MS RECOVERY WAS LESS THAN 30%
THALLIUM	BJ	B0GRL0	MS RECOVERY WAS BELOW THE CONTROL LIMIT
ZINC	J	B0GRL0	MS RECOVERY AND MS DUPLICATE RPD WAS ABOVE THE CONTROL LIMIT

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ATTACHMENT 3

QUALIFIED DATA SUMMARY and ANNOTATED LABORATORY REPORTS

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Validated Data Summary, Data Package: W0779-QES

	Sample #	B0GRL0	
	Date	10/23/95	
	Location		
	Depth		
	Type	Solid	
	Comments		
Parameter	Units	Results	Q
ALUMINUM	MG/KG	10000.000	
ANTIMONY	MG/KG	8.500	BJ
ARSENIC	MG/KG	36.500	
BARIUM	MG/KG	112.000	
BERYLLIUM	MG/KG	0.710	B
CADMIUM	MG/KG	0.240	U
CALCIUM	MG/KG	83600.000	
CHROMIUM	MG/KG	15.800	J
COBALT	MG/KG	9.800	
COPPER	MG/KG	46.400	J
IRON	MG/KG	16500.000	
LEAD	MG/KG	6.100	J
MAGNESIUM	MG/KG	5450.000	
MANGANESE	MG/KG	239.000	
NICKEL	MG/KG	13.300	
POTASSIUM	MG/KG	1400.000	
SELENIUM	MG/KG	0.100	UR
SILVER	MG/KG	0.860	B
SODIUM	MG/KG	2800.000	
THALLIUM	MG/KG	0.080	BJ
VANADIUM	MG/KG	46.400	
ZINC	MG/KG	128.000	J

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

Verified HRG
1/15/96

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U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

B0GRL0

Lab Name: QUANTERRA_MO
Lab Code: ITMO Case No.:
Matrix (soil/water): SOIL
Level (low/med): LOW
% Solids: 97.0

Contract: 550.108
SAS No.:
SDG No.: W0779
Lab Sample ID: 9678-001
Date Received: 10/25/95

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

CAS No.	Analyte	Concentration	C	Q	M	Q
7429-90-5	Aluminum	10000			P	
7440-36-0	Antimony	8.5	B	N	P	BJ
7440-38-2	Arsenic	36.5			F	
7440-39-3	Barium	112			P	
7440-41-7	Beryllium	0.71	B		P	
7440-43-9	Cadmium	0.24	U		P	
7440-70-2	Calcium	83600			P	
7440-47-3	Chromium	15.8	Z	N	P	J
7440-48-4	Cobalt	9.8			P	
7440-50-8	Copper	46.4	Z	EN	P	J
7439-89-6	Iron	16500			P	
7439-92-1	Lead	6.1	Z	N	F	J
7439-95-4	Magnesium	5450			P	
7439-96-5	Manganese	239			P	
7440-02-0	Nickel	13.3			P	
7440-09-7	Potassium	1400			P	
7782-49-2	Selenium	0.10	U	N	F	UR
7440-22-4	Silver	0.86	B		P	
7440-23-5	Sodium	2800			P	
7440-28-0	Thallium	0.08	B	N	F	BJ
7440-62-2	Vanadium	46.4		E	P	
7440-66-6	Zinc	128	Z	EN	P	J

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

Comments:

FORM I - IN

SW-846

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ATTACHMENT 4

LABORATORY NARRATIVE and CHAIN-OF-CUSTODY DOCUMENTATION

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Quanterra
Environmental Services

Quanterra Incorporated
13715 Rider Trail North
Earth City, Missouri 63045

314 298-8566 Telephone
314 298-8757 Fax

CERTIFICATE OF ANALYSIS

NOV 1995
RECEIVED
Data
Log In

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

November 16, 1995

Attention: Joan Kessner

Project number	:	550.108
Date Received by Lab	:	October 25, 1995
Number of Samples	:	One (1)
Sample Type	:	Solid
SDG Number	:	W0779
Data Deliverable	:	Summary

I. Introduction

On October 25, 1995, one (1) solid sample was received by Quanterra, Richland and transferred to Quanterra, St. Louis for chemical analysis. Upon receipt, the sample was given the following laboratory ID number to correspond with the specific client ID:

St Louis ID	BHI ID	Richland ID	Matrix	Date of Receipt
9678-001	B0GRL0	51034701	Solid	10/25/95

II. Analytical Results/ Methodology

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

011

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Quanterra
Environmental Services

Bechtel Hanford Incorporated
November 16, 1995
Project Number: 550.108
SDG: W0779
Page 2

Analyses requested: ICP Metals by EPA method 6010, Arsenic by EPA method 7060, Lead by EPA method 7421, Selenium by EPA method 7740, and Thallium by EPA method 7841. Chloride, Fluoride, Nitrate, Nitrite, Phosphate, and Sulfate by EPA method 300.0. Cyanide by EPA method 335.2. pH by EPA method 9045. Sulfide by EPA method 9030.

III. Quality Control

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

IV. Definitions

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

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

012

HLG 1/15/96
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Quanterra
Environmental Services

Bechtel Hanford Incorporated
November 16, 1995
Project Number: 550.108
SDG: W0779
Page 3

V. Comments

The Matrix Spike recoveries were outside the acceptable limits for antimony, chromium, lead, selenium and thallium. The Matrix Spike Duplicate recoveries were outside the acceptable limits for antimony, lead selenium, copper and zinc. The associated data for each of these analytes was flagged with an "N" qualifier. The Relative Percent Difference for the Matrix Spike/Matrix Spike Duplicate was above the acceptable limit for chromium, nickel, selenium, vanadium and zinc. The serial dilution result was above the acceptable limit for copper, vanadium and zinc. The associated data for each of the analytes was flagged with an "E" qualifier.

The Relative Percent Difference could not be calculated due to the values being below the detection limits for sample 9678-001 and its duplicate on the Phosphate analysis.

Sample 9678-001, -001DUP and -001MS were reintegrated for Fluoride to even the baseline which was affected by an interfering unknown peak.

The Relative Percent Difference could not be calculated due to the values being below the detection limits for sample 9678-001 and its duplicate for the Sulfide analysis.

The Chromium VI matrix spike and matrix spike duplicate recoveries were low due to sample interference.

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
c:\\priceS\abbydave\hanw0779.nar

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Westinghouse Hanford Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	C.O.C.# 009564 Page 1 of 1

Collector HULSE, KARL	Contact/Requestor ENCKE, DAVID B.	Tel. No. 373-3461 MSIN X5-53 FAX
SAF Number B96-026	Sample Origin 183-H Basin	Purchase Order/Charge Code N/A
Project Title 183-H Basin D&D	Logbook # WHC-N-205 # 47	Ice Chest # Temp.
Shipped To (Lab) Quanterra	Method of Shipment Gov. Vehicle	Bill of Lading/Air Bill No. N/A
Protocol RCRA	Data Turnaround PRIORITY	Offsite Property No. N/A

Sample No.	Lab. ID	*	Date	Time	No/Type Container	Sample Analysis	Perservative
B0GRL0		X	10/23/95	1435	(1) 20 P	ACTIVITY SCAN (Lab Specific)	None
B0GRL0	100%	X	10/23/95	1435	(1) 60 aG	ANIONS--IC (EPA 300 0), F, Cl, SO4, PO4, NO2, NO3, pH (9045) 51034701	4 deg C
B0GRL0		X	10/23/95	1435	(1) 60 aG	Chromium(Hexavalent) (7195) 34801	Cool to 4 deg C
B0GRL0	100%	X	10/23/95	1435	(1) 250 P	Cyanide (EPA 335 2) 34701	4 deg. C
B0GRL0		X	10/23/95	1435	(1) 1000 P	Gross Alpha/Beta (ITAS-RD-3222), U-234,-235,-238 (ITAS-RD-3234), Tc-99 (ITAS-IT-RS-0001), Total U (ITAS-RD-4200), Gamma Spec (ITAS-RD-3219) 34801	Cool to 4 C
B0GRL0	100%	X	10/23/95	1435	(1) 60 aG	ICP METALS TAL (6010), Arsenic (7060), Lead (7421), Selenium (7740), Thallium (7841) 34701	Cool to 4 C
B0GRL0	100%	X	10/23/95	1435	(1) 60 P	SULFIDE (9030)	4 deg. C

SDG W0779

POSSIBLE SAMPLE HAZARDS/REMARKS MSDS Yes ☐ No ☒
List all known wastes. Sample matrix Concrete

SPECIAL INSTRUCTIONS Hold Time
Sample analysis for nitrite, nitrate, and phosphate by EPA 300 0 and Chromium-VI by SW-846 7195 are being requested for Information Only The ERC Contractor acknowledges the holding times will not be met

Relinquished By	Print	Sign	Date/Time	Received By	Print	Sign	Date/Time
KB Hulse	KB Hulse		10-25-95 0950	K.J. Young	Don Young		10-25-95 0950
K.J. Young	Don Young		10-25-95 1030	Karen Achtenburg	Quanterra		10-25-95 10:30

Matrix *

S	Soil	DS	Drum Solids
SE	Sediment	DL	Drum Liquids
SO	Solid	T	Tissue
SL	Sludge	WI	Wipe
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

All samples containing hazardous materials shall be picked up by requestor and returned to parent container or site of origin.

A-6001-500 (07/95)

HRG 1/15/96

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ATTACHMENT 5

DATA VALIDATION SUPPORTING DOCUMENTATION

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

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: 183-H Concrete Sampling			DATA PACKAGE: LN0779-QES		
VALIDATOR: H. GREGERSON		LAB: QUANTERRA		DATE: 1/15/96	
CASE:			SDG:		
ANALYSES PERFORMED					
☐ CLP/ICP	☐ CLP/GFAA	☐ CLP/Hg	☐ CLP/Cyanide	☐	☐
☒ SW-846/ICP	☒ SW-846/GFAA	☐ SW-846/Hg	☐ SW-846 Cyanide	☐	☐
SAMPLES/MATRIX RQGRLO / SOLID					

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

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

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

Comments:

2. HOLDING TIMES

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

Comments:

016

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

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

3. INSTRUMENT PERFORMANCE AND CALIBRATIONS

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

4. BLANKS

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

5. ACCURACY

Were spike samples analyzed? . . . . . Yes No 1. N/A
Are spike sample recoveries acceptable? . . . . . Yes No N/A
Were laboratory control samples (LCS) analyzed? . . . . . Yes No N/A
Are LCS recoveries acceptable? . . . . . Yes No N/A
Comments:
1. The %R for Sb, Cr, Cu, Pb, Se, Tl, and Zn were outside the control limit and qualification was applied. See supporting documents.

017

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

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

6. PRECISION

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

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

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

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

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

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

Comments: 1. The RPDs for Cr and Zn were outside the control limit. See supporting document.

7. FURNACE AA QUALITY CONTROL

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

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

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

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

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

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

Comments: GFAA raw data not supplied.

8. REPORTED RESULTS AND DETECTION LIMITS

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

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

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

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

Comments:

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HOLDING TIME SUMMARY

SDG: W0779-QES	VALIDATOR: HEIDI GREGERSON	DATE: 1/15/96	PAGE 1 OF 1
COMMENTS:			

FIELD SAMPLE ID	ANALYSIS TYPE	DATE SAMPLED	DATE PREPARED	DATE ANALYZED	PREP. HOLDING TIME, DAYS	ANALYSIS HOLDING TIME, DAYS	QUALIFIER
BOGRLO	ICP Metals	10/23/95	11/1/95	11/2/95	9	10	none
	GFAA As Se		11/1/95	11/3/95	9	11	none
	GFAA Pb		11/1/95	11/8/95	9	17	none
	GFAA Tl		11/1/95	11/1/95	9	9	none

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U.S. EPA - CLP

5A
SPIKE SAMPLE RECOVERY

EPA SAMPLE NO.

B0GRL0S

Lab Name: QUANTERRA_MO Contract: 550.108

Lab Code: ITMO Case No.: _____ SAS No.: _____ SDG No.: W0779

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

% Solids for Sample: 97.0

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

Analyte	Control Limit %R	Spiked Sample Result (SSR)	C	Sample Result (SR)	C	Spike Added (SA)	%R	Q	M
Aluminum									NR
Antimony	80-120	37.4320		8.5464	B	51.55	56.0	N	P
Arsenic		39.9691		36.5361		4.12	83.3		F
Barium	80-120	290.5711		111.7567		206.19	86.7		P
Beryllium	80-120	5.8258		0.7052	B	5.15	99.4		P
Cadmium	80-120	4.8763		0.2371	U	5.15	94.7		P
Calcium									NR
Chromium	80-120	47.7443		15.7866		20.62	155.0	N	P
Cobalt	80-120	55.8959		9.8062		51.55	89.4		P
Copper	80-120	73.9918		46.4412		25.77	106.9		P
Iron									NR
Lead	80-120	5.8701		6.1113		2.06	-11.7	N	F
Magnesium									NR
Manganese		341.5701		239.1814		51.55	198.6		P
Nickel	80-120	72.3309		13.2588		51.55	114.6		P
Potassium									NR
Selenium	80-120	0.1031	U	0.1031	U	1.03	0.0	N	F
Silver	80-120	5.1629	B	0.8629	B	5.15	83.5		P
Sodium									NR
Thallium	80-120	3.7113		0.0835	B	5.15	70.4	N	F
Vanadium	80-120	88.7454		46.4082		51.55	82.1		P
Zinc	80-120	170.6340		128.3021		51.55	82.1		P

Samples affected: B0GRL0

Comments:

FORM V (Part 1) - IN SW-846

020 HRG 1/15/96 ~~0000021~~

U.S. EPA - CLP

5A
SPIKE SAMPLE RECOVERY

EPA SAMPLE NO.

B0GRL0SD

Lab Name: QUANTERRA_MO Contract: 550.108

Lab Code: ITMO Case No.: SAS No.: SDG No.: W0779

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

% Solids for Sample: 97.0

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

Analyte	Control Limit %R	Spiked Sample Result (SSR)	C	Sample Result (SR)	C	Spike Added (SA)	%R	Q	M
Aluminum									NR
Antimony	80-120	32.6536		8.5464	B	51.55	46.8	N	P
Arsenic		35.1443		36.5361		4.12	-33.8		F
Barium	80-120	326.2278		111.7567		206.19	104.0		P
Beryllium	80-120	6.1206		0.7052	B	5.15	105.2		P
Cadmium	80-120	5.0052		0.2371	U	5.15	97.2		P
Calcium									NR
Chromium	80-120	36.1186		15.7866		20.62	98.6		P
Cobalt	80-120	59.2072		9.8062		51.55	95.8		P
Copper	80-120	79.1825		46.4412		25.77	127.1	N	P
Iron									NR
Lead	80-120	5.7371		6.1113		2.06	-18.2	N	F
Magnesium									NR
Manganese		348.7010		239.1814		51.55	212.5		P
Nickel	80-120	60.0814		13.2588		51.55	90.8		P
Potassium									NR
Selenium	80-120	0.4361	B	0.1031	U	1.03	42.3	N	F
Silver	80-120	5.5072	B	0.8629	B	5.15	90.2		P
Sodium									NR
Thallium	80-120	4.2299		0.0835	B	5.15	80.5		F
Vanadium	80-120	105.0990		46.4082		51.55	113.9		P
Zinc	80-120	207.3000		128.3021		51.55	153.2	N	P

Samples Affected: B0GRL0

Comments:

FORM V (Part 1) - IN SW-846

021 HRG 1/15/96 ~~0000028~~

U.S. EPA - CLP

6A
MATRIX SPIKE DUPLICATES

EPA SAMPLE NO.

B0GRL0SD

Lab Name: QUANTERRA MO Contract: 550.108

Lab Code: ITMO Case No.: SAS No.: SDG No.: W0779

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

% Solids: 97.0

Percent recoveries:

Analyte	Control Limit	Matrix Spike (S)	Matrix Spike Duplicate (SD)	RPD	Q	M
Al	20%					NR
Sb	20%	56.00	46.80	17.9		P
As	20%	83.30		200.0		F
Ba	20%	86.70	104.00	18.1		P
Be	20%	99.40	105.20	5.7		P
Cd	20%	94.70	97.20	2.6		P
Ca	20%					NR
Cr	20%	155.00	98.60	44.5		P
Co	20%	89.40	95.80	6.9		P
Cu	20%	106.90	127.10	17.3		P
Fe	20%					NR
Pb	20%					F
Mg	20%					NR
Mn	20%	198.60	212.50	6.8		P
Ni	20%	114.60	90.80	23.2		P
K	20%					NR
Se	20%	0.00	42.30	200.0		F
Ag	20%	83.50	90.20	7.7		P
Na	20%					NR
Tl	20%	70.40	80.50	13.4		F
V	20%	82.10	113.90	32.4		P
Zn	20%	82.10	153.20	60.4		P

Samples Affected: B0GRL0

FORM VI - IN 022 ~~0000023~~ HRG 1/15/96

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APPENDIX L

ERC RADIOLOGICAL SURVEY RECORDS

This appendix contains copies of release surveys for the floors and walls of the 183-H Solar Evaporation Basin. Surveys were performed following decontamination by surface scabbling. Surveys were used to help determine the disposition of waste after the structures were removed. Table L-1 relates the basin floors and walls to the appropriate surveys.

Table L-1. 183-H Basin Areas and Corresponding ERC Release Survey Number*

	Basin No. 1	Basin No. 2	Basin No. 3	Basin No. 4
North Wall	No Release	612	610	472
South Wall	646	620	545	472
East Wall	643	656	600	472
West Wall	642	613	568	472
Sed. Floor	No Release	632, 648	569, 598, 625	431
Floc. Floor	No Release	662	672	470

*All survey numbers preceded by "PS-183H-0xxx" where xxx is the number(s) above.

ERC Radiological Survey Record

4/22/96 ~~0039124~~ 0039174 Page 1 of 3

Survey & Counting Instruments			Survey Number:	Location:	Check One	RWP Number:
Model	Serial Number	Response ✓	PS-183H-~~0481~~ 0431	183H Solar Basin	☒ Release ☐ Routine ☐ Work Progress ☐ Shipment	PS-324 Rev. 2
11LBLWM2224	119816	[illegible]	Date: 4-07-95	Time: 0600		
— Probe	123098	[illegible]				
—	—	—				
—	—	—				

Contamination Survey Information

No.	Description of item or location surveyed	Removable Alpha	Removable Beta-Gamma	Direct Alpha	Direct Beta-Gamma	No.	Description of item or location surveyed	Removable Alpha	Removable Beta-Gamma	Direct Alpha	Direct Beta-Gamma
	NA						NA				

Circled values in removable B-G column denotes mrad/hr beta ▶ Unless noted, removable contamination is <1,000 dpm/100 cm² Beta-gamma. Direct readings are <1,000 dpm/probe Beta-gamma, Alpha is <20 dpm ◀ Readings taken at 3/4 max. dimension of object: CF (CP) = 3, CF (RO-2) = 4 Readings beyond that distance, CF = 1

○ = Removable | # = Direct | M = LAW | ____ = Gamma, mR/hr | □ = Beta, mrad/hr | △ = Micro-R/hr | ◆ = Contact Rdg. | N = Neutrons, mrem/hr | [AS] = air sample

—C— Contaminated Area | —H— High Contamination Area | — Radiological Buffer Area | —RC— Radiologically Controlled Area | —RM— Radioactive Materials Storage Area | —R— Radiation Area | —HR— High Radiation Area

see attached maps for info.

(Both Print & Sign)
9-7-95 K. Hartelius [signature]
RCT Signature/Date

RC Supervisor Signature/Date F. [signature] 9/19/95

Remarks: survey performed per release plan for basins. all areas are <5K dpm/100 cm².

BHI-TM-R006 (6/95)

ERC Radiological Survey Record - Continuation

Survey No. PS-183H-~~0481~~ 0431 9-8-95 Page 2 of 3

Contamination Survey Information

No.	Description of item or location surveyed	Removable Alpha	Removable Beta-Gamma	Direct Alpha	Direct Beta-Gamma	No.	Description of item or location surveyed	Removable Alpha	Removable Beta-Gamma	Direct Alpha	Direct Beta-Gamma

N/A

N/A

Additional Information (drawing, map, etc.)

166	186	206	207	246	247
165	185	205	208	245	248
164	184	204	209	244	249
163	183	203	210	243	250
162	182	202	211	242	251
161	181	201	212	241	252
160	180	200	213	240	253
159	179	199	214	239	254
158	178	198	215	238	255
157	177	197	216	237	256
156	176	196	217	236	257
155	175	195	218	235	258
154	174	194	219	234	259
153	173	193	220	233	260
152	172	192	221	232	261
151	171	191	222	231	262
150	170	190	223	230	263
149	169	189	224	229	264
148	168	188	225	228	265
147	167	187	226	227	266

Basin #4
#147→266

N

all quadrants were surveyed per release plan.

BHI-TM-R007 (6/95)

EHC Radiological Survey Record -- Continuation

Survey No. PS-1834-0431

Contamination Survey Information

No.	Description of item or location surveyed	Removable		Direct		No.	Description of item or location surveyed	Removable		Direct	
		Alpha	Beta-Gamma	Alpha	Beta-Gamma			Alpha	Beta-Gamma	Alpha	Beta-Gamma
	N/A						N/A				

Additional Information (drawing, map, etc.)

285	286	323	324	362	363
284	287	322	325	361	364
283	288	321	326	360	365
282	289	320	327	358	366
281	290	319	328	357	367
280	291	318	329	356	368
279	292	317	330	355	369
278	293	316	331	354	370
277	294	315	332	353	371
276	295	314	333	352	372
275	296	313	334	351	373
274	297	312	335	350	374
273	298	311	336	349	375
272	299	310	337	348	376
271	300	309	338	347	377
270	301	308	339	346	378
269	302	307	340	345	380
268	303	306	341	344	382
267	304	305	342	343	384

Basin #4
#285 → 384

N

all quadrants were surveyed per release plan.

BHI-TM-R007 (6/95)

ERC Radiological Survey Record

Page 1 of 1

Survey & Counting Instruments			Survey Number:	Location:	(Check One)	RWP Number:
Model	Serial Number	Response ✓	PS-183H-0470	183H Solar Basin	☒ Release ☐ Routine ☐ Work Progress ☐ Shipment	PS-324 Rev. 2
Ludlum 2224	119816	[illegible]	Date: 9-19-95			
— Probe	123098	[illegible]	Time: 0500			
—	—	—				
—	—	—				

Contamination Survey Information

No.	Description of item or location surveyed	Removable Alpha	Removable Beta-Gamma	Direct Alpha	Direct Beta-Gamma	No.	Description of item or location surveyed	Removable Alpha	Removable Beta-Gamma	Direct Alpha	Direct Beta-Gamma
	NA						NA				

Circled values in removable B-G column denotes mrad/hr beta ▶ Unless noted, removable contamination is <1,000 dpm/100 cm² Beta-gamma. Direct readings are <1,000 dpm/probe Beta-gamma. Alpha is <20 dpm ◀ Readings taken at 3/4 max. dimension of object: CF (CP) = 3, CF (RO-2) = 4 Readings beyond that distance, CF = 1

○ = Removable | # = Direct | M = LAW | ____ = Gamma, mR/hr | □ = Beta, mrad/hr | △ = Micro-R/hr | + = Contact Rdg. | N = Neutrons, mrem/hr | [AS] = air sample

—C— Contaminated Area | —H— High Contamination Area | — Radiological Buffer Area | —RC— Radiologically Controlled Area | —RM— Radioactive Materials Storage Area | —R— Radiation Area | —HR— High Radiation Area

Basin #4 floculator floor & Wall (2')

	483				484				485				486				487				488		
482	481	480	479	478	477	476	475	474	473	472	471	470	469	468	467	466	465	464	463	462	461	460	459
458	457	455	454	453	452	451	450	449	448	447	446	445	444	443	442	441	440	439	438	437	436	435	434
432	431	430	429	428	427	426	425	424	423	422	421	420	419	418	417	416	415	414	413	412	411	410	409
408	407	406	405	404	403	402	401	400	399	398	397	396	395	394	393	392	391	390	389	388	387	386	385

N

(Both Print & Sign)

9-19-95 K. Hartshius [signature]
RCT Signature/Date

F. Zwerle [signature] 9/19/95
RC Supervisor Signature/Date

Remarks: all quadrants surveyed per 183H Solar Basin release plan. Spot check off walls above 2' was also done. found <5K dpm/100 cm².

BHI-TM-R006 (6/95)

ERC Radiological Survey Record

Page 1 of 1

Survey & Counting Instruments			Survey Number:	Location:	(Check One)	RWP Number:
Model	Serial Number	Response ✓	PS-183H-0472	183 H Solar Basin	☒ Release ☐ Routine ☐ Work Progress ☐ Shipment	PS-324 Rev. 2
Ludlum 2224	119 816	[illegible]	Date: 9-19-95	Time: 0600		
— Probe	123098	[illegible]				
—	—	—				
—	—	—				

Contamination Survey Information

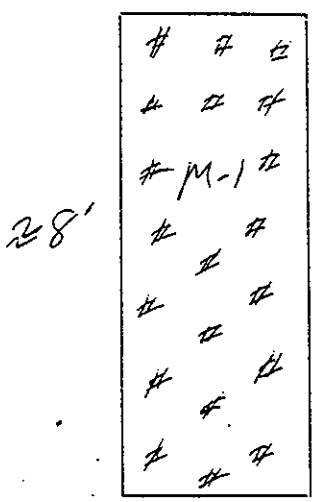
No.	Description of item or location surveyed	Removable Alpha	Removable Beta-Gamma	Direct Alpha	Direct Beta-Gamma	No.	Description of item or location surveyed	Removable Alpha	Removable Beta-Gamma	Direct Alpha	Direct Beta-Gamma
	NA						NA				

Circled values in removable B-G column denotes mrad/hr beta ▶ Unless noted, removable contamination is <1,000 dpm/100 cm² Beta-gamma. Direct readings are <1,000 dpm/probe Beta-gamma, Alpha is <20 dpm ◀ Readings taken at 3/4 max. dimension of object: CF (CP) = 3, CF (RO-2) = 4. Readings beyond that distance, CF = 1

○ = Removable | # = Direct | M = LAW | ____ = Gamma, mR/hr | □ = Beta, mrad/hr | △ = Micro-R/hr | + = Contact Rdg. | N = Neutrons, mrem/hr | [AS] = air sample

—C— Contaminated Area | —H— High Contamination Area | — Radiological Buffer Area | —RC— Radiologically Controlled Area | —RM— Radioactive Materials Storage Area | —R— Radiation Area | —HR— High Radiation Area

Wall Quadrant



Quadrant #s and Survey #s

South wall: #5, 6, 7, 10, 11, 13, 16, 20, 23 } PS-183H-0251

west wall: 40, 41, 42, 44, 45, 46, 47, 48, 50, 56, 72 } PS-183H-0323

74, 80, 81, — PS-183H-0339

100, 105, 106, 107, 116, 121, 124, 126, 133, 134, 140, 141, 146 } PS-183H-0324

(Both Print & Sign)
9-19-95 K Hartelius [signature]
RCT Signature/Date
F. Ewalt [signature] 9/19/95
RC Supervisor Signature/Date

Remarks: # is slow scan with periodic static checks as per release plan. Concentration on decomed areas see above listed survey reports.

BHI-TM-R006 (6/95)

ERC Radiological Survey Record

Page 1 of 1

Survey & Counting Instruments			Survey Number:	Location:	(Check One)	RWP Number:
Model	Serial Number	Response ✓	PS-183H-0545	183 H Basin #3 South Wall	☒ Release ☐ Routine ☐ Work Progress ☐ Shipment	PS 324 Rev 2
N	N	N	Date: 10-12-95	Time: 1200		
A	A	A				

Contamination Survey Information

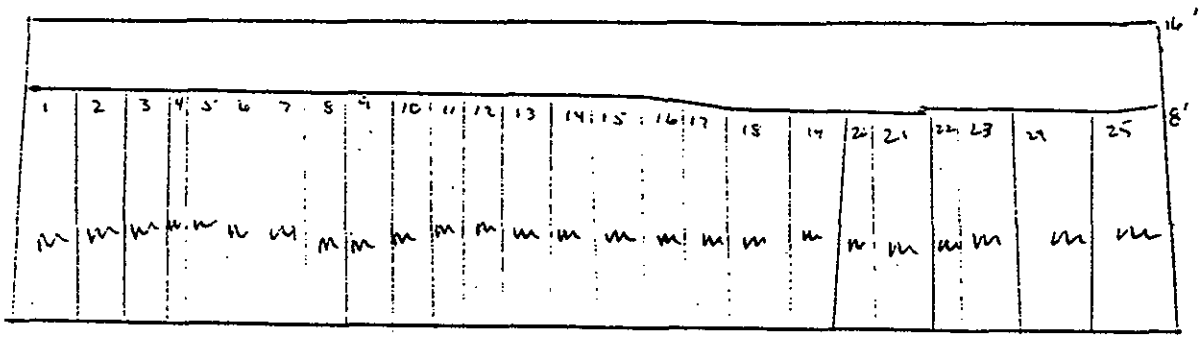
No.	Description of item or location surveyed	Removable Alpha	Removable Beta-Gamma	Direct Alpha	Direct Beta-Gamma	No.	Description of item or location surveyed	Removable Alpha	Removable Beta-Gamma	Direct Alpha	Direct Beta-Gamma
	N						N				
	A		A				A		N		
				A						A	

Circled values in removable B-G column denotes mrad/hr beta ▶ Unless noted, removable contamination is <1,000 dpm/100 cm² Beta-gamma. Direct readings are <1,000 dpm/probe Beta-gamma, Alpha is <20 dpm ◀ Readings taken at 3/4 max. dimension of object: CF (CP) = 3, CF (RO-2) = 4 Readings beyond that distance, CF = 1

○ = Removable | # = Direct | M = LAW | ____ = Gamma, mR/hr | □ = Beta, mrad/hr | △ = Micro-R/hr | • = Contact Rdg. | N = Neutrons, mrem/hr | [AS] = air sample

—C— Contaminated Area | —H— High Contamination Area | — Radiological Buffer Area | —RC— Radiologically Controlled Area | —RM— Radioactive Materials Storage Area | —R— Radiation Area | —HR— High Radiation Area

Basin #3 South wall



*Note ① all masslins < 1000 dpm per probe area. VBA.
② Smear was Entire section. VBA

(Both Print & Sign)

RCT Signature/Date: VB Abbott / VB Abbott 10/12/95

RC Supervisor Signature/Date: KMathews / KMath 10/17/95

Remarks: Area released per Radiologic Survey reports #s PS-183H-0512 + PS-183H-0498. VBA.

BHI-TM-R006 (6/95)

ERC Radiological Survey Record

Page 1 of 1

Survey & Counting Instruments			Survey Number:		Location:	(Check One)	RWP Number:
Model	Serial Number	Response ✓	PS-183H-0568		183H Basin #3 West Wall	☒ Release ☐ Routine ☐ Work Progress ☐ Shipment	PS 324 Rev 2
Ludlum 2224	123570	V375	Date: 10/24/95	Time: 1200			
with 43-89	N/A	N/A					
Probe							
NH							

Contamination Survey Information

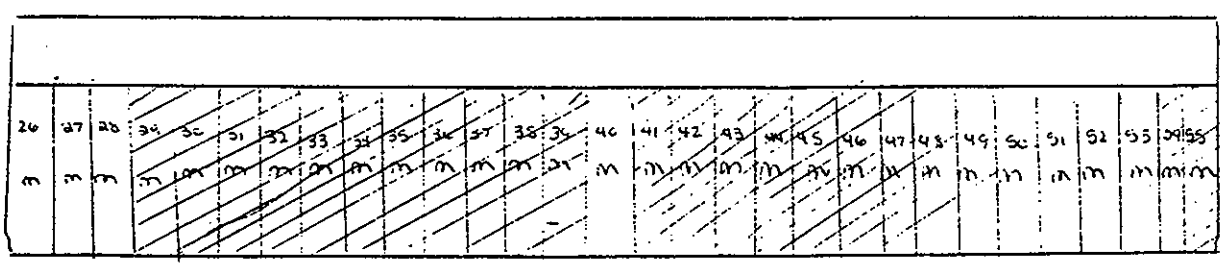
No.	Description of item or location surveyed	Removable Alpha	Removable Beta-Gamma	Direct Alpha	Direct Beta-Gamma	No.	Description of item or location surveyed	Removable Alpha	Removable Beta-Gamma	Direct Alpha	Direct Beta-Gamma
	N/A		N/A				N/A		N/A		

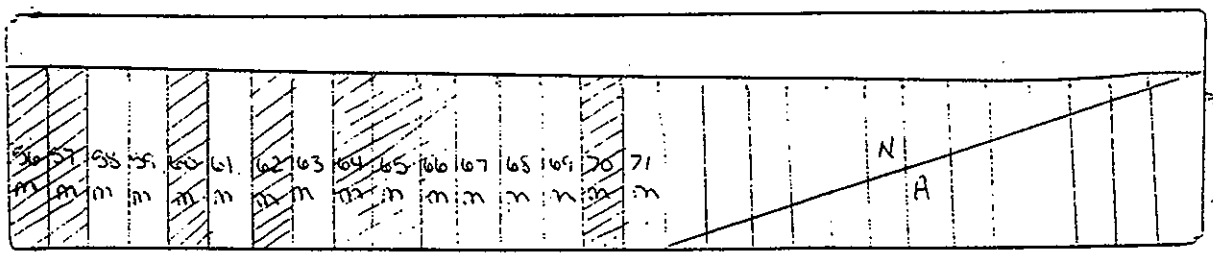
Circled values in removable B-G column denotes mrad/hr beta ▶ Unless noted, removable contamination is <1,000 dpm/100 cm² Beta-gamma. Direct readings are <1,000 dpm/probe Beta-gamma, Alpha is <20 dpm ◀ Readings taken at 3/4 max. dimension of object: CF (CP) = 3, CF (RO-2) = 4 Readings beyond that distance, CF = 1

○ = Removable | # = Direct | M = LAW | ____ = Gamma, mR/hr | ☐ = Beta, mrad/hr | △ = Micro-R/hr | ◆ = Contact Rdg. | N = Neutrons, mrem/hr | [AS] = air sample

—C— Contaminated Area | —H— High Contamination Area | — Radiological Buffer Area | —RC— Radiologically Controlled Area | —RM— Radioactive Materials Storage Area | —R— Radiation Area | —HR— High Radiation Area

Basin #3 West Wall





(Both Print & Sign) Valerie B Abbott

RCT Signature/Date Valerie B. Abbott 10/24/95

RC Supervisor Signature/Date [signature] 10/25/95

F. G. ZWIESLER

Remarks: ① Indicates area surveyed by direct scan @ 4" per second with 2224.
② m - large area swipes x 2' x 8'.
③ Wall released by combining with survey report # PS-183H-0533

BHI-TM-R006 (6/95)

ERC Radiological Survey Record

Page 1 of 1

Survey & Counting Instruments			Survey Number:		Location:	(Check One)	RWP Number:
Model	Serial Number	Response ✓	PS-183H-0569		183H Basin #3 floor	☒ Release ☐ Routine ☐ Work Progress ☐ Shipment	PS 324
Ludlum 2224	123870						
with 43-89 probe	↓	↓	Date:	Time:			
Ludlum 2224	107641	NP	10/24/95	1200			
with ~~[illegible]~~	↓	↓					
~~[illegible]~~ Beta (SP)	108210	JM					

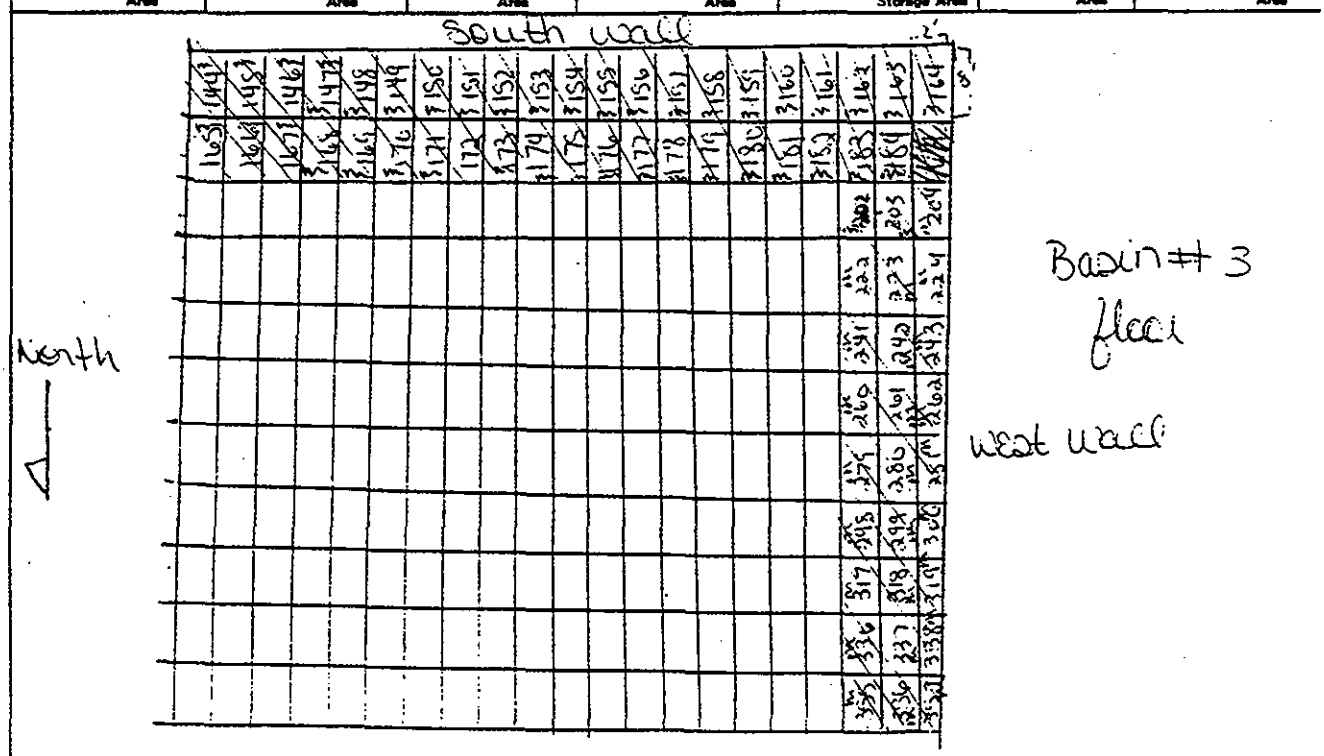
Contamination Survey Information

No.	Description of item or location surveyed	Removable Alpha	Removable Beta-Gamma	Direct Alpha	Direct Beta-Gamma	No.	Description of item or location surveyed	Removable Alpha	Removable Beta-Gamma	Direct Alpha	Direct Beta-Gamma
	N		N				N			N	
	A			A			A			A	

Circled values in removable B-G column denotes mrad/hr beta ▶ Unless noted, removable contamination is <1,000 dpm/100 cm² Beta-gamma. Direct readings are <1,000 dpm/probe Beta-gamma. Alpha is <20 dpm ◀ Readings taken at 3/4 max. dimension of object: CF (CP) = 3, CF (RO-2) = 4. Readings beyond that distance, CF = 1.

○ = Removable | # = Direct | M = LAW | ____ = Gamma, mR/hr | □ = Beta, mrad/hr | △ = Micro-R/hr | ◆ = Contact Rdg. | N = Neutrons, mrem/hr | [AS] = air sample

—C— Contaminated Area | —H— High Contamination Area | — Radiological Buffer Area | —RC— Radiologically Controlled Area | —RM— Radioactive Materials Storage Area | —R— Radiation Area | —HR— High Radiation Area



(Both Print & Sign)

RCT Signature/Date: Valerie O'Hara / J. Martin 10/25/95 / W Duckett 10-25-95

RC Supervisor Signature/Date: F. G. ZWIESLER 10/25/95

Remarks: 1/// area surveyed by slow scan 4"/sec with Ludlum 2224/ pr (1) Contaminated Survey'd and re-survey'd per each section. VOH

BHI-TM-R006 (6/95)

ERC Radiological Survey Record

Page 1 of 2

Survey & Counting Instruments			Survey Number:		Location:	(Check One)	RWP Number:
Model	Serial Number	Response ✓	PS-183H-0598		183H Solar Basin	☒ Release ☐ Routine ☐ Work Progress ☐ Shipment	PS 324 Rev 2
CM IP-11	1677/1804		Date:	Time:			
PAM	2865		11-3-95	1100			
N/A	N/A	N/A					

Contamination Survey Information

No.	Description of item or location surveyed	Removable Alpha	Removable Beta-Gamma	Direct Alpha	Direct Beta-Gamma	No.	Description of item or location surveyed	Removable Alpha	Removable Beta-Gamma	Direct Alpha	Direct Beta-Gamma
		N/A						N/A			

Circled values in removable B-G column denotes mrad/hr beta ▶ Unless noted, removable contamination is <1,000 dpm/100 cm² Beta-gamma. Direct readings are <1,000 dpm/probe Beta-gamma, Alpha is <20 dpm ◀ Readings taken at 3/4 max. dimension of object: CF (CP) = 3, CF (RO-2) = 4 Readings beyond that distance, CF = 1

○ = Removable | # = Direct | M = LAW | ____ = Gamma; mR/hr | ☐ = Beta, mrad/hr | △ = Micro-R/hr | ◆ = Contact Rdg. | N = Neutrons, mrem/hr | [AS] = air sample

—C— Contaminated Area | —H— High Contamination Area | — Radiological Buffer Area | —RC— Radiologically Controlled Area | —RM— Radioactive Materials Storage Area | —R— Radiation Area | —HR— High Radiation Area

N/A

(Both Print & Sign)

RCT Signature/Date: [signature] 11-3-95

RC Supervisor Signature/Date: [signature] 11/6/95

F. G. ZWIESLER

Remarks: All LAW < 1000dpm/100 cm² β-γ, < 20dpm/100 cm² α. See also survey # PS-183H-0594.

BHI-TM-R006a (8/95)

ERC Radiological Survey Record -- Continuation

Survey No. PS-183H-0598

Contamination Survey Information

No.	Description of item or location surveyed	Removable Alpha	Removable Beta-Gamma	Direct Alpha	Direct Beta-Gamma	No.	Description of item or location surveyed	Removable Alpha	Removable Beta-Gamma	Direct Alpha	Direct Beta-Gamma
		N/A						N/A			

Additional Information (drawing, map, etc.)

N/A	N/A	N/A	N/A	N/A
201 M	221 M			
200 M	220 M	240 M	259 M	278 M
199 M	219 M	239 M	258 M	277 M
198 M	218 M	238 M	257 M	276 M
197 M	217 M	237 M	256 M	275 M
196 M	216 M	236 M	255 M	274 M
195 M	215 M	235 M	254 M	273 M
194 M	214 M	234 M	253 M	272 M
193 M	213 M	233 M	252 M	271 M
192 M	212 M	232 M	251 M	270 M
191 M	211 M	231 M	250 M	269 M
190 M	210 M	230 M	249 M	268 M
189 M	209 M	229 M	248 M	267 M
188 M	208 M	228 M	247 M	266 M
187 M	207 M	227 M	246 M	265 M
186 M	206 M	226 M	245 M	264 M
185 M	205 M	225 M	244 M	263 M

N/A

N

Basin #3 floor

BHI-TM-R007 (6/95)

ERC Radiological Survey Record

Page 1 of 1

Survey & Counting Instruments			Survey Number:		Location:	(Check One)	RWP Number:
Model	Serial Number	Response ✓	PS-183H-600		183H Solar Basin	☒ Release ☐ Routine ☐ Work Progress ☐ Shipment	PS 324 Rev 2
Ludlum 2224	119779	M VB	Date: 11-3-45	Time: 1500			
Ludlum 2224	119784	M					
BM 1P-11	1677/1804	M					
PAM	2865	M					

Contamination Survey Information

No.	Description of item or location surveyed	Removable Alpha	Removable Beta-Gamma	Direct Alpha	Direct Beta-Gamma	No.	Description of item or location surveyed	Removable Alpha	Removable Beta-Gamma	Direct Alpha	Direct Beta-Gamma
		N/A						N/A			

Circled values in removable B-G column denotes mrad/hr beta ▶ Unless noted, removable contamination is <1,000 dpm/100 cm² Beta-gamma. Direct readings are <1,000 dpm/probe Beta-gamma, Alpha is <20 dpm ◀ Readings taken at 3/4 max. dimension of object: CF (CP) = 3, CF (RO-2) = 4. Readings beyond that distance, CF = 1

○ = Removable | # = Direct | M = LAW | ____ = Gamma, mR/hr | □ = Beta, mrad/hr | △ = Micro-R/hr | + = Contact Rdg. | N = Neutrons, mrem/hr | [AS] = air sample

—C— Contaminated Area | —H— High Contamination Area | — Radiological Buffer Area | —RC— Radiologically Controlled Area | —RM— Radioactive Materials Storage Area | —R— Radiation Area | —HR— High Radiation Area

#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#
97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120
M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M

Basin #3
East Wall

#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#
121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142		
M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	N/A	

(Both Print & Sign)

RCT Signature/Date: J. Martin 11-3-45 / VB Abbott 11-3-45

RC Supervisor Signature/Date: [signature] 11/6/95
F. G. ZWIESLER

Remarks: /// indicates area surveyed by direct scan @ 6"/sec using Ludlum 2224 w/ 43 89 probe Background was <256 cpm. All LAW <1000dpm/PA BT and <20 dpm/PA α. See also survey # PS-183H-0557, PS-183H-0539.

BHI-TM-R008 (6/95)

ERC Radiological Survey Record

Page 1 of 1

Survey & Counting Instruments			Survey Number:		Location:	(Check One)	RWP Number:
Model	Serial Number	Response ✓	PS-183H-0610		183 H Solar Basin	☒ Release	PS 324 Rev 2
Ludlum 2223	107641/105206	m				☐ Routine	
ESP-1	3414	m VBT	Date: 11-7-95	Time: 1500		☐ Work Progress	
N/A	N/A	N/A				☐ Shipment	

Contamination Survey Information

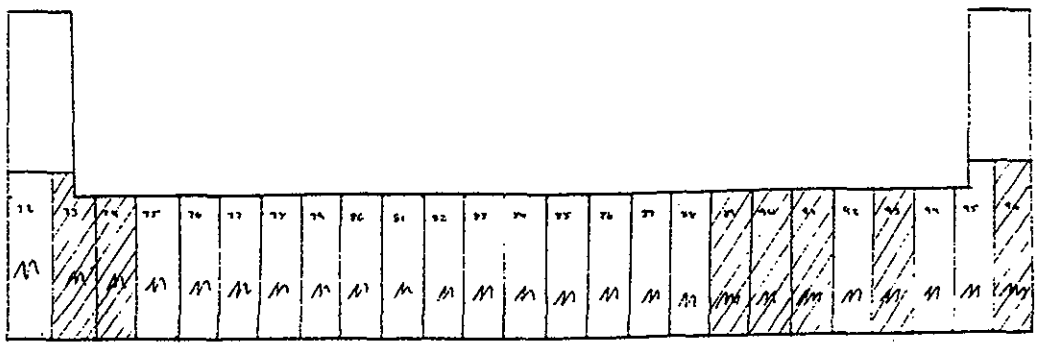
No.	Description of item or location surveyed	Removable Alpha	Removable Beta-Gamma	Direct Alpha	Direct Beta-Gamma	No.	Description of item or location surveyed	Removable Alpha	Removable Beta-Gamma	Direct Alpha	Direct Beta-Gamma
		N									
		A						N			
								A			

Circled values in removable B-G column denotes mrad/hr beta ▶ Unless noted, removable contamination is <1,000 dpm/100 cm² Beta-gamma. Direct readings are <1,000 dpm/probe Beta-gamma. Alpha is <20 dpm ◀ Readings taken at 3/4 max. dimension of object: CF (CP) = 3, CF (RO-2) = 4 Readings beyond that distance, CF = 1

○ = Removable | # = Direct | M = LAW | ____ = Gamma, mR/hr | □ = Beta, mrad/hr | △ = Micro-R/hr | ✦ = Contact Rdg. | N = Neutrons, mrem/hr | [AS] = air sample

—C— Contaminated Area | —H— High Contamination Area | — Radiological Buffer Area | —RC— Radiologically Controlled Area | —RM— Radioactive Materials Storage Area | —R— Radiation Area | —HR— High Radiation Area

Basin # 3 North Wall



(Both Print & Sign) Valerie B. Abbott Valerie B. Abbott 11/7/95

RCT Signature/Date J. Martin 11-7-95

RC Supervisor Signature/Date 11/8/95 E. G. ZWIESLER

Remarks: /// indicates area surveyed by direct scan @ 6"/sec using ESP-1 w/ 43-89 probe and 4"/sec using Ludlum 2223 w/ 43-1-1 probe. Background <250 cpm. See also survey # PS-183H-0556.

BHI-TM-R006a (8/95)

ERC Radiological Survey Record

Page 1 of 1

Survey & Counting Instruments			Survey Number:		Location:	(Check One)	RWP Number:
Model	Serial Number	Response ✓	PS-183H-0612		183 H Solar Basin	☒ Release ☐ Routine ☐ Work Progress ☐ Shipment	PS 324 Rev 2
Ludlum 2224	119784	m					
PAM	2565	m	Date: 11-8-95	Time: 1100			
GM/P-11	1677 / 1804	m					

Contamination Survey Information

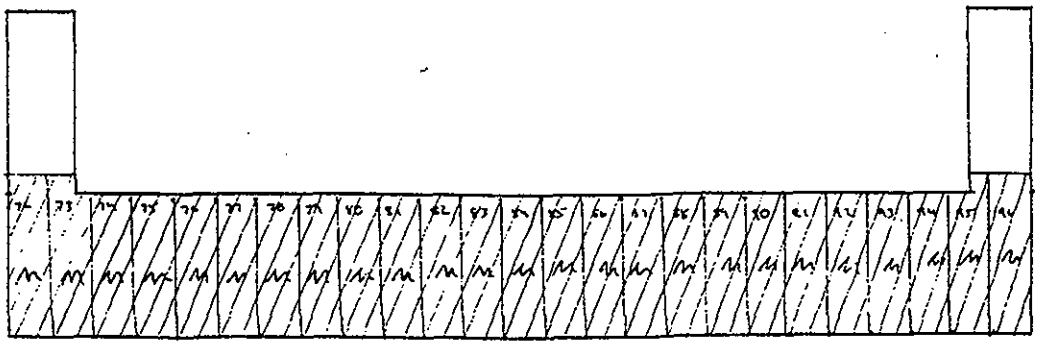
No.	Description of item or location surveyed	Removable Alpha	Removable Beta-Gamma	Direct Alpha	Direct Beta-Gamma	No.	Description of item or location surveyed	Removable Alpha	Removable Beta-Gamma	Direct Alpha	Direct Beta-Gamma
	N/A						N/A				

Circled values in removable B-G column denotes mrad/hr beta ▶ Unless noted, removable contamination is <1,000 dpm/100 cm² Beta-gamma. Direct readings are <1,000 dpm/probe Beta-gamma. Alpha is <20 dpm ◀ Readings taken at 3/4 max. dimension of object: CF (CP) = 3, CF (RO-2) = 4 Readings beyond that distance, CF = 1

○ = Removable | # = Direct | M = LAW | _____ = Gamma, mR/hr | □ = Beta, mrad/hr | △ = Micro-R/hr | + = Contact Rdg. | N = Neutrons, mrem/hr | [AS] = air sample

—C— Contaminated Area | —H— High Contamination Area | — Radiological Buffer Area | —RC— Radiologically Controlled Area | —RM— Radioactive Materials Storage Area | —R— Radiation Area | —HR— High Radiation Area

Basin #2 North Wall



(Both Print & Sign)

RCT Signature/Date: J. Martin Jones 11-8-95

RC Supervisor Signature/Date: [signature] 11/14/95

F. G. ZWIESLER

Remarks: /// indicates areas surveyed by direct scan @ 4"/sec using Ludlum 2224 w/ 43-89 probe. Background was < 400cpm. See also surveys # PS-183H-0575

BHI-TM-R006a (8/95)

ERC Radiological Survey Record

Page 1 of 1

Survey & Counting Instruments			Survey Number:		Location:	(Check One)	RWP Number:
Model	Serial Number	Response ✓	PS-183H-0613		183H Solar Basin	☒ Release ☐ Routine ☐ Work Progress ☐ Shipment	PS 324 Rev 2
Ludlum 2224	119779	n					
Ludlum 2224	119784		Date:	Time:			
ORTEC	1677 / 1804	n	11-8-95	1500			
PAM	2565	n					

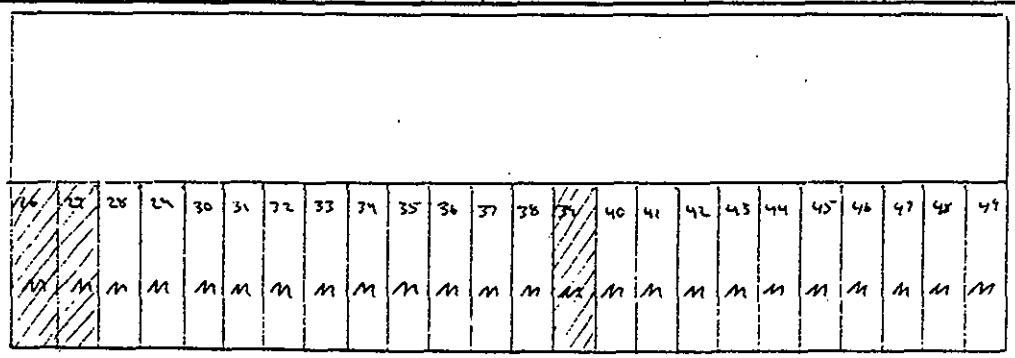
Contamination Survey Information

No.	Description of item or location surveyed	Removable Alpha	Removable Beta-Gamma	Direct Alpha	Direct Beta-Gamma	No.	Description of item or location surveyed	Removable Alpha	Removable Beta-Gamma	Direct Alpha	Direct Beta-Gamma
	N/A						N/A				

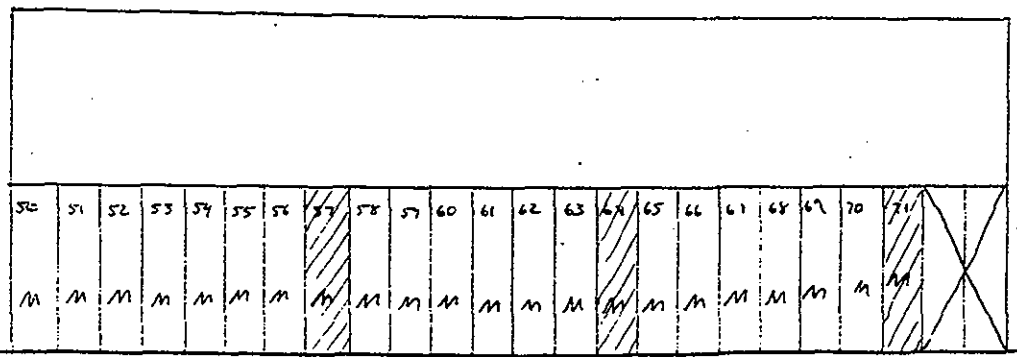
Circled values in removable B-G column denotes mrad/hr beta ▶ Unless noted, removable contamination is <1,000 dpm/100 cm² Beta-gamma. Direct readings are <1,000 dpm/probe Beta-gamma, Alpha is <20 dpm ◀ Readings taken at 3/4 max. dimension of object: CF (CP) = 3, CF (RO-2) = 4. Readings beyond that distance, CF = 1

○ = Removable | # = Direct | M = LAW | ____ = Gamma, mR/hr | □ = Beta, mrad/hr | △ = Micro-R/hr | ⊕ = Contact Rdg. | N = Neutrons, mrem/hr | [AS] = air sample

—C— Contaminated Area | —H— High Contamination Area | — Radiological Buffer Area | —RC— Radiologically Controlled Area | —RM— Radioactive Materials Storage Area | —R— Radiation Area | —HR— High Radiation Area



Basin #2 West Wall



(Both Print & Sign)

RCT Signature/Date: J. Martin 11-8-95 / LBaldock 11/8/95

RC Supervisor Signature/Date: 11/14/95 F.G. ZWIESLER

Remarks: /// indicates areas surveyed by direct scan @ 6"/sec using Ludlum 2224 w/ 43-89 probe. Background ≈ 250cpm. See also surveys #PS-143H-0582 and PS-183H-0505.

BHI-TM-R006 (6/95)

ERC Radiological Survey Record

Page 1 of 1

Survey & Counting Instruments			Survey Number:	Location:	(Check One)	RWP Number:
Model	Serial Number	Response ✓	PS-183H-0620	183 H Basin #2 South Wall	☒ Release ☐ Routine ☐ Work Progress ☐ Shipment	PS324 REV 2
Ludlum 2224	119784	[illegible]	Date: 11-10-95	Time: 1500		
GM PII	1677/1804	[illegible]				
Ludlum 2224	119779	[illegible]				

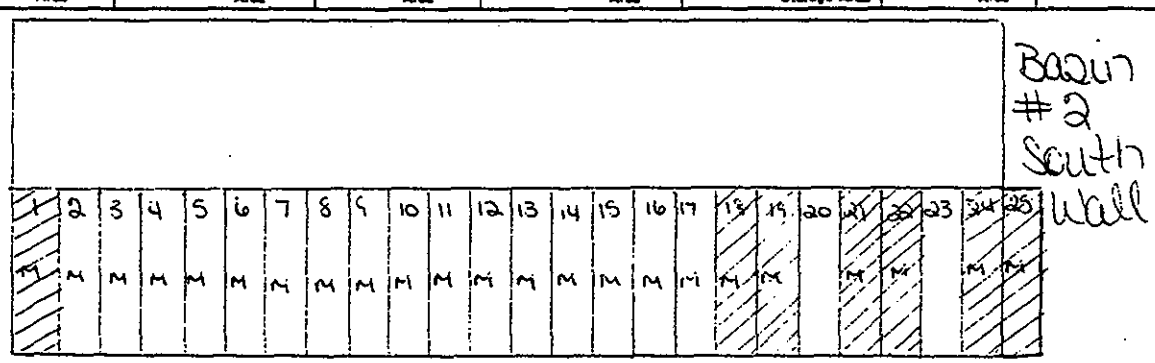
Contamination Survey Information

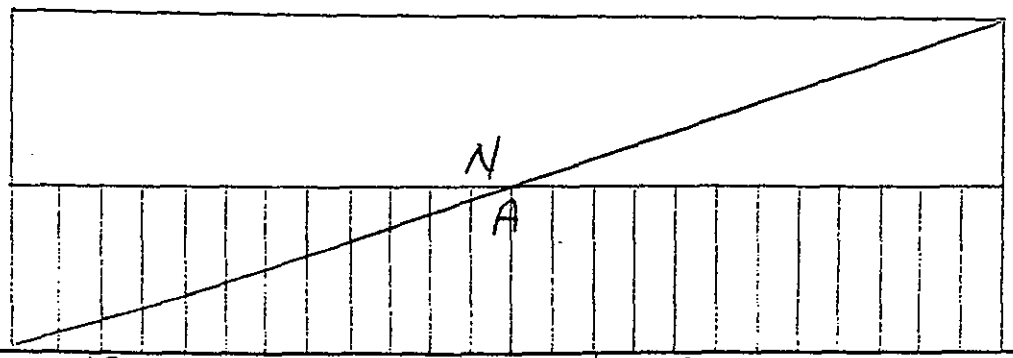
No.	Description of item or location surveyed	Removable Alpha	Removable Beta-Gamma	Direct Alpha	Direct Beta-Gamma	No.	Description of item or location surveyed	Removable Alpha	Removable Beta-Gamma	Direct Alpha	Direct Beta-Gamma
	N/A		N/A				N/A		N/A		

Circled values in removable B-G column denotes mrad/hr beta ▶ Unless noted, removable contamination is <1,000 dpm/100 cm² Beta-gamma. Direct readings are <1,000 dpm/probe Beta-gamma, Alpha is <20 dpm ◀ Readings taken at 3/4 max. dimension of object: CF (CP) = 3, CF (RO-2) = 4 Readings beyond that distance, CF = 1

○ = Removable | # = Direct | M = LAW | ____ = Gamma, mR/hr | □ = Beta, mrad/hr | △ = Micro-R/hr | + = Contact Rdg. | N = Neutrons, mrem/hr | [AS] = air sample

—C— Contaminated Area | —H— High Contamination Area | — Radiological Buffer Area | —RC— Radiologically Controlled Area | —RM— Radioactive Materials Storage Area | —R— Radiation Area | —HR— High Radiation Area





(Both Print & Sign) VBAbbott / J. Martin

RCT Signature/Date VBAbbott [signature] 11-13-95

RC Supervisor Signature/Date [signature] 11/14/95

F. G. ZWIESLER

Remarks: ① /// Indicates areas surveyed by direct scan @ 6"/sec ② using Ludlum 2224/43-89 probe. w/Background under 250 cpm ③ released per survey #'s PS-183 0579 and PS-183H-0479.

BHI-TM-R006 (6/95)

ERC Radiological Survey Record

Page 1 of 2

Survey & Counting Instruments			Survey Number:		Location:	(Check One)	RWP Number:
Model	Serial Number	Response ✓	PS-183H-0625		183 H Solar Basins	☒ Release ☐ Routine ☐ Work Progress ☐ Shipment	PS 324 Rev 2
ESP 1	3404	m					
Ludlum 2224	119784	m	Date: 11-16-95	Time: 1500			
GM 1P-11	16771	m					
—	—	—					

Contamination Survey Information

No.	Description of item or location surveyed	Removable Alpha	Removable Beta-Gamma	Direct Alpha	Direct Beta-Gamma	No.	Description of item or location surveyed	Removable Alpha	Removable Beta-Gamma	Direct Alpha	Direct Beta-Gamma
	N/A						N/A				

Circled values in removable B-G column denotes mrad/hr beta ▶ Unless noted, removable contamination is <1,000 dpm/100 cm² Beta-gamma. Direct readings are <1,000 dpm/probe Beta-gamma, Alpha is <20 dpm ◀ Readings taken at 3/4 max. dimension of object: CF (CP) = 3, CF (RO-2) = 4 Readings beyond that distance, CF = 1

○ = Removable | # = Direct | M = LAW | ____ = Gamma, mR/hr | □ = Beta, mrad/hr | △ = Micro-R/hr | + = Contact Rdg. | N = Neutrons, mrem/hr | [AS] = air sample

—C— Contaminated Area | —H— High Contamination Area | — Radiological Buffer Area | —RC— Radiologically Controlled Area | —RM— Radioactive Materials Storage Area | —R— Radiation Area | —HR— High Radiation Area

N/A

(Both Print & Sign)

RCT Signature/Date J. Martin [signature] 11-17-95

RC Supervisor Signature/Date F. [signature] 11/19/95

Remarks: /// indicates areas surveyed by direct scan @ 6"/sec using Ludlum 2224 or equiv w/ 43-84 probe Background was < 250 cpm. See also survey # PS-183H-0568, PS-183H-0594, PS-183H-0598, PS-183H-0599

BHI-TM-R006a (8/95)

ERC Radiological Survey Record – Continuation

Survey No. PS-183H ~~0225M~~ 0625 11-17-95 Page 2 of 2

Contamination Survey Information

No.	Description of item or location surveyed	Removable Alpha	Removable Beta-Gamma	Direct Alpha	Direct Beta-Gamma	No.	Description of item or location surveyed	Removable Alpha	Removable Beta-Gamma	Direct Alpha	Direct Beta-Gamma
	N/A						N/A				

Additional Information (drawing, map, etc.)

		301	320	339	
		300	319	338	357
		299	318	337	356
		298	317	336	355
		297 M	316 M	335 M	354 M
		296 M	315 M	334 M	353 M
		295 M	314 M	333 M	352 M
		294 M	313 M	332 M	351 M
		293 M	312 M	331 M	350 M
		292 M	311 M	330 M	349 M
		291 M	310 M	329 M	348 M
		290 M	309 M	328 M	347 M
		289 M	308 M	327 M	346 M
		287 M	307 M	326 M	345 M
		286 M	306 M	325 M	344 M
		285 M	305 M	324 M	343 M
		284 M	304 M	323 M	342 M
		283 M	M 303	322 M	341 M
		282 M	M 302	321 M	340 M

→ N

Basin # 3 floor

BHI-TM-R007 (6/95)

ERC Radiological Survey Record

Page 1 of 1

Survey & Counting Instruments			Survey Number:		Location:	(Check One)	RWP Number:
Model	Serial Number	Response ✓	PS-183H-0632		183H Solar Basin #2	☒ Release ☐ Routine ☐ Work Progress ☐ Shipment	PS324 Rev 2
GM/PII	1677/1804	vbm/sm	Date:	Time:			
Ludlum 2224	119784	vbm/sm	11-17-95	1515			
NNC-4PC	414924	vbm/sm					
N/A							

Contamination Survey Information

No.	Description of item or location surveyed	Removable Alpha	Removable Beta-Gamma	Direct Alpha	Direct Beta-Gamma	No.	Description of item or location surveyed	Removable Alpha	Removable Beta-Gamma	Direct Alpha	Direct Beta-Gamma
	N		N				N		N		
	A			A			A			A	

Circled values in removable B-G column denotes mrad/hr beta ▶ Unless noted, removable contamination is <1,000 dpm/100 cm² Beta-gamma. Direct readings are <1,000 dpm/probe Beta-gamma. Alpha is <20 dpm ◀ Readings taken at 3/4 max. dimension of object: CF (CP) = 3, CF (RO-2) = 4 Readings beyond that distance, CF = 1

○ = Removable | # = Direct | M = LAW | ____ = Gamma, mR/hr | ☐ = Beta, mrad/hr | △ = Micro-R/hr | ◆ = Contact Rdg. | N = Neutrons, mrem/hr | [AS] = air sample

—C— Contaminated Area | —H— High Contamination Area | — Radiological Buffer Area | —RC— Radiologically Controlled Area | —RM— Radioactive Materials Storage Area | —R— Radiation Area | —HR— High Radiation Area

Basin # 2 floor.

N

M163	M184	M205	M226	M247	M268	M289	M310	M331	M352	373M
M162	M183	M204	M225	M246	M267	M288	M305	M330	M351	372M
M161	M182	M203	M224	M245	M266	M287	M306	M329	M350	371M
M160	M181	M202	M223	M244	M265	M286	M307	M328	M349	370M
M159	M180	M201								
M158	M175	M200								
M157	M175	M199								
M156	M177	M198								
M155	M176	M197								
M154	M175	M196								
M153	M174	M195								
M152	M173	M194								
M151	M172	M193								
M150	M171	M192								
M149	M170	M191								
M148	M169	M190								
M147	M168	M189								
M146	M167	M188								
M145	M166	M187								
M144	M165	M186								
M143	M164	M185								

* Note *
Grids without #s are still in a CA.

(Both Print & Sign)

RCT Signature/Date: Valerie B. Abbott, Valerie B. Abbott 11/17/95 / J. Martin 11-17-95

RC Supervisor Signature/Date: T. Bucher 11/26/95

Remarks: ON Grids released LAW was done on all grids in /// indicates area surveyed by direct scan @ 6"/sec using Ludlum 2224 w/ 43.89 probe and 2"/sec using NNC-4PC Floor monitor Background was < 1500 cpm. See also survey # PS-183H-

BHI-TM-R006a (8/95)

ERC Radiological Survey Record

Page 1 of 1

Survey & Counting Instruments			Survey Number:		Location:	(Check One)	RWP Number:
Model	Serial Number	Response ✓	PS-183H-0642		183H Solar Basin	[X] Release	PS 324 Rev 2
GM-P-11	1677/1904	m	Date: 11-28-95	Time: 1330		[ ] Routine	
PAM	2881	m				[ ] Work Progress	
N/A	N/A	N/A				[ ] Shipment	

Contamination Survey Information

No.	Description of item or location surveyed	Removable Alpha	Removable Beta-Gamma	Direct Alpha	Direct Beta-Gamma	No.	Description of item or location surveyed	Removable Alpha	Removable Beta-Gamma	Direct Alpha	Direct Beta-Gamma
	N/A						N/A				

Circled values in removable B-G column denotes mrad/hr beta ▶ Unless noted, removable contamination is <1,000 dpm/100 cm² Beta-gamma. Direct readings are <1,000 dpm/probe Beta-gamma. Alpha is <20 dpm ◀ Readings taken at 3/4 max. dimension of object: CF (CP) = 3, CF (RO-2) = 4 Readings beyond that distance, CF = 1

○ = Removable | # = Direct | M = LAW | ____ = Gamma, mR/hr | □ = Beta, mrad/hr | △ = Micro-R/hr | + = Contact Rdg. | N = Neutrons, mrem/hr | [AS] = air sample

—C— Contaminated Area | —H— High Contamination Area | — Radiological Buffer Area | —RC— Radiologically Controlled Area | —RM— Radioactive Materials Storage Area | —R— Radiation Area | —HR— High Radiation Area

West Wall
Basin #1

27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m

51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m

(Both Print & Sign)

RCT Signature/Date J. Martin [signature] 11-28-95

RC Supervisor Signature/Date [signature] 11/28/95
F. G. ZWIESLER

Remarks: See also survey PS-183H-0163. All vertical surfaces of the walls have been surveyed IAW BHI-00517 Rev 1. Survey of wall does not include the sloped or skirt portion.

BHI-TM-R005 (6/95)

ERC Radiological Survey Record

Page ___ of ___

Survey & Counting Instruments			Survey Number:		Location:	(Check One)	RWP Number:
Model	Serial Number	Response ✓	PS-183H-0643		183 H Solar Basin	☒ Release ☐ Routine ☐ Work Progress ☐ Shipment	PS 324 Rev 2
SMIP-II	1677/18821	ok					
RPM	7581	ok	Date: 11-28-95	Time: 1300			

Contamination Survey Information

No.	Description of item or location surveyed	Removable Alpha	Removable Beta-Gamma	Direct Alpha	Direct Beta-Gamma	No.	Description of item or location surveyed	Removable Alpha	Removable Beta-Gamma	Direct Alpha	Direct Beta-Gamma
	N/A						N/A				

Circled values in removable B-G column denotes mrad/hr beta ▶ Unless noted, removable contamination is <1,000 dpm/100 cm² Beta-gamma. Direct readings are <1,000 dpm/probe Beta-gamma, Alpha is <20 dpm ◀ Readings taken at 3/4 max. dimension of object: CF (CP) = 3, CF (RO-2) = 4 Readings beyond that distance, CF = 1

○ = Removable | # = Direct | M = LAW | ____ = Gamma, mR/hr | □ = Beta, mrad/hr | △ = Micro-R/hr | ◆ = Contact Rdg. | N = Neutrons, mrem/hr | [AS] = air sample

—C— Contaminated Area | —H— High Contamination Area | — Radiological Buffer Area | —RC— Radiologically Controlled Area | —RM— Radioactive Materials Storage Area | —R— Radiation Area | —HR— High Radiation Area

East Wall
Basin #1

106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129
m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m

130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154
m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m

(Both Print & Sign)

RCT Signature/Date: J. Martin 11-28-95

RC Supervisor Signature/Date: 11/28/95 F. G. ZWIESLER

Remarks: See also survey # PS-183H-0163 All vertical surfaces of the wall have been surveyed IAW BHI-00517 Rev 1. Survey of wall does not include the sloped or skirt portion.

BHI-TM-R006 (6/95)

ERC Radiological Survey Record

Page 1 of 1

Survey & Counting Instruments			Survey Number:		Location:	(Check One)	RWP Number:
Model	Serial Number	Response ✓	PS-183H-C646		183 H Solar Basins	☒ Release ☐ Routine ☐ Work Progress ☐ Shipment	PS 324 Rev 2
EMIP-11	1677/1804	m	Date: 11-27-95	Time: 1000			
RAM	2881	m					
N/A	N/A	N/A					

Contamination Survey Information

No.	Description of item or location surveyed	Removable Alpha	Removable Beta-Gamma	Direct Alpha	Direct Beta-Gamma	No.	Description of item or location surveyed	Removable Alpha	Removable Beta-Gamma	Direct Alpha	Direct Beta-Gamma
	N/A						N/A				

Circled values in removable B-G column denotes mrad/hr beta ▶ Unless noted, removable contamination is <1,000 dpm/100 cm² Beta-gamma. Direct readings are <1,000 dpm/probe Beta-gamma. Alpha is <20 dpm ◀ Readings taken at 3/4 max. dimension of object: CF (CP) = 3, CF (RO-2) = 4 Readings beyond that distance, CF = 1

○ = Removable | # = Direct | M = LAW | ____ = Gamma, mR/hr | □ = Beta, mrad/hr | △ = Micro-R/hr | + = Contact Rdg. | N = Neutrons, mrem/hr | [AS] = air sample

—C— Contaminated Area | —H— High Contamination Area | — Radiological Buffer Area | —RC— Radiologically Controlled Area | —RM— Radioactive Materials Storage Area | —R— Radiation Area | —HR— High Radiation Area

South Wall Basin #1

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m

(Both Print & Sign)

RCT Signature/Date J. Martin 11/29/95

RC Supervisor Signature/Date [signature] 12/4/95

F. G. ZWIESLER

Remarks: See also survey # PS-183H-018C All portions of the wall above the seam were surveyed in IAW BHI-00517 Rev 1 Lower portion or skirt has not been decommed. m

BHI-TM-R006a (8/95)

ERC Radiological Survey Record

Page 1 of 3

Survey & Counting Instruments			Survey Number:	Location:	(Check One)	RWP Number:
Model	Serial Number	Response ✓	PS-183 H-0648	183 H Solar Basin	☒ Release ☐ Routine ☐ Work Progress ☐ Shipment	PS 324 Rev 2
CM/P-11	1677/1804	m				
PAM	2581	m				
NMC-4PC	414924	m	Date: 11-30-95	Time: 1500		
Ludlum 2223	119769	m				

Contamination Survey Information

No.	Description of item or location surveyed	Removable Alpha	Removable Beta-Gamma	Direct Alpha	Direct Beta-Gamma	No.	Description of item or location surveyed	Removable Alpha	Removable Beta-Gamma	Direct Alpha	Direct Beta-Gamma
		N/A						N/A			

Circled values in removable B-G column denotes mrad/hr beta ▶ Unless noted, removable contamination is <1,000 dpm/100 cm² Beta-gamma. Direct readings are <1,000 dpm/probe Beta-gamma. Alpha is <20 dpm ◀ Readings taken at 3/4 max. dimension of object: CF (CP) = 3, CF (RO-2) = 4. Readings beyond that distance, CF = 1

○ = Removable | # = Direct | M = LAW | ____ = Gamma, mR/hr | ☐ = Beta, mrad/hr | △ = Micro-R/hr | ⊕ = Contact Rdg. | N = Neutrons, mrem/hr | [AS] = air sample

—C— Contaminated Area | —H— High Contamination Area | — Radiological Buffer Area | —RC— Radiologically Controlled Area | —RM— Radioactive Materials Storage Area | —R— Radiation Area | —HR— High Radiation Area

N/A

(Both Print & Sign)

RCT Signature/Date: J. Murtin / RBAbbott 11-30-95

RC Supervisor Signature/Date: 12/4/95 E. G. ZWIESLER

Remarks: All indicates areas surveyed by direct scan using NMC-4PC @ 6"/sec or Ludlum 2223 w/ 43-1-1 probe @ 4"/sec IAW BHI-00517 Rev 1. See also survey # PS-183H-0640 and PS-183 H-0647

BHI-TM-R006a (8/95)

Survey No. PS-183H-0648

Page 2 of 3

Contamination Survey Information

No.	Description of item or location surveyed	Removable Alpha	Removable Beta-Gamma	Direct Alpha	Direct Beta-Gamma	No.	Description of item or location surveyed	Removable Alpha	Removable Beta-Gamma	Direct Alpha	Direct Beta-Gamma
		N/A						N/A			

Additional Information (drawing, map, etc.)

N 222	243	264 N	285 N	306	327
221	242 N	263	284	305 N	~~326~~ N
N 220	241	~~262~~ N	283 N	304	325
219	240 N	261	282	303 N	324 N
N 218	239	260 N	281 N	302	323
217	238 N	259	280	301 N	322 N
216 N	237	~~258~~ N	279 N	300	321
215	236 N	257	~~278~~	299 N	320 N
214 N	235	256 N	277 N	298	319
213	234 N	255	~~276~~	297 N	318 N
212 N	233	~~254~~ N	275 N	296	317
211	~~232~~ N	~~253~~	274	295 N	316 N
~~210~~ N	231	~~252~~ N	273 N	294	315
209	~~230~~ N	~~251~~ N	272 N	293 N	314 N
~~208~~ N	229	~~250~~ N	271 N	292	313
207	228 N	~~249~~	~~270~~ N	291 N	312 N
206 N	227	~~248~~ N	~~269~~	290	311 N

Basin #2
Floor

BHI-TM-R007 (6/95)

Survey No. PS-1834-0648

Page 3 of 3

Contamination Survey Information

No.	Description of item or location surveyed	Removable Alpha	Removable Beta-Gamma	Direct Alpha	Direct Beta-Gamma	No.	Description of item or location surveyed	Removable Alpha	Removable Beta-Gamma	Direct Alpha	Direct Beta-Gamma
		N/A						N/A			

Additional Information (drawing, map, etc.)

N/A	N/A				
348 N	369				
347	368 N				
346 N	367				
345	366 N				
346 N	365				
345	364 N				
344 N	363				
343	362 N				
342 N	361				
341	360 N				
340 N	359				
339	358 N				
338 N	357				
337	356 N				
336 N	355				
335	354 N				
334 N	353				

N/A

→ N

Basin #2 Floor

BHI-TM-R007 (6/95)

ERC Radiological Survey Record

Page 1 of 1

Survey & Counting Instruments			Survey Number:		Location:	(Check One)	RWP Number:
Model	Serial Number	Response ✓	PS-183H-0656		183 H Solar Basin	☒ Release ☐ Routine ☐ Work Progress ☐ Shipment	PS 524 RCL 2
Ludlum 2223	119763	m	Date: 12-7-95	Time: 0800			
EM IP-11	1677 / 1804	m					
PAM	2881	m					

Contamination Survey Information

No.	Description of item or location surveyed	Removable Alpha	Removable Beta-Gamma	Direct Alpha	Direct Beta-Gamma	No.	Description of item or location surveyed	Removable Alpha	Removable Beta-Gamma	Direct Alpha	Direct Beta-Gamma
1	Grid #97 skirt	86C	20K	28K	100K						

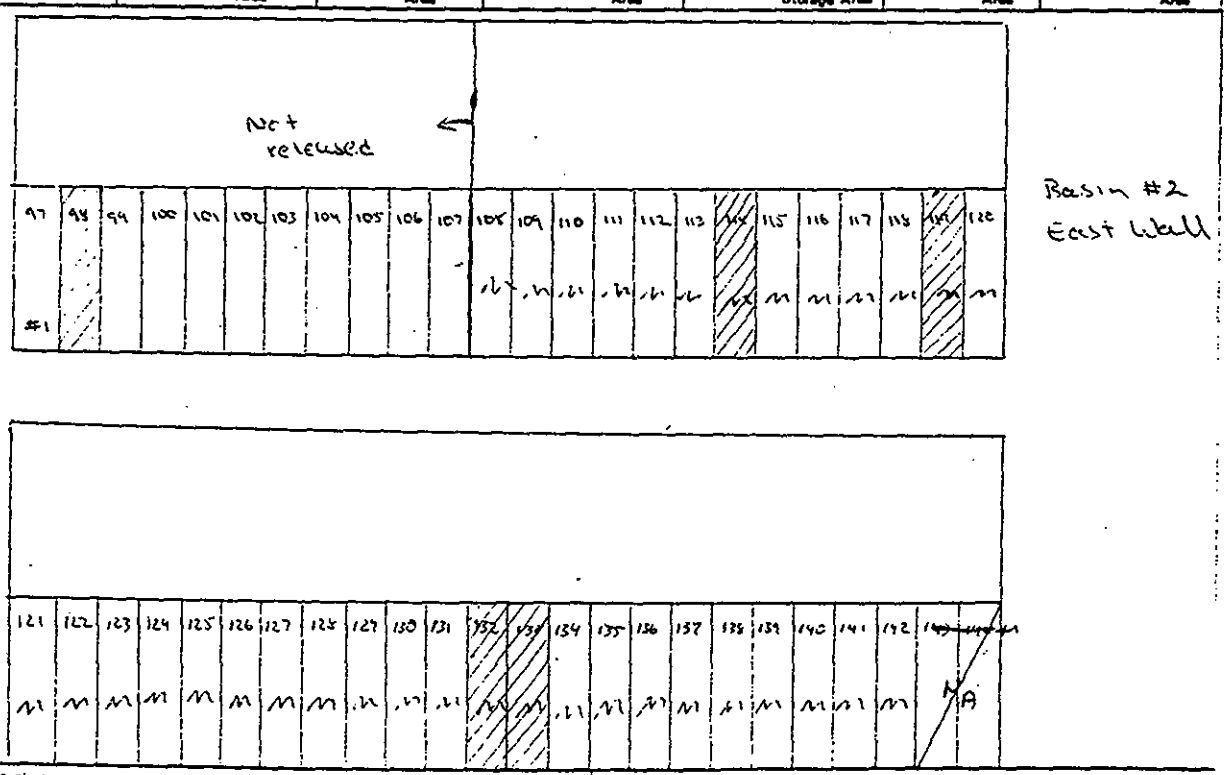
N/A

N/A

Circled values in removable B-G column denotes mrad/hr beta ▶ Unless noted, removable contamination is <1,000 dpm/100 cm² Beta-gamma. Direct readings are <1,000 dpm/probe Beta-gamma. Alpha is <20 dpm ◀ Readings taken at 3/4 max. dimension of object: CF (CP) = 3, CF (RO-2) = 4 Readings beyond that distance, CF = 1

○ = Removable | # = Direct | M = LAW | ____ = Gamma, mR/hr | ☐ = Beta, mrad/hr | △ = Micro-R/hr | • = Contact Rdg. | N = Neutrons, mrem/hr | [AS] = air sample

—C— Contaminated Area | —H— High Contamination Area | — Radiological Buffer Area | —RC— Radiologically Controlled Area | —RM— Radioactive Materials Storage Area | —R— Radiation Area | —HR— High Radiation Area



Basin #2 East Wall

(Both Print & Sign)

RCT Signature/Date J Martin [signature] 12-7-95

RC Supervisor Signature/Date [signature] 12/10/95

F.G. ZWIESLER

Remarks: Grids 97-107 will not be released because of contamination on and under grid #97. Grids 108 through 142 have been surveyed IAW BHI-00517 and are released

BHI-TM-R005 (6/95)

ERC Radiological Survey Record

Page 1 of 1

Survey & Counting Instruments			Survey Number:		Location:	(Check One)	RWP Number:
Model	Serial Number	Response ✓	PS-183H-0662		183H Solar Basins	☒ Release ☐ Routine ☐ Work Progress ☐ Shipment	PS 324 Rev 2
Ludlum 2224	119769	m	Date: 12-9-95	Time: 1500			
ESP-1	2414	m					
Gm 1P-11	1677/1800	m					
PAM	2881	m					

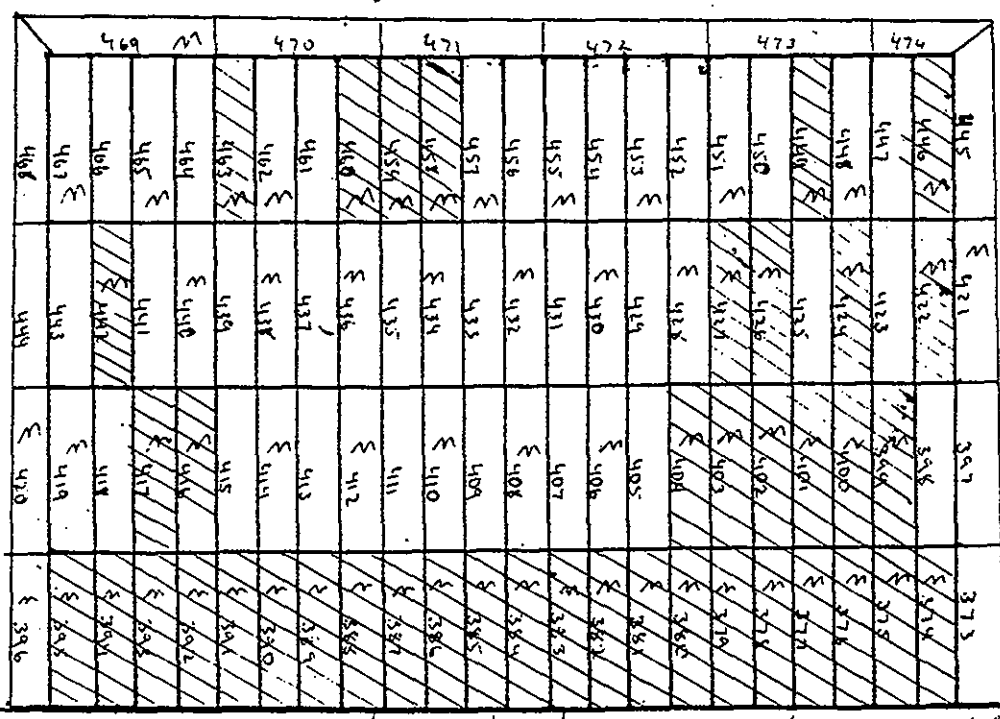
Contamination Survey Information

No.	Description of item or location surveyed	Removable Alpha	Removable Beta-Gamma	Direct Alpha	Direct Beta-Gamma	No.	Description of item or location surveyed	Removable Alpha	Removable Beta-Gamma	Direct Alpha	Direct Beta-Gamma
	N/A						N/A				

Circled values in removable B-G column denotes mrad/hr beta ▶ Unless noted, removable contamination is <1,000 dpm/100 cm² Beta-gamma. Direct readings are <1,000 dpm/probe Beta-gamma, Alpha is <20 dpm ◀ Readings taken at 3/4 max. dimension of object: CF (CP) = 3, CF (RO-2) = 4 Readings beyond that distance, CF = 1

○ = Removable | # = Direct | M = LAW | ____ = Gamma, mR/hr | □ = Beta, mrad/hr | △ = Micro-R/hr | + = Contact Rdg. | N = Neutrons, mrem/hr | [AS] = air sample

—C— Contaminated Area | —H— High Contamination Area | — Radiological Buffer Area | —RC— Radiologically Controlled Area | —RM— Radioactive Materials Storage Area | —R— Radiation Area | —HR— High Radiation Area



Basin #2 Flocculate

(Both Print & Sign)

RCT Signature/Date: J. Martin 12-13-95 / VB Abbott 12/18/95

RC Supervisor Signature/Date: 12/18/95

E G ZWIESLER

Remarks: /// indicates areas surveyed by direct scan @ 4" /sec using Ludlum 2224 or ESP-1 w/ 43-1-1 probe. Background ~ 250 cpm.

BHI-TM-R006 (6/95)

ERC Radiological Survey Record

Page 1 of 1

Survey & Counting Instruments			Survey Number:		Location:	(Check One)	RWP Number:
Model	Serial Number	Response✓	PS-183H-0672		183H Solar Ponds	☒ Release ☐ Routine ☐ Work Progress ☐ Shipment	PS 324 Rev. 0
Ludlum 2224	119779		Date:	Time:			
ESP-1	3404		12-15-95	1500			
C-M IP-11	1677/1804						
RAM	2651						

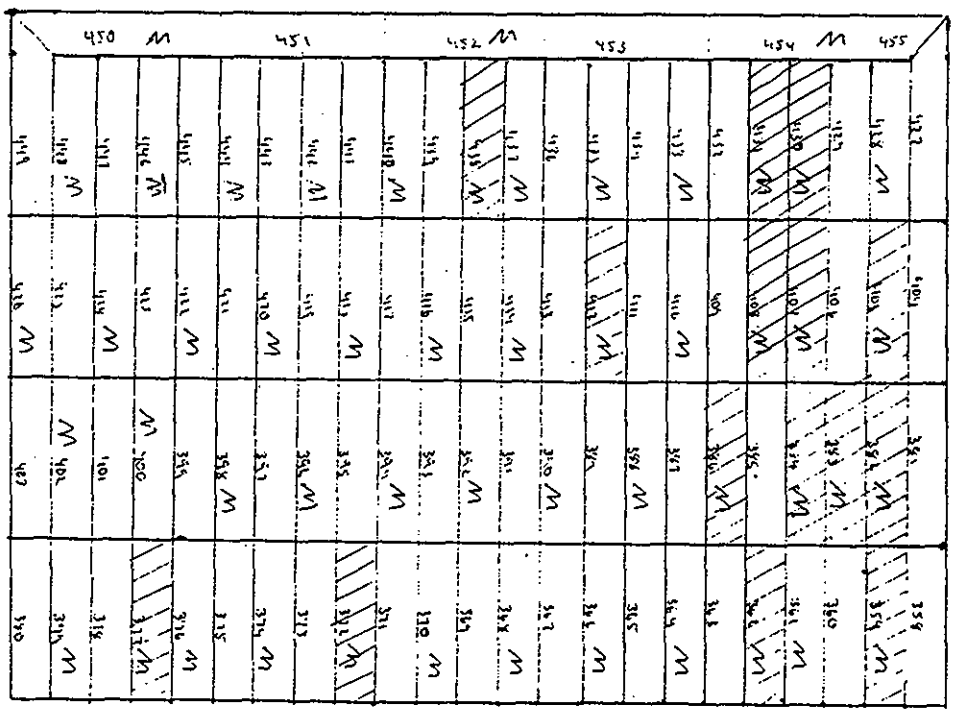
Contamination Survey Information

No.	Description of item or location surveyed	Removable Alpha	Removable Beta-Gamma	Direct Alpha	Direct Beta-Gamma	No.	Description of item or location surveyed	Removable Alpha	Removable Beta-Gamma	Direct Alpha	Direct Beta-Gamma
	N						N				
	A										

Circled values in removable B-G column denotes mrad/hr beta ▶ Unless noted, removable contamination is <1,000 dpm/100 cm² Beta-gamma. Direct readings are <1,000 dpm/probe Beta-gamma, Alpha is <20 dpm ◀ Readings taken at 3/4 max. dimension of object: CF (CP) = 3, CF (RO-2) = 4 Readings beyond that distance, CF = 1

○ = Removable | # = Direct | M = LAW | ____ = Gamma, mR/hr | ☐ = Beta, mrad/hr | △ = Micro-R/hr | ◆ = Contact Rdg. | N = Neutrons, mrem/hr | [AS] = air sample

—C— Contaminated Area | —H— High Contamination Area | — Radiological Buffer Area | —RC— Radiologically Controlled Area | —RM— Radioactive Materials Storage Area | —R— Radiation Area | —HR— High Radiation Area



(Both Print & Sign)

RCT Signature/Date: J. Martin / [illegible] 12/15/95

RC Supervisor Signature/Date: [illegible] 12/20/95 F.G. ZWIESLER

Remarks: /// indicates areas surveyed by direct scan using Ludlum 2224 and ESP-1 w/43-89 probe @ 6"/sec IAW BHI-00517 Rev 1. Background was < 1500 cpm. See also survey PS-183H-0671.

BHI-TM-R006a (8/95)

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