

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

LK4651

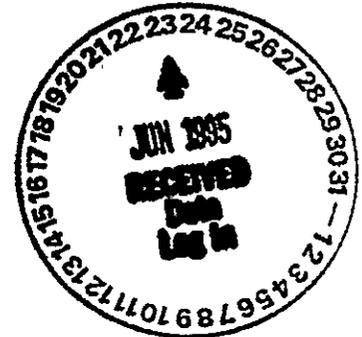
0044019

LOCKHEED MARTIN 

June 19, 1995

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

RE: Log-in No.:	L4651
Quotation No.:	Q400000-B
SAF:	B95-063
Document File No.:	0601596
BHI Document File No.:	229
SDG No.:	LK4651



The attached data report contains the analytical results of samples that were submitted to Lockheed Analytical Services on 1 June 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. 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.



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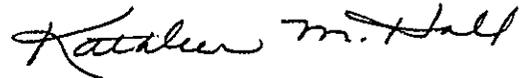
**Lockheed Analytical Services**

Log-in No.: L4651  
Quotation No.: Q400000-B  
SAF: B95-063  
Document File No.: 0601596  
BHI Document File No.:229  
SDG No.: LK4651  
Page1

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

**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**

- Two water samples were received for LK4651 and analyzed in batch 610 bh2 for selected analytes as requested on the chain of custody. Quality control analysis was performed on the following sample:

Client ID	LAL #		Method
BOFMW5	L4651-18	MS, DUP	D1385 Hydrazine
BOFMW5	L4651-15	MS, DUP	300.0 Fluoride, Nitrate-Nitrogen
BOFMW5	L4651-14	MS, DUP	350.1 Ammonia
BOFMW5	L4651-21	MS, DUP	415.1 Total Organic Carbon
BOFMW5	L4651-16	MS, DUP	9010 Total Cyanide
BOFMW5	L4651-22	MS, DUP	9020 Total Organic Halides

**Holding Time Requirements**

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

**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 exception:

For Method D1385 Hydrazine, the matrix spike recovery exceeded the 75-125% acceptance limit. However, the LCS recovery was within criteria (110.8%) indicating the system was under control. The associated samples are flagged with an "N".

**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).

**Preparation and Analysis Requirements**

All samples were received on June 1, 1995. The samples were logged in as L4651 and were prepared and analyzed in batch 601 bh2.

**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.

Shelley McGrath  
Prepared By

June 15, 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** can be found on the preparation and calculation worksheets, respectively, of the attached raw data.

**Analytical Method**

**Uranium Isotopic**

The uranium isotopic analysis was performed using LAL-91-SOP-0108. All samples were analyzed on analytical batch #23919, which contains an MBB and LCS. Data from sample 23919DUP1 will be reported in place of sample BOFMW4 due to a chemical recovery of 5%. No duplicate data (DUP) will be reported for this batch. All other QC criteria for this batch were met.

Yvonne M. Jacoby  
Prepared By

June 19, 1995  
Date

**Lockheed Analytical Services**  
**DATA QUALIFIERS FOR INORGANIC ANALYSES**

[Revised 08/28/92]

<b>For Use on the Analytical Data Reporting Forms</b>	
<b>B</b>	<i>For CLP Analyses Only</i> – Reported value is less than the contract required detection limit (CRDL) but greater than or equal to the instrument detection limit (IDL).
<b>C</b>	<i>For Routine, Non-CLP Analyses Only</i> – Any constituent that was also detected in the associated blank whose concentration was greater than the reporting detection limit (RDL).
<b>D</b>	Presence of high levels of interfering constituents required dilution of sample which increased the RDL by the dilution factor.
<b>E</b>	Estimated value due to presence of interference.
<b>H</b>	Sample analysis performed outside of method-or client-specified maximum holding time requirement.
<b>M</b>	<i>For CLP Analyses Only</i> – Duplicate injection precision criterion was not met.
<b>N</b>	Matrix spike recovery exceeded acceptance limits.
<b>S</b>	Reported value was determined from the method of standard addition.
<b>U</b>	<i>For CLP Reporting Only</i> – Constituent was analyzed for but not detected (sample quantitation must be corrected for dilution and percent moisture).
<b>W</b>	<i>For AAS Only</i> – Post-digestion spike for Furnace AAS did not meet acceptance criteria and sample absorbance is less than 50% of spike absorbance.
<b>X, Y, or Z</b>	Analyst-defined qualifier.
<b>*</b>	Relative percent difference (RPD) for duplicate analysis exceeded acceptance limits.
<b>+</b>	Correlation coefficient (r) for the MSA is less than 0.995.
<b>For Use on the QC Data Reporting Forms</b>	
<b>a<sup>1</sup></b>	The spike recovery and/or RPD for matrix spike and matrix spike duplicates cannot be evaluated due to insufficient spiking level compared to the elevated sample analyte concentration.
<b>b<sup>1</sup></b>	The RPD cannot be computed because the sample and/or duplicate concentration was below the RDL.

<sup>1</sup> Used as footnote designations on the QC summary form.

**Lockheed Analytical Services**  
**DATA QUALIFIERS FOR RADIOCHEMICAL ANALYSES**  
*[Revised 08/28/92]*

<b>For Use on the Analytical Data Reporting Forms</b>	
<b>B</b>	Any constituent that was also detected in the associated blank whose concentration was greater than the reporting detection limit (RDL) and/or minimum detectable activity (MDA).
<b>C</b>	Presence of high TDS in sample required reduction of sample size which increased the MDA.
<b>D</b>	Constituent detected in the diluted sample.
<b>E</b>	Constituent concentration exceeded the calibration or attenuation curve range.
<b>F</b>	<i>For Alpha Spectrometry Only</i> -- FWHM exceeded acceptance limits.
<b>H</b>	Sample analysis performed outside of method-specified maximum holding time requirement.
<b>Y</b>	Chemical yield exceeded acceptance limits.
<b>For Use on the QC Data Reporting Forms</b>	
<b>*</b>	QC data (i.e., percent recovery data for laboratory control standard and matrix spike; and RPD for replicate analyses) exceeded acceptance limits.
<b>a<sup>1</sup></b>	The spike recovery and/or RPD for matrix spike and duplicates cannot be evaluated due to insufficient spiking level compared to the elevated sample analyte concentration.
<b>b<sup>1</sup></b>	The RPD cannot be computed because the sample and/or duplicate concentration was below the MDA.

<sup>1</sup> Used as foot note designations on the QC summary form.

*Revision Copy*

LOCKHEED ANALYTICAL SERVICES  
 LOGIN CHAIN OF CUSTODY REPORT (ln01)  
 Jun 08 1995, 01:57 pm

Login Number: L4651  
 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
L4651-1 temp 2; SAF# B95-063 Location: EXPENDED Water 1 S SCREENING	BOFMW4	30-MAY-95	01-JUN-95	16-JUN-95
			Hold:26-NOV-95	
L4651-2 temp 2; SAF# B95-063 Location: RFG01-43D Water 1 S SCREENING	BOFMW5	30-MAY-95	01-JUN-95	16-JUN-95
			Hold:26-NOV-95	
L4651-3 temp 2; SAF# B95-063 Location: 156RAD1-05 Water 1 S 350.1 NH3/N	BOFMW4	30-MAY-95	01-JUN-95	16-JUN-95
			Hold:27-JUN-95	
L4651-4 temp 2; SAF# B95-063 Location: 153 Water 1 S 300.0 FLUORIDE Water 1 S 300.0 NITRATE Water 1 S 300.0 SULFATE	BOFMW4	30-MAY-95	01-JUN-95	16-JUN-95
			Hold:27-JUN-95	
			Hold:01-JUN-95	
			Hold:27-JUN-95	
* L4651-5 temp 2; SAF# B95-063 Location: 153 Water 1 S 9010 CYANIDE TOTAL	BOFMW4	30-MAY-95	01-JUN-95	16-JUN-95
			Hold:13-JUN-95	
L4651-6 temp 2; SAF# B95-063 Location: 156RAD1-05	BOFMW4	30-MAY-95	01-JUN-95	16-JUN-95
L4651-7 temp 2; SAF# B95-063 Location: 156-023D Water 1 S D1385 HYDRAZINE	BOFMW4	30-MAY-95	01-JUN-95	16-JUN-95
			Hold:27-JUN-95	
L4651-8 temp 2; SAF# B95-063, ICP=Ba, Cd, Cr, Cu, Pb, Mn, Ni, V Location: 156-020 Water 1 S 6010 ICP METALS	BOFMW4	30-MAY-95	01-JUN-95	16-JUN-95
			Hold:26-NOV-95	
L4651-9 temp 2; SAF# B95-063 Location: 156-020	BOFMW4	30-MAY-95	01-JUN-95	16-JUN-95

9010 CYANIDE T+A CHANGED TO 9010 CYANIDE TOT

L4651-5, 16

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*RE*

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LOCKHEED ANALYTICAL SERVICES  
 LOGIN CHAIN OF CUSTODY REPORT (1n01)  
 Jun 08 1995, 01:57 pm

Login Number: L4651  
 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
Water 1 S 7470	MERCURY	Hold:27-JUN-95		
L4651-10 temp 2; SAF# B95-063 Location: 156RAD1-05	BOFMW4	30-MAY-95	01-JUN-95	16-JUN-95
Water 1 S 415.1	CARBON (TOC)	Hold:27-JUN-95		
L4651-11 temp 2; SAF# B95-063 Location: 121	BOFMW4	30-MAY-95	01-JUN-95	16-JUN-95
Water 1 S 9020	TOX	Hold:27-JUN-95		
L4651-12 temp 2; SAF# B95-063 Location: 156RAD1-05	BOFMW4	30-MAY-95	01-JUN-95	16-JUN-95
L4651-13 temp 2; SAF# B95-063 Location: 155	BOFMW4	30-MAY-95	01-JUN-95	16-JUN-95
Water 1 S U-ISOTOPIC	LAL-0108	Hold:26-NOV-95		
L4651-14 temp 2; SAF# B95-063 Location: RFG01-07A	BOFMW5	30-MAY-95	01-JUN-95	16-JUN-95
Water 1 S 350.1	NH3/N	Hold:27-JUN-95		
L4651-15 temp 2; SAF# B95-063 Location: 121	BOFMW5	30-MAY-95	01-JUN-95	16-JUN-95
Water 1 S 300.0	FLUORIDE	Hold:27-JUN-95		
Water 1 S 300.0	NITRATE	Hold:01-JUN-95		
Water 1 S 300.0	SULFATE	Hold:27-JUN-95		
* L4651-16 temp 2; SAF# B95-063 Location: 133	BOFMW5	30-MAY-95	01-JUN-95	16-JUN-95
Water 1 S 9010	CYANIDE TOTAL	Hold:13-JUN-95		
L4651-17 temp 2; SAF# B95-063 Location: RFG01-07A	BOFMW5	30-MAY-95	01-JUN-95	16-JUN-95

LOCKHEED ANALYTICAL SERVICES  
 LOGIN CHAIN OF CUSTODY REPORT (ln01)  
 Jun 08 1995, 01:57 pm

Login Number: L4651  
 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
L4651-18 temp 2; SAF# B95-063 Location: 121 Water 1 S D1385 HYDRAZINE	BOFMW5	30-MAY-95	01-JUN-95	16-JUN-95
		Hold:27-JUN-95		
L4651-19 temp 2; SAF# B95-063, ICP=Ba, Cd, Cr, Cu, Pb, Mn, Ni, V Location: RFG01-07B Water 1 S 6010 ICP METALS	BOFMW5	30-MAY-95	01-JUN-95	16-JUN-95
		Hold:26-NOV-95		
L4651-20 temp 2; SAF# B95-063 Location: RFG01-07B Water 1 S 7470 MERCURY	BOFMW5	30-MAY-95	01-JUN-95	16-JUN-95
		Hold:27-JUN-95		
L4651-21 temp 2; SAF# B95-063 Location: RFG01-07A Water 1 S 415.1 CARBON (TOC)	BOFMW5	30-MAY-95	01-JUN-95	16-JUN-95
		Hold:27-JUN-95		
L4651-22 temp 2; SAF# B95-063 Location: 121 Water 1 S 9020 TOX	BOFMW5	30-MAY-95	01-JUN-95	16-JUN-95
		Hold:27-JUN-95		
L4651-23 temp 2; SAF# B95-063 Location: RFG01-07A	BOFMW5	30-MAY-95	01-JUN-95	16-JUN-95
L4651-24 temp 2; SAF# B95-063 Location: 155 Water 1 S U-ISOTOPIC LAL-0108	BOFMW5	30-MAY-95	01-JUN-95	16-JUN-95
		Hold:26-NOV-95		
L4651-25 SAF# B95-063 Location: Water 1 S EDD - DISK DEL. Water 1 S INORG TYPE 2 RPT Water 1 S RAD RPT TYPE 2	REPORT TYPE	01-JUN-95	01-JUN-95	16-JUN-95

Signature: \_\_\_\_\_

Date: \_\_\_\_\_

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LOCKHEED ANALYTICAL SERVICES  
 LOGIN CHAIN OF CUSTODY REPORT (ln01)  
 Jun 01 1995, 02:07 pm

Login Number: L4651  
 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
L4651-1 temp 2; SAF# B95-063 Location: 157 Water 1 S SCREENING	BOFMW4	30-MAY-95	01-JUN-95	16-JUN-95
		Hold:26-NOV-95		
L4651-2 temp 2; SAF# B95-063 Location: 157 Water 1 S SCREENING	BOFMW5	30-MAY-95	01-JUN-95	16-JUN-95
		Hold:26-NOV-95		
L4651-3 temp 2; SAF# B95-063 Location: 157 Water 1 S 350.1 NH3/N	BOFMW4	30-MAY-95	01-JUN-95	16-JUN-95
		Hold:27-JUN-95		
L4651-4 temp 2; SAF# B95-063 Location: 157 Water 1 S 300.0 FLUORIDE Water 1 S 300.0 NITRATE Water 1 S 300.0 SULFATE	BOFMW4	30-MAY-95	01-JUN-95	16-JUN-95
		Hold:27-JUN-95		
		Hold:01-JUN-95		
		Hold:27-JUN-95		
L4651-5 temp 2; SAF# B95-063 Location: 157 Water 1 S 9010 CYANIDE T + A	BOFMW4	30-MAY-95	01-JUN-95	16-JUN-95
		Hold:13-JUN-95		
L4651-6 temp 2; SAF# B95-063 Location: 157	BOFMW4	30-MAY-95	01-JUN-95	16-JUN-95
L4651-7 temp 2; SAF# B95-063 Location: 157 Water 1 S D1385 HYDRAZINE	BOFMW4	30-MAY-95	01-JUN-95	16-JUN-95
		Hold:27-JUN-95		
L4651-8 temp 2; SAF# B95-063, ICP=Ba, Cd, Cr, Cu, Pb, Mn, Ni, V Location: 157 Water 1 S 6010 ICP METALS	BOFMW4	30-MAY-95	01-JUN-95	16-JUN-95
		Hold:26-NOV-95		
L4651-9 temp 2; SAF# B95-063 Location: 157	BOFMW4	30-MAY-95	01-JUN-95	16-JUN-95

LOCKHEED ANALYTICAL SERVICES  
 LOGIN CHAIN OF CUSTODY REPORT (ln01)  
 Jun 01 1995, 02:07 pm

Login Number: L4651  
 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
Water 1 S 7470	MERCURY	Hold:27-JUN-95		
L4651-10 temp 2; SAF# B95-063 Location: 157	BOFMW4	30-MAY-95	01-JUN-95	16-JUN-95
Water 1 S 415.1	CARBON (TOC)	Hold:27-JUN-95		
L4651-11 temp 2; SAF# B95-063 Location: 157	BOFMW4	30-MAY-95	01-JUN-95	16-JUN-95
Water 1 S 9020	TOX	Hold:27-JUN-95		
L4651-12 temp 2; SAF# B95-063 Location: 157	BOFMW4	30-MAY-95	01-JUN-95	16-JUN-95
L4651-13 temp 2; SAF# B95-063 Location: 157	BOFMW4	30-MAY-95	01-JUN-95	16-JUN-95
Water 1 S U-ISOTOPIC	LAL-0108	Hold:26-NOV-95		
L4651-14 temp 2; SAF# B95-063 Location: 157	BOFMW5	30-MAY-95	01-JUN-95	16-JUN-95
Water 1 S 350.1	NH3/N	Hold:27-JUN-95		
L4651-15 temp 2; SAF# B95-063 Location: 157	BOFMW5	30-MAY-95	01-JUN-95	16-JUN-95
Water 1 S 300.0	FLUORIDE	Hold:27-JUN-95		
Water 1 S 300.0	NITRATE	Hold:01-JUN-95		
Water 1 S 300.0	SULFATE	Hold:27-JUN-95		
L4651-16 temp 2; SAF# B95-063 Location: 157	BOFMW5	30-MAY-95	01-JUN-95	16-JUN-95
Water 1 S 9010	CYANIDE T + A	Hold:13-JUN-95		
L4651-17 temp 2; SAF# B95-063 Location: 157	BOFMW5	30-MAY-95	01-JUN-95	16-JUN-95

LOCKHEED ANALYTICAL SERVICES  
 LOGIN CHAIN OF CUSTODY REPORT (ln01)  
 Jun 01 1995, 02:07 pm

Login Number: L4651  
 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
L4651-18 temp 2; SAF# B95-063 Location: 157 Water 1 S D1385 HYDRAZINE	BOFMW5	30-MAY-95	01-JUN-95	16-JUN-95
		Hold: 27-JUN-95		
L4651-19 temp 2; SAF# B95-063, ICP=Ba, Cd, Cr, Cu, Pb, Mn, Ni, V Location: 157 Water 1 S 6010 ICP METALS	BOFMW5	30-MAY-95	01-JUN-95	16-JUN-95
		Hold: 26-NOV-95		
L4651-20 temp 2; SAF# B95-063 Location: 157 Water 1 S 7470 MERCURY	BOFMW5	30-MAY-95	01-JUN-95	16-JUN-95
		Hold: 27-JUN-95		
L4651-21 temp 2; SAF# B95-063 Location: 157 Water 1 S 415.1 CARBON (TOC)	BOFMW5	30-MAY-95	01-JUN-95	16-JUN-95
		Hold: 27-JUN-95		
L4651-22 temp 2; SAF# B95-063 Location: 157 Water 1 S 9020 TOX	BOFMW5	30-MAY-95	01-JUN-95	16-JUN-95
		Hold: 27-JUN-95		
L4651-23 temp 2; SAF# B95-063 Location: 157	BOFMW5	30-MAY-95	01-JUN-95	16-JUN-95
L4651-24 temp 2; SAF# B95-063 Location: 157 Water 1 S U-ISOTOPIC LAL-0108	BOFMW5	30-MAY-95	01-JUN-95	16-JUN-95
		Hold: 26-NOV-95		
L4651-25 SAF# B95-063 Location: Water 1 S EDD - DISK DEL. Water 1 S INORG TYPE 2 RPT Water 1 S RAD RPT TYPE 2	REPORT TYPE	01-JUN-95	01-JUN-95	16-JUN-95

Signature: *mmll* 016  
 Date: 6-1-95

0601596

**L4651**

<b>Westinghouse Hanford Company</b>	<b>CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST</b>	<b>009190</b>
		Page 1 of 1

Collector: HULSE, KARL	Company Contact SMITH, R.C. (CLAY)	Telephone No. 372-2537
SAF Number B95-063	Customer Contact SMITH, DAVID S.	Telephone No. 376-5903
Project Designation 183-H Basin Drive Well Water		Ice Chest # <i>SML-472</i>
Shipped To (Lab) Lockheed	Method of Shipment <i>FEDERAL EXPRESS</i>	Bill of Lading/Air Bill No.
Protocol RCRA	Data Turnaround EXPEDITED	Offsite Property No.

Sample No.	Matrix *	Date	Time	No/Type Container	Sample Analysis	Perservative
BOFMW4	W	5/30/95	1420	(1) 1000 Poly	AMMONIA (EPA 350.1)	H2SO4 / 4 deg.C
BOFMW4	W	5/30/95	1420	(1) 500 Poly	ANIONS (EPA 300.0), (IC) include only F, SO4, NO3	Cool 4 deg. C
BOFMW4	W	5/30/95	1420	<i>2 700 5-30-95</i> (X) 1000 Poly	Cyanide (9010)	NaOH Cool 4 deg C
BOFMW4	W	5/30/95	1420	(1) 125 aG	Hydrazine (D1385)	H2SO4
BOFMW4	W	5/30/95	1430	(1) 500 aG	ICP Metals (6010), Include only Barium, Cadmium, Chromium, Copper, Lead, Manganese, Nickle, Vanadium	HNO3
BOFMW4	W	5/30/95	1430	(1) 500 aG	Mercury (7470)	HNO3
BOFMW4	W	5/30/95	1420	(1) 20 Poly	Rad Screen (Lab specific)	None
BOFMW4	W	5/30/95	1420	(1) 125 Poly	TOC (EPA 415.1)	H2SO4 Cool 4 deg. C
BOFMW4	W	5/30/95	1415	<i>2 700 5-30-95</i> (X) 250 aGs	TOX (9020)	H2SO4 / 4 deg. C
BOFMW4	W	5/30/95	1445	(1) 4000 aG	U-234,-235,-238 (LAL-91-SOP-0108)	HNO3 Cool 4 Deg. C

<p>POSSIBLE SAMPLE HAZARDS/REMARKS</p> <p style="text-align: center; font-size: 2em;"><b>PRIORITY TURNAROUND</b></p>	<p>SPECIAL INSTRUCTIONS</p> <p>Sample analysis for nitrate by EPA 300.0 is being requested for <u>information only</u>. The ERC Contractor acknowledges the 48-hour holding time will not be met.</p>
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Relinquished By <i>KB Hulse</i>	Date/Time <i>5-31-95 1100</i>	Received By	Date/Time	<p>Matrix *</p> <p>S = Soil                      DS = Drum Solids</p> <p>SE = Sediment              DL = Drum Liquids</p> <p>SO = Solid                    T = Tissue</p> <p>SL = Sludge                  WI = Wipe</p> <p>W = Water                    L = Liquid</p> <p>O = Oil                        V = Vegetation</p> <p>A = Air                         X = Other</p>
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 SECTION	Received By <i>M. Worth</i>	Title <i>Sample Custodian</i>	Date/Time <i>6-1-95/0900</i>	
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time	

0601596

<b>Westinghouse Hanford Company</b>	<b>CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST</b>	<b>009191</b>
		Page 1 of 1

Collector: <b>HULSE, KARL</b>	Company Contact <b>SMITH, R.C. (CLAY)</b>	Telephone No. <b>372-2537</b>
SAF Number <b>B95-063</b>	Customer Contact <b>SMITH, DAVID S.</b>	Telephone No. <b>376-5903</b>
Project Designation <b>183-H Basin Drive Well Water</b>		Ice Chest # <b>SML-472</b>
Shipped To (Lab) <b>Lockheed</b>	Method of Shipment <b>FEDERAL EXPRESS</b>	Bill of Lading/Air Bill No.
Protocol <b>RCRA</b>	Data Turnaround <b>EXPEDITED</b>	Offsite Property No.

Sample No.	Matrix *	Date	Time	No/Type Container	Sample Analysis	Preservative
BOFMW5	W	5/30/95	1420	(1) 1000 Poly	AMMONIA (EPA 350.1)	H2SO4 / 4 deg. C
BOFMW5	W	5/30/95	1420	(1) 500 Poly	ANIONS (EPA 300.0), (IC) include only F, SO4, NO3	Cool 4 deg. C
BOFMW5	W	5/30/95	1420	<del>(1) 1000 Poly</del> <i>2 700 5-30-95</i> <i>(X) 1000 Poly</i>	Cyanide (9010)	NaOH Cool 4 deg. C
BOFMW5	W	5/30/95	1420	(1) 125 aG	Hydrazine (D1385)	H2SO4
BOFMW5	W	5/30/95	1430	(1) 500 aG	ICP Metals (6010), Include only Barium, Cadmium, Chromium, Copper, Lead, Manganese, Nickel, Vanadium	HNO3
BOFMW5	W	5/30/95	1430	(1) 500 aG	Mercury (7470)	HNO3
BOFMW5	W	5/30/95	1420	(1) 20 Poly	Rad Screen (Lab specific)	None
BOFMW5	W	5/30/95	1420	(1) 125 Poly	TOC (EPA 415.1)	H2SO4 Cool 4 deg. C
BOFMW5	W	5/30/95	1415	<del>(1) 250 aGs</del> <i>2 700 5-30-95</i> <i>(X) 250 aGs</i>	TOX (9020)	H2SO4 / 4 deg. C
BOFMW5	W	5/30/95	1445	(1) 4000 aG	U-234,-235,-238 (LAL-91-SOP-0108)	HNO3 Cool 4 Deg. C

<b>POSSIBLE SAMPLE HAZARDS/REMARKS</b>  <h1 style="margin: 0;">PRIORITY TURNAROUND</h1>	<b>SPECIAL INSTRUCTIONS</b> Sample analysis for nitrate by EPA 300.0 is being requested for <u>information only</u> . The ERC Contractor acknowledges the 48-hour holding time will not be met.
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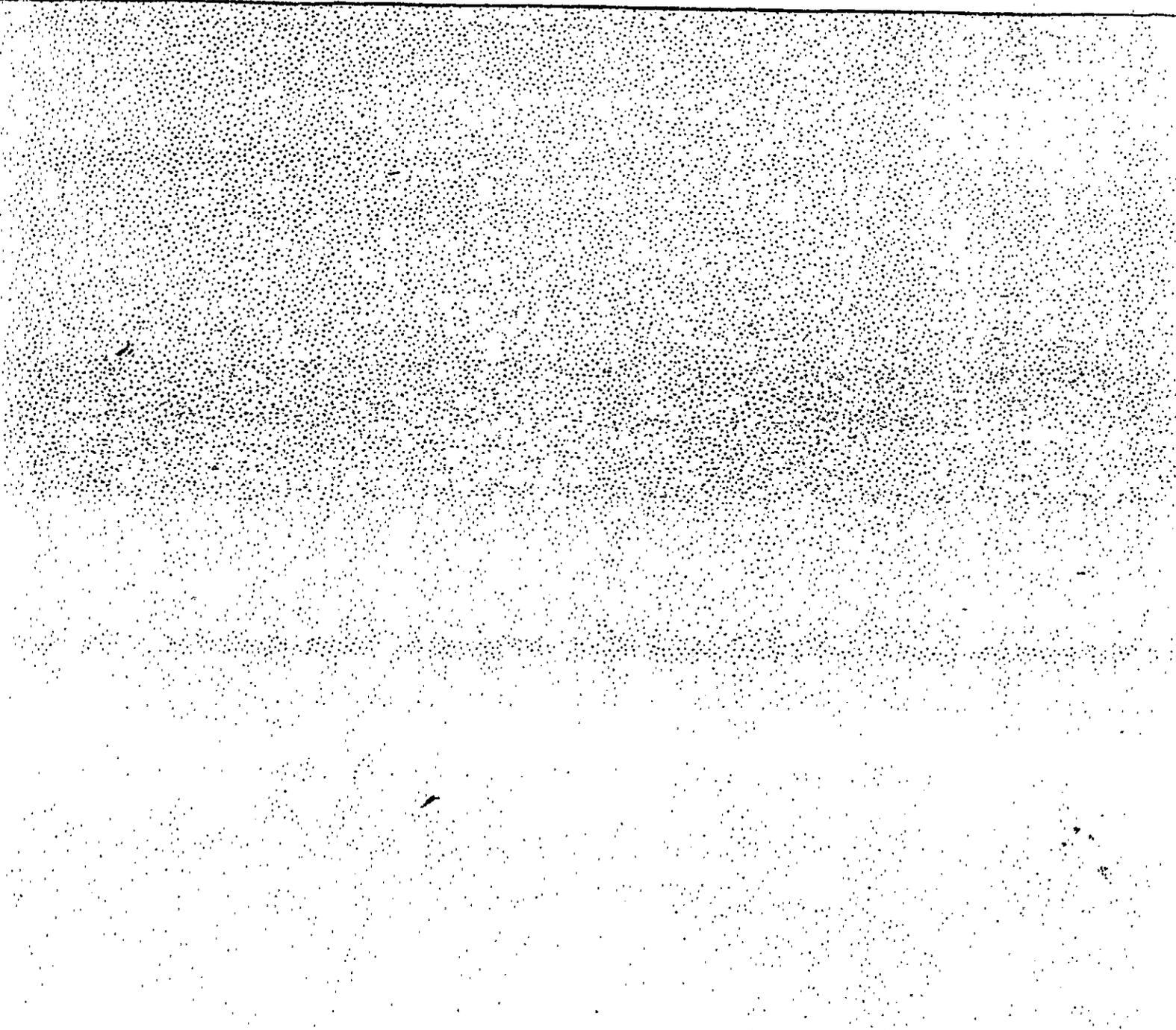
Relinquished By <i>KB Hulse</i>	Date/Time <i>5-31-95 1100</i>	Received By	Date/Time	<b>Matrix *</b> S = Soil                      DS = Drum Solids SE = Sediment              DL = Drum Liquids SO = Solid                    T = Tissue SL = Sludge                  WI = Wipe W = Water                    L = Liquid O = Oil                        V = Vegetation A = Air                        X = Other
Relinquished By	Date/Time	Received By	Date/Time	
Relinquished By	Date/Time	Received By	Date/Time	
<b>LABORATORY SECTION</b>	Received By <i>Moyelle</i>	Title <i>Sample Custodian</i>	Date/Time <i>6-1-95 / oqu</i>	
<b>FINAL SAMPLE DISPOSITION</b>	Disposal Method	Disposed By	Date/Time	

0601594

AMPLE STATUS REPORT FOR N 5424. RAD SCREEN DOGMW4 TIME: 5/31/95 8:25D  
ISPACHED: 5/30/95 8:20 SAMPLE HAS NOT BEEN SLURPED PAGE 1  
RECEIVED: 5/31/95 6:20

EXT.	DETER.	RESULTS OR STATUS	OUT OF GOOD CHARGE
***	*****	*****	RANGE? ANS? CODE
4271	TOT ACT	< 5.0000E 01 pCi/g	N Y XR5728

END OF REPORT



0601596

AMPLE STATUS REPORT FOR N 5425. RAD SCREEN BOFMW5 TIME: 5/31/95 8:25D  
ISPACHED: 5/30/95 8:20 SAMPI F HAS NOT BEEN SLURPED PAGE 1  
RECEIVED: 5/31/95 6:20

EXT.	DETER.	RESULTS OR STATUS	OUT OF RANCE?	GOOD ANS?	CHARGE CODE
4271	TOT-ACT	< 5.000000 U1 pCi/G	N	Y	XR5728

END OF REPORT

020

0601590

WHC/BHI SAMPLE CHECK-IN LIST

Date/Time Received: 6-1-95 / 0900 SDG #: MA

Work Order Number: MA SAF #: 695-063

Shipping Container ID: SML-412 Chain of Custody # 009190 and 009191

- 1. Custody Seals on shipping container intact? Yes  No
- 2. Custody Seals dated and signed? Yes  No
- 3. Chain-of-Custody record present? Yes  No
- 4. Cooler temperature 2°C
- 5. Vermiculite/packing materials is Wet  Dry
- 6. Number of samples in shipping container: 24
- 7. Sample holding times exceeded: Yes  No
- 8. Samples have: X tape X hazard labels  
X custody seals X appropriate sample labels
- 9. Samples are: X in good condition        leaking  
       broken        have air bubbles
- 10. Were any anomalies identified in sample receipt? Yes  No
- 11. Description of anomalies (include sample numbers):

Sample Custodian: AMiller On: 6-1-95

Telephoned To: Rathless Hall On 6-1-95 BY Anthony R Miller

# LOCKHEED MARTIN



## Sample Login Login Review Checklist

Lot Number L4651

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 effective login review, at a minimum, five reports from 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

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

### LOGIN CHAIN OF CUSTODY

	<u>YES</u>	<u>NO</u>	<u>N/A</u>	<u>Comment</u>
1. Are the collect, receive, and due dates correct for every sample?	<u>X</u>	___	___	_____
2. Have all appropriate comments been indicated in the comment section?	<u>X</u>	___	___	_____

### SAMPLE RECEIVING CHECKLIST

	<u>YES</u>	<u>NO</u>	<u>N/A</u>	<u>Comment</u>
1. Are all discrepancies between the COC and the login noted (if applicable)?	___	___	<u>X</u>	_____

Arthur Miller  
primary review signature

6-1-95  
date

Paul J. Dady  
secondary review signature

6-01-95  
date

022

060159

Lockheed Analytical Services  
Sample Receiving Checklist

Client Name: Westhouse

Job No. L4651

Cooler ID:

COOLER CONDITION UPON RECEIPT

Temperature of cooler upon receipt:

2°C

temperature of temp. blank upon receipt:

	Yes	No	* Comments/Discrepancies
--	-----	----	--------------------------

custody seals intact

X

chain of custody present

X

blue ice (or equiv.) present/frozen

X

rad survey completed

X

SAMPLE CONDITION UPON RECEIPT

	Yes	No	* Comments/Discrepancies
--	-----	----	--------------------------

all bottles labeled

X

samples intact

X

proper container used for sample type

X

sample volume sufficient for analysis

X

proper pres. indicated on the COC

X

VOA's contain headspace

NA

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

NA

MISCELLANEOUS ITEMS

	Yes	No	* Comments/Discrepancies
--	-----	----	--------------------------

samples with short holding times

X

Nitrate

samples to subcontract

X

ADDITIONAL COMMENTS/DISCREPANCIES

Completed by / date:

Murillo 6-1-95

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

060154

023

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

Client Sample Number	LAL Sample Number	SDG Number	Matrix	Method
BOFMW4	L4651-1		Water	SCREENING
	L4651-3		Water	350.1 NH3/N
	L4651-4		Water	300.0 FLUORIDE
	L4651-4		Water	300.0 NITRATE
	L4651-4		Water	300.0 SULFATE
	L4651-5		Water	9010 CYANIDE T
	L4651-7		Water	D1385 HYDRAZINE
	L4651-8		Water	6010 ICP METALS
	L4651-9		Water	7470 MERCURY
	L4651-10		Water	415.1 CARBON (T
	L4651-11		Water	9020 TOX
	L4651-13		Water	U-ISOTOPIC LAL
	BOFMW5	L4651-2		Water
L4651-14			Water	350.1 NH3/N
L4651-15			Water	300.0 FLUORIDE
L4651-15			Water	300.0 NITRATE
L4651-15			Water	300.0 SULFATE
L4651-16			Water	9010 CYANIDE T
L4651-18			Water	D1385 HYDRAZINE
L4651-19			Water	6010 ICP METALS
L4651-20			Water	7470 MERCURY
L4651-21			Water	415.1 CARBON (T
L4651-22			Water	9020 TOX
L4651-24		Water	U-ISOTOPIC LAL	
REPORT TYPE	L4651-25		Water	EDD - DISK DEL.
	L4651-25		Water	INORG TYPE 2 RP
	L4651-25		Water	RAD RPT TYPE 2

LOCKHEED ANALYTICAL SERVICES

Sample Results

Client Sample ID: BOFMW4	Date Collected: 30-MAY-95
Matrix: Water	Date Received: 01-JUN-95
Percent Solids: N/A	

Constituent	Units	Method	Result	Project Reporting Limit	Data Qualifier(s)	Date Analyzed	LAS Batch ID	LAS Sample ID
Fluoride	mg/L	300.0	12.	1.0	D(1:10)	05-JUN-95	23663	L4651-4
Nitrate-N	mg/L	300.0	35.	0.020		01-JUN-95	23662	L4651-4
Sulfate	mg/L	300.0	29.	0.10		01-JUN-95	23664	L4651-4
Ammonia Nitrogen	mg/L	350.1	1.5	0.050		12-JUN-95	23666	L4651-3
Total Organic Carbon	mg/L	415.1	29.	10.	D(1:10)	13-JUN-95	23669	L4651-10
Cyanide Total	mg/L	9010	0.039	0.020	D(1:2)	08-JUN-95	23969	L4651-5
TOTAL ORGANIC HALIDE	mg/L	9020	<0.020	0.040	<del>D</del> U	08-JUN-95	23670	L4651-11
Hydrazine	ug/L	D1385	< 5.0	25.	NU	09-JUN-95	23667	L4651-7

*km 6-16-95*

LOCKHEED ANALYTICAL SERVICES

Sample Results

Client Sample ID: B0FMW5	Date Collected: 30-MAY-95
Matrix: Water	Date Received: 01-JUN-95
Percent Solids: N/A	

Constituent	Units	Method	Result	Project Reporting Limit	Data Qualifier(s)	Date Analyzed	LAS Batch ID	LAS Sample ID
Fluoride	mg/L	300.0	12.	1.0	D(1:10)	05-JUN-95	23663	L4651-15
Nitrate-N	mg/L	300.0	35.	0.020		01-JUN-95	23662	L4651-15
Sulfate	mg/L	300.0	28.	0.10		01-JUN-95	23664	L4651-15
Ammonia Nitrogen	mg/L	350.1	1.5	0.050		12-JUN-95	23666	L4651-14
Total Organic Carbon	mg/L	415.1	29.	10.	D(1:10)	13-JUN-95	23669	L4651-21
Cyanide Total	mg/L	9010	0.097	0.020	D(1:2)	08-JUN-95	23969	L4651-16
TOTAL ORGANIC HALIDE	mg/L	9020	< 0.020	0.040	U	08-JUN-95	23670	L4651-22
Hydrazine	ug/L	D1385	< 5.0	25.	NU	09-JUN-95	23667	L4651-18

## TOTAL METALS RESULTS

Client Sample ID: BOFMW4	Date Collected: 05-30-95	Matrix: water
LAL Batch ID(s): 601 bh2	Date Received: 06-01-95	

Constituents	Method	Concentration (mg/L)	IDL (mg/L)	RDL (mg/L)	Data Qualifier(s)	Date Analyzed	LAL ID
Barium	6010	0.041	0.01	0.20	B	06-09-95	L4651-8
Cadmium	6010	<0.003	0.003	0.005	U	06-09-95	L4651-8
Chromium	6010	0.012	0.004	0.010		06-09-95	L4651-8
Copper	6010	0.13	0.002	0.025		06-09-95	L4651-8
Lead	6010	<0.034	0.034	0.10	U	06-09-95	L4651-8
Manganese	6010	0.022	0.002	0.015		06-09-95	L4651-8
Mercury	7470	<0.0002	0.0002	0.0002	U	06-14-95	L4561-9
Nickel	6010	0.015	0.012	0.040	B	06-09-95	L4651-8
Vanadium	6010	0.014	0.003	0.050	B	06-09-95	L4651-8

<b>Comments:</b>
------------------

## TOTAL METALS RESULTS

Client Sample ID: BOFMW5	Date Collected: 05-30-95	Matrix: water
LAL Batch ID(s): 601 bh2	Date Received: 06-01-95	

Constituents	Method	Concentration (mg/L)	IDL (mg/L)	RDL (mg/L)	Data Qualifier(s)	Date Analyzed	LAL ID
Barium	6010	0.041	0.01	0.20	B	06-09-95	L4651-19
Cadmium	6010	<0.003	0.003	0.005	U	06-09-95	L4651-19
Chromium	6010	0.0087	0.004	0.010	B	06-09-95	L4651-19
Copper	6010	0.12	0.002	0.025		06-09-95	L4651-19
Lead	6010	<0.034	0.034	0.10	U	06-09-95	L4651-19
Manganese	6010	0.021	0.002	0.015		06-09-95	L4651-19
Mercury	7470	<0.0002	0.0002	0.0002	U	06-14-95	L4651-20
Nickel	6010	<0.012	0.012	0.040	U	06-09-95	L4651-19
Vanadium	6010	0.011	0.003	0.050	B	06-09-95	L4651-19

**Comments:**

LOCKHEED ANALYTICAL SERVICES

RAD DATA REPORT (ra01)

Bechtel Hanford, Inc. \* Richland, WA

Bechtel Hanford Project (Project BECHTEL-HANFORD)

Client Sample ID: B0FMW4

LAL Sample ID: L4651-13

Date Collected: 30-MAY-95

Date Received: 01-JUN-95

Matrix: Water

Login Number: L4651

Constituent	Analyzed	Batch	Activity	Error	MDA	DataQual	Units
U-233/4	13-JUN-95	U-ISOTOPIC LAL-0108_23919	12.0	1.2	0.16		pCi/L
U-235	13-JUN-95	U-ISOTOPIC LAL-0108_23919	1.20	0.34	0.066		pCi/L
U-238	13-JUN-95	U-ISOTOPIC LAL-0108_23919	11.7	1.2	0.16		pCi/L

LOCKHEED ANALYTICAL SERVICES

RAD DATA REPORT (ra01)

Bechtel Hanford, Inc. \* Richland, WA

Bechtel Hanford Project (Project BECHTEL-HANFORD)

Client Sample ID: B0FMW5

LAL Sample ID: L4651-24

Date Collected: 30-MAY-95

Date Received: 01-JUN-95

Matrix: Water

Login Number: L4651

Constituent	Analyzed	Batch	Activity	Error	MDA	DataQual	Units
U-233/4	13-JUN-95	U-ISOTOPIC LAL-0108_23919	59.0	4.1	0.28		pCi/L
U-235	13-JUN-95	U-ISOTOPIC LAL-0108_23919	9.5	1.2	0.24		pCi/L
U-238	13-JUN-95	U-ISOTOPIC LAL-0108_23919	62.5	4.3	0.19		pCi/L



# Certificate

THIS IS A PHOTOCOPY OF THE CERTIFICATE WHICH IS BEING MAILED TO YOU UNDER SEPARATE COVER.

## Standard Reference Material 4321B Alpha-Particle Solution Standard

Radionuclide	Natural Uranium
Source identification	SRM 4321B
Source description	Liquid in 5-mL flame-sealed glass ampoule
Source mass	Approximately 5.3 grams
Solution composition	Natural uranium in 1-molar nitric acid
Uranium concentration	0.01998 g g <sup>-1</sup>
Reference time	1200 EST January 1, 1992
Radioactivity concentration	U-238: 246.7 Bq g <sup>-1</sup> U-235: 11.35 Bq g <sup>-1</sup> U-234: 237.6 Bq g <sup>-1</sup>
Overall uncertainty	U-238: 0.87 percent <sup>(1)</sup> * U-235: 0.96 percent U-234: 1.86 percent
Measuring instrument	Mass spectrometer, silicon surface-barrier detector, and 4π(α+β) liquid-scintillation counter <sup>(2)</sup>
Half life	U-238: (4.468 ± 0.005) × 10 <sup>9</sup> years <sup>(3)</sup> U-235: (7.037 ± 0.011) × 10 <sup>8</sup> years U-234: (2.454 ± 0.006) × 10 <sup>5</sup> years

Total U = 495.7 Bq/g

This standard reference material was prepared in the Physics Laboratory, Ionizing Radiation Division, Radioactivity Group, Dale D. Hoppes, Group Leader.

Gaithersburg, MD  
February, 1992

William P. Reed, Chief  
Standard Reference Materials Program

\*Notes on back

AA9804

# INITIAL STANDARD DILUTION RECORD

Standard Information:			
Isotope:	<u>U-238</u>	Vendor:	<u>NIST</u>
Activity of Standard Received:	<u>0.035338 uCi</u>	Vendor I.D. #	<u></u>
Weight of Standard Received (g):	<u>5.3 g</u>	LAL I.D. #:	<u>AA9804</u>
Standard Activity (pCi/g):	<u>6.67E+03 pCi/g</u>	NIST Traceable ?	<u>yes</u>
Half-life in Years or Days:	<u>4.468E+09 yrs</u>	Certificate #:	<u>SRM4321B</u>
Reference Date:	<u>1/1/92</u>	Receiver's Name:	<u>Kevin Free</u>
		Date Received:	<u>8/19/93</u>

Primary Dilution:			
Balance Verification?:	<u>yes</u>		
Diluent Used:	<u>1 M HNO3</u>		
a: Decay Corrected Standard Activity (pCi/g):	<u>6.67E+03</u>	<u>pCi/g</u>	
b: Weight of the Source Transferred (g):	<u>5.23707</u>	<u>g</u>	
c: Total diluted weight (g):	<u>132.03</u>	<u>g</u>	
d: Total Diluted Volume (mL)	<u>128.28</u>	<u>mL</u>	
e: Activity of Dilution by Weight (pCi/g) [a * b / c]:	<u>2.645E+02</u>	<u>pCi/g</u>	
f: Calculated Density of Solution (g/mL) [c / d]:	<u>1.029E+00</u>	<u>g/mL</u>	
g: Activity of Dilution by Volume (pCi/mL) [e * f]:	<u>2.722E+02</u>	<u>pCi/mL</u>	
h. Dilution Logbook I.D. #:	<u>LAL-93-474-14-1</u>		
Prepared By: _____	Preparation Date: <u>8/20/93</u>		
Reviewed By: _____	Review Date: _____		
Purity/Cross Check Performed By: _____	Check Date: _____		

# SECONDARY/WORKING LEVEL STANDARD DILUTION RECORD

Dilution Source Information	
Isotope:	<u>U-238</u>
Parent Barcode Number	<u>AA9804</u>
Vendor or Certificate I.D. # of Parent Standard:	<u>SRM 4321B</u>
Diluted Source Logbook I.D. #:	<u>93-474-14-1</u>
Balance Verification?:	<u>YCS</u>
Diluent Used:	<u>1M HNO3</u>

Dilution	
*Diluent:	<u>1M HNO3</u>
*Density of diluent (g/ml):	<u>N/A</u> g/ml
a: Parent Specific Activity:	<u>272.21</u> <sup>pCi/ml</sup> pCi/g <sub>AW 1-21-95</sub>
b: Amount of Source Transferred:	<u>5.9495</u> g
c: Total amount of Dilution:	<u>141.58</u> g
d: Total Volume of Dilution:	<u>N/A</u> ml
e: Activity of Dilution (a * b / c):	<u>N/A</u> pCi/g
f: Activity of Dilution (a * b / d):	<u>11.44</u> pCi/ml
Dilution Logbook I.D. #:	<u>94-677-30-1</u>
Prepared By: <u>Dynes Wony</u>	Preparation Date: <u>1-21-95</u>
Reviewed By: <u>Joe Hutchinson</u>	Review Date: <u>1/26/95</u>

\*If the diluent remains unchanged from the diluent used for the dilution source, then a weight dilution of a volume unit source can be performed without a density conversion. If the diluent changes, a weighted proportion density conversion is necessary.

Read and Understood By

099

