START 9713523.1714

LK7301-LAS

0046385

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

1 JAN 1997 RECEIVED EDMC

July 29, 1996

Ms. Joan Kessner
Bechtel Hanford, Inc.
3350 George Washington Way
MS B1-35
Richland, WA 99352

AUG 1996 RECEIVED Data Log In

RE:	Log-in No.:	L7301
	Quotation No.:	Q400000-B
	SAF:	B96-122
	Document File No.:	0622596
	BHI Document Control No.:	378
	SDG No.:	LK7301

The attached data report contains the analytical results of samples that were submitted to Lockheed Analytical Services on June 22, 1996. 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 M. Hall at (509) 375-4741.

"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,

Karen Hermann for

Kathleen M. Hall
Client Services Representative

cc: Client Services
Document Control

Lockheed Analytical Services

Log-in No.: L7301
Quotation No.: Q400000-B
SAF: B96-122
Document File No.: 0622596
BHI Document File No.:378
SDG No.: LK7301
Page 1

CASE NARRATIVE
INORGANIC 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 22, 1996. The samples were logged in as L7301 and were prepared and analyzed in batch 622 bt1 for total metals. The samples were analyzed by Method 7000 Furnace Metals, 7471 Mercury and Method 6010 ICP Metals.

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 exception: The matrix spike recovery for mercury (66%) was outside of acceptance limits. The recovery based on the LCS (96.9%) support that the analytical system was operating within control limits.

Sample Results

- The oil sample was prepared as a solid and the density was determined in order to report the results in mg/L.
- The LCS Oil sample does not contain arsenic, selenium or mercury, therefore the LCSW is also reported.

Shellee McGrath
Prepared By

July 29, 1996
Date

CASE NARRATIVE
RADIOCHEMICAL ANALYSES

The routine calibration and quality control (QC) 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, and duplicate samples.

NOTE: Chemical recoveries and minimum detectable activities can be found on the preparation sheets and calculation sheets of the attached raw data.

Holding Time Requirements

All holding time requirements were met.

Analytical Method Gross Alpha/Beta

The gross alpha/beta analysis was performed using standard operating procedures, LAL-91-SOP-0060 and LAL-91-SOP-0061. The samples were analyzed in workgroups 38485 and 38486. The instrument calibration verification met criteria. The method blanks were within QC criteria. The laboratory control sample recoveries were within QC criteria. The duplicate recoveries were within QC criteria. No re-analyses were performed.

Yvonne M. Jacoby
Prepared By

July 8, 1996
Date

9713523.1717

Revision METALS

LOCKHEED ANALYTICAL SERVICES
LOGIN CHAIN OF CUSTODY REPORT (ln01)
Jul 01 1996, 11:17 am

Login Number: L7301
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
L7301-1	B0HGX4	20-JUN-96	22-JUN-96		07-JUL-96
TEMP 2; SAF# B96-122					
Location: RFG01-43C					
Oil 6 S SCREENING					
L7301-2	B0HGX5	20-JUN-96	22-JUN-96		07-JUL-96
TEMP 2; SAF# B96-122					
Location: RFG01-43C					
Oil 6 S SCREENING					
L7301-3	B0HGX6	20-JUN-96	22-JUN-96		07-JUL-96
TEMP 2; SAF# B96-122					
Location: RFG01-43C					
Oil 6 S SCREENING					
L7301-4	B0HGX7	20-JUN-96	22-JUN-96		07-JUL-96
TEMP 2; SAF# B96-122					
Location: RFG01-43C					
Oil 6 S SCREENING					
L7301-5	B0HGX8	20-JUN-96	22-JUN-96		07-JUL-96
TEMP 2; SAF# B96-122					
Location: RFG01-43C					
Oil 6 S SCREENING					
L7301-6	B0HGX9	20-JUN-96	22-JUN-96		07-JUL-96
TEMP 2; SAF# B96-122					
Location: RFG01-43C					
Oil 6 S SCREENING					
L7301-7	B0HGY0	20-JUN-96	22-JUN-96		07-JUL-96
TEMP 2; SAF# B96-122					
Location: RFG01-43C					
Water 1 S SCREENING	Hold:	17-DEC-96			
L7301-8	B0HGY1	20-JUN-96	22-JUN-96		07-JUL-96
TEMP 2; SAF# B96-122					
Location: RFG01-43C					
Oil 6 S SCREENING					
L7301-9	B0HGY2	20-JUN-96	22-JUN-96		07-JUL-96
TEMP 2; SAF# B96-122					
Location: RFG01-43C					
Oil 6 S SCREENING					

9713523.1718

LOCKHEED ANALYTICAL SERVICES
LOGIN CHAIN OF CUSTODY REPORT (ln01)
Jul 01 1996, 11:17 am

Login Number: L7301
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
L7301-10	B0HGY3	20-JUN-96	22-JUN-96	07-JUL-96
TEMP 2; SAF# B96-122				
Location: RFG01-43C				
Oil 6 S SCREENING				
L7301-11	B0HGX4	20-JUN-96	22-JUN-96	07-JUL-96
TEMP 2; SAF# B96-122				
Location: 156-018				
Oil 6 S DENSITY				
Oil 6 S GR ALP/BETA LAL-0061 Hold:17-DEC-96				
L7301-12	B0HGX5	20-JUN-96	22-JUN-96	07-JUL-96
TEMP 2; SAF# B96-122				
Location: 156-018				
Oil 6 S DENSITY				
Oil 6 S GR ALP/BETA LAL-0061 Hold:17-DEC-96				
L7301-13	B0HGX6	20-JUN-96	22-JUN-96	07-JUL-96
TEMP 2; SAF# B96-122				
Location: 156-018				
Oil 6 S DENSITY				
Oil 6 S GR ALP/BETA LAL-0061 Hold:17-DEC-96				
L7301-14	B0HGX7	20-JUN-96	22-JUN-96	07-JUL-96
TEMP 2; SAF# B96-122				
Location: 156-018				
Oil 6 S DENSITY				
Oil 6 S GR ALP/BETA LAL-0061 Hold:17-DEC-96				
L7301-15	B0HGX8	20-JUN-96	22-JUN-96	07-JUL-96
TEMP 2; SAF# B96-122				
Location: 156-018				
Oil 6 S DENSITY				
Oil 6 S GR ALP/BETA LAL-0061 Hold:17-DEC-96				
L7301-16	B0HGX9	20-JUN-96	22-JUN-96	07-JUL-96
TEMP 2; SAF# B96-122				
Location: 156-018				
Oil 6 S DENSITY				
Oil 6 S GR ALP/BETA LAL-0061 Hold:17-DEC-96				
L7301-17	B0HGY0	20-JUN-96	22-JUN-96	07-JUL-96
TEMP 2; SAF# B96-122				
Location: 156-018				

0010

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9713523.1719

LOCKHEED ANALYTICAL SERVICES
LOGIN CHAIN OF CUSTODY REPORT (ln01)
Jul 01 1996, 11:17 am

Login Number: L7301
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
Water 1 S GR ALP/BETA LAL-0060 Hold:17-DEC-96					
L7301-18	B0HGY1	20-JUN-96	22-JUN-96		07-JUL-96
TEMP 2; SAF# B96-122					
Location: 156-018					
Oil 6 S DENSITY					
Oil 6 S GR ALP/BETA LAL-0061 Hold:17-DEC-96					
L7301-19	B0HGY2	20-JUN-96	22-JUN-96		07-JUL-96
TEMP 2; SAF# B96-122					
Location: 156-018					
Oil 6 S DENSITY					
Oil 6 S GR ALP/BETA LAL-0061 Hold:17-DEC-96					
L7301-20	B0HGY3	20-JUN-96	22-JUN-96		07-JUL-96
TEMP 2; SAF# B96-122					
Location: 156-018					
Oil 6 S DENSITY					
Oil 6 S GR ALP/BETA LAL-0061 Hold:17-DEC-96					
L7301-21	B0HGX4	20-JUN-96	22-JUN-96		07-JUL-96
TEMP 2; SAF# B96-122, TCLP=(M)					
Location: 133					
Oil 6 S 1311 TCLP REG. EXTR. Hold:04-JUL-96					
Oil 6 S 6010 ICP METALS Hold:17-DEC-96					
Oil 6 S 7000 FURNACE METALS Hold:17-DEC-96					
Oil 6 S 7471 MERCURY Hold:18-JUL-96					
L7301-22	REPORT TYPE	22-JUN-96	22-JUN-96		07-JUL-96
SAF# B96-122					
Location:					
Water 1 S EDD - DISK DEL.					
Water 1 S INORG TYPE 2 RPT					
Water 1 S RAD RPT TYPE 2					

* CHANGED MATRIX FOR 6010, 7000, 7471 TO (6) OIL (BASED ON TCLP/OIL MEMO EPA #35)

Signature: R. Callum

Date: 7-1-96

CL2255

9713523.1720

LOCKHEED ANALYTICAL SERVICES
LOGIN CHAIN OF CUSTODY REPORT (ln01)
Jun 24 1996, 03:24 pm

Login Number: L7301
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
L7301-1	B0HGX4	20-JUN-96	22-JUN-96		07-JUL-96
TEMP 2; SAF# B96-122					
Location: 157					
Oil 6 S SCREENING					
L7301-2	B0HGX5	20-JUN-96	22-JUN-96		07-JUL-96
TEMP 2; SAF# B96-122					
Location: 157					
Oil 6 S SCREENING					
L7301-3	B0HGX6	20-JUN-96	22-JUN-96		07-JUL-96
TEMP 2; SAF# B96-122					
Location: 157					
Oil 6 S SCREENING					
L7301-4	B0HGX7	20-JUN-96	22-JUN-96		07-JUL-96
TEMP 2; SAF# B96-122					
Location: 157					
Oil 6 S SCREENING					
L7301-5	B0HGX8	20-JUN-96	22-JUN-96		07-JUL-96
TEMP 2; SAF# B96-122					
Location: 157					
Oil 6 S SCREENING					
L7301-6	B0HGX9	20-JUN-96	22-JUN-96		07-JUL-96
TEMP 2; SAF# B96-122					
Location: 157					
Oil 6 S SCREENING					
L7301-7	B0HGY0	20-JUN-96	22-JUN-96		07-JUL-96
TEMP 2; SAF# B96-122					
Location: 157					
Water 1 S SCREENING	Hold:17-DEC-96				
L7301-8	B0HGY1	20-JUN-96	22-JUN-96		07-JUL-96
TEMP 2; SAF# B96-122					
Location: 157					
Oil 6 S SCREENING					
L7301-9	B0HGY2	20-JUN-96	22-JUN-96		07-JUL-96
TEMP 2; SAF# B96-122					
Location: 157					
Oil 6 S SCREENING					

0012

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9715523.1721

LOCKHEED ANALYTICAL SERVICES
LOGIN CHAIN OF CUSTODY REPORT (ln01)
Jun 24 1996, 03:24 pm

Login Number: L7301
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
L7301-10	B0HGY3	20-JUN-96	22-JUN-96		07-JUL-96
TEMP 2; SAF# B96-122					
Location: 157					
Oil 6 S SCREENING					
L7301-11	B0HGX4	20-JUN-96	22-JUN-96		07-JUL-96
TEMP 2; SAF# B96-122					
Location: 157					
Oil 6 S DENSITY					
Oil 6 S GR ALP/BETA LAL-0061 Hold:17-DEC-96					
L7301-12	B0HGX5	20-JUN-96	22-JUN-96		07-JUL-96
TEMP 2; SAF# B96-122					
Location: 157					
Oil 6 S DENSITY					
Oil 6 S GR ALP/BETA LAL-0061 Hold:17-DEC-96					
L7301-13	B0HGX6	20-JUN-96	22-JUN-96		07-JUL-96
TEMP 2; SAF# B96-122					
Location: 157					
Oil 6 S DENSITY					
Oil 6 S GR ALP/BETA LAL-0061 Hold:17-DEC-96					
L7301-14	B0HGX7	20-JUN-96	22-JUN-96		07-JUL-96
TEMP 2; SAF# B96-122					
Location: 157					
Oil 6 S DENSITY					
Oil 6 S GR ALP/BETA LAL-0061 Hold:17-DEC-96					
L7301-15	B0HGX8	20-JUN-96	22-JUN-96		07-JUL-96
TEMP 2; SAF# B96-122					
Location: 157					
Oil 6 S DENSITY					
Oil 6 S GR ALP/BETA LAL-0061 Hold:17-DEC-96					
L7301-16	B0HGX9	20-JUN-96	22-JUN-96		07-JUL-96
TEMP 2; SAF# B96-122					
Location: 157					
Oil 6 S DENSITY					
Oil 6 S GR ALP/BETA LAL-0061 Hold:17-DEC-96					
L7301-17	B0HGY0	20-JUN-96	22-JUN-96		07-JUL-96
TEMP 2; SAF# B96-122					
Location: 157					

0013

062296

9713523.1722

LOCKHEED ANALYTICAL SERVICES
LOGIN CHAIN OF CUSTODY REPORT (ln01)
Jun 24 1996, 03:24 pm

Login Number: L7301
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 GR ALP/BETA LAL-0060 Hold:17-DEC-96				
L7301-18	B0HGY1	20-JUN-96	22-JUN-96	07-JUL-96
TEMP 2; SAF# B96-122				
Location: 157				
Oil 6 S DENSITY				
Oil 6 S GR ALP/BETA LAL-0061 Hold:17-DEC-96				
L7301-19	B0HGY2	20-JUN-96	22-JUN-96	07-JUL-96
TEMP 2; SAF# B96-122				
Location: 157				
Oil 6 S DENSITY				
Oil 6 S GR ALP/BETA LAL-0061 Hold:17-DEC-96				
L7301-20	B0HGY3	20-JUN-96	22-JUN-96	07-JUL-96
TEMP 2; SAF# B96-122				
Location: 157				
Oil 6 S DENSITY				
Oil 6 S GR ALP/BETA LAL-0061 Hold:17-DEC-96				
L7301-21	B0HGX4	20-JUN-96	22-JUN-96	07-JUL-96
TEMP 2; SAF# B96-122, TCLP=(M)				
Location: 157				
Oil 6 S 1311 TCLP REG. EXTR. Hold:04-JUL-96				
TCLP Extr 13 S 6010 ICP METALS Hold:17-DEC-96				
TCLP Extr 13 S 7000 FURNACE METALS Hold:17-DEC-96				
TCLP Extr 13 S 7470 MERCURY Hold:18-JUL-96				
L7301-22	REPORT TYPE	22-JUN-96	22-JUN-96	07-JUL-96
SAF# B96-122				
Location:				
Water 1 S EDD - DISK DEL.				
Water 1 S INORG TYPE 2 RPT				
Water 1 S RAD RPT TYPE 2				

Signature: [illegible]

Date: 6.24.96

0014

Ole 2-25-96

Bechtel Hanford, Inc.

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

L7301

Data Turnaround: ☑ Priority ☐ ~~Normal~~ R.F 6-20-96

Collector: D. Bowers / R. Fahlberg	Company Contact: P.K. Huff	Telephone: 373-4566
Project Designation: N Pad Drum Sampling	Sampling Location: 100 area 90 day Pad	SAF No.: B96-122
Ice Chest No.: B11-1	Field Logbook No.: EFL-1133-1	Method of Shipment: ~~Hand de~~ R.F 6-20-96 Air Freight
Shipped To: Lock Heed	Offsite Property No.: W96-0-0640-50	Bill of Lading/Air Bill No.: Q904658732

Possible Sample Hazards/Remarks

Special Handling and/or Storage

Preservation	none	none	none	none								
Type of Container	P	G	P	P								
No. of Container(s)	1	1	1	1								
Volume	20 ml	250 ml	20 ml	20 ml								
SAMPLE ANALYSIS	Gross Alpha / Beta	Metals ICP Mercury	Activity scan	Rad screen								

Sample No.	Matrix*	Date Sampled	Time Sampled										
BOHGX4	O	6/20/96	0922	X	X	X							
BOHGX5	O	6/20/96	0932	X		X							
BOHGX6	O	6/20/96	0947	X		X							
BOHGX7	O	6/20/96	1005	X		X							
BOHGX8	O	6/20/96	1023	X		X							
BOHGX9	O	6/20/96	1039	X		X							

CHAIN OF POSSESSION	Sign/Print Names		
Relinquished By: D. Bowers	Date/Time: 6-20-96/1330	Received By: GR Bukhtar	Date/Time: 1330 6-20-96
Relinquished By: GR Bukhtar	Date/Time: 0930 6-21-96	Received By:	Date/Time:
Relinquished By:	Date/Time:	Received By:	Date/Time:
Relinquished By:	Date/Time:	Received By:	Date/Time:

SPECIAL INSTRUCTIONS

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

LABORATORY SECTION	Received By: [illegible]	Title: Sample Custodian	Date/Time: 6-22-96/0930
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

9715276.1723

Bechtel Hanford, Inc.

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

Data Turnaround: ☑ Priority ~~■ Normal~~ R.F 6-20-96

Collector: D. Bowers / R. Fahlberg	Company Contact: P.K. Huff	Telephone: 373-4566
Project Designation: N Pad Drum Sampling	Sampling Location: 100 area 90 day Pad	SAF No.: B96-122
Ice Chest No.: Billy	Field Logbook No.: EFL-1133-1	Method of Shipment: ~~Hand de~~ R.F 6-20-96 Air Freight
Shipped To: Lockheed	Offsite Property No.: W96-0-0640-50	Bill of Lading/Air Bill No.: 2904658732

Possible Sample Hazards/Remarks

Special Handling and/or Storage

SAMPLE ANALYSIS				
Preservation	none	none	none	none
Type of Container	P/G	P/G	P/G	P/G
No. of Container(s)	1	1	1	1
Volume	20ml	250ml	20ml	20ml
	Gross Alpha / Beta	Metals ICP Mercury	Activity scan	Rad screen

Sample No.	Matrix*	Date Sampled	Time Sampled										
BOHGY0	W	6/20/96	1047	X		X							
BOHGY1	O	6/20/96	1055	X		X							
BOHGY2	O	6/20/96	1115	X		X							
BOHGY3	O	6/20/96	1121	X		X							
		6/20/96											
		6/20/96											

9713523.1724

CHAIN OF POSSESSION	Sign/Print Names		
Relinquished By: Doug Bowers	Date/Time: 6-20-96/1330	Received By: EAB Buhtten	Date/Time: 1330 6-20-96
Relinquished By: EAB Buhtten	Date/Time: 0930 6-20-96	Received By:	Date/Time:
Relinquished By:	Date/Time:	Received By:	Date/Time:
Relinquished By:	Date/Time:	Received By:	Date/Time:

SPECIAL INSTRUCTIONS

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

LABORATORY SECTION	Received By	Title	Date/Time
	[illegible]	Sample Custodian	6-22-96 / 0930

FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

Filed

Customer ID: BOHGX4
Lab Sample#: S96E000774

Sample Date: 06/20/96 09:2
Recv. Date: 06/20/96 13:0

PARAMETER	RESULTS	UNITS
Total Activity by LSC		
Total Act. by LSC: % Uncert.	12.1	%Uncertainty
Total Activity by LSC (Solid)	< 1.24e-5	uCi/g

Customer ID: BOHGX5
Lab Sample#: S96E000775

Sample Date: 06/20/96 09:32
Recv. Date: 06/20/96 13:04

PARAMETER	RESULTS	UNITS
Total Activity by LSC		
Total Act. by LSC: % Uncert.	12.5	%Uncertainty
Total Activity by LSC (Solid)	< 1.10e-5	uCi/g

Customer ID: BOHGX6
Lab Sample#: S96E000776

Sample Date: 06/20/96 09:47
Recv. Date: 06/20/96 13:04

PARAMETER	RESULTS	UNITS
Total Activity by LSC		
Total Act. by LSC: % Uncert.	11.7	%Uncertainty
Total Activity by LSC (Solid)	< 1.27e-5	uCi/g

Customer ID: BOHGX7
Lab Sample#: S96E000777

Sample Date: 06/20/96 10:05
Recv. Date: 06/20/96 13:04

PARAMETER	RESULTS	UNITS
Total Activity by LSC		
Total Act. by LSC: % Uncert.	10.7	%Uncertainty
Total Activity by LSC (Solid)	2.38e-5	uCi/g

Customer ID: BOHGX8
Lab Sample#: S96E000778

Sample Date: 06/20/96 10:23
Recv. Date: 06/20/96 13:04

PARAMETER	RESULTS	UNITS
Total Activity by LSC		
Total Act. by LSC: % Uncert.	11.2	%Uncertainty
Total Activity by LSC (Solid)	< 1.34e-5	uCi/g

Customer ID: BOHGX9
Lab Sample#: S96E000779

Sample Date: 06/20/96 10:39
Recv. Date: 06/20/96 13:04

PARAMETER	RESULTS	UNITS
Total Activity by LSC		
Total Act. by LSC: % Uncert.	11.5	%Uncertainty
Total Activity by LSC (Solid)	< 9.55e-6	uCi/g

a62259

VALIDATED RESULTS SHORT REPORT 21 Jun 1

Customer ID: BOHGY0 Sample Date: 06/20/96 10:4
Lab Sample#: S96E000780 Recv. Date: 06/20/96 13:0

PARAMETER	RESULTS	UNITS

Customer ID: BOHGY0 Sample Date: 06/20/96 10:4
Lab Sample#: S96E000780 Recv. Date: 06/20/96 13:0

PARAMETER	RESULTS	UNITS
Total Activity by LSC		
Total Act. by LSC: % Uncert.	12.6	%Uncertainty
Total Activity by LSC (Solid)	< 6.20e-6	uCi/g

Customer ID: BOHGY1 Sample Date: 06/20/96 10:55
Lab Sample#: S96E000781 Recv. Date: 06/20/96 13:04

PARAMETER	RESULTS	UNITS
Total Activity by LSC		
Total Act. by LSC: % Uncert.	12.5	%Uncertainty
Total Activity by LSC (Solid)	< 8.31e-6	uCi/g

Customer ID: BOHGY2 Sample Date: 06/20/96 11:15
Lab Sample#: S96E000782 Recv. Date: 06/20/96 13:04

PARAMETER	RESULTS	UNITS
Total Activity by LSC		
Total Act. by LSC: % Uncert.	12.9	%Uncertainty
Total Activity by LSC (Solid)	< 7.67e-6	uCi/g

Customer ID: BOHGY3 Sample Date: 06/20/96 11:21
Lab Sample#: S96E000783 Recv. Date: 06/20/96 13:04

PARAMETER	RESULTS	UNITS
Total Activity by LSC		
Total Act. by LSC: % Uncert.	12.4	%Uncertainty
Total Activity by LSC (Solid)	< 7.69e-6	uCi/g

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LOCKHEED MARTIN

Sample Login
Login Review Checklist

Lot Number L7301

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 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	

A M Miller — primary review signature — 6-24-96 date

A M Miller — secondary review signature — 6-24-96 date

0019

0622596

SAMPLE CHECK-IN LIST

Date/Time Received: 6-22-96/0920 SDG#: N/A

Work Order Number: N/A SAF #: B96-122

Shipping Container ID: BILLY Chain of Custody # N/A

1. Custody Seals on shipping container intact? Yes [X] No [ ]
2. Custody Seals dated and signed? Yes [X] No [ ]
3. Sample temperature 2°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
   - X custody seals
   - ____ hazard labels
   - X 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: [signature] Date: 6-24-96

Telephoned To: Kathleen Hall On 6-24-96 By Anthony Miller

Lockheed Analytical Services
Sample Receiving Checklist

Client Name: Bechtel-Hanford Job No. L7301 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			NU
are samples bi-phasic (if so, indicate sample ID'S):			NU

MISCELLANEOUS ITEMS			
	Yes	No	* Comments/Discrepancies
samples with short holding times		X	
samples to subcontract		X	

ADDITIONAL COMMENTS/DISCREPANCIES

Completed by / date: [illegible] 6.24.96

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*

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version 2.0 (11/11/94)

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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
BOHGX4	L7301-1		Oil	SCREENING
	L7301-11		Oil	DENSITY
	L7301-11		Oil	GR ALP/BETA LAL
	L7301-21		Oil	1311 TCLP REG.
	L7301-21		TCLP Extr	6010 ICP METALS
	L7301-21		TCLP Extr	7000 FURNACE ME
	L7301-21		TCLP Extr	7470 MERCURY
BOHGX5	L7301-2		Oil	SCREENING
	L7301-12		Oil	DENSITY
	L7301-12		Oil	GR ALP/BETA LAL
BOHGX6	L7301-3		Oil	SCREENING
	L7301-13		Oil	DENSITY
	L7301-13		Oil	GR ALP/BETA LAL
BOHGX7	L7301-4		Oil	SCREENING
	L7301-14		Oil	DENSITY
	L7301-14		Oil	GR ALP/BETA LAL
BOHGX8	L7301-5		Oil	SCREENING
	L7301-15		Oil	DENSITY
	L7301-15		Oil	GR ALP/BETA LAL
BOHGX9	L7301-6		Oil	SCREENING
	L7301-16		Oil	DENSITY
	L7301-16		Oil	GR ALP/BETA LAL
BOHGY0	L7301-7		Water	SCREENING
	L7301-17		Water	GR ALP/BETA LAL
BOHGY1	L7301-8		Oil	SCREENING
	L7301-18		Oil	DENSITY
	L7301-18		Oil	GR ALP/BETA LAL
BOHGY2	L7301-9		Oil	SCREENING
	L7301-19		Oil	DENSITY
	L7301-19		Oil	GR ALP/BETA LAL
BOHGY3	L7301-10		Oil	SCREENING
	L7301-20		Oil	DENSITY
	L7301-20		Oil	GR ALP/BETA LAL
REPORT TYPE	L7301-22		Water	EDD - DISK DEL.
	L7301-22		Water	INORG TYPE 2 RP
	L7301-22		Water	RAD RPT TYPE 2

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LOCKHEED ANALYTICAL SERVICES

Sample Results

Client Sample ID: B0HGX4	Date Collected: 20-JUN-96
Matrix: Oil	Date Received: 22-JUN-96
Percent Solids: N/A	

Constituent	Units	Method	Result	MDL	RDL	Data Qual	Dilution	Date Analyzed	LAS Batch ID	LAS Sample ID
BARIUM	mg/l	6010	< 1.0	1.0	25.	U	1	10-JUL-96	38585	L7301-21
CADMIUM	mg/l	6010	< 0.38	0.38	0.63	U	1	10-JUL-96	38585	L7301-21
CHROMIUM	mg/l	6010	< 0.76	0.76	1.3	U	1	10-JUL-96	38585	L7301-21
SILVER	mg/l	6010	< 0.76	0.76	1.3	U	1	10-JUL-96	38585	L7301-21
ARSENIC	mg/l	7060	< 0.38	0.38	1.3	UW	1	05-JUL-96	38586	L7301-21
LEAD	mg/l	7421	2.1	0.25	0.38		1	10-JUL-96	38586	L7301-21
SELENIUM	mg/l	7740	< 0.38	0.38	0.63	UW	1	05-JUL-96	38586	L7301-21
Mercury	mg/l	7471	< 0.061	0.061	0.061	UN	1	03-JUL-96	38587	L7301-21

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LOCKHEED ANALYTICAL SERVICES

RADIOCHEMISTRY DATA REPORT
Account Name: Bechtel Hanford, Inc. * Richland, WA
Project Name: BECHTEL-HANFORD
Project Desc: Bechtel Hanford Project

Client Sample ID: B0HGX4
Date Collected: 20-JUN-96
Matrix: Oil

Login Number: L7301
Date Received: 22-JUN-96

Constituent	Method	Batch	Activity	Error	MDA	Qualifier	Units	Analyzed	Lab ID
Gross Alpha	LAL-0061	38486	-0.009	0.023	0.054		pCi/g	02-JUL-96	L7301-11
Gross Beta	LAL-0061	38486	0.002	0.059	0.10		pCi/g	02-JUL-96	L7301-11

LOCKHEED ANALYTICAL SERVICES

RADIOCHEMISTRY DATA REPORT
Account Name: Bechtel Hanford, Inc. * Richland, WA
Project Name: BECHTEL-HANFORD
Project Desc: Bechtel Hanford Project

Client Sample ID: B0HGX5
Date Collected: 20-JUN-96
Matrix: Oil

Login Number: L7301
Date Received: 22-JUN-96

Constituent	Method	Batch	Activity	Error	MDA	Qualifier	Units	Analyzed	Lab ID
Gross Alpha	LAL-0061	38486	0.012	0.027	0.051		pCi/g	02-JUL-96	L7301-12
Gross Beta	LAL-0061	38486	-0.002	0.059	0.10		pCi/g	02-JUL-96	L7301-12

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LOCKHEED ANALYTICAL SERVICES

RADIOCHEMISTRY DATA REPORT
Account Name: Bechtel Hanford, Inc. * Richland, WA
Project Name: BECHTEL-HANFORD
Project Desc: Bechtel Hanford Project

Client Sample ID: B0HGX6
Date Collected: 20-JUN-96
Matrix: Oil

Login Number: L7301
Date Received: 22-JUN-96

Constituent	Method	Batch	Activity	Error	MDA	Qualifier	Units	Analyzed	Lab ID
Gross Alpha	LAL-0061	38486	-0.013	0.024	0.058		pCi/g	02-JUL-96	L7301-13
Gross Beta	LAL-0061	38486	-0.015	0.055	0.10		pCi/g	02-JUL-96	L7301-13

LOCKHEED ANALYTICAL SERVICES

RADIOCHEMISTRY DATA REPORT
Account Name: Bechtel Hanford, Inc. * Richland, WA
Project Name: BECHTEL-HANFORD
Project Desc: Bechtel Hanford Project

Client Sample ID: B0HGX7
Date Collected: 20-JUN-96
Matrix: Oil

Login Number: L7301
Date Received: 22-JUN-96

Constituent	Method	Batch	Activity	Error	MDA	Qualifier	Units	Analyzed	Lab ID
Gross Alpha	LAL-0061	38486	-0.002	0.028	0.058		pCi/g	02-JUL-96	L7301-14
Gross Beta	LAL-0061	38486	0.018	0.059	0.10		pCi/g	02-JUL-96	L7301-14

LOCKHEED ANALYTICAL SERVICES

RADIOCHEMISTRY DATA REPORT
Account Name: Bechtel Hanford, Inc. * Richland, WA
Project Name: BECHTEL-HANFORD
Project Desc: Bechtel Hanford Project

Client Sample ID: B0HGX8
Date Collected: 20-JUN-96
Matrix: Oil

Login Number: L7301
Date Received: 22-JUN-96

Constituent	Method	Batch	Activity	Error	MDA	Qualifier	Units	Analyzed	Lab ID
Gross Alpha	LAL-0061	38486	0.016	0.031	0.055		pCi/g	02-JUL-96	L7301-15
Gross Beta	LAL-0061	38486	-0.019	0.055	0.10		pCi/g	02-JUL-96	L7301-15

LOCKHEED ANALYTICAL SERVICES

RADIOCHEMISTRY DATA REPORT
Account Name: Bechtel Hanford, Inc. * Richland, WA
Project Name: BECHTEL-HANFORD
Project Desc: Bechtel Hanford Project

Client Sample ID: B0HGX9
Date Collected: 20-JUN-96
Matrix: Oil

Login Number: L7301
Date Received: 22-JUN-96

Constituent	Method	Batch	Activity	Error	MDA	Qualifier	Units	Analyzed	Lab ID
Gross Alpha	LAL-0061	38486	0.004	0.025	0.051		pCi/g	02-JUL-96	L7301-16
Gross Beta	LAL-0061	38486	0.042	0.063	0.11		pCi/g	02-JUL-96	L7301-16

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LOCKHEED ANALYTICAL SERVICES

RADIOCHEMISTRY DATA REPORT
Account Name: Bechtel Hanford, Inc. * Richland, WA
Project Name: BECHTEL-HANFORD
Project Desc: Bechtel Hanford Project

Client Sample ID: B0HGY0
Date Collected: 20-JUN-96
Matrix: Liq. Waste

Login Number: L7301
Date Received: 22-JUN-96

Constituent	Method	Batch	Activity	Error	MDA	Qualifier	Units	Analyzed	Lab ID
Gross Alpha	LAL-0060	38485	0.004	0.013	0.025		pCi/g	03-JUL-96	L7301-17
Gross Beta	LAL-0060	38485	0.069	0.025	0.036		pCi/g	03-JUL-96	L7301-17

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LOCKHEED ANALYTICAL SERVICES

RADIOCHEMISTRY DATA REPORT
Account Name: Bechtel Hanford, Inc. * Richland, WA
Project Name: BECHTEL-HANFORD
Project Desc: Bechtel Hanford Project

Client Sample ID: B0HGY1
Date Collected: 20-JUN-96
Matrix: Oil

Login Number: L7301
Date Received: 22-JUN-96

Constituent	Method	Batch	Activity	Error	MDA	Qualifier	Units	Analyzed	Lab ID
Gross Alpha	LAL-0061	38486	0.193	0.063	0.052		pCi/g	02-JUL-96	L7301-18
Gross Beta	LAL-0061	38486	0.037	0.063	0.11		pCi/g	02-JUL-96	L7301-18

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LOCKHEED ANALYTICAL SERVICES

RADIOCHEMISTRY DATA REPORT
Account Name: Bechtel Hanford, Inc. * Richland, WA
Project Name: BECHTEL-HANFORD
Project Desc: Bechtel Hanford Project

Client Sample ID: B0HGY2
Date Collected: 20-JUN-96
Matrix: Oil

Login Number: L7301
Date Received: 22-JUN-96

Constituent	Method	Batch	Activity	Error	MDA	Qualifier	Units	Analyzed	Lab ID
Gross Alpha	LAL-0061	38486	0.001	0.024	0.052		pCi/g	02-JUL-96	L7301-19
Gross Beta	LAL-0061	38486	0.015	0.059	0.10		pCi/g	02-JUL-96	L7301-19

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LOCKHEED ANALYTICAL SERVICES

RADIOCHEMISTRY DATA REPORT
Account Name: Bechtel Hanford, Inc. * Richland, WA
Project Name: BECHTEL-HANFORD
Project Desc: Bechtel Hanford Project

Client Sample ID: B0HGY3
Date Collected: 20-JUN-96
Matrix: Oil

Login Number: L7301
Date Received: 22-JUN-96

Constituent	Method	Batch	Activity	Error	MDA	Qualifier	Units	Analyzed	Lab ID
Gross Alpha	LAL-0061	38486	-0.002	0.024	0.054		pCi/g	02-JUL-96	L7301-20
Gross Beta	LAL-0061	38486	-0.001	0.059	0.10		pCi/g	02-JUL-96	L7301-20

Quick Turn

LOCKHEED ANALYTICAL LABORATORY

SAMPLE PREPARATION LOG FOR GROSS ALPHA/BETA ANALYSIS

LAL-91-SOP-0060

Date Prep Started : 7/3/96 | Matrix : Liq. Waste

Workgroup Number : GR ALP/BETA LAL-0060 38485 | Prep Due Date : 07/01/96

CLIENT SAMPLE ID	LAL ID		QC	CHILD LAL ID	pH <2	ALQT VOL (g/L/smp)	PLANCHET TARE WT (grams)	PLANCHET GROSS WT (grams)	* * *	SAMPLE WEIGHT (grams)	COMMENTS
L7304-2	38485DUP1	1	DUP1	38485-01	N	~~.0005~~	8.7397	8.8116			0.5g
Lab Ctrl Sample	38485LCS1	2	LCS1	38485-02		~~250~~	8.5858	8.6646			100g
Method Blank	38485MBB	3	MBB1	38485-03		~~250~~	8.6261	8.6262			100g
B0HGY0	L7301-17	4		38485-04		~~.015~~	8.7143	8.7458			15.0
B0HGK3	L7304-2	5	SMP1	38485-05		~~.0005~~	8.7206	8.7992			0.5
		6									
		7									
		8									
		9									
		10									
		11									
		12									
		13									
		14									
		15									
		16									
		17									
		18									
		19									
		20									
		21									
		22									
		23									
		24									

LCS Volume & RefDate	1.0 mL	8/1/90	MS Volume & RefDate		Prep Anlst	CD
LCS Nuclide	Am-241	Sr-90	MS Nuclide		Start Date	7/3/96
LCS Activity	9.81 pCi/mL	12.0 pCi/mL	MS Activity		Count Anlst	
LCS ID #	95-721-13-		MS ID #			

Balance Number : 40020046 ( ) | Pipette Number : 71008 ( ) | LCS added by: CD

( ) | ( ) | Witnessed by : DH

Comments :

Analyst : [signature] | Checked by: JV | Cnt Rm Custody\Date : JV 7-3-96

V96106

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LOCKHEED ANALYTICAL LABORATORY

SAMPLE PREPARATION LOG FOR GROSS ALPHA/BETA ANALYSIS

LAL-91-SOP-0060

Date Prep Started : 7/3/96 Matrix : Liq. Waste

Workgroup Number : GR ALP/BETA LAL-0060 38485 Prep Due Date : 07/01/96

CLIENT SAMPLE ID	LAL ID		QC	CHILD LAL ID	pH <2	ALQT VOL (g)	PLANCHET TARE WT (grams)	PLANCHET GROSS WT (grams)	* * *	SAMPLE WEIGHT (grams)	COMMENTS
L7304-2	38485DUP1	1	DUP1	38485-01	N	0.5	8.7397	8.8116		0.0719	
Lab Ctrl Sample	38485LCS1	2	LCS1	38485-02	N	100.0	8.5858	8.6646		0.0788	
Method Blank	38485MBB	3	MBB1	38485-03	N	100.0	8.6261	8.6262		0.0001	
B0HGY0	L7301-17	4		38485-04	N	15.0	8.7143	8.7458		0.0315	
B0HGK3	L7304-2	5	SMP1	38485-05	N	0.5	8.7206	8.7992		0.0786	
		6									
		7									
		8									
		9									
		10									
		11									
		12									
		13									
		14									
		15									
		16									
		17									
		18									
		19									
		20									
		21									
		22									
		23									
		24									

LCS Volume & RefDate	1.0 mL; 08/01/90		MS Volume & RefDate		Prep Anlst CD
LCS Nuclide	Am-241	Sr-90	MS Nuclide		Start Date 7/3/96
LCS Activity	9.8 pCi/mL	12.0 pCi/mL	MS Activity		Count Anlst
LCS ID #	95-721-13-1		MS ID #		

Balance Number : 40020046 ( ) Pipette Number : 71008 ( ) LCS added by: CD

( ) ( ) Witnessed by : DH

Comments :

Analyst: Checked by: SV

V96106

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LOCKHEED ANALYTICAL LABORATORY

ALPHA ACTIVITY CALCULATIONS FOR GROSS ALPHA/BETA ANALYSIS

LAL-91-SOP-0060

Workgroup No: GR ALP/BETA LAL-0060 38485

PARENT LAL ID	DET	PLANCHET LAL ID	CTIME (min)	COUNTS ALPHA	COUNTS ALPHA BKG	EFF ALPHA	Bkg Corr ACTIVITY pCi/g	CNT ERR 2 SIGMA pCi/g	TTL ERR 2 SIGMA pCi/g	LLD ALPHA pCi/g	MDA ALPHA pCi/g	FLAGS	COUNT DATE
38485DUP1	LB1-C4	38485-01	100	2	4.5	0.100	-0.2210	0.4489	0.4491	0.8847	1.1291	DUP1	07/03/96
38485LCS1	LB1-C3	38485-02	100	214	3.8	0.094	0.1005	0.0138	0.0147	0.0043	0.0056	LCS1	07/03/96
38485MBB	LB1-C2	38485-03	100	1	3.8	0.202	-0.0006	0.0010	0.0010	0.0020	0.0026	MBB1	07/03/96
L7301-17	LB1-C1	38485-04	100	6	4.1	0.145	0.0039	0.0129	0.0129	0.0196	0.0252		07/03/96
L7304-2	LB1-D1	38485-05	100	7	5.4	0.098	0.1450	0.6323	0.6324	0.9908	1.2389	SMP1	07/03/96

9713523.1744

Comments : 38485LCS1 Alpha LCS Recovery = 0.1/0.1 = 103.4 %.
L7304-2, 38485DUP1 RPD = -962.9 %, RER = 0.34

MBB = -0.0006 pCi/g => less than RDL(HAMDC).

V96106

Date Completed : 7-3-96
Anlst Signature : [illegible]

Checked by : [illegible]

LOCKHEED ANALYTICAL LABORATORY

BETA ACTIVITY CALCULATIONS FOR GROSS ALPHA/BETA ANALYSIS

LAL-91-SOP-0060

Workgroup No: GR ALP/BETA LAL-0060 38485

PARENT LAL ID	DET	PLANCHET LAL ID	CTIME (min)	COUNTS BETA	COUNTS BETA BKG	EFF BETA	A>>B XTALK Factor	Bkg Corr ACTIVITY pCi/g	CNT ERR 2 SIGMA pCi/g	TTL ERR 2 SIGMA pCi/g	LLD BETA pCi/g	MDA BETA pCi/g	FLAGS	COUNT DATE
38485DUP1	LB1-C4	38485-01	100	1709	99.7	0.402	0.279	36.0899	1.8685	2.5976	1.0405	1.1012	DUP1	07/03/96
38485LCS1	LB1-C3	38485-02	100	1157	100.0	0.404	0.281	0.1113	0.0078	0.0095	0.0052	0.0055	LCS1	07/03/96
38485MBB	LB1-C2	38485-03	100	96	99.7	0.420	0.258	-0.0003	0.0029	0.0029	0.0050	0.0053	MBB1	07/03/96
L7301-17	LB1-C1	38485-04	100	201	104.7	0.417	0.267	0.0690	0.0247	0.0249	0.0343	0.0362		07/03/96
L7304-2	LB1-D1	38485-05	100	1624	104.8	0.408	0.281	33.5135	1.7983	2.4580	1.0503	1.1101	SMP1	07/03/96

9713523.1745

Comments : 38485LCS1 Beta LCS Recovery = 0.1/0.1 = 106.8 %.
L7304-2, 38485DUP1 RPD = 7.4 %, RER = 0.51

MBB = -0.0003 pCi/g => less than RDL(HAMDC).

V96106

Date Completed : 7-3-96
Anlst Signature : SY

Checked by : JN

0054

LOCKHEED ANALYTICAL LABORATORY

SAMPLE PREPARATION LOG FOR GROSS ALPHA/BETA ANALYSIS

LAL-91-SOP-0060

Date Prep Started : 7/1/96 Matrix : Oil

Workgroup Number : GR ALP/BETA LAL-0061 38486 Prep Due Date : 07/02/96

CLIENT SAMPLE ID	LAL ID		QC	CHILD LAL ID	pH <2	ALQT VOL (g/L/smp)	PLANCHET TARE WT (grams)	PLANCHET GROSS WT (grams)	* * *	SAMPLE WEIGHT (grams)	COMMENTS
L7301-11	38486DUP1	1	DUP1	38486-01		5.0g	8.7434	8.7435			
Lab Ctrl Sample	38486LCS1	2	LCS1	38486-02			8.5486	8.6272			
Method Blank	38486MBB	3	MBB1	38486-03			8.7605	8.7606			
B0HGX4	L7301-11	4	SMP1	38486-04			8.6669	8.6670			
B0HGX5	L7301-12	5		38486-05			8.7037	8.7038			
B0HGX6	L7301-13	6		38486-06			8.7378	8.7379			
B0HGX7	L7301-14	7		38486-07			8.6998	8.6999			
B0HGX8	L7301-15	8		38486-08			8.6868	8.6869			
B0HGX9	L7301-16	9		38486-09			8.7333	8.7334			
B0HGY1	L7301-18	10		38486-10			8.6824	8.6825			
B0HGY2	L7301-19	11		38486-11			8.6794	8.6807			
B0HGY3	L7301-20	12		38486-12			8.7089	8.7090			
		13									
		14									
		15									
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LCS Volume & RefDate	10 ml	8/1/90	MS Volume & RefDate		Prep Anlst: CD
LCS Nuclide	Am-241	Sr-90	MS Nuclide		Start Date: 7/1/96
LCS Activity	9.81 pCi/ml	120 pCi/ml	MS Activity		Count Anlst:
LCS ID #	95-721-13-1		MS ID #		

Balance Number : 40020046 ( ) Pipette Number : 71008 ( ) LCS added by: CD

( ) ( ) Witnessed by : RM

Comments :

Analyst [signature] Checked by: [signature] 7/2/96 Cnt Rm Custody\Date : SV 7-2-96

V96106

0056

9713523.1746

LOCKHEED ANALYTICAL LABORATORY

SAMPLE PREPARATION LOG FOR GROSS ALPHA/BETA ANALYSIS

LAL-91-SOP-0060

Date Prep Started : 7/1/96 Matrix : Oil

Workgroup Number : GR ALP/BETA LAL-0061 38486 Prep Due Date : 07/02/96

CLIENT SAMPLE ID	LAL ID		QC	CHILD LAL ID	pH <2	ALQT VOL (g)	PLANCHET TARE WT (grams)	PLANCHET GROSS WT (grams)	* * *	SAMPLE WEIGHT (grams)	COMMENTS
L7301-11	38486DUP1	1	DUP1	38486-01	N	5.00	8.7434	8.7435		0.0001	
Lab Ctrl Sample	38486LCS1	2	LCS1	38486-02	N	5.00	8.5486	8.6272		0.0786	
Method Blank	38486MBB	3	MBB1	38486-03	N	5.00	8.7605	8.7606		0.0001	
B0HGX4	L7301-11	4	SMP1	38486-04	N	5.00	8.6669	8.6670		0.0001	
B0HGX5	L7301-12	5		38486-05	N	5.00	8.7037	8.7038		0.0001	
B0HGX6	L7301-13	6		38486-06	N	5.00	8.7378	8.7379		0.0001	
B0HGX7	L7301-14	7		38486-07	N	5.00	8.6998	8.6999		0.0001	
B0HGX8	L7301-15	8		38486-08	N	5.00	8.6868	8.6869		0.0001	
B0HGX9	L7301-16	9		38486-09	N	5.00	8.7333	8.7334		0.0001	
B0HGY1	L7301-18	10		38486-10	N	5.00	8.6824	8.6825		0.0001	
B0HGY2	L7301-19	11		38486-11	N	5.00	8.6794	8.6807		0.0013	
B0HGY3	L7301-20	12		38486-12	N	5.00	8.7089	8.7090		0.0001	
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		24									

LCS Volume & RefDate	1.0 mL; 08/01/90		MS Volume & RefDate		Prep Anlst	CD
LCS Nuclide	Am-241	Sr-90	MS Nuclide		Start Date	7/1/96
LCS Activity	9.8 pCi/mL	12.0 pCi/mL	MS Activity		Count Anlst	
LCS ID #	95-721-13-1		MS ID #			

Balance Number : 40020046 ( ) Pipette Number : 71008 ( ) LCS added by: CD

( ) ( ) Witnessed by : RM

Comments :

Analyst : Checked by: 7/2/96

V96106

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LOCKHEED ANALYTICAL LABORATORY

ALPHA ACTIVITY CALCULATIONS FOR GROSS ALPHA/BETA ANALYSIS

LAL-91-SOP-0060

Workgroup No: GR ALP/BETA LAL-0061 38486

PARENT LAL ID	DET	PLANCHET LAL ID	CTIME (min)	COUNTS ALPHA	COUNTS ALPHA BKG	EFF ALPHA	Bkg Corr ACTIVITY pCi/g	CNT ERR 2 SIGMA pCi/g	TTL ERR 2 SIGMA pCi/g	LLD ALPHA pCi/g	MDA ALPHA pCi/g	FLAGS	COUNT DATE
38486DUP1	LB1-A1	38486-01	100	10	3.7	0.213	0.027	0.031	0.031	0.038	0.050	DUP1	07/02/96
38486LCS1	LB1-A2	38486-02	100	237	4.8	0.101	2.079	0.273	0.292	0.091	0.116	LCS1	07/02/96
38486MBB	LB1-A3	38486-03	100	4	8.1	0.231	-0.016	0.026	0.026	0.051	0.062	MBB1	07/02/96
L7301-11	LB1-A4	38486-04	100	3	5.1	0.222	-0.009	0.023	0.023	0.043	0.054	SMP1	07/02/96
L7301-12	LB1-B1	38486-05	100	7	4.1	0.217	0.012	0.027	0.027	0.039	0.051		07/02/96
L7301-13	LB1-B2	38486-06	100	3	6.1	0.223	-0.013	0.024	0.024	0.047	0.058		07/02/96
L7301-14	LB1-B3	38486-07	100	6	6.5	0.225	-0.002	0.028	0.028	0.047	0.058		07/02/96
L7301-15	LB1-B4	38486-08	100	10	5.9	0.229	0.016	0.031	0.031	0.044	0.055		07/02/96
L7301-16	LB1-C1	38486-09	100	5	4.1	0.213	0.004	0.025	0.025	0.040	0.051		07/02/96
L7301-18	LB1-C2	38486-10	100	47	3.8	0.202	0.193	0.062	0.063	0.040	0.052		07/02/96
L7301-19	LB1-C3	38486-11	100	4	3.8	0.205	0.001	0.024	0.024	0.040	0.052		07/02/96
L7301-20	LB1-C4	38486-12	100	4	4.5	0.211	-0.002	0.024	0.024	0.042	0.054		07/02/96

Comments : 38486LCS1 Alpha LCS Recovery = 2.1/1.9 = 107.0 %.
L7301-11, 38486DUP1 RPD = 391.1 %, RER = 0.66

MBB = -0.02 pCi/g => less than RDL(HAMDC).

V96106

Date Completed : 7-2-96
Anlst Signature :

Checked by :

9713523.1748

LOCKHEED ANALYTICAL LABORATORY

BETA ACTIVITY CALCULATIONS FOR GROSS ALPHA/BETA ANALYSIS

LAL-91-SOP-0060

Workgroup No: GR ALP/BETA LAL-0061_38486

PARENT LAL ID	DET	PLANCHET LAL ID	CTIME (min)	COUNTS BETA	COUNTS BETA BKG	EFF BETA	A>>B XTALK Factor	Bkg Corr ACTIVITY pCi/g	CNT ERR 2 SIGMA pCi/g	TTL ERR 2 SIGMA pCi/g	LLD BETA pCi/g	MDA BETA pCi/g	FLAGS	COUNT DATE
38486DUP1	LB1-A1	38486-01	100	136	108.6	0.430	0.258	0.054	0.064	0.064	0.101	0.107	DUP1	07/02/96
38486LCS1	LB1-A2	38486-02	100	1145	97.6	0.408	0.281	2.167	0.152	0.187	0.101	0.107	LCS1	07/02/96
38486MBB	LB1-A3	38486-03	100	94	100.7	0.444	0.258	-0.011	0.056	0.056	0.095	0.100	MBB1	07/02/96
L7301-11	LB1-A4	38486-04	100	106	105.8	0.439	0.258	0.002	0.059	0.059	0.098	0.104	SMP1	07/02/96
L7301-12	LB1-B1	38486-05	100	101	101.1	0.429	0.258	-0.002	0.059	0.059	0.098	0.104		07/02/96
L7301-13	LB1-B2	38486-06	100	88	96.2	0.435	0.258	-0.015	0.055	0.055	0.094	0.100		07/02/96
L7301-14	LB1-B3	38486-07	100	113	104.2	0.444	0.258	0.018	0.059	0.059	0.096	0.102		07/02/96
L7301-15	LB1-B4	38486-08	100	90	98.3	0.439	0.258	-0.019	0.055	0.055	0.095	0.100		07/02/96
L7301-16	LB1-C1	38486-09	100	125	104.7	0.426	0.258	0.042	0.063	0.063	0.101	0.106		07/02/96
L7301-18	LB1-C2	38486-10	100	128	99.8	0.420	0.258	0.037	0.063	0.063	0.100	0.105		07/02/96
L7301-19	LB1-C3	38486-11	100	107	99.7	0.427	0.258	0.015	0.059	0.059	0.098	0.104		07/02/96
L7301-20	LB1-C4	38486-12	100	99	99.8	0.423	0.258	-0.001	0.059	0.059	0.099	0.105		07/02/96

Comments : 38486LCS1 Beta LCS Recovery = 2.2/2.1 = 104.0 %.
L7301-11, 38486DUP1 RPD = 188.7 %, RER = 0.43

MBB = -0.01 pCi/g => less than RDL(HAMDC).

V96106

Date Completed : SV
Anlst Signature : 7-2-96

Checked by : JAS

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059

PROJECT Gross Alpha/Beta w/ CS 97-1323.1750

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SECONDARY/WORKING LEVEL STANDARD DILUTION RECORD

Dilution Source Information

Isotope: Am-241 and Sr-90

Parent Barcode Number: AA0030 AA0046

Vendor or Certificate I.D. # of Parent Standard: Am-241 IPL 388-100-1; Sr-90 NIST SRM 4919G

Diluted Source Logbook I.D. #: Am-241 91-0225-60-1; Sr-90 91-0225-30-2

Balance Verification?: Yes

Diluent Used: 0.1 N HNO_3

Dilution

*Diluent: 0.1 N HNO_3 + 42 mg $Sr(NO_3)_2$/mL

*Density of diluent (g/ml): NA

a: Parent Specific Activity: Am-241 981 pCi/mL; Sr-90 600 pCi/mL m 8/1/90

b: Amount of Source Transferred: Am-241 0.5 mL; Sr-90 0.5 ~~g~~ mL

c: Total amount of Dilution: 500 ~~g~~ mL

d: Total Volume of Dilution: 500 mL

e: Activity of Dilution [a * b / c]: NA

f: Activity of Dilution (a * b / d): Am-241 9.81 pCi/mL; Sr-90 12 pCi/mL m 8/1/90

Dilution Logbook I.D. #: 95-721-13-1

Prepared By: Joe Hutchinson Preparation Date: 8/23/95

Reviewed By: [illegible] Review Date: 8/24/95

*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

Signed Date Signed Date

5 1/2. Lilly had to 1C 6 ml to make 91-0225-60-1 AA0030

0713523.1751

CERTIFICATE OF CALIBRATION
ALPHA STANDARD SOLUTION

Radionuclide	Am-241	Customer:	LOCKHEED ENGINEERING & SCIENCES C
Half Life:	432.7 ± 0.5 years	P.O.No.:	06LAB1245
Catalog No.:	7241	Reference Date:	November 1 1991 12:00 PST.
Source No.:	388-100-1	Contained Radioactivity:	0.997 µCi.

Description of Solution

a. Mass of solution:	5.0007	grams.
b. Chemical form:	AmCl3 in 0.5N HCl	
c. Carrier content:	None added	
d. Density:	1.0077	gram/ml @ 20°C.

Radioimpurities

None detected

Radioactive Daughters

None detected

Radionuclide Concentration

0.1994 µCi/gram.

Method of Calibration

Weighed aliquots of the solution were assayed using a liquid scintillation counter.

Uncertainty of Measurement

a. Systematic uncertainty in instrument calibration:	±2.0%
b. Random uncertainty in assay:	±0.7%
c. Random uncertainty in weighing(s):	±0.0%
d. Total uncertainty at the 99% confidence level:	±2.7%

NIST Traceability

This calibration is implicitly traceable to the National Institute of Standards and Technology.

Notes

1. Nuclear data were taken from "Table of Isotopes", Seventh Edition, edited by Virginia S. Shirley.
2. IPL participates in an NIST measurement assurance program to establish and maintain implicit traceability for a number of nuclides, based on the blind assay(and later NIST certification) of Standard Reference Materials. (As in NRC Regulatory Guide 4.15)

Gary A Gilmore
QUALITY CONTROL

ISOTOPE PRODUCTS LABORATORIES
1800 No. Keystone Street.,
Burbank, California 91504
(818) 843 - 7000

0062

9713523.1752

Notebook No. 0225

PROJECT Preparation of Am-241 Std.

Continued From Page

Cert # / Purch Ref.	Calib. Cert. Date	Exp. Date	Ref. #	Vendor	Prep. In	Witness In
388-100-1	Nov 1, 1991	5/6/94	91-0225-604	IPL	JH	[illegible]

Item #	Preparation Date	Final Conc.	Initial Conc.	Bar Code
1	5/6/92	9,800 pCi/g	0.997 uCi in 5 g / 0.1994 uCi/g	AA0030

The entire standard was transferred to a 100-mL volumetric V.F. and the ~~Sample~~ Std was diluted to 100mL with 0.5N HCl.

68.4902
63.5665 g wt. V.F.
4.9237 g std

164.01 g std + dilution
63.57 g V.F.
100.44 g diluted std

$$\text{Activity Std} = \frac{0.1994\ \mu Ci/g \times 4.9237\ g \text{ of std}}{100.44\ g \text{ dilution}}$$

Density 0.5N HCl = 1.003598 g/mL ⇒ 0.0897748 uCi/g × 1.003598 g/mL
= 0.0098 uCi/g = 0.009810 uCi/g or mL
or = 9,800 pCi/g = 9810 pCi/mL

Continued on Page

Read and Understood By

0063

Joe Hutchison — Signed — 5/6/92 — Date

J [illegible] — Signed — 7/13/92 — Date

AA004

9713523.1753 THIS IS A PHOTOCOPY OF THE CERTIFICATE WHICH IS BEING MAILED TO YOU UNDER SEPARATE COVER.

National Institute of Standards & Technology

Certificate

Standard Reference Material 4919-G
Radioactivity Standard

Radionuclide	Strontium-90
Source identification	4919-G
Source description	Solution in NIST borosilicate-glass ampoule [1]*
Solution composition	Strontium-90 plus yttrium-90 plus approximately 95 μg each of non-radioactive strontium and yttrium per gram of 1-molar hydrochloric acid [2]
Mass	Approximately 5.0 grams
Radioactivity concentration	4.514×10^9 Bq g^{-1}
Reference time	1200 EST August 1, 1990
Overall uncertainty	1.05 percent [3]
Photon-emitting impurities	None observed [4]
Alpha-particle-emitting impurities	None observed [5]
Half life	28.5 ± 0.2 years [6]
Measuring instrument	$4\pi\beta$ liquid-scintillation counter

This standard reference material was prepared in the Center for Radiation Research, Ionizing Radiation Division, Radioactivity Group, Dale D. Hoppes, Group Leader.

Gaithersburg, MD 20899
uary, 1991

William P. Reed, Acting Chief
Office of Standard Reference Materials

*Notes on back

0064

9713523.1754

Notebook No. LAL-91-LC6-0199

PROJECT SR-90 Radionuclide Standard Preparation

Continued From Page

CERT # Parent Ref #	Calibration cert Date	Expiration Date	Reference #	VENDOR	PREP INITIALS	WITNESS INITIALS
SRM # 4919-6	1200 Aug 1, 1990	10-2-93	SRM #4919-6-A 91-0199-63	NIST	[illegible]	[illegible]

ITEM #	Preparation Date	Final Concentration	INITIAL Concentration
1	~~1200 EST~~ 10-2-91 ~~Aug 1, 1990~~	~~600,068.599~~ 12-2-91 6000.685 Bq/m	4.514×10^3 Bq-1

9/10/91

Radionuclide = SR-90

SOURCE # 4919-6

Source description # Solution in NIST Borosilicate glass ampule

Composition # SR-90 + Y-90 plus approximately 95 mg of non radioactive SR and yttrium per gram of 1 molar HCL.

Mass approximately 5.0 grams

Radioactivity conc. 4.514×10^3 Bq^{-1}

Reference Time = 1200 EST Aug. 1, 1990

T1/2 = 28.5 ±0.2 years

10/2/91 Preparation

1/ weighing 100.0 ml V.F + Standard of SR-90 in ampule = 65.2000

100.0 ml V.F. (empty) (g) = 60.2814

Difference of mass (g) t.w. = 4.9186

2/ Calculations:

4.514×10^3 Bq/g X 4.9186 = 22,202.5604 Bq

22,202.5604 Bq X 27.027 Pci/Bq = 600,068.5999 Pci

(STD date Aug 1, 1990)

Continued on Page

Transferred 11-19-91 Paul Pickett

(Referenced from LAL LC6 0199 pg 63)

Read and Understood By

0065

Signed 12/19/91 Date

Signed 12/4/91 Date