LOCKHEED MARTIN

Lockheed Analytical Services

Ms. Joan Kessner
Bechtel Hanford, Inc.
P.O. Box 969
1022 Lee Boulevard
Richland, WA 99352

ANALYTICAL DATA REPORT

FOR

METALS AND VOLATILE ORGANICS

LOG-IN NUMBER:	L8060
QUOTATION NUMBER:	Q400000-B
SAF:	B96-194
DOCUMENT FILE NUMBER:	0928596A
BHI DOCUMENT FILE NO.:	401
SDG NUMBER:	LK8060

BECHTEL HANFORD

Table of Contents

Sample Login No. L8060

This package contains a total of 52 pages.

Lockheed Environmental Systems & Technologies Co.
Lockheed Analytical Services
975 Kelly Johnson Drive Las Vegas, Nevada 89119-3705
Telephone 702-361-0220 800-582-7605 Facsimile 702-361-8146

LOCKHEED MARTIN

November 6, 1996

Ms. Joan Kessner
Bechtel Hanford, Inc.
P.O. Box 969
1022 Lee Boulevard
Richland, WA 99352

RE:		
	Log-in No.:	L8060
	Quotation No.:	Q400000-B
	SAF:	B96-194
	Document File No.:	0928596A
	BHI Document File No.:	401
	SDG No.:	LK8060

The attached data report contains the analytical results of samples that were submitted to Lockheed Analytical Services on 28 September 1996.

The temperatures of the two coolers upon receipt were 2 and 3°C. Sample containers received agree with the chain-of-custody documentation. All sample containers were received intact. Samples were received in time to meet the analytical holding time requirements.

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 Mary Wolf at (702) 361-3955 ext. 311.

"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,

Mary K. Wolf

Mary K. Wolf
Client Services Representative

cc: Client Services
Document Control

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), and duplicate sample(s).

Preparation and Analysis Requirements

All samples were received on September 28, 1996. The samples were logged in as L8060 and were prepared and analyzed in batch 928 bh T for total metals. The samples were analyzed by Method 7000 Furnace Metals for arsenic, selenium, thallium, lead, and antimony, Method 7470 Mercury and Method 6010 ICP Metals for all other analytes.

Holding Time Requirements

- All samples were analyzed within the method-specific holding times.

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.

Shellee McGrath
Prepared By

November 6, 1996
Date

CASE NARRATIVE
ORGANIC ANALYSES

Analytical Method 8240

Analytical Batch 100296-8260-E1

NOTE: Client sample B0JDW9 (L8060-7) was the native sample used for the Matrix Spike (42200MS) and Matrix Spike Duplicate (42200MSD).

The 42200MS, 42200MSD, and Laboratory Control Sample (42200LCS) contained several compounds in addition to the five (5) required spike compounds.

The samples were analyzed within the required holding time on October 2, 1996. All associated tunes, initial and continuing calibrations met criteria. There were no target compounds detected in the Method Blank (42200MB). Surrogate recoveries were within QC limits. Compound recoveries were within QC limits in the 42200MS, 42200MSD, and 42200LCS. The Relative Percent Differences (RPDs) between the 42200MS and 42200MSD recoveries were within QC limits. All samples met internal standard area counts and retention times method criteria.

Prepared By
Patricia Lonergan

November 6, 1996

LOCKHEED ANALYTICAL SERVICES
LOGIN CHAIN OF CUSTODY REPORT (ln01)
Oct 01 1996, 01:19 pm

Login Number: L8060
Account: 596 Bechtel Hanford, Inc. * Richland, WA
Project: BECHTEL-HANFORD Bechtel Hanford Project

Laboratory Sample Number	Client Sample Number	Collect Date	Receive Date	PR	Due Date
L8060-1	B0JDW7 ✓	26-SEP-96	28-SEP-96		12-NOV-9
temp 2,3; OLD ID# L8049-1					
Location: 157					
Water 1 S SCREENING		Hold:25-MAR-97			
L8060-2	B0JDW7	26-SEP-96	28-SEP-96		12-NOV-9
temp 2,3; OLD ID# L8049-4					
Location: RFG18-51A3					
Water 1 S 8240 VOLATILES ✓		Hold:10-OCT-96			
L8060-3	B0JDW7	26-SEP-96	28-SEP-96		12-NOV-9
temp 2,3; OLD ID# L8049-5					
Location: RFG18-51A3					
L8060-4	B0JDW7	26-SEP-96	28-SEP-96		12-NOV-9
temp 2,3; OLD ID# L8049-6					
Location: RFG18-51A3					
L8060-5	B0JDW7	26-SEP-96	28-SEP-96		12-NOV-9
temp 2,3; OLD ID# L8049-7					
Location: RFG18-51A3					
L8060-6	B0JDW7	26-SEP-96	28-SEP-96		12-NOV-9
temp 2,3; OLD ID# L8049-8					
Location: RFG18-51A3					
L8060-7	B0JDW9 ✓	26-SEP-96	28-SEP-96		12-NOV-9
temp 2,3; OLD ID# L8049-9					
Location: RFG18-51A3					
Water 1 S 8240 VOLATILES		Hold:10-OCT-96			
L8060-8	B0JDW9	26-SEP-96	28-SEP-96		12-NOV-9
temp 2,3; OLD ID# L8049-10					
Location: RFG18-51A3					
L8060-9	B0JDW9	26-SEP-96	28-SEP-96		12-NOV-9
temp 2,3; OLD ID# L8049-11					
Location: RFG18-51A3					
L8060-10	B0JDW9	26-SEP-96	28-SEP-96		12-NOV-9
temp 2,3; OLD ID# L8049-12					
Location: RFG18-51A3					

0009

0928596 A

LOCKHEED ANALYTICAL SERVICES
LOGIN CHAIN OF CUSTODY REPORT (ln01)
Oct 01 1996, 01:19 pm

Login Number: L8060
Account: 596 Bechtel Hanford, Inc. * Richland, WA
Project: BECHTEL-HANFORD Bechtel Hanford Project

Laboratory Sample Number	Client Sample Number	Collect Date	Receive Date	PR	Due Date
L8060-11	B0JDW9	26-SEP-96	28-SEP-96		12-NOV-9
temp 2,3; OLD ID# L8049-13					
Location: RFG18-51A3					
L8060-12	B0JDW7	26-SEP-96	28-SEP-96		12-NOV-9
temp 2,3; OLD ID# L8049-19, ICP+Tn,Pb					
Location: RFG02-28B					
Water	1 S 6010 ICP METALS	Hold:25-MAR-97			
Water	1 S 7000 FURNACE METALS	Hold:25-MAR-97			
Water	1 S 7470 MERCURY	Hold:24-OCT-96			
L8060-13	B0JDW8	26-SEP-96	28-SEP-96		12-NOV-9
temp 2,3; OLD ID# L8049-20, ICP+Tn,Pb					
Location: RFG02-28B					
Water	1 S 6010 ICP METALS	Hold:25-MAR-97			
Water	1 S 7000 FURNACE METALS	Hold:25-MAR-97			
Water	1 S 7470 MERCURY	Hold:24-OCT-96			
L8060-14	REPORT TYPE	28-SEP-96	28-SEP-96		12-NOV-9
Location:					
Water	1 S EDD - DISK DEL.				
Water	1 S GCMS2				
Water	1 S INORG TYPE 2 RPT				
Water	1 S WOLF				

Signature: Arnold

Date: 10-1-96 0010

0928596 A

L8040

L8049 NLM

Bechtel Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	B96-194-8	Page 1 of 2

Collector: Al Rizzo/ Bob Fahlberg / K. Trapp	Company Contact: Bruce Ford — Telephone No.: 372-9176	Project Coordinator: Koerner, CC	Data Turnaround: 45 Days
Project Designation: ERDF Routine Groundwater Monitoring	Sampling Location: 200 West	SAF No.: B96-194	
Ice Chest No.: ER-210	Field Logbook No.: EFL-1309	Method of Shipment: Federal Express	
Shipped To: Lockheed	Offsite Property No.: W96-0-0314-10	Bill of Lading/Air Bill No.: 277 1632 866	

POSSIBLE SAMPLE HAZARDS/REMARKS: Unknown

Special Handling and/or Storage: Cool to 4C

SAMPLE ANALYSIS	Preservation	Type of Container	No. of Container(s)	Volume	See item (1) in Special Instructions.	Activity Scan	Total Uranium	Alkalinity - 310.1	TOX - 9020	IC Anions - 300.0 (Chloride, Fluoride, Sulfate)	TDS - 160.1	NO2/NO3 - 353.2	Carbon-14	Gross Alpha, Gross Beta; Total Radium
	HNO3 to pH <2	P	1	1L										
	None	P	1	20ml										
	HNO3 to pH <2	aG	1	40ml										
	Cool 4C	P	1	250ml										
	H2SO4 to pH <2 Cool 4C	aGa*	1	500ml										
	Cool 4C	P	1	500ml										
	Cool 4C	P	1	500ml										
	H2SO4 to pH <2 Cool 4C	P	1	500ml										
	None	P	1	500ml										
	HNO3 to pH <2	P	2	1L										
Sample No.	Matrix *	Sample Date	Sample Time											
80JDW7	Water	9/26/96	1330		X	X								
80JDW8	Water	9/26/96	1330		X									
80JDW9	Water													

CHAIN OF POSSESSION	Sign/Print Names			
Relinquished By: K. Trapp / K. Trapp	Date/Time: 1050 9/27/96	Received By:	Date/Time:	
Relinquished By:	Date/Time:	Received By:	Date/Time:	
Relinquished By:	Date/Time:	Received By:	Date/Time:	
Relinquished By:	Date/Time:	Received By:	Date/Time:	

0923859964

SPECIAL INSTRUCTIONS
None

(1) ICP Metals - 6010A (TAL); ICP Metals - 6010A (SW-846) (Lead, Tin); Arsenic - 7060 - (FAA), Selenium - 7740 - (FAA)

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

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

Bechtel Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	B96-194-8	Page 2 of 2

Collector Al Rizzo/ Bob Fahlberg /K. Trapp	**Company Contact** Bruce Ford	**Telephone No.** 372-9176	**Project Coordinator** Koerner, CC	**Data Turnaround** 45 Days
Project Designation ERDF Routine Groundwater Monitoring	**Sampling Location** 200 West		**SAF No.** B96-194	
Ice Chest No. EH-210	**Field Logbook No.** EFL-1309		**Method of Shipment** Federal Express	
Shipped To Lockheed	**Offsite Property No.** W96-0-0314-10		**Bill of Lading/Air Bill No.** 277 1632 866	

POSSIBLE SAMPLE HAZARDS/REMARKS
Unknown

Special Handling and/or Storage
Cool to 4C

Preservation	HCl to pH <2	None	HCl to pH <2 Cool 4C								
Type of Container	P	P	aGs*								
No. of Container(s)	4	4	5								
Volume	1L	1L	40ml								
SAMPLE ANALYSIS	Technetium-99	Iodine-129	VOA - 8240A (TCL)								

Sample No.	Matrix *	Sample Date	Sample Time								
~~B0JDW7~~	~~Water~~	~~9/26/96~~	~~K 9/26/96~~								
~~B0JDW8~~	~~Water~~	~~K 9/26/96~~									
B0JDW9	Water	9/26/96	1330			X ✓					
B0JDW7	W	9/26/96	1330			X ✓					

CHAIN OF POSSESSION — **Sign/Print Names**

Relinquished By	Date/Time	Received By	Date/Time
K. Trapp/K. Trapp	1090 9/26/96		
Relinquished By	Date/Time	Received By	Date/Time
Relinquished By	Date/Time	Received By	Date/Time
Relinquished By	Date/Time	Received By	Date/Time

SPECIAL INSTRUCTIONS
None

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: Paula Dua — Title: Sample Custodian — Date/Time: 9-26-96 1740

0092859 A

Lockheed Analytical Services
Sample Receiving Checklist

Client Name: Bechtel - Hanford Job No. L8060 Cooler ID:

COOLER CONDITION UPON RECEIPT			
Temperature of cooler upon receipt:	4°C samples stored in RFG		
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		X	
are samples bi-phasic (if so, indicate sample ID'S):			ML
MISCELLANEOUS ITEMS			
	Yes	No	* Comments/Discrepancies
samples with short holding times		X	
samples to subcontract		X	
ADDITIONAL COMMENTS/DISCREPANCIES			
COC had a different SAF # and samples had to be re-logged in under another job # per Mary Wolf. AH 10-1-94			
Completed by / date: AH 10-1-94			
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*			

A9608596

version 2.0 (11/11/94)

LOCKHEED MARTIN

Sample Login
Login Review Checklist

Lot Number L8060

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

For effective login review, at a minimum, five reports form the login process are required. These are the COC (or equivalent) the login COC report, the sample summary report, the sample receiving checklist, and the login quotation. Before beginning review, ensure that these five components are available. Jobs with single component samples, the sample summary report may be omitted.

SAMPLE SUMMARY REPORT	YES	NO	N/A	Comment
1. Are all sample ID's correct?	✓ X			
2. Are all samples present?	✓ X			
3. Are all matrices indicated correctly?	✓ X			
4. Are all analyses on the COC logged in for the appropriate samples?	✓ X			
5. Are all analyses logged in for the correct container?	✓ X			
6. Are samples logged in according to LAS batching procedures?	✓ X			

LOGIN CHAIN OF CUSTODY	YES	NO	N/A	Comment
1. Are the collect, receive, and due dates correct for every sample?	✓ X			
2. Have all appropriate comments been indicated in the comment section?	✓ X			

SAMPLE RECEIVING CHECKLIST	YES	NO	N/A	Comment
1. Are all discrepancies between the COC and the login noted (if applicable)?			✓ X	

0014

primary review signature — 10·1·96 date

secondary review signature — 10/1/96 date

0928596A

Lockheed Analytical Laboratory
SAMPLE SUMMARY REPORT (su02)
Bechtel Hanford, Inc. * Richland, WA

Client Sample Number	LAL Sample Number	SDG Number	Matrix	Method
B0JDW7	L8060-1		Water	SCREENING
	L8060-2		Water	8240 VOLATILES
	L8060-12		Water	6010 ICP METALS
	L8060-12		Water	7000 FURNACE ME
	L8060-12		Water	7470 MERCURY
B0JDW8	L8060-13		Water	6010 ICP METALS
	L8060-13		Water	7000 FURNACE ME
	L8060-13		Water	7470 MERCURY
B0JDW9	L8060-7		Water	8240 VOLATILES
REPORT TYPE	L8060-14		Water	EDD - DISK DEL.
	L8060-14		Water	GCMS2
	L8060-14		Water	INORG TYPE 2 RP
	L8060-14		Water	WOLF

0928596A

L 8060

Bechtel Hanford

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

L 8049 10-4-96 ab B96-194-8

Collector Al Rizzo/ Bob Fahlberg / K. Trapp	**Company Contact** Bruce Ford	**Telephone No.** 372-9176	**Project Coordinator** Koerner, CC	**Data Turnaround** 45 Days
Project Designation ERDF Routine Groundwater Monitoring	**Sampling Location** 200 West		**SAF No.** B96-194	
Ice Chest No. EA-210	**Field Logbook No.** EEL-1309		**Method of Shipment** Federal Express	
Shipped To Lockheed	**Offsite Property No.** W96-0-0314-10		**Bill of Lading/Air Bill No.** 277 1632 966	

POSSIBLE SAMPLE HAZARDS/REMARKS
Unknown

Special Handling and/or Storage
Cool to 4C

Preservation	HNO3 to pH <2	None	HNO3 to pH <2	Cool 4C	H2SO4 to pH <2 Cool 4C	Cool 4C	Cool 4C	H2SO4 to pH <2 Cool 4C	None	HNO3 to pH <2
Type of Container	P	P	aG	P	aGs*	P	P	P	P	P
No. of Container(s)	1	1	1	1	1	1	1	1	1	2
Volume	1L	20ml	40ml	250ml	500ml	500ml	500ml	500ml	500ml	1L
SAMPLE ANALYSIS	See item (1) in Special Instructions	Activity Scan	Total Uranium	Alkalinity - 310.1	TOX - 9020	IC Anions - 300.0 (Chloride, Fluoride, Sulfate)	TDS - 160.1	NO2/NO3 - 353.2	Carbon-14	Gross Alpha; Gross Beta; Total Radium

Sample No.	Matrix *	Sample Date	Sample Time										
B0JDW7	Water	9/26/96	1330	X	X								
B0JDW8	Water	9/26/96	1330	X									
B0JDW9	Water												

CHAIN OF POSSESSION

Relinquished By	Date/Time	Received By	Date/Time
K. Trapp / K. Trapp	9/27/96 1050		
Relinquished By	Date/Time	Received By	Date/Time
Relinquished By	Date/Time	Received By	Date/Time
Relinquished By	Date/Time	Received By	Date/Time

SPECIAL INSTRUCTIONS
None

(1) ICP Metals - 6010A (TAL); ICP Metals - 6010A (SW-846) (Lead, Tin); Arsenic - 7060 - (FAA); Selenium - 7740 - (FAA)

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
	Paula Davis	Sample Custodian	9-28-96 / 9:40
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

0016

B0S8Th2

Bechtel Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	B96-194-8	Page 2 of 2

Collector Al Rizzo/ Bob Fahlberg /K. Trapp	**Company Contact** Bruce Ford	**Telephone No.** 372-9176	**Project Coordinator** Koerner, CC	**Data Turnaround** 45 Days
Project Designation ERDF Routine Groundwater Monitoring	**Sampling Location** 200 West		**SAF No.** B96-194	
Ice Chest No. EH-210	**Field Logbook No.** EFL-1309		**Method of Shipment** Federal Express	
Shipped To Lockheed	**Offsite Property No.** W96-0-0314-10		**Bill of Lading/Air Bill No.** 277 1632 866	

POSSIBLE SAMPLE HAZARDS/REMARKS												
Unknown	**Preservation**	HCl to pH <2	None	HCl to pH <2 Cool 4C								
	Type of Container	P	P	aGs*								
	No. of Container(s)	4	4	5								
Special Handling and/or Storage Cool to 4C	**Volume**	1L	1L	40ml								
SAMPLE ANALYSIS		Technetium-99	Iodine-129	VOA - 8240A (TCL)								

Sample No.	Matrix *	Sample Date	Sample Time										
~~B0JDW7~~	~~Water~~	~~9/26/96~~	~~1330~~										
~~B0JDW8~~	~~Water~~	~~9/26/96~~											
B0JDW9	Water	9/26/96	1330			X							
B0JDW7	W	9/26/96	1330			X							

CHAIN OF POSSESSION	Sign/Print Names			
Relinquished By	Date/Time 1090	Received By	Date/Time	
K. Trapp/K. Trapp	9/26/96			
Relinquished By	Date/Time	Received By	Date/Time	
Relinquished By	Date/Time	Received By	Date/Time	
Relinquished By	Date/Time	Received By	Date/Time	

SPECIAL INSTRUCTIONS
None

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	9-28-96 9:40
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

0017

196858

Environmental Restoration Contractor **ERC Team**

Interoffice Memorandum

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

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

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

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

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

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

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

SAMPLE CHECK-IN LIST

Date/Time Received: 9-28-96 / 5:40 SDG#: N/A

Work Order Number: N/A SAF #: B96-194 / B96-181

Shipping Container ID: ER-26 Chain of Custody # B96-194-839

1. Custody Seals on shipping container intact? Yes [X] No [ ]
2. Custody Seals dated and signed? Yes [X] No [ ]
3. Sample temperature 2°
4. Vermiculite/packing materials is Wet [ ] Dry [X]
5. Each sample is in a plastic bag? Yes [X] No [ ]
6. Sample holding times exceeded? Yes [X] No [ ]

7. Samples have:
   - ___ tape
   - X custody seals
   - ___ hazard labels
   - ___ appropriate sample labels

8. Samples are:
   - X in good condition
   - ___ broken
   - ___ leaking
   - ___ have air bubbles

9. Is the information on the COC and Sample bottles in agreement?

Yes[X] No [ ]

Notes: _____

Sample Custodian/Laboratory: Paula Dunn/L495 Date: 9-28-96

Telephoned To: N/A On _____ By _____

0019

EG 9285

SAMPLE CHECK-IN LIST

Date/Time Received: 9-28-96 / 9:40 SDG#: _____

Work Order Number: n/a SAF #: B96-181

Shipping Container ID: ER-210 Chain of Custody # B96-181-38

1. Custody Seals on shipping container intact? Yes [X] No [ ]
2. Custody Seals dated and signed? Yes [X] No [ ]
3. Sample temperature 3°C
4. Vermiculite/packing materials is Wet [ ] Dry [X]
5. Each sample is in a plastic bag? Yes [X] No [ ]
6. Sample holding times exceeded? Yes [ ] No [X]

7. Samples have:
   - ____ tape
   - ____ hazard labels
   - X custody seals
   - ____ appropriate sample labels

8. Samples are:
   - X in good condition
   - ____ leaking
   - ____ broken
   - ____ have air bubbles

9. Is the information on the COC and Sample bottles in agreement?

Yes[X] No [ ]

Notes: _____

Sample Custodian/Laboratory: [signature] / LAS Date: 9-28-96

Telephoned To: n/a On _____ By _____

0020

C9285961

LOCKHEED MARTIN

Sample Login
Login Review Checklist

Lot Number LE049

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

For effective login review, at a minimum, five reports form the login process are required. These are the COC (or equivalent), the login COC report, the sample summary report, the sample receiving checklist, and the login quotation. Before beginning review, ensure that these five components are available. Jobs with single component samples, the sample summary report may be omitted.

SAMPLE SUMMARY REPORT	YES	NO	N/A	Comment
1. Are all sample ID's correct?	X			
2. Are all samples present?	X			
3. Are all matrices indicated correctly?	X			
4. Are all analyses on the COC logged in for the appropriate samples?	X			
5. Are all analyses logged in for the correct container?	X			
6. Are samples logged in according to LAS batching procedures?	X			

LOGIN CHAIN OF CUSTODY	YES	NO	N/A	Comment
1. Are the collect, receive, and due dates correct for every sample?	X			
2. Have all appropriate comments been indicated in the comment section?	X			

SAMPLE RECEIVING CHECKLIST	YES	NO	N/A	Comment
1. Are all discrepancies between the COC and the login noted (if applicable)?			X	

0021

[signature] 9-28-96
primary review signature date

[signature] 9.28.96
secondary review signature date

C928596

Lockheed Analytical Services
Sample Receiving Checklist

Client Name: Bechtel / Hanford Job No. LE049 Cooler ID: n/a

COOLER CONDITION UPON RECEIPT			
Temperature of cooler upon receipt:	2c		
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		X	
are samples bi-phasic (if so, indicate sample ID'S):		n/a	
MISCELLANEOUS ITEMS			
	Yes	**No**	*** Comments/Discrepancies**
samples with short holding times	X		nitrates / nitrites
samples to subcontract		n/a	
ADDITIONAL COMMENTS/DISCREPANCIES			
Completed by / date:	[signature] 8-23-96		
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*

022

Version 2.0 (11/11/94)

Lockheed Analytical Services
Sample Receiving Checklist

Client Name: Rockwell - Hanford Job No. L8649 Cooler ID: n/a

COOLER CONDITION UPON RECEIPT

Temperature of cooler upon receipt: 3°

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	
are samples bi-phasic (if so, indicate sample ID'S):		n/a	

MISCELLANEOUS ITEMS

	Yes	No	* Comments/Discrepancies
samples with short holding times		X	
samples to subcontract		n/a	

ADDITIONAL COMMENTS/DISCREPANCIES

Completed by / date: [signature] 9-28-94

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*

0230

LOCKHEED ANALYTICAL SERVICES

Sample Results

Client Sample ID: B0JDW7	Date Collected: 26-SEP-96
Matrix: Water	Date Received: 28-SEP-96
Percent Solids: N/A	

Constituent	Units	Method	Result	MDL	RDL	Data Qual	Dilution	Date Analyzed	LAS Batch ID	LAS Sample ID
ALUMINUM, TOTAL	mg/l	6010	0.064	0.048	0.20	B	1	04-NOV-96	42433	L8060-12
BARIUM, TOTAL	mg/l	6010	0.041	0.0080	0.20	B	1	04-NOV-96	42433	L8060-12
BERYLLIUM, TOTAL	mg/l	6010	< 0.0010	0.0010	0.0050	U	1	04-NOV-96	42433	L8060-12
CADMIUM, TOTAL	mg/l	6010	< 0.0030	0.0030	0.0050	U	1	04-NOV-96	42433	L8060-12
CALCIUM, TOTAL	mg/l	6010	44.	0.010	5.0		1	04-NOV-96	42433	L8060-12
CHROMIUM, TOTAL	mg/l	6010	0.018	0.0060	0.010		1	04-NOV-96	42433	L8060-12
COBALT, TOTAL	mg/l	6010	< 0.0040	0.0040	0.050	U	1	04-NOV-96	42433	L8060-12
COPPER, TOTAL	mg/l	6010	< 0.0060	0.0060	0.025	U	1	04-NOV-96	42433	L8060-12
IRON, TOTAL	mg/l	6010	0.085	0.0060	0.10	B	1	04-NOV-96	42433	L8060-12
MAGNESIUM, TOTAL	mg/l	6010	13.	0.062	5.0		1	04-NOV-96	42433	L8060-12
MANGANESE, TOTAL	mg/l	6010	0.0034	0.0010	0.015	B	1	04-NOV-96	42433	L8060-12
NICKEL, TOTAL	mg/l	6010	< 0.012	0.012	0.040	U	1	04-NOV-96	42433	L8060-12
POTASSIUM, TOTAL	mg/l	6010	5.5	1.4	5.0		1	05-NOV-96	42433	L8060-12
SILVER, TOTAL	mg/l	6010	< 0.0060	0.0060	0.010	U	1	04-NOV-96	42433	L8060-12
SODIUM, TOTAL	mg/l	6010	22.	0.32	5.0		1	04-NOV-96	42433	L8060-12
TIN, TOTAL	mg/l	6010	0.023	0.015	0.20	B	1	04-NOV-96	42433	L8060-12
VANADIUM, TOTAL	mg/l	6010	0.025	0.0060	0.050	B	1	04-NOV-96	42433	L8060-12
ZINC, TOTAL	mg/l	6010	0.0093	0.0030	0.020	B	1	04-NOV-96	42433	L8060-12
ANTIMONY, TOTAL	mg/l	7041	< 0.0090	0.0090	0.060	U	1	05-NOV-96	42434	L8060-12
ARSENIC, TOTAL	mg/l	7060	< 0.0030	0.0030	0.010	U	1	28-OCT-96	42434	L8060-12
LEAD, TOTAL	mg/l	7421	< 0.0020	0.0020	0.0030	U	1	28-OCT-96	42434	L8060-12
SELENIUM, TOTAL	mg/l	7740	< 0.0030	0.0030	0.0050	U	1	01-NOV-96	42434	L8060-12
THALLIUM, TOTAL	mg/l	7840	< 0.0030	0.0030	0.010	U	1	01-NOV-96	42434	L8060-12
MERCURY, TOTAL	mg/l	7470	< 0.00020	0.00020	0.00020	U	1	24-OCT-96	42436	L8060-12

LOCKHEED ANALYTICAL SERVICES

Sample Results

Client Sample ID: B0JDW8	Date Collected: 26-SEP-96
Matrix: Water	Date Received: 28-SEP-96
Percent Solids: N/A	

Constituent	Units	Method	Result	MDL	RDL	Data Qual	Dilution	Date Analyzed	LAS Batch ID	LAS Sample ID
ALUMINUM, TOTAL	mg/l	6010	0.058	0.048	0.20	B	1	04-NOV-96	42433	L8060-13
BARIUM, TOTAL	mg/l	6010	0.040	0.0080	0.20	B	1	04-NOV-96	42433	L8060-13
BERYLLIUM, TOTAL	mg/l	6010	< 0.0010	0.0010	0.0050	U	1	04-NOV-96	42433	L8060-13
CADMIUM, TOTAL	mg/l	6010	< 0.0030	0.0030	0.0050	U	1	04-NOV-96	42433	L8060-13
CALCIUM, TOTAL	mg/l	6010	43.	0.010	5.0		1	04-NOV-96	42433	L8060-13
CHROMIUM, TOTAL	mg/l	6010	0.020	0.0060	0.010		1	04-NOV-96	42433	L8060-13
COBALT, TOTAL	mg/l	6010	< 0.0040	0.0040	0.050	U	1	04-NOV-96	42433	L8060-13
COPPER, TOTAL	mg/l	6010	< 0.0060	0.0060	0.025	U	1	04-NOV-96	42433	L8060-13
IRON, TOTAL	mg/l	6010	0.060	0.0060	0.10	B	1	04-NOV-96	42433	L8060-13
MAGNESIUM, TOTAL	mg/l	6010	13.	0.062	5.0		1	04-NOV-96	42433	L8060-13
MANGANESE, TOTAL	mg/l	6010	0.0013	0.0010	0.015	B	1	04-NOV-96	42433	L8060-13
NICKEL, TOTAL	mg/l	6010	< 0.012	0.012	0.040	U	1	04-NOV-96	42433	L8060-13
POTASSIUM, TOTAL	mg/l	6010	5.3	1.4	5.0		1	05-NOV-96	42433	L8060-13
SILVER, TOTAL	mg/l	6010	< 0.0060	0.0060	0.010	U	1	04-NOV-96	42433	L8060-13
SODIUM, TOTAL	mg/l	6010	21.	0.32	5.0		1	04-NOV-96	42433	L8060-13
TIN, TOTAL	mg/l	6010	0.029	0.015	0.20	B	1	04-NOV-96	42433	L8060-13
VANADIUM, TOTAL	mg/l	6010	0.026	0.0060	0.050	B	1	04-NOV-96	42433	L8060-13
ZINC, TOTAL	mg/l	6010	< 0.0030	0.0030	0.020	U	1	04-NOV-96	42433	L8060-13
ANTIMONY, TOTAL	mg/l	7041	< 0.0090	0.0090	0.060	U	1	05-NOV-96	42434	L8060-13
ARSENIC, TOTAL	mg/l	7060	0.0038	0.0030	0.010	B	1	28-OCT-96	42434	L8060-13
LEAD, TOTAL	mg/l	7421	< 0.0020	0.0020	0.0030	U	1	28-OCT-96	42434	L8060-13
SELENIUM, TOTAL	mg/l	7740	< 0.0030	0.0030	0.0050	U	1	01-NOV-96	42434	L8060-13
THALLIUM, TOTAL	mg/l	7840	< 0.0030	0.0030	0.010	U	1	01-NOV-96	42434	L8060-13
MERCURY, TOTAL	mg/l	7470	< 0.00020	0.00020	0.00020	U	1	24-OCT-96	42436	L8060-13

LOCKHEED ANALYTICAL SERVICES

METALS RESULTS

QC Data Summary For Reagent Blank Analysis

Constituent	Units	MDL	RDL	LAS Batch ID	Date Analyzed	Reagent Blank Result	Data Qualifier
ALUMINUM, TOTAL	mg/l	.048	.2	42433	04-NOV-96	0.075	B
BARIUM, TOTAL	mg/l	.008	.2	42433	04-NOV-96	< .008	
BERYLLIUM, TOTAL	mg/l	.001	.005	42433	04-NOV-96	< .001	
CADMIUM, TOTAL	mg/l	.003	.005	42433	04-NOV-96	< .003	
CALCIUM, TOTAL	mg/l	.01	5	42433	04-NOV-96	0.017	B
CHROMIUM, TOTAL	mg/l	.006	.01	42433	04-NOV-96	0.0062	B
COBALT, TOTAL	mg/l	.004	.05	42433	04-NOV-96	< .004	
COPPER, TOTAL	mg/l	.006	.025	42433	04-NOV-96	< .006	
IRON, TOTAL	mg/l	.006	.1	42433	04-NOV-96	0.040	B
MAGNESIUM, TOTAL	mg/l	.062	5	42433	04-NOV-96	< .062	
MANGANESE, TOTAL	mg/l	.001	.015	42433	04-NOV-96	< .001	
NICKEL, TOTAL	mg/l	.012	.04	42433	04-NOV-96	< .012	
POTASSIUM, TOTAL	mg/l	1.418	5	42433	05-NOV-96	< 1.418	
SILVER, TOTAL	mg/l	.006	.01	42433	04-NOV-96	< .006	
SODIUM, TOTAL	mg/l	.317	5	42433	04-NOV-96	0.84	B
TIN, TOTAL	mg/l	.015	.2	42433	04-NOV-96	0.019	B
VANADIUM, TOTAL	mg/l	.006	.05	42433	04-NOV-96	< .006	
ZINC, TOTAL	mg/l	.003	.02	42433	04-NOV-96	< .003	

LOCKHEED ANALYTICAL SERVICES

METALS RESULTS

QC Data Summary For Reagent Blank Analysis

Constituent	Units	MDL	RDL	LAS Batch ID	Date Analyzed	Reagent Blank Result	Data Qualifier
ANTIMONY, TOTAL	mg/l	.009	.06	42434	05-NOV-96	< .009	
ARSENIC, TOTAL	mg/l	.003	.01	42434	28-OCT-96	< .003	
LEAD, TOTAL	mg/l	.002	.003	42434	28-OCT-96	< .002	
SELENIUM, TOTAL	mg/l	.003	.005	42434	01-NOV-96	< .003	
THALLIUM, TOTAL	mg/l	.003	.01	42434	01-NOV-96	< .003	

LOCKHEED ANALYTICAL SERVICES

METALS RESULTS

QC Data Summary For Reagent Blank Analysis

Constituent	Units	MDL	RDL	LAS Batch ID	Date Analyzed	Reagent Blank Result	Data Qualifier
MERCURY, TOTAL	mg/l	.0002	.0002	42436	24-OCT-96	< .0002	

LOCKHEED ANALYTICAL SERVICES

METALS RESULTS

QC Data Summary For Duplicate Sample Analysis

Client Sample ID B0JDW8 (DUP)

Constituent	Units	LAS Batch ID	LAS Sample ID	Date Analyzed	Sample Result	Duplicate Result	Relative Percent Difference	Control Limit	Data Qualifier
ALUMINUM, TOTAL	mg/l	42433	L8060-13	04-NOV-96	0.05811	0.1168		0.20	
BARIUM, TOTAL	mg/l	42433	L8060-13	04-NOV-96	0.04017	0.04050		0.20	
BERYLLIUM, TOTAL	mg/l	42433	L8060-13	04-NOV-96	< 0.0010	< 0.0010	b		
CADMIUM, TOTAL	mg/l	42433	L8060-13	04-NOV-96	< 0.0030	< 0.0030	b		
CALCIUM, TOTAL	mg/l	42433	L8060-13	04-NOV-96	43.34	44.47	3		
CHROMIUM, TOTAL	mg/l	42433	L8060-13	04-NOV-96	0.02049	0.01491		0.010	
COBALT, TOTAL	mg/l	42433	L8060-13	04-NOV-96	< 0.0040	< 0.0040	b		
COPPER, TOTAL	mg/l	42433	L8060-13	04-NOV-96	< 0.0060	< 0.0060	b		
IRON, TOTAL	mg/l	42433	L8060-13	04-NOV-96	0.06030	0.06829		0.10	
MAGNESIUM, TOTAL	mg/l	42433	L8060-13	04-NOV-96	12.82	13.22		5.0	
MANGANESE, TOTAL	mg/l	42433	L8060-13	04-NOV-96	0.001270	0.001350		0.015	
NICKEL, TOTAL	mg/l	42433	L8060-13	04-NOV-96	< 0.012	< 0.012	b		
POTASSIUM, TOTAL	mg/l	42433	L8060-13	05-NOV-96	5.264	5.412		5.0	
SILVER, TOTAL	mg/l	42433	L8060-13	04-NOV-96	< 0.0060	< 0.0060	b		
SODIUM, TOTAL	mg/l	42433	L8060-13	04-NOV-96	21.47	21.96		5.0	
TIN, TOTAL	mg/l	42433	L8060-13	04-NOV-96	0.02907	0.02428		0.20	
VANADIUM, TOTAL	mg/l	42433	L8060-13	04-NOV-96	0.02583	0.02743		0.050	
ZINC, TOTAL	mg/l	42433	L8060-13	04-NOV-96	< 0.0030	0.004410	b		
ANTIMONY, TOTAL	mg/l	42434	L8060-13	05-NOV-96	< 0.0090	< 0.0090	b		
ARSENIC, TOTAL	mg/l	42434	L8060-13	28-OCT-96	0.003800	0.003100		0.010	
LEAD, TOTAL	mg/l	42434	L8060-13	28-OCT-96	< 0.0020	< 0.0020	b		
SELENIUM, TOTAL	mg/l	42434	L8060-13	01-NOV-96	< 0.0030	< 0.0030	b		
THALLIUM, TOTAL	mg/l	42434	L8060-13	01-NOV-96	< 0.0030	< 0.0030	b		

LOCKHEED ANALYTICAL SERVICES

METALS RESULTS

QC Data Summary For Duplicate Sample Analysis

Client Sample ID B0JDW7 (DUP)

Constituent	Units	LAS Batch ID	LAS Sample ID	Date Analyzed	Sample Result	Duplicate Result	Relative Percent Difference	Control Limit	Data Qualifier
MERCURY, TOTAL	mg/l	42436	L8060-12	24-OCT-96	< 0.00020	< 0.00020	b		

LOCKHEED ANALYTICAL SERVICES

GC/MS FOR VOLATILE ORGANICS
8240 VOLATILES

Client Sample ID:	B0JDW7	LAL Sample ID:	L8060-2
Date Collected:	26-SEP-96	Date Received:	28-SEP-96
Date Analyzed:	02-OCT-96	Analytical Dilution:	1
Matrix:	Water	Analytical Batch ID:	100296-8260-E1
		Preparation Dilution:	1.00

SURROGATE	RECOVERY	QC Limits
1,2-Dichloroethane-d4	95%	84-122
Toluene-d8	103%	87-117
Bromofluorobenzene	105%	83-118

CONSTITUENT	CAS NO.	RESULT ug/L	PRACTICAL QUANTITATION LIMIT ug/L	DATA QUALIFIER(s)
Chloromethane	74-87-3	<5.0	5.0	
Vinyl Chloride	75-01-4	<5.0	5.0	
Bromomethane	74-83-9	<5.0	5.0	
Chloroethane	75-00-3	<5.0	5.0	
Trichlorofluoromethane	75-69-4	<5.0	5.0	
Acetone	67-64-1	4.1	10.	J
1,1-Dichloroethene	75-35-4	<5.0	5.0	
Carbon Disulfide	75-15-0	<5.0	5.0	
Methylene Chloride	75-09-2	<5.0	5.0	
trans-1,2-Dichloroethene	156-60-5	<5.0	5.0	
Vinyl Acetate	108-05-4	<10.	10.	
1,1-Dichloroethane	75-34-3	<5.0	5.0	
2-Butanone	78-93-3	3.4	10.	J
cis-1,2-Dichloroethene	156-59-2	<5.0	5.0	
Chloroform	67-66-3	<5.0	5.0	
1,1,1-Trichloroethane	71-55-6	<5.0	5.0	
Carbon tetrachloride	56-23-5	1.6	5.0	J
1,2-Dichloroethane	107-06-2	<5.0	5.0	
Benzene	71-43-2	<5.0	5.0	
Trichloroethene	79-01-6	<5.0	5.0	
1,2-Dichloropropane	78-87-5	<5.0	5.0	
Bromodichloromethane	75-27-4	<5.0	5.0	
2-Chloroethylvinylether	110-75-8	<20.	20.	
4-Methyl-2-Pentanone	108-10-1	2.3	10.	J
cis-1,3-Dichloropropene	10061-01-5	<5.0	5.0	
Toluene	108-88-3	<5.0	5.0	
trans-1,3-Dichloropropene	10061-02-6	<5.0	5.0	
2-Hexanone	591-78-6	3.0	10.	J
1,1,2-Trichloroethane	79-00-5	<5.0	5.0	
Tetrachloroethene	127-18-4	<5.0	5.0	
Dibromochloromethane	124-48-1	<5.0	5.0	
Chlorobenzene	108-90-7	<5.0	5.0	
Ethylbenzene	100-41-4	<5.0	5.0	
m,p-Xylene	136777-61-2	<5.0	5.0	
o-Xylene	95-47-6	<5.0	5.0	
Styrene	100-42-5	<5.0	5.0	
Bromoform	75-25-2	<5.0	5.0	
1,1,2,2-Tetrachloroethane	79-34-5	1.4	5.0	J
1,3-Dichlorobenzene	541-73-1	<5.0	5.0	
1,4-Dichlorobenzene	106-46-7	<5.0	5.0	
1,2-Dichlorobenzene	95-50-1	<5.0	5.0	

LOCKHEED ANALYTICAL SERVICES

GC/MS FOR VOLATILE ORGANICS
8240 VOLATILES

Client Sample ID:	B0JDW9	LAL Sample ID:	L8060-7
Date Collected:	26-SEP-96	Date Received:	28-SEP-96
Date Analyzed:	02-OCT-96	Analytical Dilution:	1
Matrix:	Water	Analytical Batch ID:	100296-8260-E1
		Preparation Dilution:	1.00

SURROGATE	RECOVERY	QC Limits
1,2-Dichloroethane-d4	95%	84-122
Toluene-d8	103%	87-117
Bromofluorobenzene	105%	83-118

CONSTITUENT	CAS NO.	RESULT ug/L	PRACTICAL QUANTITATION LIMIT ug/L	DATA QUALIFIER(s
Chloromethane	74-87-3	<5.0	5.0	
Vinyl Chloride	75-01-4	<5.0	5.0	
Bromomethane	74-83-9	<5.0	5.0	
Chloroethane	75-00-3	<5.0	5.0	
Trichlorofluoromethane	75-69-4	<5.0	5.0	
Acetone	67-64-1	<10.	10.	
1,1-Dichloroethene	75-35-4	<5.0	5.0	
Carbon Disulfide	75-15-0	<5.0	5.0	
Methylene Chloride	75-09-2	<5.0	5.0	
trans-1,2-Dichloroethene	156-60-5	<5.0	5.0	
Vinyl Acetate	108-05-4	<10.	10.	
1,1-Dichloroethane	75-34-3	<5.0	5.0	
2-Butanone	78-93-3	<10.	10.	
cis-1,2-Dichloroethene	156-59-2	<5.0	5.0	
Chloroform	67-66-3	<5.0	5.0	
1,1,1-Trichloroethane	71-55-6	<5.0	5.0	
Carbon tetrachloride	56-23-5	<5.0	5.0	
1,2-Dichloroethane	107-06-2	<5.0	5.0	
Benzene	71-43-2	<5.0	5.0	
Trichloroethene	79-01-6	<5.0	5.0	
1,2-Dichloropropane	78-87-5	<5.0	5.0	
Bromodichloromethane	75-27-4	<5.0	5.0	
2-Chloroethylvinylether	110-75-8	<20.	20.	
4-Methyl-2-Pentanone	108-10-1	<10.	10.	
cis-1,3-Dichloropropene	10061-01-5	<5.0	5.0	
Toluene	108-88-3	<5.0	5.0	
trans-1,3-Dichloropropene	10061-02-6	<5.0	5.0	
2-Hexanone	591-78-6	<10.	10.	
1,1,2-Trichloroethane	79-00-5	<5.0	5.0	
Tetrachloroethene	127-18-4	<5.0	5.0	
Dibromochloromethane	124-48-1	<5.0	5.0	
Chlorobenzene	108-90-7	<5.0	5.0	
Ethylbenzene	100-41-4	<5.0	5.0	
m,p-Xylene	136777-61-2	<5.0	5.0	
o-Xylene	95-47-6	<5.0	5.0	
Styrene	100-42-5	<5.0	5.0	
Bromoform	75-25-2	<5.0	5.0	
1,1,2,2-Tetrachloroethane	79-34-5	<5.0	5.0	
1,3-Dichlorobenzene	541-73-1	<5.0	5.0	
1,4-Dichlorobenzene	106-46-7	<5.0	5.0	
1,2-Dichlorobenzene	95-50-1	<5.0	5.0	

0040

LOCKHEED ANALYTICAL SERVICES

GC/MS FOR VOLATILE ORGANICS

Client Sample ID:	Method Blank	LAL Sample ID:	42200MB
Date Collected:	N/A	Date Received:	N/A
Date Analyzed:	02-OCT-96	Analytical Dilution:	1
		Analytical Batch ID:	100296-8260-E1
		Preparation Dilution:	1.00

SURROGATE	RECOVERY	QC Limits
1,2-Dichloroethane-d4	94%	84-122
Toluene-d8	103%	87-117
Bromofluorobenzene	107%	83-118

CONSTITUENT	CAS NO.	RESULT ug/L	PRACTICAL QUANTITATION LIMIT ug/L	DATA QUALIFIER(s)
Chloromethane	74-87-3	<5.0	5.0	
Vinyl Chloride	75-01-4	<5.0	5.0	
Bromomethane	74-83-9	<5.0	5.0	
Chloroethane	75-00-3	<5.0	5.0	
Trichlorofluoromethane	75-69-4	<5.0	5.0	
Acetone	67-64-1	<10.	10.	
1,1-Dichloroethene	75-35-4	<5.0	5.0	
Carbon Disulfide	75-15-0	<5.0	5.0	
Methylene Chloride	75-09-2	<5.0	5.0	
trans-1,2-Dichloroethene	156-60-5	<5.0	5.0	
Vinyl Acetate	108-05-4	<10.	10.	
1,1-Dichloroethane	75-34-3	<5.0	5.0	
2-Butanone	78-93-3	<10.	10.	
cis-1,2-Dichloroethene	156-59-2	<5.0	5.0	
Chloroform	67-66-3	<5.0	5.0	
1,1,1-Trichloroethane	71-55-6	<5.0	5.0	
Carbon tetrachloride	56-23-5	<5.0	5.0	
1,2-Dichloroethane	107-06-2	<5.0	5.0	
Benzene	71-43-2	<5.0	5.0	
Trichloroethene	79-01-6	<5.0	5.0	
1,2-Dichloropropane	78-87-5	<5.0	5.0	
Bromodichloromethane	75-27-4	<5.0	5.0	
2-Chloroethylvinylether	110-75-8	<20.	20.	
4-Methyl-2-Pentanone	108-10-1	<10.	10.	
cis-1,3-Dichloropropene	10061-01-5	<5.0	5.0	
Toluene	108-88-3	<5.0	5.0	
trans-1,3-Dichloropropene	10061-02-6	<5.0	5.0	
2-Hexanone	591-78-6	<10.	10.	
1,1,2-Trichloroethane	79-00-5	<5.0	5.0	
Tetrachloroethene	127-18-4	<5.0	5.0	
Dibromochloromethane	124-48-1	<5.0	5.0	
Chlorobenzene	108-90-7	<5.0	5.0	
Ethylbenzene	100-41-4	<5.0	5.0	
m,p-Xylene	136777-61-2	<5.0	5.0	
o-Xylene	95-47-6	<5.0	5.0	
Styrene	100-42-5	<5.0	5.0	
Bromoform	75-25-2	<5.0	5.0	
1,1,2,2-Tetrachloroethane	79-34-5	<5.0	5.0	
1,3-Dichlorobenzene	541-73-1	<5.0	5.0	
1,4-Dichlorobenzene	106-46-7	<5.0	5.0	
1,2-Dichlorobenzene	95-50-1	<5.0	5.0	

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LOCKHEED ANALYTICAL SERVICES

SPIKED SAMPLE RESULT
GC/MS FOR VOLATILE ORGANICS

Client Sample ID:	BOJDW9	LAL Sample ID:	42200MS
Date Collected:	26-SEP-96	Date Received:	28-SEP-96
Date Analyzed:	02-OCT-96	Analytical Dilution:	1
		Analytical Batch ID:	100296-8260-E1
		Preparation Dilution:	1.00

SURROGATE	RECOVERY	QC Limits
1,2-Dichloroethane-d4	95%	84-122
Toluene-d8	104%	87-117
Bromofluorobenzene	107%	83-118

CONSTITUENT	CAS NO.	RESULT ug/L	PRACTICAL QUANTITATION LIMIT ug/L	DATA QUALIFIER(S)
Chloromethane	74-87-3	39.	5.0	
Vinyl Chloride	75-01-4	46.	5.0	
Bromomethane	74-83-9	86.	5.0	
Chloroethane	75-00-3	73.	5.0	
Trichlorofluoromethane	75-69-4	<5.0	5.0	
Acetone	67-64-1	40.	10.	
1,1-Dichloroethene	75-35-4	41.	5.0	
Carbon Disulfide	75-15-0	47.	5.0	
Methylene Chloride	75-09-2	44.	5.0	
trans-1,2-Dichloroethene	156-60-5	41.	5.0	
Vinyl Acetate	108-05-4	45.	10.	
1,1-Dichloroethane	75-34-3	43.	5.0	
2-Butanone	78-93-3	44.	10.	
cis-1,2-Dichloroethene	156-59-2	38.	5.0	
Chloroform	67-66-3	43.	5.0	
1,1,1-Trichloroethane	71-55-6	43.	5.0	
Carbon tetrachloride	56-23-5	46.	5.0	
1,2-Dichloroethane	107-06-2	44.	5.0	
Benzene	71-43-2	46.	5.0	
Trichloroethene	79-01-6	49.	5.0	
1,2-Dichloropropane	78-87-5	46.	5.0	
Bromodichloromethane	75-27-4	46.	5.0	
2-Chloroethylvinylether	110-75-8	<20.	20.	
4-Methyl-2-Pentanone	108-10-1	48.	10.	
cis-1,3-Dichloropropene	10061-01-5	47.	5.0	
Toluene	108-88-3	48.	5.0	
trans-1,3-Dichloropropene	10061-02-6	47.	5.0	
2-Hexanone	591-78-6	48.	10.	
1,1,2-Trichloroethane	79-00-5	48.	5.0	
Tetrachloroethene	127-18-4	49.	5.0	
Dibromochloromethane	124-48-1	47.	5.0	
Chlorobenzene	108-90-7	50.	5.0	
Ethylbenzene	100-41-4	49.	5.0	
m,p-Xylene	136777-61-2	98.	5.0	
o-Xylene	95-47-6	49.	5.0	
Styrene	100-42-5	49.	5.0	
Bromoform	75-25-2	47.	5.0	
1,1,2,2-Tetrachloroethane	79-34-5	45.	5.0	
1,3-Dichlorobenzene	541-73-1	<5.0	5.0	
1,4-Dichlorobenzene	106-46-7	<5.0	5.0	
1,2-Dichlorobenzene	95-50-1	<5.0	5.0	

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LOCKHEED ANALYTICAL SERVICES

SPIKED SAMPLE RESULT
GC/MS FOR VOLATILE ORGANICS

Client Sample ID:	BOJDW9	LAL Sample ID:	42200MSD
Date Collected:	26-SEP-96	Date Received:	28-SEP-96
Date Analyzed:	02-OCT-96	Analytical Dilution:	1
		Analytical Batch ID:	100296-8260-E1
		Preparation Dilution:	1.00

SURROGATE	RECOVERY	QC Limits
1,2-Dichloroethane-d4	95%	84-122
Toluene-d8	104%	87-117
Bromofluorobenzene	107%	83-118

CONSTITUENT	CAS NO.	RESULT ug/L	PRACTICAL QUANTITATION LIMIT ug/L	DATA QUALIFIER(s)
Chloromethane	74-87-3	39.	5.0	
Vinyl Chloride	75-01-4	45.	5.0	
Bromomethane	74-83-9	87.	5.0	
Chloroethane	75-00-3	75.	5.0	
Trichlorofluoromethane	75-69-4	<5.0	5.0	
Acetone	67-64-1	41.	10.	
1,1-Dichloroethene	75-35-4	42.	5.0	
Carbon Disulfide	75-15-0	48.	5.0	
Methylene Chloride	75-09-2	45.	5.0	
trans-1,2-Dichloroethene	156-60-5	42.	5.0	
Vinyl Acetate	108-05-4	45.	10.	
1,1-Dichloroethane	75-34-3	44.	5.0	
2-Butanone	78-93-3	44.	10.	
cis-1,2-Dichloroethene	156-59-2	39.	5.0	
Chloroform	67-66-3	44.	5.0	
1,1,1-Trichloroethane	71-55-6	44.	5.0	
Carbon tetrachloride	56-23-5	47.	5.0	
1,2-Dichloroethane	107-06-2	45.	5.0	
Benzene	71-43-2	47.	5.0	
Trichloroethene	79-01-6	49.	5.0	
1,2-Dichloropropane	78-87-5	47.	5.0	
Bromodichloromethane	75-27-4	47.	5.0	
2-Chloroethylvinylether	110-75-8	<20.	20.	
4-Methyl-2-Pentanone	108-10-1	50.	10.	
cis-1,3-Dichloropropene	10061-01-5	47.	5.0	
Toluene	108-88-3	49.	5.0	
trans-1,3-Dichloropropene	10061-02-6	48.	5.0	
2-Hexanone	591-78-6	49.	10.	
1,1,2-Trichloroethane	79-00-5	49.	5.0	
Tetrachloroethene	127-18-4	49.	5.0	
Dibromochloromethane	124-48-1	47.	5.0	
Chlorobenzene	108-90-7	50.	5.0	
Ethylbenzene	100-41-4	49.	5.0	
m,p-Xylene	136777-61-2	99.	5.0	
o-Xylene	95-47-6	50.	5.0	
Styrene	100-42-5	49.	5.0	
Bromoform	75-25-2	48.	5.0	
1,1,2,2-Tetrachloroethane	79-34-5	46.	5.0	
1,3-Dichlorobenzene	541-73-1	<5.0	5.0	
1,4-Dichlorobenzene	106-46-7	<5.0	5.0	
1,2-Dichlorobenzene	95-50-1	<5.0	5.0	

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LOCKHEED ANALYTICAL SERVICES

MATRIX SPIKE DATA SUMMARY
GC/MS FOR VOLATILE ORGANICS

Client Sample ID:	BOJDW9	LAL Sample ID:	42200MS
Date Collected:	26-SEP-96	Date Received:	28-SEP-96
Date Analyzed:	02-OCT-96	Analytical Dilution:	1
		Analytical Batch ID:	100296-8260-E1
		Preparation Dilution:	1.00

SURROGATE	RECOVERY	QC Limits
1,2-Dichloroethane-d4	95%	84-122
Toluene-d8	104%	87-117
Bromofluorobenzene	107%	83-118

Constituent	Spike Added ug/L	Sample Concentration ug/L	MS Concentration ug/L	% Recovery	QC Limits % Recovery
1,1-Dichloroethene	50.0	0.000	40.8	82	62-124
Benzene	50.0	0.000	46.4	93	68-128
Trichloroethene	50.0	0.000	48.6	97	65-125
Toluene	50.0	0.000	48.4	97	69-129
Chlorobenzene	50.0	0.000	50.3	101	68-128

LOCKHEED ANALYTICAL SERVICES

MATRIX SPIKE DUPLICATE DATA SUMMARY
GC/MS FOR VOLATILE ORGANICS

Client Sample ID:	BOJDW9	LAL Sample ID:	42200MSD
Date Collected:	26-SEP-96	Date Received:	28-SEP-96
Date Analyzed:	02-OCT-96	Analytical Dilution:	1
		Analytical Batch ID:	100296-8260-E1
		Preparation Dilution:	1.00

SURROGATE	RECOVERY	QC Limits
1,2-Dichloroethane-d4	95%	84-122
Toluene-d8	104%	87-117
Bromofluorobenzene	107%	83-118

Constituent	Spike Added ug/L	MSD Concentration ug/L	% Recovery	RPD	QC Limits RPD	QC Limits % Recovery
1,1-Dichloroethene	50.0	41.8	84	2	14	62-124
Benzene	50.0	47.4	95	2	11	68-128
Trichloroethene	50.0	49.1	98	1	14	65-125
Toluene	50.0	48.9	98	1	13	69-129
Chlorobenzene	50.0	50.5	101	0	13	68-128

LOCKHEED ANALYTICAL SERVICES

VOLATILE INTERNAL STANDARD
AREA AND RT SUMMARY

Instrument ID: GC/MS-E

Date/Time Analyzed: 02-OCT-96 16:44
LAL Batch ID: 100296-8260-E1

		IS1 (PFB) Area	RT	IS2 (DFB) Area	RT	IS3 (CBZ) Area	RT	IS4 (DCB) Area	RT
12 HOUR STD		1162560	11.38	1851989	12.56	1587276	16.76	1372242	20.83
UPPER LIMIT		2325120	11.88	3703978	13.06	3174552	17.26	2744484	21.33
LOWER LIMIT		581280	10.88	925994	12.06	793638	16.26	686121	20.33
Client Sample ID	LAL Sample ID								
Method Blank	42200MB	1105949	11.39	1627322	12.57	1528005	16.76	1308797	20.84
BOJDW9	42200MS	1224258	11.38	1907041	12.57	1762127	16.76	1492228	20.83
B0JDW7	L8060-2	1207360	11.38	1901276	12.57	1750893	16.76	1462247	20.83
B0JDW9	L8060-7	1133418	11.38	1800863	12.57	1690198	16.75	1399051	20.83
Lab Ctrl Sample	42200LCS	1160608	11.38	1855168	12.57	1712706	16.76	1444816	20.83
BOJDW9	42200MSD	1184192	11.38	1858850	12.57	1728609	16.76	1454918	20.83

AREA UPPER LIMIT = +100% of internal standard area
AREA LOWER LIMIT = -50% of internal standard area
RT UPPER LIMIT = +0.50 minutes of internal standard RT
RT LOWER LIMIT = -0.50 minutes of internal standard RT

IS1 (PFB) = Pentafluorobenzene
IS2 (DFB) = 1,4-Difluorobenzene
IS3 (CBZ) = Chlorobenzene-d5
IS4 (DCB) = 1,4-Dichlorobenzene-d4

0048

[illegible]

KEARNEY

DEC 12-23-96 1996
RECEIVED
Validation
Log In

23 December 1996

Ms. Joan Kessner
Bechtel Hanford Incorporated
3350 George Washington Way MSIN BI-35
Richland, Washington 99352

Dear Ms. Kessner:

Enclosed are the data validation reports for sample data groups W01213-QES and LK8060-LAS.

Sincerely,

R. Bruce Christian, CIH
Associate

cc: J. Duncan - CH2
J. Goode - ATK

Date: 23 December 1996
To: Bechtel Hanford Inc. (technical representative)
From: A.T. Kearney, Inc.
Project: ERDF Routine Groundwater Monitoring, Round 1
Subject: Volatiles - Data Package No. LK8060-LAS (SDG No. LK8060)

INTRODUCTION

This memo presents the results of data validation on Summary Data Package No. LK8060-LAS prepared by Lockheed Analytical Services (LAS). A list of the samples validated along with the analyses reported and the method of analysis is provided in the following table.

Sample ID	Sample Date	Media	Validation Level	Analysis
B0JDW7	09/26/96	Water	D	VOA 8240A (TCL)
B0JDW9	09/26/96	Water	D	VOA 8240A (TCL)

Data validation was conducted in accordance with the WHC statement of work (WHC 1994) and validation procedures (WHC 1992a). Appendices 1 through 5 provide the following information as indicated below:

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

DATA QUALITY OBJECTIVES

- **Holding Times**

  Analytical holding times are assessed to ascertain whether the holding time requirements were met by the laboratory. Preserved water samples must be analyzed within 14 days of the date of sample collection. Unpreserved samples must be analyzed within seven days of sample collection.

  If holding times are exceeded, but not by greater than twice the limit, all associated sample results are qualified as estimates and flagged "J" for detects and "UJ" for non-detects. If holding times are exceeded by greater than twice

the limit, all associated detected sample results are qualified as estimates and flagged "J" and all non-detects are rejected and flagged "UR".

All holding times were met.

- **Instrument Calibration and Tuning**

Instrument calibration and tuning is performed to establish that the GC/MS instrument is capable of producing acceptable and reliable analytical data over a range of concentrations. The initial and continuing calibrations are performed according to SW-846 methods and all results must meet validation requirements set by Westinghouse-Hanford (WHC 1992a). An initial multipoint calibration is performed prior to sample analysis to establish the linear range of the GC/MS instrument. Continuing calibration checks are performed to verify that instrument performance is stable and reproducible on a day-to-day basis.

Instrument calibration and tuning were acceptable

- **Blanks**

Method blank analyses are conducted to determine the extent of laboratory contamination introduced through sampling, sample preparation and analysis. At least one acceptable method blank analysis must be conducted for every 20 samples of a given matrix. No contaminants should be present in the method blank. Analytical results for analytes present in any sample at less than five times the concentration of that analyte found in the associated blank are qualified as non-detects and flagged "U". Common laboratory contaminants present in samples at less than ten times the concentration of that analyte found in the associated blank are qualified as non-detects. If a sample result is less than the CRQL and is less than five times (or less than ten times for laboratory contaminants) the highest associated blank result, the sample result value is raised to the CRQL, qualified as undetected and flagged "U".

Tentatively identified compounds (TICs) present in the samples and blanks that are within plus or minus 0.06 relative retention time units (RRT) of each other are qualified as undetected and flagged "U" if the sample concentration is less than five times (or less than ten times for common laboratory contaminants) the highest blank concentration.

The TIC reported in sample number B0JDW7 at a retention time of 8.73 minutes was qualified as undetected and flagged "U" due to its close spectral and RRT match to the TIC reported in the associated method blank.

All other method blank target compound results were acceptable.

Trip Blank

One trip blank was identified in this data package. The trip blank sample number, location and associated field sample number are as follows:

Trip Blank	Associated Field Samples	Well Location
B0JDW9	B0JDW7	699-35-66A

No target analytes were detected in the trip blank.

- **Accuracy**

Matrix Spike/Matrix Spike Duplicate Recoveries

Matrix spike/matrix spike duplicate analyses are used to assess the analytical accuracy of the reported data and the effect of the matrix on the ability to accurately quantify sample concentrations. Matrix spike/matrix spike duplicate analyses are performed in duplicate using the target compounds for which percent recoveries must be within established laboratory quality control limits. If spike recoveries are outside control limits, detected sample results less than five times the spike concentration are qualified as estimates and flagged "J". Undetected sample results with spike recoveries outside control limits are qualified as estimates and flagged "UJ". Sample results greater than five times the spike concentration require no qualification.

All matrix spike/matrix spike duplicate recovery results were acceptable.

Surrogate Recovery

The analysis of surrogate compounds provides a measure of system performance for individual samples. Matrix-specific surrogate compound recovery control windows have been established by the laboratory program. When a surrogate compound recovery is out of the control window, all positively identified target compounds associated with the unacceptable surrogate recoveries are qualified as estimates and flagged "J". Undetected compounds with surrogate recoveries less than the lower control limit are qualified as having an estimated detection limit and flagged "UJ". Samples with surrogate recoveries less than ten percent are qualified as estimates and flagged "J" for detects, and rejected and flagged "UR" for nondetects. Undetected compounds with surrogate recoveries greater than the upper control limit require no qualification.

All surrogate recovery results were acceptable.

- Precision

Matrix Spike/Matrix Spike Duplicate Samples

Matrix spike/matrix spike duplicate results provide matrix-specific information on the precision of the method for specific target compound classes. Precision is expressed by the RPD between the recoveries of duplicate matrix spike analyses performed on a sample. For water samples analyzed using SW-846 protocol, results must be within RPD limits of plus or minus 20 percent. If RPD values are out of specification and the sample concentration is less than five times the spike concentration, all associated sample results are qualified as estimates and flagged "J" for detects and "UJ" for non-detects. If RPD values are out of specification and the sample concentration is greater than five times the spike concentration, no qualification is required.

All matrix spike/matrix spike duplicate recovery results were acceptable.

Split Samples

One pair of field split samples were submitted to QES/LAS for analysis as shown below:

Sample No.	Split Sample No.	Well No.
B0JCW3 (QES)	B0JDW7 (LAS)	699-35-66A

The split sample results were compared using the validation guidelines for determining the RPD between a sample and its duplicate. All split sample results were within QC limits.

- **System Performance**

Internal Standards Performance

The evaluation of internal standards results provides a means to assess the stability and sensitivity of the GC/MS system on every analysis. Internal standard area counts must be within the limits of -50% to +100% of the most recent standard. The retention time of the internal standard must not vary by more than +/-30 seconds of the most recent calibration. If area counts for a particular internal standard are outside the control limits or the relative retention time shift is greater than +/- 30 seconds, all associated sample results are qualified as estimates and flagged "J" for detects and "UJ" for non-detects. If area counts and retention times are both outside control limits, all non-detect

sample results associated with that internal standard are rejected and flagged "UR".

Internal standard performance was acceptable.

Compound Identification

The identifications of detected compounds are confirmed to investigate the possibility of false positives or false negatives. If a compound was incorrectly reported as undetected, the associated result is qualified as detected (no qualifier) or as an estimate and flagged "J". If retention time and mass spectral criteria are not met, all associated results are qualified as unusable and flagged "R". If it is determined that incorrect identifications were made as a result of cross-contamination or carryover between analyses, then the affected data are qualified as unusable and flagged "UR/R".

Compound identifications were acceptable.

- **Analytical Detection Levels**

Reported analytical detection levels are compared to CRQLs to ensure that laboratory detection levels meet the required criteria. The CRQL for 2-chloroethylvinylether was exceeded. Under WHC guidelines, no qulaification is required. All other laboratory reported analytical detection levels were at or below the analyte specific CRQLs.

- **Completeness**

Data Package No. LK8060-LAS (SDG No. LK8060) was submitted for validation and verified for completeness. The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

None found.

REFERENCES

EPA, 1987, *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods*, SW-846, Third Edition, Environmental Protection Agency, Washington, D.C.

EPA, 1988a, *EPA Contract Laboratory Program Statement of Work for Organics Analyses, Multi-Media, Multi-Concentration*, U.S. Environmental Protection Agency, Washington, D.C.

EPA, 1988b, *Laboratory Data Validation Functional Guidelines for Evaluating Organics Analyses*, U.S. Environmental Protection Agency, Washington, D.C.

EPA, 1988c, *EPA Contract Laboratory Program Statement of Work for Inorganics Analyses, Multi-Media, Multi-Concentration*, U.S. Environmental Protection Agency, Washington, D.C.

EPA, 1988d, *Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analyses*, U.S. Environmental Protection Agency, Washington, D.C.

EPA, 1990, *EPA Contract Laboratory Program Statement of Work for Inorganic Analyses, Multi-media, Multi-Concentration*, U.S. Environmental Protection Agency, Washington, D.C.

EPA, 1991, *EPA Contract Laboratory Program Statement of Work for Organics Analyses, Multi-Media, Multi-Concentration*, Environmental Protection Agency, Washington, D.C.

WHC, 1992a, *Data Validation Procedures for Chemical Analyses*, WHC-SD-EN-SPP-002, Rev. 2, Westinghouse Hanford Company, October 1993.

WHC, 1992b, *Data Validation Procedure for Radiological Analyses*, WHC-SD-EN-SPP-001, Rev. 2, Westinghouse Hanford Company, 1993.

EPA, 1994a, *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*, U.S. Environmental Protection Agency, Washington, D.C.

EPA, 1994b, *USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review*, U.S. Environmental Protection Agency, Washington, D.C.

WHC, 1994, *Validation Statement of Work*, Rev.1, Westinghouse Hanford Company, 1994.

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers which may be applied by data validator in compliance with WHC procedures herein are as follows:

U - Indicates the compound or analyte was analyzed for and not detected in the sample. The value reported is the sample quantitation limit corrected for dilution and moisture content by the laboratory.

UJ - Indicates the compound or analyte was analyzed for and not detected in the sample. Due to a QC deficiency identified during the data validation, the associated quantitation limit is an estimate.

J - Indicates the compound or analyte was analyzed for and detected. The associated concentration is an estimate, but the data are usable for decision-making purposes.

R - Indicates the compound or analyte was analyzed for, detected, and due to an identified QC deficiency, the data are unusable.

UR - Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data is unusable due to an identified QC deficiency.

NJ - Indicates presumptive evidence of a compound at an estimated value. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).

N - Indicates presumptive evidence of a compound. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).

Appendix 2

Summary of Data Qualification

SDG: W01213	REVIEWER: JAS	DATE: 12/23/96	PAGE 1 OF 1
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Unknown TIC (RT = 8.73)	U	B0DJW7	Method blank contamination

Appendix 3

Qualified Data Summary and Annotated Laboratory Reports

VOLATILE ORGANIC ANALYSIS, WATER MATRIX, (ug/L)

Project: BECHTEL-HANFORD																					
Laboratory: Lockheed																					
Case	SDG: LK8060																				
Sample Number		B0JDW7		B0JDW9																	
Location		699-35-66A		699-35-66A																	
Remarks		Split		Trip Blank																	
Analysis Date		10/02/96		10/02/96																	
Sample Date		09/26/96		09/26/96																	
Volatile Organics	CRDL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Chloromethane	10	5.0	U	5.0	U																
Vinyl Chloride	10	5.0	U	5.0	U																
Bromomethane	10	5.0	U	5.0	U																
Chloroethane	10	5.0	U	5.0	U																
Trichlorofluoromethane	10	5.0	U	5.0	U																
Acetone	10	4.1	J	10	U																
1,1-Dichloroethene	10	5.0	U	5.0	U																
Carbon Disulfide	10	5.0	U	5.0	U																
Methylene Chloride	10	5.0	U	5.0	U																
trans-1,2-Dichloroethene	10	5.0	U	5.0	U																
Vinyl Acetate	10	10	U	10	U																
1,1-Dichloroethane	10	5.0	U	5.0	U																
2-Butanone	10	3.4	J	10	U																
cis-1,2-Dichloroethene	10	5.0	U	5.0	U																
Chloroform	10	5.0	U	5.0	U																
1,1,1-Trichloroethane	10	5.0	U	5.0	U																
Carbon Tetrachloride	10	1.6	J	5.0	U																
1,2-Dichloroethane	10	5.0	U	5.0	U																
Benzene	10	5.0	U	5.0	U																
Trichloroethene	10	5.0	U	5.0	U																
1,2-Dichloropropane	10	5.0	U	5.0	U																
Bromodichloromethane	10	5.0	U	5.0	U																
2-Chloroethylvinylether	10	20	U	20	U																
4-Methyl-2-pentanone	10	2.3	J	10	U																
cis-1,3-Dichloropropene	10	5.0	U	5.0	U																
Toluene	10	5.0	U	5.0	U																
trans-1,3-Dichloropropene	10	5.0	U	5.0	U																
2-Hexanone	10	3.0	J	10	U																
1,1,2-Trichloroethane	10	5.0	U	5.0	U																
Tetrachloroethene	10	5.0	U	5.0	U																
Dibromochloromethane	10	5.0	U	5.0	U																
Chlorobenzene	10	5.0	U	5.0	U																
Ethylbenzene	10	5.0	U	5.0	U																
m,p-Xylene	10	5.0	U	5.0	U																
o-Xylene	10	5.0	U	5.0	U																
Styrene	10	5.0	U	5.0	U																
Bromoform	10	5.0	U	5.0	U																
1,1,2,2-Tetrachloroethane	10	1.4	J	5.0	U																
1,3-Dichlorobenzene	10	5.0	U	5.0	U																
1,4-Dichlorobenzene	10	5.0	U	5.0	U																
1,2-Dichlorbenzene	10	5.0	U	5.0	U																

LOCKHEED ANALYTICAL SERVICES

GC/MS FOR VOLATILE ORGANICS
8240 VOLATILES

Client Sample ID:	B0JDW7	LAL Sample ID:	L8060-2
Date Collected:	26-SEP-96	Date Received:	28-SEP-96
Date Analyzed:	02-OCT-96	Analytical Dilution:	1
Matrix:	Water	Analytical Batch ID:	100296-8260-E1
		Preparation Dilution:	1.00

SURROGATE	RECOVERY	QC Limits
1,2-Dichloroethane-d4	95%	84-122
Toluene-d8	103%	87-117
Bromofluorobenzene	105%	83-118

CONSTITUENT	CAS NO.	RESULT ug/L	PRACTICAL QUANTITATION LIMIT ug/L	DATA QUALIFIER(S)
Chloromethane	74-87-3	<5.0	5.0	
Vinyl Chloride	75-01-4	<5.0	5.0	
Bromomethane	74-83-9	<5.0	5.0	
Chloroethane	75-00-3	<5.0	5.0	
Trichlorofluoromethane	75-69-4	<5.0	5.0	
Acetone	67-64-1	4.1	10.	J
1,1-Dichloroethene	75-35-4	<5.0	5.0	
Carbon Disulfide	75-15-0	<5.0	5.0	
Methylene Chloride	75-09-2	<5.0	5.0	
trans-1,2-Dichloroethene	156-60-5	<5.0	5.0	
Vinyl Acetate	108-05-4	<10.	10.	
1,1-Dichloroethane	75-34-3	<5.0	5.0	
2-Butanone	78-93-3	3.4	10.	J
cis-1,2-Dichloroethene	156-59-2	<5.0	5.0	
Chloroform	67-66-3	<5.0	5.0	
1,1,1-Trichloroethane	71-55-6	<5.0	5.0	
Carbon tetrachloride	56-23-5	1.6	5.0	J
1,2-Dichloroethane	107-06-2	<5.0	5.0	
Benzene	71-43-2	<5.0	5.0	
Trichloroethene	79-01-6	<5.0	5.0	
1,2-Dichloropropane	78-87-5	<5.0	5.0	
Bromodichloromethane	75-27-4	<5.0	5.0	
2-Chloroethylvinylether	110-75-8	<20.	20.	
4-Methyl-2-Pentanone	108-10-1	2.3	10.	J
cis-1,3-Dichloropropene	10061-01-5	<5.0	5.0	
Toluene	108-88-3	<5.0	5.0	
trans-1,3-Dichloropropene	10061-02-6	<5.0	5.0	
2-Hexanone	591-78-6	3.0	10.	J
1,1,2-Trichloroethane	79-00-5	<5.0	5.0	
Tetrachloroethene	127-18-4	<5.0	5.0	
Dibromochloromethane	124-48-1	<5.0	5.0	
Chlorobenzene	108-90-7	<5.0	5.0	
Ethylbenzene	100-41-4	<5.0	5.0	
m,p-Xylene	136777-61-2	<5.0	5.0	
o-Xylene	95-47-6	<5.0	5.0	
Styrene	100-42-5	<5.0	5.0	
Bromoform	75-25-2	<5.0	5.0	
1,1,2,2-Tetrachloroethane	79-34-5	1.4	5.0	J
1,3-Dichlorobenzene	541-73-1	<5.0	5.0	
1,4-Dichlorobenzene	106-46-7	<5.0	5.0	
1,2-Dichlorobenzene	95-50-1	<5.0	5.0	

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LOCKHEED ANALYTICAL SERVICES

GC/MS FOR VOLATILE ORGANICS
TENTATIVELY IDENTIFIED COMPOUNDS
8240 VOLATILES

Client Sample ID:	B0JDW7	LAL Sample ID:	L8060-2
Date Collected:	26-SEP-96	Date Received:	28-SEP-96
Date Analyzed:	02-OCT-96	Analytical Dilution:	1
Matrix:	Water	Analytical Batch ID:	100296-8260-E1
		Preparation Dilution:	1.00

Number of TICs found: 1

CONCENTRATION UNITS:
(ug/L or ug/Kg) ug/L

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1		Unknown	8.73	30	~~JB~~ U
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					

12/2/96 12/17/96

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LOCKHEED ANALYTICAL SERVICES

GC/MS FOR VOLATILE ORGANICS
8240 VOLATILES

Client Sample ID:	B0JDW9	LAL Sample ID:	L8060-7
Date Collected:	26-SEP-96	Date Received:	28-SEP-96
Date Analyzed:	02-OCT-96	Analytical Dilution:	1
Matrix:	Water	Analytical Batch ID:	100296-8260-E1
		Preparation Dilution:	1.00

SURROGATE	RECOVERY	QC Limits
1,2-Dichloroethane-d4	95%	84-122
Toluene-d8	103%	87-117
Bromofluorobenzene	105%	83-118

CONSTITUENT	CAS NO.	RESULT ug/L	PRACTICAL QUANTITATION LIMIT ug/L	DATA QUALIFIER(S)
Chloromethane	74-87-3	<5.0	5.0	
Vinyl Chloride	75-01-4	<5.0	5.0	
Bromomethane	74-83-9	<5.0	5.0	
Chloroethane	75-00-3	<5.0	5.0	
Trichlorofluoromethane	75-69-4	<5.0	5.0	
Acetone	67-64-1	<10.	10.	
1,1-Dichloroethene	75-35-4	<5.0	5.0	
Carbon Disulfide	75-15-0	<5.0	5.0	
Methylene Chloride	75-09-2	<5.0	5.0	
trans-1,2-Dichloroethene	156-60-5	<5.0	5.0	
Vinyl Acetate	108-05-4	<10.	10.	
1,1-Dichloroethane	75-34-3	<5.0	5.0	
2-Butanone	78-93-3	<10.	10.	
cis-1,2-Dichloroethene	156-59-2	<5.0	5.0	
Chloroform	67-66-3	<5.0	5.0	
1,1,1-Trichloroethane	71-55-6	<5.0	5.0	
Carbon tetrachloride	56-23-5	<5.0	5.0	
1,2-Dichloroethane	107-06-2	<5.0	5.0	
Benzene	71-43-2	<5.0	5.0	
Trichloroethene	79-01-6	<5.0	5.0	
1,2-Dichloropropane	78-87-5	<5.0	5.0	
Bromodichloromethane	75-27-4	<5.0	5.0	
2-Chloroethylvinylether	110-75-8	<20.	20.	
4-Methyl-2-Pentanone	108-10-1	<10.	10.	
cis-1,3-Dichloropropene	10061-01-5	<5.0	5.0	
Toluene	108-88-3	<5.0	5.0	
trans-1,3-Dichloropropene	10061-02-6	<5.0	5.0	
2-Hexanone	591-78-6	<10.	10.	
1,1,2-Trichloroethane	79-00-5	<5.0	5.0	
Tetrachloroethene	127-18-4	<5.0	5.0	
Dibromochloromethane	124-48-1	<5.0	5.0	
Chlorobenzene	108-90-7	<5.0	5.0	
Ethylbenzene	100-41-4	<5.0	5.0	
m,p-Xylene	136777-61-2	<5.0	5.0	
o-Xylene	95-47-6	<5.0	5.0	
Styrene	100-42-5	<5.0	5.0	
Bromoform	75-25-2	<5.0	5.0	
1,1,2,2-Tetrachloroethane	79-34-5	<5.0	5.0	
1,3-Dichlorobenzene	541-73-1	<5.0	5.0	
1,4-Dichlorobenzene	106-46-7	<5.0	5.0	
1,2-Dichlorobenzene	95-50-1	<5.0	5.0	

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LOCKHEED ANALYTICAL SERVICES

GC/MS FOR VOLATILE ORGANICS
TENTATIVELY IDENTIFIED COMPOUNDS
8240 VOLATILES

Client Sample ID:	B0JDW9	LAL Sample ID:	L8060-7
Date Collected:	26-SEP-96	Date Received:	28-SEP-96
Date Analyzed:	02-OCT-96	Analytical Dilution:	1
Matrix:	Water	Analytical Batch ID:	100296-8260-E1
		Preparation Dilution:	1.00

Number of TICs found: 0

CONCENTRATION UNITS:
(ug/L or ug/Kg) ug/L

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
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22					
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24					
25					
26					
27					
28					
29					

12/2/96

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Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

Lockheed Environmental Systems & Technologies Co
Lockheed Analytical Services
975 Kelly Johnson Drive Las Vegas, Nevada 89119-3705
Telephone 702-361-0220 800-582-7605 Facsimile 702-361-8146

LOCKHEED MARTIN

November 18, 1996

Ms. Joan Kessner
Bechtel Hanford, Inc.
P.O. Box 969
1022 Lee Boulevard
Richland, WA 99352

RE:		
	Log-in No.:	L8060
	Quotation No.:	Q400000-B
	SAF:	B96-194
	Document File No.:	0928596A
	BHI Document File No.:	401
	SDG No.:	LK8060

The attached data report contains the analytical results of samples that were submitted to Lockheed Analytical Services on 28 September 1996.

The temperatures of the two coolers upon receipt were 2 and 3°C. Sample containers received agree with the chain-of-custody documentation. All sample containers were received intact. Samples were received in time to meet the analytical holding time requirements.

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 Mary Wolf at (702) 361-3955 ext. 311.

"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,

Mary K. Wolf
Client Services Representative

cc: Client Services
Document Control

000[illegible]

CASE NARRATIVE
ORGANIC ANALYSES

Analytical Method 8240

Analytical Batch 100296-8260-E1

NOTE: Client sample B0JDW9 (L8060-7) was the native sample used for the Matrix Spike (42200MS) and Matrix Spike Duplicate (42200MSD).

The 42200MS, 42200MSD, and Laboratory Control Sample (42200LCS) contained several compounds in addition to the five (5) required spike compounds.

The samples were analyzed within the required holding time on October 2, 1996. All associated tunes, initial and continuing calibrations met criteria. There were no target compounds detected in the Method Blank (42200MB). Surrogate recoveries were within QC limits. Compound recoveries were within QC limits in the 42200MS, 42200MSD, and 42200LCS. The Relative Percent Differences (RPDs) between the 42200MS and 42200MSD recoveries were within QC limits. All samples met internal standard area counts and retention times method criteria.

Prepared By
Patricia Lonergan

November 18, 1996

L9040

Bechtel Hanford | **CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST** L8049 | B96-194-8 | Page 1 of 2

Collector: Al Rizzo/ Bob Fahlberg / K. Trapp	Company Contact: Bruce Ford	Telephone No.: 372-9176	Project Coordinator: Koerner, CC	Data Turnaround: 45 Days
Project Designation: ERDF Routine Groundwater Monitoring	Sampling Location: 200 West		SAF No.: B96-194	
Ice Chest No.: EB-210	Field Logbook No.: EEL-1309		Method of Shipment: Federal Express	
Shipped To: Lockheed	Offsite Property No.: W96-U-0314-10		Bill of Lading/Air Bill No.: 277 1632 866	

POSSIBLE SAMPLE HAZARDS/REMARKS: Unknown

Special Handling and/or Storage: Cool to 4C

Preservation	HNO3 to pH <2	None	HNO3 to pH <2	Cool 4C	H2SO4 to pH <2 Cool 4C	Cool 4C	Cool 4C	H2SO4 to pH <2 Cool 4C	None	HNO3 to pH <2
Type of Container	P	P	aG	P	aGr*	P	P	P	P	P
No. of Container(s)	1	1	1	1	1	1	1	1	1	2
Volume	1L	20ml	40ml	250ml	500ml	500ml	500ml	500ml	500ml	1L

SAMPLE ANALYSIS

Sample No.	Matrix *	Sample Date	Sample Time	See item (1) in Special Instructions	Activity Scan	Total Uranium	Alkalinity - 310.1	TOX - 9020	IC Anions - 300.0 (Chloride, Fluoride, Sulfate)	TDS - 160.1	NO2/NO3 - 353.2	Carbon-14	Gross Alpha, Gross Beta, Total Radium
B0JDW7	Water	9/26/96	1330	X	X								
B0JDW8	Water	9/26/96	1330	X									
B0JDW9	Water												

CHAIN OF POSSESSION — Sign/Print Names

	Date/Time		Date/Time
Relinquished By: K. Trapp / K. Trapp	1050 9/27/96	Received By	
Relinquished By		Received By	
Relinquished By		Received By	
Relinquished By		Received By	

SPECIAL INSTRUCTIONS

None

(1) ICP Metals - 6010A (TAL), ICP Metals - 6010A (SW-846) (Lead, Tin), Arsenic - 7060 - (FAA), Selenium - 7740 - (PAA)

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: [illegible] Title: Sample Custodian Date/Time: 9-28-96 / 9:40 Date/Time

Bechtel Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	B96-194-8	Page 2 of 2

Collector: Al Rizzo/ Bob Fahlberg /K. Trapp	Company Contact: Bruce Ford	Telephone No.: 372-9176	Project Coordinator: Koerner, CC	Data Turnaround: 45 Days
Project Designation: ERDF Routine Groundwater Monitoring	Sampling Location: 200 West		SAF No.: B96-194	
Ice Chest No.: EH-210	Field Logbook No.: EFL-1309		Method of Shipment: Federal Express	
Shipped To: Lockheed	Offsite Property No.: W96-0-0314-10		Bill of Lading/Air Bill No.: 277 1632 866	

POSSIBLE SAMPLE HAZARDS/REMARKS: Unknown

Special Handling and/or Storage: Cool to 4C

Preservation	HCl to pH <2	None	HCl to pH <2 Cool 4C								
Type of Container	P	P	aGs*								
No. of Container(s)	4	4	5								
Volume	1L	1L	40ml								

SAMPLE ANALYSIS

				Technetium-99	Iodine-129	VOA - 8240A (TCL)							
Sample No.	Matrix*	Sample Date	Sample Time										
~~B0JDW7~~	~~Water~~	~~9/26/96~~	~~1330~~										
~~B0JDW8~~	~~Water~~	~~9/26/96~~											
B0JDW9	Water	9/26/96	1330			X ✓							
B0JDW7	W	9/26/96	1330			X ✓							

CHAIN OF POSSESSION	Sign/Print Names		
Relinquished By: K. Trapp / K. Trapp	Date/Time: 1030 9/26/96	Received By:	Date/Time:
Relinquished By:	Date/Time:	Received By:	Date/Time:
Relinquished By:	Date/Time:	Received By:	Date/Time:
Relinquished By:	Date/Time:	Received By:	Date/Time:
LABORATORY	Received By:	Title:	Date/Time:

SPECIAL INSTRUCTIONS: None

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

Appendix 5

Data Validation Supporting Documentation

GC/MS ORGANIC DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D (circled)	E
PROJECT:			DATA PACKAGE:		
VALIDATOR: J. Shanahan	LAB:		DATE: 12-2-96		
CASE:			SDG: LK8060		

ANALYSES PERFORMED

☐ CLP Volatiles	☒ SW-846 8240 (cap column)	☐ SW-846 8260 (packed column)	☐ CLP Semivolatiles	☐ SW-846 8270 (cap column)	☐ SW-846 (packed column)
☐	☐	☐	☐	☐	☐

SAMPLES/MATRIX

B0JDW7, B0JDW9 (water)

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: _____

GC/MS ORGANIC DATA VALIDATION CHECKLIST

3. INSTRUMENT TUNING AND CALIBRATION

Is the GC/MS tuning/performance check acceptable?	(Yes)	No	N/A
Are initial calibrations acceptable?	(Yes)	No	N/A
Are continuing calibrations acceptable?	(Yes)	No	N/A

Comments: _____

4. BLANKS

Were laboratory blanks analyzed?	(Yes)	No	N/A
Are laboratory blank results acceptable?	(Yes)	No	N/A
Were field/trip blanks analyzed?	(Yes)	No	N/A
Are field/trip blank results acceptable?	(Yes)	No	N/A

Comments: B0JDW9 - trip blank - all nondetect

5. ACCURACY

Were surrogates/System Monitoring Compounds analyzed?	(Yes)	No	N/A
Are surrogate/System Monitoring Compound recoveries acceptable?	(Yes)	No	N/A
Were MS/MSD samples analyzed?	(Yes)	No	N/A
Are MS/MSD results acceptable?	(Yes)	No	N/A

Comments: _____

GC/MS ORGANIC DATA VALIDATION CHECKLIST

6. PRECISION

Are MS/MSD 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. SYSTEM PERFORMANCE

Were internal standards analyzed? . . . . . (Yes) No N/A

Are internal standard areas acceptable? . . . . . (Yes) No N/A

Are internal standard retention times acceptable? . . . . . (Yes) No N/A

Comments: _____

8. COMPOUND IDENTIFICATION AND QUANTITATION

Is compound identification acceptable? . . . . . (Yes) No N/A

Is compound quantitation acceptable? . . . . . (Yes) No N/A

Comments: TIC at 8.73 min BOJDW7

9. REPORTED RESULTS AND QUANTITATION LIMITS

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

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

Do results meet the CRQLs? . . . . . (Yes) No N/A

Has the laboratory properly identified and coded all TIC? . . . (Yes) No N/A

Comments: _____

Date: 23 December 1996
To: Bechtel Hanford Inc. (technical representative)
From: A.T. Kearney, Inc.
Project: ERDF Landfill Routine Groundwater Monitoring, Round 1
Subject: Inorganics - Data Package No. LK8060-LAS (SDG No. LK8060)

INTRODUCTION

This memo presents the results of data validation on Data Package No. LK8060-LAS prepared by Lockheed Analytical Services (LAS). A list of samples validated along with the analyses reported and the method of analysis is provided in the following table.

Sample ID	Sample Date	Media	Validation Level	Analysis
B0JDW7	09/26/96	Water	D	See Note 1
B0JDW8	09/26/96	Water	D	See Note 1

1 - ICP Metals - 6010A (TAL, lead, tin); Arsenic - 7060 (FAA); Selenium - 7740 (FAA); Mercury - 7470 (CV). Mercury was not validated per BHI instructions since the analysis had not been requested.

Data validation was conducted in accordance with the WHC statement of work (WHC 1994) and validation procedures (WHC 1992a). Appendices 1 through 5 provide the following information as indicated below:

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

DATA QUALITY OBJECTIVES

- **Holding Times**

  Analytical holding times for AA and ICP metals are assessed to ascertain whether the holding time requirements were met by the laboratory. The holding time requirements is that samples must be analyzed within six months of sampling.

  Holding time requirements were met for all samples.

- **Blanks**

Calibration Blanks

A calibration blank must be analyzed immediately after each initial and continuing calibration verification. The blank must be analyzed at the beginning of the run and after the last analytical sample. In the case of positive blank results, samples with digestate concentrations (in ug/L) of less than five times the highest amount found in any of the associated blanks have had their associated values qualified as non-detected and flagged "U". Samples with concentrations of greater than five times the highest blank value do not require qualification.

In the case of negative calibration blank results, if the absolute value of any calibration blank exceeds the Instrument Detection Limit (IDL), all nondetects are qualified as estimates and flagged "UJ", and all positive results within two times the absolute value of the blank result are qualified as estimates and flagged "J". The qualification is applied only to results generated between the associated unacceptable calibration blank and the nearest acceptable blank.

Due to positive initial and continuing calibration blank results, aluminum results in samples B0JDW7 and B0JDW8 were qualified as nondetects and flagged "U".

Due to positive initial and continuing calibration blank results, chromium results in samples B0JDW7 and B0JDW8 were qualified as nondetects and flagged "U".

Due to positive continuing calibration blank results, cobalt results in samples B0JDW7 and B0JDW8 were qualified as nondetects and flagged "U".

All other initial and continuing calibration blank results were acceptable.

Preparation Blanks

At least one preparation blank, consisting of deionized distilled water processed through each sample preparation and analysis procedure, must be prepared and analyzed with every sample delivery group. In the case of positive blank results, samples with digestate concentrations (in ug/L) less than five times the preparation blank value have had their associated values qualified as non-detected and flagged "U". Samples with concentrations of greater than five times the highest blank concentration do not require qualification.

In the case of negative blank results, if the absolute value exceeds the Contract Required Detection Limit (CRDL), all nondetects are rejected and flagged "UR" and all detects that are less than ten times the absolute value of the associated preparation blank result are qualified as estimates and flagged "J". If the absolute value of the negative preparation blank is greater than the IDL and less

than or equal to the CRDL, all nondetects are qualified as estimates and flagged "UJ" and all detects less than ten times the absolute value of the blank are qualified as estimates and flagged "J". If the sample results are greater than ten times the absolute value of the preparation blank, no qualification is necessary.

Due to positive preparation blank results, the iron results in samples B0JDW7 and B0JDW8 were qualified as nondetects and flagged "U".

All other preparation blank results were acceptable.

- **Accuracy**

Matrix Spike

Matrix spike analyses are used to assess the analytical accuracy of the reported data and the effect of the matrix on the ability to accurately quantify sample concentrations. Matrix spike recoveries must fall within the range of 75% to 125%. Samples with a spike recovery of less than 30% and a sample result below the IDL are rejected and flagged "UR". Samples with a spike recovery of 30% to 74% and a sample result less than the IDL are qualified "UJ". Samples with a spike recovery of greater than 125% or less than 75% and a sample result greater than the IDL are qualified as estimates and flagged "J". Finally, for samples with a spike recovery greater than 125% and a sample result less than the IDL, no qualification is required.

All matrix spike recovery results were acceptable.

Laboratory Control Sample Recovery

The LCS monitors the overall performance of the analysis, including the sample preparation. An LCS should be digested or distilled and analyzed with every group of samples which have been prepared together. The performance criteria for solid LCS samples are established through interlaboratory studies coordinated by a certifying agency (e.g., EPA or an independent commercial supplier). One liquid LCS is digested and analyzed for each sample batch that contains water samples. The results are compared against the control limit of 80-120% as required by the WHC data validation guidelines (WHC 1992a).

All LCS results were acceptable.

- **Precision**

Laboratory Duplicate Samples

Laboratory duplicate sample analyses are used to measure laboratory precision and sample homogeneity. Results must be within RPD limits of plus or minus 35% for solid samples. If RPD values are out of specification and the sample concentration is greater than five times the CRDL, all associated sample results are qualified as estimated and flagged "J". If RPD values are plus or minus two times the CRDL and the sample concentration is less than five times the CRDL, all associated sample results are qualified as estimated and flagged "J/UJ". The performance criteria for aqueous laboratory duplicates are an RPD less than 20% for positive sample results greater than five times the CRDL or plus or minus the CRDL for positive sample results less than five times the CRDL. Sample results outside the criteria are qualified as estimates and flagged "J/UJ".

All laboratory duplicate recovery results were acceptable.

ICP Serial Dilution

The ICP serial dilution is used to determine whether significant physical or chemical interferences exist due to the sample matrix. If the sample concentration is greater than or equal to 50 times the IDL for an analyte and the %D is greater than 10%, the associated data is qualified as an estimate and flagged "J".

All ICP serial dilution results were acceptable.

- **Furnace AA Quality Control**

The post-digestion analytical spike is analyzed to determine the extent of interference in the digestate matrix. When the result of the analytical spike analyses exceeds the control window of 85 to 115 percent recovery and the absorbance of the sample is greater than fifty percent of the analytical spike absorbance, then the sample must be reanalyzed using the MSA. The duplicate injections and the analytical spike recoveries establish the precision and accuracy of the individual GFAA determinations.

Duplicate Injections

Each furnace analysis requires a minimum of two injections (burns), except for full MSA. For concentrations greater than the CRDL, the duplicate injection readings must agree within 20% RSD or CV. If these requirements are not met, the analytical sample must be rerun once (i.e., two additional burns). If the readings are then still outside the QC limits, the result is qualified as an estimate and flagged "J".

All duplicate injection results were acceptable.

Analytical Spike Recoveries

For all samples whose analytical spike results are outside the 85 to 115 percent control limit, but whose absorbances are <50 percent of the analytical spike absorbance, the samples were qualified as estimates and flagged "J". In cases where the analytical spike recovery was <10 percent, non-detect results were rejected and flagged "UR".

All analytical spike recovery results were acceptable.

Split Samples

Two pairs of field split samples were submitted to QES/LAS for analysis as shown below:

Sample No.	Split Sample No.	Well No.
B0JCW3 (QES)	B0JDW7 (LAS)	699-35-66A
B0JCW4 (QES)	B0JDW8 (LAS)	699-35-66A

The split sample results were compared using the validation guidelines for determining the RPD between a sample and its duplicate. All split sample results were within QC limits.

- **Detection Levels**

Reported detection levels are compared against CRDLs to ensure that laboratory detection levels meet the required criteria. All reported laboratory detection levels met the analyte specific CRDL.

- **Completeness**

Data Package No. LK8060-LAS (SDG No. LK8060) was submitted for validation and verified for completeness. The completion rate was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

Due to blank contamination, the aluminum, chromium and iron results in samples

B0JDW7 and B0JDW8 were qualified as nondetects and flagged "U". Due to a negative continuing calibration blank result, the cobalt result in sample numbers B0JDW7 and B0JDW8, both nondetects, were qualified as estimates and flagged "UJ". Data flagged "J" indicates that the associated concentration is an estimate, but under WHC guidelines, the data may be usable for decision-making purposes. All other validated results are considered accurate within the standard error associated with the methods.

REFERENCES

EPA, 1987, *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods*, SW-846, Third Edition, Environmental Protection Agency, Washington, D.C.

EPA, 1988a, *EPA Contract Laboratory Program Statement of Work for Organics Analyses, Multi-Media, Multi-Concentration*, U.S. Environmental Protection Agency, Washington, D.C.

EPA, 1988b, *Laboratory Data Validation Functional Guidelines for Evaluating Organics Analyses*, U.S. Environmental Protection Agency, Washington, D.C.

EPA, 1988c, *EPA Contract Laboratory Program Statement of Work for Inorganics Analyses, Multi-Media, Multi-Concentration*, U.S. Environmental Protection Agency, Washington, D.C.

EPA, 1988d, *Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analyses*, U.S. Environmental Protection Agency, Washington, D.C.

EPA, 1990, *EPA Contract Laboratory Program Statement of Work for Inorganic Analyses, Multi-media, Multi-Concentration*, U.S. Environmental Protection Agency, Washington, D.C.

EPA, 1991, *EPA Contract Laboratory Program Statement of Work for Organics Analyses, Multi-Media, Multi-Concentration*, Environmental Protection Agency, Washington, D.C.

WHC, 1992a, *Data Validation Procedures for Chemical Analyses*, WHC-SD-EN-SPP-002, Rev. 2, Westinghouse Hanford Company, October 1993.

WHC, 1992b, *Data Validation Procedure for Radiological Analyses*, WHC-SD-EN-SPP-001, Rev. 2, Westinghouse Hanford Company, 1993.

EPA, 1994, *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*, U.S. Environmental Protection Agency, Washington, D.C.

WHC, 1994, *Validation Statement of Work*, Rev.1, Westinghouse Hanford Company, 1994.

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers which may be applied by data validators in compliance with WHC guidelines are as follows:

U - Indicates the compound or analyte was analyzed for and not detected in the sample. The value reported is the sample quantitation limit corrected for sample dilution and moisture content by the laboratory.

UJ - Indicates the compound or analyte was analyzed for and not detected in the sample. Due to a QC deficiency identified during the data validation, the associated quantitation limit is an estimate.

J - Indicates the compound or analyte was analyzed for and detected. Due to a QC deficiency identified during the data validation, the associated concentration is an estimate, but the data are usable for decision-making purposes.

BJ - Applied to inorganic analyses only. Indicates the analyte concentration was greater than the IDL but less than the CRDL and is considered an estimated value.

R - Indicates the compound or analyte was analyzed for, detected, and due to an identified QC deficiency, the data are unusable.

UR - Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data is unusable due to an identified QC deficiency.

NJ - Indicates presumptive evidence of a compound at an estimated value. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).

N - Indicates presumptive evidence of a compound. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).

Appendix 2

Summary of Data Qualification

SDG: W01213	REVIEWER: RBC	DATE: 12/23/96	PAGE 1 OF 1
COMMENTS: No qualifiers assigned.			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Aluminum	U	B0JDW7, B0JDW8	Positive blank result
Chromium	U	B0JDW7, B0JDW8	Positive blank result
Cobalt	UJ	B0JDW7, B0JDW8	Negative blank result
Iron	U	B0JDW7, B0JDW8	Positive blank result

Appendix 3

Qualified Data Summary and Annotated Laboratory Reports

INORGANIC ANALYSIS, WATER MATRIX, (ug/L)

Project: BECHTEL-HANFORD																					
Laboratory: Quanterra																					
Case	SDG: LK8060																				
Sample Number		B0JDW7		B0JDW8																	
Location		699-35-66A		699-35-66A																	
				Filtered																	
Remarks		Split		Split																	
Sample Date		09/26/96		09/26/96																	
Inorganic Analytes	CRDL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Aluminium	20	63.7	U	58.1	U																
Antimony	6	4.0	U	4.0	U																
Arsenic	1	3.0	U	3.8																	
Barium	20	40.8		40.2																	
Beryllium	0.5	1.0	U	1.0	U																
Cadmium	0.5	4.0	U	4.0	U																
Calcium	500	43800		43300																	
Chromium	1	17.9	U	20.5	U																
Cobalt	5	4.0	UJ	4.0	UJ																
Copper	2.5	6.0	U	6.0	U																
Iron	10	84.7	U	60.3	U																
Lead	0.3	2.0	U	2.0	U																
Magnesium	500	13000		12800																	
Manganese	1.5	3.4		2.0	U																
Mercury	0.2	0.20	U	0.20	U																
Nickel	4	10.0	U	10.0	U																
Potassium	500	5530		5260																	
Selenium	5	4.0	U	4.0	U																
Silver	1	5.0	U	5.0	U																
Sodium	500	21500		21500																	
Thallium	1	3.0	U	3.0	U																
Vanadium	5	24.9		25.8																	
Zinc	2	9.3		3.0	U																
Tin	100	33.0	U	33.0	U																

CLP

1

INORGANIC ANALYSES DATA SHEET

CLIENT ID NO.: B0JDW7

Lab Name: L.A.S Contract: BECHTEL

Lab Code: LOCK Case No.: 928BHT SAS No.: SDG No.: L8060W

Matrix (soil/water): WATER Lab Sample ID: L8060-12

Level (low/med): LOW Date Received: 09/28/96

% Solids: 0.0

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

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	63.7	~~B~~		P	U
7440-36-0	Antimony	4.0	U		F	
7440-38-2	Arsenic	3.0	U		F	
7440-39-3	Barium	40.8	B		P	
7440-41-7	Beryllium	1.0	U		P	
7440-43-9	Cadmium	4.0	U		P	
7440-70-2	Calcium	43800			P	~~B~~ U
7440-47-3	Chromium	17.9			P	
7440-48-4	Cobalt	4.0	~~U~~		P	UJ
7440-50-8	Copper	6.0	U		P	
7439-89-6	Iron	84.7	~~B~~		P	U
7439-92-1	Lead	2.0	U		F	
7439-95-4	Magnesium	13000			P	
7439-96-5	Manganese	3.4	B		P	
7439-97-6	Mercury	0.20	U		AV	
7440-02-0	Nickel	10.0	U		P	
7440-09-7	Potassium	5530			P	
7782-49-2	Selenium	4.0	~~U~~		F	
7440-22-4	Silver	5.0	U		P	
7440-23-5	Sodium	21500		E	P	
7440-28-0	Thallium	3.0	~~U~~		F	
7440-62-2	Vanadium	24.9	B		P	~~B~~ RMC
7440-66-6	Zinc	9.3	~~B~~		P	

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

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12/14/96

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CLP

1

INORGANIC ANALYSES DATA SHEET

CLIENT ID NO.

B0JDW7

Lab Name: L.A.S_____ Contract: BECHTEL___

Lab Code: LOCK__ Case No.: 928BHT SAS No.: _____ SDG No.: L8060W

Matrix (soil/water): WATER Lab Sample ID: L8060-12__

Level (low/med): LOW__ Date Received: 09/28/96

% Solids: __0.0

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

CAS No.	Analyte	Concentration	C	Q	M
7440-31-5	Tin	33.0	U		P

Color Before: COLORLESS Clarity Before: CLEAR_ Texture: _____

Color After: COLORLESS Clarity After: CLEAR_ Artifacts: _____

Comments:

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12/18/96

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1

INORGANIC ANALYSES DATA SHEET

CLIENT ID NO.: B0JDW8

Lab Name: L.A.S Contract: BECHTEL

Lab Code: LOCK Case No.: 928BHT SAS No.: SDG No.: L8060W

Matrix (soil/water): WATER Lab Sample ID: L8060-13

Level (low/med): LOW Date Received: 09/28/96

% Solids: 0.0

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

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	58.1	B		P	U
7440-36-0	Antimony	4.0	U		F	
7440-38-2	Arsenic	3.8	B		F	
7440-39-3	Barium	40.2	B		P	
7440-41-7	Beryllium	1.0	U		P	
7440-43-9	Cadmium	4.0	U		P	
7440-70-2	Calcium	43300			P	
7440-47-3	Chromium	20.5			P	U
7440-48-4	Cobalt	4.0	U		P	UJ
7440-50-8	Copper	6.0	U		P	
7439-89-6	Iron	60.3	B		P	U
7439-92-1	Lead	2.0	U		F	
7439-95-4	Magnesium	12800			P	
7439-96-5	Manganese	2.0	U		P	
7439-97-6	Mercury	0.20	U		AV	
7440-02-0	Nickel	10.0	U		P	
7440-09-7	Potassium	5260			P	
7782-49-2	Selenium	4.0	U		F	
7440-22-4	Silver	5.0	U		P	
7440-23-5	Sodium	21500		E	P	
7440-28-0	Thallium	3.0	U		F	
7440-62-2	Vanadium	25.8	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:

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12/11/96

0030

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1

INORGANIC ANALYSES DATA SHEET

CLIENT ID NO.

B0JDW8

Lab Name: L.A.S_____ Contract: BECHTEL___

Lab Code: LOCK__ Case No.: 928BHT SAS No.: _____ SDG No.: L8060W

Matrix (soil/water): WATER Lab Sample ID: L8060-13__

Level (low/med): LOW__ Date Received: 09/28/96

% Solids: __0.0

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

CAS No.	Analyte	Concentration	C	Q	M
7440-31-5	Tin	33.0	U		P

Color Before: COLORLESS Clarity Before: CLEAR_ Texture: _____

Color After: COLORLESS Clarity After: CLEAR_ Artifacts: _____

Comments:

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12/18/96

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Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

Lockheed Environmental Systems & Technologies Co
Lockheed Analytical Services
975 Kelly Johnson Drive Las Vegas, Nevada 89119-3705
Telephone 702-361-0220 800-582-7605 Facsimile 702-361-8146

LOCKHEED MARTIN

November 18, 1996

Ms. Joan Kessner
Bechtel Hanford, Inc.
P.O. Box 969
1022 Lee Boulevard
Richland, WA 99352

RE:		
	Log-in No.:	L8060
	Quotation No.:	Q400000-B
	SAF:	B96-194
	Document File No.:	0928596A
	BHI Document File No.:	401
	SDG No.:	LK8060

The attached data report contains the analytical results of samples that were submitted to Lockheed Analytical Services on 28 September 1996.

The temperatures of the two coolers upon receipt were 2 and 3°C. Sample containers received agree with the chain-of-custody documentation. All sample containers were received intact. Samples were received in time to meet the analytical holding time requirements.

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 Mary Wolf at (702) 361-3955 ext. 311.

"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,

Mary K. Wolf
Client Services Representative

cc: Client Services
Document Control

000[illegible]

000043

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), and duplicate sample(s).

Preparation and Analysis Requirements

- Two water samples for total metals analysis. The samples were prepared and analyzed as LAS Batch 928BHT and analyzed for selected analytes as requested on the chain of custody. Samples B0JDW7 (L8060-12) and B0JDW8 (L8060-13) were used for matrix spike, duplicate, post-digestion spike and serial dilution analyses. All flags due to the performance of the above-mentioned QC samples are also associated with every sample digested with this batch.

Holding Time Requirements

- All samples were analyzed within the method-specific holding times.

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:

- In the analysis of sodium, the percent difference of serial dilution slightly exceeded the 10% control limit. This may be due to physical interferences. All sodium results are flagged with an "E".

Sample Results

- The following methods and qualifiers are reported on the basis of the techniques employed to perform the analyses:

Method 6010A "P" ICP-AES
Method 7000A "F" GFAA
Method 7470A "AV"Cold Vapor AA

Nalini Prabhakar — **Prepared By**

11/18/96 — **Date**

L 8060

Bechtel Hanford | **CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST** L8049 10/4 mk | 96-B96-194-8 | Page 1 of 2

Collector Al Rizzo/ Bob Fahlberg / K. Trapp	**Company Contact** Bruce Ford	**Telephone No.** 372-9176	**Project Coordinator** Koerner, CC	**Data Turnaround** 45 Days
Project Designation ERDF Routine Groundwater Monitoring	**Sampling Location** 200 West		**SAF No.** B96-194	
Ice Chest No. EH-210	**Field Logbook No.** EEL-1309		**Method of Shipment** Federal Express	
Shipped To Lockheed	**Offsite Property No.** W96-0-0314-10		**Bill of Lading/Air Bill No.** 277 1632 866	

POSSIBLE SAMPLE HAZARDS/REMARKS
Unknown

Special Handling and/or Storage
Cool to 4C

Preservation	HNO3 to pH <2	None	HNO3 to pH <2	Cool 4C	H2SO4 to pH <2 Cool 4C	Cool 4C	Cool 4C	H2SO4 to pH <2 Cool 4C	None	HNO3 to pH <2
Type of Container	P	P	aG	P	aGa*	P	P	P	P	P
No. of Container(s)	1	1	1	1	1	1	1	1	1	2
Volume	1L	20ml	40ml	250ml	500ml	500ml	500ml	500ml	500ml	1L
SAMPLE ANALYSIS	See item (1) in Special Instructions.	Activity Scan	Total Uranium	Alkalinity - 310.1	TOX - 9020	IC Anions - 300.0 (Chloride, Fluoride, Sulfate)	TDS - 160.1	NO2/NO3 - 353.2	Carbon-14	Gross Alpha; Gross Beta; Total Radium
Sample No. / Matrix * / Sample Date / Sample Time										
B0JDW7 / Water / 9/26/96 / 1330	X	X								
B0JDW8 / Water / 9/26/96 / 1330	X									
B0JDW9 / Water										

CHAIN OF POSSESSION

Relinquished By	Date/Time	Received By	Date/Time
K. Trapp / K. Trapp	1050 9/27/96		
Relinquished By	Date/Time	Received By	Date/Time
Relinquished By	Date/Time	Received By	Date/Time
Relinquished By	Date/Time	Received By	Date/Time

SPECIAL INSTRUCTIONS
None

(1) ICP Metals - 6010A (TAL); ICP Metals - 6010A (SW-846) (Lead, Tin); Arsenic - 7060 - (FAA); Selenium - 7740 - (FAA)

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 9-28-96 / 9:40

FINAL SAMPLE Disposal Method Disposed By Date/Time

Bechtel Hanford | **CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST** | B96-194-8 | Page 2 of 2

Collector Al Rizzo/ Bob Fahlberg /K. Trapp	**Company Contact** Bruce Ford	**Telephone No.** 372-9176	**Project Coordinator** Koerner, CC	**Data Turnaround** 45 Days
Project Designation ERDF Routine Groundwater Monitoring	**Sampling Location** 200 West		**SAF No.** B96-194	
Ice Chest No. EH-210	**Field Logbook No.** EFL-1309		**Method of Shipment** Federal Express	
Shipped To Lockheed	**Offsite Property No.** W96-0-0314-10		**Bill of Lading/Air Bill No.** 277 1632 866	

POSSIBLE SAMPLE HAZARDS/REMARKS Unknown

Special Handling and/or Storage Cool to 4C

Preservation	HCl to pH < 2	None	HCl to pH < 2 Cool 4C								
Type of Container	P	P	aGs*								
No. of Container(s)	4	4	5								
Volume	1L	1L	40ml								
SAMPLE ANALYSIS	Technetium-99	Iodine-129	VOA - 8240A (TCL)								

Sample No.	Matrix *	Sample Date	Sample Time								
~~B0JDW7~~	~~Water~~	~~9/26/96~~	~~K.T 9/26/96~~								
~~B0JDW8~~	~~Water~~	K.T 9/26/96									
B0JDW9	Water	9/26/96	1330			X					
B0JDW7	W	9/26/96	1330			X					
C.											

CHAIN OF POSSESSION

Relinquished By	Date/Time	Received By	Date/Time
K. Trapp/K. Trapp	1040 9/26/96		
Relinquished By	Date/Time	Received By	Date/Time
Relinquished By	Date/Time	Received By	Date/Time
Relinquished By	Date/Time	Received By	Date/Time

SPECIAL INSTRUCTIONS None

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 [illegible] Title Sample Custodian Date/Time 9-28-96 9:40

FINAL SAMPLE Disposal Method Disposed By Date/Time

Appendix 5

Data Validation Supporting Documentation

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	(D)	E
PROJECT: ERDF RCWM Rnd 7			DATA PACKAGE: LK8060 - LA5		
VALIDATOR: RPK		LAB: LA5		DATE: 12/6/96	
CASE:			SDG: LK8060 -LA5		

ANALYSES PERFORMED

☒ CLP/ICP	☐ CLP/GFAA	☐ CLP/Hg	☐ CLP/Cyanide	☒ Arsenic Tl ~~Se~~ GFAA	☐
☒ SW-846/ICP	☐ SW-846/GFAA	☐ SW-846/Hg	☐ SW-846 Cyanide	☐	☐

SAMPLES/MATRIX water

B0JDW7 B0JDW8

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: _____

A-19

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

3. INSTRUMENT PERFORMANCE AND CALIBRATIONS

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

Comments: Selenium 11% - all undetected No qual

4. BLANKS

Were ICB and CCB checks performed for all applicable analyses?	(Yes)	No	N/A
Are ICB and CCB results acceptable?	Yes	(No)	N/A
Were preparation blanks analyzed?	(Yes)	No	N/A
Are preparation blank results acceptable?	Yes	(No)	N/A
Were field/trip blanks analyzed?	Yes	(No)	N/A
Are field/trip blank results acceptable?	Yes	No	(N/A)

Comments: ICB/CCB Al, Cr, ~~V~~ Co — only Al qual U

~~Prep Al, Cr, Cu, Na — only Al qual U~~

Iron — U - prep blank

ICB/CCB - AL/Cr/Cobalt Cobalt-UT

AL/Cr-U

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:

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6. PRECISION

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

Comments: duplicates Al (67.1) Cr (31.5) Zinc (200) ~~Al - J (already qualified)~~ dups OK ~~Cr - J~~
Ser dil Al, Cr, Fe, K, Tin - ok

7. FURNACE AA QUALITY CONTROL

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

Comments:

8. REPORTED RESULTS AND DETECTION LIMITS

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

Comments:

BLANK AND SAMPLE DATA SUMMARY

SDG: ~~LB~~ LIC8060 | VALIDATOR: [illegible] | DATE: 12/19/96 | PAGE 1 OF 1

COMMENTS:

SAMPLE ID	COMPOUND	RESULT	Q	RT	UNITS	5X RESULT	10X RESULT	SAMPLES AFFECTED	QUALIFIER
ICB	Aluminum	56.0	B		ug/L	280		B0JBW7 B0JDW8	U
	Chromium	4.8	B		"	24		"	"
CCB1	Cobalt	-4.6	B		"			"	UJ
PBLK	Iron	39.54	B		"	197.7		"	UJ

B-E3

000028