START 9713513.0883

LK02-LAS 2792

0046127

Lockheed Analytical Services

SEP 1994 RECEIVED SDLA

BECHTEL HANFORD, INC.

ANALYTICAL DATA REPORT

FOR

METALS AND NON-METALS FOR WATER
AND
METALS AND NON-METALS FOR FILTERED WATER

DEC 1996 RECEIVED EDMC

RECORD COPY

LOG-IN NUMBER:	L2491/L2528
QUOTATION NUMBER:	Q40000
SAF:	B94-004
DOCUMENT FILE NUMBER:	0728512/0803512
WHC DOCUMENT CONTROL NO.:	63/64

DEL 9-21-9

CASE NARRATIVE
INORGANIC METALS ANALYSES
WATER

The routine calibration and quality control analyses performed for this batch include as applicable: instrument tune (ICP/MS only), initial and continuing calibration verification, initial and continuing calibration blanks, method blank(s), laboratory control sample(s), ICP interference check samples (ICP only), serial dilutions, analytical (post-digestion) spike samples, matrix spike (predigestion) sample(s), duplicate sample(s).

Preparation and Analysis Requirements

- Two water samples were received in good condition on July 28, 1994 and logged in as projects L2491 and L2528. The cooler temperature upon receipt was at 2 °C.

- The samples were prepared as LAS Batch 728WHT and analyzed for selected analytes as requested on the chain of custody. Sample BOCJJ7 (L2491-1) was used for matrix spike and duplicate, post-digestion spike and serial dilution. All data flags due to the performance of the above-mentioned QC are associated with every sample digested with this batch.

  The samples were digested originally for mercury on August 26, 1994. Due to instruments problems, the analyses performed for mercury produced unusable data. A redigestion was performed on the samples but with reduced volume of samples for sample BOCJJ7, its duplicate and its matrix spike because of insufficient volume of samples available. The preparation was done using 15 mls of sample brought to a final volume of 50 mls. The reporting detection limit for this sample is then affected by the prep factor. It is raised to 0.67 μg/L from 0.2 μg/L.

Holding Time Requirements

- All samples were analyzed within the method-specific holding times with the exception of mercury analysis. Sample BOCJJ7 and BOCJJ9 were analyzed out of holding times. No mercury was found in any of the samples.

Method Blanks

- The level of analytes in the method blanks were less than the reporting detection

limits.

Internal Quality Control

All internal quality control were within acceptance limits with the following exceptions:

- The matrix spike recovered outside the control limits for arsenic. However, the acceptable recovery for the water LCS (prep blank spiked) for arsenic indicated that the analytical system was operating correctly and that the out-of-control recoveries may be attributed to matrix interferences.

Sample Results

- For mercury, sample BOCJJ7 (L2491-1) and its QC were reported at a higher detection limit because the digestion was performed on a reduced volume because of insufficient amount of samples.

Hongsheng Li — September 13, 1994

Prepared By — **Date**

Lockheed Analytical Services

Log-in No: L2491/L2528
Quotation No: Q40000
Document File No: 0728512/0803512
Page: 1

CASE NARRATIVE
INORGANIC METALS ANALYSES
WATER

The routine calibration and quality control analyses performed for this batch include as applicable: instrument tune (ICP/MS only), initial and continuing calibration verification, initial and continuing calibration blanks, method blank(s), laboratory control sample(s), ICP interference check samples (ICP only), serial dilutions, analytical (post-digestion) spike samples, matrix spike (predigestion) sample(s), duplicate sample(s).

Preparation and Analysis Requirements

- Two water samples were received in good condition on July 28, 1994 and logged in as projects L2491 and L2528. The cooler temperature upon receipt was at 2°C.

- The samples were prepared as LAS Batch 728WHD and analyzed for selected analytes as requested on the chain of custody. Sample BOCJJ8 (L2491-2) was used for matrix spike and duplicate, post-digestion spike and serial dilution. All data flags due to the performance of the above-mentioned QC are associated with every sample digested with this batch.

Holding Time Requirements

- All samples were analyzed within the method-specific holding times with the exception of mercury. Sample BOCJJ8 was analyzed about 8 days after the holding time has expired and BOCJKO 2 days out of holding time. No mercury was found in the samples.

Method Blanks

- The level of analytes in the method blanks were less than the reporting detection limits.

Internal Quality Control

All internal quality control were within acceptance limits.

Hongsheng Li — September 13, 1994

Prepared By — **Date**

[tet_w.nar]

CASE NARRATIVE
INORGANIC NON-METALS ANALYSES
WATER

The routine calibration and quality control analyses performed for this batch include as applicable: initial and continuing calibration verification, initial and continuing calibration blanks, method blank(s), laboratory control sample(s), matrix spike sample(s), and duplicate sample(s).

Preparation and Analysis Requirements

- Two water samples were received for SAF: B94-004. One water sample was logged in as L2491 and prepared and analyzed as batch 728WH and one water sample was logged in as L2528 and prepared as batch 803WH and analyzed for selected analytes as requested on the chain of custody.

BATCH 728WH:

Client ID	LAL #		Method
BOCJJ7	L2491-3	DUP, MS	300.0 Chloride, Nitrate, Nitrite, Sulfate
	L2491-3	DUP, MS	365.2 Ortho Phosphate
	L2491-4	DUP, MS	353.2 Nitrate
	L2491-5	DUP, MS	9030 Sulfide
	L2491-6	DUP, MS	350.1 Ammonia

BATCH 803WH:

Client ID	LAL #		Method
BOCJJ9	L2528-2	DUP, MS	300.0 Chloride, Nitrate, Nitrite, Sulfate
	L2528-3	DUP, MS	353.2 Nitrate
	L2528-4	DUP, MS	9030 Sulfide
	L2528-5	DUP, MS	350.1 Ammonia

Holding Time Requirements

- All samples were analyzed within the method-specific holding times with the exception of Method 365.2 Ortho-Phosphate and Method 300.0 Nitrate and Nitrite which were received from the client out of holding time in Batches 728WH and 803WH. Analyses proceeded at the direction of the client and the applicable samples are flagged with an "H".

Method Blanks

- The concentration levels of all the requested analytes in the method blank were below the reporting detection limits.

Internal Quality Control

- All Internal Quality Control were within acceptance limits with the following exceptions:

Batch 728WH:

Method 9030 Sulfide had a CCV recovery of 127%. However, the sample was nondetect. The matrix spike recovered outside the control limits for Sulfide (74.2%). However, the associated LCS recovery (97.9%) was within criteria, indicating matrix interference was present during the sample analysis. The applicable sample is flagged with an "N".

Batch 803WH:

Method 9030 Sulfide. The matrix spike recovered outside the control limits for Sulfide (168.0%). However, the associated LCS recovery (88.6) was within criteria, indicating a matrix interference was present during the sample analysis. The applicable sample is flagged with an "N".

Kay McCann — September 13, 1994

Prepared By — **Date**

LKOa

OFFICE OF SAMPLE MANAGEMENT

RECORD OF DISPOSITION

ROD-B94-007
Record of Disposition No.

DATE: 08/03/94	LABORATORY: Lockheed
PROJECT TITLE/NO.: 100-HR-3 Groundwater Sampling--Round 7 SAF# B94-004	NCR NO.: N/A

SAMPLE IDENTIFICATION NUMBERS: BOCJJ7, BOCJJ8

DESCRIPTION OF EVENT:

1) The Chain-of-Custody for the sample numbers listed above was not signed upon receipt at the Lockheed laboratory.

2) The COC documents that two bottles for Sr-90 analysis were to be received by the laboratory for sample number BOCJJ7. Lockheed received one bottle for Sr-90 analysis under sample number BOCJJ7, and another bottle for Sr-90 analysis for sample number BOCJJ8.

Cancelled per ROD-B94-0009 DSA 10/20/94

DISPOSITION OF SAMPLES:

1) The two Sr-90 bottles are to be combined and analyzed under one sample number. The results will be reported under sample number BOCJJ7.

2) The remaining analyses for sample numbers BOCJJ7 and BOCJJ8 are to be performed. The results of these analyses will be used for information purposes only due to the Chain-of-Custody being broken.

APPROVAL SIGNATURES:

R.C. Smith [signature] for RCS — 8/3/94
OSM Project Coordinator (Print/Sign Name) — Date

R.L. Biggerstaff
Technical Representative (Print/Sign Name) — Date

N/A
Quality Assurance (Print/Sign Name) — Date

9713513.0890

LK02

OFFICE OF SAMPLE MANAGEMENT

RECORD OF DISPOSITION

ROD-B94-008
Record of Disposition No.

DATE: 08/03/94

LABORATORY: Lockheed

PROJECT TITLE/NO.: 100-HR-3 Groundwater Sampling--Round 7
SAF# B94-004

NCR NO.: N/A

SAMPLE IDENTIFICATION NUMBERS: BOCJJ7, BOCJJ8

DESCRIPTION OF EVENT:

NOTE: THIS RECORD OF DISPOSITION REPLACES ROD-B94-007. ROD-B94-007 HAS BEEN CANCELED.

The COC documents that two bottles for Sr-90 analysis were to be received by the laboratory for sample number BOCJJ7. Lockheed received one bottle for Sr-90 analysis under sample number BOCJJ7, and another bottle for Sr-90 analysis for sample number BOCJJ8.

DISPOSITION OF SAMPLES:

The two Sr-90 Bottles are to be combined and analyzed under one sample number. The results of the Sr-90 analysis will be reported under sample number BOCJJ7.

Cancelled per ROD-B94-0009 DEA 10-20-94

APPROVAL SIGNATURES:

R.C. Smith Michael Dial for RCS 8/3/94
OSM Project Coordinator (Print/Sign Name) Date

R.L. Biggerstaff
Technical Representative (Print/Sign Name) Date

N/A
Quality Assurance (Print/Sign Name) Date

9713513.0891

OFFICE OF SAMPLE MANAGEMENT

RECORD OF DISPOSITION

ROD-B94-009
Record of Disposition No.

DATE: 08/04/94	LABORATORY: Lockheed
PROJECT TITLE/NO.: 100-HR-3 Groundwater Sampling—Round 7 SAF# B94-004	NCR NO.: N/A

SAMPLE IDENTIFICATION NUMBERS: BOCJJ7, BOCJJ8

DESCRIPTION OF EVENT:

NOTE: THIS RECORD OF DISPOSITION REPLACES ROD-B94-008. ROD-B94-008 HAS BEEN CANCELED.

The COC documents that two bottles for gross alpha, gross beta, and Sr-90 analyses were for sample number BOCJJ7. Lockheed received one bottle for gross alpha, gross beta, and Sr-90 analysis under sample number BOCJJ7, and another bottle for gross alpha, gross beta, and Sr-90 analysis for sample number BOCJJ8.

DISPOSITION OF SAMPLES:

With the concurrence of R.L. Biggerstaff, project engineer, the gross alpha, gross beta, and Sr-90 analyses are to be canceled for sample numbers BOCJJ7 and BOCJJ8.

APPROVAL SIGNATURES:

R.C. Smith
OSM Project Coordinator (Print/Sign Name) — 8/4/94 Date

R.L. Biggerstaff
Technical Representative (Print/Sign Name) — 8/8/94 Date

N/A
Quality Assurance (Print/Sign Name) — Date

OFFICE OF SAMPLE MANAGEMENT

RECORD OF DISPOSITION

ROD-B94-010
Record of Disposition No.

DATE: 08/04/94	LABORATORY: ~~Quanterra~~ Lockheed
PROJECT TITLE/NO.: 100-HR-3/B94-004	NCR NO.: N/A

SAMPLE IDENTIFICATION NUMBERS:

All

DESCRIPTION OF EVENT:

1) No metals target analyte list specified.

2) Metals sample volume insufficient to perform QC at regular volumes. 400 ml received; 1000 ml required.

3) Sulfide sample volume insufficient for matrix QC. Separate bottles for each analysis are required.

DISPOSITION OF SAMPLES:

1) Report TAL with As, Pb, Se, Tl by GFAA and Hg by 7470.

2) Use 50 ml for all metals (ICP, GFAA) digestions and 100 ml for the Hg analysis on one sample. Perform Hg QC on separate sample at 100 ml for each aliquot. (See IT/WHC Issue Resolution Form)

3) Report LCS for QC.

APPROVAL SIGNATURES:

R. C. Smith/ R Clayton Smith — 8/4/94
OSM Project Coordinator (Print/Sign Name) — Date

R. L. Biggerstaff/ R L Biggerstaff — 8/8/94
Technical Representative (Print/Sign Name) — Date

N/A
Quality Assurance (Print/Sign Name) — Date

OFFICE OF SAMPLE MANAGEMENT

RECORD OF DISPOSITION

ROD-B94-011
Record of Disposition No.

DATE: 08/05/94	LABORATORY: ~~Quanterra~~ Lockheed
PROJECT TITLE/NO.: 100-HR-3 Groundwater, Round 7/ B94-004	NCR NO.: N/A

SAMPLE IDENTIFICATION NUMBERS:

All

DESCRIPTION OF EVENT:

Preparation methods differ for non-filtered and filtered metals analyses by CLP90 protocol.

DISPOSITION OF SAMPLES:

Analyze MS and duplicate for both types of metals analyses.

APPROVAL SIGNATURES:

R. C. Smith/ R C Smith — 8/5/94
OSM Project Coordinator (Print/Sign Name) — Date

R. L. Biggerstaff/ R L Biggerstaff — 8/8/94
Technical Representative (Print/Sign Name) — Date

N/A
Quality Assurance (Print/Sign Name) — Date

OFFICE OF SAMPLE MANAGEMENT

RECORD OF DISPOSITION

ROD-B94-015
Record of Disposition No.

DATE: 08/11/94	LABORATORY: Lockheed
PROJECT TITLE/NO.: 100-HR-3 Groundwater - Round 7/894-004	NCR NO.: N/A

SAMPLE IDENTIFICATION NUMBERS:

All

DESCRIPTION OF EVENT:

The SAF/FSR requested that samples be analyzed for phosphate by method 300.0. The lab is not prepared to analyze for phosphate by method 300.0.

DISPOSITION OF SAMPLES:

Perform phosphate analysis by method 365.2

APPROVAL SIGNATURES:

R. C. Smith/ R Clayton Smith — 8/11/94
OSM Project Coordinator (Print/Sign Name) — Date

R. L. Biggerstaff/ R L Biggerstaff — 8/12/94
Technical Representative (Print/Sign Name) — Date

N/A
Quality Assurance (Print/Sign Name) — Date

LK02

9413513.0895

OFFICE OF SAMPLE MANAGEMENT

RECORD OF DISPOSITION

ROD-B94-046
Record of Disposition No.

DATE: 10/4/94	LABORATORY: Lockheed
PROJECT TITLE/NO.: 100-HR-3 Groundwater/B94-004	NCR NO.: n/A

SAMPLE IDENTIFICATION NUMBERS:

B0CJJ7, B0CJJ8, B0CJJ9, B0CJK0

DESCRIPTION OF EVENT:

Holding times for mercury analysis were missed by 6 days. Laboratory error.

DISPOSITION OF SAMPLES:

Samples were analyzed for mercury anyway without customer concurrence.

APPROVAL SIGNATURES:

R. C. Smith/ R Clayton Smith — 10/4/94
OSM Project Coordinator (Print/Sign Name) — Date

R. L. Biggerstaff/ R L Biggerstaff — 10/11/94
Technical Representative (Print/Sign Name) — Date

N/A
Quality Assurance (Print/Sign Name) — Date

9715515.0896

LOGIN CHAIN OF CUSTODY REPORT (ln01)
Aug 09 1994, 03:45 pm

Login Number: L2491
Account: 512 Westinghouse Hanford Co. * Richland, WA
Project: WESTINGHOUSE-HANFORD Westinghouse Hanford Project (Richland,WA)

Laboratory Sample Number	Client Sample Number	Collect Date	Receive Date	PR	Due Date
L2491-1	B0CJJ7	25-JUL-94	28-JUL-94		06-SEP-94
temp 2 "SAS # - B94-004"					
Location: RFG19-94B					
Water 1 S CLP CYANIDE		Hold:08-AUG-94			
Water 1 S CLP FURNACE		Hold:21-JAN-95			
Water 1 S CLP ICP		Hold:21-JAN-95			
Water 1 S CLP MERCURY		Hold:22-AUG-94			
L2491-2	B0CJJ8	25-JUL-94	28-JUL-94		06-SEP-94
temp 2 "SAS # - B94-004"					
Location: RFG19-94B					
Filt H20 15 S CLP CYANIDE		Hold:08-AUG-94			
Filt H20 15 S CLP FURNACE		Hold:21-JAN-95			
Filt H20 15 S CLP ICP		Hold:21-JAN-95			
Filt H20 15 S CLP MERCURY		Hold:22-AUG-94			
L2491-3	B0CJJ7	25-JUL-94	28-JUL-94		06-SEP-94
temp 2 "SAS # - B94-004" "Cl,So4,No2,No3,Po4"					
Location: 121					
Water 1 S 300.0 CHLORIDE		Hold:22-AUG-94			
Water 1 S 300.0 NITRATE		Hold:27-JUL-94			
Water 1 S 300.0 NITRITE		Hold:27-JUL-94			
Water 1 S 300.0 SULFATE		Hold:22-AUG-94			
* Water 1 S 365.2 ORTHO		Hold:27-JUL-94			
L2491-4	B0CJJ7	25-JUL-94	28-JUL-94		06-SEP-94
temp 2 "SAS # - B94-004"					
Location: 121					
Water 1 S 353.2 NITRATE		Hold:22-AUG-94			
L2491-5	B0CJJ7	25-JUL-94	28-JUL-94		06-SEP-94
temp 2 "SAS # - B94-004"					
Location: 133					
Water 1 S 9030 SULFIDE		Hold:15-AUG-94			
L2491-6	B0CJJ7	25-JUL-94	28-JUL-94		06-SEP-94
temp 2 "SAS # - B94-004"					
Location: 121					
Water 1 S 350.1 NH3/N		Hold:22-AUG-94			
L2491-7	B0CJJ7	25-JUL-94	28-JUL-94		06-SEP-94
temp 2 "SAS # - B94-004"					
Location: 156CART-4					
Water 1 S NONE		Hold:04-AUG-94			

*- analysis changed per Client JLS 8-9-94

008

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9413515.0897

LOGIN CHAIN OF CUSTODY REPORT (ln01)
Aug 09 1994, 03:45 pm

Login Number: L2491
Account: 512 Westinghouse Hanford Co. * Richland, WA
Project: WESTINGHOUSE-HANFORD Westinghouse Hanford Project (Richland,WA

Laboratory Sample Number	Client Sample Number	Collect Date	Receive Date	PR	Due Date
L2491-8	B0CJJ7	25-JUL-94	28-JUL-94		06-SEP-9
temp 2 "SAS # - B94-004"					
Location: 156-058D					
Water 1 S NONE		Hold:04-AUG-94			
L2491-9	B0CJJ7	25-JUL-94	28-JUL-94		06-SEP-9
temp 2 "SAS # - B94-004"					
Location: 155					
Water 1 S TRITIUM(H3) LAL-0066		Hold:21-JAN-95			
L2491-10	B0CJJ7	25-JUL-94	28-JUL-94		06-SEP-9
temp 2 "SAS # - B94-004"					
Location: 156-087					
L2491-11	B0CJJ7	25-JUL-94	28-JUL-94		06-SEP-9
temp 2 "SAS # - B94-004" ACTIVITY SCAN					
Location: EXPENDED					
Water 1 S SCREENING		Hold:21-JAN-95			
L2491-12	REPORT TYPE	28-JUL-94	28-JUL-94		06-SEP-9
Location:					
Water 1 S EDD - DISK DEL.					
Water 1 S INORG TYPE 4A RPT					

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Signature: James Jones

Date: 8-9-94

07295

9215913.0898

LOGIN CHAIN OF CUSTODY REPORT (ln01)
Jul 28 1994, 06:15 pm

Login Number: L2491
Account: 512 Westinghouse Hanford Co. * Richland, WA
Project: WESTINGHOUSE-HANFORD Westinghouse Hanford Project (Richland,WA

Laboratory Sample Number	Client Sample Number	Collect Date	Receive Date	PR	Due Date
L2491-1	B0CJJ7	25-JUL-94	28-JUL-94		06-SEP-9
temp 2 "SAS # - B94-004"					
Location: 156RAD1-04					
Water 1 S CLP CYANIDE		Hold:08-AUG-94			
Water 1 S CLP FURNACE		Hold:21-JAN-95			
Water 1 S CLP ICP		Hold:21-JAN-95			
Water 1 S CLP MERCURY		Hold:22-AUG-94			
L2491-2	B0CJJ8	25-JUL-94	28-JUL-94		06-SEP-9
temp 2 "SAS # - B94-004"					
Location: 156RAD1-04					
Filt H20 15 S CLP CYANIDE		Hold:08-AUG-94			
Filt H20 15 S CLP FURNACE		Hold:21-JAN-95			
Filt H20 15 S CLP ICP		Hold:21-JAN-95			
Filt H20 15 S CLP MERCURY		Hold:22-AUG-94			
L2491-3	B0CJJ7	25-JUL-94	28-JUL-94		06-SEP-9
temp 2 "SAS # - B94-004" "Cl,So4,No2,No3,Po4"					
Location: 156RAD1-04					
Water 1 S 300.0 CHLORIDE		Hold:22-AUG-94			
Water 1 S 300.0 NITRATE		Hold:27-JUL-94			
Water 1 S 300.0 NITRITE		Hold:27-JUL-94			
Water 1 S 300.0 PHOSPHATE					
Water 1 S 300.0 SULFATE		Hold:22-AUG-94			
L2491-4	B0CJJ7	25-JUL-94	28-JUL-94		06-SEP-9
temp 2 "SAS # - B94-004"					
Location: 156RAD1-04					
Water 1 S 353.2 NITRATE		Hold:22-AUG-94			
L2491-5	B0CJJ7	25-JUL-94	28-JUL-94		06-SEP-9
temp 2 "SAS # - B94-004"					
Location: 156RAD1-04					
Water 1 S 9030 SULFIDE		Hold:15-AUG-94			
L2491-6	B0CJJ7	25-JUL-94	28-JUL-94		06-SEP-9
temp 2 "SAS # - B94-004"					
Location: 156RAD1-04					
Water 1 S 350.1 NH3/N		Hold:22-AUG-94			
L2491-7	B0CJJ7	25-JUL-94	28-JUL-94		06-SEP-9
temp 2 "SAS # - B94-004"					
Location: 156RAD1-04					
Water 1 S GR ALP/BETA LAL-0060		Hold:21-JAN-95			

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0728572

9413116.0899

LOGIN CHAIN OF CUSTODY REPORT (ln01)
Jul 28 1994, 06:15 pm

Login Number: L2491
Account: 512 Westinghouse Hanford Co. * Richland, WA
Project: WESTINGHOUSE-HANFORD Westinghouse Hanford Project (Richland,WA)

Laboratory Sample Number	Client Sample Number	Collect Date	Receive Date	PR	Due Date
Water 1 S SR-90 LAL-0196	Hold:21-JAN-95				
L2491-8	B0CJJ8	25-JUL-94	28-JUL-94		06-SEP-94
temp 2 "SAS # - B94-004"					
Location: 156RAD1-04					
Water 1 S GR ALP/BETA LAL-0060	Hold:21-JAN-95				
Water 1 S SR-90 LAL-0196	Hold:21-JAN-95				
L2491-9	B0CJJ7	25-JUL-94	28-JUL-94		06-SEP-94
temp 2 "SAS # - B94-004"					
Location: 156RAD1-04					
Water 1 S TRITIUM(H3) LAL-0066	Hold:21-JAN-95				
L2491-10	B0CJJ7	25-JUL-94	28-JUL-94		06-SEP-94
temp 2 "SAS # - B94-004"					
Location: 156RAD1-04					
L2491-11	B0CJJ7	25-JUL-94	28-JUL-94		06-SEP-94
temp 2 "SAS # - B94-004" ACTIVITY SCAN					
Location: 156RAD1-04					
Water 1 S SCREENING	Hold:21-JAN-95				
L2491-12	REPORT TYPE	28-JUL-94	28-JUL-94		06-SEP-94
Location:					
Water 1 S EDD - DISK DEL.					
Water 1 S INORG TYPE 4A RPT					

Signature: [illegible]

Date: 7-29-94

011

0728512

Level 4A SAF # B94-004

EDD

Westinghouse Hanford Company

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST L2491

Page 1 of 1

Data Turnaround: [ ] Priorty [X] Normal

Collector: BIT WHITTEN	Company Contact: PH BUTCHER	Telephone No.: (509)3764388
Project Designation: 100-HR-3	Sampling Location: 100H & 100D	SAF No.: B94-004
Ice Chest No.: Beta 4	Field Logbook No.: EFL-1018	Method of Shipment: EMERY
Shipped To: LOCKHEED	Offsite Property No.: W94-0-0746-34	Bill of Lading/Air Bill No.: 1402136714
Possible Sample Hazards/Remarks		
Special Handling and/or Storage: COOL TO 4 DEGREES CENTIGRADE		

SAMPLE ANALYSIS	CLP-METALS (UNFILTERED)	ANIONS: Cl, SO4, NO2, NO3 PO4	NO2/NO3	SULFIDE	AMMONIA	GROSS ALPHA/BETA, Sr-90	TRITIUM	ACTIVITY SCAN								
Preservative	HNO3<2	COOL 4	H2SO4<2	SEE"SI"	H2SO4<2	HNO3<2	COOL 4		HNO3 pH<2							
Type of Container	G	G	P	P	P/G	G	Gs	G/P	G							
No. of Container(s)	1	1	1	1	1	2	2	1	1							
Volume	500ml	500ml	500ml	500ml	500ml	2.5L	1L	40ml	500ml							

Sample No.	Matrix*	Date Sampled	Time Sampled	CLP-METALS (UNFILTERED)	ANIONS	NO2/NO3	SULFIDE	AMMONIA	GROSS ALPHA/BETA, Sr-90	TRITIUM	ACTIVITY SCAN	CLP METALS FILTERED						
B0CJJ7	W	07/25/94	0920	X	X	X	X	X	X	X	X							
B0CJJ8	W	07/25/94	0920									X						

CHAIN OF POSSESSION — Sign/Print Names

Relinquished By	Date/Time	Received By	Date/Time
Kelly O Lee	7/25/94 1234	David St. John WHC	7/25/94 1234
David St. John WHC	07/27/94 0914	CH2M HILL A Simpson	7/27/94 0914
CH2M HILL A Simpson	7/27/94 0950		

SPECIAL INSTRUCTIONS

NOTE: PRESERVATIVE FORSULFIDE=ZnAc+NaOH pH<2 NOTE: DATA DELIVERABLE-STANDALONE

total activity delayed 222-S lab equipment problems
A J SIMPSON

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: [signature] Title: Sample Custodian Date/Time: 7-28-94/1350

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

DISTRIBUTION: Original- Sample Yellow - Sampler

BC-6000-828 (12/92)

9713515.0901

SAMPLE STATUS REPORT FOR N 1254. RAD SCREEN D5-14 TIME: 7/26/94 13:30
DISPATCHED: 7/20/94 14: 8 SAMPLE HAS NOT BEEN SLURPED
RECEIVED: 7/25/94 12:57

EXT.	DETER.	RESULTS OR STATUS	OUT OF RANGE?	GOOD ANS?	CHARGE CODE
****	********	**********	***	***	******
4271	TOT-ACT	< 5.00000E 01 pCi/G	N	Y	J12UP

END OF REPORT

BO CJJ3
BO CJJ4
BO CJJ 7
BO CJJ 8
BO CJ90
BO CJ91

Figure 1

SAMPLE CHECK-IN LIST

(1 Per Shipping Container)

Date/Time Received 2-28-94 4:00pm Client Name Westinghouse Hanford

Project/Client # L2491 Batch or Case # N/A

Cooler ID (if noted on outside of cooler) N/A

1. Condition of shipping container? Good
2. Custody Seals on cooler intact? Yes [x] No [ ]
3. Custody Seals dated and signed? Yes [x] No [ ]
4. Chain of Custody record is taped on inside of cooler lid? Yes [X] No [ ]
5. Vermiculite/packing material is: Wet [ ] Dry [X]
6. Each sample is in a plastic bag? Yes [X] No [ ]
7. Number of sample containers in cooler: 11
8. Samples have: X tape ___ hazard labels ___ custody seals ___ appropriate sample labels
9. Samples are: X in good condition ___ leaking ___ broken ___ have air bubbles ___ other
10. Coolant Present? Yes [X] No [ ] ~~Sample~~ Cooler Temperature 2°C
11. The following paperwork should be accounted for (N/A if not applicable):

    Chain of Custody #(s) N/A

    Request for Analysis #(s) B94-004

    Airbill # 1402136714 Carrier Emery

12. Have any anomalies been identified above? Yes [ ] No [X]
13. Memos have been initiated for all anomalies identified above? Yes [ ] N/A

Printed Name/Signature PAUL OFRIS Paul Davis Date/Time 2-28-94

014

07285

Lockheed Analytical Services
Sample Receiving Checklist

Client Name: WESTINGHOUSE HANFORD Job No. L2491 Cooler ID: N/A

COOLER CONDITION UPON RECEIPT

Temperature of cooler upon receipt: 2°C

temperature of temp. blank upon receipt:

	Yes	No	* Comments/Discrepancies
custody seals intact	X		
chain of custody present	X		
blue ice (or equiv.) present/frozen	X		
rad survey completed	X		

SAMPLE CONDITION UPON RECEIPT

	Yes	No	* Comments/Discrepancies
all bottles labeled	X		
samples intact	X		
proper container used for sample type	X		
sample volume sufficient for analysis	X		
proper pres. indicated on the COC	X		
VOA's contain headspace		N/A	

MISCELLANEOUS ITEMS

	Yes	No	* Comments/Discrepancies
samples with short holding times	X	X	Nitrate, Nitrite
samples to subcontract		X	

ADDITIONAL COMMENTS/DISCREPANCIES Nitrate/Nitrite Sample was Sampled on the 25 of July. The Holding time was up on the 28 of July. I.D.# BOCJJ8 for RAD Analysis was not marked on Chain-of-Custody. Logged-in per container Information.

Completed by / date: Paul C Davis 7-28-94

Sent to the client (date/initials): ** Client's signature upon receipt:

*Notes: * = contact the appropriate CSR of any discrepancies immediately upon receipt*

*** = please review this information and return via facsimile to the appropriate CSR (702) 361-8146*

07285

Sample Login

Login Review Checklist

Lot Number L2491

The login review should be conducted by that person logging in the samples as well as a peer. Please use this checklist to ensure that such reviews occur in a uniform basis. Please sign and date below to verify that a login review has occurred. This checklist should be affixed to each login package prior to distribution.

For an effective login review, at a minimum, five reports from the login process are required. These are the chain of custody (or equivalent), the login chain of custody report, the sample summary report, the sample receiving checklist, and the login quotation. Before beginning a review, ensure that these five components are available. For jobs with single component samples, the sample summary report may be ommited.

Sample Summary Report N/A	Yes	No
1. Are all sample IDs correct?	X	—
2. Are all samples present?	X	—
3. Are all matrices correct? (e.g., TCLP analyses should be on a TCLP leachate, field blanks should be water)	X	—
4. Are all analyses on the chain of custody/login quotation included?	X	—
5. Are analyses logged in for the correct container? (e.g., analyses requiring preservation logged in for a preserved container and vice versa)	X	—
6. Are samples logged in according to laboratory batching procedures? (e.g., TCLP regular leaching and associated metals/semivolatile organics should be logged in on the same bottle)	X	—

Login Chain of Custody Report		
1. Are the Collect, Receive , and Due dates correct for every sample?	X	—
2. Have appropriate sample comments been included? (e.g., MS/MSD designation, comments from the client concerning method modifications)	X	—

Sample Receiving Checklist		
1. Are any discrepancies between the chain of custody and the login noted? (e.g., client IDs different on chains of custody and bottle labels, samples not sent, samples lost from breakage)	X	— PCD

Paul C Davis 7-28-94 [illegible] 7-29-94

Primary review signature Date Secondary review signature Date

9213515.0905

Lockheed Analytical Laboratory
SAMPLE SUMMARY REPORT (su02)
Westinghouse Hanford Co. * Richland, WA

Client Sample Number	LAL Sample Number	SDG Number	Matrix	Method
BOCJJ7	L2491-1		Water	CLP CYANIDE
	L2491-1		Water	CLP FURNACE
	L2491-1		Water	CLP ICP
	L2491-1		Water	CLP MERCURY
	L2491-3		Water	300.0 CHLORIDE
	L2491-3		Water	300.0 NITRATE
	L2491-3		Water	300.0 NITRITE
	L2491-3		Water	300.0 PHOSPHATE
	L2491-3		Water	300.0 SULFATE
	L2491-4		Water	353.2 NITRATE
	L2491-5		Water	9030 SULFIDE
	L2491-6		Water	350.1 NH3/N
	L2491-7		Water	GR ALP/BETA LAL-0060
	L2491-7		Water	SR-90 LAL-0196
	L2491-9		Water	TRITIUM(H3) LAL-0066
	L2491-11		Water	SCREENING
BOCJJ8	L2491-2		Filt H20	CLP CYANIDE
	L2491-2		Filt H20	CLP FURNACE
	L2491-2		Filt H20	CLP ICP
	L2491-2		Filt H20	CLP MERCURY
	L2491-8		Water	GR ALP/BETA LAL-0060
	L2491-8		Water	SR-90 LAL-0196
REPORT TYPE	L2491-12		Water	EDD - DISK DEL.
	L2491-12		Water	INORG TYPE 4A RPT

LOGIN CHAIN OF CUSTODY REPORT (ln01)
Aug 09 1994, 03:45 pm

Login Number: L2528
Account: 512 Westinghouse Hanford Co. * Richland, WA
Project: WESTINGHOUSE-HANFORD Westinghouse Hanford Project (Richland,WA)

Laboratory Sample Number	Client Sample Number	Collect Date	Receive Date	PR	Due Date
L2528-1	B0CJJ9	01-AUG-94	03-AUG-94		17-SEP-9
temp 2 B94-004					
Location: RFG02-22A					
Water 1 S CLP FURNACE		Hold:28-JAN-95			
Water 1 S CLP ICP		Hold:28-JAN-95			
Water 1 S CLP MERCURY		Hold:29-AUG-94			
L2528-2	B0CJJ9	01-AUG-94	03-AUG-94		17-SEP-9
temp 2 B94-004					
Location: RFG19-54C					
Water 1 S 300.0 CHLORIDE		Hold:29-AUG-94			
Water 1 S 300.0 NITRATE		Hold:03-AUG-94			
Water 1 S 300.0 NITRITE		Hold:03-AUG-94			
Water 1 S 300.0 SULFATE		Hold:29-AUG-94			
* Water 1 S 365.2 ORTHO					
L2528-3	B0CJJ9	01-AUG-94	03-AUG-94		17-SEP-9
temp 2 B94-004					
Location: 121					
Water 1 S 353.2 NITRATE		Hold:29-AUG-94			
L2528-4	B0CJJ9	01-AUG-94	03-AUG-94		17-SEP-9
temp 2 B94-004					
Location: 133					
Water 1 S 9030 SULFIDE		Hold:22-AUG-94			
L2528-5	B0CJJ9	01-AUG-94	03-AUG-94		17-SEP-9
temp 2 B94-004					
Location: 121					
Water 1 S 350.1 NH3/N		Hold:29-AUG-94			
L2528-6	B0CJJ9	01-AUG-94	03-AUG-94		17-SEP-9
temp 2 B94-004					
Location: 156-058D					
Water 1 S GROSS ALPHA LAL-0060		Hold:28-JAN-95			
Water 1 S GROSS BETA LAL-0060		Hold:28-JAN-95			
Water 1 S SR-90 LAL-0196		Hold:28-JAN-95			
L2528-7	B0CJJ9	01-AUG-94	03-AUG-94		17-SEP-9
temp 2 B94-004					
Location: 156-058D					

*- Analysis changed per client. JLJ 8-9-94

018

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LOGIN CHAIN OF CUSTODY REPORT (ln01)
Aug 09 1994, 03:45 pm

Login Number: L2528
Account: 512 Westinghouse Hanford Co. * Richland, WA
Project: WESTINGHOUSE-HANFORD Westinghouse Hanford Project (Richland,WA

Laboratory Sample Number	Client Sample Number	Collect Date	Receive Date	Due PR Date
L2528-8	B0CJJ9	01-AUG-94	03-AUG-94	17-SEP-9
temp 2 B94-004				
Location: 156-087				
Water 1 S TRITIUM(H3) LAL-0066 Hold:28-JAN-95				
L2528-9	B0CJJ9	01-AUG-94	03-AUG-94	17-SEP-9
temp 2 B94-004				
Location: 156-087				
L2528-10	B0CJJ9	01-AUG-94	03-AUG-94	17-SEP-9
temp 2 B94-004 ACTIVITY SCAN				
Location: 156RAD1-01				
Water 1 S SCREENING Hold:28-JAN-95				
L2528-11	B0CJK0	01-AUG-94	03-AUG-94	17-SEP-9
temp 2 B94-004				
Location: RFG02-22A				
Filt H20 15 S CLP FURNACE Hold:28-JAN-95				
Filt H20 15 S CLP ICP Hold:28-JAN-95				
Filt H20 15 S CLP MERCURY Hold:29-AUG-94				
L2528-12	REPORT TYPE	03-AUG-94	03-AUG-94	17-SEP-9
Location:				
Water 1 S EDD - DISK DEL.				
Water 1 S INORG TYPE 4A RPT				

Signature: [signature]

Date: 8-9-94

019

080351.

LOGIN CHAIN OF CUSTODY REPORT (ln01)
Aug 03 1994, 06:20 pm

Login Number: L2528
Account: 512 Westinghouse Hanford Co. * Richland, WA
Project: WESTINGHOUSE-HANFORD Westinghouse Hanford Project (Richland,WA)

Laboratory Sample Number	Client Sample Number	Collect Date	Receive Date	PR	Due Date
L2528-1	B0CJJ9	01-AUG-94	03-AUG-94		17-SEP-94
temp 2 B94-004					
Location: 156RAD1-04					
Water 1 S CLP FURNACE		Hold:28-JAN-95			
Water 1 S CLP ICP		Hold:28-JAN-95			
Water 1 S CLP MERCURY		Hold:29-AUG-94			
L2528-2	B0CJJ9	01-AUG-94	03-AUG-94		17-SEP-94
temp 2 B94-004					
Location: 156RAD1-04					
Water 1 S 300.0 CHLORIDE		Hold:29-AUG-94			
Water 1 S 300.0 NITRATE		Hold:03-AUG-94			
Water 1 S 300.0 NITRITE		Hold:03-AUG-94			
Water 1 S 300.0 PHOSPHATE					
Water 1 S 300.0 SULFATE		Hold:29-AUG-94			
L2528-3	B0CJJ9	01-AUG-94	03-AUG-94		17-SEP-94
temp 2 B94-004					
Location: 156RAD1-04					
Water 1 S 353.2 NITRATE		Hold:29-AUG-94			
L2528-4	B0CJJ9	01-AUG-94	03-AUG-94		17-SEP-94
temp 2 B94-004					
Location: 156RAD1-04					
Water 1 S 9030 SULFIDE		Hold:22-AUG-94			
L2528-5	B0CJJ9	01-AUG-94	03-AUG-94		17-SEP-94
temp 2 B94-004					
Location: 156RAD1-04					
Water 1 S 350.1 NH3/N		Hold:29-AUG-94			
L2528-6	B0CJJ9	01-AUG-94	03-AUG-94		17-SEP-94
temp 2 B94-004					
Location: 156CART#4					
Water 1 S GROSS ALPHA LAL-0060		Hold:28-JAN-95			
Water 1 S GROSS BETA LAL-0060		Hold:28-JAN-95			
Water 1 S SR-90 LAL-0196		Hold:28-JAN-95			
L2528-7	B0CJJ9	01-AUG-94	03-AUG-94		17-SEP-94
temp 2 B94-004					
Location: 156CART#4					

020 8803512

9413536.0929

LOGIN CHAIN OF CUSTODY REPORT (ln01)
Aug 03 1994, 06:20 pm

Login Number: L2528
Account: 512 Westinghouse Hanford Co. * Richland, WA
Project: WESTINGHOUSE-HANFORD Westinghouse Hanford Project (Richland,WA

Laboratory Sample Number	Client Sample Number	Collect Date	Receive Date	PR	Due Date
L2528-8	B0CJJ9	01-AUG-94	03-AUG-94		17-SEP-9
temp 2 B94-004					
Location: 156CART#4					
Water 1 S TRITIUM(H3) LAL-0066 Hold:28-JAN-95					
L2528-9	B0CJJ9	01-AUG-94	03-AUG-94		17-SEP-9
temp 2 B94-004					
Location: 156CART#4					
L2528-10	B0CJJ9	01-AUG-94	03-AUG-94		17-SEP-9
temp 2 B94-004	ACTIVITY SCAN				
Location: HOOD					
Water 1 S SCREENING Hold:28-JAN-95					
L2528-11	B0CJK0	01-AUG-94	03-AUG-94		17-SEP-9
temp 2 B94-004					
Location: 156RAD1-04					
Filt H20 15 S CLP FURNACE Hold:28-JAN-95					
Filt H20 15 S CLP ICP Hold:28-JAN-95					
Filt H20 15 S CLP MERCURY Hold:29-AUG-94					
L2528-12	REPORT TYPE	03-AUG-94	03-AUG-94		17-SEP-9
Location:					
Water 1 S EDD - DISK DEL.					
Water 1 S INORG TYPE 4A RPT					

Signature: Paul C. Davis

Date: 8-3-94

021 0 803512

Westinghouse Hanford Company

12528

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

Page 1 of 1

Data Turnaround: [ ] Priorty [X] Normal

Collector: K. Trapp	Company Contact: PH BUTCHER	Telephone No.: (509)3764388
Project Designation: 100-HR-3	Sampling Location: 100H & 100D	SAF No.: B94-004
Ice Chest No.: GWS 015	Field Logbook No.: EFL-0057	Method of Shipment: EMERY
Shipped To: LOCKHEED	Offsite Property No.: W94-0-0746-47	Bill of Lading/Air Bill No.: 1402136736
Possible Sample Hazards/Remarks		
Special Handling and/or Storage: COOL TO 4 DEGREES CENTIGRADE		

SAMPLE ANALYSIS	CLP-METALS (UNFILTERED)	ANIONS: Cl, SO4, NO2, NO3 PO4	NO2/NO3	SULFIDE	AMMONIA	GROSS ALPHA/BETA, Sr-90	TRITIUM	ACTIVITY SCAN	CLP-Metals Filtered						
Preservative	HNO3<2	COOL 4	H2SO4<2	SEE"SI"	H2SO4<2	HNO3<2	COOL 4	NA	HNO3						
Type of Container	G	G	P	P	P/G	G	Gs	G/P	G						
No. of Container(s)	1	1	1	1	1	2	2	1	1						
Volume	500ml	500ml	500ml	500ml	500ml	2.5L	1L	40ml	500mL						

Sample No.	Matrix*	Date Sampled	Time Sampled														
BO CJJ9	W	8/1/94	1110	X	X	X	X	X	X	X	X						
BO CJK0	W	↓	↓									X					

CHAIN OF POSSESSION — Sign/Print Names

Relinquished By	Date/Time	Received By	Date/Time
K. Trapp / K. Trapp CHI	8/1/94 1300	C.M. Simpson	8/1/94 1300
C.M. Simpson CAZU HILL	8/2/94 0900		
2			

SPECIAL INSTRUCTIONS

NOTE: PRESERVATIVE FORSULFIDE=ZnAc+NaOH pH<2 NOTE: DATA DELIVERABLE-STANDALONE

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: [signature] Title: Sample Custodian Date/Time: 8-3-94 / 1500

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

DISTRIBUTION: Original- Sample Yellow - Sampler

BC-6000-828 (12/92)

080351

9715515.0911

MESSAGE CONFIRMATION

08/03/94 14:27

SESSION NO.= 213

ID=LOCKHEED LAB SAMPLE RECEIVING

DATE	TIME	S,R-TIME	DISTANT STATION ID	MODE	PAGES	RESULT	
08/03	14:26	01'06"	15099468988	G3 -S	01	OK	0000

08035

9716016.0P12

SAMPLE STATUS REPORT FOR N 1266. RAD SCREEN H3-1 TIME: 8/ 2/94 7:57
DISPATCHED: 7/20/94 14: 9 SAMPLE HAS NOT BEEN SLURPED
RECEIVED: 8/ 1/94 14:32

EXT.	DETER.	RESULTS OR STATUS	OUT OF RANGE?	GOOD ANS?	CHARGE CODE
****	********	**********	***	***	******
4271	TOT-ACT	< 5.00000E 01 pCi/G	N	Y	J12UP

END OF REPORT

BO CJC4
BO CJC5
BO CJJ5
BO CJJ6
BO CJJ9
BO CJK0

08035

Figure 1

SAMPLE CHECK-IN LIST

(1 Per Shipping Container)

Date/Time Received 8-3-94 ~~1:30 p.m.~~ 3:00 pm 8-4-94 Client Name Westinghouse - Hanford

Project/Client # 100-HR-3 Batch or Case # _____

Cooler ID (if noted on outside of cooler) ~~N/A~~ CWS015 Rel 8-3-94

1. Condition of shipping container? good
2. Custody Seals on cooler intact? Yes [X] No [ ]
3. Custody Seals dated and signed? Yes [X] No [ ]
4. Chain of Custody record is taped on inside of cooler lid? Yes [X] No [ ]
5. Vermiculite/packing material is: Wet [ ] Dry [X] _____
6. Each sample is in a plastic bag? Yes [X] No [ ] _____
7. Number of sample containers in cooler: 11
8. Samples have:
   - ____ tape
   - ____ hazard labels
   - X custody seals
   - ____ appropriate sample labels
9. Samples are:
   - X in good condition
   - ____ leaking
   - ____ broken
   - ____ have air bubbles
   - ____ other
10. Coolant Present? Yes [X] No [ ] Sample Temperature 2°C
11. The following paperwork should be accounted for (N/A if not applicable):

    Chain of Custody #(s) BC-6000-828

    Request for Analysis #(s) _____

    Airbill # 1402136736 Carrier Emery

    1402136736

12. Have any anomalies been identified above? Yes [ ] No [X]
13. Memos have been initiated for all anomalies identified above? Yes [X]

Printed Name/Signature Paul C. Davis Paul C. Davis Date/Time 8-3-94 3:00 p.m.

LOCKHEED ANALYTICAL SERVICES

Reporting and Detection Limits for Inorganic Constituents

Revised 11/01/93

Other Constituents

Constituent	Analytical Method	Aqueous (mg/L) Detection Limit	Aqueous (mg/L) Reporting Detection Limit	Solids (mg/kg)* Detection Limit	Solids (mg/kg)* Reporting Detection Limit
Alkalinity - High	310.1	0.30	30.	3.0	300.
Alkalinity - Low	310.1	0.55	30.	5.5	300.
Ammonia as Nitrogen	350.1	0.014	0.050	0.14	0.50
Bromide	300.0	0.0048	0.10	0.048	1.0
Chem Ox Demand	410.4	5.9	20.	N/A	N/A
Chloride	300.0	0.0042	0.020	0.042	0.20
Chloride	325.2	0.19	1.0	N/A	N/A
Chromium VI	7196	0.0013	0.020	0.013	0.20
Cyanide	335.2/9010/CLP	0.0041	0.020	0.41	2.0
Fluoride	340.2	0.014	0.050	0.14	0.50
Hydrazine	LAL-92-SOP-0189	0.00052	0.0010	0.0052	0.0010
Monomethylhydrazine	LAL-92-SOP-0189	0.00052	0.0010	0.0052	0.0010
Nitrate as Nitrogen	300.0	0.0022	0.020	0.022	0.20
Nitrate/Nitrite as Nitrog	353.2	0.013	0.050	0.13	0.50
Nitrite as Nitrogen	300.0	0.0013	0.010	0.013	0.10
o-Phosphate-Phosphorus	365.2	0.0038	0.030	0.038	0.30
Silica	370.1	0.060	1.0	N/A	N/A
Sulfate	300.0	0.011	0.10	0.11	1.0
Sulfate	375.4/9038	1.0	5.0	10.	50.
Sulfide	9030	1.0**	3.0	N/A	N/A
Total Dissolved Solids	160.1	7.2	40.	N/A	N/A
Total Kjedhal Nitrogen	351.2	0.093	0.20	N/A	N/A
Total Organic Carbon	415.2	0.15	1.0	N/A	N/A
Total Organic Halides	9020	0.013	0.040	0.13	0.40

* 1:10 (soil:water) extraction ratio

** determined by method: Greenberg, Arnold E., et. al. Standard Methods for the Examination of Water and Wastewater, 18th Edition. Washington, D.C.: 1992.

LOCKHEED ANALYTICAL SERVICES

Reporting and Detection Limits for Inorganic Constituents

Revised 11/01/93

Other Constituents

Constituent	Analytical Method	Aqueous (mg/L)		Solids (mg/kg)*	
		Detection Limit	Reporting Detection Limit	Detection Limit	Reporting Detection Limit
Total Phenolics	420.1	0.0028	0.15	0.028	1.5
Total Phosphorus	365.2	0.0063	0.030	N/A	N/A
Total Residual Chlorine	330.5	0.010**	0.10	N/A	N/A
Total Suspended Solids	160.2	3.7	12.	N/A	N/A
Unsymm Dimethylhydrazine	LAL-92-SOP-0189	0.00051	0.0010	0.0051	0.0010

* 1:10 (soil:water) extraction ratio

** determined by method: Greenberg, Arnold E., et. al. Standard Methods for the Examination of Water and Wastewater, 18th Edition. Washington, D.C.: 1992.

9713513.0916

U.S. EPA - CLP

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

BOCJJ7

Lab Name: L.A.S. Contract: WSTHS

Lab Code: LOCK Case No.: 728WHT SAS No.: SDG No.: B94-004

Matrix (soil/water): WATER Lab Sample ID: L2491-1

Level (low/med): LOW Date Received: 07/28/94

% Solids: 0.0

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	31.0	U		P
7440-36-0	Antimony	46.0	U		P
7440-38-2	Arsenic	3.0	U	WN	F
7440-39-3	Barium	86.2	B		P
7440-41-7	Beryllium	1.0	U		P
7440-43-9	Cadmium	3.0	U		P
7440-70-2	Calcium	60200			P
7440-47-3	Chromium	1220			P
7440-48-4	Cobalt	8.0	U		P
7440-50-8	Copper	4.1	B		P
7439-89-6	Iron	44.2	B		P
7439-92-1	Lead	2.0	U		F
7439-95-4	Magnesium	17600			P
7439-96-5	Manganese	2.0	U		P
7439-97-6	Mercury	0.67	U		AV
7440-02-0	Nickel	8.0	U		P
7440-09-7	Potassium	5690			P
7782-49-2	Selenium	3.0	U		F
7440-22-4	Silver	4.0	U		P
7440-23-5	Sodium	16700			P
7440-28-0	Thallium	4.0	U		F
7440-62-2	Vanadium	20.6	B		P
7440-66-6	Zinc	12.5	B		P

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

FORM I - IN

ILMO2.1

U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

BOCJJ9

Lab Name: L.A.S. Contract: WSTHS

Lab Code: LOCK Case No.: 728WHT SAS No.: SDG No.: B94-004

Matrix (soil/water): WATER Lab Sample ID: L2528-1

Level (low/med): LOW Date Received: 08/03/94

% Solids: 0.0

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	31.0	U		P
7440-36-0	Antimony	46.0	U		P
7440-38-2	Arsenic	3.4	B	WN	F
7440-39-3	Barium	20.9	B		P
7440-41-7	Beryllium	1.0	U		P
7440-43-9	Cadmium	3.0	U		P
7440-70-2	Calcium	33000			P
7440-47-3	Chromium	10.0			P
7440-48-4	Cobalt	8.0	U		P
7440-50-8	Copper	3.2	B		P
7439-89-6	Iron	125			P
7439-92-1	Lead	2.0	U		F
7439-95-4	Magnesium	8200			P
7439-96-5	Manganese	3.6	B		P
7439-97-6	Mercury	0.20	U		AV
7440-02-0	Nickel	8.0	U		P
7440-09-7	Potassium	4150	B		P
7782-49-2	Selenium	3.0	U	W	F
7440-22-4	Silver	4.0	U		P
7440-23-5	Sodium	13000			P
7440-28-0	Thallium	4.0	U		F
7440-62-2	Vanadium	12.2	B		P
7440-66-6	Zinc	8.0	B		P

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

FORM I - IN

ILMO2.1

9715516.0919

U.S. EPA - CLP

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

BOCJJ8

Lab Name: L.A.S. Contract: WSTHS

Lab Code: LOCK Case No.: 728WHD SAS No.: SDG No.: B94-004

Matrix (soil/water): WATER Lab Sample ID: L2491-2

Level (low/med): LOW Date Received: 07/28/94

% Solids: 0.0

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	31.0	U		P
7440-36-0	Antimony	46.0	U		P
7440-38-2	Arsenic	3.0	U	W	F
7440-39-3	Barium	85.1	B		P
7440-41-7	Beryllium	1.0	U		P
7440-43-9	Cadmium	3.0	U		P
7440-70-2	Calcium	63100			P
7440-47-3	Chromium	1300			P
7440-48-4	Cobalt	8.0	U		P
7440-50-8	Copper	2.7	B		P
7439-89-6	Iron	10.0	U		P
7439-92-1	Lead	2.0	U		F
7439-95-4	Magnesium	18100			P
7439-96-5	Manganese	2.0	U		P
7439-97-6	Mercury	0.20	U		AV
7440-02-0	Nickel	8.0	U		P
7440-09-7	Potassium	5950			P
7782-49-2	Selenium	3.0	U	W	F
7440-22-4	Silver	4.0	U		P
7440-23-5	Sodium	16700			P
7440-28-0	Thallium	4.0	U		F
7440-62-2	Vanadium	20.0	B		P
7440-66-6	Zinc	3.0	U		P

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

FORM I - IN

ILMO2.1

9715524.8919

U.S. EPA - CLP

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

BOCJK0

Lab Name: L.A.S. Contract: WSTHS

Lab Code: LOCK Case No.: 728WHD SAS No.: SDG No.: B94-004

Matrix (soil/water): WATER Lab Sample ID: L2528-11

Level (low/med): LOW Date Received: 08/03/94

% Solids: 0.0

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	31.0	U		P
7440-36-0	Antimony	46.0	U		P
7440-38-2	Arsenic	3.0	U	W	F
7440-39-3	Barium	22.1	B		P
7440-41-7	Beryllium	1.0	U		P
7440-43-9	Cadmium	3.0	U		P
7440-70-2	Calcium	37400			P
7440-47-3	Chromium	4.7	B		P
7440-48-4	Cobalt	8.0	U		P
7440-50-8	Copper	2.0	U		P
7439-89-6	Iron	10.0	U		P
7439-92-1	Lead	2.0	U		F
7439-95-4	Magnesium	9010			P
7439-96-5	Manganese	2.0	U		P
7439-97-6	Mercury	0.20	U		AV
7440-02-0	Nickel	9.9	B		P
7440-09-7	Potassium	4510	B		P
7782-49-2	Selenium	3.0	U		F
7440-22-4	Silver	4.0	U		P
7440-23-5	Sodium	13800			P
7440-28-0	Thallium	4.0	U		F
7440-62-2	Vanadium	12.8	B		P
7440-66-6	Zinc	3.0	U		P

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

FORM I - IN

ILM02.1

LOCKHEED ANALYTICAL SERVICES

Sample Results

Client Sample ID: B0CJJ9	Date Collected: 01-AUG-94
Matrix: Water	Date Received: 03-AUG-94

Constituent	Units	Method	Result	Project Reporting Limit	Data Qualifier(s)	Date Analyzed	LAS Batch|ID	LAS Sample|ID
Chloride	mg/L	300.0	5.3	0.020		05-AUG-94	11831	L2528-2
Nitrate-N	mg/L	300.0	2.5	0.020	H	05-AUG-94	11833	L2528-2
Nitrite-N	mg/L	300.0	< 0.025	0.025	HU	05-AUG-94	11834	L2528-2
Sulfate	mg/L	300.0	22.	0.10		05-AUG-94	11832	L2528-2
Ammonia Nitrogen	mg/L	350.1	0.030	0.014		05-AUG-94	11835	L2528-5
Nitrate-Nitrite-Nitrogen	mg/L	353.2	2.6	0.10		09-AUG-94	11836	L2528-3
O-Phosphate-Phosphorus	mg/L	365.2	0.032	0.030	H	12-AUG-94	12239	L2528-2
Sulfide	mg/L	9030	< 1.0	3.0	NU	05-AUG-94	11877	L2528-4

9713516.0921

LOCKHEED ANALYTICAL SERVICES

Sample Results

Client Sample ID: B0CJJ7	Date Collected: 25-JUL-94
Matrix: Water	Date Received: 28-JUL-94

Constituent	Units	Method	Result	Project Reporting Limit	Data Qualifier(s)	Date Analyzed	LAS Batch|ID	LAS Sample|ID
Chloride	mg/L	300.0	18.	0.020		02-AUG-94	11573	L2491-3
Nitrate-N	mg/L	300.0	10.	0.020	H	02-AUG-94	11571	L2491-3
Nitrite-N	mg/L	300.0	0.071	0.025	H	02-AUG-94	11572	L2491-3
Sulfate	mg/L	300.0	83.	0.10		02-AUG-94	11574	L2491-3
Ammonia Nitrogen	mg/L	350.1	0.036	0.050	B	05-AUG-94	11737	L2491-6
Nitrate-Nitrite-Nitrogen	mg/L	353.2	11.	0.050		09-AUG-94	11738	L2491-4
O-Phosphate-Phosphorus	mg/L	365.2	0.016	0.030	HB	12-AUG-94	12239	L2491-3
Sulfide	mg/L	9030	< 1.0	3.0	NU	01-AUG-94	11672	L2491-5

9713516.0922

Lockheed Analytical Services

BECHTEL HANFORD, INC.

ANALYTICAL DATA REPORT

FOR

RADIOCHEMISTRY

SEP 1994
RECEIVED
Data
Log In

RECORD COPY

LOG-IN NUMBER:	L2491/L2528
QUOTATION NUMBER:	Q40000
SAF:	B94-004
DOCUMENT FILE NUMBER:	0728512/0803512
WHC DOCUMENT CONTROL NO.:	63/64

9715.13.0925

Lockheed
Environmental Systems & Technologies Co.

Lockheed Analytical Services
975 Kelly Johnson Drive
Las Vegas, Nevada 89119-3705

Phone: (800) 582-7605
Fax: (702) 361-8146

September 20, 1994

Ms. Joan Kessner
Bechtel Hanford, Inc.
P. O. Box 969
Richland, WA 99352

RE:Log-in No.:L2491/L2528
Quotation No.:Q400000
SAF:B94-004
Document File No.:0728512/0803512
WHC Document Control No.:63/64

The attached data report contains the analytical results of samples that were submitted to Lockheed Analytical Services on 28 July 1994. The temperature of the cooler upon receipt was 2°C. Sample containers were received intact. Samples were not received in time to meet the analytical holding time requirements for method 300.0. (See attached Sample Receiving Checklist). All discrepancies identified upon receipt of the samples have been forwarded to the client and are documented in the enclosed chain-of-custody records.

The attached data report contains the analytical results of samples that were submitted to Lockheed Analytical Services on 3 August 1994. The temperature of the cooler upon receipt was 2°C. Sample containers received agree with the chain-of-custody documentation. Sample containers were received intact. Samples were not received in time to meet the analytical holding time requirements for method 300.0. (See attached Sample Receiving Checklist). All discrepancies identified upon receipt of the samples have been forwarded to the client and are documented in the enclosed chain-of-custody records.

The case narratives included in the following attachments provide a detailed description of all events that occurred during sample preparation, analysis, and data review specific to the samples and analytical methods requested.

A list of data qualifiers, chain-of-custody forms, sample receiving checklist, and log-in report are also enclosed representing the samples received within this group.

If you have any questions concerning the analysis or the data please call Kathleen M. Hall at (509) 375-3268, ext. 351.

" 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".

Sincerely,

for Kathleen M. Hall
Project Manager

kmh:yj

cc: Client Services
Document Control

CASE NARRATIVE
RADIOCHEMICAL ANALYSES

The routine calibration and quality control analyses performed for this batch include as applicable: instrument calibration, initial and continuing calibration verification, quench monitoring standards, instrument background analysis, method blanks, yield tracer, laboratory control samples, matrix spike samples, duplicate samples.

Holding Time Requirements

All holding time requirements were met.

Analytical Method

Gross alpha beta

The gross alpha beta analysis was performed using LAL-91-SOP-0060. No problems were encountered during analysis. All QC criteria were met. A sample from another client was used for the sample duplicate analysis.

Tritium

The tritium analysis was performed using LAL-91-SOP-0066. No problems were encountered during analysis. All QC criteria were met.

Total radio-strontium

The total radio-strontium analysis was performed using LAL-91-SOP-0196. No problems were encountered during analysis. All QC criteria were met.

Yvonne M. Jacoby
Prepared By

September 20, 1994
Date

9715115.0926

LOCKHEED ANALYTICAL SERVICES INTERNAL CHAIN OF CUSTODY REPORT

Account: Westinghouse Hanford Co. * Richland, WA
Project: Westinghouse Hanford Project (Richland,WA)

CLIENT ID	LAL ID	MOVED FROM	MOVED TO	CUSTODIAN	MOVE DATE
BOCJJ7	L2491-1	156RAD1-04	160	lr09366	30-JUL-94
BOCJJ7	L2491-1	160	RFG19-94B	l703822	01-AUG-94
BOCJJ7	L2491-1	RFG19-94B	133	lr09807	26-AUG-94
BOCJJ7	L2491-1	133	160	lr09782	29-AUG-94
BOCJJ7	L2491-1	160	RFG19-110B	temp1	29-AUG-94
BOCJJ7	L2491-1	RFG19-110B	133	temp1	31-AUG-94
BOCJJ7	L2491-1	133	EXPENDED	lr08239	08-SEP-94
BOCJJ8	L2491-2	156RAD1-04	160	lr09366	30-JUL-94
BOCJJ8	L2491-2	160	RFG19-94B	l703822	01-AUG-94
BOCJJ8	L2491-2	RFG19-94B	133	lr08243	26-AUG-94
BOCJJ8	L2491-2	133	121	lr08243	26-AUG-94
BOCJJ8	L2491-2	121	133	temp1	31-AUG-94
BOCJJ7	L2491-3	156RAD1-04	160	lr09366	30-JUL-94
BOCJJ7	L2491-3	160	RFG19-94B	l703822	01-AUG-94
BOCJJ7	L2491-3	RFG19-94B	121	lr09783	02-AUG-94
BOCJJ7	L2491-3	121	RFG19-56B	l703822	10-AUG-94
BOCJJ7	L2491-3	RFG19-56B	133	lr09785	12-AUG-94
BOCJJ7	L2491-3	133	160	lr09782	29-AUG-94
BOCJJ7	L2491-3	160	RFG19-110B	temp1	29-AUG-94
BOCJJ7	L2491-4	156RAD1-04	160	lr09366	30-JUL-94
BOCJJ7	L2491-4	160	RFG19-94B	l703822	01-AUG-94
BOCJJ7	L2491-4	RFG19-94B	121	lr09809	08-AUG-94
BOCJJ7	L2491-4	121	RFG19-56B	l703822	10-AUG-94
BOCJJ7	L2491-5	156RAD1-04	160	lr09366	30-JUL-94
BOCJJ7	L2491-5	160	RFG19-94B	l703822	01-AUG-94
BOCJJ7	L2491-5	RFG19-94B	133	lr09482	01-AUG-94
BOCJJ7	L2491-5	133	RFG19-56B	l703822	10-AUG-94
BOCJJ7	L2491-6	156RAD1-04	160	lr09366	30-JUL-94
BOCJJ7	L2491-6	160	RFG19-94B	l703822	01-AUG-94
BOCJJ7	L2491-6	RFG19-94B	121	lr09809	05-AUG-94
BOCJJ7	L2491-6	121	RFG19-56B	l703822	10-AUG-94
BOCJJ7	L2491-7	156RAD1-05	156CART-4	lr08248	02-AUG-94
BOCJJ7	L2491-7	156CART-4	155	lr09352	04-AUG-94
BOCJJ7	L2491-7	155	156CART-4	lr08248	05-AUG-94
BOCJJ7	L2491-7	156CART-4	156V-058D	lr08248	09-AUG-94
BOCJJ7	L2491-8	156RAD1-05	156CART-4	lr08248	02-AUG-94
BOCJJ7	L2491-8	156CART-4	156-058B	lr08248	04-AUG-94
BOCJJ7	L2491-8	156-058B	156-058D	lr08248	04-AUG-94
BOCJJ7	L2491-9	156RAD1-04	156CART-4	lr08248	30-JUL-94
BOCJJ7	L2491-9	156CART-4	156-087	lr08248	04-AUG-94
BOCJJ7	L2491-9	156-087	155	lr09352	07-AUG-94
BOCJJ7	L2491-9	155	156V-087	lr08248	09-AUG-94
BOCJJ7	L2491-10	156RAD1-04	156CART-4	lr08248	30-JUL-94
BOCJJ7	L2491-10	156CART-4	156-087	lr08248	04-AUG-94
BOCJJ7	L2491-11	156RAD1-04	156TEMP-1	lr08248	29-JUL-94
BOCJJ7	L2491-11	156TEMP-1	EXPENDED	lr08248	30-JUL-94

9715315.0927

LOCKHEED ANALYTICAL SERVICES INTERNAL CHAIN OF CUSTODY REPORT

Account: Westinghouse Hanford Co. * Richland, WA
Project: Westinghouse Hanford Project (Richland,WA)

CLIENT ID	LAL ID	MOVED FROM	MOVED TO	CUSTODIAN	MOVE DATE
B0CJJ9	L2528-1	156RAD1-04	160	lr09366	04-AUG-94
B0CJJ9	L2528-1	160	RFG02-22A	l703822	04-AUG-94
B0CJJ9	L2528-1	RFG02-22A	133	lr09807	26-AUG-94
B0CJJ9	L2528-1	133	160	lr09782	29-AUG-94
B0CJJ9	L2528-1	160	RFG19-110B	temp1	29-AUG-94
B0CJJ9	L2528-1	RFG19-110B	160	lr09782	12-SEP-94
B0CJJ9	L2528-1	160	RFG19-50B	temp1	12-SEP-94
B0CJJ9	L2528-2	156RAD1-04	160	lr09366	04-AUG-94
B0CJJ9	L2528-2	160	121	lr09783	04-AUG-94
B0CJJ9	L2528-2	121	RFG19-54C	l703822	08-AUG-94
B0CJJ9	L2528-2	RFG19-54C	133	lr09785	12-AUG-94
B0CJJ9	L2528-2	133	160	lr09782	29-AUG-94
B0CJJ9	L2528-2	160	RFG19-110B	temp1	29-AUG-94
B0CJJ9	L2528-3	156RAD1-04	160	lr09366	04-AUG-94
B0CJJ9	L2528-3	160	RFG02-22A	l703822	04-AUG-94
B0CJJ9	L2528-3	RFG02-22A	121	lr09809	08-AUG-94
B0CJJ9	L2528-3	121	RFG19-56B	l703822	10-AUG-94
B0CJJ9	L2528-4	156RAD1-04	160	lr09366	04-AUG-94
B0CJJ9	L2528-4	160	RFG02-22A	l703822	04-AUG-94
B0CJJ9	L2528-4	RFG02-22A	133	lr09482	05-AUG-94
B0CJJ9	L2528-4	133	RFG19-56B	l703822	10-AUG-94
B0CJJ9	L2528-5	156RAD1-04	160	lr09366	04-AUG-94
B0CJJ9	L2528-5	160	RFG02-22A	l703822	04-AUG-94
B0CJJ9	L2528-5	RFG02-22A	121	lr09809	05-AUG-94
B0CJJ9	L2528-5	121	RFG19-56B	l703822	10-AUG-94
B0CJJ9	L2528-6	156CART#4	156-058B	lr08248	04-AUG-94
B0CJJ9	L2528-6	156-058B	156-058D	lr08248	04-AUG-94
B0CJJ9	L2528-6	156-058D	155	lr09352	05-SEP-94
B0CJJ9	L2528-6	155	155	lr09352	09-SEP-94
B0CJJ9	L2528-6	155	156V-074	lr08248	19-SEP-94
B0CJJ9	L2528-7	156CART#4	156-058B	lr08248	04-AUG-94
B0CJJ9	L2528-7	156-058B	156-058D	lr08248	04-AUG-94
B0CJJ9	L2528-8	156CART#4	156-087	lr08248	04-AUG-94
B0CJJ9	L2528-8	156-087	155	lr09352	15-AUG-94
B0CJJ9	L2528-8	155	156CART-4	lr08248	16-AUG-94
B0CJJ9	L2528-8	156CART-4	156V-077	lr08248	18-AUG-94
B0CJJ9	L2528-8	156V-077	156V-076	lr08233	23-AUG-94
B0CJJ9	L2528-9	156CART#4	156-087	lr08248	04-AUG-94
B0CJJ9	L2528-10	HOOD	156RAD1-01	lr08248	05-AUG-94
B0CJK0	L2528-11	156RAD1-04	160	lr09366	04-AUG-94
B0CJK0	L2528-11	160	RFG02-22A	l703822	04-AUG-94
B0CJK0	L2528-11	RFG02-22A	133	lr08243	26-AUG-94
B0CJK0	L2528-11	133	121	lr08243	26-AUG-94

971.5515.0928

Lockheed

Environmental Systems & Technologies Co.
Lockheed Analytical Services

INTERDEPARTMENTAL COMMUNICATION

DATE August 2, 1994

TO Russ Stimmel	DEPT./ ORGN.	BLDG./ ZONE	PLANT/ FAC.	
FROM Kathleen Hall	DEPT./ 5030 ORGN.	BLDG./ LAS ZONE	PLANT/ FAC.	EXT.

SUBJECT: Instructions for L2491

Sample L2491-8 (client ID BOCCJ8) was logged in for gross alpha/beta and Sr-90 per instructions on the container. THe analysis was not requested on the COC. We have been instructed (by phone call 8/2/94, 3:30 PM from Clay Smith) to analyze this bottle for these analyses, but report with the client ID of BOCCJ7. This will therefore be a duplicate of L2491-7. I am to receive written confirmation of this request which is to be included in the data package. I will forward this information to you as soon as I receive it.

Thank you.

cc:M. Butler
Yvonne Jacoby
P. Sturtz

Post-it™ Fax Note 7671

Date 8/2/94	# of pages ▶ 1
To Paul Sturtz	From Kathleen Hall
Co./Dept.	Co.
Phone #	Phone # 509-375-2719
Fax # 702-361-9848	Fax #

003

FORM LESAT 426A

9213516.0929

LOGIN CHAIN OF CUSTODY REPORT (ln01)
Aug 02 1994, 04:11 pm

Login Number: L2491
Account: 512 Westinghouse Hanford Co. * Richland, WA
Project: WESTINGHOUSE-HANFORD Westinghouse Hanford Project (Richland,WA

Laboratory Sample Number	Client Sample Number	Collect Date	Receive Date	PR	Due Date
L2491-1	B0CJJ7	25-JUL-94	28-JUL-94		06-SEP-9
temp 2 "SAS # - B94-004"					
Location: RFG19-94B					
Water 1 S CLP CYANIDE		Hold:08-AUG-94			
Water 1 S CLP FURNACE		Hold:21-JAN-95			
Water 1 S CLP ICP		Hold:21-JAN-95			
Water 1 S CLP MERCURY		Hold:22-AUG-94			
L2491-2	B0CJJ8	25-JUL-94	28-JUL-94		06-SEP-9
temp 2 "SAS # - B94-004"					
Location: RFG19-94B					
Filt H20 15 S CLP CYANIDE		Hold:08-AUG-94			
Filt H20 15 S CLP FURNACE		Hold:21-JAN-95			
Filt H20 15 S CLP ICP		Hold:21-JAN-95			
Filt H20 15 S CLP MERCURY		Hold:22-AUG-94			
L2491-3	B0CJJ7	25-JUL-94	28-JUL-94		06-SEP-9
temp 2 "SAS # - B94-004" "Cl,So4,No2,No3,Po4"					
Location: 121					
Water 1 S 300.0 CHLORIDE		Hold:22-AUG-94			
Water 1 S 300.0 NITRATE		Hold:27-JUL-94			
Water 1 S 300.0 NITRITE		Hold:27-JUL-94			
Water 1 S 300.0 PHOSPHATE					
Water 1 S 300.0 SULFATE		Hold:22-AUG-94			
L2491-4	B0CJJ7	25-JUL-94	28-JUL-94		06-SEP-9
temp 2 "SAS # - B94-004"					
Location: RFG19-94B					
Water 1 S 353.2 NITRATE		Hold:22-AUG-94			
L2491-5	B0CJJ7	25-JUL-94	28-JUL-94		06-SEP-9
temp 2 "SAS # - B94-004"					
Location: 133					
Water 1 S 9030 SULFIDE		Hold:15-AUG-94			
L2491-6	B0CJJ7	25-JUL-94	28-JUL-94		06-SEP-9
temp 2 "SAS # - B94-004"					
Location: RFG19-94B					
Water 1 S 350.1 NH3/N		Hold:22-AUG-94			
L2491-7	B0CJJ7	25-JUL-94	28-JUL-94		06-SEP-9
temp 2 "SAS # - B94-004"					
Location: 156CART-4					
Water 1 S GR ALP/BETA LAL-0060		Hold:21-JAN-95			

* ID# Changed

Load 8-2-94

9716015.0990

LOGIN CHAIN OF CUSTODY REPORT (ln01)
Aug 02 1994, 04:11 pm

Login Number: L2491
Account: 512 Westinghouse Hanford Co. * Richland, WA
Project: WESTINGHOUSE-HANFORD Westinghouse Hanford Project (Richland,WA)

Laboratory Sample Number	Client Sample Number	Collect Date	Receive Date	PR	Due Date
Water 1 S SR-90 LAL-0196	Hold:21-JAN-95				
L2491-8	B0CJJ7	25-JUL-94	28-JUL-94		06-SEP-9
temp 2 "SAS # - B94-004"					
Location: 156CART-4					
Water 1 S GR ALP/BETA LAL-0060	Hold:21-JAN-95				
Water 1 S SR-90 LAL-0196	Hold:21-JAN-95				
L2491-9	B0CJJ7	25-JUL-94	28-JUL-94		06-SEP-9
temp 2 "SAS # - B94-004"					
Location: 156CART-4					
Water 1 S TRITIUM(H3) LAL-0066	Hold:21-JAN-95				
L2491-10	B0CJJ7	25-JUL-94	28-JUL-94		06-SEP-9
temp 2 "SAS # - B94-004"					
Location: 156CART-4					
L2491-11	B0CJJ7	25-JUL-94	28-JUL-94		06-SEP-9
temp 2 "SAS # - B94-004" ACTIVITY SCAN					
Location: EXPENDED					
Water 1 S SCREENING	Hold:21-JAN-95				
L2491-12	REPORT TYPE	28-JUL-94	28-JUL-94		06-SEP-9
Location:					
Water 1 S EDD - DISK DEL.					
Water 1 S INORG TYPE 4A RPT					

Signature: [illegible]

Date: 8-2-94

9715515.0951

LOGIN CHAIN OF CUSTODY REPORT (ln01)
Aug 09 1994, 03:45 pm

Login Number: L2491
Account: 512 Westinghouse Hanford Co. * Richland, WA
Project: WESTINGHOUSE-HANFORD Westinghouse Hanford Project (Richland,WA)

Laboratory Sample Number	Client Sample Number	Collect Date	Receive Date	Due PR Date
L2491-1	B0CJJ7	25-JUL-94	28-JUL-94	06-SEP-94
temp 2 "SAS # - B94-004"				
Location: RFG19-94B				
Water 1 S CLP CYANIDE		Hold:08-AUG-94		
Water 1 S CLP FURNACE		Hold:21-JAN-95		
Water 1 S CLP ICP		Hold:21-JAN-95		
Water 1 S CLP MERCURY		Hold:22-AUG-94		
L2491-2	B0CJJ8	25-JUL-94	28-JUL-94	06-SEP-94
temp 2 "SAS # - B94-004"				
Location: RFG19-94B				
Filt H20 15 S CLP CYANIDE		Hold:08-AUG-94		
Filt H20 15 S CLP FURNACE		Hold:21-JAN-95		
Filt H20 15 S CLP ICP		Hold:21-JAN-95		
Filt H20 15 S CLP MERCURY		Hold:22-AUG-94		
L2491-3	B0CJJ7	25-JUL-94	28-JUL-94	06-SEP-94
temp 2 "SAS # - B94-004" "Cl,So4,No2,No3,Po4"				
Location: 121				
Water 1 S 300.0 CHLORIDE		Hold:22-AUG-94		
Water 1 S 300.0 NITRATE		Hold:27-JUL-94		
Water 1 S 300.0 NITRITE		Hold:27-JUL-94		
Water 1 S 300.0 SULFATE		Hold:22-AUG-94		
* Water 1 S 365.2 ORTHO		Hold:27-JUL-94		
L2491-4	B0CJJ7	25-JUL-94	28-JUL-94	06-SEP-94
temp 2 "SAS # - B94-004"				
Location: 121				
Water 1 S 353.2 NITRATE		Hold:22-AUG-94		
L2491-5	B0CJJ7	25-JUL-94	28-JUL-94	06-SEP-94
temp 2 "SAS # - B94-004"				
Location: 133				
Water 1 S 9030 SULFIDE		Hold:15-AUG-94		
L2491-6	B0CJJ7	25-JUL-94	28-JUL-94	06-SEP-94
temp 2 "SAS # - B94-004"				
Location: 121				
Water 1 S 350.1 NH3/N		Hold:22-AUG-94		
L2491-7	B0CJJ7	25-JUL-94	28-JUL-94	06-SEP-94
temp 2 "SAS # - B94-004"				
Location: 156CART-4				
Water 1 S NONE		Hold:04-AUG-94		

*- analysis changed per Client JLS 8-9-94

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9413.1.096

LOGIN CHAIN OF CUSTODY REPORT (ln01)
Aug 09 1994, 03:45 pm

Login Number: L2491
Account: 512 Westinghouse Hanford Co. * Richland, WA
Project: WESTINGHOUSE-HANFORD Westinghouse Hanford Project (Richland,WA

Laboratory Sample Number	Client Sample Number	Collect Date	Receive Date	PR	Due Date
L2491-8	B0CJJ7	25-JUL-94	28-JUL-94		06-SEP-9
temp 2 "SAS # - B94-004"					
Location: 156-058D					
Water 1 S NONE		Hold: 04-AUG-94			
L2491-9	B0CJJ7	25-JUL-94	28-JUL-94		06-SEP-9
temp 2 "SAS # - B94-004"					
Location: 155					
Water 1 S TRITIUM(H3) LAL-0066		Hold: 21-JAN-95			
L2491-10	B0CJJ7	25-JUL-94	28-JUL-94		06-SEP-9
temp 2 "SAS # - B94-004"					
Location: 156-087					
L2491-11	B0CJJ7	25-JUL-94	28-JUL-94		06-SEP-9
temp 2 "SAS # - B94-004" ACTIVITY SCAN					
Location: EXPENDED					
Water 1 S SCREENING		Hold: 21-JAN-95			
L2491-12	REPORT TYPE	28-JUL-94	28-JUL-94		06-SEP-9
Location:					
Water 1 S EDD - DISK DEL.					
Water 1 S INORG TYPE 4A RPT					

Signature: James Jost

Date: 8-9-94

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9413015.0955

LOGIN CHAIN OF CUSTODY REPORT (ln01)
Jul 28 1994, 06:15 pm

Login Number: L2491
Account: 512 Westinghouse Hanford Co. * Richland, WA
Project: WESTINGHOUSE-HANFORD Westinghouse Hanford Project (Richland,WA)

Laboratory Sample Number	Client Sample Number	Collect Date	Receive Date	PR	Due Date
L2491-1	B0CJJ7	25-JUL-94	28-JUL-94		06-SEP-94
temp 2 "SAS # - B94-004"					
Location: 156RAD1-04					
Water 1 S CLP CYANIDE		Hold:08-AUG-94			
Water 1 S CLP FURNACE		Hold:21-JAN-95			
Water 1 S CLP ICP		Hold:21-JAN-95			
Water 1 S CLP MERCURY		Hold:22-AUG-94			
L2491-2	B0CJJ8	25-JUL-94	28-JUL-94		06-SEP-94
temp 2 "SAS # - B94-004"					
Location: 156RAD1-04					
Filt H20 15 S CLP CYANIDE		Hold:08-AUG-94			
Filt H20 15 S CLP FURNACE		Hold:21-JAN-95			
Filt H20 15 S CLP ICP		Hold:21-JAN-95			
Filt H20 15 S CLP MERCURY		Hold:22-AUG-94			
L2491-3	B0CJJ7	25-JUL-94	28-JUL-94		06-SEP-94
temp 2 "SAS # - B94-004" "Cl,So4,No2,No3,Po4"					
Location: 156RAD1-04					
Water 1 S 300.0 CHLORIDE		Hold:22-AUG-94			
Water 1 S 300.0 NITRATE		Hold:27-JUL-94			
Water 1 S 300.0 NITRITE		Hold:27-JUL-94			
Water 1 S 300.0 PHOSPHATE					
Water 1 S 300.0 SULFATE		Hold:22-AUG-94			
L2491-4	B0CJJ7	25-JUL-94	28-JUL-94		06-SEP-94
temp 2 "SAS # - B94-004"					
Location: 156RAD1-04					
Water 1 S 353.2 NITRATE		Hold:22-AUG-94			
L2491-5	B0CJJ7	25-JUL-94	28-JUL-94		06-SEP-94
temp 2 "SAS # - B94-004"					
Location: 156RAD1-04					
Water 1 S 9030 SULFIDE		Hold:15-AUG-94			
L2491-6	B0CJJ7	25-JUL-94	28-JUL-94		06-SEP-94
temp 2 "SAS # - B94-004"					
Location: 156RAD1-04					
Water 1 S 350.1 NH3/N		Hold:22-AUG-94			
L2491-7	B0CJJ7	25-JUL-94	28-JUL-94		06-SEP-94
temp 2 "SAS # - B94-004"					
Location: 156RAD1-04					
Water 1 S GR ALP/BETA LAL-0060		Hold:21-JAN-95			

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9415.1.034

LOGIN CHAIN OF CUSTODY REPORT (ln01)
Jul 28 1994, 06:15 pm

Login Number: L2491
Account: 512 Westinghouse Hanford Co. * Richland, WA
Project: WESTINGHOUSE-HANFORD Westinghouse Hanford Project (Richland,WA

Laboratory Sample Number	Client Sample Number	Collect Date	Receive Date	PR	Due Date
Water 1 S SR-90 LAL-0196 Hold:21-JAN-95					
L2491-8	B0CJJ8	25-JUL-94	28-JUL-94		06-SEP-9
temp 2 "SAS # - B94-004"					
Location: 156RAD1-04					
Water 1 S GR ALP/BETA LAL-0060 Hold:21-JAN-95					
Water 1 S SR-90 LAL-0196 Hold:21-JAN-95					
L2491-9	B0CJJ7	25-JUL-94	28-JUL-94		06-SEP-9
temp 2 "SAS # - B94-004"					
Location: 156RAD1-04					
Water 1 S TRITIUM(H3) LAL-0066 Hold:21-JAN-95					
L2491-10	B0CJJ7	25-JUL-94	28-JUL-94		06-SEP-9
temp 2 "SAS # - B94-004"					
Location: 156RAD1-04					
L2491-11	B0CJJ7	25-JUL-94	28-JUL-94		06-SEP-9
temp 2 "SAS # - B94-004" ACTIVITY SCAN					
Location: 156RAD1-04					
Water 1 S SCREENING Hold:21-JAN-95					
L2491-12	REPORT TYPE	28-JUL-94	28-JUL-94		06-SEP-9
Location:					
Water 1 S EDD - DISK DEL.					
Water 1 S INORG TYPE 4A RPT					

Signature: [illegible]

Date: 7-29-94

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Westinghouse Hanford Company

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST L2491

Page 1 of 1

Data Turnaround: [ ] Priorty [X] Normal

Collector: B.T. WHITTEN	Company Contact: PH BUTCHER	Telephone No.: (509)3764388
Project Designation: 100-HR-3	Sampling Location: 100H & 100D	SAF No.: B94-004
Ice Chest No.: Bx + 4	Field Logbook No.: EFL-1018	Method of Shipment: EMERY
Shipped To: LOCKHEED	Offsite Property No.: W94-0-0746-34	Bill of Lading/Air Bill No.: 1402136714

Possible Sample Hazards/Remarks

Special Handling and/or Storage: COOL TO 4 DEGREES CENTIGRADE

SAMPLE ANALYSIS																
Preservative	HNO3<2	COOL 4	H2SO4<2	SEE"SI"	H2SO4<2	HNO3<2	COOL 4		HNO3 pH<2						
Type of Container	G	G	P	P	P/G	G	Gs	G/P	G						
No. of Container(s)	1	1	1	1	1	2	2	1	1						
Volume	500ml	500ml	500ml	500ml	500ml	2.5L	1L	40ml	500ml						
	CLP-METALS (UNFIL-TERED)	ANIONS: Cl, SO4, NO2, NO3 PO4	NO2/NO3	SULFIDE	AMMONIA	GROSS ALPHA/ BETA, Sr-90	TRITIUM	ACTIVI-TY SCAN	CLP METALS FILTERED						

Sample No.	Matrix*	Date Sampled	Time Sampled	CLP-METALS (UNFIL-TERED)	ANIONS	NO2/NO3	SULFIDE	AMMONIA	GROSS ALPHA/BETA, Sr-90	TRITIUM	ACTIVITY SCAN	CLP METALS FILTERED					
B0CJJ7	W	07/25/94	0920	X	X	X	X	X	X	X	X						
B0CJJ8	W	07/25/94	0920									X					

CHAIN OF POSSESSION	Sign/Print Names		
Relinquished By	Date/Time	Received By	Date/Time
[illegible]	7/25/94 [illegible]	David St. John [illegible]	7/25/94 1234
Relinquished By	Date/Time	Received By	Date/Time
David St. John [illegible]	07/27/94 [illegible]	[illegible]	7/27/94 0910
Relinquished By	Date/Time	Received By	Date/Time
[illegible]	7/27/94 [illegible]		
Relinquished By	Date/Time	Received By	Date/Time

SPECIAL INSTRUCTIONS

NOTE: PRESERVATIVE FORSULFIDE=ZnAc+NaOH pH<2 NOTE: DATA DELIVERABLE-STANDALONE

total activity delayed 222-S Lab equipment problems

A J SIMPSON

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
	[illegible]	Sample Custodian	7-28-94 / 1330

FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

DISTRIBUTION: Original- Sample Yellow - Sampler

BC-6000-828 (12/92)

Figure 1

SAMPLE CHECK-IN LIST

(1 Per Shipping Container)

Date/Time Received 2-25-94 4:[illegible] Client Name Westinghouse Hanford

Project/Client # L 21571 Batch or Case # N/A

Cooler ID (if noted on outside of cooler) N/A

1. Condition of shipping container? Good
2. Custody Seals on cooler intact? Yes [x] No [ ]
3. Custody Seals dated and signed? Yes [x] No [ ]
4. Chain of Custody record is taped on inside of cooler lid? Yes [x] No [ ]
5. Vermiculite/packing material is: Wet [ ] Dry [X] _____
6. Each sample is in a plastic bag? Yes [X] No [ ] _____
7. Number of sample containers in cooler: 11
8. Samples have: X tape ____ hazard labels ____ custody seals ____ appropriate sample labels
9. Samples are: X in good condition ____ leaking ____ broken ____ have air bubbles ____ other
10. Coolant Present? Yes [X] No [ ] ~~Sample~~ Cooler Temperature 2°C
11. The following paperwork should be accounted for (N/A if not applicable):

    Chain of Custody #(s) N/A

    Request for Analysis #(s) 894-004

    Airbill # 1402136714 Carrier Emery
12. Have any anomalies been identified above? Yes [ ] No [X]
13. Memos have been initiated for all anomalies identified above? Yes [ ] N/A

Printed Name/Signature PAUL COFFIS Paul Coffis Date/Time 2-28-94

Lockheed Analytical Services
Sample Receiving Checklist

012

Client Name: WESTINGHOUSE HANFORD Job No. L2491 Cooler ID: N/A

COOLER CONDITION UPON RECEIPT

Temperature of cooler upon receipt: 2°C

temperature of temp. blank upon receipt: —

	Yes	No	* Comments/Discrepancies
custody seals intact	X		
chain of custody present	X		
blue ice (or equiv.) present/frozen	X		
rad survey completed	X		

SAMPLE CONDITION UPON RECEIPT

	Yes	No	* Comments/Discrepancies
all bottles labeled	X		
samples intact	X		
proper container used for sample type	X		
sample volume sufficient for analysis	X		
proper pres. indicated on the COC	X		
VOA's contain headspace		N/A	

MISCELLANEOUS ITEMS

	Yes	No	* Comments/Discrepancies
samples with short holding times	X	X**	nitrate/nitrite
samples to subcontract		X	

ADDITIONAL COMMENTS/DISCREPANCIES Nitrate/nitrite sample was sampled on the 25 of July. The holding time was up on the 28 of July. I.D.# BOC155. The RAD analysis was not marked on chain-of-custody. Logged-in per container information.

Completed by / date: Paul C. Dalen 7-28-94

Sent to the client (date/initials): ** Client's signature upon receipt:

*Notes: * = contact the appropriate CSR of any discrepancies immediately upon receipt*

*** = please review this information and return via facsimile to the appropriate CSR (702) 361-8146*

version 1.0 (5/12/94)

Sample Login

Login Review Checklist

Lot Number L2441

The login review should be conducted by that person logging in the samples as well as a peer. Please use this checklist to ensure that such reviews occur in a uniform basis. Please sign and date below to verify that a login review has occurred. This checklist should be affixed to each login package prior to distribution.

For an effective login review, at a minimum, five reports from the login process are required. These are the chain of custody (or equivalent), the login chain of custody report, the sample summary report, the sample receiving checklist, and the login quotation. Before beginning a review, ensure that these five components are available. For jobs with single component samples, the sample summary report may be ommited.

Sample Summary Report
N/A

		Yes	No
1.	Are all sample IDs correct?	X	—
2.	Are all samples present?	X	—
3.	Are all matrices correct? (e.g., TCLP analyses should be on a TCLP leachate, field blanks should be water)	X	—
4.	Are all analyses on the chain of custody/login quotation included?	X	—
5.	Are analyses logged in for the correct container? (e.g., analyses requiring preservation logged in for a preserved container and vice versa)	X	—
6.	Are samples logged in according to laboratory batching procedures? (e.g., TCLP regular leaching and associated metals/semivolatile organics should be logged in on the same bottle)	X	—

Login Chain of Custody Report

1.	Are the Collect, Receive , and Due dates correct for every sample?	X	—
2.	Have appropriate sample comments been included? (e.g., MS/MSD designation, comments from the client concerning method modifications)	X	—

Sample Receiving Checklist

1.	Are any discrepancies between the chain of custody and the login noted? (e.g., client IDs different on chains of custody and bottle labels, samples not sent, samples lost from breakage)	X	— PCN

Paul C Davis	7-28-94	[illegible]	7-29-94
Primary review signature	Date	Secondary review signature	Date

07285.

Lockheed Analytical Laboratory
SAMPLE SUMMARY REPORT (su02)
Westinghouse Hanford Co. * Richland, WA

Client Sample Number	LAL Sample Number	SDG Number	Matrix	Method
BOCJJ7	L2491-1		Water	CLP CYANIDE
	L2491-1		Water	CLP FURNACE
	L2491-1		Water	CLP ICP
	L2491-1		Water	CLP MERCURY
	L2491-3		Water	300.0 CHLORIDE
	L2491-3		Water	300.0 NITRATE
	L2491-3		Water	300.0 NITRITE
	L2491-3		Water	300.0 PHOSPHATE
	L2491-3		Water	300.0 SULFATE
	L2491-4		Water	353.2 NITRATE
	L2491-5		Water	9030 SULFIDE
	L2491-6		Water	350.1 NH3/N
	L2491-7		Water	GR ALP/BETA LAL-0060
	L2491-7		Water	SR-90 LAL-0196
	L2491-9		Water	TRITIUM(H3) LAL-0066
	L2491-11		Water	SCREENING
BOCJJ8	L2491-2		Filt H20	CLP CYANIDE
	L2491-2		Filt H20	CLP FURNACE
	L2491-2		Filt H20	CLP ICP
	L2491-2		Filt H20	CLP MERCURY
	L2491-8		Water	GR ALP/BETA LAL-0060
	L2491-8		Water	SR-90 LAL-0196
REPORT TYPE	L2491-12		Water	EDD - DISK DEL.
	L2491-12		Water	INORG TYPE 4A RPT

SAMPLE STATUS REPORT FOR N 1254. RAD SCREEN D5-14 TIME: 7/26/94 13:30
DISPATCHED: 7/20/94 14: 8 SAMPLE HAS NOT BEEN SLURPED
RECEIVED: 7/25/94 12:57

EXT.	DETER.	RESULTS OR STATUS	OUT OF RANGE?	GOOD ANS?	CHARGE CODE
****	********	**********	***	***	******
4271	TOT-ACT	< 5.00000E 01 pCi/G	N	Y	J12UP

END OF REPORT

BO CJJ3
BO CJJ4
BO CJJ 7
BO CJJ 8
BO CJ90
BO CJ91

016

61

FORM OF PAYMENT

Check ☐ GRL ☐ FCCOD ☐

Bill to Shipper ☒ Bill to Consignee ☐ Third Party Billing ☐

E Shipper's Account Number

EMERY WORLDWIDE — A CF Company

SERVICES * *

UNITED STATES · CANADA: Same Day ☐ AM ☒ PM ☐ Second Day ☐ Saturday Delivery ☐

INTERNATIONAL: Express ☐ Standard Plus ☐ Preferred ☐ Standard ☐ Business Documents ☐ Customs Clearance ☐ Delivery ☐

Date	Origin	Shipment Number
07-27-94		140213671 4

From:
WESTINGHOUSE SHIPPING DEPT (SCS) 376-6665
U.S. DEPARTMENT OF ENERGY C/O

Canada ☐

To:
LOCKHEED ANALYTICAL SERVICES
LOCKHEED ANALYTICAL SERVICES
975 KELLY JOHNSON DRIVE
LAS VEGAS NV USA

Hold for Pick Up ☐ Canada ☐

Tariff Dest. | Gateway

Check to Shipper $

EMERY WORLDWIDE will accept Consignee's check with all risks being assumed by Shipper, including but not limited to non-payment, fraud and misrepresentation.

Customer's Reference Numbers: PE3A1 8B410 W94-0-0746#34

E Consignee's Account Number: 89119-3705

PH BUTCHER

Description	Pcs	L	W	H	Total Pieces	Total Weight (lb/kg)
1 COOLER ID: BETA WATER SAMPLES	1				1	60

FOR INFORMATION OR RATES CALL 1 800 44 EMERY (1 800 443 6379)

Declared Value $

140213671 4

Remarks: OVERNIGHT DELIVERY SIGNATURE SECURITY SERVICE

Shipper's Signature X

Zip Ship ☐ — For shipments within the 50 United States Shipper has the option to check this box and, by checking, agrees that the Zip Ship conditions, described in the area to the right, apply.

Mark if Emery Packaging is used: 9X12 ☒ 12X15 ☒

International Shipments: Free Domicile ☐ Commodity Code

Third Party Account Number mandatory for Third Party Billing. E Third Party Account Number

International Customs Value | International Insurance

Base Charge | Total Transportation Charges | Other Charges/Advance at Origin ☐ OC/AO $

LAS-A

Terms and Conditions on Back

EMERY WORLDWIDE — A CF Company

SIGNATURE AND TALLY RECORD

60029-46 (8/89) Litho USA

DATE: 07-27-94 SHIPMENT NO.: 140213571 4

SHIPPER: WESTINGHOUSE SHIPPING DEPT (509) 376-6665

REFERENCE NO.: W94-0-0746#34

SHIPPER NAME AND ADDRESS	CONSIGNEE NAME AND ADDRESS
WESTINGHOUSE SHIPPING DEPT (509) 376-6665 U.S. DEPARTMENT OF ENERGY C/O WESTINGHOUSE HANFORD COMPANY 2355 STEVENS DRIVE 1163 BUILDING PO BOX 1970 RICHLAND WA 99352	LOCKHEED ANALYTICAL SERVICES 975 KELLY JOHNSON DRIVE LAS VEGAS NV 89119-3705

Pieces	Weight	Description/Marks	Emery Authorization No.
1	60 LBS	COOLER ID: BETA 4 WATER SAMPLES	

EACH PERSON HANDLING OR TAKING CUSTODY OF THIS SHIPMENT MUST SIGN AND COMPLETE THE INFORMATION BELOW

Name of Person/Company	Transship Point/Destination	Signature of Person Accepting Custody	Time/Date
JIM FOSS SHIPPING DEPT WESTINGHOUSE HANFORD CO	RICHLAND WA		
2.			
3.			
4.			
5.			
6. A Lmiller	LAS	Anthony C Miller	7-28-94/1500
7.			
8.			

SPECIAL HANDLING INSTRUCTIONS

CONSIGNEE COPY

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Figure 1

SAMPLE CHECK-IN LIST

(1 Per Shipping Container)

Date/Time Received 8-3-94 ~~1:30 pm~~ 3:20 pm 8-4-94 Client Name Westinghouse - Hanford

Project/Client # 100-HR-3 Batch or Case # _____

Cooler ID (if noted on outside of cooler) ~~N/A~~ CWS 015 RP 8-3-94

1. Condition of shipping container? good
2. Custody Seals on cooler intact? Yes [X] No [ ]
3. Custody Seals dated and signed? Yes [X] No [ ]
4. Chain of Custody record is taped on inside of cooler lid? Yes [X] No [ ]
5. Vermiculite/packing material is: Wet [ ] Dry [X] _____
6. Each sample is in a plastic bag? Yes [X] No [ ] _____
7. Number of sample containers in cooler: 11
8. Samples have:
   - ____ tape
   - ____ hazard labels
   - X custody seals
   - ____ appropriate sample labels
9. Samples are:
   - X in good condition
   - ____ leaking
   - ____ broken
   - ____ have air bubbles
   - ____ other
10. Coolant Present? Yes [X] No [ ] Sample Temperature 2°C
11. The following paperwork should be accounted for (N/A if not applicable):

    Chain of Custody #(s) BC-6000-828

    Request for Analysis #(s) _____

    Airbill # 1402136736 Carrier Emery

    1402136736

12. Have any anomalies been identified above? Yes [ ] No [X]
13. Memos have been initiated for all anomalies identified above? Yes [X]

Printed Name/Signature Paul C. Davis Paul C. Davis Date/Time 8-3-94 3:00 pm

9413.004

LOGIN CHAIN OF CUSTODY REPORT (ln01)
Aug 09 1994, 03:45 pm

Login Number: L2528
Account: 512 Westinghouse Hanford Co. * Richland, WA
Project: WESTINGHOUSE-HANFORD Westinghouse Hanford Project (Richland,WA

Laboratory Sample Number	Client Sample Number	Collect Date	Receive Date	PR	Due Date
L2528-1	B0CJJ9	01-AUG-94	03-AUG-94		17-SEP-9
temp 2 B94-004					
Location: RFG02-22A					
Water 1 S CLP FURNACE	Hold:28-JAN-95				
Water 1 S CLP ICP	Hold:28-JAN-95				
Water 1 S CLP MERCURY	Hold:29-AUG-94				
L2528-2	B0CJJ9	01-AUG-94	03-AUG-94		17-SEP-9
temp 2 B94-004					
Location: RFG19-54C					
Water 1 S 300.0 CHLORIDE	Hold:29-AUG-94				
Water 1 S 300.0 NITRATE	Hold:03-AUG-94				
Water 1 S 300.0 NITRITE	Hold:03-AUG-94				
Water 1 S 300.0 SULFATE	Hold:29-AUG-94				
* Water 1 S 365.2 ORTHO					
L2528-3	B0CJJ9	01-AUG-94	03-AUG-94		17-SEP-9
temp 2 B94-004					
Location: 121					
Water 1 S 353.2 NITRATE	Hold:29-AUG-94				
L2528-4	B0CJJ9	01-AUG-94	03-AUG-94		17-SEP-9
temp 2 B94-004					
Location: 133					
Water 1 S 9030 SULFIDE	Hold:22-AUG-94				
L2528-5	B0CJJ9	01-AUG-94	03-AUG-94		17-SEP-9
temp 2 B94-004					
Location: 121					
Water 1 S 350.1 NH3/N	Hold:29-AUG-94				
L2528-6	B0CJJ9	01-AUG-94	03-AUG-94		17-SEP-9
temp 2 B94-004					
Location: 156-058D					
Water 1 S GROSS ALPHA LAL-0060	Hold:28-JAN-95				
Water 1 S GROSS BETA LAL-0060	Hold:28-JAN-95				
Water 1 S SR-90 LAL-0196	Hold:28-JAN-95				
L2528-7	B0CJJ9	01-AUG-94	03-AUG-94		17-SEP-9
temp 2 B94-004					
Location: 156-058D					

*- Analysis changed per client. JLJ 8-9-94

0803JLJ

Figure 1

SAMPLE CHECK-IN LIST

(1 Per Shipping Container)

Date/Time Received 8-3-94 ~~1:30 p.m.~~ 3:00 pm 8-4-94 Client Name Westinghouse - Hanford

Project/Client # 100-HR-3 Batch or Case # _____

Cooler ID (if noted on outside of cooler) ~~N/A~~ CWS015 8-3-94

1. Condition of shipping container? good
2. Custody Seals on cooler intact? Yes [X] No [ ]
3. Custody Seals dated and signed? Yes [X] No [ ]
4. Chain of Custody record is taped on inside of cooler lid? Yes [X] No [ ]
5. Vermiculite/packing material is: Wet [ ] Dry [X] _____
6. Each sample is in a plastic bag? Yes [X] No [ ] _____
7. Number of sample containers in cooler: 11
8. Samples have:
   - ____ tape
   - ____ hazard labels
   - X custody seals
   - ____ appropriate sample labels
9. Samples are:
   - X in good condition
   - ____ leaking
   - ____ broken
   - ____ have air bubbles
   - ____ other
10. Coolant Present? Yes [X] No [ ] Sample Temperature 2°C
11. The following paperwork should be accounted for (N/A if not applicable):

    Chain of Custody #(s) BC-6000-828

    Request for Analysis #(s) _____

    Airbill # 1402136736 Carrier Emery

    [40]213[73]6
12. Have any anomalies been identified above? Yes [ ] No [X]
13. Memos have been initiated for all anomalies identified above? Yes [X]

Printed Name/Signature PAUL C. DAVIS Paul C Davis Date/Time 8-3-94 3:00 p.m.

9215115.0996

LOGIN CHAIN OF CUSTODY REPORT (ln01)
Aug 09 1994, 03:45 pm

Login Number: L2528
Account: 512 Westinghouse Hanford Co. * Richland, WA
Project: WESTINGHOUSE-HANFORD Westinghouse Hanford Project (Richland,WA

Laboratory Sample Number	Client Sample Number	Collect Date	Receive Date	PR	Due Date
L2528-8	B0CJJ9	01-AUG-94	03-AUG-94		17-SEP-9
temp 2 B94-004					
Location: 156-087					
Water 1 S TRITIUM(H3) LAL-0066 Hold:28-JAN-95					
L2528-9	B0CJJ9	01-AUG-94	03-AUG-94		17-SEP-9
temp 2 B94-004					
Location: 156-087					
L2528-10	B0CJJ9	01-AUG-94	03-AUG-94		17-SEP-9
temp 2 B94-004 ACTIVITY SCAN					
Location: 156RAD1-01					
Water 1 S SCREENING Hold:28-JAN-95					
L2528-11	B0CJK0	01-AUG-94	03-AUG-94		17-SEP-9
temp 2 B94-004					
Location: RFG02-22A					
Filt H20 15 S CLP FURNACE Hold:28-JAN-95					
Filt H20 15 S CLP ICP Hold:28-JAN-95					
Filt H20 15 S CLP MERCURY Hold:29-AUG-94					
L2528-12	REPORT TYPE	03-AUG-94	03-AUG-94		17-SEP-9
Location:					
Water 1 S EDD - DISK DEL.					
Water 1 S INORG TYPE 4A RPT					

Signature: [signature]

Date: 8-9-94

080357

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LOGIN CHAIN OF CUSTODY REPORT (ln01)
Aug 03 1994, 06:20 pm

Login Number: L2528
Account: 512 Westinghouse Hanford Co. * Richland, WA
Project: WESTINGHOUSE-HANFORD Westinghouse Hanford Project (Richland,WA

Laboratory Sample Number	Client Sample Number	Collect Date	Receive Date	PR	Due Date
L2528-1	B0CJJ9	01-AUG-94	03-AUG-94		17-SEP-9
temp 2 B94-004					
Location: 156RAD1-04					
Water 1 S CLP FURNACE		Hold:28-JAN-95			
Water 1 S CLP ICP		Hold:28-JAN-95			
Water 1 S CLP MERCURY		Hold:29-AUG-94			
L2528-2	B0CJJ9	01-AUG-94	03-AUG-94		17-SEP-9
temp 2 B94-004					
Location: 156RAD1-04					
Water 1 S 300.0 CHLORIDE		Hold:29-AUG-94			
Water 1 S 300.0 NITRATE		Hold:03-AUG-94			
Water 1 S 300.0 NITRITE		Hold:03-AUG-94			
Water 1 S 300.0 PHOSPHATE					
Water 1 S 300.0 SULFATE		Hold:29-AUG-94			
L2528-3	B0CJJ9	01-AUG-94	03-AUG-94		17-SEP-9
temp 2 B94-004					
Location: 156RAD1-04					
Water 1 S 353.2 NITRATE		Hold:29-AUG-94			
L2528-4	B0CJJ9	01-AUG-94	03-AUG-94		17-SEP-9
temp 2 B94-004					
Location: 156RAD1-04					
Water 1 S 9030 SULFIDE		Hold:22-AUG-94			
L2528-5	B0CJJ9	01-AUG-94	03-AUG-94		17-SEP-9
temp 2 B94-004					
Location: 156RAD1-04					
Water 1 S 350.1 NH3/N		Hold:29-AUG-94			
L2528-6	B0CJJ9	01-AUG-94	03-AUG-94		17-SEP-9
temp 2 B94-004					
Location: 156CART#4					
Water 1 S GROSS ALPHA LAL-0060		Hold:28-JAN-95			
Water 1 S GROSS BETA LAL-0060		Hold:28-JAN-95			
Water 1 S SR-90 LAL-0196		Hold:28-JAN-95			
L2528-7	B0CJJ9	01-AUG-94	03-AUG-94		17-SEP-9
temp 2 B94-004					
Location: 156CART#4					

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9413513.0948

LOGIN CHAIN OF CUSTODY REPORT (ln01)
Aug 03 1994, 06:20 pm

Login Number: L2528
Account: 512 Westinghouse Hanford Co. * Richland, WA
Project: WESTINGHOUSE-HANFORD Westinghouse Hanford Project (Richland,WA)

Laboratory Sample Number	Client Sample Number	Collect Date	Receive Date	PR	Due Date
L2528-8	B0CJJ9	01-AUG-94	03-AUG-94		17-SEP-9
temp 2 B94-004					
Location: 156CART#4					
Water 1 S TRITIUM(H3) LAL-0066 Hold:28-JAN-95					
L2528-9	B0CJJ9	01-AUG-94	03-AUG-94		17-SEP-9
temp 2 B94-004					
Location: 156CART#4					
L2528-10	B0CJJ9	01-AUG-94	03-AUG-94		17-SEP-9
temp 2 B94-004 ACTIVITY SCAN					
Location: HOOD					
Water 1 S SCREENING Hold:28-JAN-95					
L2528-11	B0CJK0	01-AUG-94	03-AUG-94		17-SEP-9
temp 2 B94-004					
Location: 156RAD1-04					
Filt H20 15 S CLP FURNACE Hold:28-JAN-95					
Filt H20 15 S CLP ICP Hold:28-JAN-95					
Filt H20 15 S CLP MERCURY Hold:29-AUG-94					
L2528-12	REPORT TYPE	03-AUG-94	03-AUG-94		17-SEP-9
Location:					
Water 1 S EDD - DISK DEL.					
Water 1 S INORG TYPE 4A RPT					

Signature: Paul C. Davis

Date: 8-3-94

023

0803512

Westinghouse Hanford Company

2528

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

Page 1 of 1

Data Turnaround: [ ] Priorty [X] Normal

Collector: K. Trapp	Company Contact: PH BUTCHER	Telephone No.: (509)3764388
Project Designation: 100-HR-3	Sampling Location: 100H & 100D	SAF No.: B94-004
Ice Chest No.: GWS 015	Field Logbook No.: EFL-0057	Method of Shipment: EMERY
Shipped To: LOCKHEED	Offsite Property No.: W94-0-0746-47	Bill of Lading/Air Bill No.: 1402136736
Possible Sample Hazards/Remarks		
Special Handling and/or Storage: COOL TO 4 DEGREES CENTIGRADE		

Preservative	HNO3<2	COOL 4	H2SO4<2	SEE"SI"	H2SO4<2	HNO3<2	COOL 4	NA	HNO3						
Type of Container	G	G	P	P	P/G	G	Gs	G/P	G						
No. of Container(s)	1	1	1	1	1	2	2	1	1						
Volume	500ml	500ml	500ml	500ml	500ml	2.5L	1L	40ml	500mL						
SAMPLE ANALYSIS	CLP-METALS (UNFILTERED)	ANIONS: Cl, SO4, NO2, NO3 PO4	NO2/NO3	SULFIDE	AMMONIA	GROSS ALPHA/BETA, Sr-90	TRITIUM	ACTIVITY SCAN	CLP-Metals Filtered						

Sample No.	Matrix*	Date Sampled	Time Sampled														
B0CJJ9	W	8/1/94	1110	X	X	X	X	X	X	X	X						
B0CJK0	W	↓	↓									X					

CHAIN OF POSSESSION — Sign/Print Names

Relinquished By	Date/Time	Received By	Date/Time
K. Trapp / K. Trapp (CHI)	8/1/94 1300	C.J. Simpson	8/1/94 1300
C.J. Simpson (CHI)	8/2/94 0900		

SPECIAL INSTRUCTIONS

NOTE: PRESERVATIVE FORSULFIDE=ZnAc+NaOH pH<2 NOTE: DATA DELIVERABLE-STANDALONE

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
	A.M. Miller	Sample Custodian	8-3-94 / 1500

FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

BC-6000-828 (12/92)

9713513.0950

MESSAGE CONFIRMATION

08/03/94 14:27

SESSION NO.= 213

ID=LOCKHEED LAB SAMPLE RECEIVING

DATE	TIME	S,R-TIME	DISTANT STATION ID	MODE	PAGES	RESULT	
08/03	14:26	01'06"	15099468988	G3 -S	01	OK	0000

02

08035

SAMPLE STATUS REPORT FOR N 1266. RAD SCREEN H3-1 TIME: 8/ 2/94 7:57
DISPATCHED: 7/20/94 14: 9 SAMPLE HAS NOT BEEN SLURPED
RECEIVED: 8/ 1/94 14:32

EXT.	DETER.	RESULTS OR STATUS	OUT OF RANGE?	GOOD ANS?	CHARGE CODE
****	********	**********	***	***	******
4271	TOT-ACT	< 5.00000E 01 pCi/G	N	Y	J12UP

END OF REPORT

BO CJC4
BO CJC5
BO CJJ5
BO CJJ6
BO CJJ9
BO CJK0

OVERNIGHT DELIVERY

Contractor	OFF-SITE PROPERTY CONTROL	CONTROL NO. (To be obtained from PROPERTY MANAGEMENT)
BHI		NA C - 746 - 17

PART I - TO BE COMPLETED BY ORIGINATOR

Department	Section	Unit
ER Eng Support	Field & Analytical Supp	ER Field Sampling

The following items are to be shipped from ☒ Contractor ☐ Vendor

Routing ☐ Prepaid ☐ Collect

Shipped to
Company: Lockheed Analytical Services
Address: 975 Kelly Johnson Drive
City: Las Vegas, NV 89119
State / Zip Code
Country

Off-site Custodian

On-site Custodian — Payroll No.

Qty.	Property No.	Description (include Manufacture Name, Model, Serial No.)	Acquisition Cost
1 lbs. 69		Sample #: [illegible] Cooler ID: GW5015 Polycooler with groundwater samples packed in wet ice and vermiculite	N/A
1 lbs. [illegible]		Sample #: ~~Cooler ID:~~ JJS 5/7/94 ~~Polycooler with groundwater samples packed in wet ice and~~ vermiculite	N/A

☐ Classified ☒ Unclassified ☐ Shipped Under DOE Contract ☐ Shipped Under Contractor's Use Permit Contract

Necessity for the off-site use of this property

☐ Required for Project Work. List Project No. 100 U-2 3

☐ Business Trip

☐ Off-site Assignment

Bill of lading # 1007136736

☐ Shipment to Subcontractor. List Subcontract No.

☐ Other (Please specify) Sampling supports RI/FS work in the

CERTIFICATION OF THE RADIATION MONITORING RELEASE MUST BE SECURED THE SAME DAY THAT MATERIAL IS DELIVERED TO SHIPPING.

RM Clearance for Public Release	RM Survey No.	Date

Location of and Contact for Property (Name/Phone No./Bldg./Area)
P. H. Butcher/(509)376-4388

Date Ready for Shipment	Cost Code to be Charged	Approximate Date This Property will be Returned
5/2/94	88410 / PE3A1	N/A

Originated By	Date	Authorized By	Date
[illegible]		[illegible]	5/2/94

Property Representative Signature	Date	Property Management Approval	Date
		[illegible]	5/2/94

PART II - TO BE COMPLETED BY SHIPPING

Authorized Shipping Signature	Date
C.R. [illegible]	5-2-94

DISTRIBUTION (AFTER FINAL SIGNATURES)

White - Property Management Yellow - Shipping Green - Accounts Payable Pink - Originator Goldenrod - Property Management

54-3000-479 (01/94)

027

08035

Lockheed Analytical Services
Sample Receiving Checklist

Client Name: Nichols House - Hanford Job No. L2528 Cooler ID: N/A

COOLER CONDITION UPON RECEIPT

Temperature of cooler upon receipt: 2°C

temperature of temp. blank upon receipt:

	Yes	No	* Comments/Discrepancies
custody seals intact	X		
chain of custody present	X		
blue ice (or equiv.) present/frozen	X		
rad survey completed	X		

SAMPLE CONDITION UPON RECEIPT

	Yes	No	* Comments/Discrepancies
all bottles labeled	X		
samples intact	X		
proper container used for sample type	X		
sample volume sufficient for analysis	X		
proper pres. indicated on the COC	X		
VOA's contain headspace		N/A	

MISCELLANEOUS ITEMS

	Yes	No	* Comments/Discrepancies
samples with short holding times	X		NITRATE/NITRITE. THE HOLDING TIME FOR THIS
samples to subcontract		X	SAMPLE EXPIRES 8-24-95. SAMPLE WILL BE ~~FROM~~ ANALYZED PER CLIENT.

ADDITIONAL COMMENTS/DISCREPANCIES CLP metal call for Cyanide. THE Client DID not send a sample with the right preservative. Cyanide was not logged-in per that reason.

Completed by / date: Paul Davis 8-3-94

Sent to the client (date/initials): ** Client's signature upon receipt:

*Notes: * = contact the appropriate CSR of any discrepancies immediately upon receipt*

*** = please review this information and return via facsimile to the appropriate CSR (702) 361-8146*

Sample Login

Login Review Checklist

Lot Number 42529

The login review should be conducted by that person logging in the samples as well as a peer. Please use this checklist to ensure that such reviews occur in a uniform basis. Please sign and date below to verify that a login review has occurred. This checklist should be affixed to each login package prior to distribution.

For an effective login review, at a minimum, five reports from the login process are required. These are the chain of custody (or equivalent), the login chain of custody report, the sample summary report, the sample receiving checklist, and the login quotation. Before beginning a review, ensure that these five components are available. For jobs with single component samples, the sample summary report may be ommited.

Sample Summary Report N/A	Yes	No
1. Are all sample IDs correct?	X	—
2. Are all samples present?	X	—
3. Are all matrices correct? (e.g., TCLP analyses should be on a TCLP leachate, field blanks should be water)	X	—
4. Are all analyses on the chain of custody/login quotation included?	X	—
5. Are analyses logged in for the correct container? (e.g., analyses requiring preservation logged in for a preserved container and vice versa)	X	—
6. Are samples logged in according to laboratory batching procedures? (e.g., TCLP regular leaching and associated metals/semivolatile organics should be logged in on the same bottle)	X	—

Login Chain of Custody Report		
1. Are the Collect, Receive , and Due dates correct for every sample?	X	—
2. Have appropriate sample comments been included? (e.g., MS/MSD designation, comments from the client concerning method modifications)	X	—

Sample Receiving Checklist		
1. Are any discrepancies between the chain of custody and the login noted? (e.g., client IDs different on chains of custody and bottle labels, samples not sent, samples lost from breakage)	X	—

Paul Davis 8-3-94 Mm 8-3-94

Primary review signature Date Secondary review signature Date

029
08035

9715r6.055

Lockheed Analytical Laboratory
SAMPLE SUMMARY REPORT (su02)
Westinghouse Hanford Co. * Richland, WA

Client Sample Number	LAL Sample Number	SDG Number	Matrix	Method
BOCJJ9	L2528-1		Water	CLP FURNACE
	L2528-1		Water	CLP ICP
	L2528-1		Water	CLP MERCURY
	L2528-2		Water	300.0 CHLORIDE
	L2528-2		Water	300.0 NITRATE
	L2528-2		Water	300.0 NITRITE
	L2528-2		Water	300.0 PHOSPHATE
	L2528-2		Water	300.0 SULFATE
	L2528-3		Water	353.2 NITRATE
	L2528-4		Water	9030 SULFIDE
	L2528-5		Water	350.1 NH3/N
	L2528-6		Water	GROSS ALPHA LAL-0060
	L2528-6		Water	GROSS BETA LAL-0060
	L2528-6		Water	SR-90 LAL-0196
	L2528-8		Water	TRITIUM(H3) LAL-0066
	L2528-10		Water	SCREENING
BOCJK0	L2528-11		Filt H20	CLP FURNACE
	L2528-11		Filt H20	CLP ICP
	L2528-11		Filt H20	CLP MERCURY
REPORT TYPE	L2528-12		Water	EDD - DISK DEL.
	L2528-12		Water	INORG TYPE 4A RPT

9713513.0956

RADIOCHEMISTRY RESULTS
(FORM 1)

RAD DATA REPORT (ra01)

Westinghouse Hanford Co. * Richland, WA

Westinghouse Hanford Project (Richland,WA) (Project WESTINGHOUSE-HANFORD)

Client Sample ID: B0CJJ7 | LAL Sample ID: L2491-9

Date Collected: 25-JUL-94 | Date Received: 28-JUL-94

Matrix: Water | Login Number: L2491

SDG: L2491

Constituent	Analyzed	Batch	Activity	Error	MDA	DataQual	Units
H-3	09-AUG-94	TRITIUM(H3) LAL-0066_11715	760	200	210		pCi/L

RAD DATA REPORT (ra01)

Westinghouse Hanford Co. * Richland, WA

Westinghouse Hanford Project (Richland,WA) (Project WESTINGHOUSE-HANFORD)

Client Sample ID: B0CJJ9 | LAL Sample ID: L2528-6

Date Collected: 01-AUG-94 | Date Received: 03-AUG-94

Matrix: Water | Login Number: L2528

Constituent	Analyzed	Batch	Activity	Error	MDA	DataQual	Units
Gross Alpha	08-SEP-94	GROSS ALPHA LAL-0060_13002	0.3	1.0	2.0	C	pCi/L
Gross Beta	08-SEP-94	GROSS ALPHA LAL-0060_13002	5.3	1.6	2.2		pCi/L
Total radio-strontium	16-SEP-94	SR-90 LAL-0196_13044	-0.19	0.51	0.65		pCi/L

RAD DATA REPORT (ra01)

Westinghouse Hanford Co. * Richland, WA

Westinghouse Hanford Project (Richland,WA) (Project WESTINGHOUSE-HANFORD)

Client Sample ID: B0CJJ9 | LAL Sample ID: L2528-8

Date Collected: 01-AUG-94 | Date Received: 03-AUG-94

Matrix: Water | Login Number: L2528

Constituent	Analyzed	Batch	Activity	Error	MDA	DataQual	Units
H-3	16-AUG-94	TRITIUM(H3) LAL-0066_12116	190	160	240		pCi/L

9713513.0960

VALIDATION SUMMARY

9713513.0961

Golder Associates Inc.

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

Golder Associates

DEC 1994

December 6, 1994

Our ref: 943-1610.010.0400
94-1610/O/94

CH2M Hill
P.O. Box 1510
Richland, Washington 99352

ATTENTION: Ms. Jeanette Duncan

RE: ELECTRONIC TRANSMITTAL OF DATA VALIDATION FINAL SUMMARY REPORT AND SUPPORTING TABLES, CONTRACT NO. MSH-SWV-315905

Dear Ms. Duncan:

This letter is to transmit the 100-HR-3 Round 7 Groundwater Sampling Task Data Validation Summary Report and supporting tables on diskette.

Please call if you have any questions.

Sincerely,

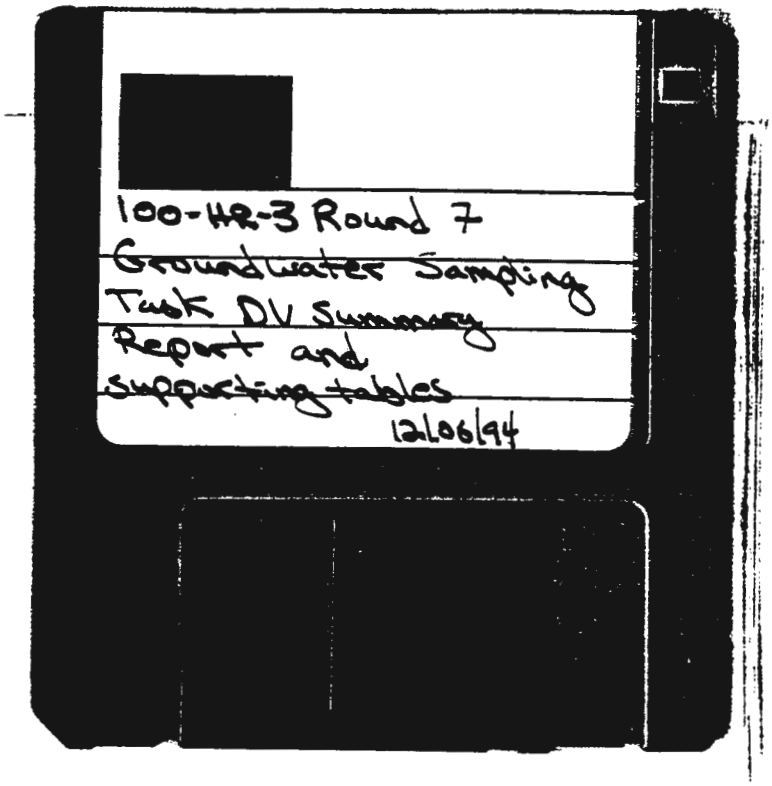
GOLDER ASSOCIATES INC.

Christina I. Jensen
Task Manager

Kent M. Angelos
Project Manager

Enclosures

p:\enviros\whc\dv\hr3-disk.ltr



12/06/94

Data Validation Check List

for Project 100-HR-3

Summary Pkg.
BHI-00129 Rev.00

HEIS Samp Number	Client Sample Number	Master DP File Number	DP Sequence Number	Laboratory	Y N VOA	Y N SEMI VOA	Y N PEST/PCB	Y N WETCHEM	Y N METALS	COMMENTS	Y N RADCHEM	Date OSM Rcvd DP
B0CJJ7		LK02	002	LOCKHEED	N	N	N	Y 9/20/94	Y 9/20/94	07/28/94 - SAF-B94-004 - GA,GB,SR90 CANCELED;DOC-BHI-00129	Y 9/27/94	9/27/94
B0CJJ8		LK02	002	LOCKHEED	N	N	N	N	Y 9/20/94	07/28/94 - SAF-B94-004 - DOC#BHI-00129 REV.00	N	9/20/94
B0CJJ9		LK02	002	LOCKHEED	N	N	N	Y 9/20/94	Y 9/20/94	08/03/94 - SAF-B94-004 - DOC#BHI-00129 REV.00	Y 9/27/94	9/27/94
B0CJK0		LK02	002	LOCKHEED	N	N	N	N	Y 9/20/94	08/03/94 - SAF-B94-004 - DOC#BHI-00129 REV.00	N	9/20/94
B0CJ88		W0149	157	QUANTERRA	N	N	N	Y 9/12/94	Y 9/12/94	07/27/94 - SAF-B94-004;DOC#BHI-00129REV.00;RE ANAL MET(11-14-94)VAL(11-28-94	Y 9/12/94	9/12/94
B0CJ89		W0149	157	QUANTERRA	N	N	N	N	Y 9/12/94	07/27/94 - SAF-B94-004;DOC#BHI-00129REV.00;RE ANAL MET(11-14-94)VAL(11-28-94	N	9/12/94

Validation Rcvd _____

12/06/94

Data Validation Check List

for Project 100-HR-3

HEIS Samp Number	Client Sample Number	Master DP File Number	DP Sequence Number	Laboratory	Y N VOA	Y N SEMI VOA	Y N PEST/PCB	Y N WETCHEM	Y N METALS	COMMENTS	Y N RADCHEM	Date OSM Rcvd DP
B0CJ90		W0149	157	QUANTERRA	N	N	N	Y 9/12/94	Y 9/12/94	07/27/94 - SAF-B94-004;DOC#BHI-00129REV.00;RE ANAL MET(11-14-94)VAL(11-28-94	Y 9/12/94	9/12/94
B0CJ91		W0149	157	QUANTERRA	N	N	N	N	Y 9/12/94	07/27/94 - SAF-B94-004;DOC#BHI-00129REV.00;RE ANAL MET(11-14-94)VAL(11-28-94	N	9/12/94
B0CJ94		W0149	157	QUANTERRA	N	N	N	Y 9/12/94	Y 9/12/94	07/27/94 - SAF-B94-004;DOC#BHI-00129REV.00;RE ANAL MET(11-14-94)VAL(11-28-94	Y 9/12/94	9/12/94
B0CJ95		W0149	157	QUANTERRA	N	N	N	N	Y 9/12/94	07/27/94 - SAF-B94-004;DOC#BHI-00129REV.00;RE ANAL MET(11-14-94)VAL(11-28-94	N	9/12/94
B0CJB4		W0149	157	QUANTERRA	N	N	N	Y 9/12/94	Y 9/12/94	07/27/94 - SAF-B94-004;DOC#BHI-00129REV.00;RE ANAL MET(11-14-94)VAL(11-28-94	Y 9/12/94	9/12/94
B0CJB5		W0149	157	QUANTERRA	N	N	N	N	Y 9/12/94	07/27/94 - SAF-B94-004;DOC#BHI-00129REV.00;RE ANAL MET(11-14-94)VAL(11-28-94	N	9/12/94

Validation Rcvd _____

9/16/94 09:03

12/06/94

Data Validation Check List

for Project 100-HR-3

HEIS Samp Number	Client Sample Number	Master DP File Number	DP Sequence Number	Laboratory	Y N VOA	Y N SEMI VOA	Y N PEST/PCB	Y N WETCHEM	Y N METALS	COMMENTS	Y N RADCHEM	Date OSM Rcvd DP
B0CJB8		W0149	157	QUANTERRA	N	N	N	Y 9/12/94	Y 9/12/94	07/27/94 - SAF-B94-004;DOC#BHI-00129REV.00;RE ANAL MET(11-14-94)VAL(11-28-94	Y 9/12/94	9/12/94
B0CJB9		W0149	157	QUANTERRA	N	N	N	N	Y 9/12/94	07/27/94 - SAF-B94-004;DOC#BHI-00129REV.00;RE ANAL MET(11-14-94)VAL(11-28-94	N	9/12/94
B0CJC0		W0149	157	QUANTERRA	N	N	N	Y 9/12/94	Y 9/12/94	07/27/94 - SAF-B94-004;DOC#BHI-00129REV.00;RE ANAL MET(11-14-94)VAL(11-28-94	Y 9/12/94	9/12/94
B0CJC1		W0149	157	QUANTERRA	N	N	N	N	Y 9/12/94	07/27/94 - SAF-B94-004;DOC#BHI-00129REV.00;RE ANAL MET(11-14-94)VAL(11-28-94	N	9/12/94
B0CJG5		W0149	157	QUANTERRA	N	N	N	Y 9/12/94	Y 9/12/94	07/27/94 - SAF-B94-004;DOC#BHI-00129REV.00;RE ANAL MET(11-14-94)VAL(11-28-94	Y 9/12/94	9/12/94
B0CJG6		W0149	157	QUANTERRA	N	N	N	N	Y 9/12/94	07/27/94 - SAF-B94-004;DOC#BHI-00129REV.00;RE ANAL MET(11-14-94)VAL(11-28-94	N	9/12/94

Validation Rcvd _____

9/16/94 09:04

12/06/94

Data Validation Check List

for Project 100-HR-3

HEIS Samp Number	Client Sample Number	Master DP File Number	DP Sequence Number	Laboratory	Y N VOA	Y N SEMI VOA	Y N PEST/PCB	Y N WETCHEM	Y N METALS	COMMENTS	Y N RADCHEM	Date OSM Rcvd DP
B0CJG7		W0149	157	QUANTERRA	N	N	N	Y 9/12/94	Y 9/12/94	07/27/94 - SAF-B94-004;DOC#BHI-00129REV.00;RE ANAL MET(11-14-94)VAL(11-28-94	Y 9/12/94	9/12/94
B0CJG8		W0149	157	QUANTERRA	N	N	N	N	Y 9/12/94	07/27/94 - SAF-B94-004;DOC#BHI-00129REV.00;RE ANAL MET(11-14-94)VAL(11-28-94	N	9/12/94
B0CJG9		W0149	157	QUANTERRA	N	N	N	Y 9/12/94	Y 9/12/94	07/27/94 - SAF-B94-004;DOC#BHI-00129REV.00;RE ANAL MET(11-14-94)VAL(11-28-94	Y 9/12/94	9/12/94
B0CJH0		W0149	157	QUANTERRA	N	N	N	N	Y 9/12/94	07/27/94 - SAF-B94-004;DOC#BHI-00129REV.00;RE ANAL MET(11-14-94)VAL(11-28-94	N	9/12/94
B0CJJ3		W0149	157	QUANTERRA	N	N	N	Y 9/12/94	Y 9/12/94	07/29/94 - SAF-B94-004;DOC#BHI-00129REV.00;RE ANAL MET(11-14-94)VAL(11-28-94	Y 9/12/94	9/12/94
B0CJJ4		W0149	157	QUANTERRA	N	N	N	N	Y 9/12/94	07/29/94 - SAF-B94-004;DOC#BHI-00129REV.00;RE ANAL MET(11-14-94)VAL(11-28-94	N	9/12/94

Validation Rcvd _____

9712513.0965

12/06/94

Data Validation Check List

for Project 100-HR-3

HEIS Samp Number	Client Sample Number	Master DP File Number	DP Sequence Number	Laboratory	Y N VOA	Y N SEMI VOA	Y N PEST/PCB	Y N WETCHEM	Y N METALS	COMMENTS	Y N RADCHEM	Date OSM Rcvd DP
B0CJ86		W0150	156	QUANTERRA	N	N	N	Y 9/12/94	Y 9/12/94	07/28/94 - SAF-B94-004;DOC#BHI-00129REV.00;RE ANAL MET(11-14-94)VAL(11-28-94	Y 9/12/94	9/12/94
B0CJ87		W0150	156	QUANTERRA	N	N	N	N	Y 9/12/94	07/28/94 - SAF-B94-004;DOC#BHI-00129REV.00;RE ANAL MET(11-14-94)VAL(11-28-94	N	9/12
B0CJ92		W0150	156	QUANTERRA	N	N	N	Y 9/12/94	Y 9/12/94	07/28/94 - SAF-B94-004;DOC#BHI-00129REV.00;RE ANAL MET(11-14-94)VAL(11-28-94	Y 9/12/94	9/12/94
B0CJ93		W0150	156	QUANTERRA	N	N	N	N	Y 9/12/94	07/28/94 - SAF-B94-004;DOC#BHI-00129REV.00;RE ANAL MET(11-14-94)VAL(11-28-94	N	9/12/94
B0CJB0		W0150	156	QUANTERRA	N	N	N	Y 9/12/94	Y 9/12/94	07/28/94 - SAF-B94-004;DOC#BHI-00129REV.00;RE ANAL MET(11-14-94)VAL(11-28-94	Y 9/12/94	9/12/94
B0CJB1		W0150	156	QUANTERRA	N	N	N	N	Y 9/12/94	07/28/94 - SAF-B94-004;DOC#BHI-00129REV.00;RE ANAL MET(11-14-	N	9/12/94

Validation Rcvd _____

9715190966

12/06/94

Data Validation Check List

for Project 100-HR-3

HEIS Samp Number	Client Sample Number	Master DP File Number	DP Sequence Number	Laboratory	Y N VOA	Y N SEMI VOA	Y N PEST/PCB	Y N WETCHEM	Y N METALS	COMMENTS	Y N RADCHEM	Date OSM Rcvd DP
										94)VAL(11-28-94		
B0CJG1		W0150	156	QUANTERRA	N	N	N	Y 9/14/94	Y 9/12/94	07/29/94 - SAF-B94-004;DOC#BHI-00129REV.00;RE ANAL MET(11-14-94)VAL(11-28-94	Y 9/12/94	9/14/94
B0CJG2		W0150	156	QUANTERRA	N	N	N	N	Y 9/12/94	07/29/94 - SAF-B94-004;DOC#BHI-00129REV.00;RE ANAL MET(11-14-94)VAL(11-28-94	N	9/12/94
B0CJG3		W0150	156	QUANTERRA	N	N	N	Y 9/14/94	Y 9/12/94	07/29/94 - SAF-B94-004;DOC#BHI-00129REV.00;RE ANAL MET(11-14-94)VAL(11-28-94	Y 9/12/94	9/14/94
B0CJG4		W0150	156	QUANTERRA	N	N	N	N	Y 9/12/94	07/29/94 - SAF-B94-004;DOC#BHI-00129REV.00;RE ANAL MET(11-14-94)VAL(11-28-94	N	9/12/94
B0CJH1		W0150	156	QUANTERRA	N	N	N	Y 9/12/94	Y 9/12/94	07/28/94 - SAF-B94-004;DOC#BHI-00129REV.00;RE ANAL MET(11-14-94)VAL(11-28-94	Y 9/12/94	9/12/94
B0CJH2		W0150	156	QUANTERRA	N	N	N	N	Y 9/12/94	07/28/94 - SAF-B94-004;DOC#BHI-00129REV.00;RE ANAL MET(11-14-	N	9/12/94

Validation Rcvd _____

9/15/95 BDT

12/06/94

Data Validation Check List

for Project 100-HR-3

HEIS Samp Number	Client Sample Number	Master DP File Number	DP Sequence Number	Laboratory	Y N VOA	Y N SEMI VOA	Y N PEST/PCB	Y N WETCHEM	Y N METALS	COMMENTS	Y N RADCHEM	Date OSM Rcvd DP
										94)VAL(11-28-94		
B0CJH3		W0150	156	QUANTERRA	N	N	N	Y 9/12/94	Y 9/12/94	07/28/94 - SAF-B94-004;DOC#BHI-00129REV.00;RE ANAL MET(11-14-94)VAL(11-28-94	Y 9/12/94	9/12/94
B0CJH4		W0150	156	QUANTERRA	N	N	N	N	Y 9/12/94	07/28/94 - SAF-B94-004;DOC#BHI-00129REV.00;RE ANAL MET(11-14-94)VAL(11-28-94	N	9/12/94
B0CJH5		W0150	156	QUANTERRA	N	N	N	Y 9/14/94	Y 9/12/94	07/29/94 - SAF-B94-004;DOC#BHI-00129REV.00;RE ANAL MET(11-14-94)VAL(11-28-94	Y 9/12/94	9/14/94
B0CJH6		W0150	156	QUANTERRA	N	N	N	N	Y 9/12/94	07/29/94 - SAF-B94-004;DOC#BHI-00129REV.00;RE ANAL MET(11-14-94)VAL(11-28-94	N	9/12/94
B0CJH7		W0150	156	QUANTERRA	N	N	N	Y 9/12/94	Y 9/12/94	07/28/94 - SAF-B94-004;DOC#BHI-00129REV.00;RE ANAL MET(11-14-94)VAL(11-28-94	Y 9/12/94	9/12/94
B0CJH8		W0150	156	QUANTERRA	N	N	N	N	Y 9/12/94	07/28/94 - SAF-B94-004;DOC#BHI-00129REV.00;RE ANAL MET(11-14-Validation Rcvd	N	9/12/94

9/12/94

12/06/94

Data Validation Check List

for Project 100-HR-3

HEIS Samp Number	Client Sample Number	Master DP File Number	DP Sequence Number	Laboratory	Y N VOA	Y N SEMI VOA	Y N PEST/PCB	Y N WETCHEM	Y N METALS	COMMENTS	Y N RADCHEM	Date OSM Rcvd DP
										94)VAL(11-28-94		
B0CJH9		W0150	156	QUANTERRA	N	N	N	Y 9/12/94	Y 9/12/94	07/27/94 - SAF-B94-004;DOC#BHI-00129REV.00;RE ANAL MET(11-14-94)VAL(11-28-94	Y 9/12/94	9/12/94
B0CJJ0		W0150	156	QUANTERRA	N	N	N	N	Y 9/12/94	07/27/94 - SAF-B94-004;DOC#BHI-00129REV.00;RE ANAL MET(11-14-94)VAL(11-28-94	N	9/12/94
B0CJ76		W0156	159	QUANTERRA	N	N	N	Y 9/13/94	Y 9/13/94	08/01/94 - SAF-B94-004;DOC#BHI-00129REV.00;RE ANAL-MET(11-14-94)VAL(11-23-94	Y 9/14/94	9/14/94
B0CJ77		W0156	159	QUANTERRA	N	N	N	N	Y 9/13/94	08/01/94 - SAF-B94-004;DOC#BHI-00129REV.00;RE ANAL-MET(11-14-94)VAL(11-23-94	N	9/13/94
B0CJ82		W0156	159	QUANTERRA	N	N	N	Y 9/13/94	Y 9/13/94	08/02/94 - SAF-B94-004;DOC#BHI-00129REV.00;RE ANAL MET(11-14-94)VAL(11-23-94	Y 9/14/94	9/14/94
B0CJ83		W0156	159	QUANTERRA	N	N	N	N	Y 9/13/94	08/02/94 - SAF-B94-004;DOC#BHI Validation Rcvd _____	N	9/13/94

9/35/94 09/09

12/06/94

Data Validation Check List

for Project 100-HR-3

HEIS Samp Number	Client Sample Number	Master DP File Number	DP Sequence Number	Laboratory	Y N VOA	Y N SEMI VOA	Y N PEST/PCB	Y N WETCHEM	Y N METALS	COMMENTS	Y N RADCHEM	Date OSM Rcvd DP
										-00129REV.00;RE ANAL MET(11-14-94)VAL(11-23-94		
B0CJ84		W0156	159	QUANTERRA	N	N	N	Y 9/13/94	Y 9/13/94	08/01/94 - SAF-B94-004;DOC#BHI-00129REV.00;RE ANAL MET(11-14-94)VAL(11-23-94	Y 9/14/94	9/14/94
B0CJ85		W0156	159	QUANTERRA	N	N	N	N	Y 9/13/94	08/01/94 - SAF-B94-004;DOC#BHI-00129REV.00;RE ANAL MET(11-14-94)VAL(11-23-94	N	9/13/94
B0CJ96		W0156	159	QUANTERRA	N	N	N	Y 9/13/94	Y 9/13/94	08/01/94 - SAF-B94-004;DOC#BHI-00129REV.00;RE ANAL MET(11-14-94)VAL(11-23-94	Y 9/14/94	9/14/94
B0CJ97		W0156	159	QUANTERRA	N	N	N	N	Y 9/13/94	08/01/94 - SAF-B94-004;DOC#BHI-00129REV.00;RE ANAL MET(11-14-94)VAL(11-23-94	N	9/13/94
B0CJ98		W0156	159	QUANTERRA	N	N	N	Y 9/13/94	Y 9/13/94	08/01/94 - SAF-B94-004;DOC#BHI-00129REV.00;RE ANAL MET(11-14-94)VAL(11-23-94	Y 9/14/94	9/14/94
B0CJ99		W0156	159	QUANTERRA	N	N	N	N	Y 9/13/94	08/01/94 - SAF-B94-004;DOC#BHI	N	9/13/94

Validation Rcvd _____

9415120.09

12/06/94

Data Validation Check List

for Project 100-HR-3

HEIS Samp Number	Client Sample Number	Master DP File Number	DP Sequence Number	Laboratory	Y N VOA	Y N SEMI VOA	Y N PEST/PCB	Y N WETCHEM	Y N METALS	COMMENTS	Y N RADCHEM	Date OSM Rcvd DP
										-00129REV.00;RE ANAL MET(11-14-94)VAL(11-23-94		
B0CJB2		W0156	159	QUANTERRA	N	N	N	Y 9/13/94	Y 9/13/94	08/01/94 - SAF-B94-004;DOC#BHI-00129REV.00;RE ANAL MET(11-14-94)VAL(11-23-94	Y 9/14/94	9/14/94
B0CJB3		W0156	159	QUANTERRA	N	N	N	N	Y 9/13/94	08/01/94 - SAF-B94-004;DOC#BHI-00129REV.00;RE ANAL MET(11-14-94)VAL(11-23-94	N	9/13/94
B0CJB6		W0156	159	QUANTERRA	N	N	N	Y 9/13/94	Y 9/13/94	08/01/94 - SAF-B94-004;DOC#BHI-00129REV.00;RE ANAL MET(11-14-94)VAL(11-23-94	Y 9/14/94	9/14/94
B0CJB7		W0156	159	QUANTERRA	N	N	N	N	Y 9/13/94	08/01/94 - SAF-B94-004;DOC#BHI-00129REV.00;RE ANAL MET(11-14-94)VAL(11-23-94	N	9/13/94
B0CJC4		W0156	159	QUANTERRA	N	N	N	Y 9/13/94	Y 9/13/94	08/02/94 - SAF-B94-004;DOC#BHI-00129REV.00;RE ANAL MET(11-14-94)VAL(11-23-94	Y 9/14/94	9/14/94
B0CJC5		W0156	159	QUANTERRA	N	N	N	N	Y 9/13/94	08/02/94 - SAF-B94-004;DOC#BHI Validation Rcvd _____	N	9/13/94

12/06/94

Data Validation Check List

for Project 100-HR-3

HEIS Samp Number	Client Sample Number	Master DP File Number	DP Sequence Number	Laboratory	Y N VOA	Y N SEMI VOA	Y N PEST/PCB	Y N WETCHEM	Y N METALS	COMMENTS	Y N RADCHEM	Date OSM Rcvd DP
										-00129REV.00;RE ANAL MET(11-14-94)VAL(11-23-94		
B0CJF9		W0156	159	QUANTERRA	N	N	N	Y 9/13/94	Y 9/13/94	07/29/94 - SAF-B94-004;DOC#BHI-00129REV.00;RE ANAL MET(11-14-94)VAL(11-23-94	Y 9/14/94	9/14/94
B0CJG0		W0156	159	QUANTERRA	N	N	N	N	Y 9/13/94	07/29/94 - SAF-B94-004;DOC#BHI-00129REV.00;RE ANAL MET(11-14-94)VAL(11-23-94	N	9/13/94
B0CJJ1		W0156	159	QUANTERRA	N	N	N	Y 9/13/94	Y 9/13/94	07/29/94 - SAF-B94-004;DOC#BHI-00129REV.00;RE ANAL MET(11-14-94)VAL(11-23-94	Y 9/14/94	9/14/94
B0CJJ2		W0156	159	QUANTERRA	N	N	N	N	Y 9/13/94	07/29/94 - SAF-B94-004;DOC#BHI-00129REV.00;RE ANAL MET(11-14-94)VAL(11-23-94	N	9/13/94
B0CJ72		W0159	167	QUANTERRA	N	N	N	Y 9/22/94	Y 9/22/94	08/05/94 - SAF-B94-004;DOC#BHI-00129REV.00;RE ANAL MET(11-14-94)VAL(11-23-94	Y 9/22/94	9/22/94

Validation Rcvd _____

12/06/94

Data Validation Check List

for Project 100-HR-3

HEIS Samp Number	Client Sample Number	Master DP File Number	DP Sequence Number	Laboratory	Y N VOA	Y N SEMI VOA	Y N PEST/PCB	Y N WETCHEM	Y N METALS	COMMENTS	Y N RADCHEM	Date OSM Rcvd DP
B0CJ73		W0159	167	QUANTERRA	N	N	N	N	Y 9/22/94	08/05/94 - SAF-B94-004;DOC#BHI-00129REV.00;RE ANAL MET(11-14-94)VAL(11-23-94	N	9/22/94
B0CJ74		W0159	167	QUANTERRA	N	N	N	Y 9/22/94	Y 9/22/94	08/03/94 - SAF-B94-004;DOC#BHI-00129REV.00;RE ANAL MET(11-14-94)VAL(11-23-94	Y 9/22/94	9/22/94
B0CJ75		W0159	167	QUANTERRA	N	N	N	N	Y 9/22/94	08/03/94 - SAF-B94-004;DOC#BHI-00129REV.00;RE ANAL MET(11-14-94)VAL(11-23-94	N	9/22/94
B0CJ78		W0159	167	QUANTERRA	N	N	N	Y 9/22/94	Y 9/22/94	08/02/94 - SAF-B94-004;DOC#BHI-00129REV.00;RE ANAL MET(11-14-94)VAL(11-23-94	Y 9/22/94	9/22/94
B0CJ79		W0159	167	QUANTERRA	N	N	N	N	Y 9/22/94	08/02/94 - SAF-B94-004;DOC#BHI-00129REV.00;RE ANAL MET(11-14-94)VAL(11-23-94	N	9/22/94
B0CJ80		W0159	167	QUANTERRA	N	N	N	Y 9/22/94	Y 9/22/94	08/03/94 - SAF-B94-004;DOC#BHI-00129REV.00;RE ANAL MET(11-14-94)VAL(11-23-94	Y 9/22/94	9/22/94

Validation Rcvd _____

12/06/94

Data Validation Check List

for Project 100-HR-3

HEIS Samp Number	Client Sample Number	Master DP File Number	DP Sequence Number	Laboratory	Y N VOA	Y N SEMI VOA	Y N PEST/PCB	Y N WETCHEM	Y N METALS	COMMENTS	Y N RADCHEM	Date OSM Rcvd DP
B0CJ81		W0159	167	QUANTERRA	N	N	N	N	Y 9/22/94	08/03/94 - SAF-B94-004;DOC#BHI-00129REV.00;RE ANAL MET(11-14-94)VAL(11-23-94	N	9/22/94
B0CJC2		W0159	167	QUANTERRA	N	N	N	Y 9/22/94	Y 9/22/94	08/02/94 - SAF-B94-004;DOC#BHI-00129REV.00;RE ANAL MET(11-14-94)VAL(11-23-94	Y 9/22/94	9/22/94
B0CJC3		W0159	167	QUANTERRA	N	N	N	N	Y 9/22/94	08/02/94 - SAF-B94-004;DOC#BHI-00129REV.00;RE ANAL MET(11-14-94)VAL(11-23-94	N	9/22/94
B0CJJ5		W0159	167	QUANTERRA	N	N	N	Y 9/22/94	Y 9/22/94	08/02/94 - SAF-B94-004;DOC#BHI-00129REV.00;RE ANAL MET(11-14-94)VAL(11-23-94	Y 9/22/94	9/22/94
B0CJJ6		W0159	167	QUANTERRA	N	N	N	N	Y 9/22/94	08/02/94 - SAF-B94-004;DOC#BHI-00129REV.00;RE ANAL MET(11-14-94)VAL(11-23-94	N	9/22/94
B0CJK1		W0159	167	QUANTERRA	N	N	N	Y 9/22/94	Y 9/22/94	08/03/94 - SAF-B94-004-DOC#BHI-00129REV.00;RE ANAL MET(11-14-94)VAL(11-23-94	Y 9/22/94	9/22/94

Validation Rcvd _____

9/22/94

12/06/94

Data Validation Check List

for Project 100-HR-3

HEIS Samp Number	Client Sample Number	Master DP File Number	DP Sequence Number	Laboratory	Y N VOA	Y N SEMI VOA	Y N PEST/PCB	Y N WETCHEM	Y N METALS	COMMENTS	Y N RADCHEM	Date OSM Rcvd DP
B0CJK2		W0159	167	QUANTERRA	N	N	N	N	Y 9/22/94	08/03/94 - SAF-B94-004-DOC#BHI-00129REV.00;RE ANAL MET(11-14-94)VAL(11-23-94	N	9/22/94
B0CJK3		W0159	167	QUANTERRA	N	N	N	Y 9/22/94	Y 9/22/94	08/03/94 - SAF-B94-004-DOC#BHI-00129REV.00;RE ANAL MET(11-14-94)VAL(11-23-94	Y 9/22/94	9/22/94
B0CJK4		W0159	167	QUANTERRA	N	N	N	N	Y 9/22/94	08/03/94 - SAF-B94-004-DOC#BHI-00129REV.00;RE ANAL MET(11-14-94)VAL(11-23-94	N	9/22/94
B0CJK5		W0159	167	QUANTERRA	N	N	N	Y 9/22/94	Y 9/22/94	08/10/94 - SAF-B94-004-DOC#BHI-00129REV.00;RE ANAL MET(11-14-94)VAL(11-23-94	Y 9/22/94	9/22/94
B0CJK6		W0159	167	QUANTERRA	N	N	N	N	Y 9/22/94	08/10/94 - SAF-B94-004-DOC#BHI-00129REV.00;RE ANAL MET(11-14-94)VAL(11-23-94	N	9/22/94
B0CJR8		W0159	167	QUANTERRA	N	N	N	Y 9/22/94	Y 9/22/94	08/10/94 - SAF-B94-004;DOC#BHI-00129REV.00;RE ANAL MET(11-14-94)VAL(11-23-94	Y 9/22/94	9/22/94

Validation Rcvd _____

9/22/94

12/06/94

Data Validation Check List

for Project 100-HR-3

HEIS Samp Number	Client Sample Number	Master DP File Number	DP Sequence Number	Laboratory	Y N VOA	Y N SEMI VOA	Y N PEST/PCB	Y N WETCHEM	Y N METALS	COMMENTS	Y N RADCHEM	Date OSM Rcvd DP
B0CJR9		W0159	167	QUANTERRA	N	N	N	N	Y 9/22/94	08/10/94 - SAF-B94-004;DOC#BHI-00129REV.00;RE ANAL MET(11-14-94)VAL(11-23-94	N	9/22/94

Data Entry Complete: DP DEa

DATATRAC ____

9/23/96

Validation Rcvd 12-5-94

9713513.0977

Golder Associates Inc.

4104-148th Avenue, NE
Redmond, WA 98052
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COPY

Golder Associates

December 2, 1994

DEC 1994
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Validation
Log In

Our ref: 943-1610.010.0400
94-1610/O/89

CH2M Hill
P.O. Box 1510
Richland, Washington 99352

ATTENTION: Ms. Jeanette Duncan

RE: TRANSMITTAL OF DATA VALIDATION FINAL SUMMARY REPORT
CONTRACT NO. MSH-SWV-315905

Dear Ms. Duncan:

This letter is to transmit the revised final data validation summary for the 100-HR-3 Round 7 groundwater sample task.

Included with this are reviewer comment responses which have been addressed within the body of the report. Please call if you have any questions.

Sincerely,

GOLDER ASSOCIATES INC.

Christina I. Jensen
Christina I. Jensen
Task Manager

Kent M. Angelos
Kent M. Angelos
Project Manager

Enclosures

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

9713513.0978

BHI-00129
Rev. 01

DATA VALIDATION SUMMARY REPORT
100-HR-3 ROUND 7 GROUNDWATER SAMPLING TASK

Prepared for

Bechtel Hanford Inc.
Richland, Washington

Prepared by

Golder Associates Inc.
Redmond, Washington

December 2, 1994

943-1610.010

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1.0 INTRODUCTION

This report presents a summary of data validation results on water samples collected for the 100-HR-3 Seventh Round Groundwater Sampling task.

The analyses performed for this project consisted of:

- Metals;
- General chemistry;
- Radiochemistry.

The laboratories used for the analyses were Quanterra (QES) Laboratory and Lockheed Analytical Services (LAS) Laboratory.

As required by the contract and the WHC statement of work (WHC 1994), data validation was conducted using Westinghouse data validation procedures (WHC 1993a and 1993b), in which the sample results were validated to level D as defined by WHC 1993a and 1993b. At the completion of validation and verification of each data package, a data validation summary was prepared and transmitted with the original documentation to Hanford Analytical Services (HAS) for inclusion in the project QA record.

This report provides a summary of the data in terms of defined laboratory performance criteria and project-specific data quality objectives to assure the data is acceptable for use in the 100-HR-3 Seventh Round Groundwater Sampling task. Table 1-1 provides information concerning the data packages which were validated and verified. Tables 1-2 and 1-3 provide a summary and explanation of all qualifiers applied to the validated inorganic and radiochemistry results, respectively.

Five sections, including this introduction, comprise this report. Sections 2.0 through 4.0 provide summaries of the validation of the metals, general chemistry and radiochemistry parameters, respectively. Section 5.0 provides a list of references used to prepare this report and Appendixes A through F to this report include validated data summary tables.

1.1 CHEMICAL ANALYSES

Chemical analysis data consists of 84 water samples analyzed for target analyte list (TAL) metals and 42 water samples for general chemistry parameters (nitrate/nitrite, sulfide, ammonia and anions [chloride, phosphate, nitrate, nitrite, sulfate]). The chemical data and associated QC has been reviewed and validated to verify that reported sample results are acceptable for decision making purposes.

1.2 RADIOCHEMICAL ANALYSES

The radiochemical data consists of 42 water samples analyzed for gross alpha, gross beta, strontium-90 and tritium. The radiochemical data and associated QC has been reviewed and validated to verify that reported sample results are acceptable for decision making purposes.

1.3 WESTINGHOUSE HANFORD GUIDANCE USED

Data validation was conducted using Westinghouse data validation procedures (WHC 1993a and 1993b).

1.4 DEFICIENCIES

Major and minor deficiencies were identified during the validation of the metals, general chemistry and radiochemistry parameters, requiring qualification of the results and is summarized in each analysis-specific section below.

1.5 SAMPLES AND ANALYSES VALIDATED

Table 1-1 provides a cross-reference list of all samples validated including data package tracking numbers, HEIS sample numbers, sample dates, site and sample locations, sample type, and analyses performed.

Table 1-1. 100-HR-3 Data Validation, List of Samples Validated. (Sheet 1 of 2)

DATA PACKAGE ID	SAMPLE ID	SAMPLE DATE	MEDIA	LOCATION	SAMPLE TYPE	METALS	GENERAL CHEMISTRY	RADIO-NUCLIDES
LK02-LAS	B0CJJ7	25-Jul-94	GW	D5-14	SPLIT of B0CJ90	X	X	X
LK02-LAS	B0CJJ8	25-Jul-94	GW	D5-14	SPLIT of B0CJ91	X*		
LK02-LAS	B0CJJ9	01-Aug-94	GW	H3-1	SPLIT of B0CJC4	X	X*	X*
LK02-LAS	B0CJK0	01-Aug-94	GW	H3-1	SPLIT of B0CJC5	X		
W0149-QES-157	B0CJ88	25-Jul-94	GW	D5-12	INVEST	X*	X	X
W0149-QES-157	B0CJ89	25-Jul-94	GW	D5-12	INVEST	X		
W0149-QES-157	B0CJ90	25-Jul-94	GW	D5-14	INVEST	X	X	X
W0149-QES-157	B0CJ91	25-Jul-94	GW	D5-14	INVEST	X		
W0149-QES-157	B0CJ94	25-Jul-94	GW	D5-16	INVEST	X	X*	X*
W0149-QES-157	B0CJ95	25-Jul-94	GW	D5-16	INVEST	X		
W0149-QES-157	B0CJB4	26-Jul-94	GW	D8-3	INVEST	X	X	X
W0149-QES-157	B0CJB5	26-Jul-94	GW	D8-3	INVEST	X		
W0149-QES-157	B0CJB8	26-Jul-94	GW	D8-54A	INVEST	X	X*	X*
W0149-QES-157	B0CJB9	26-Jul-94	GW	D8-54A	INVEST	X		
W0149-QES-157	B0CJC0	26-Jul-94	GW	D8-54B	INVEST	X*	X	X
W0149-QES-157	B0CJC1	26-Jul-94	GW	D8-54B	INVEST	X*		
W0149-QES-157	B0CJG5	26-Jul-94	GW	H4-16	INVEST	X	X	X
W0149-QES-157	B0CJG6	26-Jul-94	GW	H4-16	INVEST	X		
W0149-QES-157	B0CJG7	26-Jul-94	GW	H4-17	INVEST	X*	X	X
W0149-QES-157	B0CJG8	26-Jul-94	GW	H4-17	INVEST	X		
W0149-QES-157	B0CJG9	25-Jul-94	GW	H4-45	INVEST	X	X	X
W0149-QES-157	B0CJH0	25-Jul-94	GW	H4-45	INVEST	X		
W0149-QES-157	B0CJJ3	25-Jul-94	GW	D5-14	DUPLICATE of B0CJ90	X	X	X
W0149-QES-157	B0CJJ4	25-Jul-94	GW	D5-14	DUPLICATE of B0CJ91	X		
W0150-QES-156	B0CJ86	27-Jul-94	GW	D2-6	INVEST	X	X	X
W0150-QES-156	B0CJ87	27-Jul-94	GW	D2-6	INVEST	X*		
W0150-QES-156	B0CJ92	27-Jul-94	GW	D5-15	INVEST	X	X	X
W0150-QES-156	B0CJ93	27-Jul-94	GW	D5-15	INVEST	X		
W0150-QES-156	B0CJB0	27-Jul-94	GW	D5-19	INVEST	X	X*	X*
W0150-QES-156	B0CJB1	27-Jul-94	GW	D5-19	INVEST	X		
W0150-QES-156	B0CJG1	28-Jul-94	GW	H4-13	INVEST	X	X*	X*
W0150-QES-156	B0CJG2	28-Jul-94	GW	H4-13	INVEST	X		
W0150-QES-156	B0CJG3	28-Jul-94	GW	H4-15A	INVEST	X*	X	X
W0150-QES-156	B0CJG4	28-Jul-94	GW	H4-15A	INVEST	X		
W0150-QES-156	B0CJH1	27-Jul-94	GW	H4-46	INVEST	X	X	X
W0150-QES-156	B0CJH2	27-Jul-94	GW	H4-46	INVEST	X		
W0150-QES-156	B0CJH3	27-Jul-94	GW	H4-47	INVEST	X	X*	X*
W0150-QES-156	B0CJH4	27-Jul-94	GW	H4-47	INVEST	X		
W0150-QES-156	B0CJH5	28-Jul-94	GW	H4-48	INVEST	X	X*	X*
W0150-QES-156	B0CJH6	28-Jul-94	GW	H4-48	INVEST	X		
W0150-QES-156	B0CJH7	27-Jul-94	GW	H4-49	INVEST	X	X	X
W0150-QES-156	B0CJH8	27-Jul-94	GW	H4-49	INVEST	X*		
W0150-QES-156	B0CJH9	26-Jul-94	GW	H5-1	INVEST	X*	X	X

Table 1-1. 100-HR-3 Data Validation, List of Samples Validated. (Sheet 2 of 2)

DATA PACKAGE ID	SAMPLE ID	SAMPLE DATE	MEDIA	LOCATION	SAMPLE TYPE	METALS	GENERAL CHEMISTRY	RADIO-NUCLIDES
W0150-QES-156	B0CJJ0	26-Jul-94	GW	H5-1	INVEST	X		
W0156-QES-159	B0CJ76	29-Jul-94	GW	96-43	INVEST	X	X	X
W0156-QES-159	B0CJ77	29-Jul-94	GW	96-43	INVEST	X		
W0156-QES-159	B0CJ82	01-Aug-94	GW	97-51A	INVEST	X*	X	X
W0156-QES-159	B0CJ83	01-Aug-94	GW	97-51A	INVEST	X		
W0156-QES-159	B0CJ84	29-Jul-94	GW	D2-5	INVEST	X	X*	X*
W0156-QES-159	B0CJ85	29-Jul-94	GW	D2-5	INVEST	X*		
W0156-QES-159	B0CJ96	29-Jul-94	GW	D5-17	INVEST	X	X	X
W0156-QES-159	B0CJ97	29-Jul-94	GW	D5-17	INVEST	X*		
W0156-QES-159	B0CJ98	29-Jul-94	GW	D5-18	INVEST	X	X*	X*
W0156-QES-159	B0CJ99	29-Jul-94	GW	D5-18	INVEST	X		
W0156-QES-159	B0CJB2	29-Jul-94	GW	D5-20	INVEST	X	X	X
W0156-QES-159	B0CJB3	29-Jul-94	GW	D5-20	INVEST	X*		
W0156-QES-159	B0CJB6	29-Jul-94	GW	D8-53	INVEST	X	X*	X*
W0156-QES-159	B0CJB7	29-Jul-94	GW	D8-53	INVEST	X		
W0156-QES-159	B0CJC4	01-Aug-94	GW	H3-1	INVEST	X	X	X
W0156-QES-159	B0CJC5	01-Aug-94	GW	H3-1	INVEST	X		
W0156-QES-159	B0CJF9	28-Jul-94	GW	H4-10	INVEST	X	X	X
W0156-QES-159	B0CJG0	28-Jul-94	GW	H4-10	INVEST	X		
W0156-QES-159	B0CJJ1	28-Jul-94	GW	H6-1	INVEST	X	X	X
W0156-QES-159	B0CJJ2	28-Jul-94	GW	H6-1	INVEST	X		
W0159-QES-167	B0CJ72	03-Aug-94	GW	91-46	INVEST	X	X	X
W0159-QES-167	B0CJ73	03-Aug-94	GW	91-46	INVEST	X		
W0159-QES-167	B0CJ74	02-Aug-94	GW	93-48A	INVEST	X		X
W0159-QES-167	B0CJ75	02-Aug-94	GW	93-48A	INVEST	X		
W0159-QES-167	B0CJ78	01-Aug-94	GW	96-49	INVEST	X*	X	X
W0159-QES-167	B0CJ79	01-Aug-94	GW	96-49	INVEST	X*		
W0159-QES-167	B0CJ80	02-Aug-94	GW	97-43	INVEST	X	X	X
W0159-QES-167	B0CJ81	02-Aug-94	GW	97-43	INVEST	X		
W0159-QES-167	B0CJC2	01-Aug-94	GW	D8-55	INVEST	X	X	X
W0159-QES-167	B0CJC3	01-Aug-94	GW	D8-55	INVEST	X*		
W0159-QES-167	B0CJJ5	01-Aug-94	GW	H3-1	DUPLICATE of B0CJC4	X	X*	X*
W0159-QES-167	B0CJJ6	01-Aug-94	GW	H3-1	DUPLICATE of B0CJC5	X		
W0159-QES-167	B0CJK1	02-Aug-94	GW	—	EQUIP BLANK	X	X	X
W0159-QES-167	B0CJK2	02-Aug-94	GW	—	EQUIP BLANK	X		
W0159-QES-167	B0CJK3	02-Aug-94	GW	—	EQUIP BLANK	X	X	X
W0159-QES-167	B0CJK4	02-Aug-94	GW	—	EQUIP BLANK	X	X	
W0159-QES-167	B0CJK5	09-Aug-94	GW	—	EQUIP BLANK	X	X*	X*
W0159-QES-167	B0CJK6	09-Aug-94	GW	—	EQUIP BLANK	X*		
W0159-QES-167	B0CJR8	09-Aug-94	GW	—	EQUIP BLANK	X	X	X
W0159-QES-167	B0CJR9	09-Aug-94	GW	—	EQUIP BLANK	X		

* - Indicates sample results which where 100% recalculated.

Table 1-2. 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.

Table 1-3. 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 MDA 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 MDA. 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 not 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.

2.0 METALS DATA VALIDATION SUMMARY

2.1 SUMMARY

This section presents a summary of the inorganic data validation results and review against the WHC Statement of Work (WHC 1994). Table 1-1 shows the data package identification, HEIS sample identification, sample collection date, location and sample type. Appendix A provides tabular summaries of all validated sample results and Appendix B provides tabulated field QC data.

2.1.1 Five Sample Delivery Groups

Sample results from five inorganic data packages are included in this report:

Data Package ID	No. of Samples
W0149-QES-157	20
W0150-QES-156	20
W0156-QES-159	20
W0159-QES-167	20
LK02-LAS	4

2.1.2 All Samples Validated

Results for the data packages listed above were validated to Level D as specified in Section 1.0, with data qualifiers assigned as specified in the validation procedures.

2.1.3 Westinghouse Hanford Validation Guidance Used

Data validation was performed in accordance with Data Validation Procedures for Chemical Analyses (WHC 1993a).

2.1.4 Samples Analyzed According to CLP Protocols

This section provides a summary of the data in terms of defined laboratory performance criteria and project-specific data quality objectives to assure the data is acceptable for use in the 100-HR-3 Round Seven Groundwater Sampling task.

- **Precision.** Laboratory duplicate RPD results were acceptable with the exception of unfiltered iron, filtered copper, filtered nickel and filtered zinc in two of the five data packages.

Laboratory ICP serial dilution percent difference (%D) performances were acceptable with the exception of the exceedance for unfiltered sodium in one of the five data packages.

Field duplicate RPD values were acceptable with the exception of unfiltered iron and nickel for samples B0CJ90/B0CJJ3 and unfiltered iron for samples B0CJC4/B0CJJ5.

Field split RPD values were acceptable with the exception of unfiltered iron and nickel for samples B0CJ90/B0CJJ7 and unfiltered iron for samples B0CJC4/B0CJJ9.

- **Accuracy.** Laboratory spike recoveries were acceptable with the exception of unfiltered zinc, mercury, selenium, chromium and iron and filtered zinc, copper, selenium and thallium in three of the five data packages.

- **Representativeness.** Field duplicate RPD values were acceptable with the exception of unfiltered iron and nickel in two of the five data packages.

  Field split RPD were acceptable with the exception of unfiltered iron and nickel in two of the five data packages.

- **Completeness.** Overall, 84 samples were validated for metals with a total of 1932 results reported, of which 1917 were deemed valid. This results in a completeness of 99% which meets normal work plan completeness objectives of 90% for precision and accuracy.

- **Comparability.** All results were reported in common units (μg/L) facilitating comparison of the data.

2.1.5 Deficiencies Noted

Major and minor deficiencies were identified requiring qualification of the data which are explained in greater detail below.

2.2 ANALYTICAL METHOD

The following paragraphs summarize the analytical requirements for the metals analyses.

2.2.1 Initial and Continuing Calibration

Initial and continuing calibration requirements were met for all analyses in all data packages with the exception of the following:

Data Package W0150-QES-156. The method of standard addition (MSA) correlation coefficient for selenium in sample B0CJB0 was less than the 0.995 control limit.

In accordance with the data validation requirements, the associated sample result has been qualified as estimated (UJ).

2.2.2 Blanks

Laboratory method blanks (initial and continuing calibration and preparation blanks) were analyzed at the proper frequency and results were undetected with the exception of low concentrations of target analytes as summarized in the following sections.

2.2.2.1 Calibration Blanks. The following is a summary of the analytes detected in the calibration blanks:

Data Package W0149-QES-157. Beryllium, manganese, aluminum, barium, chromium, cobalt, copper, iron, vanadium and mercury were detected in the initial and/or continuing calibration blanks at positive concentrations and silver, vanadium and selenium were detected at negative concentrations.

Data Package W0150-QES-156. Manganese, beryllium, vanadium, aluminum, copper, iron, chromium, mercury and selenium were detected in the associated initial and/or continuing calibration blanks at positive concentrations and silver and vanadium were detected in the associated continuing calibration blanks at negative concentrations.

Data Package W0156-QES-159. Beryllium, manganese and iron were detected in the associated initial and/or continuing calibration blanks at positive concentrations. Vanadium was detected in the associated continuing calibration blanks at negative concentrations.

Data Package W0159-QES-167. Beryllium, manganese, magnesium, sodium, iron, aluminum, calcium, vanadium and chromium were detected in the initial and/or continuing calibration blanks at positive concentrations. Selenium and vanadium were detected in the continuing calibration blanks at negative concentrations.

Data Package LK02-LAS. Copper, iron, manganese, nickel, vanadium and zinc were detected in the associated initial and/or continuing calibration blanks at positive concentrations.

In accordance with the validation requirements, sample results associated with the above calibration blanks were qualified as follows:

- undetected (U) for sample results that are less than five times (5x) the highest associated positive blank concentration, and
- estimated (UJ for non-detects, J for sample results within two times (2x) the absolute value of the associated blank) if associated with negative blank results.

2.2.2.2 Preparation Blanks. The following is a summary of the analytes detected in the preparation blanks:

Data Package W0149-QES-157. Beryllium, manganese, barium, iron, and zinc were detected in the associated preparation blanks at positive concentrations

Data Package W0150-QES-156. Manganese, zinc, beryllium, vanadium, aluminum, iron and mercury were detected in the preparation blank at positive concentrations.

Data Package W0156-QES-159. Beryllium, manganese, zinc and mercury were detected in the preparation blank at positive concentrations.

Data Package W0159-QES-167. Beryllium, manganese, magnesium, sodium, iron, zinc, aluminum, calcium, vanadium, and mercury were detected in the preparation blank at positive concentrations and mercury and lead were detected at negative concentrations.

Data Package LK02-LAS. Copper, iron and zinc were detected in the preparation blank at positive concentrations.

In accordance with the validation requirements, sample results associated with the preparation blanks were qualified as follows:

- undetected (U) for positive sample results less than 5x the highest blank concentration if associated with a positive blank result >IDL but <CRDL, and

- estimated (J for detects, UJ for non-detects) if associated with a negative blank and within ten times (10x) the absolute value of the negative blank that is greater than (>) the IDL but less than (<) the CRDL.

2.2.2.3 Field Blanks. Data Package W0159-QES-167. Samples B0CJK1, B0CJK2, B0CJK3, B0CJK4, B0CJK5, B0CJK6, B0CJR8 and B0CJR9 are identified as equipment blanks. All associated results are nondetects with the exception of aluminum in sample B0CJR9, barium in sample B0CJK5, calcium in samples B0CJK5, B0CJK6, B0CJR8 and B0CJR9, sodium in samples B0CJK6, B0CJR8 and B0CJR9 and zinc in samples B0CJK1, B0CJK5, B0CJK6, B0CJR8 and B0CJR9.

In accordance with the data validation procedures, data qualifiers were not applied based on field blank sample results.

2.3 HOLDING TIMES

Holding time requirements were met for all samples with the exception of the following:

Data Package LK02-LAS. The holding time for mercury was exceeded for all samples.

In accordance with the data validation requirements, the associated sample results have been qualified as estimated (UJ).

2.4 ANALYTICAL ACCURACY

2.4.1 Spike Samples

Spike sample recoveries were acceptable with the exception of the following which were below the minimum 30% control limit:

Data Package W0149-QES-157. Unfiltered zinc.

Data Package W0156-QES-159. Filtered zinc and copper.

In accordance with the data validation requirements, the associated sample results reported and verified as nondetects were qualified as unusable (UR) and the results reported and verified as detects were qualified as estimated (J for detects greater than the CRDL and BJ for detects greater than the IDL but less than the CRDL).

Spike sample percent recoveries were acceptable with the exception of the following which were outside the 75% to 125% control limits, but greater than 30%:

Data Package W0149-QES-157. Unfiltered mercury, filtered selenium and thallium were less than 75% but greater than 30%.

Data Package W0156-QES-159. Unfiltered selenium was less than the 75% control limit but greater than 30%.

Data Package W0159-QES-167. Unfiltered chromium and iron exceeded the 125% control limit. Unfiltered and filtered selenium were less than the 75% control limit but greater than 30%.

In accordance with the validation procedures, the associated positive sample results for unfiltered chromium and iron and the associated sample results for selenium, unfiltered mercury and filtered thallium were qualified as estimated (J for detects, BJ for detects less than the CRDL and greater than the IDL and UJ for nondetects).

2.4.2 Laboratory Control Samples

All laboratory control sample percent recoveries were within the control limits of 80% to 120% with the exception of the following:

Data Package LK02-LAS. Unfiltered mercury.

In accordance with the data validation requirements, the associated sample results have been qualified as estimated (UJ).

2.4.3 GFAA Analytical Spikes

Graphite furnace atomic absorption (GFAA) analytical spike recoveries were acceptable for all samples with the exception of the following analytes in the indicated data packages:

Data Package W0149-QES-157. Arsenic, selenium and thallium.

Data Package W0150-QES-156. Arsenic, lead, selenium and thallium.

Data Package W0156-QES-159. Lead, selenium and thallium.

Data Package W0159-QES-167. Selenium and thallium.

Data Package LK02-LAS. Arsenic and selenium.

In accordance with the data validation requirements, the associated sample results have been qualified as estimated (J for detects, BJ for detects less than the CRDL and greater than the IDL and UJ for nondetects).

2.5 ANALYTICAL PRECISION

2.5.1 Laboratory Duplicates

The laboratory duplicate relative percent differences were within the specified control limits with the following exceptions:

Data Package W0156-QES-159. Filtered copper, nickel and zinc.

Data Package W0159-QES-167. Unfiltered iron.

In accordance with the validation procedures, sample results were qualified as estimated (J for detects and BJ for detects less than the CRDL and greater than the IDL).

2.5.2 ICP Serial Dilution

The ICP serial dilution %D were less than 10% for the validated samples in which sample concentrations were greater than fifty times the instrument detection limit (IDL) with the exception of the following:

Data Package W0149-QES-157. Unfiltered sodium.

In accordance with validation procedures, sample results were qualified as estimated (J for detects and BJ for detects less than the CRDL and greater than the IDL).

2.5.3 Field Duplicates

A total of four samples were identified as field duplicates. Appendix B presents a summary of the primary and duplicate sample results and the calculated RPD values. All RPD values were compared to the specified control limits and were acceptable with the exception of the following analytes for the indicated samples:

Data Package W0149-QES-157. Unfiltered iron and nickel for B0CJ90/B0CJJ3.

Data Package W0156-QES-159. Unfiltered iron for samples B0CJC4/B0CJJ5.

In accordance with the data validation procedures, data qualifiers were not applied based on field duplicate sample results.

2.5.4 Field Splits

A total of four samples were identified as field splits. Appendix B presents a summary of the primary and field split sample results and the calculated RPD values. All RPD values were compared to the specified control limits and were acceptable with the exception of the following analytes for the indicated samples:

Data Packages W0149-QES-157 and LK02-LAS. Unfiltered iron and nickel for samples B0CJ90/B0CJJ7

Data Packages W0156-QES-159 and LK02-LAS. Unfiltered iron for samples B0CJC4/B0CJJ9.

In accordance with the data validation procedures, data qualifiers were not applied based on field split sample results.

2.6 SAMPLE RESULT QUANTITATION, VERIFICATION, AND REPORTED DETECTION LIMITS

All sample results were verified and confirmed against the raw data with results correctly reported. Sample detection limits were calculated properly and were consistent with method detection limit requirements.

2.7 SYSTEM PERFORMANCE AND OVERALL ASSESSMENT

System performance was assessed by a review of the raw data with no indications of poor performance noted.

3.0 GENERAL CHEMISTRY DATA VALIDATION SUMMARY

3.1 SUMMARY

This section presents a summary of the general chemistry data validation results and review against the WHC Statement of Work (WHC 1994). Table 1-1 shows the data package identification, HEIS sample identification, sample collection date, location and sample type. Appendix C provides a summary of all validated data results.

3.1.1 Five Sample Delivery Groups

Sample results from five general chemistry data packages are included in this report:

Data Package ID	No. of Samples
W0149-QES-157	10
W0150-QES-156	10
W0156-QES-159	10
W0159-QES-167	10
LK02-LAS	2

3.1.2 All Samples Validated

Results for the data packages listed above were validated to level D as described in the validation procedures (WHC 1993a).

3.1.3 Westinghouse Hanford Validation Guidance Used

Data validation was performed in accordance with Data Validation Procedures for Chemical Analyses (WHC 1993a).

3.1.4 Samples Analyzed According to CLP Protocols

This section provides a summary of the data in terms of defined laboratory performance criteria and project-specific data quality objectives to assure the data is acceptable for use in the 100-HR-3 Seventh Round Groundwater Sampling task.

- **Precision.** Laboratory duplicate, field duplicate and field split RPD results were within the specified control limits with the exception of a sulfate laboratory duplicate result in one of the five data packages and nitrite-N results in one of two field duplicate and field split samples.

- **Accuracy.** Matrix spike and laboratory spike recoveries were acceptable with the exception of matrix spike percent recoveries in three of the five data packages.

- **Representativeness.** Field duplicate and split RPD values were within specified control limits with the exception of the nitrite-N result for field duplicate samples B0CJ90/B0CJJ3 and field split samples B0CJ90/B0CJJ7.

- **Completeness.** Overall, 42 samples were validated for general chemistry parameters with a total of 336 results reported, of which 243 were deemed valid. This results in a completeness of 72% which does not meet the completeness objective of 90%.

- **Comparability.** All results were reported in common units (mg/L, mg-N/L or μg-N/L) facilitating comparison of the data with the exception of the nitrate+nitrite-N and ammonia-N results which were reported by the LAS laboratory as mg-N/L. These results were converted to μg-N/L in Appendix B facilitating comparison of the QES data results.

3.1.5 Deficiencies Noted

Major and minor deficiencies were identified during data validation. The required qualifications of the data are summarized in greater detail below.

3.2 ANALYTICAL METHOD

The analytical method requirements were met for the analysis of the general chemistry parameters.

3.2.1 Initial and Continuing Calibration

Initial and continuing calibration requirements were met for all analyses with the following exception:

Data Package LK02-LAS. The sulfide analysis initial calibration verification (ICV) associated with sample B0CJJ9 and the sulfide analysis continuing calibration verification (CCV) associated with samples B0CJJ7 and B0CJJ9 exceeded the control limits of 90% to 110%.

In accordance with the data validation requirements, the associated sample results have been qualified as estimated (UJ).

3.2.2 Blanks

3.2.2.1 Laboratory Method Blanks. Laboratory method blanks were analyzed at the proper frequency and results were reported and verified as undetected.

3.2.2.2 Field Blanks. Samples B0CJK1, B0CJK3, B0CJK4, B0CJK5, and B0CJR8 were identified as equipment blanks and all reported results were reported and verified as nondetects with the exception of

3.2.2.2 Field Blanks. Samples B0CJK1, B0CJK3, B0CJK4, B0CJK5, and B0CJR8 were identified as equipment blanks and all reported results were reported and verified as nondetects with the exception of nitrate-N in samples B0CJK1 and B0CJK3 at 0.082 and 0.120 mg-N/L, respectively, and ammonia in sample B0CJK1 at 43.6 μg-N/L.

In accordance with the data validation requirements, no qualifications are applied for positive results in field or equipment blanks.

3.3 HOLDING TIMES

Several sample holding time requirements were exceeded for the general chemistry analyses as summarized below.

Data Packages W0149-QES-157, W0150-QES-156, W0156-QES-159, and W0159-QES-167. The maximum holding time requirements were exceeded by a factor greater than two for the nitrate, nitrite and phosphate analyses for all associated samples.

Data Package LK02-LAS. The holding time requirement for sulfide analysis was exceeded for sample B0CJJ7 and the maximum holding time requirements were exceeded by a factor greater than two for the nitrate, nitrite and phosphate analyses for both samples (B0CJJ7 and B0CJJ9).

In accordance with the validation requirements, the nitrate, nitrite and phosphate sample results reported and verified as nondetects were qualified as unusable (UR) and the associated sample results reported and verified as detects were qualified as estimated (J). The sulfide result for sample B0CJJ7 was qualified as estimated (UJ).

3.4 ANALYTICAL ACCURACY

3.4.1 Matrix Spike Samples

Matrix spike sample percent recoveries (MS %R) were within the control limits of 75% to 125% with the following exceptions:

Data Package W0150-QES-156. The MS %R for sulfate was greater than the 125% control limit and the MS %R for nitrate-N was less than the minimum control limit of 30%.

Data Package W0156-QES-159. The MS %R for sulfate was greater than the 125% control limit.

In accordance with the validation requirements, all associated sulfate results were qualified as estimated (J), and since the associated nitrate-N results were reported and verified as detected, the nitrate results were also qualified as estimated (J).

Data Package LK02-LAS. The MS %R for sulfide was less than the 75% control limit but greater than the 30% minimum control limit.

In accordance with the validation requirements, the associated sulfide results were qualified as estimated (UJ).

3.4.2 Laboratory Control Samples

All laboratory control sample percent recoveries were within the control limits of 80% to 120% for all data packages.

3.5 ANALYTICAL PRECISION

3.5.1 Laboratory Duplicates

The laboratory duplicate relative percent differences (RPD) were within the specified control limits with the exception of the following:

Data Package W0156-QES-159. Sulfate.

In accordance with the validation procedures, the associated sulfate results were qualified as estimated (J).

3.5.2 Field Duplicates

A total of two samples were identified as field duplicates. Appendix D presents a summary of the primary and duplicate sample results and the calculated RPD values. All RPD values were compared to the specified control limits and were acceptable with the exception of the following analytes for the indicated samples:

Data Package W0149-QES-157. Nitrite-N for samples B0CJ90/B0CJJ3.

In accordance with the data validation procedures, data qualifiers were not applied based on field duplicate sample results.

3.5.3 Field Splits

A total of two samples were identified as field splits. Appendix D presents a summary of the primary and field split sample results and the calculated RPD values. All RPD values were compared to the specified control limits and were acceptable with the exception of the following analytes for the indicated samples:

Data Packages W0149-QES-157/LK02-LAS. Nitrite-N for samples B0CJ90/B0CJJ7.

In accordance with the data validation procedures, data qualifiers were not applied based on field split sample results.

3.6 SAMPLE RESULT QUANTITATION, VERIFICATION, AND REPORTED DETECTION LIMITS

All sample results were verified and confirmed against the raw data with results correctly reported. Sample detection limits were calculated properly and were consistent with method detection limit requirements with the following exception:

Data Packages W0150-QES-156, W0156-QES-159 and W0159-QES-167. The detection limit requirement of 0.1 mg/L was not met for the chloride, sulfate and phosphate analyses.

In accordance with the data validation requirements, no qualification was applied for the exceedance of the required detection limit.

3.7 SYSTEM PERFORMANCE AND OVERALL ASSESSMENT

System performance was assessed by a review of the raw data with no indications of poor performance noted.

4.0 RADIOCHEMISTRY DATA VALIDATION SUMMARY

4.1 SUMMARY

This section presents a summary of the radiochemistry data validation results and review against the WHC Statement of Work (WHC 1994). Table 1-1 shows the data package identification, HEIS sample identification, sample collection date, location and sample type. Appendix E provides a summary of all validated data results.

4.1.1 Five Sample Delivery Groups

Sample results from five radiochemistry data packages are included in this report:

Data Package ID	No. of Samples
W0149-QES-157	10
W0150-QES-156	10
W0156-QES-159	10
W0159-QES-167	10
LK02-LAS	2

4.1.2 All Samples Validated

Results for the data packages listed above were validated to level D as described in the validation procedures (WHC 1993b).

4.1.3 Westinghouse Hanford Validation Guidance Used

Data validation was performed in accordance with Data Validation Procedures for Radiochemical Analyses (WHC 1993b).

4.1.4 Samples Analyzed According to CLP Protocols

This section provides a summary of the data in terms of defined laboratory performance criteria and project-specific data quality objectives to assure the data is acceptable for use in the 100-HR-3 Seventh Round Groundwater Sampling task.

- **Precision.** Laboratory duplicate, field duplicate and field split RPD results were within the specified control limits with the exception of one laboratory duplicate result in one of the five data packages.

- **Accuracy.** Laboratory control sample and chemical carrier recoveries were acceptable for all results in the five data packages.

- **Representativeness.** Field duplicate RPD results were within the specifed control limits.

- **Completeness.** Overall, 42 water samples were validated for radiochemistry with 165 results reported, all of which were deemed valid. This results in a completeness of 100% which meets the objective of 90% for precision and accuracy.

- **Comparability.** All results were reported in common units (picocuries per liter, pci/L) facilitating comparison of results.

4.1.5 Deficiencies Noted

There were no major deficiencies identified during validation. Minor deficiencies were identified requiring qualification of the data which are explained in greater detail below.

4.2 ANALYTICAL METHOD

The following paragraphs summarize the analytical requirements for the radiochemistry analyses.

4.2.1 Instrument Calibration

Initial and continuing calibration requirements were met for all analyses in the five data packages.

4.2.2 Blanks

4.2.2.1 Method Blanks. Laboratory method blanks were analyzed at the proper frequency and results were reported and verified as undetected for all analyses.

4.2.2.2 Field Blanks. Samples B0CJK1, B0CJK3, B0CJK5 and B0CJR8 were identified as equipment blanks. All associated sample results were reported and verified as nondetects.

4.2.3 Holding Times

Holding time requirements were met for all samples validated.

4.3 ANALYTICAL ACCURACY

4.3.1 Laboratory Control Samples

Laboratory control (blank spike) samples were analyzed at the required frequency with all results within the specified control limits.

4.4 ANALYTICAL PRECISION

4.4.1 Laboratory Duplicates

Laboratory duplicate relative percent difference values were within required control limits for all data packages with the following exception:

Data Package W0156-QES-159. Gross beta.

In accordance with the validation procedures, the associated sample results were qualified as estimated (J).

4.4.2 Field Duplicates

Samples B0CJJ3 and B0CJJ5 were identified as field duplicate samples. Appendix F presents a summary of the primary and duplicate sample results and the calculated RPD values. All RPD values were within the specified control limits.

4.4.3 Field Splits

Samples B0CJJ7 and B0CJJ9 were identified as field split samples. As indicated in the record of disposition for the data package LK02-LAS, the gross alpha, gross beta and strontium-90 analyses were cancelled. Therefore, the gross beta field split RPD could not be evaluated.

Appendix F presents a summary of the primary and split sample results and the calculated RPD values. The results were within the specified control limits.

4.5 SAMPLE RESULTS QUANTITATION, VERIFICATION AND REPORTED DETECTION LIMITS

All sample results were verified and confirmed against the raw data. Validated results were properly calculated using the proper detectors, efficiencies and background counts. Minimum detectable activities (MDAs) were calculated properly to account for sample volumes and were consistent with method detection limit requirements.

4.6 SYSTEM PERFORMANCE AND OVERALL ASSESSMENT

System performance was assessed by a review of the raw data and no indications of poor performance were noted.

5.0 REFERENCES

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

WHC 1993b, 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.

APPENDIX A

INORGANIC VALIDATED DATA SUMMARY TABLES

Validated Data Summary, Data Package: W0149-QES-157

	Samp#	B0CJ88		B0CJ89		B0CJ90		B0CJ91		B0CJ94		B0CJ95	
	Date	7-25-94		7-25-94		7-25-94		7-25-94		7-25-94		7-25-94	
	Location	D5-12		D5-12		D5-14		D5-14		D5-16		D5-16	
	Depth	---		---		---		---		---		---	
	Type	WATER		WATER		WATER		WATER		WATER		WATER	
	Comments												
Parameter	Units	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
ALUMINUM	UG/L	34.500	U	36.800	U	64.700	U	52.600	U	56.500	U	83.100	U
ANTIMONY	UG/L	46.200	U	46.200	U	46.200	U	46.200	U	46.200	U	46.200	U
ARSENIC	UG/L	3.100	B	2.300	B	4.800	B	3.400	B	5.000	BJ	2.200	B
BARIUM	UG/L	139.000	B	135.000	B	88.300	B	87.000	B	106.000	B	111.000	B
BERYLLIUM	UG/L	0.300	U	0.470	U	0.300	U	0.310	U	0.300	U	0.310	U
CADMIUM	UG/L	3.700	U	3.700	U	3.700	U	3.700	U	3.700	U	3.700	U
CALCIUM	UG/L	136000.000		135000.000		65900.000		65900.000		68600.000		73800.000	
CHROMIUM	UG/L	172.000		173.000		1410.000		1310.000		937.000		999.000	
COBALT	UG/L	3.400	U	3.400	U	3.400	U	3.400	U	3.400	U	3.900	U
COPPER	UG/L	8.100	U	8.100	U	9.300	U	7.600	U	8.900	U	17.800	U
IRON	UG/L	145.000	U	77.700	U	249.000		15.300	U	174.000		54.000	U
LEAD	UG/L	0.900	U	0.900	U	0.900	U	0.900	U	0.900	U	0.900	U
MAGNESIUM	UG/L	27300.000		27100.000		18500.000		18800.000		26300.000		27800.000	
MANGANESE	UG/L	9.100	U	7.200	U	7.600	U	2.600	U	6.900	U	7.400	U
MERCURY	UG/L	0.170	UJ	0.100	U	0.100	UJ	0.100	U	0.100	UJ	0.100	U
NICKEL	UG/L	15.500	U	15.500	U	189.000		15.500	U	26.500	B	22.200	B
POTASSIUM	UG/L	6370.000		6480.000		6360.000		6610.000		7000.000		7560.000	
SELENIUM	UG/L	2.800	UR	6.000	UJ	1.400	UR	1.400	UJ	7.400	UR	1.800	UJ
SILVER	UG/L	3.800	U	3.800	U	3.800	U	3.800	U	3.800	U	4.500	B
SODIUM	UG/L	14300.000	J	14000.000		17600.000	J	17400.000		15400.000	J	16100.000	
THALLIUM	UG/L	1.200	UJ	1.200	UJ	1.200	U	1.200	UJ	1.200	U	1.200	UJ
VANADIUM	UG/L	34.300	U	21.200	U	35.200	U	36.700	U	27.500	U	37.700	U
ZINC	UG/L	11.300	U	5.800	U	10.300	U	5.800	U	64.000	U	14.400	U

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

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Validated Data Summary, Data Package: W0149-QES-157

	Samp#	B0CJB4		B0CJB5		B0CJB8		B0CJB9		B0CJC0		B0CJC1	
	Date	7-26-94		7-26-94		7-26-94		7-26-94		7-26-94		7-26-94	
	Location	D8-3		D8-3		D8-54A		D8-54A		D8-54B		D8-54B	
	Depth	---		---		---		---		---		---	
	Type	WATER		WATER		WATER		WATER		WATER		WATER	
	Comments												
Parameter	Units	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
ALUMINUM	UG/L	50.600	U	34.500	U	71.600	U	34.500	U	55.600	U	34.500	U
ANTIMONY	UG/L	46.200	U	46.200	U	46.200	U	46.200	U	46.200	U	46.200	U
ARSENIC	UG/L	1.800	B	1.600	B	3.800	B	2.800	BJ	4.400	B	3.300	B
BARIUM	UG/L	153.000	B	152.000	B	65.200	B	60.400	B	108.000	B	110.000	B
BERYLLIUM	UG/L	0.310	U	0.300	U	0.300	U	0.870	U	0.300	U	0.790	U
CADMIUM	UG/L	3.700	U	3.700	U	3.700	U	3.700	U	3.700	U	3.700	U
CALCIUM	UG/L	141000.000		141000.000		75900.000		69300.000		44200.000		45800.000	
CHROMIUM	UG/L	156.000		154.000		401.000		351.000		69.800		8.000	U
COBALT	UG/L	3.400	U	3.400	U	3.400	U	3.400	U	3.400	U	3.400	U
COPPER	UG/L	14.100	U	8.100	U	14.900	U	12.900	B	11.300	U	9.300	U
IRON	UG/L	74.200	U	35.600	U	100.000	U	50.300	B	317.000		40.900	U
LEAD	UG/L	0.900	U	0.900	U	0.900	U	0.900	U	18.300		0.900	U
MAGNESIUM	UG/L	12300.000		12700.000		13200.000		12800.000		16400.000		16800.000	
MANGANESE	UG/L	4.600	U	4.200	U	4.600	U	4.900	U	138.000		133.000	
MERCURY	UG/L	0.130	UJ	0.100	U	0.130	UJ	0.100	U	0.150	UJ	0.100	U
NICKEL	UG/L	15.500	U	15.500	U	18.800	B	15.500	U	24.400	B	15.500	U
POTASSIUM	UG/L	9720.000		9620.000		5550.000		4620.000	B	10500.000		10800.000	
SELENIUM	UG/L	1.500	UR	1.400	UJ	2.200	UR	1.400	UJ	1.400	UR	7.000	UJ
SILVER	UG/L	3.800	U	3.800	U	5.300	B	3.800	UJ	3.800	U	3.800	U
SODIUM	UG/L	8500.000	J	8480.000		12500.000	J	11900.000		33100.000	J	34000.000	
THALLIUM	UG/L	1.200	U	1.200	UJ	1.200	U	1.200	UJ	1.200	U	1.200	UJ
VANADIUM	UG/L	39.100	U	30.500	U	37.100	U	24.200	B	31.300	U	43.400	U
ZINC	UG/L	5.800	U	5.800	U	7.200	U	7.100	B	7.700	U	5.800	U

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

Verified
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Validated Data Summary, Data Package: W0149-QES-157

	Samp#	B0CJG5		B0CJG6		B0CJG7		B0CJG8		B0CJG9		B0CJH0	
	Date	7-26-94		7-26-94		7-26-94		7-26-94		7-25-94		7-25-94	
	Location	H4-16		H4-16		H4-17		H4-17		H4-45		H4-45	
	Depth	---		---		---		---		---		---	
	Type	WATER		WATER		WATER		WATER		WATER		WATER	
	Comments												
Parameter	Units	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
ALUMINUM	UG/L	34.500	U	54.200	U	367.000	U	34.500	U	34.500	U	36.400	U
ANTIMONY	UG/L	46.200	U	46.200	U	46.200	U	46.200	U	46.200	U	46.200	U
ARSENIC	UG/L	4.600	B	3.500	B	3.400	B	2.500	B	4.000	B	3.000	B
BARIUM	UG/L	18.800	B	18.000	U	61.200	B	57.800	B	17.500	B	18.800	U
BERYLLIUM	UG/L	0.300	U	0.300	U	0.630	U	0.500	U	0.380	U	0.300	U
CADMIUM	UG/L	3.700	U	3.700	U	3.700	U	3.700	U	3.700	U	3.700	U
CALCIUM	UG/L	46800.000		48200.000		72900.000		72500.000		44700.000		48200.000	
CHROMIUM	UG/L	67.600		15.900	U	125.000		93.000		7.800	B	9.000	U
COBALT	UG/L	3.400	U	3.400	U	3.400	U	3.400	U	3.400	U	3.400	U
COPPER	UG/L	7.600	U	10.100	U	10.100	U	7.600	U	7.600	U	7.600	U
IRON	UG/L	238.000		72.400	U	633.000		57.100	U	36.000	U	33.800	U
LEAD	UG/L	0.900	U	0.900	U	0.900	U	0.900	U	0.900	U	0.900	U
MAGNESIUM	UG/L	5740.000		5860.000		14000.000		13700.000		5280.000		5780.000	
MANGANESE	UG/L	5.900	U	3.500	U	17.600	U	3.800	U	2.200	U	2.600	U
MERCURY	UG/L	0.160	UJ	0.100	U	0.170	UJ	0.100	U	0.100	UJ	0.100	U
NICKEL	UG/L	30.000	B	15.500	U	15.500	U	15.500	U	15.500	U	15.500	U
POTASSIUM	UG/L	3470.000	B	3680.000	B	7190.000		6930.000		2720.000	U	3070.000	B
SELENIUM	UG/L	1.400	UR	1.400	UJ	1.400	UR	1.400	UJ	1.400	UR	1.400	UJ
SILVER	UG/L	3.800	U	3.800	U	3.800	U	3.800	U	3.800	U	3.800	U
SODIUM	UG/L	5580.000	J	5680.000		17100.000	J	16800.000		4860.000	BJ	5200.000	
THALLIUM	UG/L	1.200	U	1.200	UJ	1.200	U	1.200	UJ	1.200	U	1.200	UJ
VANADIUM	UG/L	14.500	U	14.600	U	28.500	U	17.400	B	9.600	UJ	14.800	U
ZINC	UG/L	6.200	U	6.200	U	6.400	U	24.100	U	5.800	U	6.100	U

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

Verified
AGM 12/02/94

9713515.1007

Validated Data Summary, Data Package: W0149-QES-157

	Samp#	BOCJJ3		BOCJJ4	
	Date	7-25-94		7-25-94	
	Location	D5-14		D5-14	
	Depth	---		---	
	Type	WATER		WATER	
	Comments	DUPLICATE		DUPLICATE	
Parameter	Units	Result	Q	Result	Q
ALUMINUM	UG/L	38.700	U	34.500	U
ANTIMONY	UG/L	46.200	U	46.200	U
ARSENIC	UG/L	4.900	B	3.900	B
BARIUM	UG/L	87.500	B	89.100	B
BERYLLIUM	UG/L	0.300	U	0.300	U
CADMIUM	UG/L	3.700	U	3.700	U
CALCIUM	UG/L	65600.000		67400.000	
CHROMIUM	UG/L	1330.000		1340.000	
COBALT	UG/L	3.400	U	3.400	U
COPPER	UG/L	7.700	U	7.600	U
IRON	UG/L	98.400	U	15.500	U
LEAD	UG/L	0.900	U	0.900	U
MAGNESIUM	UG/L	18500.000		19200.000	
MANGANESE	UG/L	4.400	U	2.800	U
MERCURY	UG/L	0.130	UJ	0.100	U
NICKEL	UG/L	15.500	U	15.500	U
POTASSIUM	UG/L	6430.000		6760.000	
SELENIUM	UG/L	1.500	UR	1.400	UJ
SILVER	UG/L	3.800	U	3.800	U
SODIUM	UG/L	17600.000	J	17700.000	
THALLIUM	UG/L	1.200	U	1.200	UJ
VANADIUM	UG/L	40.200	U	40.700	U
ZINC	UG/L	5.800	U	5.800	U

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

Verified
agm 12/02/94

9715613.1008

Validated Data Summary, Data Package: W0150-QES-156

	Samp#	B0CJ86		B0CJ87		B0CJ92		B0CJ93		B0CJB0		B0CJB1	
	Date	7-27-94		7-27-94		7-27-94		7-27-94		7-27-94		7-27-94	
	Location	D2-6		D2-6		D5-15		D5-15		D5-19		D5-19	
	Depth	---		---		---		---		---		---	
	Type	WATER		WATER		WATER		WATER		WATER		WATER	
	Comments												
Parameter	Units	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
ALUMINUM	UG/L	61.700	U	84.600	U	80.000	U	46.700	U	111.000	B	196.000	U
ANTIMONY	UG/L	46.200	U	46.200	U	46.200	U	53.700	B	46.200	U	46.200	U
ARSENIC	UG/L	2.900	B	2.400	B	4.600	B	2.900	B	4.200	B	3.200	B
BARIUM	UG/L	61.600	B	58.600	B	100.000	B	99.000	B	87.600	B	94.600	B
BERYLLIUM	UG/L	0.780	U	0.310	U	0.940	U	0.780	U	0.380	U	3.500	U
CADMIUM	UG/L	3.700	U	3.700	U	3.700	U	3.700	U	3.700	U	3.700	U
CALCIUM	UG/L	89400.000		84600.000		79300.000		77300.000		83500.000		84800.000	
CHROMIUM	UG/L	193.000		164.000		1810.000		1760.000		104.000		66.100	
COBALT	UG/L	3.400	U	3.400	U	3.400	U	3.400	U	3.400	U	3.400	U
COPPER	UG/L	7.600	U	7.600	U	7.600	U	8.900	B	7.600	U	8.000	B
IRON	UG/L	144.000	U	30.800	U	104.000	U	24.700	U	311.000		114.000	U
LEAD	UG/L	1.300	U	1.300	U	1.300	U	1.300	U	1.300	U	1.300	U
MAGNESIUM	UG/L	19400.000		18500.000		19400.000		19000.000		25900.000		26100.000	
MANGANESE	UG/L	7.100	U	3.400	U	4.400	U	3.000	U	7.200	U	6.400	U
MERCURY	UG/L	0.170	U	0.100	U	0.180	U	0.100	U	0.100	U	0.100	U
NICKEL	UG/L	47.200		29.400	B	15.500	U	15.500	U	22.500	B	15.500	U
POTASSIUM	UG/L	5830.000		5390.000		5980.000		5850.000		5960.000		6000.000	
SELENIUM	UG/L	1.400	U	2.300	BJ	1.900	BJ	1.500	BJ	1.400	UJ	2.200	BJ
SILVER	UG/L	3.800	UJ	3.800	U	3.800	UJ	4.400	B	3.800	U	3.800	U
SODIUM	UG/L	13300.000		12900.000		18100.000		17900.000		17000.000		17900.000	
THALLIUM	UG/L	1.200	U	1.200	UJ	1.200	U	1.200	UJ	1.200	U	1.200	UJ
VANADIUM	UG/L	21.800	U	25.700	U	30.400	U	32.700	U	19.300	BJ	27.200	U
ZINC	UG/L	13.700	B	17.500	B	5.800	U	7.900	B	54.700		32.800	

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

Verified
sgm 12/02/94

9713513.1009

Validated Data Summary, Data Package: W0150-QES-156

	Samp#	BOCJG1		BOCJG2		BOCJG3		BOCJG4		BOCJH1		BOCJH2	
	Date	7-28-94		7-28-94		7-28-94		7-28-94		7-27-94		7-27-94	
	Location	H4-13		H4-13		H4-15A		H4-15A		H4-46		H4-46	
	Depth	---		---		---		---		---		---	
	Type	WATER		WATER		WATER		WATER		WATER		WATER	
	Comments												
Parameter	Units	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
ALUMINUM	UG/L	34.500	U	34.500	U	34.500	U	34.500	U	91.000	U	60.600	U
ANTIMONY	UG/L	46.200	U	46.200	U	46.200	U	46.200	U	46.200	U	46.200	U
ARSENIC	UG/L	2.100	B	3.300	B	4.500	BJ	4.400	B	5.400	B	4.000	B
BARIUM	UG/L	25.200	B	41.200	B	83.400	B	82.000	B	30.900	B	32.000	B
BERYLLIUM	UG/L	0.360	U	0.300	U	0.870	U	0.440	U	0.940	U	0.310	U
CADMIUM	UG/L	3.700	U	3.700	U	3.700	U	3.700	U	3.700	U	3.700	U
CALCIUM	UG/L	48400.000		56100.000		54400.000		52600.000		52800.000		53800.000	
CHROMIUM	UG/L	40.800		34.600		123.000		117.000		35.500		25.500	U
COBALT	UG/L	3.400	U	3.400	U	3.400	U	3.400	U	3.400	U	3.400	U
COPPER	UG/L	15.500	B	8.300	B	11.000	B	7.800	B	7.600	U	7.600	U
IRON	UG/L	56.700	B	43.500	B	53.500	B	32.600	B	84.300	U	19.600	U
LEAD	UG/L	1.300	U	1.300	U	1.600	B	1.300	U	1.300	U	1.300	U
MAGNESIUM	UG/L	8560.000		8920.000		11500.000		11200.000		10700.000		11000.000	
MANGANESE	UG/L	3.700	U	3.500	U	4.200	U	3.100	U	3.100	U	1.900	U
MERCURY	UG/L	0.110	U	0.160	B	0.100	U	0.120	B	0.100	U	0.100	U
NICKEL	UG/L	15.500	U	15.500	U	15.500	U	15.500	U	15.500	U	15.500	U
POTASSIUM	UG/L	2720.000	U	5210.000		4370.000	B	5710.000		5600.000		5700.000	
SELENIUM	UG/L	1.400	UJ	1.400	UJ	1.400	UJ	1.400	UJ	1.400	UJ	1.400	UJ
SILVER	UG/L	3.800	U	3.800	U	3.800	U	3.800	U	3.800	UJ	3.900	B
SODIUM	UG/L	6940.000		15900.000		11800.000		11600.000		18200.000		19000.000	
THALLIUM	UG/L	1.200	UJ	1.200	U	1.200	U	1.200	U	1.200	U	1.200	U
VANADIUM	UG/L	10.900	B	12.100	B	19.700	B	16.800	B	19.200	U	23.100	U
ZINC	UG/L	19.000	U	11.500	U	25.400	U	11.100	U	6.300	B	5.800	U

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

Verified
agm 12/02/94

9/35 6.010

Validated Data Summary, Data Package: W0150-QES-156

	Samp#	BOCJH3		BOCJH4		BOCJH5		BOCJH6		BOCJH7		BOCJH8	
	Date	7-27-94		7-27-94		7-28-94		7-28-94		7-27-94		7-27-94	
	Location	H4-47		H4-47		H4-48		H4-48		H4-49		H4-49	
	Depth	---		---		---		---		---		---	
	Type	WATER		WATER		WATER		WATER		WATER		WATER	
	Comments												
Parameter	Units	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
ALUMINUM	UG/L	109.000	U	48.800	U	72.000	B	34.500	U	69.900	U	47.600	U
ANTIMONY	UG/L	46.200	U	46.200	U	46.200	U	46.200	U	46.200	U	46.200	U
ARSENIC	UG/L	4.900	B	3.500	B	3.100	B	3.000	B	4.300	B	3.200	B
BARIUM	UG/L	14.200	B	15.000	B	17.200	B	17.000	B	25.000	B	23.900	B
BERYLLIUM	UG/L	0.620	U	0.310	U	0.430	U	0.300	U	0.620	U	0.310	U
CADMIUM	UG/L	3.700	U	3.700	U	3.700	U	3.700	U	3.700	U	3.700	U
CALCIUM	UG/L	35900.000		36100.000		32500.000		33000.000		28700.000		28600.000	
CHROMIUM	UG/L	17.500	U	8.500	U	12.000		45.800		11.300	U	5.300	U
COBALT	UG/L	3.400	U	3.400	U	3.400	U	3.400	U	3.400	U	3.400	U
COPPER	UG/L	7.600	U	7.600	U	8.400	B	7.600	U	7.600	U	7.600	U
IRON	UG/L	70.400	U	23.000	U	108.000		364.000		71.700	U	15.700	U
LEAD	UG/L	1.300	U	1.300	U	48.800		1.300	U	1.300	U	1.300	U
MAGNESIUM	UG/L	5910.000		5980.000		6640.000		6800.000		6800.000		6810.000	
MANGANESE	UG/L	3.000	U	1.700	U	3.800	U	3.300	U	2.900	U	2.200	U
MERCURY	UG/L	0.130	U	0.100	U	0.100	U	0.200		0.160	U	0.100	U
NICKEL	UG/L	15.500	U	15.500	U	15.500	U	15.500	U	15.500	U	15.500	U
POTASSIUM	UG/L	3170.000	B	2990.000	B	3280.000	B	4160.000	B	4620.000	B	4530.000	B
SELENIUM	UG/L	1.400	U	1.400	U	1.400	UJ	1.600	UJ	1.400	U	1.400	U
SILVER	UG/L	3.800	UJ	3.800	U	3.800	U	3.800	U	3.800	UJ	3.800	U
SODIUM	UG/L	5740.000		5790.000		6450.000		6780.000		9450.000		9350.000	
THALLIUM	UG/L	1.200	U	1.200	U	1.200	U	1.200	U	1.200	U	1.200	U
VANADIUM	UG/L	13.100	U	9.600	U	11.500	B	9.700	B	11.800	U	15.900	U
ZINC	UG/L	5.800	U	5.800	U	17.300	U	9.300	U	36.800		5.800	U

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

Verified
SGM 12/02/94

9736510.1011

Validated Data Summary, Data Package: W0150-QES-156

Parameter	Units	Samp# / Date / Location / Depth / Type / Comments: BOCJH9, 7-26-94, H5-1, ---, WATER	Q	BOCJJ0, 7-26-94, H5-1, ---, WATER	Q
ALUMINUM	UG/L	205.000	U	34.500	U
ANTIMONY	UG/L	46.200	U	46.200	U
ARSENIC	UG/L	2.600	B	1.600	B
BARIUM	UG/L	57.500	B	57.500	B
BERYLLIUM	UG/L	0.310	U	0.300	U
CADMIUM	UG/L	3.700	U	3.700	U
CALCIUM	UG/L	67300.000		70100.000	
CHROMIUM	UG/L	177.000		91.500	
COBALT	UG/L	3.400	U	3.400	U
COPPER	UG/L	13.700	U	7.600	U
IRON	UG/L	612.000		70.200	U
LEAD	UG/L	1.300	U	1.300	UJ
MAGNESIUM	UG/L	17600.000		18100.000	
MANGANESE	UG/L	17.300	U	3.500	U
MERCURY	UG/L	0.100	U	0.100	U
NICKEL	UG/L	40.000	B	15.500	U
POTASSIUM	UG/L	6910.000		7060.000	
SELENIUM	UG/L	1.400	UJ	1.400	UJ
SILVER	UG/L	3.800	B	3.800	U
SODIUM	UG/L	28000.000		28600.000	
THALLIUM	UG/L	1.200	U	1.200	U
VANADIUM	UG/L	25.800	U	22.500	U
ZINC	UG/L	231.000		128.000	

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

Verified
sgm 12/02/94

97/5513.1012

Validated Data Summary, Data Package: W0156-QES-159

	Samp#	B0CJ76		B0CJ77		B0CJ82		B0CJ83		B0CJ84		B0CJ85	
	Date	7-29-94		7-29-94		8-1-94		8-1-94		7-29-94		7-29-94	
	Location	96-43		96-43		97-51A		97-51A		D2-5		D2-5	
	Depth	---		---		---		---		---		---	
	Type	WATER		WATER		WATER		WATER		WATER		WATER	
	Comments												
Parameter	Units	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
ALUMINUM	UG/L	55.100	B	29.000	U	30.800	B	29.000	U	29.000	U	29.000	U
ANTIMONY	UG/L	46.200	U	46.200	U	46.200	U	46.200	U	46.200	U	46.200	U
ARSENIC	UG/L	3.500	B	2.800	B	1.200	B	1.100	U	3.900	B	2.800	B
BARIUM	UG/L	44.000	B	42.400	B	87.100	B	88.000	B	61.700	B	62.900	B
BERYLLIUM	UG/L	0.440	U	0.300	U	0.430	U	0.440	U	0.440	U	0.440	U
CADMIUM	UG/L	3.700	U	3.700	U	3.700	U	3.700	U	3.700	U	3.700	U
CALCIUM	UG/L	43600.000		42500.000		53400.000		53500.000		64700.000		64600.000	
CHROMIUM	UG/L	177.000		157.000		52.900		52.200		38.600		40.200	
COBALT	UG/L	3.400	U	3.400	U	3.400	U	3.400	U	3.400	U	3.400	U
COPPER	UG/L	12.000	B	8.900	BJ	11.000	B	10.600	BJ	12.100	B	9.000	BJ
IRON	UG/L	160.000		28.900	U	890.000		51.100	B	170.000		35.400	U
LEAD	UG/L	1.300	U	1.300	U	1.300	U	1.300	U	1.300	U	1.300	U
MAGNESIUM	UG/L	12500.000		12300.000		12300.000		12300.000		19400.000		19500.000	
MANGANESE	UG/L	6.600	B	3.400	U	3.600	U	3.400	U	10.400	B	3.700	U
MERCURY	UG/L	0.140	U	0.160	U	0.130	U	0.120	U	0.170	U	0.190	U
NICKEL	UG/L	15.500	U	15.500	U	15.500	U	15.500	U	15.500	U	15.500	U
POTASSIUM	UG/L	4780.000	B	5130.000		3270.000	B	4210.000	B	4370.000	B	5700.000	
SELENIUM	UG/L	7.000	UJ	1.400	UJ	7.000	UJ	1.900	BJ	7.000	UJ	1.400	UJ
SILVER	UG/L	4.200	U	4.200	U	4.200	U	4.200	U	4.200	U	4.200	U
SODIUM	UG/L	20400.000		20800.000		12100.000		12500.000		14200.000		14900.000	
THALLIUM	UG/L	1.200	U	1.200	U	1.200	UJ	1.200	UJ	1.200	UJ	1.200	UJ
VANADIUM	UG/L	16.700	B	14.000	B	15.200	B	12.200	B	24.800	B	21.400	B
ZINC	UG/L	6.300	B	5.800	BJ	17.600	U	11.100	UR	8.400	B	5.800	UR

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

Verified
Sgm 12/02/94

Validated Data Summary, Data Package: W0156-QES-159

	Samp#	B0CJ96		B0CJ97		B0CJ98		B0CJ99		B0CJB2		B0CJB3	
	Date	7-29-94		7-29-94		7-29-94		7-29-94		7-29-94		7-29-94	
	Location	D5-17		D5-17		D5-18		D5-18		D5-20		D5-20	
	Depth	---		---		---		---		---		---	
	Type	WATER		WATER		WATER		WATER		WATER		WATER	
	Comments												
Parameter	Units	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
ALUMINUM	UG/L	407.000		29.000	U	131.000	B	29.000	U	71.100	B	29.000	U
ANTIMONY	UG/L	46.200	U	46.200	U	46.200	U	46.200	U	46.200	U	46.200	U
ARSENIC	UG/L	1.800	B	1.400	B	1.600	B	1.400	B	2.600	B	2.500	B
BARIUM	UG/L	56.900	B	56.000	B	88.200	B	86.400	B	75.800	B	66.000	B
BERYLLIUM	UG/L	0.440	U	0.370	U	0.800	U	0.440	U	0.580	U	0.440	U
CADMIUM	UG/L	3.700	U	3.700	U	3.700	U	3.700	U	3.700	U	3.700	U
CALCIUM	UG/L	49800.000		50400.000		82100.000		81400.000		52900.000		46100.000	
CHROMIUM	UG/L	117.000		11.400		101.000		59.000		240.000		174.000	
COBALT	UG/L	3.400	U	3.400	U	3.400	U	3.400	U	3.400	U	3.400	U
COPPER	UG/L	17.300	B	14.200	BJ	15.400	B	12.000	BJ	13.800	B	9.000	BJ
IRON	UG/L	1050.000		36.200	U	452.000		36.700	U	243.000		29.000	U
LEAD	UG/L	1.300	U	1.300	U	1.300	U	1.300	U	1.300	U	1.300	U
MAGNESIUM	UG/L	15900.000		16200.000		25400.000		25200.000		16600.000		14600.000	
MANGANESE	UG/L	21.900		6.300	B	13.400	B	4.800	B	9.100	B	3.500	U
MERCURY	UG/L	0.180	U	0.180	U	0.180	U	0.180	U	0.100	U	0.120	U
NICKEL	UG/L	55.900		16.500	BJ	17.400	B	15.500	U	15.500	U	15.500	U
POTASSIUM	UG/L	5360.000		5120.000		5530.000		5330.000		5160.000		4070.000	B
SELENIUM	UG/L	1.400	UJ	1.400	UJ	1.800	BJ	2.400	BJ	7.000	UJ	1.400	UJ
SILVER	UG/L	4.200	U	4.200	U	4.200	U	4.200	U	4.200	U	4.200	U
SODIUM	UG/L	11600.000		12600.000		12200.000		12100.000		16200.000		14000.000	
THALLIUM	UG/L	1.200	UJ	1.200	UJ	1.300	BJ	1.200	UJ	1.200	UJ	1.200	UJ
VANADIUM	UG/L	15.500	B	11.400	B	20.000	B	18.000	B	28.400	B	25.900	B
ZINC	UG/L	37.800		13.500	BJ	9.000	B	11.400	BJ	12.200	B	5.800	UR

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

Verified
gjm 12/02/94

Validated Data Summary, Data Package: W0156-QES-159

	Samp#	B0CJB6		B0CJB7		B0CJC4		B0CJC5		B0CJF9		B0CJG0	
	Date	7-29-94		7-29-94		8-1-94		8-1-94		7-28-94		7-28-94	
	Location	D8-53		D8-53		H3-1		H3-1		H4-10		H4-10	
	Depth	---		---		---		---		---		---	
	Type	WATER		WATER		WATER		WATER		WATER		WATER	
	Comments												
Parameter	Units	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
ALUMINUM	UG/L	38.200	B	29.000	U	40.200	B	29.000	U	117.000	B	46.200	B
ANTIMONY	UG/L	46.200	U	46.200	U	46.200	U	46.200	U	46.200	U	46.200	U
ARSENIC	UG/L	1.900	B	2.200	B	4.100	B	4.100	B	1.600	B	1.700	B
BARIUM	UG/L	71.800	B	70.700	B	20.000	B	20.300	B	58.500	B	55.600	B
BERYLLIUM	UG/L	0.590	U	0.580	U	0.440	U	0.430	U	0.360	U	0.300	U
CADMIUM	UG/L	3.700	U	3.700	U	3.700	U	3.700	U	3.700	U	3.700	U
CALCIUM	UG/L	79700.000		78900.000		33000.000		34000.000		42000.000		40100.000	
CHROMIUM	UG/L	363.000		346.000		10.700		5.300	U	108.000		56.100	
COBALT	UG/L	3.400	U	3.400	U	3.400	U	3.400	U	3.400	U	3.400	U
COPPER	UG/L	13.400	B	12.400	BJ	10.100	B	10.900	BJ	11.000	B	502.000	J
IRON	UG/L	177.000		35.100	U	865.000		31.100	B	270.000		126.000	
LEAD	UG/L	1.300	UJ	1.300	U	1.300	U	1.300	U	1.300	U	2.800	B
MAGNESIUM	UG/L	11600.000		11500.000		8380.000		8600.000		10000.000		9640.000	
MANGANESE	UG/L	6.600	B	4.900	B	10.600	U	3.500	U	7.000	U	3.500	U
MERCURY	UG/L	0.130	U	0.150	U	0.100	U	0.100	U	0.100	U	0.190	U
NICKEL	UG/L	15.500	U	15.500	U	15.500	U	15.500	U	42.800		138.000	J
POTASSIUM	UG/L	3920.000	B	3420.000	B	4610.000	B	4800.000	B	4710.000	B	5060.000	
SELENIUM	UG/L	7.000	UJ	1.400	UJ	1.400	UJ	1.400	UJ	7.000	UJ	1.400	UJ
SILVER	UG/L	4.200	U	4.200	U	4.200	U	4.200	U	4.200	U	4.200	U
SODIUM	UG/L	9320.000		9360.000		12900.000		13300.000		13400.000		13000.000	
THALLIUM	UG/L	1.200	UJ	1.200	UJ	1.200	BJ	1.200	U	1.200	U	1.200	U
VANADIUM	UG/L	17.900	B	17.100	B	19.600	B	17.800	B	15.000	B	12.300	B
ZINC	UG/L	8.200	B	6.500	BJ	13.200	U	7.600	UR	14.300	U	950.000	J

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

Verified
sgm 12/02/94

9715K.105

Validated Data Summary, Data Package: W0156-QES-159

Parameter	Units	Samp# / Date / Location / Depth / Type / Comments: B0CJJ1, 7-28-94, H6-1, ---, WATER	Q	B0CJJ2, 7-28-94, H6-1, ---, WATER	Q
ALUMINUM	UG/L	29.000	U	45.900	B
ANTIMONY	UG/L	46.200	U	46.200	U
ARSENIC	UG/L	3.200	B	1.800	B
BARIUM	UG/L	37.900	B	25.400	B
BERYLLIUM	UG/L	0.380	U	0.430	U
CADMIUM	UG/L	3.700	U	3.700	U
CALCIUM	UG/L	53300.000		47500.000	
CHROMIUM	UG/L	33.000		35.900	
COBALT	UG/L	3.400	U	3.400	U
COPPER	UG/L	7.600	U	42.000	J
IRON	UG/L	20.500	B	38.300	B
LEAD	UG/L	1.300	U	1.300	U
MAGNESIUM	UG/L	7770.000		8420.000	
MANGANESE	UG/L	2.300	U	4.500	U
MERCURY	UG/L	0.140	U	0.180	U
NICKEL	UG/L	15.500	U	15.500	U
POTASSIUM	UG/L	4810.000	B	3400.000	B
SELENIUM	UG/L	1.400	UJ	1.400	UJ
SILVER	UG/L	4.200	U	4.200	U
SODIUM	UG/L	14300.000		6990.000	
THALLIUM	UG/L	1.600	BJ	1.200	U
VANADIUM	UG/L	9.800	UJ	12.300	B
ZINC	UG/L	26.700		61.600	UR

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

Verified
sgm 12/02/94

9713513.1016

Validated Data Summary, Data Package: W0159-QES-167

Parameter	Units	Samp#	B0CJ72		B0CJ73		B0CJ74		B0CJ75		B0CJ78		B0CJ79	
		Date	8-3-94		8-3-94		8-2-94		8-2-94		8-1-94		8-1-94	
		Location	91-46		91-46		93-48A		93-48A		96-49		96-49	
		Depth	---		---		---		---		---		---	
		Type	WATER		WATER		WATER		WATER		WATER		WATER	
		Comments												
			Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
ALUMINUM	UG/L		29.000	U	29.000	U	552.000		63.000	U	29.000	U	34.800	B
ANTIMONY	UG/L		46.200	U	46.200	U	46.200	U	46.200	U	46.200	U	46.200	U
ARSENIC	UG/L		9.500	B	9.900	B	7.400	B	6.500	B	5.200	B	4.300	B
BARIUM	UG/L		29.000	B	29.200	B	44.600	B	37.400	B	80.500	B	84.900	B
BERYLLIUM	UG/L		0.430	U	0.440	U	0.780	U	0.940	U	0.380	U	0.430	U
CADMIUM	UG/L		3.700	U	3.700	U	3.700	U	3.700	U	3.700	U	3.700	U
CALCIUM	UG/L		29900.000		29600.000		33200.000		33300.000		51300.000		50400.000	
CHROMIUM	UG/L		26.400	J	13.100		57.600	J	21.800	U	35.000	J	38.600	
COBALT	UG/L		3.400	U	3.400	U	3.400	U	3.400	U	3.400	U	3.400	U
COPPER	UG/L		9.300	B	7.600	U	7.600	U	7.600	U	7.600	U	13.700	B
IRON	UG/L		102.000	J	54.500	B	1090.000	J	27.400	U	277.000	J	103.000	
LEAD	UG/L		1.300	U	1.300	UJ	1.300	U	1.300	UJ	1.300	U	1.300	U
MAGNESIUM	UG/L		11800.000		11700.000		10700.000		10500.000		11200.000		11600.000	
MANGANESE	UG/L		3.600	U	2.900	U	40.800		4.000	U	5.400	U	4.500	U
MERCURY	UG/L		0.100	U	0.100	U	0.180	U	0.100	UJ	0.180	U	0.180	U
NICKEL	UG/L		15.500	U	15.500	U	24.000	B	15.500	U	15.500	U	15.500	U
POTASSIUM	UG/L		3500.000	B	4440.000	B	5230.000		5310.000		5520.000		4480.000	B
SELENIUM	UG/L		7.000	UJ	1.400	UJ	7.000	UJ	1.400	UJ	7.000	UJ	1.400	UJ
SILVER	UG/L		4.200	U	4.200	U	4.200	U	4.200	U	4.200	U	4.200	U
SODIUM	UG/L		20900.000		20900.000		19000.000		18800.000		12700.000		13300.000	
THALLIUM	UG/L		1.200	UJ	1.200	U	1.200	UJ	1.200	U	1.300	BJ	1.200	U
VANADIUM	UG/L		27.700	B	26.500	B	17.900	U	17.600	U	18.600	BJ	21.000	B
ZINC	UG/L		13.900	B	13.600	B	11.200	B	7.800	B	21.100		10.700	U

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

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sgm 12/02/94

Validated Data Summary, Data Package: W0159-QES-167

	Samp#	B0CJ80		B0CJ81		B0CJC2		B0CJC3		B0CJJ5		B0CJJ6	
	Date	8-2-94		8-2-94		8-1-94		8-1-94		8-1-94		8-1-94	
	Location	97-43		97-43		D8-55		D8-55		H3-1		H3-1	
	Depth	---		---		---		---		---		---	
	Type	WATER		WATER		WATER		WATER		WATER		WATER	
	Comments									DUPLICATE		DUPLICATE	
Parameter	Units	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
ALUMINUM	UG/L	66.500	U	78.900	U	99.500	B	104.000	B	37.900	B	29.000	U
ANTIMONY	UG/L	46.200	U	46.200	U	46.200	U	46.200	U	46.200	U	46.200	U
ARSENIC	UG/L	1.800	B	1.100	U	1.800	B	1.800	B	4.400	B	3.800	B
BARIUM	UG/L	42.000	B	40.900	B	59.700	B	61.100	B	20.800	B	19.900	B
BERYLLIUM	UG/L	0.940	U	0.940	U	0.430	U	0.430	U	0.300	U	0.300	U
CADMIUM	UG/L	3.700	U	3.700	U	3.700	U	3.700	U	3.700	U	3.700	U
CALCIUM	UG/L	47400.000		47600.000		39700.000		40300.000		34300.000		33400.000	
CHROMIUM	UG/L	183.000	J	180.000		121.000	J	21.300		5.700	BJ	5.300	U
COBALT	UG/L	3.400	U	3.400	U	3.400	U	3.400	U	3.400	U	3.400	U
COPPER	UG/L	7.600	U	7.600	U	13.200	B	13.200	B	8.700	B	7.600	U
IRON	UG/L	340.000	J	25.100	U	598.000	J	84.200	B	267.000	J	33.200	B
LEAD	UG/L	1.300	U	1.300	UJ	1.800	B	1.300	U	1.300	U	1.300	U
MAGNESIUM	UG/L	10500.000		10500.000		6490.000		6570.000		8660.000		8460.000	
MANGANESE	UG/L	9.900	U	5.100	U	12.400	U	4.000	U	7.800	U	3.200	U
MERCURY	UG/L	0.130	U	0.100	UJ	0.140	U	0.170	U	0.140	U	0.180	U
NICKEL	UG/L	15.500	U	15.500	U	64.400		15.500	U	15.500	U	15.500	U
POTASSIUM	UG/L	5050.000		5220.000		3820.000	B	4610.000	B	3000.000	B	4250.000	B
SELENIUM	UG/L	7.000	UJ	1.400	UJ	1.400	UJ	1.400	UJ	7.000	UJ	1.400	UJ
SILVER	UG/L	4.200	U	4.200	U	4.200	U	4.200	U	4.200	U	4.200	U
SODIUM	UG/L	22900.000		22800.000		6360.000		6490.000		13500.000		13200.000	
THALLIUM	UG/L	1.200	U	1.200	U	1.200	UJ	1.200	UJ	1.200	U	1.200	U
VANADIUM	UG/L	9.800	U	9.800	U	11.400	B	11.900	B	18.200	B	16.000	B
ZINC	UG/L	5.800	U	8.300	B	135.000		27.700	U	13.700	U	5.800	U

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

Verified
sgm 12/02/94

9713513.1018

Validated Data Summary, Data Package: W0159-QES-167

	Samp#	B0CJK1		B0CJK2		B0CJK3		B0CJK4		B0CJK5		B0CJK6	
	Date	8-2-94		8-2-94		8-2-94		8-2-94		8-9-94		8-9-94	
	Location	---		---		---		---		---		---	
	Depth	---		---		---		---		---		---	
	Type	WATER		WATER		WATER		WATER		WATER		WATER	
	Comments	EQ. BLANK		EQ. BLANK		EQ. BLANK		EQ. BLANK		EQ. BLANK		EQ. BLANK	
Parameter	Units	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
ALUMINUM	UG/L	29.000	U	47.600	U	68.300	U	38.600	U	29.000	U	29.000	U
ANTIMONY	UG/L	46.200	U	46.200	U	46.200	U	46.200	U	46.200	U	46.200	U
ARSENIC	UG/L	1.100	U	1.100	U	1.100	U	1.100	U	1.100	U	1.100	U
BARIUM	UG/L	1.300	U	1.300	U	1.300	U	1.300	U	1.400	B	1.300	U
BERYLLIUM	UG/L	0.470	U	0.780	U	0.470	U	0.940	U	0.430	U	0.300	U
CADMIUM	UG/L	3.700	U	3.700	U	3.700	U	3.700	U	3.700	U	3.700	U
CALCIUM	UG/L	166.000	U	244.000	U	108.000	U	92.400	U	57.000	B	72.000	B
CHROMIUM	UG/L	5.300	U	5.300	U	5.300	U	5.300	U	5.300	U	5.300	U
COBALT	UG/L	3.400	U	3.400	U	3.400	U	3.400	U	3.400	U	3.400	U
COPPER	UG/L	7.600	U	7.600	U	7.600	U	7.600	U	7.600	U	7.600	U
IRON	UG/L	28.900	UJ	21.100	U	21.700	UJ	21.500	U	20.600	UJ	30.700	U
LEAD	UG/L	1.300	U	1.300	UJ	1.300	U	1.300	UJ	1.300	U	1.300	UJ
MAGNESIUM	UG/L	44.900	U	44.900	U	44.900	U	44.900	U	129.000	U	83.700	U
MANGANESE	UG/L	2.700	U	2.700	U	2.300	U	2.300	U	1.400	U	2.600	U
MERCURY	UG/L	0.190	U	0.100	UJ	0.100	U	0.100	UJ	0.100	U	0.100	UJ
NICKEL	UG/L	15.500	U	15.500	U	15.500	U	15.500	U	15.500	U	15.500	U
POTASSIUM	UG/L	1940.000	U	1940.000	U	1940.000	U	1940.000	U	1940.000	U	1940.000	U
SELENIUM	UG/L	1.400	UJ	1.400	UJ	1.400	UJ	1.400	UJ	1.400	UJ	1.400	UJ
SILVER	UG/L	4.200	U	4.200	U	4.200	U	4.200	U	4.200	U	4.200	U
SODIUM	UG/L	408.000	U	412.000	U	385.000	U	320.000	U	354.000	U	407.000	B
THALLIUM	UG/L	1.200	U	1.200	U	1.200	U	1.200	U	1.200	UJ	1.200	U
VANADIUM	UG/L	9.800	U	9.800	U	9.800	U	9.800	U	9.800	U	9.800	U
ZINC	UG/L	5.800	B	5.800	U	5.800	U	5.800	U	7.600	B	6.300	B

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

Verified
sgm 12/02/94

9715916.1089

Validated Data Summary, Data Package: W0159-QES-167

	Samp#	B0CJR8		B0CJR9	
	Date	8-9-94		8-9-94	
	Location	---		---	
	Depth	---		---	
	Type	WATER		WATER	
	Comments	EQ. BLANK		EQ. BLANK	
Parameter	Units	Result	Q	Result	Q
ALUMINUM	UG/L	29.000	U	35.700	B
ANTIMONY	UG/L	46.200	U	46.200	U
ARSENIC	UG/L	1.100	U	1.100	U
BARIUM	UG/L	1.300	U	1.300	U
BERYLLIUM	UG/L	0.300	U	0.300	U
CADMIUM	UG/L	3.700	U	3.700	U
CALCIUM	UG/L	95.900	B	103.000	B
CHROMIUM	UG/L	5.300	U	5.300	U
COBALT	UG/L	3.400	U	3.400	U
COPPER	UG/L	7.600	U	7.600	U
IRON	UG/L	46.400	UJ	40.100	U
LEAD	UG/L	1.300	U	1.300	UJ
MAGNESIUM	UG/L	104.000	U	100.000	U
MANGANESE	UG/L	1.400	U	2.700	U
MERCURY	UG/L	0.100	U	0.100	UJ
NICKEL	UG/L	15.500	U	15.500	U
POTASSIUM	UG/L	1940.000	U	1940.000	U
SELENIUM	UG/L	1.400	UJ	1.400	UJ
SILVER	UG/L	4.200	U	4.200	U
SODIUM	UG/L	450.000	B	473.000	B
THALLIUM	UG/L	1.200	UJ	1.200	U
VANADIUM	UG/L	9.800	U	9.800	U
ZINC	UG/L	12.800	B	11.400	B

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

Verified
SJM 12/02/94

Validated Data Summary, Data Package: LK02-LAS

	Samp#	B0CJJ7		B0CJJ8		B0CJJ9		B0CJK0	
	Date	7-25-94		7-25-94		8-1-94		8-1-94	
	Location	D5-14		D5-14		H3-1		H3-1	
	Depth	---		---		---		---	
	Type	WATER		WATER		WATER		WATER	
	Comments	SPLIT		SPLIT		SPLIT		SPLIT	
Parameter	Units	Result	Q	Result	Q	Result	Q	Result	Q
ALUMINUM	UG/L	31.000	U	31.000	U	31.000	U	31.000	U
ANTIMONY	UG/L	46.000	U	46.000	U	46.000	U	46.000	U
ARSENIC	UG/L	3.000	UJ	3.000	UJ	3.400	BJ	3.000	UJ
BARIUM	UG/L	86.200	B	85.100	B	20.900	B	22.100	B
BERYLLIUM	UG/L	1.000	U	1.000	U	1.000	U	1.000	U
CADMIUM	UG/L	3.000	U	3.000	U	3.000	U	3.000	U
CALCIUM	UG/L	60200.000		63100.000		33000.000		37400.000	
CHROMIUM	UG/L	1220.000		1300.000		10.000		4.700	B
COBALT	UG/L	8.000	U	8.000	U	8.000	U	8.000	U
COPPER	UG/L	4.100	U	2.700	U	3.200	U	2.000	U
IRON	UG/L	44.200	U	10.000	U	125.000		10.000	U
LEAD	UG/L	2.000	U	2.000	U	2.000	U	2.000	U
MAGNESIUM	UG/L	17600.000		18100.000		8200.000		9010.000	
MANGANESE	UG/L	2.000	U	2.000	U	3.600	U	2.000	U
MERCURY	UG/L	0.670	UJ	0.200	UJ	0.200	UJ	0.200	UJ
NICKEL	UG/L	8.000	U	8.000	U	8.000	U	9.900	U
POTASSIUM	UG/L	5690.000		5950.000		4150.000	B	4510.000	B
SELENIUM	UG/L	3.000	U	3.000	UJ	3.000	U	3.000	U
SILVER	UG/L	4.000	U	4.000	U	4.000	U	4.000	U
SODIUM	UG/L	16700.000		16700.000		13000.000		13800.000	
THALLIUM	UG/L	4.000	U	4.000	U	4.000	U	4.000	U
VANADIUM	UG/L	20.600	U	20.000	U	12.200	U	12.800	U
ZINC	UG/L	12.500	U	3.000	U	8.000	U	3.000	U

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

Verified
sgm 12/02/94

9713518.1021

APPENDIX B

INORGANIC VALIDATED FIELD DUPLICATE AND FIELD SPLIT SUMMARY

Sample Location: D5-14						
Parameter	CRDL	BOCJJ3-Duplicate		B0CJ90		RPD (%)
		Result µg/L	Q	Result µg/L	Q	
ALUMINUM	200	38.7	U	64.7	U	NA
ANTIMONY	60	46.2	U	46.2	U	NA
ARSENIC	10	4.9	B	4.8	B	2.1
BARIUM	200	87.5	B	88.3	B	0.9
BERYLLIUM	5	0.3	U	0.3	U	NA
CADMIUM	5	3.7	U	3.7	U	NA
CALCIUM	5000	65600		65900		0.5
CHROMIUM	10	1330		1410		6
COBALT	50	3.4	U	3.4	U	NA
COPPER	25	7.7	U	9.3	U	NA
IRON	100	98.4	U	249		200
LEAD	3	0.9	U	0.9	U	NA
MAGNESIUM	5000	18500		18500		0
MANGANESE	15	4.4	U	7.6	U	NA
MERCURY	0.2	0.13	UJ	0.1	UJ	NA
NICKEL	40	15.5	U	189		200
POTASSIUM	5000	6430		6360		1
SELENIUM	5	1.5	UR	1.4	UR	NA
SILVER	10	3.8	U	3.8	U	NA
SODIUM	5000	17600	J	17600	J	0
THALLIUM	10	1.2	U	1.2	U	NA
VANADIUM	50	40.2	U	35.2	U	NA
ZINC	20	5.8	U	10.3	U	NA

Sample Location: D5-14						
Parameter	CRDL	BOCJJ4-Duplicate (filtered)		B0CJ91 (filtered)		RPD (%)
		Result µg/L	Q	Result µg/L	Q	
ALUMINUM	200	34.5	U	52.6	U	NA
ANTIMONY	60	46.2	U	46.2	U	NA
ARSENIC	10	3.9	B	3.4	B	13.7
BARIUM	200	89.1	B	87	B	2
BERYLLIUM	5	0.3	U	0.31	U	NA
CADMIUM	5	3.7	U	3.7	U	NA
CALCIUM	5000	67400		65900		2
CHROMIUM	10	1340		1310		2
COBALT	50	3.4	U	3.4	U	NA
COPPER	25	7.6	U	7.6	U	NA
IRON	100	15.5	U	15.3	U	NA
LEAD	3	0.9	U	0.9	U	NA
MAGNESIUM	5000	19200		18800		2
MANGANESE	15	2.8	U	2.6	U	NA
MERCURY	0.2	0.1	U	0.1	U	NA
NICKEL	40	15.5	U	15.5	U	NA
POTASSIUM	5000	6760		6610		2
SELENIUM	5	1.4	UJ	1.4	UJ	NA
SILVER	10	3.8	U	3.8	U	NA
SODIUM	5000	17700		17400		2
THALLIUM	10	1.2	UJ	1.2	UJ	NA
VANADIUM	50	40.7	U	36.7	U	NA
ZINC	20	5.8	U	5.8	U	NA

Sample Location: D5-14						
Parameter	CRDL	BOCJJ7-Split		B0CJ90		RPD (%)
		Result µg/L	Q	Result µg/L	Q	
ALUMINUM	200	31	U	64.7	U	NA
ANTIMONY	60	46	U	46.2	U	NA
ARSENIC	10	3	UJ	4.8	B	200
BARIUM	200	86.2	B	88.3	B	2.4
BERYLLIUM	5	1	U	0.3	U	NA
CADMIUM	5	3	U	3.7	U	NA
CALCIUM	5000	60200		65900		9
CHROMIUM	10	1220		1410		14
COBALT	50	8	U	3.4	U	NA
COPPER	25	4.1	U	9.3	U	NA
IRON	100	44.2	U	249		200
LEAD	3	2	U	0.9	U	NA
MAGNESIUM	5000	17600		18500		5
MANGANESE	15	2	U	7.6	U	NA
MERCURY	0.2	0.67	UJ	0.1	UJ	NA
NICKEL	40	8	U	189		200
POTASSIUM	5000	5690		6360		11
SELENIUM	5	3	U	1.4	UR	NA
SILVER	10	4	U	3.8	U	NA
SODIUM	5000	16700		17600	J	5
THALLIUM	10	4	U	1.2	U	NA
VANADIUM	50	20.6	U	35.2	U	NA
ZINC	20	12.5	U	10.3	U	NA

Sample Location: D5-14						
Parameter	CRDL	BOCJJ8-Split (filtered)		B0CJ91 (filtered)		RPD (%)
		Result µg/L	Q	Result µg/L	Q	
ALUMINUM	200	31	U	52.6	B	200
ANTIMONY	60	46	U	46.2	U	NA
ARSENIC	10	3	UJ	3.4	B	200
BARIUM	200	85.1	B	87	B	2
BERYLLIUM	5	1	U	0.31	U	NA
CADMIUM	5	3	U	3.7	U	NA
CALCIUM	5000	63100		65900		4
CHROMIUM	10	1300		1310		1
COBALT	50	8	U	3.4	U	NA
COPPER	25	2.7	U	7.6	U	NA
IRON	100	10	U	15.3	U	NA
LEAD	3	2	U	0.9	U	NA
MAGNESIUM	5000	18100		18800		4
MANGANESE	15	2	U	2.6	U	NA
MERCURY	0.2	0.2	UJ	0.1	U	NA
NICKEL	40	8	U	15.5	U	NA
POTASSIUM	5000	5950		6610		10
SELENIUM	5	3	UJ	1.4	UJ	NA
SILVER	10	4	U	3.8	U	NA
SODIUM	5000	16700		17400		4
THALLIUM	10	4	U	1.2	UJ	NA
VANADIUM	50	20	U	36.7	U	NA
ZINC	20	3	U	5.8	U	NA

Sample Location: H3-1						
Parameter	CRDL	BOCJJ5-Duplicate		B0CJC4		RPD (%)
		Result µg/L	Q	Result µg/L	Q	
ALUMINUM	200	37.9	B	40.2	B	6
ANTIMONY	60	46.2	U	46.2	U	NA
ARSENIC	10	4.4	B	4.1	B	7
BARIUM	200	20.8	B	20	B	4
BERYLLIUM	5	0.3	U	0.44	U	NA
CADMIUM	5	3.7	U	3.7	U	NA
CALCIUM	5000	34300		33000		4
CHROMIUM	10	5.7	BJ	10.7		61.0
COBALT	50	3.4	U	3.4	U	NA
COPPER	25	8.7	B	10.1	B	14.9
IRON	100	267	J	865		106.0
LEAD	3	1.3	U	1.3	U	NA
MAGNESIUM	5000	8660		8380		3
MANGANESE	15	7.8	U	10.6	U	NA
MERCURY	0.2	0.14	U	0.1	U	NA
NICKEL	40	15.5	U	15.5	U	NA
POTASSIUM	5000	3000	B	4610	B	42.31
SELENIUM	5	7	UJ	1.4	UJ	NA
SILVER	10	4.2	U	4.2	U	NA
SODIUM	5000	13500		12900		5
THALLIUM	10	1.2	U	1.2	BJ	200
VANADIUM	50	18.2	B	19.6	B	7.4
ZINC	20	13.7	U	13.2	U	NA

Sample Location: H3-1						
Parameter	CRDL	BOCJJ6-Duplicate (filtered)		B0CJC5 (filtered)		RPD (%)
		Result µg/L	Q	Result µg/L	Q	
ALUMINUM	200	29	U	29	U	NA
ANTIMONY	60	46.2	U	46.2	U	NA
ARSENIC	10	3.8	B	4.1	B	7.6
BARIUM	200	19.9	B	20.3	B	2
BERYLLIUM	5	0.3	U	0.43	U	NA
CADMIUM	5	3.7	U	3.7	U	NA
CALCIUM	5000	33400		34000		2
CHROMIUM	10	5.3	U	5.3	U	NA
COBALT	50	3.4	U	3.4	U	NA
COPPER	25	7.6	U	10.9	BJ	200
IRON	100	33.2	B	31.1	B	6.5
LEAD	3	1.3	U	1.3	U	NA
MAGNESIUM	5000	8460		8600		2
MANGANESE	15	3.2	U	3.5	U	NA
MERCURY	0.2	0.18	U	0.1	U	NA
NICKEL	40	15.5	U	15.5	U	NA
POTASSIUM	5000	4250	B	4800	B	12
SELENIUM	5	1.4	UJ	1.4	UJ	NA
SILVER	10	4.2	U	4.2	U	NA
SODIUM	5000	13200		13300		1
THALLIUM	10	1.2	U	1.2	U	NA
VANADIUM	50	16	B	17.8	B	11
ZINC	20	5.8	U	7.6	UR	NA

Sample Location: H3-2						
Parameter	CRDL	BOCJJ9-Split		B0CJC4		RPD (%)
		Result µg/L	Q	Result µg/L	Q	
ALUMINUM	200	31	U	40.2	B	200
ANTIMONY	60	46	U	46.2	U	NA
ARSENIC	10	3.4	BJ	4.1	B	18.7
BARIUM	200	20.9	B	20	B	4
BERYLLIUM	5	1	U	0.44	U	NA
CADMIUM	5	3	U	3.7	U	NA
CALCIUM	5000	33000		33000		0
CHROMIUM	10	10		10.7		7
COBALT	50	8	U	3.4	U	NA
COPPER	25	3.2	U	10.1	B	200
IRON	100	125		865		149
LEAD	3	2	U	1.3	U	NA
MAGNESIUM	5000	8200		8380		2
MANGANESE	15	3.6	U	10.6	U	NA
MERCURY	0.2	0.2	UJ	0.1	U	NA
NICKEL	40	8	U	15.5	U	NA
POTASSIUM	5000	4150	B	4610	B	10
SELENIUM	5	3	U	1.4	UJ	NA
SILVER	10	4	U	4.2	U	NA
SODIUM	5000	13000		12900		1
THALLIUM	10	4	U	1.2	BJ	200
VANADIUM	50	12.2	U	19.6	B	200
ZINC	20	8	U	13.2	U	NA

Sample Location: H3-1						
Parameter	CRDL	BOCJK0 Split (filtered)		B0CJC5 (filtered)		RPD (%)
		Result µg/L	Q	Result µg/L	Q	
ALUMINUM	200	31	U	29	U	NA
ANTIMONY	60	46	U	46.2	U	NA
ARSENIC	10	3	UJ	4.1	B	200
BARIUM	200	22.1	B	20.3	B	8.5
BERYLLIUM	5	1	U	0.43	U	NA
CADMIUM	5	3	U	3.7	U	NA
CALCIUM	5000	37400		34000		10
CHROMIUM	10	4.7	B	5.3	U	200
COBALT	50	8	U	3.4	U	NA
COPPER	25	2	U	10.9	BJ	200
IRON	100	10	U	31.1	B	200
LEAD	3	2	U	1.3	U	NA
MAGNESIUM	5000	9010		8600		5
MANGANESE	15	2	U	3.5	U	NA
MERCURY	0.2	0.2	UJ	0.1	U	NA
NICKEL	40	9.9	U	15.5	U	NA
POTASSIUM	5000	4510	B	4800	B	6
SELENIUM	5	3	U	1.4	UJ	NA
SILVER	10	4	U	4.2	U	NA
SODIUM	5000	13800		13300		4
THALLIUM	10	4	U	1.2	U	NA
VANADIUM	50	12.8	U	17.8	B	200
ZINC	20	3	U	7.6	UR	NA

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913-1101.010

APPENDIX C

GENERAL CHEMISTRY VALIDATED DATA SUMMARY TABLES

Validated Data Summary, Data Package: W0149-QES-157

	Samp#	B0CJ88		B0CJ90		B0CJ94		B0CJB4		B0CJB8		B0CJC0	
	Date	7-25-94		7-25-94		7-25-94		7-26-94		7-26-94		7-26-94	
	Location	D5-12		D5-14		D5-16		D8-3		D8-54A		D8-54B	
	Depth	---		---		---		---		---		---	
	Type	WATER		WATER		WATER		WATER		WATER		WATER	
	Comments												
Parameter	Units	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
CHLORIDE	MG/L	27.000		17.200		18.300		27.000		23.900		4.760	
NITRITE	MG-N/L	0.020	UR	0.020	J	0.138	J	0.286	J	0.020	UR	0.020	UR
NITRATE	MG-N/L	22.100	J	10.500	J	12.000	J	42.100	J	9.540	J	0.436	J
PHOSPHATE	MG/L	1.000	UR	1.000	UR	1.000	UR	1.000	UR	1.000	UR	1.000	UR
SULFATE	MG/L	205.000		79.700		115.000		130.000		87.500		61.500	
SULFIDE	MG/L	0.400	U	0.400	U	0.400	U	0.400	U	0.394	U	0.394	U
NITRATE+NITRITE	UG-N/L	22300.000		10800.000		15300.000		43000.000		9700.000		449.000	
AMMONIA	UG-N/L	30.000	U	30.000	U	30.000	U	409.000		30.000	U	30.000	U

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Validated Data Summary, Data Package: W0149-QES-157

	Samp#	BOCJG5		BOCJG7		BOCJG9		BOCJJ3	
	Date	7-26-94		7-26-94		7-25-94		7-25-94	
	Location	H4-16		H4-17		H4-45		D5-14	
	Depth	---		---		---		---	
	Type	WATER		WATER		WATER		WATER	
	Comments							DUPLICATE	
Parameter	Units	Result	Q	Result	Q	Result	Q	Result	Q
CHLORIDE	MG/L	5.240		9.870		4.880		17.300	
NITRITE	MG-N/L	0.020	UR	0.020	UR	0.020	UR	0.069	J
NITRATE	MG-N/L	2.560	J	7.850	J	3.720	J	10.500	J
PHOSPHATE	MG/L	1.000	UR	1.000	UR	1.000	UR	1.000	UR
SULFATE	MG/L	25.600		72.300		26.800		79.200	
SULFIDE	MG/L	0.400	U	0.400	U	0.388	U	0.400	U
NITRATE+NITRITE	UG-N/L	2680.000		8100.000		3730.000		10800.000	
AMMONIA	UG-N/L	30.000	U	30.000	U	30.000	U	30.000	U

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

Verified
dgm 12/22/94

9735513.046

Validated Data Summary, Data Package: W0150-QES-156

	Samp#	BOCJ86		BOCJ92		BOCJB0		BOCJG1		BOCJG3		BOCJH1	
	Date	7-27-94		7-27-94		7-27-94		7-28-94		7-28-94		7-27-94	
	Location	D2-6		D5-15		D5-19		H4-13		H4-15A		H4-46	
	Depth	---		---		---		---		---		---	
	Type	WATER		WATER		WATER		WATER		WATER		WATER	
	Comments												
Parameter	Units	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
CHLORIDE	MG/L	22.500		26.100		17.900		4.960		5.860		6.290	
NITRITE	MG-N/L	0.020	UR	0.020	UR	0.020	UR	0.020	UR	0.020	UR	0.020	UR
NITRATE	MG-N/L	14.400	J	12.600	J	14.600	J	4.240	J	4.760	J	5.400	J
PHOSPHATE	MG/L	1.000	UR	1.000	UR	1.000	UR	1.000	UR	1.000	UR	1.000	UR
SULFATE	MG/L	94.200	J	74.500	J	116.000	J	24.200	J	34.400	J	38.000	J
SULFIDE	MG/L	0.400	U	0.400	U	0.400	U	0.400	U	0.400	U	0.400	U
NITRATE+NITRITE	UG-N/L	14100.000		12600.000		14500.000		4310.000		4850.000		5720.000	
AMMONIA	UG-N/L	30.000	U	30.000	U	30.000	U	30.000	U	30.000	U	30.000	U

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

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dgm 12/02/94

9713518.1034

Validated Data Summary, Data Package: W0150-QES-156

	Samp#	BOCJH3		BOCJH5		BOCJH7		BOCJH9	
	Date	7-27-94		7-28-94		7-27-94		7-26-94	
	Location	H4-47		H4-48		H4-49		H5-1	
	Depth	---		---		---		---	
	Type	WATER		WATER		WATER		WATER	
	Comments								
Parameter	Units	Result	Q	Result	Q	Result	Q	Result	Q
CHLORIDE	MG/L	4.680		4.610		3.710		9.090	
NITRITE	MG-N/L	0.020	UR	0.020	UR	0.020	UR	0.020	UR
NITRATE	MG-N/L	0.925	J	0.712	J	0.590	J	6.470	J
PHOSPHATE	MG/L	1.000	UR	1.000	UR	1.000	UR	1.000	UR
SULFATE	MG/L	17.300	J	17.200	J	14.800	J	50.300	J
SULFIDE	MG/L	0.392	U	0.400	U	0.394	U	0.391	U
NITRATE+NITRITE	UG-N/L	866.000		721.000		587.000		6580.000	
AMMONIA	UG-N/L	30.000	U	30.000	U	30.000	U	30.000	U

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

Verified
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9735B.1035

Validated Data Summary, Data Package: W0156-QES-159

	Samp#	B0CJ76		B0CJ82		B0CJ84		B0CJ96		B0CJ98		B0CJB2	
	Date	7-29-94		8-1-94		7-29-94		7-29-94		7-29-94		7-29-94	
	Location	96-43		97-51A		D2-5		D5-17		D5-18		D5-20	
	Depth	---		---		---		---		---		---	
	Type	WATER		WATER		WATER		WATER		WATER		WATER	
	Comments												
Parameter	Units	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
CHLORIDE	MG/L	7.500		19.400		15.600		9.190		17.000		15.700	
NITRITE	MG-N/L	0.020	UR	0.020	UR	0.020	UR	0.152	J	0.020	UR	0.020	UR
NITRATE	MG-N/L	3.780	J	4.100	J	8.330	J	6.950	J	15.000	J	6.960	J
PHOSPHATE	MG/L	1.000	UR	1.000	UR	1.000	UR	1.000	UR	1.000	UR	1.000	UR
SULFATE	MG/L	32.200	J	72.900	J	82.900	J	44.200	J	118.000	J	53.100	J
SULFIDE	MG/L	0.400	U	0.549		0.396	U	0.400	U	0.392	U	0.388	U
NITRATE+NITRITE	UG-N/L	3900.000		3960.000		7090.000		8710.000		13900.000		6810.000	
AMMONIA	UG-N/L	30.000	U	30.000	U	30.000	U	30.000	U	30.000	U	30.000	U

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97351.1046

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Validated Data Summary, Data Package: W0156-QES-159

	Samp#	B0CJB6		B0CJC4		B0CJF9		B0CJJ1	
	Date	7-29-94		8-1-94		7-28-94		7-28-94	
	Location	D8-53		H3-1		H4-10		H6-1	
	Depth	---		---		---		---	
	Type	WATER		WATER		WATER		WATER	
	Comments								
Parameter	Units	Result	Q	Result	Q	Result	Q	Result	Q
CHLORIDE	MG/L	27.500		5.660		4.900		6.860	
NITRITE	MG-N/L	0.020	UR	0.020	UR	0.020	UR	0.020	UR
NITRATE	MG-N/L	10.400	J	2.650	J	2.560	J	4.360	J
PHOSPHATE	MG/L	1.000	UR	1.000	UR	1.000	UR	1.000	UR
SULFATE	MG/L	76.000	J	22.600	J	23.800	J	30.100	J
SULFIDE	MG/L	0.400	U	0.394	U	0.400	U	0.408	U
NITRATE+NITRITE	UG-N/L	10500.000		2620.000		2490.000		4480.000	
AMMONIA	UG-N/L	30.000	U	30.000	U	30.000	U	30.000	U

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

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agm 12/02/94

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Validated Data Summary, Data Package: W0159-QES-167

	Samp#	B0CJ72		B0CJ74		B0CJ78		B0CJ80		B0CJC2		B0CJJ5	
	Date	8-3-94		8-2-94		8-1-94		8-2-94		8-1-94		8-1-94	
	Location	91-46		93-48A		96-49		97-43		D8-55		H3-1	
	Depth	---		---		---		---		---		---	
	Type	WATER		WATER		WATER		WATER		WATER		WATER	
	Comments											DUPLICATE	
Parameter	Units	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
CHLORIDE	MG/L	4.430		5.800		16.900		7.890		4.950		5.360	
NITRITE	MG-N/L	0.020	UR	0.100	UR	0.020	UR	0.020	UR	0.020	UR	0.020	UR
NITRATE	MG-N/L	2.010	J	262.000	J	3.750	J	2.890	J	2.050	J	2.600	J
PHOSPHATE	MG/L	1.000	UR	1.000	UR	1.000	UR	1.000	UR	1.000	UR	1.000	UR
SULFATE	MG/L	30.800		39.600		68.500		49.800		30.900		22.500	
SULFIDE	MG/L	1.000	U	0.388	U	0.394	U	0.391	U	0.392	U	0.388	U
NITRATE+NITRITE	UG-N/L	1840.000		1340.000		3550.000		2750.000		2020.000		2600.000	
AMMONIA	UG-N/L	30.000	U	30.000	U	30.000	U	30.000	U	30.000	U	30.000	U

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

Verified
sgm 12/02/94

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Validated Data Summary, Data Package: W0159-QES-167

	Samp#	B0CJK1		B0CJK3		B0CJK5		B0CJR8	
	Date	8-2-94		8-2-94		8-9-94		8-9-94	
	Location	---		---		---		---	
	Depth	---		---		---		---	
	Type	WATER		WATER		WATER		WATER	
	Comments	EQ. BLANK		EQ. BLANK		EQ. BLANK		EQ. BLANK	
Parameter	Units	Result	Q	Result	Q	Result	Q	Result	Q
CHLORIDE	MG/L	0.250	U	0.250	U	0.250	U	0.250	U
NITRITE	MG-N/L	0.020	UR	0.020	UR	0.020	UR	0.020	UR
NITRATE	MG-N/L	0.082	J	0.120	J	0.020	UR	0.020	UR
PHOSPHATE	MG/L	1.000	UR	1.000	UR	1.000	UR	1.000	UR
SULFATE	MG/L	1.000	U	1.000	U	1.000	U	1.000	U
SULFIDE	MG/L	0.394	U	0.391	U	0.385	U	0.385	U
NITRATE+NITRITE	UG-N/L	50.000	U	50.000	U	50.000	U	50.000	U
AMMONIA	UG-N/L	43.600		30.000	U	30.000	U	30.000	U

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

Verified
sgm 12/02/94

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Validated Data Summary, Data Package: LK02-LAS

	Samp#	BOCJJ7		BOCJJ9	
	Date	7-25-94		8-1-94	
	Location	D5-14		H3-1	
	Depth	---		---	
	Type	WATER		WATER	
	Comments	SPLIT		SPLIT	
Parameter	Units	Result	Q	Result	Q
CHLORIDE	MG/L	18.000		5.300	
NITRITE	MG-N/L	0.071	J	0.025	UJ
NITRATE	MG-N/L	10.000	J	2.500	J
PHOSPHATE	MG-P/L	0.016	BJ	0.032	J
SULFATE	MG/L	83.000		22.000	
SULFIDE	MG/L	1.000	UJ	1.000	UJ
NITRATE+NITRITE	MG-N/L	11.000		2.600	
AMMONIA	MG-N/L	0.036	B	0.030	

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

Verified
agm 12/02/94

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APPENDIX D

GENERAL CHEMISTRY FIELD DUPLICATE AND FIELD SPLIT SUMMARY

Sample Location: D5-14						
		B0CJ90		B0CJJ3-Duplicate		
Parameter	CRDL	Result (mg/L)	Q	Result (mg/L)	Q	RPD (%)
Chloride	2.5	17.2		17.3		1
Nitrite-N	0.02	0.02	J	0.069	J	110
Nitrate-N	1	10.5	J	10.5	J	0
Sulfate	10	79.7		79.2		1
Nitrate+Nitrite-N (ug-N/L)	2500	10800		10800		0
Phosphate	1	1	UR	1	UR	NA
Sulfide	0.4	0.4	U	0.4	U	NA
Ammonia-N (ug-N/L)	30	30	U	30	U	NA

Sample Location: H3-1						
		B0CJC4		B0CJJ5-Duplicate		
Parameter	CRDL	Result (mg/L)	Q	Result (mg/L)	Q	RPD (%)
Chloride	0.5	5.66		5.36		5
Nitrate-N	0.2	2.65	J	2.6	J	2
Sulfate	2	22.6	J	22.5		0
Nitrate+Nitrite-N (ug-N/L)	500	2620		2600		1
Nitrite-N	0.02	0.02	UR	0.02	UR	NA
Phosphate	1	1	UR	1	UR	NA
Sulfide	0.4	0.394	U	0.388	U	NA
Ammonia-N (ug-N/L)	30	30	U	30	U	NA

Sample Location: D5-14						
		B0CJ90		B0CJJ7-Split		
Parameter	CRDL	Result (mg/L)	Q	Result (mg/L)	Q	RPD (%)
Chloride	2.5	17.2		18		5
Nitrite-N	0.02	0.02	J	0.071	J	112
Nitrate-N	1	10.5	J	10	J	5
Sulfate	10	79.7		83		4
Nitrate+Nitrite-N (ug-N/L)	2500	10800		11000		2
Phosphate	1	1	UR	0.016	BJ	200
Ammonia-N (ug-N/L)	30	30	U	36	B	200
Sulfide	0.4	0.4	U	1	UJ	NA

Sample Location: H3-1						
		B0CJC4		B0CJJ9-Split		
Parameter	CRDL	Result (mg/L)	Q	Result (mg/L)	Q	RPD (%)
Chloride	0.5	5.66		5.3		7
Nitrate-N	0.2	2.65	J	2.5	J	6
Sulfate	2	22.6	J	22		3
Nitrate+Nitrite-N (ug-N/L)	500	2620.00		2600		1
Phosphate	1	1	UR	0.032	J	200
Ammonia-N (ug-N/L)	30	30	U	30		200
Nitrite-N	0.02	0.02	UR	0.025	UJ	NA
Sulfide	0.4	0.394	U	1	UJ	NA

APPENDIX E

RADIOCHEMISTRY VALIDATED DATA SUMMARY TABLES

Validated Data Summary, Data Package: W0149-QES-157

	Samp#	B0CJ88		B0CJ90		B0CJ94		B0CJB4		B0CJB8		B0CJC0	
	Date	7-25-94		7-25-94		7-25-94		7-26-94		7-26-94		7-26-94	
	Location	D5-12		D5-14		D5-16		D8-3		D8-54A		D8-54B	
	Depth	---		---		---		---		---		---	
	Type	WATER		WATER		WATER		WATER		WATER		WATER	
	Comments												
Parameter	Units	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
GROSS ALPHA	PCI/L	3.230	U	2.030	U	2.460	U	3.720		1.950	U	1.990	U
GROSS BETA	PCI/L	80.900		9.240		6.600		15.700		17.500		10.100	
STRONTIUM	PCI/L	38.400		0.890	U	1.100	U	3.830		5.560		0.870	U
TRITIUM	PCI/L	35900.000		737.000		7780.000		3350.000		11900.000		235.000	U

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

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Validated Data Summary, Data Package: W0149-QES-157

	Samp#	B0CJG5		B0CJG7		B0CJG9		B0CJJ3	
	Date	7-26-94		7-26-94		7-25-94		7-25-94	
	Location	H4-16		H4-17		H4-45		D5-14	
	Depth	---		---		---		---	
	Type	WATER		WATER		WATER		WATER	
	Comments							DUPLICATE	
Parameter	Units	Result	Q	Result	Q	Result	Q	Result	Q
GROSS ALPHA	PCI/L	1.560	U	3.590		2.260		2.490	
GROSS BETA	PCI/L	14.300		9.030		25.900		6.780	
STRONTIUM	PCI/L	5.080		0.918	U	11.100		0.954	U
TRITIUM	PCI/L	583.000		4150.000		499.000		593.000	

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

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sgm 12/02/94

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Validated Data Summary, Data Package: W0150-QES-156

	Samp#	B0CJ86		B0CJ92		B0CJB0		B0CJG1		B0CJG3		B0CJH1	
	Date	7-27-94		7-27-94		7-27-94		7-28-94		7-28-94		7-27-94	
	Location	D2-6		D5-15		D5-19		H4-13		H4-15A		H4-46	
	Depth	---		---		---		---		---		---	
	Type	WATER		WATER		WATER		WATER		WATER		WATER	
	Comments												
Parameter	Units	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
GROSS ALPHA	PCI/L	2.260	U	2.130	U	2.480	U	2.000		1.640	U	2.620	
GROSS BETA	PCI/L	6.160		9.090		5.900		59.800		7.180		10.400	
STRONTIUM	PCI/L	0.945	U	2.430		1.100	U	26.100		1.080	U	1.870	
TRITIUM	PCI/L	1940.000		1470.000		35500.000		968.000		2030.000		5390.000	

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

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sgm 12/02/94

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Validated Data Summary, Data Package: W0150-QES-156

	Samp#	BOCJH3		BOCJH5		BOCJH7		BOCJH9	
	Date	7-27-94		7-28-94		7-27-94		7-26-94	
	Location	H4-47		H4-48		H4-49		H5-1	
	Depth	---		---		---		---	
	Type	WATER		WATER		WATER		WATER	
	Comments								
Parameter	Units	Result	Q	Result	Q	Result	Q	Result	Q
GROSS ALPHA	PCI/L	1.240	U	1.250		3.360		3.650	
GROSS BETA	PCI/L	3.140	U	3.820		5.060		8.230	
STRONTIUM	PCI/L	0.776	U	0.926		0.753	U	0.900	U
TRITIUM	PCI/L	628.000		657.000		765.000		8900.000	

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

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Validated Data Summary, Data Package: W0156-QES-159

	Samp#	B0CJ76		B0CJ82		B0CJ84		B0CJ96		B0CJ98		B0CJB2	
	Date	7-29-94		8-1-94		7-29-94		7-29-94		7-29-94		7-29-94	
	Location	96-43		97-51A		D2-5		D5-17		D5-18		D5-20	
	Depth	---		---		---		---		---		---	
	Type	WATER		WATER		WATER		WATER		WATER		WATER	
	Comments												
Parameter	Units	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
GROSS ALPHA	PCI/L	2.140		1.540	U	1.990		2.680		2.850		1.860	U
GROSS BETA	PCI/L	7.380	J	3.250	J	6.250	J	6.420	J	6.030	J	3.980	J
STRONTIUM	PCI/L	0.763	U	0.798	U	0.857	U	0.735	U	0.925	U	0.803	U
TRITIUM	PCI/L	10300.000		7530.000		22600.000		23500.000		50000.000		252.000	U

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

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Validated Data Summary, Data Package: W0156-QES-159

	Samp#	B0CJB6		B0CJC4		B0CJF9		B0CJJ1	
	Date	7-29-94		8-1-94		7-28-94		7-28-94	
	Location	D8-53		HC-1		H4-10		H6-1	
	Depth	---		---		---		---	
	Type	WATER		WATER		WATER		WATER	
	Comments								
Parameter	Units	Result	Q	Result	Q	Result	Q	Result	Q
GROSS ALPHA	PCI/L	2.200	U	1.630	U	1.580		3.470	
GROSS BETA	PCI/L	14.200	J	4.540	J	4.610	J	15.800	J
STRONTIUM	PCI/L	5.820		0.741	U	0.753	U	4.680	
TRITIUM	PCI/L	11600.000		252.000	U	2460.000		5190.000	

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

Verified.
Dgm 12/02/94

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Validated Data Summary, Data Package: W0159-QES-167

	Samp#	B0CJ72		B0CJ74		B0CJ78		B0CJ80		B0CJC2		B0CJJ5	
	Date	8-3-94		8-2-94		8-1-94		8-2-94		8-1-94		8-1-94	
	Location	91-46		93-48A		96-49		97-43		D8-55		H3-1	
	Depth	---		---		---		---		---		---	
	Type	WATER		WATER		WATER		WATER		WATER		WATER	
	Comments												
Parameter	Units	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
GROSS ALPHA	pCi/L	1.800	U	2.210		1.980	U	1.870		1.480	U	1.510	U
GROSS BETA	pCi/L	6.900		5.200		7.520		5.870		4.580		8.090	
STRONTIUM	pCi/L	0.813	U	0.846	U	0.775	U	0.724	U	0.779	U	0.702	U
TRITIUM	pCi/L	5110.000		2430.000		7740.000		9200.000		264.000	U	264.000	U

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

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Sgm 12/02/94

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Validated Data Summary, Data Package: W0159-QES-167

	Samp#	B0CJK1		B0CJK3		B0CJK5		B0CJR8	
	Date	8-2-94		8-2-94		8-9-94		8-9-94	
	Location	---		---		---		---	
	Depth	---		---		---		---	
	Type	WATER		WATER		WATER		WATER	
	Comments	EQ. BLANK		EQ. BLANK		EQ. BLANK		EQ. BLANK	
Parameter	Units	Result	Q	Result	Q	Result	Q	Result	Q
GROSS ALPHA	pCi/L	0.981	U	0.899	U	1.780	U	0.974	U
GROSS BETA	pCi/L	2.910	U	2.760	U	2.680	U	2.910	U
STRONTIUM	pCi/L	0.783	U	0.793	U	0.754	U	0.817	U
TRITIUM	pCi/L	264.000	U	264.000	U	264.000	U	264.000	U

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

Verified
sgm 12/02/94

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Validated Data Summary, Data Package: LK02-LAS

	Samp#	BOCJJ7		BOCJJ9	
	Date	7-25-94		8-1-94	
	Location	D5-14		H3-1	
	Depth	---		---	
	Type	WATER		WATER	
	Comments	SPLIT		SPLIT	
Parameter	Units	Result	Q	Result	Q
GROSS ALPHA	pCi/L	NR		2.000	U
GROSS BETA	pCi/L	NR		5.300	
STRONTIUM	pCi/L	NR		0.650	U
TRITIUM	pCi/L	760.000		240.000	U

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sgm 12/02/94

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APPENDIX F

RADIOCHEMISTRY VALIDATED FIELD DUPLICATE AND FIELD SPLIT SUMMARY

Sample Location: D5-14						
		B0CJ90		B0CJJ3-DUPLICATE		
Parameter	RDL	Result (pCi/L)	Q	Result (pCi/L)	Q	RPD (%)
Gross Alpha	3	2.03	U	2.49		200
Gross Beta	4	9.24		6.78		31
Tritium	400	737		593		22
Strontium	10	0.89	U	0.954	U	NA

Sample Location: H3-1						
		B0CJC4		B0CJJ5-Duplicate		
Parameter	RDL	Result (pCi/L)	Q	Result (pCi/L)	Q	RPD (%)
Gross Alpha	3	1.63	U	1.51	U	NA
Gross Beta	4	4.54	J	8.09		56
Tritium	400	252	U	264	U	NA
Strontium	10	0.741	U	0.702	U	NA

Sample Location: D5-14						
		B0CJ90		B0CJJ7-Split		
Parameter	RDL	Result (pCi/L)	Q	Result (pCi/L)	Q	RPD (%)
Gross Alpha	3	2.03	U	Analysis Cancelled		NA
Gross Beta	4	9.24		Analysis Cancelled		NA
Tritium	400	737		760		3
Strontium	10	0.89	U	Analysis Cancelled		NA

Sample Location: H3-1						
		B0CJC4		B0CJJ9-Split		RPD (%)
Parameter	RDL	Result (pCi/L)	Q	Result (pCi/L)	Q	
Gross Alpha	3	1.63	U	2	U	NA
Gross Beta	4	4.54	J	5.3		15
Tritium	400	252	U	240	U	NA
Strontium	10	0.741	U	0.65	U	NA

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RECORD COPY

MEMORANDUM

OCT 1994
RECEIVED

TO: 100-HR-3 Project QA Record

FR: Dennis K. Robinson, Golder Associates Inc. for DKR 10/18/94

October 18, 1994

RE: METALS DATA VALIDATION SUMMARY FOR DATA PACKAGE: LK02-LAS (943-1610.012 filename LASM.HR3)

INTRODUCTION

This memo presents the results of data validation on 4 water samples analyzed by Lockheed Analytical Services Laboratory. The samples validated along with the analyses reported and the methods of analyses are provided in the following table.

SAMPLE ID	SAMPLE DATE	MEDIA	ANALYSIS
BOCJJ7	07/25/94	Water	CLP Metals
BOCJJ8	07/25/94	Water (Filtered)	CLP Metals
BOCJJ9	08/01/94	Water	CLP Metals
BOCJK0	08/01/94	Water (Filtered)	CLP Metals

Data validation was conducted 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. Annotated Laboratory Reports
Attachment 4. Laboratory Narrative and Chain-of-Custody Documentation
Attachment 5. Data Validation Supporting Documentation

DATA QUALITY OBJECTIVES

Precision. Goals for precision were met.

Accuracy. Goals for accuracy were met with the exception of the deficiencies identified below.

Detection Limits. Target goals for sample detection limit were met with the exception of mercury for sample BOCJJ7. Due to insufficient sample volume a smaller sample volume than required by the method was used by the laboratory. Qualification of the data was not required.

Completeness. A total of 4 samples were validated in this data package with a total of 92 determinations reported, all of which were deemed valid. This results in a completeness of 100 percent which meets the objective of 90 percent.

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 as estimated or undetected.

- **Holding Times.** The holding times for mercury analysis was exceeded for all samples requiring the qualification of the data as estimated. Attachments 2 and 5 provide a summary of the samples affected, data qualifications applied, and supporting documentation.

- **Positive Blanks.** Copper, iron, manganese, nickel, vanadium, and zinc were detected at positive concentrations in the associated calibration and/or preparation blanks. Attachments 2 and 5 provide a summary of the samples affected, data qualifications applied, and supporting documentation.

- **Laboratory Control Sample Recovery.** The percent recovery of the laboratory control sample was outside the control limits for mercury (78.9%). Attachments 2 and 5 provide a summary of the samples affected, data qualifications applied, and supporting documentation.

- **Graphite Furnace Quality Control.** The analytical spike recoveries were unacceptable for arsenic and selenium for several samples. 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, September 7, 1994, Westinghouse Hanford Company, Richland, Washington.

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Attachment 1

Glossary of Data Reporting Qualifiers

GLOSSARY OF INORGANIC DATA REPORTING QUALIFIERS

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

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

UJ - Indicates the constituent was analyzed for and not detected. Due to a minor quality control deficiency identified during the data validation the concentration reported 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 the 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

9713513.1066

Data Qualification Summary

Project: 100-HR-3	Validator: D. Robinson	Date: 10/13/94	Page 1 of 1
Comments: Metals analysis			
Analyte	Qualifier	Samples Affected	Reason
Arsenic	UJ BJ	B0CJJ7, B0CJK0 BOCJJ8 B0CJJ9	Analytical spike recovery unacceptable
Copper	U	BOCJJ7 BOCJJ8 BOCJJ9	Present in associated ICB, CCB and/or Prep. Blank at a positive concentration
Iron	U	BOCJJ7	Present in associated ICB, CCB and/or Prep. Blank at a positive concentration
Manganese	U	BOCJJ9	Present in associated CCB at a positive concentration.
Mercury	UJ	BOCJJ7 BOCJJ8 BOCJJ9 BOCJK0	Holding time was exceeded.
Nickel	U	BOCJK0	Present in associated CCB at a positive concentration.
Selenium	UJ	BOCJJ8	Percent recovery of analytical spike sample less than 85%
Vanadium	U	BOCJJ7 BOCJJ8 BOCJJ9 BOCJK0	Present in associated CCB at a positive concentration.
Zinc	U	BOCJJ7 BOCJJ9	Present in associated CCB and/or Prep. blank at a positive concentration.
Mercury	UJ	B0CJJ7 B0CJJ9	LCS recovery below control limit.
Selenium	UJ	B0CJJ8	Analytical spike recovery unacceptable

revised page
5/11/95
006

Attachment 3

Annotated Laboratory Reports

Validated Data Summary, Data Package: LK02-LAS

	Samp#	BOCJJ7		BOCJJ8		BOCJJ9		BOCJK0	
	Date	7-25-94		7-25-94		8-1-94		8-1-94	
	Location	D5-14		D5-14		H3-1		H3-1	
	Depth	---		---		---		---	
	Type	WATER		WATER		WATER		WATER	
	Comments	SPLIT		SPLIT		SPLIT		SPLIT	
Parameter	Units	Result	Q	Result	Q	Result	Q	Result	Q
ALUMINUM	UG/L	31.000	U	31.000	U	31.000	U	31.000	U
ANTIMONY	UG/L	46.000	U	46.000	U	46.000	U	46.000	U
ARSENIC	UG/L	3.000	UJ	3.000	UJ	3.400	BJ	3.000	UJ
BARIUM	UG/L	86.200	B	85.100	B	20.900	B	22.100	B
BERYLLIUM	UG/L	1.000	U	1.000	U	1.000	U	1.000	U
CADMIUM	UG/L	3.000	U	3.000	U	3.000	U	3.000	U
CALCIUM	UG/L	60200.000		63100.000		33000.000		37400.000	
CHROMIUM	UG/L	1220.000		1300.000		10.000		4.700	B
COBALT	UG/L	8.000	U	8.000	U	8.000	U	8.000	U
COPPER	UG/L	4.100	U	2.700	U	3.200	U	2.000	U
IRON	UG/L	44.200	U	10.000	U	125.000		10.000	U
LEAD	UG/L	2.000	U	2.000	U	2.000	U	2.000	U
MAGNESIUM	UG/L	17600.000		18100.000		8200.000		9010.000	
MANGANESE	UG/L	2.000	U	2.000	U	3.600	U	2.000	U
MERCURY	UG/L	0.670	UJ	0.200	UJ	0.200	UJ	0.200	UJ
NICKEL	UG/L	8.000	U	8.000	U	8.000	U	9.900	U
POTASSIUM	UG/L	5690.000		5950.000		4150.000	B	4510.000	B
SELENIUM	UG/L	3.000	U	3.000	UJ	3.000	U	3.000	U
SILVER	UG/L	4.000	U	4.000	U	4.000	U	4.000	U
SODIUM	UG/L	16700.000		16700.000		13000.000		13800.000	
THALLIUM	UG/L	4.000	U	4.000	U	4.000	U	4.000	U
VANADIUM	UG/L	20.600	U	20.000	U	12.200	U	12.800	U
ZINC	UG/L	12.500	U	3.000	U	8.000	U	3.000	U

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

Revised page
6/10/94 008

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U.S. EPA - CLP

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

BOCJJ7

Lab Name: L.A.S. Contract: WSTHS

Lab Code: LOCK Case No.: 728WHT SAS No.: SDG No.: B94-004

Matrix (soil/water): WATER Lab Sample ID: L2491-1

Level (low/med): LOW Date Received: 07/28/94

% Solids: 0.0

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

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	31.0	U		P	
7440-36-0	Antimony	46.0	U		P	
7440-38-2	Arsenic	3.0	~~U~~	~~WN~~	F	UJ silicoted
7440-39-3	Barium	86.2	B		P	
7440-41-7	Beryllium	1.0	U		P	
7440-43-9	Cadmium	3.0	U		P	
7440-70-2	Calcium	60200			P	
7440-47-3	Chromium	1220			P	
7440-48-4	Cobalt	8.0	U		P	
7440-50-8	Copper	4.1	~~B~~		P	u
7439-89-6	Iron	44.2	~~B~~		P	u
7439-92-1	Lead	2.0	U		F	
7439-95-4	Magnesium	17600			P	
7439-96-5	Manganese	2.0	U		P	
7439-97-6	Mercury	0.67	~~U~~		AV	UJ
7440-02-0	Nickel	8.0	U		P	
7440-09-7	Potassium	5690			P	
7782-49-2	Selenium	3.0	U		F	
7440-22-4	Silver	4.0	U		P	
7440-23-5	Sodium	16700			P	
7440-28-0	Thallium	4.0	U		F	
7440-62-2	Vanadium	20.6	~~B~~		P	u
7440-66-6	Zinc	12.5	~~B~~		P	u

DKF 10/13/94

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

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U.S. EPA - CLP

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

BOCJJ9

Lab Name: L.A.S. Contract: WSTHS

Lab Code: LOCK Case No.: 728WHT SAS No.: SDG No.: B94-004

Matrix (soil/water): WATER Lab Sample ID: L2528-1

Level (low/med): LOW Date Received: 08/03/94

% Solids: 0.0

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

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	31.0	U		P	
7440-36-0	Antimony	46.0	U		P	
7440-38-2	Arsenic	3.4	~~B~~	~~WN~~	F	BJ 5/11/94
7440-39-3	Barium	20.9	B		P	
7440-41-7	Beryllium	1.0	U		P	
7440-43-9	Cadmium	3.0	U		P	
7440-70-2	Calcium	33000			P	
7440-47-3	Chromium	10.0			P	
7440-48-4	Cobalt	8.0	U		P	
7440-50-8	Copper	3.2	~~B~~		P	"
7439-89-6	Iron	125			P	
7439-92-1	Lead	2.0	U		F	
7439-95-4	Magnesium	8200			P	
7439-96-5	Manganese	3.6	~~B~~		P	"
7439-97-6	Mercury	0.20	~~U~~		AV	" UJ
7440-02-0	Nickel	8.0	U		P	
7440-09-7	Potassium	4150	B		P	
7782-49-2	Selenium	3.0	~~U~~	~~W~~	F	"
7440-22-4	Silver	4.0	U		P	
7440-23-5	Sodium	13000			P	
7440-28-0	Thallium	4.0	U		F	
7440-62-2	Vanadium	12.2	~~B~~		P	"
7440-66-6	Zinc	8.0	~~B~~		P	"

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Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

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U.S. EPA - CLP

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

BOCJJ8

Lab Name: L.A.S. Contract: WSTHS

Lab Code: LOCK Case No.: 728WHD SAS No.: SDG No.: B94-004

Matrix (soil/water): WATER Lab Sample ID: L2491-2

Level (low/med): LOW Date Received: 07/28/94

% Solids: 0.0

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

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	31.0	U		P	
7440-36-0	Antimony	46.0	U		P	
7440-38-2	Arsenic	3.0	~~U~~	~~W~~	F	UJ
7440-39-3	Barium	85.1	B		P	
7440-41-7	Beryllium	1.0	U		P	
7440-43-9	Cadmium	3.0	U		P	
7440-70-2	Calcium	63100			P	
7440-47-3	Chromium	1300			P	
7440-48-4	Cobalt	8.0	U		P	
7440-50-8	Copper	2.7	~~B~~		P	U
7439-89-6	Iron	10.0	U		P	
7439-92-1	Lead	2.0	U		F	
7439-95-4	Magnesium	18100			P	
7439-96-5	Manganese	2.0	U		P	
7439-97-6	Mercury	0.20	~~U~~		AV	UJ
7440-02-0	Nickel	8.0	U		P	
7440-09-7	Potassium	5950			P	
7782-49-2	Selenium	3.0	~~U~~	~~W~~	F	UJ
7440-22-4	Silver	4.0	U		P	
7440-23-5	Sodium	16700			P	
7440-28-0	Thallium	4.0	U		F	
7440-62-2	Vanadium	20.0	~~B~~		P	U
7440-66-6	Zinc	3.0	U		P	

DKR 10/13/94

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Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

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U.S. EPA - CLP

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

BOCJK0

Lab Name: L.A.S. Contract: WSTHS

Lab Code: LOCK Case No.: 728WHD SAS No.: SDG No.: B94-004

Matrix (soil/water): WATER Lab Sample ID: L2528-11

Level (low/med): LOW Date Received: 08/03/94

% Solids: 0.0

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

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	31.0	U		P	
7440-36-0	Antimony	46.0	U		P	
7440-38-2	Arsenic	3.0	~~U~~	~~W~~	F	UJ 5/10/94
7440-39-3	Barium	22.1	B		P	
7440-41-7	Beryllium	1.0	U		P	
7440-43-9	Cadmium	3.0	U		P	
7440-70-2	Calcium	37400			P	
7440-47-3	Chromium	4.7	B		P	
7440-48-4	Cobalt	8.0	U		P	
7440-50-8	Copper	2.0	U		P	
7439-89-6	Iron	10.0	U		P	
7439-92-1	Lead	2.0	U		F	
7439-95-4	Magnesium	9010			P	
7439-96-5	Manganese	2.0	U		P	
7439-97-6	Mercury	0.20	~~U~~		AV	UJ
7440-02-0	Nickel	9.9	~~B~~		P	U
7440-09-7	Potassium	4510	B		P	
7782-49-2	Selenium	3.0	U		F	
7440-22-4	Silver	4.0	U		P	
7440-23-5	Sodium	13800			P	
7440-28-0	Thallium	4.0	U		F	
7440-62-2	Vanadium	12.8	~~B~~		P	U
7440-66-6	Zinc	3.0	U		P	

DKR 10/13/94

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Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

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Attachment 4

Laboratory Narrative and Chain-of-Custody Documentation

CASE NARRATIVE
INORGANIC METALS ANALYSES
WATER

The routine calibration and quality control analyses performed for this batch include as applicable: instrument tune (ICP/MS only), initial and continuing calibration verification, initial and continuing calibration blanks, method blank(s), laboratory control sample(s), ICP interference check samples (ICP only), serial dilutions, analytical (post-digestion) spike samples, matrix spike (predigestion) sample(s), duplicate sample(s).

Preparation and Analysis Requirements

- Two water samples were received in good condition on July 28, 1994 and logged in as projects L2491 and L2528. The cooler temperature upon receipt was at 2 °C.

- The samples were prepared as LAS Batch 728WHT and analyzed for selected analytes as requested on the chain of custody. Sample BOCJJ7 (L2491-1) was used for matrix spike and duplicate, post-digestion spike and serial dilution. All data flags due to the performance of the above-mentioned QC are associated with every sample digested with this batch.

  The samples were digested originally for mercury on August 26, 1994. Due to instruments problems, the analyses performed for mercury produced unusable data. A redigestion was performed on the samples but with reduced volume of samples for sample BOCJJ7, its duplicate and its matrix spike because of insufficient volume of samples available. The preparation was done using 15 mls of sample brought to a final volume of 50 mls. The reporting detection limit for this sample is then affected by the prep factor. It is raised to 0.67 μg/L from 0.2 μg/L.

Holding Time Requirements

- All samples were analyzed within the method-specific holding times with the exception of mercury analysis. Sample BOCJJ7 and BOCJJ9 were analyzed out of holding times. No mercury was found in any of the samples.

Method Blanks

- The level of analytes in the method blanks were less than the reporting detection

limits.

Internal Quality Control

All internal quality control were within acceptance limits with the following exceptions:

- The matrix spike recovered outside the control limits for arsenic. However, the acceptable recovery for the water LCS (prep blank spiked) for arsenic indicated that the analytical system was operating correctly and that the out-of-control recoveries may be attributed to matrix interferences.

Sample Results

- For mercury, sample BOCJJ7 (L2491-1) and its QC were reported at a higher detection limit because the digestion was performed on a reduced volume because of insufficient amount of samples.

Hongsheng Li — September 13, 1994

Prepared By — **Date**

[tet_w.nar]

Lockheed Analytical Services

Log-in No: L2491/L2528
Quotation No: Q40000
Document File No: 0728512/0803512
Page: 1

CASE NARRATIVE
INORGANIC METALS ANALYSES
WATER

The routine calibration and quality control analyses performed for this batch include as applicable: instrument tune (ICP/MS only), initial and continuing calibration verification, initial and continuing calibration blanks, method blank(s), laboratory control sample(s), ICP interference check samples (ICP only), serial dilutions, analytical (post-digestion) spike samples, matrix spike (predigestion) sample(s), duplicate sample(s).

Preparation and Analysis Requirements

- Two water samples were received in good condition on July 28, 1994 and logged in as projects L2491 and L2528. The cooler temperature upon receipt was at 2°C.

- The samples were prepared as LAS Batch 728WHD and analyzed for selected analytes as requested on the chain of custody. Sample BOCJJ8 (L2491-2) was used for matrix spike and duplicate, post-digestion spike and serial dilution. All data flags due to the performance of the above-mentioned QC are associated with every sample digested with this batch.

Holding Time Requirements

- All samples were analyzed within the method-specific holding times with the exception of mercury. Sample BOCJJ8 was analyzed about 8 days after the holding time has expired and BOCJKO 2 days out of holding time. No mercury was found in the samples.

Method Blanks

- The level of analytes in the method blanks were less than the reporting detection limits.

Internal Quality Control

All internal quality control were within acceptance limits.

Hongsheng Li — September 13, 1994

Prepared By — **Date**

[tet_w.nar]

Level 4A SAF# B94-004
EDD

Westinghouse Hanford Company

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST L2491

Page 1 of 1

Date Turnaround: ☐ Priorty ☒ Normal

Collector: BIT WHITTEN	Company Contact: PH BUTCHER	Telephone No.: (509)3764388
Project Designation: 100-HR-3	Sampling Location: 100H & 100D	SAF No.: B94-004
Ice Chest No.: Beta 4	Field Logbook No.: EFL-1018	Method of Shipment: EMERY
Shipped To: LOCKHEED	Offsite Property No.: W94-0-0746-34	Bill of Lading/Air Bill No.: 1402136714

Possible Sample Hazards/Remarks

Special Handling and/or Storage: COOL TO 4 DEGREES CENTIGRADE

SAMPLE ANALYSIS	CLP-METALS (UNFILTERED)	ANIONS: Cl, SO4, NO2, NO3 PO4	NO2/NO3	SULFIDE	AMMONIA	GROSS ALPHA/BETA, Sr-90	TRITIUM	ACTIVITY SCAN	CLP-METALS FILTERED
Preservative	HNO3<2	COOL 4	H2SO4<2	SEE"SI"	H2SO4<2	HNO3<2	COOL 4		HNO3 pH<2
Type of Container	G	G	P	P	P/G	G	Gs	G/P	G
No. of Container(s)	1	1	1	1	1	2	2	1	1
Volume	500ml	500ml	500ml	500ml	500ml	2.5L	1L	40ml	500ml

Sample No.	Matrix*	Date Sampled	Time Sampled	CLP-METALS (UNFILTERED)	ANIONS	NO2/NO3	SULFIDE	AMMONIA	GROSS ALPHA/BETA	TRITIUM	ACTIVITY SCAN	CLP-METALS FILTERED
B0CJJ7	W	07/25/94	0920	X	X	X	X	X	X	X	X	
B0CJJ8	W	07/25/94	0920									X

CHAIN OF POSSESSION — Sign/Print Names

Relinquished By	Date/Time	Received By	Date/Time
[signature]	7/25/94 1234	David St. John [signature] WHC	7/25/94 1234
David St. John [signature] WHC	07/27/94 0940	[signature] CH2M HILL	7/27/94 0940
[signature] CH2M HILL	7/27/94 0950		

SPECIAL INSTRUCTIONS
NOTE: PRESERVATIVE FORSULFIDE=ZnAc+NaOH pH<2 NOTE: DATA DELIVERABLE-STANDALONE

total activity delayed 222-S lab equipment problems
A J SIMPSON

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 [signature] Title: Sample Custodian Date/Time: 7-28-94/1330

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

DISTRIBUTION: Original- Sample Yellow - Sampler

BC-6000-828 (12/92)

Westinghouse Hanford Company

12528

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

Page 1 of 1

Data Turnaround: [ ] Priorty [X] Normal

Collector: K. Trapp	Company Contact: PH BUTCHER	Telephone No.: (509)3764388
Project Designation: 100-HR-3	Sampling Location: 100H & 100D	SAF No.: B94-004
Ice Chest No.: GWS 015	Field Logbook No.: EFL-0057	Method of Shipment: EMERY
Shipped To: LOCKHEED	Offsite Property No.: W94-0-0746-47	Bill of Lading/Air Bill No.: 1402136736
Possible Sample Hazards/Remarks		
Special Handling and/or Storage: COOL TO 4 DEGREES CENTIGRADE		

SAMPLE ANALYSIS																	
Preservative				HNO3<2	COOL 4	H2SO4<2	SEE"SI"	H2SO4<2	HNO3<2	COOL 4	NA	HNO3					
Type of Container				G	G	P	P	P/G	G	Gs	G/P	G					
No. of Container(s)				1	1	1	1	1	2	2	1	1					
Volume				500ml	500ml	500ml	500ml	500ml	2.5L	1L	40ml	500mL					
				CLP-METALS (UNFILTERED)	ANIONS: Cl, SO4, NO2, NO3 PO4	NO2/NO3	SULFIDE	AMMONIA	GROSS ALPHA/ BETA, Sr-90	TRITIUM	ACTIVITY SCAN	CLP-Metals Filtered					
Sample No.	Matrix*	Date Sampled	Time Sampled														
B0CJJ9	W	8/1/94	1110	X	X	X	X	X	X	X	X						
B0CJK0	W	↓	↓									X					

CHAIN OF POSSESSION	Sign/Print Names		
Relinquished By	Date/Time	Received By	Date/Time
K. Trapp / K. Trapp CHI	8/1/94 1300	CA Simpson	8/1/94 1300
Relinquished By	Date/Time	Received By	Date/Time
CA Simpson CAZU HILL	8/2/94 0900		
Relinquished By	Date/Time	Received By	Date/Time
Relinquished By	Date/Time	Received By	Date/Time

SPECIAL INSTRUCTIONS

NOTE: PRESERVATIVE FORSULFIDE=ZnAc+NaOH pH<2 NOTE: DATA DELIVERABLE-STANDALONE

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
	A M Miller	Sample Custodian	8-3-94 1500

FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

DISTRIBUTION: Original- Sample Yellow - Sampler

BC-6000-828 (12/92)

9408190916

Attachment 5

Data Validation Supporting Documentation

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: 100-HR-3			DATA PACKAGE: LKOZ-LAS		
VALIDATOR: D. Robinson		LAB: Lockheed		DATE: 10/13/94	
CASE:			SDG:		
ANALYSES PERFORMED					
[X] CLP/ICP	[X] CLP/GFAA	[X] CLP/Hg	[ ] CLP/Cyanide	[ ]	[ ]
[ ] SW-846/ICP	[ ] SW-846/GFAA	[ ] SW-846/Hg	[ ] SW-846/ Cyanide	[ ]	[ ]
SAMPLES/MATRIX Water					
BOCJJ7		BOCJJ9			
BOCJJ8		BOCJK0			

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: Mercury analysis for all samples was conducted outside the 28 day holding times, see attached holding time summary. All mercury sample results qualified as estimated, UJ.

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

Were 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 blanks analyzed? ..... Yes No (N/A)

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

Comments: Copper, iron, manganese, nickel, vanadium, and zinc were detected in the ICBs, CCBs, and/or Prep Blank resulting in following sample results being qualified as BD, undetected. BOCJJ8 (Cu, V), BOCJK0 (Ni, V), BOCJJ7 (Cu, Fe, V, & Zn), and BOCJJ9 (Cu, Mn, V, & Zn). See attached Forms 3.

5. ACCURACY

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

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

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

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

Comments: The percent recovery of LCS for mercury associated with the Total Metal samples was outside the control limits at 78.9%. Mercury results for samples BOCJJ7 and BOCJJ9 were qualified as UJ. Form 7 attached.

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
Was an ICP serial dilution sample analyzed?	(Yes)	No	N/A
Are the 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: * For analytical spike recoveries below, arsenic and selenium were unacceptable. See attachment 2 for a summary of the samples and qualification. 11/10/94

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? See above*	Yes	(No)	N/A
Was MSA performed as required?	Yes	No	(N/A)
Are MSA results acceptable?	Yes	No	(N/A)

Comments: ~~* Analytical spike recoveries were outside the control limits for arsenic (BOCJJ8), BOCJK6, BOCJJ7, & BOCJJ9~~ S 11/10/94 ~~and selenium (BOCJJ8).~~ S 11/10/94 S 11/10/94 These sample results were qualified UJ. Laboratory reported selenium result for Sample BOCJJ9 with a "W" flag, however, raw data showed analytical spike recovery for control. W flag removed. See attached instrument printouts pages 212 + 213.

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: Mercury result reported for sample BOCJJ7 was greater than the CRDL. Due to insufficient sample volume (see attached case narrative) the laboratory was required to use a smaller sample volume resulting a higher sample detection limit. No qualification of the data is required.

revised page S 11/10/94

HOLDING TIME SUMMARY

SDG: LK02-LAS	VALIDATOR: D. Robinson	DATE:10/13/94	PAGE 1 OF 1
COMMENTS: All samples were analyzed for all ICP metals within 180 day holding time.			

FIELD SAMPLE ID	ANALYSIS TYPE	DATE SAMPLED	DATE PREPARED	DATE ANALYZED	PREP. HOLDING TIME, DAYS	ANALYSIS HOLDING TIME, DAYS	QUALIFIER
BOCJJ7	ICP Metals	07/25/94	NA	09/02/94	NA	39	None
BOCJJ8	ICP Metals	07/25/94	NA	09/02/94	NA	39	None
BOCJJ9	ICP Metals	08/01/94	NA	09/02/94	NA 32	~~45~~ ~~39~~ 5 11/10/94	None
BOCJK0	ICP Metals	08/01/94	NA	09/02/94	NA 32	~~45~~ ~~39~~ 5 11/10/94	None

VONTEL Page 5 of 10/13/94 023

97135.1083

HOLDING TIME SUMMARY

SDG: LK02-LAS	VALIDATOR: D. Robinson	DATE:10/13/94	PAGE 1 OF 1
COMMENTS: All samples analyzed for all GFAA metals within 180 day holding time.			

FIELD SAMPLE ID	ANALYSIS TYPE	DATE SAMPLED	DATE PREPARED	DATE ANALYZED	PREP. HOLDING TIME, DAYS	ANALYSIS HOLDING TIME, DAYS	QUALIFIER
BOCJJ7	GFAA Metals	07/25/94	NA	08/28-29/94	NA	34-35	None
BOCJJ8	GFAA Metals	07/25/94	NA	08/28-29/94	NA	34-35	None
BOCJJ9	GFAA Metals	08/01/94	NA	08/28-29/94	NA	27-28 ~~34-35~~ gw 10/14/94	None
BOCJK0	GFAA Metals	08/01/94	NA	08/28-29/94	NA	27-28 ~~34-35~~ gw 10/10/94	None

Revised page 4/11/10/94

9715513.1084

HOLDING TIME SUMMARY

SDG: LK02-LAS	VALIDATOR: D. Robinson	DATE:10/13/94	PAGE 1 OF 1
COMMENTS: All samples were analyzed outside the 28 day holding time for mercury.			

FIELD SAMPLE ID	ANALYSIS TYPE	DATE SAMPLED	DATE PREPARED	DATE ANALYZED	PREP. HOLDING TIME, DAYS	ANALYSIS HOLDING TIME, DAYS	QUALIFIER
BOCJJ7	CVAA Mercury	07/25/94	NA	09/01/94	NA	38	UJ
BOCJJ8	CVAA Mercury	07/25/94	NA	09/01/94	NA	38	UJ
BOCJJ9	CVAA Mercury	08/01/94	NA	09/01/94	NA	31	UJ
BOCJK0	CVAA Mercury	08/01/94	NA	09/01/94	NA	31	UJ

9715316.1085

9713513.1086

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3
BLANKS

Lab Name: L.A.S._____ Contract: WSTHS_____

Lab Code: LOCK__ Case No.: 728WHT SAS No.: _____ SDG No.: B94-004

Preparation Blank Matrix (soil/water): WATER

Preparation Blank Concentration Units (ug/L or mg/kg): UG/L_

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Prepa-ration Blank	C	M
Aluminum	31.0	U	31.0	U	31.0	U	31.0	U	31.000	U	P
Antimony	46.0	U	46.0	U	46.0	U	46.0	U	46.000	U	P
Arsenic	3.0	U	3.0	U	3.0	U	3.0	U	3.000	U	F
Barium	14.0	U	14.0	U	14.0	U	14.0	U	14.000	U	P
Beryllium	1.0	U	1.0	U	1.0	U	1.0	U	1.000	U	P
Cadmium	3.0	U	3.0	U	3.0	U	3.0	U	3.000	U	P
Calcium	56.0	U	56.0	U	56.0	U	56.0	U	62.940	B	P
Chromium	4.0	U	5.4	B	4.7	B	5.0	B	4.000	U	P
Cobalt	8.0	U	8.0	U	8.0	U	8.0	U	8.000	U	P
Copper	2.0	B	2.7	B	5.2	B	4.5	B	2.500	B	P
Iron	12.2	B	16.2	B	10.8	B	11.2	B	20.140	B	P
Lead	2.0	U	2.0	U	2.0	U	2.0	U	2.000	U	F
Magnesium	48.0	U	48.0	U	48.0	U	48.0	U	48.000	U	P
Manganese	2.0	U	3.4	B	4.9	B	4.1	B	2.000	U	P
Mercury	0.2	U	0.2	U	0.2	U	0.2	U	0.200	U	AV
Nickel	8.0	U	8.0	U	10.8	B	12.0	B	8.000	U	P
Potassium	756.4	B	364.0	U	364.0	U	546.0	B	364.000	U	P
Selenium	3.0	U	3.0	U	3.0	U	3.0	U	3.000	U	F
Silver	4.0	U	4.0	U	4.0	U	4.0	U	4.000	U	P
Sodium	41.0	U	43.5	B	58.3	B	59.9	B	121.900	B	P
Thallium	4.0	U	4.0	U	4.0	U	4.0	U	4.000	U	F
Vanadium	4.0	U	4.0	U	5.1	B	4.2	B	4.000	U	P
Zinc	3.0	U	3.0	U	4.6	B	3.0	U	8.060	B	P

Associate with

All

BOCJJ8

~~All~~ DLR 10/13/94
BOCJJ7
BOCJJ9

FORM III - IN

ILMO2.1

~~037~~

9713513.1087

U.S. EPA - CLP

3
BLANKS

Lab Name: L.A.S. Contract: WSTHS

Lab Code: LOCK Case No.: 728WHT SAS No.: SDG No.: B94-004

Preparation Blank Matrix (soil/water):

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

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Prepa-ration Blank	C	M
Aluminum			31.0	U	31.0	U	31.0	U			P
Antimony			46.0	U	46.0	U	46.0	U			P
Arsenic											NR
Barium			14.0	U	14.0	U	14.0	U			P
Beryllium			1.0	U	1.0	U	1.0	U			P
Cadmium			3.0	U	3.0	U	3.0	U			P
Calcium			56.0	U	56.0	U	56.0	U			P
Chromium			7.0	B	8.0	B	7.9	B			P
Cobalt			8.0	U	8.6	B	8.0	U			P
Copper			7.0	B	5.7	B	5.9	B			P
Iron			14.7	B	14.3	B	21.8	B			P
Lead			2.0	U	2.0	U	2.0	U			F
Magnesium			48.0	U	48.0	U	59.2	B			P
Manganese			5.8	B	5.1	B	5.0	B			P
Mercury			0.2	U	0.2	U	0.2	U			AV
Nickel			11.0	B	15.9	B	8.6	B			P
Potassium			364.0	U	460.6	B	477.7	B			P
Selenium											NR
Silver			4.0	U	4.0	U	4.0	U			P
Sodium			81.4	B	61.1	B	55.0	B			P
Thallium											NR
Vanadium			6.5	B	6.5	B	5.9	B			P
Zinc			6.5	B	4.9	B	4.3	B			P

Associate with

BOCJJ8 BOCJKO BOCJJ7

BOCJKO BOCJJ7 BOCJJ9

BOCJJ9

FORM III - IN

ILMO2.1

~~038~~

027

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U.S. EPA - CLP

7

LABORATORY CONTROL SAMPLE

Lab Name: L.A.S. Contract: WSTHS

Lab Code: LOCK Case No.: 728WHT SAS No.: SDG No.: B94-004

Solid LCS Source:

Aqueous LCS Source: NIST

Analyte	Aqueous (ug/L) True	Found	%R	Solid (mg/kg) True	Found	C	Limits		%R
Aluminum	2000.0	2161.30	108.1						
Antimony	2000.0	2130.55	106.5						
Arsenic	40.0	41.10	102.8						
Barium	2000.0	2136.74	106.8						
Beryllium	50.0	49.63	99.3						
Cadmium	50.0	56.35	112.7						
Calcium	100000	108423.5	108.4						
Chromium	200.0	222.76	111.4						
Cobalt	500.0	534.73	106.9						
Copper	250.0	268.42	107.4						
Iron	1000.0	1073.87	107.4						
Lead	20.0	22.20	111.0						
Magnesium	50000.0	53074.67	106.1						
Manganese	500.0	530.89	106.2						
Mercury	1.0	0.79	78.9						
Nickel	500.0	552.75	110.6						
Potassium	50000.0	52024.56	104.0						
Selenium	10.0	9.15	91.5						
Silver	50.0	56.20	112.4						
Sodium	100000	108144.1	108.1						
Thallium	50.0	45.77	91.5						
Vanadium	500.0	537.02	107.4						
Zinc	500.0	546.75	109.4						

FORM VII - IN

ILMO2.1

~~043~~

Replicate 2 Time: 16:39
Peak Area (A-s): 0.063 Peak Height (A): 0.201
Background Pk Area (A-s): 0.024 Background Pk Height (A): 0.060
Blank Corrected Pk Area (A-s): 0.063
Concentration (ug/L): 51.99

Mean Conc (ug/L): 50.55 SD: 2.039 RSD(%): 4.03

QC sample is within range 45.0 - 55.0 101%

Se ID: CCB Seq. No.: 00022 A/S Pos.: 7 Date: 08/28/94

Replicate 1 Time: 16:42
Peak Area (A-s): 0.002 Peak Height (A): 0.004
Background Pk Area (A-s): 0.015 Background Pk Height (A): 0.034
Blank Corrected Pk Area (A-s): 0.002
Concentration (ug/L): 1.52

Replicate 2 Time: 16:46
Peak Area (A-s): 0.000 Peak Height (A): 0.004
Background Pk Area (A-s): 0.014 Background Pk Height (A): 0.032
Blank Corrected Pk Area (A-s): 0.001
Concentration (ug/L): 0.39

Mean Conc (ug/L): 0.95 SD: 0.801 RSD(%): 83.68

QC sample is within range -5.0 - 5.0 AT

Se ID: L2528-1 Seq. No.: 00023 A/S Pos.: 14 Date: 08/28/94

Replicate 1 Time: 16:50
Peak Area (A-s): 0.001 Peak Height (A): 0.005
Background Pk Area (A-s): 0.015 Background Pk Height (A): 0.032
Blank Corrected Pk Area (A-s): 0.001
Concentration (ug/L): 0.41

Replicate 2 Time: 16:53
Peak Area (A-s): 0.000 Peak Height (A): 0.004
Background Pk Area (A-s): 0.016 Background Pk Height (A): 0.031
Blank Corrected Pk Area (A-s): 0.000
Concentration (ug/L): 0.17

Mean Conc (ug/L): 0.29 SD: 0.169 RSD(%): 58.42

ND

Se ID: L2528-1 AT Seq. No.: 00024 A/S Pos.: 14 Date: 08/28/94

Replicate 1 Time: 16:57
Peak Area (A-s): 0.012 Peak Height (A): 0.051
Background Pk Area (A-s): 0.018 Background Pk Height (A): 0.040
Blank Corrected Pk Area (A-s): 0.012
Concentration (ug/L): 9.60

Replicate 2 Time: 17:01
Peak Area (A-s): 0.012 Peak Height (A): 0.042
Background Pk Area (A-s): 0.022 Background Pk Height (A): 0.047
Blank Corrected Pk Area (A-s): 0.012

Cont Next page

9213513.1090

Concentration (ug/L): 8.85

Mean Conc (ug/L): 9.23 SD: 0.527 RSD(%): 5.71

Recovery is 89.4%

Se ID: PBW728WHD Seq. No.: 00025 A/S Pos.: 15 Date: 08/28/94

Replicate 1 Time: 17:04
Peak Area (A-s): 0.001 Peak Height (A): 0.004
Background Pk Area (A-s): 0.015 Background Pk Height (A): 0.033
Blank Corrected Pk Area (A-s): 0.001
Concentration (ug/L): 1.03

Replicate 2 Time: 17:08
Peak Area (A-s): 0.001 Peak Height (A): 0.003
Background Pk Area (A-s): 0.014 Background Pk Height (A): 0.033
Blank Corrected Pk Area (A-s): 0.001
Concentration (ug/L): 0.66

Mean Conc (ug/L): 0.85 SD: 0.266 RSD(%): 31.41

ND

Se ID: PBW728WHD Seq. No.: 00026 A/S Pos.: 15 Date: 08/28/94

Replicate 1 Time: 17:12
Peak Area (A-s): 0.014 Peak Height (A): 0.054
Background Pk Area (A-s): 0.016 Background Pk Height (A): 0.037
Blank Corrected Pk Area (A-s): 0.014
Concentration (ug/L): 10.48

Replicate 2 Time: 17:15
Peak Area (A-s): 0.014 Peak Height (A): 0.053
Background Pk Area (A-s): 0.016 Background Pk Height (A): 0.037
Blank Corrected Pk Area (A-s): 0.014
Concentration (ug/L): 11.09

Mean Conc (ug/L): 10.78 SD: 0.430 RSD(%): 3.99

Recovery is 99.4%

Se ID: LCSW728WHD Seq. No.: 00027 A/S Pos.: 16 Date: 08/28/94

Replicate 1 Time: 17:19
Peak Area (A-s): 0.013 Peak Height (A): 0.052
Background Pk Area (A-s): 0.017 Background Pk Height (A): 0.036
Blank Corrected Pk Area (A-s): 0.013
Concentration (ug/L): 10.09

Replicate 2 Time: 17:23
Peak Area (A-s): 0.014 Peak Height (A): 0.050
Background Pk Area (A-s): 0.017 Background Pk Height (A): 0.037
Blank Corrected Pk Area (A-s): 0.014
Concentration (ug/L): 10.46

Mean Conc (ug/L): 10.28 SD: 0.259 RSD(%): 2.52

103%

~~213~~
030

9713515.1091

OFFICE OF SAMPLE MANAGEMENT

RECORD OF DISPOSITION

ROD-B94-011
Record of Disposition No.

DATE: 08/05/94

LABORATORY: ~~Quanterra~~ Lockheed

PROJECT TITLE/NO.: 100-HR-3 Groundwater, Round 7/ B94-004

NCR NO.: N/A

SAMPLE IDENTIFICATION NUMBERS:

All

DESCRIPTION OF EVENT:

Preparation methods differ for non-filtered and filtered metals analyses by CLP90 protocol.

DISPOSITION OF SAMPLES:

Analyze MS and duplicate for both types of metals analyses.

APPROVAL SIGNATURES:

R. C. Smith/ R C Smith — 8/5/94
OSM Project Coordinator (Print/Sign Name) — Date

R. L. Biggerstaff/ R L Biggerstaff — 8/8/94
Technical Representative (Print/Sign Name) — Date

N/A
Quality Assurance (Print/Sign Name) — Date

new page
5/11/10/94
031

OFFICE OF SAMPLE MANAGEMENT

RECORD OF DISPOSITION

ROD-B94-010
Record of Disposition No.

DATE: 08/04/94	LABORATORY: ~~Quanterra~~ Lockheed
PROJECT TITLE/NO.: 100-HR-3/B94-004	NCR NO.: N/A

SAMPLE IDENTIFICATION NUMBERS:

All

DESCRIPTION OF EVENT:

1) No metals target analyte list specified.

2) Metals sample volume insufficient to perform QC at regular volumes. 400 ml received; 1000 ml required.

3) Sulfide sample volume insufficient for matrix QC. Separate bottles for each analysis are required.

DISPOSITION OF SAMPLES:

1) Report TAL with As, Pb, Se, Tl by GFAA and Hg by 7470.

2) Use 50 ml for all metals (ICP, GFAA) digestions and 100 ml for the Hg analysis on one sample. Perform Hg QC on separate sample at 100 ml for each aliquot. (See IT/WHC Issue Resolution Form)

3) Report LCS for QC.

APPROVAL SIGNATURES:

R. C. Smith/ R Clayton Smith — 8/4/94
OSM Project Coordinator (Print/Sign Name) — Date

R. L. Biggerstaff/ R L Biggerstaff — 8/8/94
Technical Representative (Print/Sign Name) — Date

N/A
Quality Assurance (Print/Sign Name) — Date

new page
5/11/10/94
032

ACCURACY DATA SUMMARY

SDG:	VALIDATOR: C. Jensen	DATE: 11/10/94	PAGE 1 OF ___
COMMENTS: LK02-LAS			

~~SAMPLE ID~~ 11/10/94	COMPOUND	% RECOVERY	SAMPLE(S) AFFECTED	QUALIFIER REQUIRED
Analytical	Arsenic	128.1	BOCJJ7	UJ
Spike Recovery		123.4	BOCJJ9	BJ
Unacceptable		124.2	BOCJJ8	UJ
		129.5	BOCJK0	UJ
	Selenium	59.4	BOCJJ8	UJ

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11/10/94
033

9713513.1094

RECORD COPY

MEMORANDUM

OCT 1994 RECEIVED

TO: 100 HR-3 Round #7 Groundwater Project QA Record October 27, 1994

FR: Thomas Stapp, Golder Associates Inc.

RE: RADIOCHEMISTRY DATA VALIDATION SUMMARY FOR DATA PACKAGE LK02-LAS (943-1610.012 LK02RAD.HR3)

INTRODUCTION

This memo presents the results of data validation on data package LK02-LAS prepared by Lockheed Analytical Services laboratory. A list of samples validated along with the analyses reported and the methods of analysis is provided in the following table.

SAMPLE ID	SAMPLE DATE	MEDIA	ANALYSES
B0CJJ7	07/25/94	WATER	SEE NOTE 1
B0CJJ9*	08/01/94	WATER	SEE NOTE 2

Notes:
1. Indicates the sample was analyzed for tritium (by liquid scintillation).
2. Indicates the sample was analyzed for gross alpha/beta, strontium-90, and tritium (liquid scintillation).
* - Indicates the sample recieved 100% recalculation of results.

Data validation was conducted 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.

Sample Result Verification. All sample results were supported in the raw data.

Detection Limits. Detection limit goals were met.

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

MAJOR DEFICIENCIES

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

MINOR DEFICIENCIES

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

FIELD QC

- Samples B0CJJ7 and B0CJJ9 were identified as field split samples however, corresponding data were not available at the time of this review. Comparison between field split samples will be evaluated in the final data summary.

REFERENCES

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

WHC 1994, Validation of 100-HR-3 Data, 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

ATTACHMENT 1

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 MDA 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 MDA. 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 not 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

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

DATA QUALIFICATION SUMMARY - FORM B-7

SDG: LK02-LAS	REVIEWER: T. STAPP	DATE: 10-21-94	PAGE 1 OF 1
COMMENTS: RADIOCHEMISTRY			
COMPOUND/ANALYTE	QUALIFIER	SAMPLES AFFECTED	REASON
NO QUALIFICATION REQUIRED			

ATTACHMENT 3

QUALIFIED DATA SUMMARY and ANNOTATED LABORATORY REPORTS

Validated Data Summary, Data Package: LK02-LAS

	Samp#	BOCJJ7		BOCJJ9	
	Date	7-25-94		8-1-94	
	Location	D5-14		H3-1	
	Depth	---		---	
	Type	WATER		WATER	
	Comments	SPLIT		SPLIT	
Parameter	Units	Result	Q	Result	Q
GROSS ALPHA	pCi/L	---		2.000	U
GROSS BETA	pCi/L	---		5.300	
TRITIUM	pCi/L	760.000		240.000	U
STRONTIUM-90	pCi/L	---		0.650	U

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

Verified [illegible]
5/11/94

008

97351.1001

9713513.1102

RAD DATA REPORT (ra01)

Westinghouse Hanford Co. * Richland, WA

Westinghouse Hanford Project (Richland,WA) (Project WESTINGHOUSE-HANFORD)

Client Sample ID: B0CJJ7 | LAL Sample ID: L2491-9

Date Collected: 25-JUL-94 | Date Received: 28-JUL-94

Matrix: Water | Login Number: L2491

SDG: L2491

Constituent	Analyzed	Batch	Activity	Error	MDA	DataQual	Units
H-3	09-AUG-94	TRITIUM(H3) LAL-0066_11715	760	200	210		pCi/L

Verified
10-21-94

10-21-94

~~032~~

009

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RAD DATA REPORT (ra01)

Westinghouse Hanford Co. * Richland, WA

Westinghouse Hanford Project (Richland,WA) (Project WESTINGHOUSE-HANFORD)

Client Sample ID: BOCJJ9 | LAL Sample ID: L2528-6

Date Collected: 01-AUG-94 | Date Received: 03-AUG-94

Matrix: Water | Login Number: L2528

Constituent	Analyzed	Batch	Activity	Error	MDA	DataQual	Units
Gross Alpha	08-SEP-94	GROSS ALPHA LAL-0060_13002	~~0.3~~	~~1.0~~	2.0	~~G~~ U	pCi/L
Gross Beta	08-SEP-94	GROSS ALPHA LAL-0060_13002	5.3	1.6	2.2		pCi/L
Total radio-strontium	16-SEP-94	SR-90 LAL-0196_13044	~~0.19~~	~~0.51~~	0.65	U	pCi/L

Verified 10-21-94

~~033~~ 010

RAD DATA REPORT (ra01)

Westinghouse Hanford Co. * Richland, WA

Westinghouse Hanford Project (Richland,WA) (Project WESTINGHOUSE-HANFORD)

Client Sample ID: B0CJJ9 | LAL Sample ID: L2528-8

Date Collected: 01-AUG-94 | Date Received: 03-AUG-94

Matrix: Water | Login Number: L2528

Constituent	Analyzed	Batch	Activity	Error	MDA	DataQual	Units
H-3	16-AUG-94	TRITIUM(H3) LAL-0066_12116	~~190~~	~~160~~	240	U	pCi/L

Verified 10-21-94

ATTACHMENT 4

LABORATORY NARRATIVE and CHAIN-OF-CUSTODY DOCUMENTATION

9713513.1106

Lockheed
Environmental Systems & Technologies Co.

Lockheed Analytical Services
975 Kelly Johnson Drive
Las Vegas, Nevada 89119-3705

Phone: (800) 582-7605
Fax: (702) 361-8146

September 20, 1994

Ms. Joan Kessner
Bechtel Hanford, Inc.
P. O. Box 969
Richland, WA 99352

RE:Log-in No.:L2491/L2528
Quotation No.:Q400000
SAF:B94-004
Document File No.:0728512/0803512
WHC Document Control No.:63/64

The attached data report contains the analytical results of samples that were submitted to Lockheed Analytical Services on 28 July 1994. The temperature of the cooler upon receipt was 2°C. Sample containers were received intact. Samples were not received in time to meet the analytical holding time requirements for method 300.0. (See attached Sample Receiving Checklist). All discrepancies identified upon receipt of the samples have been forwarded to the client and are documented in the enclosed chain-of-custody records.

The attached data report contains the analytical results of samples that were submitted to Lockheed Analytical Services on 3 August 1994. The temperature of the cooler upon receipt was 2°C. Sample containers received agree with the chain-of-custody documentation. Sample containers were received intact. Samples were not received in time to meet the analytical holding time requirements for method 300.0. (See attached Sample Receiving Checklist). All discrepancies identified upon receipt of the samples have been forwarded to the client and are documented in the enclosed chain-of-custody records.

The case narratives included in the following attachments provide a detailed description of all events that occurred during sample preparation, analysis, and data review specific to the samples and analytical methods requested.

A list of data qualifiers, chain-of-custody forms, sample receiving checklist, and log-in report are also enclosed representing the samples received within this group.

If you have any questions concerning the analysis or the data please call Kathleen M. Hall at (509) 375-3268, ext. 351.

" 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".

Sincerely,

for Kathleen M. Hall
Project Manager

kmh:yj

cc: Client Services
Document Control

CASE NARRATIVE
RADIOCHEMICAL ANALYSES

The routine calibration and quality control analyses performed for this batch include as applicable: instrument calibration, initial and continuing calibration verification, quench monitoring standards, instrument background analysis, method blanks, yield tracer, laboratory control samples, matrix spike samples, duplicate samples.

Holding Time Requirements

All holding time requirements were met.

Analytical Method

Gross alpha beta

The gross alpha beta analysis was performed using LAL-91-SOP-0060. No problems were encountered during analysis. All QC criteria were met. A sample from another client was used for the sample duplicate analysis.

Tritium

The tritium analysis was performed using LAL-91-SOP-0066. No problems were encountered during analysis. All QC criteria were met.

Total radio-strontium

The total radio-strontium analysis was performed using LAL-91-SOP-0196. No problems were encountered during analysis. All QC criteria were met.

Yvonne M. Jacoby
Prepared By

September 20, 1994
Date

9713513.1109

OFFICE OF SAMPLE MANAGEMENT

RECORD OF DISPOSITION

ROD-B94-009
Record of Disposition No.

DATE: 08/04/94

LABORATORY: Lockheed

PROJECT TITLE/NO.: 100-HR-3 Groundwater Sampling—Round 7
SAF# B94-004

NCR NO.: N/A

SAMPLE IDENTIFICATION NUMBERS: BOCJJ7, BOCJJ8

DESCRIPTION OF EVENT:

NOTE: THIS RECORD OF DISPOSITION REPLACES ROD-B94-008. ROD-B94-008 HAS BEEN CANCELED.

The COC documents that two bottles for gross alpha, gross beta, and Sr-90 analyses were for sample number BOCJJ7. Lockheed received one bottle for gross alpha, gross beta, and Sr-90 analysis under sample number BOCJJ7, and another bottle for gross alpha, gross beta, and Sr-90 analysis for sample number BOCJJ8.

DISPOSITION OF SAMPLES:

With the concurrence of R.L. Biggerstaff, project engineer, the gross alpha, gross beta, and Sr-90 analyses are to be canceled for sample numbers BOCJJ7 and BOCJJ8.

APPROVAL SIGNATURES:

R.C. Smith — 8/4/94
OSM Project Coordinator (Print/Sign Name) — Date

R.L. Biggerstaff — 8/8/94
Technical Representative (Print/Sign Name) — Date

N/A
Quality Assurance (Print/Sign Name) — Date

~~002 A~~ 016

Lockheed Analytical Services
DATA QUALIFIERS FOR RADIOCHEMICAL ANALYSES
[Revised 08/28/92]

For Use on the Analytical Data Reporting Forms	
B	Any constituent that was also detected in the associated blank whose concentration was greater than the reporting detection limit (RDL) and/or minimum detectable activity (MDA).
C	Presence of high TDS in sample required reduction of sample size which increased the MDA.
D	Constituent detected in the diluted sample.
E	Constituent concentration exceeded the calibration or attenuation curve range.
F	*For Alpha Spectrometry Only*-- FWHM exceeded acceptance limits.
H	Sample analysis performed outside of method-specified maximum holding time requirement.
Y	Chemical yield exceeded acceptance limits.
For Use on the QC Data Reporting Forms	
*****	QC data (i.e., percent recovery data for laboratory control standard and matrix spike; and RPD for replicate analyses) exceeded acceptance limits.
a[1]	The spike recovery and/or RPD for matrix spike and duplicates cannot be evaluated due to insufficient spiking level compared to the elevated sample analyte concentration.
b[1]	The RPD cannot be computed because the sample and/or duplicate concentration was below the MDA.

[1] Used as foot note designations on the QC summary form.

Westinghouse Hanford Company

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST L2491

Page 1 of 1

Data Turnaround: [ ] Priorty [X] Normal

Collector: B.T. WRITTEN	Company Contact: PH BUTCHER	Telephone No.: (509)3764388
Project Designation: 100-HR-3	Sampling Location: 100H & 100D	SAF No.: B94-004
Ice Chest No.: 3 + 4	Field Logbook No.: EFL-1018	Method of Shipment: EMERY
Shipped To: LOCKHEED	Offsite Property No.: W94-0-0746-34	Bill of Lading/Air Bill No.: 1402136714

Possible Sample Hazards/Remarks

Special Handling and/or Storage: COOL TO 4 DEGREES CENTIGRADE

SAMPLE ANALYSIS	CLP-METALS (UNFILTERED)	ANIONS: Cl, SO4, NO2, NO3 PO4	NO2/NO3	SULFIDE	AMMONIA	GROSS ALPHA/BETA, Sr-90	TRITIUM	ACTIVITY SCAN	CLP METALS FILTERED
Preservative	HNO3<2	COOL 4	H2SO4<2	SEE"SI"	H2SO4<2	HNO3<2	COOL 4		HNO3 pH<2
Type of Container	G	G	P	P	P/G	G	Gs	G/P	G
No. of Container(s)	1	1	1	1	1	2	2	1	1
Volume	500ml	500ml	500ml	500ml	500ml	2.5L	1L	40ml	500ml

Sample No.	Matrix*	Date Sampled	Time Sampled	CLP-METALS (UNFILTERED)	ANIONS	NO2/NO3	SULFIDE	AMMONIA	GROSS ALPHA/BETA, Sr-90	TRITIUM	ACTIVITY SCAN	CLP METALS FILTERED
BOCJJ7	W	07/25/94	0920	X	X	X	X	X	X	X	X	
BOCJJ8	W	07/25/94	0920									X

CHAIN OF POSSESSION	Sign/Print Names		
Relinquished By	Date/Time	Received By: David St. John	Date/Time: 7/25/94 1234
Relinquished By: David St. John	Date/Time: 07/25/94	Received By: A J Simpson	Date/Time: 7/25/94 0910
Relinquished By	Date/Time	Received By	Date/Time
Relinquished By	Date/Time	Received By	Date/Time

SPECIAL INSTRUCTIONS

NOTE: PRESERVATIVE FORSULFIDE=ZnAc+NaOH pH<2 NOTE: DATA DELIVERABLE-STANDALONE

total activity delayed 222-S Lab equipment problems

A J SIMPSON

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
	[signature]	Sample Custodian	7-28-94/1330

FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

DISTRIBUTION: Original- Sample Yellow - Sampler

BC-6000-828 (12/92)

Westinghouse Hanford Company

2528

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

Page 1 of 1

Data Turnaround: [ ] Priorty [X] Normal

Collector: K. Trapp	Company Contact: PH BUTCHER	Telephone No.: (509)3764388
Project Designation: 100-HR-3	Sampling Location: 100H & 100D	SAF No.: B94-004
Ice Chest No.: GWS 015	Field Logbook No.: EFL-0057	Method of Shipment: EMERY
Shipped To: LOCKHEED	Offsite Property No.: W94-0-0746-47	Bill of Lading/Air Bill No.: 1402136736
Possible Sample Hazards/Remarks:		
Special Handling and/or Storage: COOL TO 4 DEGREES CENTIGRADE		

SAMPLE ANALYSIS	CLP-METALS (UNFILTERED)	ANIONS: Cl, SO4, NO2, NO3 PO4	NO2/NO3	SULFIDE	AMMONIA	GROSS ALPHA/BETA, Sr-90	TRITIUM	ACTIVITY SCAN								
Preservative	HNO3<2	COOL 4	H2SO4<2	SEE"SI"	H2SO4<2	HNO3<2	COOL 4	NA	HNO3							
Type of Container	G	G	P	P	P/G	G	Gs	G/P	G							
No. of Container(s)	1	1	1	1	1	2	2	1	1							
Volume	500ml	500ml	500ml	500ml	500ml	2.5L	1L	40ml	500ml							

Sample No.	Matrix*	Date Sampled	Time Sampled														
B0CJJ9	W	8/1/94	1110	X	X	X	X	X	X	X	X						
B0CJK0	W	↓	↓									X					

CHAIN OF POSSESSION — Sign/Print Names

Relinquished By	Date/Time	Received By	Date/Time
K. Trapp / K. Trapp	8/1/94 1300	CA Simpson	8/1/94 1300
CA Simpson	8/2/94 0900		

SPECIAL INSTRUCTIONS

NOTE: PRESERVATIVE FORSULFIDE=ZnAc+NaOH pH<2 NOTE: DATA DELIVERABLE-STANDALONE

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: [signature] Title: Sample Custodian Date/Time: 8-3-94 1500

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

DISTRIBUTION: Original- Sample Yellow - Sampler

BC-6000-828 (12/92)

ATTACHMENT 5

DATA VALIDATION SUPPORTING DOCUMENTATION

9713513.1114

RADIOCHEMICAL DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: 100-HR-3 GROUNDWATER ROUND #7			DATA PACKAGE: LK02-LAS		
VALIDATOR: T. Stapp		LAB: LOCKHEED		DATE: 10-20-94	
CASE:			SDG:		

ANALYSES PERFORMED

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

SAMPLES/MATRIX BOCJJ7, BOCJJ9 / WATER

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? . . NOTE ① . . . . . Yes (No) N/A

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

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

Comments: ① Initial calibration for Gross α β and Strontium and tritium exceeds 1 year however continuing calibration data is acceptable and qualification is not required.

02

3. Continuing Calibration . . . . . ☐ N/A

Calibration checked within one week of sample analysis? . . (Yes) No N/A 10-26-94
Calibration check acceptable? . . . . . NOTE ① . . (Yes) (No) N/A 10-26-94
Calibration check standards NIST traceable? . ~~NOTE ①~~ . . . (Yes) No ~~N/A~~
Calibration check standards expired? . . . . NOTE ①. . . . Yes (No) ~~N/A~~ 10-26-94

Comments: ① Calibration check standards were not identified for H3, Gross α/β, and Sr-90. ~~and traceability has not been provided however, the information has been requested and no qualification is required.~~ The Check Standard information provided by the Lab is acceptable but identifier codes do not appear in raw data or continuing calib. section. 10-26-94

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: no qualification is required. cj 11/10/94

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: See LCS results (Item #6)

022

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

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

10-26-94 Comments: ① ~~H3 dilution log of LCS spike was not provided and the~~ The H-3 level of activity exceeds 100 x RDL (RDL=400) however qualification is not required. ~~Dilution logs of Gross α, β and Sr-90 LCS~~ 10-26-94 ~~spike solution also not provided however, spike levels and I.D. are given in all cases and no qualif. is required.~~

7. Chemical Recovery . . . . . ☐ N/A

Chemical carrier added? . . . . . Yes No N/A
Chemical recovery acceptable? . . . . . Yes No N/A
Chemical carrier traceable? . . . NOTE ① . . . . . Yes ~~No~~ N/A 10-26-94
Chemical carrier expired? . . . . . Yes No N/A
Transcription/Calculation errors? . . . . . Yes No N/A 10-26-94

10-26-94 Comments: ① A dilution log of the Sr carrier was ~~not~~ provided and ~~however~~, the carrier amount and identification is given and no qualification is required.

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:

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? . . . NOTE ① . . . . . (Yes) No N/A
Field split RPD values acceptable? . . . NOTE ② . . . . . Yes No (N/A)
Performance audit sample(s) analyzed? . . . . . Yes No (N/A)
Performance audit sample results acceptable? . . . . . Yes No (N/A)

Comments: ① Samples BOCJJ7 and BOCJJ9 are identified as split samples of BOCJ90 and BOCJC4 respectively.
② Sample results of the split sample pairs are not available in this SDG however, RPD's will be evaluated in the final data summary.

10. Holding Times

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

Comments: See holding time Summary page (B-1).

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: LK02-LAS	VALIDATOR: T. Stapp	DATE: 10-20-94	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
BOCJJ7	H-3	7-25-94	N/A	8-07-94	N/A	≤ 180	NONE
BOCJJ9	H-3	8-01-94	↓	8-16-94	↓	≤ 180	NONE
BOCJJ9	Gross α	8-01-94	N/A	9-08-94	N/A	≤ 180	NONE
↓	Gross β	↓	↓	9-08-	↓	↓	↓
↓	Sr-90	↓	↓	9-16-	↓	↓	↓

LK02-LAS

Gross Alpha		
HEIS No.:	BOCJJ9	LCS
	D4	D2
Lab ID:	L2528-6	L2528-6
Aliquot:	2.50E-01	2.50E-01
Net counts:	5	331
Bkg counts:	3.4	3.4
Spl count time:	100	100
Bkg count time:	100	100
EFFIC:	0.099	0.142
Calc.:	2.91E-01	4.16E+01
Rptd:	2.90E-01	4.15E+01
MDA calc:	2.05E+00	1.43E+00
MDA rptd:	2.05E+00	1.43E+00

026

9135419

LK02-LAS

Gross Beta		
MEIS No.:	BOCJJ9	LCS
	D4	D2
Lab ID:	L2528-6	13002-2
Aliquot:	2.50E-01	2.50E-01
Net counts:	199	922
Bkg counts:	88.1	82.4
Spl count time:	100	100
Bkg count time:	100	100
a into b X TALK:	0.01	0.01
EFFIC:	0.373	0.381
Calc.:	5.36E+00	3.96E+01
Rptd:	5.34E+00	3.58E+01
MDA calc:	2.24E+00	2.12E+00
MDA rptd:	2.24E+00	2.13E+00

9713513.1120

LK02-LAS

Strontium 90		
HEIS No.:	BOCJJ9	LCS
DETECTOR:	D4	D4
Sample:	L2528-6	12810-2
DECAY:	0.999779	0.999779
Sample amt (L):	5.00E-01	5.00E-01
GROSS CNTS:	184	4296
Count time:	200	200
GROSS BKG:	204.5	164.2
EFFIC.:	0.44	0.44
INGROWTH:	1.257	1.224
Yield:	0.873	0.711
Calc:	-1.91E-01	4.86E+01
Rptd:	-1.90E-01	4.86E+01
MDA, Calc:	6.07E-02	4.42E-08
MDA, rptd:	6.46E-01	N/A

9713513.1122

Golder Associates Inc.

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

Golder Associates

RECORD COPY

October 21, 1994

Our ref: 943-1610.012.400
94-1610/0/36

CH2M Hill
P.O. Box 1510
Richland, Washington 99352

ATTENTION: Ms. Jeanette Duncan

RE: TRANSMITTAL OF 100-HR-3 DATA VALIDATION PACKAGE, ENVIRONMENTAL AND WASTE CHARACTERIZATION ANALYTICAL DATA VALIDATION, CONTRACT NO. MSH-SWV-315905

Dear Ms. Duncan:

Enclosed is one data validation report for the 100-HR-3 validation project. The package(s) included in this shipment are as follows:

- LK02-LAS

Also included is a hard copy of the chemistry comments for 242-A.

Please call if you have any questions.

Sincerely,

GOLDER ASSOCIATES INC.

Christina I. Jensen

Christina I. Jensen
Task Manager

Christina I. Jensen for

Kent M. Angelos
Project Manager

DFC 10/28/94
OCT 1994
RECEIVED

10/28/94

Data Validation Check List

for Project 100-HR-3

HEIS Samp Number	Client Sample Number	Master DP File Number	DP Sequence Number	Laboratory	Y N VOA	Y N SEMI VOA	Y N PEST/PCB	Y N WETCHEM	Y N METALS	COMMENTS	Y N RADCHEM	Date OSM Rcvd DP
B0CJJ7		LK02	002	LOCKHEED	N	N	N	Y 9/20/94	Y 9/20/94	07/28/94 - SAF-B94-004 - GROSS ALPHA/BETA AND SR-90 CANCELED	Y 9/27/94	9/27/94
Field split												
B0CJJ8		LK02	002	LOCKHEED	N	N	N	N	Y 9/20/94	07/28/94 - SAF-B94-004	N	9/20/94
Field split												
B0CJJ9		LK02	002	LOCKHEED	N	N	N	Y 9/20/94	Y 9/20/94	08/03/94 - SAF-B94-004	Y 9/27/94	9/27/94
Field split												
B0CJK0		LK02	002	LOCKHEED	N	N	N	N	Y 9/20/94	08/03/94 - SAF-B94-004	N	9/20/94
field split												

Data Entry Complete: DP DEW 10 28-94

DATATRAC

10/28/94

Validation Rcvd 10-28-94

9713513.1124

RECORD COPY

MEMORANDUM

OCT 1994 RECEIVED Validation Log In

TO: 100-HR-3 Project QA Record

October 18, 1994

FR: Dennis K. Robinson, Golder Associates Inc.

RE: GENERAL CHEMISTRY DATA VALIDATION SUMMARY FOR DATA PACKAGE: LK02-LAS (943-1610.012 filename LASC.HR3)

INTRODUCTION

This memo presents the results of data validation on 2 water samples analyzed by Lockheed Analytical Services Laboratory. The samples validated along with the analyses reported and the methods of analyses are provided in the following table.

SAMPLE ID	SAMPLE DATE	MEDIA	ANALYSIS
BOCJJ7 BOCJJ9	07/25/94 08/01/94	Water Water	SEE NOTE 1

NOTE 1: Samples were analyzed for ammonia by EPA method 350.1, chloride, nitrate, nitrite, and sulfate by EPA method 300.0, nitrate/nitrite by EPA method 353.2, phosphate by EPA method 365.2, and sulfide by EPA method 9030.

Data validation was conducted 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. Annotated Laboratory Reports
Attachment 4. Laboratory Narrative and Chain-of-Custody Documentation
Attachment 5. Data Validation Supporting Documentation

DATA QUALITY OBJECTIVES

Precision. Goals for precision were met.

Accuracy. Goals for accuracy were met with the exception of the deficiencies identified below.

Detection Limits. Target goals for sample detection limit were met.

Completeness. A total of 2 samples were validated in this data package with a total of 16 determinations reported, all of which were deemed valid. This results in a completeness of 100 percent which meets the objective of 90 percent.

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 as estimated or undetected.

- **Holding Times.** The holding times for phosphate analysis and nitrate and nitrite analysis by ion chromatography were exceeded for both samples requiring the qualification of the data as estimated. The holding time was exceeded for the sulfide analysis of sample BOCJJ7 requiring the qualification of the sulfide sample result as estimated. Attachments 2 and 5 provide a summary of the samples affected, data qualifications applied, and supporting documentation.

- **Calibration.** The percent recovery of the ICV (86.3%) for the sulfide analysis of sample BOCJJ9 and the CCVs (127.1% and 86.2%) for the sulfide analysis of both samples were outside the control limits (90-110%). Attachments 2 and 5 provide a summary of the samples affected, data qualifications applied, and supporting documentation.

- **Spike Sample Recovery.** The percent recovery of the spike sample was outside the control limits for sulfide for sample BOCJJ7 - 74.2% 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; September 7, 1994, Westinghouse Hanford Company, Richland, Washington.

revised page
5 11/15/94 001A

Attachment 1

Glossary of Data Reporting Qualifiers

GLOSSARY OF INORGANIC DATA REPORTING QUALIFIERS

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

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

UJ - Indicates the constituent was analyzed for and not detected. Due to a minor quality control deficiency identified during the data validation the concentration reported 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 the 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.

Attachment 2

Summary of Data Qualifications

9713513.1129

Data Qualification Summary

Project: 100-HR-3	Validator: D. Robinson	Date: 10/14/94	Page 1 of 1
Comments: General chemistry analysis			
Analyte	Qualifier	Samples Affected	Reason
Nitrate-N	J	BOCJJ7 BOCJJ9	Sample holding time was exceeded.
Nitrite-N	J,UJ	BOCJJ7 BOCJJ9	Sample holding time was exceeded.
Phosphate	J	BOCJJ7 BOCJJ9	Sample holding time was exceeded.
Sulfide	UJ	BOCJJ7 BOCJJ9	Sample holding time was exceeded. Percent recovery of the ICV, CCV, and/or matrix spike was outside the control limits.

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Attachment 3

Annotated Laboratory Reports

Validated Data Summary, Data Package: LK02-LAS

	Samp#	BOCJJ7		BOCJJ9	
	Date	7-25-94		8-1-94	
	Location	D5-14		H3-1	
	Depth	---		---	
	Type	WATER		WATER	
	Comments	SPLIT		SPLIT	
Parameter	Units	Result	Q	Result	Q
CHLORIDE	MG/L	18.000		5.300	
NITRITE	MG-N/L	0.071	J	0.025	UJ
NITRATE	MG-N/L	10.000	J	2.500	J
PHOSPHATE	MG-P/L	0.016	BJ	0.032	J
SULFATE	MG/L	83.000		22.000	
SULFIDE	MG/L	1.000	UJ	1.000	UJ
NITRATE+NITRITE	MG-N/L	11.000		2.600	
AMMONIA	MG-N/L	0.036	B	0.030	

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

Revised page
5/10/94

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LOCKHEED ANALYTICAL SERVICES

Sample Results

Client Sample ID: B0CJJ7	Date Collected: 25-JUL-94
Matrix: Water	Date Received: 28-JUL-94

Constituent	Units	Method	Result	Project Reporting Limit	Data Qualifier(s)	Date Analyzed	LAS Batch|ID	LAS Sample|ID
Chloride	mg/L	300.0	18.	0.020		02-AUG-94	11573	L2491-3
Nitrate-N	mg/L	300.0	10.	0.020	~~H~~ J	02-AUG-94	11571	L2491-3
Nitrite-N	mg/L	300.0	0.071	0.025	~~H~~ J	02-AUG-94	11572	L2491-3
Sulfate	mg/L	300.0	83.	0.10		02-AUG-94	11574	L2491-3
Ammonia Nitrogen	mg/L	350.1	0.036	0.050	B	05-AUG-94	11737	L2491-6
Nitrate-Nitrite-Nitrogen	mg/L	353.2	11.	0.050		09-AUG-94	11738	L2491-4
O-Phosphate-Phosphorus	mg/L	365.2	0.016	0.030	~~HB~~ BJ	12-AUG-94	12239	L2491-3
Sulfide	mg/L	9030	< 1.0	3.0	~~NU~~ UJ	01-AUG-94	11672	L2491-5

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10/24/94

~~303~~

97135 LOCKHEED ANALYTICAL SERVICES

Sample Results

Client Sample ID: B0CJJ9	Date Collected: 01-AUG-94
Matrix: Water	Date Received: 03-AUG-94

Constituent	Units	Method	Result	Project Reporting Limit	Data Qualifier(s)	Date Analyzed	LAS Batch|ID	LAS Sample|ID
Chloride	mg/L	300.0	5.3	0.020		05-AUG-94	11831	L2528-2
Nitrate-N	mg/L	300.0	2.5	0.020	~~H~~ J	05-AUG-94	11833	L2528-2
Nitrite-N	mg/L	300.0	< 0.025	0.025	~~HU~~ UJ	05-AUG-94	11834	L2528-2
Sulfate	mg/L	300.0	22.	0.10		05-AUG-94	11832	L2528-2
Ammonia Nitrogen	mg/L	350.1	0.030	0.014		05-AUG-94	11835	L2528-5
Nitrate-Nitrite-Nitrogen	mg/L	353.2	2.6	0.10		09-AUG-94	11836	L2528-3
O-Phosphate-Phosphorus	mg/L	365.2	0.032	0.030	J. ~~H J~~	12-AUG-94	12239	L2528-2
Sulfide	mg/L	9030	< 1.0	3.0	~~HU~~ UJ	05-AUG-94	11877	L2528-4

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Attachment 4

Laboratory Narrative and Chain-of-Custody Documentation

Lockheed Analytical Services

Log-in No: L2491/L2528
Quotation No: Q40000
Document File No: 0728512/0803512
Page: 1

CASE NARRATIVE
INORGANIC NON-METALS ANALYSES
WATER

The routine calibration and quality control analyses performed for this batch include as applicable: initial and continuing calibration verification, initial and continuing calibration blanks, method blank(s), laboratory control sample(s), matrix spike sample(s), and duplicate sample(s).

Preparation and Analysis Requirements

- Two water samples were received for SAF: B94-004. One water sample was logged in as L2491 and prepared and analyzed as batch 728WH and one water sample was logged in as L2528 and prepared as batch 803WH and analyzed for selected analytes as requested on the chain of custody.

BATCH 728WH:

Client ID	LAL #		Method
BOCJJ7	L2491-3	DUP, MS	300.0 Chloride, Nitrate, Nitrite, Sulfate
	L2491-3	DUP, MS	365.2 Ortho Phosphate
	L2491-4	DUP, MS	353.2 Nitrate
	L2491-5	DUP, MS	9030 Sulfide
	L2491-6	DUP, MS	350.1 Ammonia

BATCH 803WH:

Client ID	LAL #		Method
BOCJJ9	L2528-2	DUP, MS	300.0 Chloride, Nitrate, Nitrite, Sulfate
	L2528-3	DUP, MS	353.2 Nitrate
	L2528-4	DUP, MS	9030 Sulfide
	L2528-5	DUP, MS	350.1 Ammonia

Holding Time Requirements

- All samples were analyzed within the method-specific holding times with the exception of Method 365.2 Ortho-Phosphate and Method 300.0 Nitrate and Nitrite which were received from the client out of holding time in Batches 728WH and 803WH. Analyses proceeded at the direction of the client and the applicable samples are flagged with an "H".

Method Blanks

- The concentration levels of all the requested analytes in the method blank were below the reporting detection limits.

Internal Quality Control

- All Internal Quality Control were within acceptance limits with the following exceptions:

Batch 728WH:

Method 9030 Sulfide had a CCV recovery of 127%. However, the sample was nondetect. The matrix spike recovered outside the control limits for Sulfide (74.2%). However, the associated LCS recovery (97.9%) was within criteria, indicating matrix interference was present during the sample analysis. The applicable sample is flagged with an "N".

Batch 803WH:

Method 9030 Sulfide. The matrix spike recovered outside the control limits for Sulfide (168.0%). However, the associated LCS recovery (88.6) was within criteria, indicating a matrix interference was present during the sample analysis. The applicable sample is flagged with an "N".

Kay McCann — September 13, 1994

Prepared By — **Date**

Level 1A SAF B94-004

EDD

Westinghouse Hanford Company

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST L2491

Page 1 of 1

Data Turnaround: [ ] Priorty [X] Normal

Collector: BIT WHITTEN	Company Contact: PH BUTCHER	Telephone No.: (509)3764388
Project Designation: 100-HR-3	Sampling Location: 100H & 100D	SAF No.: B94-004
Ice Chest No.: Beta 4	Field Logbook No.: EFL-1018	Method of Shipment: EMERY
Shipped To: LOCKHEED	Offsite Property No.: W94-0-0746-34	Bill of Lading/Air Bill No.: 1402136714
Possible Sample Hazards/Remarks		
Special Handling and/or Storage: COOL TO 4 DEGREES CENTIGRADE		

SAMPLE ANALYSIS																	
Preservative				HNO3<2	COOL 4	H2SO4<2	SEE"SI"	H2SO4<2	HNO3<2	COOL 4		HNO3 pH<2					
Type of Container				G	G	P	P	P/G	G	Gs	G/P	G					
No. of Container(s)				1	1	1	1	1	2	2	1	1					
Volume				500ml	500ml	500ml	500ml	500ml	2.5L	1L	40ml	500ml					
				CLP-METALS (UNFILTERED)	ANIONS: Cl, SO4, NO2, NO3 PO4	NO2/NO3	SULFIDE	AMMONIA	GROSS ALPHA/ BETA, Sr-90	TRITIUM	ACTIVITY SCAN	CLP-METALS FILTERED					
Sample No.	Matrix*	Date Sampled	Time Sampled														
B0CJJ7	W	07/25/94	0920	X	X	X	X	X	X	X	X						
B0CJJ8	W	07/25/94	0920									X					

CHAIN OF POSSESSION — Sign/Print Names

Relinquished By	Date/Time	Received By	Date/Time
[signature]	7/25/94 1234	David St. John [signature] WHC	7/25/94 1234
David St. John [signature] WHC	07/27/94 0914	[signature] CASHMIRE	7/27/94 0910
[signature] CASHMIRE	7/27/94 0950		

SPECIAL INSTRUCTIONS

NOTE: PRESERVATIVE FORSULFIDE=ZnAc+NaOH pH<2 NOTE: DATA DELIVERABLE-STANDALONE

total activity delayed 222-S lab equipment problems

A J SIMPSON

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: [signature] Title: Sample Custodian Date/Time: 7-28-94/1350

FINAL SAMPLE DISPOSITION

Disposal Method: Disposed By: Date/Time:

DISTRIBUTION: Original- Sample Yellow - Sampler

BC-6000-828 (12/92)

Westinghouse Hanford Company

12528

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

Page 1 of 1

Data Turnaround: [ ] Priorty [X] Normal

Collector: K. Trapp	Company Contact: PH BUTCHER	Telephone No.: (509)3764388
Project Designation: 100-HR-3	Sampling Location: 100H & 100D	SAF No.: B94-004
Ice Chest No.: GWS 015	Field Logbook No.: EFL-0057	Method of Shipment: EMERY
Shipped To: LOCKHEED	Offsite Property No.: W94-0-0746-47	Bill of Lading/Air Bill No.: 1402136736
Possible Sample Hazards/Remarks		

SAMPLE ANALYSIS																	
Preservative			HNO3<2	COOL 4	H2SO4<2	SEE"SI"	H2SO4<2	HNO3<2	COOL 4	NA	HNO3						
Type of Container			G	G	P	P	P/G	G	Gs	G/P	G						
No. of Container(s)			1	1	1	1	1	2	2	1	1						
Special Handling and/or Storage: COOL TO 4 DEGREES CENTIGRADE		Volume	500ml	500ml	500ml	500ml	500ml	2.5L	1L	40ml	500mL						
			CLP-METALS (UNFIL-TERED)	ANIONS: Cl, SO4, NO2, NO3 PO4	NO2/NO3	SULFIDE	AMMONIA	GROSS ALPHA/ BETA, Sr-90	TRITIUM	ACTIVI-TY SCAN	CLP-Metals Filtered						
Sample No.	Matrix*	Date Sampled	Time Sampled														
BO CJJ9	W	8/1/94	1110	X	X	X	X	X	X	X	X						
BO CJK0	W	↓	↓									X					

CHAIN OF POSSESSION	Sign/Print Names		
Relinquished By	Date/Time	Received By	Date/Time
h. Trapp / h. Trapp CHI	8/1/94 1300	A J Simpson	8/1/94 1300
Relinquished By CAZU HILL	Date/Time	Received By	Date/Time
A J Simpson	8/2/94 0900		
Relinquished By	Date/Time	Received By	Date/Time
N			
Relinquished By	Date/Time	Received By	Date/Time

SPECIAL INSTRUCTIONS

NOTE: PRESERVATIVE FORSULFIDE=ZnAc+NaOH pH<2 NOTE: DATA DELIVERABLE-STANDALONE

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
	[illegible]	Sample Custodian	8-3-94 / 1500

FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

DISTRIBUTION: Original- Sample Yellow - Sampler

BC-6000-828 (12/92)

Attachment 5

Data Validation Supporting Documentation

GENERAL CHEMISTRY DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	(D)	E
PROJECT: 100-HR-3			DATA PACKAGE: 2K02-LAS		
VALIDATOR: D. Robinson		LAB: Lockheed		DATE: 10/14/94	
CASE:			SDG:		
ANALYSES PERFORMED					
[X] Anions/IC	[ ] TOC	[ ] TOX	[ ] TPH-418.1	[ ] Oil and Grease	[ ] Alkalinity
[X] Ammonia	[ ] BOD/COD	[ ] Chloride	[ ] Chromium-VI	[ ] pH	[X] NO_3/NO_2
[ ] Sulfate	[ ] TDS	[ ] TKN	[ ] Phosphate	[X] Sulfide	[ ]
SAMPLES/MATRIX Water					
B0CJJ7		B0CJJ9			

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: Holding times were exceeded for both samples for the Phosphate analysis and the nitrate and nitrite analysis by IC. The holding time was exceeded for sample B0CJJ7 for the sulfide analysis. See attached holding time summary.

GENERAL CHEMISTRY DATA VALIDATION CHECKLIST

3. INSTRUMENT PERFORMANCE AND CALIBRATIONS

DKR 8/14/94

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

DKR 8/14/94

Are calibration check results acceptable? ..... Yes (No) N/A

Comments: Percent recovery of the ICV (86.3%) for the sulfide analysis of BOCJJ9 and the CCVs (127.1% and 86.2%) for the sulfide analysis of both samples was outside the control limits (90-110%). Sulfide sample results were qualified as estimated, UJ

4. BLANKS

Were laboratory blanks analysed? ..... (Yes) No N/A

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

Were field blanks analyzed? ..... Yes No (N/A)

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

Comments: _____

5. ACCURACY

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

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

Were laboratory control samples (LCS) analyzed at the required frequency? ..... (Yes) No N/A

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

Comments: The percent recovery of the matrix spike sample for sulfide analysis was out of control for both samples (BOCJJ7 - 74.2%) and BOCJJ9 - 168.6%). Sulfide sample result was qualified UJ for sample BOCJJ7.

GENERAL CHEMISTRY DATA VALIDATION CHECKLIST

6. PRECISION

Were laboratory duplicates analyzed at the required frequency? ..... Yes No N/A

Are laboratory duplicate samples 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

Comments: _____

7. ANALYTE QUANTITATION

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

Comments: _____

8. REPORTED RESULTS AND DETECTION LIMITS

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

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

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

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

Comments: _____

HOLDING TIME SUMMARY

SDG: LK02-LAS	VALIDATOR: D. Robinson				DATE:10/14/94	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
BOCJJ7	Anions-IC	07/25/94	NA/	08/02/94	NA	8	J - NO_3, NO_2
BOCJJ9	Anions-IC	08/01/94	NA	08/05/94	NA	4	J - NO_3 UJ - NO_2
BOCJJ7	Ammonia	07/25/94	NA	08/05/94	NA	11	None
BOCJJ9	Ammonia	08/01/94	NA	08/05/94	NA	4	None
BOCJJ7	Nitrate/Nitrite	07/25/94	NA	08/09/94	NA	15	None
BOCJJ9	Nitrate/Nitrite	08/01/94	NA	08/09/94	NA	8	None
BOCJJ7	Phosphate	07/25/94	NA	08/12/94	NA	18	BJ
BOCJJ9	Phosphate	08/01/94	NA	08/12/94	NA	11	J
BOCJJ7	Sulfide	07/25/94	NA	08/05/94	NA	11	UJ
BOCJJ9	Sulfide	08/01/94	NA	08/05/94	NA	4	None

LOCKHEED ANALYTICAL LABORATORY
WATER QUALITY PARAMETERS
CALIBRATION SUMMARY

SDG: N/A	UNITS: mg/L	CONSTANT: N/A
LAL BATCH: 728-wh	CALIBRATION DATE: 8/1/94	LINEAR COEFFICIENT: N/A
METHOD: 9030	CALIBRATION TIME: N/A	QUADRATIC COEFFICIENT: N/A
ANALYTE: Sulfide	NUMBER OF STANDARDS: N/A	CUBIC COEFFICIENT: N/A
INSTRUMENT: Titration	CALIBRATION TYPE: N/A	COEFFICIENT OF DETERMINATION (r^2): N/A

STANDARD DATA

STANDARD ID	MANUFACTURER	LOT #	TRUE VALUE	INSTRUMENT RESPONSE	CALCULATED CONCENTRATION
#9101872628	Fisher	917354	N/A	N/A	N/A

INITIAL CALIBRATION VERIFICATION DATA

SAMPLE ID	TRUE VALUE	FOUND	% RECOVERY
ICV	10.0	10.08	100.8%

INITIAL CALIBRATION BLANK DATA

SAMPLE ID	INJECTION #	FOUND
Pb728wh	N/A	3.00 U

CONTINUING CALIBRATION VERIFICATION DATA

SAMPLE ID	INJECTION #	TRUE VALUE	FOUND VALUE	% RECOVERY
CCV	N/A	20.0	31.77	127.1%

CONTINUING CALIBRATION BLANK DATA

SAMPLE ID	INJECTION #	FOUND
N/A		

LOCKHEED ANALYTICAL LABORATORY
WATER QUALITY PARAMETERS
CALIBRATION SUMMARY

SDG: N/A	UNITS: mg/L	CONSTANT: N/A
LAL BATCH: 803-wh	CALIBRATION DATE: 8/5/94	LINEAR COEFFICIENT: N/A
METHOD: 9030	CALIBRATION TIME: N/A	QUADRATIC COEFFICIENT: N/A
ANALYTE: Sulfide	NUMBER OF STANDARDS: N/A	CUBIC COEFFICIENT: N/A
INSTRUMENT: Titration	CALIBRATION TYPE: N/A	COEFFICIENT OF DETERMINATION (r^2): N/A

STANDARD DATA

STANDARD ID	MANUFACTURER	LOT #	TRUE VALUE	INSTRUMENT RESPONSE	CALCULATED CONCENTRATION
#9101872628	Fisher	917354	N/A	N/A	N/A

INITIAL CALIBRATION VERIFICATION DATA

SAMPLE ID	TRUE VALUE	FOUND	% RECOVERY
ICV	10.0	8.63	86.3%

INITIAL CALIBRATION BLANK DATA

SAMPLE ID	INJECTION #	FOUND
Pb803wh	N/A	3.00 U

CONTINUING CALIBRATION VERIFICATION DATA

SAMPLE ID	INJECTION #	TRUE VALUE	FOUND VALUE	% RECOVERY
CCV	N/A	25.0	17.24	86.2%

CONTINUING CALIBRATION BLANK DATA

SAMPLE ID	INJECTION #	FOUND
N/A		

LOCKHEED ANALYTICAL LABORATORY
WATER QUALITY PARAMETERS
QUALITY CONTROL DATA SUMMARY

SDG: N/A	ANALYTE: Sulfide
LAL BATCH: 728-wh	UNITS: mg/L

LABORATORY CONTROL SAMPLES

LCS ID	ACCEPTANCE LIMITS (%R)	TRUE VALUE	FOUND VALUE	% RECOVERY
Pb728wh S	80-120	10.0	9.79	97.9%

MATRIX SPIKE SAMPLES

CLIENT SAMPLE ID	ACCEPTANCE LIMITS (%R)	SPIKED SAMPLE RESULT	SAMPLE RESULT	SPIKE ADDED	% RECOVERY
BOCJJ7	75-125	7.42	3.00 U	10.0	74.2%

LABORATORY DUPLICATE SAMPLES

CLIENT SAMPLE ID	ACCEPTANCE LIMITS (%RPD)	SAMPLE VALUE	DUPLICATE VALUE	RPD
BOCJJ7	75-125	3.00 U	3.00 U	b

FIELD DUPLICATE SAMPLES

CLIENT SAMPLE ID	CLIENT DUPLICATE SAMPLE ID	SAMPLE VALUE	DUPLICATE VALUE	RPD
N/A				

FIELD BLANK SAMPLES

CLIENT SAMPLE ID	ANALYSIS RESULT
N/A	

MATRIX BLANK SAMPLES

LAL SAMPLE ID	ANALYSIS RESULT
Pb728wh	3.00 U

OFFICE OF SAMPLE MANAGEMENT

RECORD OF DISPOSITION

ROD-B94-010
Record of Disposition No.

DATE: 08/04/94

LABORATORY: ~~Quanterra~~ Lockheed

PROJECT TITLE/NO.: 100-HR-3/B94-004

NCR NO.: N/A

SAMPLE IDENTIFICATION NUMBERS:

All

DESCRIPTION OF EVENT:

1) No metals target analyte list specified.

2) Metals sample volume insufficient to perform QC at regular volumes. 400 ml received; 1000 ml required.

3) Sulfide sample volume insufficient for matrix QC. Separate bottles for each analysis are required.

DISPOSITION OF SAMPLES:

1) Report TAL with As, Pb, Se, Tl by GFAA and Hg by 7470.

2) Use 50 ml for all metals (ICP, GFAA) digestions and 100 ml for the Hg analysis on one sample. Perform Hg QC on separate sample at 100 ml for each aliquot. (See IT/WHC Issue Resolution Form)

3) Report LCS for QC.

APPROVAL SIGNATURES:

R. C. Smith/ R Clayton Smith — 8/4/94
OSM Project Coordinator (Print/Sign Name) — Date

R. L. Biggerstaff/ R L Biggerstaff — 8/8/94
Technical Representative (Print/Sign Name) — Date

N/A
Quality Assurance (Print/Sign Name) — Date

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