

# START

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LK3737-LAS



Environmental Systems & Technologies Co.

Lockheed Analytical Services  
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0043535  
LK3737-LAS

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March 6, 1995

Ms. Doris Ayres  
Bechtel Hanford, Inc.  
345 Hills  
P.O. Box 969  
Richland, WA 99352



RE:	Log-in No.:	L3737
	Quotation No.:	Q400000-B
	SAF:	B94-098
	Document File No.:	0131596
	WHC Document File No.:	157
	SDG No.:	LK3737

The attached data report contains the analytical results of samples that were submitted to Lockheed Analytical Services on 31 January 1995.

The temperature of the cooler upon receipt was 2°C. Sample containers received agree with the chain-of-custody documentation. Sample containers were received intact. The vials for volatile analyses did not contain headspace. 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 Kathleen Hall at (509) 943-4423.

**Lockheed Analytical Services**

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Release of this data report has been authorized by the Laboratory Director or the Director's designee as evidenced by the following signature.

" 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 Manger or a designee, as verified by the following signature."

Sincerely,  
  
Kathleen M. Hall  
Client Services Representative

cc: Client Services  
Document Control

Lockheed Analytical Services

Log-in No.: L3737  
 Quotation No.: Q400000-B  
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## CASE NARRATIVE INORGANIC NON METALS ANALYSES

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

### Preparation and Analysis Requirements

- One soil sample was received for LK3737 and prepared as part of batch 119WH and as batch 131wh and analyzed for selected analytes as requested on the chain of custody. Quality control analyses were performed on the following samples:

#### BATCH 119WH:

Client ID	LAL #		Method
BODMX2	L3680-8	MS, DUP	9020M EXTRACTABLE ORGANIC HALIDES

#### BATCH 131WH:

Client ID	LAL #		Method
BODMX4	L3737-8	MS,DUP	300.0 CHLORIDE, FLUORIDE, NITRATE-N, NITRITE-N, ORTHOPHOSPHATE, AND SULFATE
	L3737-9	MS,DUP	353.2 NITRATE-NITRITE-NITROGEN
	L3737-6	MS,DUP	9030 SULFIDE

### Holding Time Requirements

- All samples were analyzed within the specified holding time.

### Method Blanks

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

**Lockheed Analytical Services**

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### **Internal Quality Control**

- All Internal Quality Control were within acceptance limits, except the following:

Method 9020M Extractable Organic Halides: The duplicate sample precision was outside of acceptance limits. Poor duplicate sample precision may be attributed to inhomogeneity. Therefore, some variability may exist in sample results due to this inconsistency. The affected samples are flagged with an "\*\*\*".

Method 9030 Sulfide: The matrix spike recovered outside the control limits for Sulfide. However, the acceptable recovery for the LCS for Sulfide indicated that the analytical system was operating correctly and that the out-of-control recovery may be attributed to matrix interferences. The affected samples are flagged with an "N".

Kay McCann

March 1, 1995

Prepared By \_\_\_\_\_

Date \_\_\_\_\_

## CASE NARRATIVE INORGANIC METALS ANALYSES

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

### Holding Times-

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

### Method Blanks-

The method blanks were free of contamination.

### Internal Quality Control-

All Internal Quality Control were within acceptance limits with the following exception: The matrix spike recovery for antimony (73%) was outside of the  $\pm 25\%$  acceptance limits. The recovery based on the LCS Solid (60% antimony) was within the manufacturers control limits (ERA Lot #219).

For sodium, the soil LCS (ERA Lot #219) recovery exceeded the manufacturer's advisory limits. The recovery is the result of the low true concentration (i.e., less than the reporting detection limit) for the standard. Signals detected below the RDL consists primarily of noise.

### Sample Results-

Results are reported on a dry weight basis.

Shellee McGrath  
Prepared By

February 23, 1995  
Date

**CASE NARRATIVE  
ORGANIC ANALYSES****Analytical Method 8240 Volatiles***Analytical Batch 020995-8240-J1*

The associated client sample was analyzed within holding time on February 09, 1995. All instrument tunes, initial and continuing calibrations were within QC criteria. Acetone and 2-Butanone were detected in the method blank (18944MB) at concentrations which were less than five times (5x) the Practical Quantitation Limits (PQL). One tentatively identified compound (TIC) was also detected in the method blank. All associated samples with detected target compounds and TIC as in the method blank were flagged with the qualifier "B". Surrogate recoveries were within QC limits for all associated samples analyzed. All compound recoveries in the matrix spike (18944MS), matrix spike duplicate (18944MSD) and laboratory control sample (18944LCS) were within QC limits. All relative percent differences (RPDs) between the MS and MSD recoveries were within QC limits for each spiked compound. All internal standard area counts and retention times were within QC limits for all associated samples analyzed. Target compounds and TICs were not detected in the associated client sample analyzed.

**Analytical Method 8270 Semivolatiles***Analytical Batch 020795-8270-L*

The associated client sample was extracted within holding time on February 02, 1995 and analyzed within holding time on February 07, 1995. All instrument tunes, initial and continuing calibrations were within QC criteria. Target compounds were not detected in the method blank (18560MB) but one tentatively identified compound (TIC) was detected. All associated samples with detected TIC as in the method blank were flagged with the qualifier "B". Surrogate recoveries were within QC limits for all associated samples analyzed. All compound recoveries in the matrix spike (18560MS), matrix spike duplicate (18560MSD) and laboratory control sample (18560LCS) were within QC limits. All relative percent differences (RPDs) between the MS and MSD recoveries were within QC limits for each spiked compound. All internal standard area counts and retention times were within QC limits for all associated samples analyzed. Target compounds and TICs were not detected in the associated client sample analyzed.

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**Lockheed Analytical Services**

Log-in No.: L3737  
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**Analytical Method 8080 Pesticides/PCBs**

**Analytical Batch 020895-8080-E1**

The associated client sample was extracted within holding time on February 01, 1995 and analyzed within holding time on February 09, 1995. All initial and continuing calibrations and retention time checks were within QC criteria. Target compounds were not detected in the method blank (18561MB). Surrogate recoveries were within QC limits for all associated samples analyzed. All compound recoveries in the matrix spike (18561MS), matrix spike duplicate (18561MSD) and laboratory control sample (18561LCS) were within QC limits. All relative percent differences (RPDs) between the MS and MSD recoveries were within QC limits for each spiked compound. Target compounds were not detected in the associated client sample analyzed.

Lydia M. Coleman  
Prepared By

March 6, 1995  
Date

## CASE NARRATIVE RADIOCHEMICAL ANALYSES

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

### Holding Time Requirements

All holding time requirements were met.

**Chemical Recoveries and MDAs**, when applicable, are located on the sample preparation sheets and the calculation sheets (respectively) of the attached data for each method.

### Analytical Method

#### Gamma Spectrum Analysis

The gamma spectrum analysis was performed using LAL-91-SOP-0064. No problems were encountered during analysis. All QC criteria were met.

#### Gross Alpha Beta

The gross alpha beta analysis was performed using LAL-91-SOP-0061. The alpha matrix spike was out of limits; however, since the LCS recovery was within limits, the data is considered acceptable. All other QC criteria were met.

Yvonne M. Jacoby  
Prepared By

March 6, 1995  
Date

**SAMPLE AND DATA MANAGEMENT**

**RECORD OF DISPOSITION**

ROD-895-016

Record of Disposition No.

DATE: 01/31/95

LABORATORY: Lockheed

PROJECT TITLE/NO.: 100-D Ponds/B94-098

NCR NO.: N/A

**SAMPLE IDENTIFICATION NUMBERS:**

- 1) B0DMX2, B0DMX3 (1 SDG, summary deliverable)
- 2) B0DMX4 (1 SDG, summary deliverable)

**DESCRIPTION OF EVENT:**

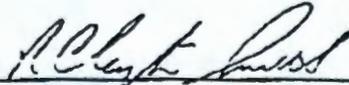
- 1) These samples were collected in the first phase of the sampling event. They were analyzed together in one batch with one set of QC.
- 2) This sample was collected in the second phase of the sampling event. It was analyzed in one batch with one set of QC.

SAF requests all data packages be standalone; both packages should be summary.

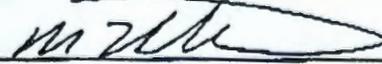
**DISPOSITION OF SAMPLES:**

- 1) Results for samples B0DMX2 and B0DMX3 should be reported in one summary data package.
- 2) Results from sample B0DMX4 should be reported in one summary data package.

**APPROVAL SIGNATURES:**

K. C. Smith/   
 OSM Project Coordinator (Print/Sign Name)

1/31/95  
 Date

M.T. Stankovich/   
 Technical Representative (Print/Sign Name)

2/13/95  
 Date

N/A  
 Quality Assurance (Print/Sign Name)

Date

**SAMPLE AND DATA MANAGEMENT**

**RECORD OF DISPOSITION**

ROD-B95-024  
Record of Disposition No.

**DATE:** 01/31/95

**LABORATORY:** Lockheed

**PROJECT TITLE/NO.:** 100-HR-3 Groundwater/B94-127;  
100-D Ponds/B94-098

**NCR NO.:** N/A

**SAMPLE IDENTIFICATION NUMBERS:**

B0DR05 (SAF-B94-127)

B0DMX2, B0DMX3, B0DMX4 (SAF-B94-098)

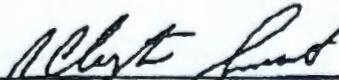
**DESCRIPTION OF EVENT:**

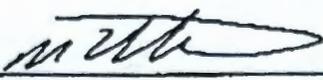
SAFs and COCs request nitrate/nitrite by method 353.1. The lab would prefer to use method 353.2.

**DISPOSITION OF SAMPLES:**

Proceed with nitrate/nitrite analyses by 353.2. Note in case narratives.

**APPROVAL SIGNATURES:**

R. C. Smith/  1/31/95  
OSM Project Coordinator (Print/Sign Name) Date

M. T. Stankovich/  2/23/95  
Technical Representative (Print/Sign Name) Date

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

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## LOCKHEED ANALYTICAL SERVICES

## COMMON IONS AND ADDITIONAL ANALYTES

## Sample Results

Client Sample ID: BODMX4	Date Collected: 27-JAN-95
Matrix: Soil	Date Received: 31-JAN-95

Constituent	Units	Method	Result	Reporting Det Limit	Data Qualifier(s)	Date Analyzed	LAS Batch ID	LAS Sample ID
Chloride	mg/kg	300.0	0.74	0.2		03-FEB-95	18718	L3737-8
Fluoride	mg/kg	300.0	1.2	0.1		13-FEB-95	18719	L3737-8
Nitrate-N	mg/kg	300.0	0.57	0.2		03-FEB-95	18716	L3737-8
Nitrite-N	mg/kg	300.0	< 0.1	0.1		03-FEB-95	18717	L3737-8
Ortho Phosphate	mg/kg	300.0	< 1	1		14-FEB-95	18720	L3737-8
Sulfate	mg/kg	300.0	46.	J		03-FEB-95	18721	L3737-8
Nitrate-Nitrite-Nitrogen	mg/kg	353.2	1.1	0.1		09-FEB-95	18722	L3737-9
Extractable Organic Halides	mg/kg	9020M	12.	6	*	02-FEB-95	18171	L3737-7
Sulfide	mg/kg	9030	< 60	60	N	03-FEB-95	18653	L3737-6

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## TOTAL METALS RESULTS

Client Sample ID: BODMX4	Date Collected: 01-27-95	Matrix: soil
LAL Batch ID(s): 131 wh	Date Received: 01-31-95	Percent Solids: 93.6

Constituents	Method	Concentration (mg/kg)	IDL (mg/kg)	RDL (mg/kg)	Data Qualifier(s)	Date Analyzed	LAL ID
Aluminum	6010	5100	15	43		02-13-95	L3737-2
Antimony	6010	<11	11	13	U N	02-13-95	L3737-2
Arsenic	7060	1.0	0.32	2.1	B	02-13-95	L3737-2
Barium	6010	110	6.4	43		02-13-95	L3737-2
Beryllium	6010	0.31	0.21	1.1	B	02-13-95	L3737-2
Cadmium	6010	<0.85	0.85	1.1	U	02-13-95	L3737-2
Calcium	6010	4700	11	1100*		02-13-95	L3737-2
Chromium	6010	4.2	0.64	2.1		02-13-95	L3737-2
Cobalt	6010	8.1	1.7	11	B	02-13-95	L3737-2
Copper	6010	15	0.85	5.3		02-13-95	L3737-2
Iron	6010	30,000	2.1	21		02-13-95	L3737-2
Lead	7421	2.1	0.43	0.64		02-14-95	L3737-2
Magnesium	6010	4500	13	1100		02-13-95	L3737-2
Manganese	6010	390	0.43	3.2		02-13-95	L3737-2
Nickel	6010	8.8	2.6	8.5		02-13-95	L3737-2
Potassium	6010	400	145	1100	B	02-13-95	L3737-2
Selenium	7740	<0.64	0.64	1.1	U	02-13-95	L3737-2
Silver	6010	<1.7	1.7	2.1	U	02-13-95	L3737-2
Sodium	6010	510	6.4	1100	B	02-13-95	L3737-2
Thallium	7841	<0.85	0.85	2.1	U	02-13-95	L3737-2
Vanadium	6010	75	2.6	11		02-13-95	L3737-2
Zinc	6010	55	2.4	4.3		02-13-95	L3737-2

Comments:

# LOCKHEED ANALYTICAL SERVICES

GC/MS FOR VOLATILE ORGANICS  
8240 VOLATILES

Client Sample ID:	BODMX4	LAL Sample ID:	L3737-3
Date Collected:	27-JAN-95	Date Received:	31-JAN-95
Date Analyzed:	09-FEB-95	Analytical Dilution:	1
Matrix:	Soil	Analytical Batch ID:	020995-8240-J1
Percent Moisture:	6.39	Preparation Dilution:	1.00

SURROGATE RECOVERY (%)		
		QC Limits
1,2-Dichloroethane-d4	98	70-121
Toluene-d8	101	81-117
Bromofluorobenzene	86	74-121

CONSTITUENT	CAS NO.	RESULT ug/kg	PRACTICAL	DATA
			QUANTITATION LIMIT ug/kg	QUALIFIER(=)
Chloromethane	74-87-3	<5.4	5.4	
Vinyl Chloride	75-01-4	<5.4	5.4	
Bromomethane	74-83-9	<5.4	5.4	
Chloroethane	75-00-3	<5.4	5.4	
Trichlorofluoromethane	75-69-4	<5.4	5.4	
Acetone	67-64-1	<11.	11.	
1,1-Dichloroethene	75-35-4	<5.4	5.4	
Carbon Disulfide	75-15-0	<5.4	5.4	
Methylene Chloride	75-09-2	<5.4	5.4	
trans-1,2-Dichloroethene	156-50-5	<5.4	5.4	
Vinyl Acetate	108-05-4	<11.	11.	
1,1-Dichloroethane	75-34-3	<5.4	5.4	
2-Butanone	78-93-3	<11.	11.	
cis-1,2-Dichloroethene	156-59-2	<5.4	5.4	
Chloroform	67-66-3	<5.4	5.4	
1,1,1-Trichloroethane	71-55-6	<5.4	5.4	
Carbon tetrachloride	56-23-5	<5.4	5.4	
1,2-Dichloroethane	107-06-2	<5.4	5.4	
Benzene	71-43-2	<5.4	5.4	
Trichloroethene	79-01-6	<5.4	5.4	
1,2-Dichloropropane	78-87-5	<5.4	5.4	
Bromodichloromethane	75-27-4	<5.4	5.4	
4-Methyl-2-Pentanone	108-10-1	<11.	11.	
cis-1,3-Dichloropropene	10061-01-5	<5.4	5.4	
Toluene	108-88-3	<5.4	5.4	
trans-1,3-Dichloropropene	10061-02-6	<5.4	5.4	
1,1,2-Trichloroethane	79-00-5	<5.4	5.4	
Tetrachloroethene	127-18-4	<5.4	5.4	
Dibromochloromethane	124-48-1	<5.4	5.4	
Chlorobenzene	108-90-7	<5.4	5.4	
Ethylbenzene	100-41-4	<5.4	5.4	
m,p-Xylene	1330-20-7	<5.4	5.4	
o-Xylene	95-47-6	<5.4	5.4	
Styrene	100-42-5	<5.4	5.4	
Bromoform	75-25-2	<5.4	5.4	
1,1,2,2-Tetrachloroethane	79-34-5	<5.4	5.4	
1,3-Dichlorobenzene	541-73-1	<5.4	5.4	
1,4-Dichlorobenzene	106-46-7	<5.4	5.4	
1,2-Dichlorobenzene	95-50-1	<5.4	5.4	

**VOLATILE ORGANIC ANALYSIS RESULTS**  
**FOR ANALYSES USING METHOD 8240**  
**TENTATIVELY IDENTIFIED COMPOUNDS**

Client Sample ID: BODMX4	LAL Sample ID: L3737-3
Date Received: 31-JAN-95	Date Analyzed: 09-FEB-95
Matrix: SOIL	Dilution Factor: 1
Analytical Batch: 020995-8240-J1	QC Batch ID: 020995-8240

Tentatively Identified Compound	Estimated Concentration ( $\mu\text{g}/\text{Kg}$ )	Retention Time (minutes)	Data Qualifier(s)
NONE DETECTED			

# LOCKHEED ANALYTICAL SERVICES

SEMI-VOLATILE ORGANICS BY GC/MS  
8270 SEMI-VOLATILES

Client Sample ID:	BODMX4	LAL Sample ID:	L3737-4
Date Collected:	27-JAN-95	Date Received:	31-JAN-95
Date Analyzed:	07-FEB-95	Date Extracted:	02-FEB-95
Matrix:	Soil	Analytical Batch ID:	020795-8270-L
QC Group:	8270 SEMI-VOLATILES_18560	Analytical Dilution:	1
Percent Moisture:	6.39	Preparation Dilution:	0.996

SURROGATE RECOVERY (%)		
		QC Limits
2-Fluorophenol	71	25-121
Phenol-d5	76	24-113
Nitrobenzene-d5	62	23-120
2-Fluorobiphenyl	69	30-115
2,4,6-Tribromophenol	79	19-122
Terphenyl-d14	89	18-137

CONSTITUENT	CAS NO.	RESULT ug/Kg	PRACTICAL QUANTITATION LIMIT ug/Kg	DATA QUALIFIER(S)
Phenol	108-95-2	<700	700	
bis(2-Chloroethyl) ether	111-44-4	<700	700	
2-Chlorophenol	95-57-8	<700	700	
1,3-Dichlorobenzene	541-73-1	<700	700	
1,4-Dichlorobenzene	106-46-7	<700	700	
Benzyl alcohol	100-51-6	<1400	1400	
1,2-Dichlorobenzene	95-50-1	<700	700	
2-Methylphenol	95-48-7	<700	700	
bis(2-chloroisopropyl) ether	39638-32-9	<700	700	
4-Methylphenol	106-44-5	<700	700	
N-Nitroso-di-n-propylamine	621-64-7	<700	700	
Hexachloroethane	67-72-1	<700	700	
Nitrobenzene	98-95-3	<700	700	
Isophorone	78-59-1	<700	700	
2-Nitrophenol	88-75-5	<700	700	
2,4-Dimethylphenol	105-67-9	<700	700	
Benzoic acid	65-85-0	<3500	3500	
bis(2-Chloroethoxy) methane	111-91-1	<700	700	
2,4-Dichlorophenol	120-83-2	<700	700	
1,2,4-Trichlorobenzene	120-82-1	<700	700	
Naphthalene	91-20-3	<700	700	
4-Chloroaniline	106-47-8	<1400	1400	
Hexachlorobutadiene	87-68-3	<700	700	
4-Chloro-3-methylphenol	59-50-7	<1400	1400	
2-Methylnaphthalene	91-57-6	<700	700	
Hexachlorocyclopentadiene	77-47-4	<700	700	
2,4,6-Trichlorophenol	88-06-2	<700	700	
2,4,5-Trichlorophenol	95-95-4	<700	700	
2-Chloronaphthalene	91-58-7	<700	700	
2-Nitroaniline	88-74-4	<3500	3500	
Dimethylphthalate	131-11-3	<700	700	
Acenaphthylene	208-96-8	<700	700	
2,6-Dinitrotoluene	606-20-2	<700	700	
3-Nitroaniline	99-09-2	<3500	3500	
Acenaphthene	83-32-9	<700	700	
2,4-Dinitrophenol	51-28-5	<3500	3500	
4-Nitrophenol	100-02-7	<3500	3500	

# LOCKHEED ANALYTICAL SERVICES

SEMI-VOLATILE ORGANICS BY GC/MS  
8270 SEMI-VOLATILES

Client Sample ID:	BODMX4	LAL Sample ID:	L3737-4
Date Collected:	27-JAN-95	Date Received:	31-JAN-95
Date Analyzed:	07-FEB-95	Date Extracted:	02-FEB-95
Matrix:	Soil	Analytical Batch ID:	020795-8270-L
QC Group:	8270 SEMI-VOLATILES_18560	Analytical Dilution:	1
Percent Moisture:	6.39	Preparation Dilution:	0.996

CONSTITUENT	CAS NO.	RESULT ug/Kg	PRACTICAL	DATA
			QUANTITATION LIMIT ug/Kg	QUALIFIER(S)
Dibenzofuran	132-64-9	<700	700	
2,4-Dinitrotoluene	121-14-2	<700	700	
Diethylphthalate	84-66-2	<700	700	
4-Chlorophenyl-phenylether	7005-72-3	<700	700	
Fluorene	86-73-7	<700	700	
4-Nitroaniline	100-01-6	<3500	3500	
4,6-Dinitro-2-methylphenol	534-52-1	<3500	3500	
N-Nitrosodiphenylamine (1)	86-30-6	<700	700	
4-Bromophenyl-phenylether	101-55-3	<700	700	
Hexachlorobenzene	118-74-1	<700	700	
Pentachlorophenol	87-86-5	<3500	3500	
Phenanthrene	85-01-8	<700	700	
Anthracene	120-12-7	<700	700	
Carbazole	86-74-8	<700	700	
Di-n-butylphthalate	84-74-2	<700	700	
Fluoranthene	206-44-0	<700	700	
Pyrene	129-00-0	<700	700	
Butylbenzylphthalate	85-68-7	<700	700	
3,3'-Dichlorobenzidine	91-94-1	<1400	1400	
Benzo (a) anthracene	56-55-3	<700	700	
Chrysene	218-01-9	<700	700	
bis (2-Ethylhexyl) phthalate	117-81-7	<700	700	
Di-n-octylphthalate	117-84-0	<700	700	
Benzo (b) fluoranthene	205-99-2	<700	700	
Benzo (k) fluoranthene	207-08-9	<700	700	
Benzo (a) pyrene	50-32-8	<700	700	
Indeno (1,2,3-cd) pyrene	193-39-5	<700	700	
Dibenz (a,h) anthracene	53-70-3	<700	700	
Benzo (g,h,i) perylene	191-24-2	<700	700	



# LOCKHEED ANALYTICAL SERVICES

ORGANOCHLORINE PESTICIDES/PCBS BY GC/ECD  
8080 PEST/PCBS

Client Sample ID:	BODMX4	LAL Sample ID:	L3737-5
Date Collected:	27-JAN-95	Date Received:	31-JAN-95
Date Analyzed:	09-FEB-95	Analytical Batch ID:	020895-8080-E-1
Date Extracted:	01-FEB-95	Analytical Dilution:	1
Matrix:	Soil	Preparation Dilution:	0.99
Percent Moisture:	6.39	QC Group:	8080 PEST/PCBS_18561

SURROGATE RECOVERY (%)		
		QC Limits
TCMX	66	60-150
DCB	86	60-150

CONSTITUENT	CAS NO.	RESULT ug/Kg	PRACTICAL QUANTITATION LIMIT ug/Kg	DATA QUALIFIER (s)
A-BHC	319-84-6	<1.9	1.9	
B-BHC	319-85-7	<1.9	1.9	
G-BHC	58-89-9	<1.9	1.9	
D-BHC	319-86-8	<1.9	1.9	
Heptachlor	76-44-8	<1.9	1.9	
Aldrin	309-00-2	<1.9	1.9	
Heptachlor Epoxide	1024-57-3	<1.9	1.9	
G-Chlordane	5103-74-2	<1.9	1.9	
Endosulfan I	959-98-8	<1.9	1.9	
A-Chlordane	5103-71-9	<1.9	1.9	
4,4'-DDE	72-55-9	<3.6	3.6	
4,4'-DDT	50-29-3	<3.6	3.6	
Dieldrin	60-57-1	<3.6	3.6	
Endrin	72-20-8	<3.6	3.6	
Endosulfan II	33213-65-9	<3.6	3.6	
4,4'-DDD	72-54-8	<3.6	3.6	
Endrin Aldehyde	7421-36-3	<3.6	3.6	
Endosulfan Sulfate	1031-07-8	<3.6	3.6	
Methoxychlor	72-43-5	<19.	19.	
Toxaphene	8001-35-2	<190	190	
PCB-1016	12674-11-2	<14.	14.	
PCB-1221	11104-28-2	<14.	14.	
PCB-1232	11141-16-5	<14.	14.	
PCB-1242	53469-21-9	<14.	14.	
PCB-1248	12672-29-6	<14.	14.	
PCB-1254	11097-69-1	<14.	14.	
PCB-1260	11096-82-5	<14.	14.	
Chlordane (Technical)	57-74-9	<44.	44.	

## RAD DATA REPORT (ra01)

Bechtel Hanford, Inc. \* Richland, WA

Bechtel Hanford Project (Project BECHTEL-HANFORD)

Client Sample ID: BODMX4

LAL Sample ID: L3737-10

Date Collected: 27-JAN-95

Date Received: 31-JAN-95

Matrix: Soil

Login Number: L3737

Constituent	Analyzed	Batch	Activity	Error	MDA	DataQual	Units
Gross Alpha	23-FEB-95	GR ALP/BETA LAL-0061_18960	6.8	4.6	5.9	C	pCi/g
Gross Beta	23-FEB-95	GR ALP/BETA LAL-0061_18960	31.8	5.2	5.7	C	pCi/g

## RAD DATA REPORT (ra01)

Bechtel Hanford, Inc. \* Richland, WA

Bechtel Hanford Project (Project BECHTEL-HANFORD)

Client Sample ID: BODMX4

LAL Sample ID: L3737-11

Date Collected: 27-JAN-95

Date Received: 31-JAN-95

Matrix: Soil

Login Number: L3737

Constituent	Analyzed	Batch	Activity	Error	MDA	DataQual	Units
Ac-228(Ra-228)	16-FEB-95	GAMMA SPEC LAL-0064_18954	0.445	0.095	0.12		pCi/g
Co-58	16-FEB-95	GAMMA SPEC LAL-0064_18954	0.014	0.015	0.023		pCi/g
Co-60	16-FEB-95	GAMMA SPEC LAL-0064_18954	-0.003	0.011	0.029		pCi/g
Cs-137	16-FEB-95	GAMMA SPEC LAL-0064_18954	0.021	0.023	0.031		pCi/g
Eu-152	16-FEB-95	GAMMA SPEC LAL-0064_18954	0.021	0.037	0.12		pCi/g
Eu-154	16-FEB-95	GAMMA SPEC LAL-0064_18954	-0.025	0.049	0.12		pCi/g
Eu-155	16-FEB-95	GAMMA SPEC LAL-0064_18954	0.040	0.046	0.076		pCi/g
Fe-59	16-FEB-95	GAMMA SPEC LAL-0064_18954	-0.003	0.024	0.056		pCi/g
Pb-212	16-FEB-95	GAMMA SPEC LAL-0064_18954	0.428	0.067	0.051		pCi/g
Pb-214(Ra-226)	16-FEB-95	GAMMA SPEC LAL-0064_18954	0.313	0.055	0.057		pCi/g
Ra-226(GAMMA)	16-FEB-95	GAMMA SPEC LAL-0064_18954	0.70	0.42	0.57		pCi/g
U-235(GAMMA)	16-FEB-95	GAMMA SPEC LAL-0064_18954	-0.026	0.094	0.16		pCi/g

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LOGIN CHAIN OF CUSTODY REPORT (ln01)  
Jan 31 1995, 12:29 pm

Login Number: L3737  
Account: 596 Bechtel Hanford, Inc. \* Richland, WA  
Project: BECHTEL-HANFORD Bechtel Hanford Project

Laboratory Sample Number	Client Sample Number	Collect Date	Receive Date	Due PR Date
L3737-1 TEMP 2 Location: 157 Soil 4 S SCREENING	BODMX4	27-JAN-95	31-JAN-95	07-MAR-95
		Hold:26-JUL-95		
L3737-2 TEMP 2; METALS=As,Pb,Se,Tl Location: 157 Soil 4 S 6010 ICP METALS Soil 4 S 7000 FURNACE METALS Soil 4 S PERCENT SOLIDS	BODMX4	27-JAN-95	31-JAN-95	07-MAR-95
		Hold:26-JUL-95		
		Hold:26-JUL-95		
		Hold:10-FEB-95		
L3737-3 TEMP 2 Location: 157 Soil 4 S 8240 VOLATILES	BODMX4	27-JAN-95	31-JAN-95	07-MAR-95
		Hold:10-FEB-95		
L3737-4 TEMP 2 Location: 157 Soil 4 S 8270 SEMI-VOLATILES	BODMX4	27-JAN-95	31-JAN-95	07-MAR-95
		Hold:10-FEB-95		
L3737-5 TEMP 2 Location: 157 Soil 4 S 8080 PEST/PCBS	BODMX4	27-JAN-95	31-JAN-95	07-MAR-95
		Hold:10-FEB-95		
L3737-6 TEMP 2 Location: 157 Soil 4 S 9030 SULFIDE	BODMX4	27-JAN-95	31-JAN-95	07-MAR-95
		Hold:03-FEB-95		
L3737-7 TEMP 2 Location: 157 Soil 4 S 9020M EOX	BODMX4	27-JAN-95	31-JAN-95	07-MAR-95
		Hold:03-FEB-95		
L3737-8 TEMP 2 Location: 157 Soil 4 S 300.0 CHLORIDE Soil 4 S 300.0 FLUORIDE Soil 4 S 300.0 NITRATE Soil 4 S 300.0 NITRITE	BODMX4	27-JAN-95	31-JAN-95	07-MAR-95
		Hold:24-FEB-95		
		Hold:29-JAN-95		

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LOGIN CHAIN OF CUSTODY REPORT (ln01)  
Jan 31 1995, 12:29 pm

Login Number: L3737  
Account: 596 Bechtel Hanford, Inc. \* Richland, WA  
Project: BECHTEL-HANFORD Bechtel Hanford Project

Laboratory Sample Number	Client Sample Number	Collect Date	Receive Date	Due PR Date
Soil	4 S 300.0 PHOSPHATE			
Soil	4 S 300.0 SULFATE	Hold:24-FEB-95		
L3737-9 TEMP 2 Location: 157	BODMX4	27-JAN-95	31-JAN-95	07-MAR-95
Soil	4 S 353.2 NITRATE	Hold:17-FEB-95		
L3737-10 TEMP 2 Location: 157	BODMX4	27-JAN-95	31-JAN-95	07-MAR-95
Soil	4 S GR ALP/BETA LAL-0061	Hold:26-JUL-95		
L3737-11 TEMP 2 Location: 157	BODMX4	27-JAN-95	31-JAN-95	07-MAR-95
Soil	4 S GAMMA SPEC LAL-0064	Hold:26-JUL-95		
L3737-12 Location:	REPORT TYPE	31-JAN-95	31-JAN-95	07-MAR-95
Water	1 S EDD - DISK DEL.			
Water	1 S GC2			
Water	1 S INORG TYPE 2 RPT +			

Signature: *[Handwritten Signature]* 01E  
Date: 1-31-95

013159

# L3737

**CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST**

Page 1 of 1

<b>Westinghouse Hanford Company</b>	<b>Collector:</b> <i>D. St. John / Doug Bauer's / WS Simpson</i>	<b>Company Contact:</b> <i>ARC SMITH/MT STANKOVICH</i>	<b>Telephone No.:</b> (509)372-2537 / (509)376-2493
<b>Project Designation:</b> 100-D PONDS PHASE II SAMPLING	<b>Sampling Location:</b> 100-D	<b>Field Logbook No.:</b> <i>EFL-1133</i>	<b>SAF No.:</b> B94-098
<b>Ice Chest No.:</b> <i>SML-272</i>	<b>Offsite Property No.:</b> <i>W95-0-0204-9</i>	<b>Method of Shipment:</b> FEDERAL EXPRESS	
<b>Shipped To:</b> LOCKHEED	<b>Bill of Lading/Air Bill No.:</b> <i>2904617737</i>		

**Date Turnaround**

Priority

Normal

Possible Sample Hazards/Remarks	Preservative	COOL 4	COOL 4	COOL 4	COOL 4	COOL 4	COOL 4	COOL 4	COOL 4	COOL 4	COOL 4	COOL 4	COOL 4	COOL 4
	Type of Container	aG	Gs	aG	aG	aG	aGs	aG	aG	aG	P/G	P/G	P/G	P/G
	No. of Container(s)	1	1	1	1	1	1	1	1	1	1	1	1	1
	Volume	125ml	125ml	125ml	125ml	40ml	40ml	125ml	125ml	500ml*	20ml	20ml	20ml	20ml
<b>SAMPLE ANALYSIS</b>	ICP METALS-TAL/AA MATALS (As, Pb, Se, Tl)	VOA-TCL	SEMI-VOA-TCL	PCB/PEST	SULFIDE	TOX	ANIONS-IC(F, Cl, SO4, PO4, NO2, NO3)	NO2-NO3	TOTAL ALPHA/BETA, GEA	ACTIVI-TY SCAN	total alpha beta GEA			

Sample No.	Matrix*	Date Sampled	Time Sampled	ICP METALS-TAL/AA MATALS (As, Pb, Se, Tl)	VOA-TCL	SEMI-VOA-TCL	PCB/PEST	SULFIDE	TOX	ANIONS-IC(F, Cl, SO4, PO4, NO2, NO3)	NO2-NO3	TOTAL ALPHA/BETA, GEA	ACTIVI-TY SCAN
<i>FORM 2 BODMX4 11/27/95 MB</i>	s	1-27-95	<i>11:30 AM</i> 1-27-95	X	X	X	X	X	X	X	X	X	X

<b>CHAIN OF POSSESSION</b>	<b>Sign/Print Names</b>	<b>SPECIAL INSTRUCTIONS</b>	<b>Matrix*</b>
Relinquished By: <i>David St. John</i>	Date/Time: <i>11/30/95</i>	Received By: <i>ERC</i>	Date/Time: <i>1-30-95</i>
Relinquished By: <i>ERC</i>	Date/Time: <i>8:00</i>	Received By: <i>Bill W. ...</i>	Date/Time: <i>1-30-95</i>
Relinquished By:	Date/Time:	Received By:	Date/Time:
Relinquished By:	Date/Time:	Received By:	Date/Time:
<b>LABORATORY SECTION</b>	Received By: <i>Ann L. Walker</i>	Title: <i>Sample Custodian</i>	Date/Time: <i>1-31-95/0630</i>
<b>FINAL SAMPLE DISPOSITION</b>	Disposal Method:	Disposed By:	Date/Time:

013154

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SAMPLE STATUS REPORT FOR N 4327. RAD SCREEN BODMT4 TIME: 1/30/95 7:45  
DISPATCHED: 1/10/95 10:29 SAMPLE HAS NOT BEEN SLURPED  
RECEIVED: 1/28/95 22:40

EXT.	DETER.	RESULTS OR STATUS	OUT OF RANGE?	GOOD ANS?	CHARGE CODE
****	*****	*****	***	***	*****
4271	TOT-ACT	< 5.00000E 01 pCi/G	N	Y	XR5442

END OF REPORT

*BODMX4  
BW  
1-30-95*

# Sample Login

## Login Review Checklist

Lot Number L3737

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

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

### Sample Summary Report

Yes No

N/A

- |    |   |          |   |   |
|----|---|----------|---|---|
| 1. | Are all sample IDs correct?   | <u>X</u> | — | — |
| 2. | Are all samples present?  | <u>X</u> | — | — |
| 3. | Are all matrices correct?<br><small>(e.g., TCLP analyses should be on a TCLP leachate, field blanks should be water)</small>  | <u>X</u> | — | — |
| 4. | Are all analyses on the chain of custody/login quotation included?  | <u>X</u> | — | — |
| 5. | Are analyses logged in for the correct container?<br><small>(e.g., analyses requiring preservation logged in for a preserved container and vice versa)</small>  | <u>X</u> | — | — |
| 6. | Are samples logged in according to laboratory batching procedures?<br><small>(e.g., TCLP regular leaching and associated metals/semivolatile organics should be logged in on the same bottle)</small> | <u>X</u> | — | — |

### Login Chain of Custody Report

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

### Sample Receiving Checklist

- |    |  |
|----|--|
| 1. | Are any discrepancies between the chain of custody and the login noted? <u>  </u> <u>  </u> <u>NH</u>                            |
|    | <small>(e.g., client IDs different on chains of custody and bottle labels, samples not sent, samples lost from breakage)</small> |

M. M. [Signature]

1-31-95

Paula [Signature]

1-31-95

Primary review signature

Date

Secondary review signature

Date

Figure 1

### SAMPLE CHECK-IN LIST

(1 Per Shipping Container)

Date/Time Received 1-31-95 / 0830 Client Name Westinghouse  
 Project/Client # B94-098 Batch or Case # N/A  
 Cooler ID (if noted on outside of cooler) N/A

1. Condition of shipping container? good
2. Custody Seals on cooler intact? Yes  No
3. Custody Seals dated and signed? Yes  No
4. Chain of Custody record is taped on inside of cooler lid? Yes  No
5. Vermiculite/packing material is: Wet  Dry
6. Each sample is in a plastic bag? Yes  No
7. Number of sample containers in cooler: \_\_\_\_\_
8. Samples have:
 

<input checked="" type="checkbox"/> tape	<input type="checkbox"/> hazard labels
<input checked="" type="checkbox"/> custody seals	<input checked="" type="checkbox"/> appropriate sample labels
9. Samples are:
 

<input checked="" type="checkbox"/> in good condition	<input type="checkbox"/> leaking
<input type="checkbox"/> broken	<input type="checkbox"/> have air bubbles
<input type="checkbox"/> other	
10. Coolant Present? Yes  No  Sample Temperature 2°C
11. The following paperwork should be accounted for (N/A if not applicable):
 

Chain of Custody #(s) N/A

Request for Analysis #(s) N/A

Airbill # 290 461737 Carrier FedX
12. Have any anomalies been identified above? Yes  No
13. Memos have been initiated for all anomalies identified above? Yes  No

Printed Name/Signature Anthony Miller Date/Time 1-31-95/0830



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

Client Sample Number	LAL Sample Number	SDG Number	Matrix	Method
BODMX4 ↓	L3737-1		Soil	• SCREENING-
	L3737-2		Soil	• 6010 ICP METALS
	L3737-2		Soil	• 7000 FURNACE ME-
	L3737-2		Soil	• PERCENT SOLIDS-
	L3737-3		Soil	• 8240 VOLATILES-
	L3737-4		Soil	• 8270 SEMI-VOLAT
	L3737-5		Soil	• 8080 PEST/PCBS-
	L3737-6		Soil	• 9030 SULFIDE -
	L3737-7		Soil	• 9020M EOX -
	L3737-8		Soil	• 300.0 CHLORIDE -
	L3737-8		Soil	• 300.0 FLUORIDE-
L3737-8		Soil	• 300.0 NITRATE -	
L3737-8		Soil	• 300.0 NITRITE -	
L3737-8		Soil	• 300.0 PHOSPHATE	
L3737-8		Soil	• 300.0 SULFATE-	
L3737-9		Soil	• 353.2 NITRATE-	
L3737-10		Soil	• GR ALP/BETA LAL-	
L3737-11		Soil	• GAMMA SPEC LAL-	
REPORT TYPE _	L3737-12		Water	EDD - DISK DEL.
	L3737-12		Water	GC2 -
	L3737-12		Water	INORG TYPE 2 RP