

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

LK6168

0045278



January 24, 1996

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



RE: Log-in No.: L6168/L6175
Quotation No.: Q400000-B
SAF: B96-036
Document File No.: 0110596A/0111596
WHC Document File No.: 317
SDG No.: LK6168

The attached data report contains the analytical results of samples that were submitted to Lockheed Analytical Services on 10 and 11 January 1996.

The temperature of the coolers upon receipt were 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) 375-4741.

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

Lockheed Analytical Services

Log-in No.: L6168/L6175
Quotation No.: Q400000-B
SAF: B96-036
Document File No.: 0110596A/0111596
WHC Document File No.: 317
SDG No.: LK6168

" 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.: L6168/L6175
Quotation No.: Q400000-B
SAF: B96-036
Document File No.: 0110596A/0111596
WHC Document File No.: 317
SDG No.: LK6168

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, duplicate samples.

NOTE: Chemical recoveries and minimum detectable activities (MDAs) can be found on the preparation sheets and calculation sheets on the attached raw data for each method.

Holding Time Requirements

All holding times were met.

Gas Proportional Counter

Analytical Method Total Strontium

The total strontium analysis was performed using standard operating procedure, LAL-92-SOP-0196. The samples were analyzed in workgroup 32462. The instrument calibration verification met criteria. The method blank was within QC criteria. The laboratory control sample recovery was within QC criteria. The duplicate recoveries were within QC criteria. No re-analyses were performed.

Yvonne M. Jacoby
Prepared By

January 24, 1996
Date

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

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

¹ Used as foot note designations on the QC summary form.

LOCKHEED ANALYTICAL SERVICES
 LOGIN CHAIN OF CUSTODY REPORT (ln01)
 Jan 10 1996, 02:34 pm

Login Number: L6168
 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
L6168-1 temp 2 Location: 157 Water 1 S SCREENING	BOGZJ9	05-JAN-96	10-JAN-96	14-FEB-96
		Hold:03-JUL-96		
L6168-2 temp 2 Location: 157 Water 1 S SR-90 LAL-0196	BOGZJ9	05-JAN-96	10-JAN-96	14-FEB-96
		Hold:03-JUL-96		
L6168-3 temp 2 Location: 157	BOGZJ9	05-JAN-96	10-JAN-96	14-FEB-96
L6168-4 temp 2 Location: 157	BOGZJ9	05-JAN-96	10-JAN-96	14-FEB-96
L6168-5 temp 2 Location: 157	BOGZJ9	05-JAN-96	10-JAN-96	14-FEB-96
L6168-6 Location: Water 1 S EDD - DISK DEL. Water 1 S RAD RPT TYPE 2	REPORT TYPE	10-JAN-96	10-JAN-96	14-FEB-96

Signature: *[Handwritten Signature]*

Date: 1-10-96

01105960f

Bechtel Hanford, Inc.

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

LL6168

Data Turnaround
 Priority
 Normal

Collector <i>A. Rizzo / B. Fehibors</i>	Company Contact J.V. Borghese	Telephone (509) 373-4790
Project Designation 100-NR-2 Monthly Performance Monitoring - Jan.	Sampling Location 100 N	SAF No. B96-036
Ice Chest No. <i>HAMMER</i>	Field Logbook No. <i>EFL-1056</i>	Method of Shipment Federal Express
Shipped To Lockheed	Offsite Property No. <i>W96-0-0640-15</i>	Bill of Lading/Air Bill No. <i>2904647002</i>

Possible Sample Hazards/Remarks	Preservation	HNO ₃	Cool 4°C
		Type of Container	P/G
	No. of Container(s)	4	1
Special Handling and/or Storage Maintain samples between 2°C and 6°C.	Volume	1L	125mL
SAMPLE ANALYSIS		Sr-90	Activity Scan

Sample No.	Matrix*	Date Sampled	Time Sampled
BOGZJ9	W	1-5-96	1147

CHAIN OF POSSESSION	Sign/Print Names	SPECIAL INSTRUCTIONS	Matrix*
Relinquished By <i>A. Rizzo</i> Date/Time 0800	Received By <i>EFL</i> Date/Time 0900		<ul style="list-style-type: none"> 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
Relinquished By <i>A. Rizzo (EFL)</i> Date/Time 11/9/96	Received By <i>B. Fehibors</i> Date/Time 1-9-96		
Relinquished By <i>EFL</i> Date/Time 0830	Received By _____ Date/Time _____		
Relinquished By <i>B. Fehibors</i> Date/Time 1-9-96	Received By _____ Date/Time _____		
Relinquished By _____ Date/Time _____	Received By _____ Date/Time _____		

LABORATORY SECTION	Received By <i>[Signature]</i>	Title <i>Sample Custodian</i>	Date/Time <i>1-10-96 / 0900</i>
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

100 NR 2

FedX

298 4549 002

SAMPLE CHECK-IN LIST

Date/Time Received: 1-10-96/0900

SDG#: MA

Work Order Number: MA

SAF #: B96-036

Shipping Container ID: HAMMER

Chain of Custody # N/A

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

7. Samples have:

<u> </u> tape	<u> </u> hazard labels
<input checked="" type="checkbox"/> custody seals	<input checked="" type="checkbox"/> appropriate sample labels

8. Samples are:

<input checked="" type="checkbox"/> in good condition	<u> </u> leaking
<u> </u> broken	<u> </u> have air bubbles

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

Yes No []

Notes: _____

Sample Custodian/Laboratory: McNeill Date: 1-10-96

Telephoned To: Kathleen Hall On 1-10-96 By Anthony Miller

01105960A

LOCKHEED MARTIN



Sample Login Login Review Checklist

Lot Number LL168

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>	_____ <u>010</u>

Heinrich
primary review signature

1-10-96
date

Paul Davis
secondary review signature

1-10-96
date

01054A

Lockheed Analytical Services
Sample Receiving Checklist

Client Name: *Bechtel-Hatch*

Job No. *L6168*

Cooler ID:

COOLER CONDITION UPON RECEIPT			
Temperature of cooler upon receipt:	<i>2°C</i>		
temperature of temp. blank upon receipt:			
	Yes	No	* Comments/Discrepancies
custody seals intact	<input checked="" type="checkbox"/>		
chain of custody present	<input checked="" type="checkbox"/>		
blue ice (or equiv.) present/frozen	<input checked="" type="checkbox"/>		
rad survey completed	<input checked="" type="checkbox"/>		
SAMPLE CONDITION UPON RECEIPT			
	Yes	No	* Comments/Discrepancies
all bottles labeled	<input checked="" type="checkbox"/>		
samples intact	<input checked="" type="checkbox"/>		
proper container used for sample type	<input checked="" type="checkbox"/>		
sample volume sufficient for analysis	<input checked="" type="checkbox"/>		
proper pres. indicated on the COC	<input checked="" type="checkbox"/>		
VOA's contain headspace			<i>✓</i>
are samples bi-phasic (if so, indicate sample ID'S):			<i>✓</i>
MISCELLANEOUS ITEMS			
	Yes	No	* Comments/Discrepancies
samples with short holding times		<input checked="" type="checkbox"/>	
samples to subcontract		<input checked="" type="checkbox"/>	
ADDITIONAL COMMENTS/DISCREPANCIES			
Completed by / date:	<i>Amille 1-10-96</i>		
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			

1111-1111

11

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

Client Sample Number	LAL Sample Number	SDG Number	Matrix	Method
BOGZJ9-	L6168-1 L6168-2		Water Water	- SCREENING - SR-90 LAL-0196
REPORT TYPE	L6168-6 L6168-6		Water Water	EDD - DISK DEL. RAD RPT TYPE 2

MUNSTON

LOCKHEED ANALYTICAL SERVICES
 LOGIN CHAIN OF CUSTODY REPORT (ln01)
 Jan 11 1996, 03:19 pm

Login Number: L6175
 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
L6175-1 TEMP 2 Location: 157 Water 1 S SCREENING	B0GYZ1	09-JAN-96	11-JAN-96	26-JAN-96
		Hold:07-JUL-96		
L6175-2 TEMP 2 Location: 157 Water 1 S SR-90 LAL-0196	B0GYZ1	09-JAN-96	11-JAN-96	26-JAN-96
		Hold:07-JUL-96		
L6175-3 TEMP 2 Location: 157	B0GYZ1	09-JAN-96	11-JAN-96	26-JAN-96
L6175-4 TEMP 2 Location: 157	B0GYZ1	09-JAN-96	11-JAN-96	26-JAN-96
L6175-5 TEMP 2 Location: 157	B0GYZ1	09-JAN-96	11-JAN-96	26-JAN-96
L6175-6 Location: Water 1 S EDD - DISK DEL. Water 1 S RAD RPT TYPE 2	REPORT TYPE	11-JAN-96	11-JAN-96	26-JAN-96

Signature: Paul C. Dams
 Date: 1-11-96

Bechtel Hanford, Inc.

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

L6175

Data Turnaround

- Priority
- Normal

Collector <i>P. Bowers, M. Mehlhorn, P. St. John</i>	Company Contact J.V. Borghese	Telephone (509) 373-4790
Project Designation 100-NR-2 Monthly Performance Monitoring - Seeps	Sampling Location 100 N	SAF No. B96-036
Ice Chest No. <i>SMC-151</i>	Field Logbook No. <i>EFL-133-1</i>	Method of Shipment Federal Express
Shipped To Lockheed	Offsite Property No. <i>W96-0-0640-10</i>	Bill of Lading/Air Bill No. <i>2904649063</i>

Possible Sample Hazards/Remarks	Preservation				HNO ₃	Cool 4°C				
	Type of Container				P/G	P/G				
	No. of Container(s)				<i>4</i>	1				
Special Handling and/or Storage Maintain samples between 2°C and 6°C.	Volume				1L	20mL				

SAMPLE ANALYSIS

Sample No.	Matrix*	Date Sampled	Time Sampled							
BOGYZ1	W	<i>1-9-96</i>	<i>1324</i>			X	X			

CHAIN OF POSSESSION	Sign/Print Names	SPECIAL INSTRUCTIONS	Matrix*
Relinquished By <i>M. Mehlhorn</i>	Date/Time <i>1-10-96</i>	Received By <i>EFL</i>	Date/Time <i>0830</i>
Relinquished By <i>M. Mehlhorn</i>	Date/Time <i>0830</i>	Received By <i>B. Whitte</i>	Date/Time <i>1-10-96</i>
Relinquished By <i>EFL</i>	Date/Time <i>0900</i>	Received By	Date/Time
Relinquished By <i>B. Whitte</i>	Date/Time <i>1-10-96</i>	Received By	Date/Time
Relinquished By <i>DLA</i>	Date/Time	Received By	Date/Time

- 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 <i>A. Miller</i>	Title <i>Sample Custodian</i>	Date/Time <i>1-11-96 / 0900</i>
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

111111

Fed X

290 4649 063

WHC-SOW-93-0003
Revision 4

SAMPLE CHECK-IN LIST

Date/Time Received: 1-11-96/0900

SDG#: _____

Work Order Number: _____

SAF #: B96-C36

Shipping Container ID: SML-151

Chain of Custody # _____

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

7. Samples have:

<u> </u> tape	<u> </u> hazard labels
<input checked="" type="checkbox"/> custody seals	<u> </u> appropriate sample labels

8. Samples are:

<input checked="" type="checkbox"/> in good condition	<u> </u> leaking
<u> </u> broken	<u> </u> have air bubbles

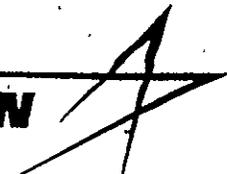
9. Is the information on the COC and Sample bottles in agreement?
 Yes No

Notes: _____

Sample Custodian/Laboratory: Paula Davis/LAS Date: 1-11-96
 Faxed
 Telephoned To: Kathleen Hall On 1-11-96 By Paula Davis
 PCO 1-11-96

Circle

LOCKHEED MARTIN



Sample Login Login Review Checklist

Lot Number L6125

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>	_____

016

Paul Davis 1-11-96
primary review signature date

[Signature] 1-11-96
secondary review signature date

011596

Lockheed Analytical Services

Sample Receiving Checklist

Client Name: Bechtel - Hanford

Job No. L6125

Cooler ID: N/A

COOLER CONDITION UPON RECEIPT

Temperature of cooler upon receipt:	<u>29</u>		
temperature of temp. blank upon receipt:			
	Yes	No	* Comments/Discrepancies
custody seals intact	<u>X</u>		
chain of custody present	<u>X</u>		
blue ice (or equiv.) present/frozen	<u>X</u>		
rad survey completed	<u>X</u>		

SAMPLE CONDITION UPON RECEIPT

	Yes	No	* Comments/Discrepancies
all bottles labeled	<u>X</u>		
samples intact	<u>X</u>		
proper container used for sample type	<u>X</u>		
sample volume sufficient for analysis	<u>X</u>		
proper pres. indicated on the COC	<u>X</u>		
VOA's contain headspace			
are samples bi-phasic (if so, indicate sample ID'S):		<u>N/A</u>	<u>N/A</u>

MISCELLANEOUS ITEMS

	Yes	No	* Comments/Discrepancies
samples with short holding times		<u>X</u>	
samples to subcontract		<u>N/A</u>	

ADDITIONAL COMMENTS/DISCREPANCIES

Completed by / date: Paul C. [Signature] 1-11-86

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

111-111

017

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

Client Sample Number	LAL Sample Number	SDG Number	Matrix	Method
BOGYZI -	L6175-1 L6175-2		Water Water	SCREENING - SR-90 LAL-0196 -
REPORT TYPE -	L6175-6 L6175-6		Water Water	EDD - DISK DEL. - RAD RPT TYPE 2 -

LOCKHEED ANALYTICAL SERVICES

RAD DATA REPORT (ra01)

Bechtel Hanford, Inc. * Richland, WA

Bechtel Hanford Project (Project BECHTEL-HANFORD)

Client Sample ID: B0GZJ9

LAL Sample ID: L6168-2

Date Collected: 05-JAN-96

Date Received: 10-JAN-96

Matrix: Water

Login Number: L6168

SDG: LK6168

Constituent	Analyzed	Batch	Activity	Error	MDA	Data Qual	Units
Total radio-strontium	19-JAN-96	SR-90 LAL-0196_32462	7840	390	1.1		pCi/L

LOCKHEED ANALYTICAL SERVICES

RAD DATA REPORT (ra01)

Bechtel Hanford, Inc. * Richland, WA

Bechtel Hanford Project (Project BECHTEL-HANFORD)

Client Sample ID: B0GYZ1

LAL Sample ID: L6175-2

Date Collected: 09-JAN-96

Date Received: 11-JAN-96

Matrix: Water

Login Number: L6175

SDG: LK6168

Constituent	Analyzed	Batch	Activity	Error	MDA	DataQual	Units
Total radio-strontium	19-JAN-96	SR-90 LAL-0196_32462	0.85	0.54	0.87		pCi/L

021

KLVD 513177
ACSR81
RIS

U.S. Environmental Protection Agency
Environmental Monitoring Systems Laboratory-Las Vegas
Nuclear Radiation Assessment Division

Calibration Certificate

Description

Principal radionuclide	<input type="text" value="Strontium-90"/>	Half-life	<input type="text" value="28.6 years"/>
Nominal activity	<input type="text" value="27"/> <input type="text" value="nano"/> curies		
Nominal volume	<input type="text" value="5"/> ml in ampule/bottle number	<input type="text" value="94003-1"/>	

Measurement Activity of principal radionuclide

Activity per gram of this solution

<input type="text" value="5.40"/>	<input type="text" value="nano"/> curies	of	<input type="text" value="Strontium-90"/>
		at 0400 hours PST on	<input type="text" value="April 1, 1994"/>

Activity of daughter radionuclide

The principal activity was accompanied at the quoted time by

<input type="text" value="5.40"/>	<input type="text" value="nano"/> curies	Per gram
of the daughter nuclide	<input type="text" value="Yttrium-90"/>	

Total mass of this solution

<input type="text" value="Approximately 5.0"/> grams
--

Method of measurement

The activity of the primary solution was measured by liquid scintillation counting.

The activity of the dilution was measured by liquid scintillation counting.

Useful Life

This radionuclide has decayed through	<input type="text" value="0.0"/>	half lives since it was obtained by EMSL-LV
We recommend that this solution should not be used after	<input type="text" value="August 1994"/>	

This dilution was prepared for the 1994 ASTM Collaborative Study of a test method for the determination of Sr-90 in water.

032

CST 3C

Purity

The manufacturer states that activities other than that of the principal nuclide and of its daughter nuclides, if any, were estimated/known to be:

- (1) less than equal to % of the principal activity
- (2) less than equal to % of the principal activity
- (3) less than equal to % of the principal activity

The activity of impurity (1) is not (2) is not (3) is not included in the quoted figures of the principal activity.

Random Errors

The precision of this standard was such that the certified value of the radioactive concentration of the principal activity had a standard error (sm) not greater than $\pm 0.1\%$ (The 99.7% confidence limits are given by $t(sm)$ where t is obtained from the student t factor for the degree of freedom $(n-1)$).

The maximum uncertainty due to the assessable systematic errors (dilution, counting, and known uncertainty of the standard) is obtained by the separate arithmetic summation of the positive and negative systematic error $(+\delta - \delta')$. These have been estimated not to exceed

$+3.8\%$ or -3.8%

the overall uncertainty (often called accuracy) is an estimate of the possible divergence of the quoted result from the true value. It is a combination of random error $[t(sm)]$ at the 99.7% confidence limits and the worst case estimate of the systematic errors $(+\delta, -\delta')$. The overall uncertainty is therefore calculated on the basis of $+ [t(sm) + \delta]$, $- [t(sm) + \delta]$ and is $+4.0\%$, -4.0% of the quoted radioactive concentration.

Decay Schemes

This standardization is based on the following assumptions of the principle nuclide, its daughter nuclides and impurities (no allowance for error in these assumptions or the assumption of quoted half-life have been included in the statement of accuracy above).

Strontium-90 decays 100 percent by beta emission to yttrium-90. Yttrium-90 also decays 100 percent by beta emission.

Chemical Composition of Solution

Carrier content per gram of solution:
30 micrograms strontium

Other components:
0.1 M HCl

Preservative:

Remarks

Date Certificate Prepared April 26, 1994

Approval Signature

Paul B. Fahn

033

Sr-90

INITIAL STANDARD DILUTION RECORD

Standard Information:

Isotope:	<u>Sr-90</u>	Vendor:	<u>EPA</u>
Activity of Standard Received:	2.7×10^4 uCi	Vendor I.D. #	<u>94003-1</u>
Weight of Standard Received (g):	<u>50</u> g	LAL I.D. #:	<u>AC5281</u>
Standard Activity (pCi/g):	5.4×10^3 pCi/g	NIST Traceable?	<u>yes</u>
Half-life in Years or Days:	<u>28.6</u> yrs	Certificate #:	<u>94003-1</u>
Reference Date:	<u>4-1-1994</u>	Receiver's Name:	<u>K. Free</u>
		Date Received:	<u>5-3-94</u>

Primary Dilution

Balance Verification?:	<u>yes</u>
Diluent Used:	<u>0.1 M HCl</u>
a: Decay Corrected Standard Activity (pCi/g):	5.4×10^3 pCi/g
b: Weight of the Source Transferred (g):	<u>4.9670</u> g
c: Total diluted weight (g):	<u>49.91</u> g
d: Total Diluted Volume (mL)	<u>50</u> mL
e: Activity of Dilution by Weight (pCi/g) [a * b / c]:	<u>537.4</u> pCi/g
f: Calculated Density of Solution (g/mL) [c / d]:	<u>0.9982</u> g/mL
g: Activity of Dilution by Volume (pCi/mL) [e * f]:	<u>536.44</u> pCi/mL
h. Dilution Logbook I.D. #:	<u>93-474-81-1 73-474-82-1 CP4/1/95</u>
Prepared By: <u>Ayres Wong</u>	Preparation Date: <u>6-15-94</u>
Reviewed By: <u>Joe Hutchison</u>	Review Date: <u>6/30/94</u>
Purity/Cross Check Performed By: _____	Check Date: _____

034

Signed

Date

Signed

Date

SECONDARY/WORKING LEVEL STANDARD DILUTION RECORD

Dilution Source Information	
Isotope:	<u>Sr-90</u>
Parent Barcode Number	<u>AC5281</u>
Vendor or Certificate I.D. # of Parent Standard:	<u>EPA 94003-1</u>
Diluted Source Logbook I.D. #:	<u>93-474-82-1</u>
Balance Verification?:	<u>Yes</u>
Diluent Used:	<u>0.1 M HCl</u>

Dilution	
*Diluent:	<u>0.1 M HCl</u>
*Density of diluent (g/ml):	<u>N/A</u>
a: Parent Specific Activity:	<u>536.44 pCi/ml</u>
b: Amount of Source Transferred:	<u>5.0018 g</u>
c: Total amount of Dilution:	<u>100.20 g</u>
d: Total Volume of Dilution:	<u>N/A</u>
e: Activity of Dilution (a * b / c):	<u>N/A</u>
f: Activity of Dilution (a * b / d):	<u>26.78 pCi/ml</u>
Dilution Logbook I.D. #:	<u>94-677-44-1</u>
Prepared By: <u>Agnes Wong</u>	Preparation Date: <u>3-2-95</u>
Reviewed By: <u>Joe H...</u>	Review Date: <u>3/3/95</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.

035

Signed	Date	Signed <u>Agnes Wong</u>	Date <u>3-3-95</u>
--------	------	--------------------------	--------------------

Strontium Carrier Standardization

Strontium Carrier (10 mg/mL):

Use commercially available 10,000 µg Sr/mL ICP Standard or equivalent. Alternately, Dissolve 24.16 g of Sr(NO₃)₂ in water and dilute to 1 L in a volumetric flask with water.

Perform calibration check on a 0.5 mL pipet and then carefully pipet 3 - 0.5 mL portions of the strontium carrier solution into separate cleaned dried and tared planchets. Dry the planchet under a drying lamp. Cool the planchets in a desiccator and weigh.

	Calib # 1	Calib # 2	Calib # 3
Carrier plus planchet wt. (mg)	6865.84	6562.93	6540.56
Tare wt. of planchet (mg)	6853.57	68 6550.76	6528.26 6520
Net wt. of carrier added (mg)	12.27	12.17	12.30

AVERAGE Sr(NO₃)₂ ± STD DEV. = 12.25 ± 0.0681 (0.61225g ± 0.0061g)
Per 0.5mL

Expected mg of Sr(NO₃)₂ = cert.value (=10mg of Sr/mL) * 0.5 mL * 2.41

Within 3% of expected (12.08 mg/0.5 mL) value (yes/no) yes

Initial and Date: WL 10-5-95

94-658-20

Walter Lutz 10-11-95

Continued on Page _____

 Signed	<u>10-4-95</u> Date	Read and Understood By  Signed	036 <u>1-16-96</u> Date

CERTIFICATE OF ANALYSIS

Catalog Number: PLSR2-3X Lot No. G3-153SR
 Element and Matrix: Sr/HNO₃/H₂O
 Starting Material: Strontium Carbonate SrCO₃
 Starting Material Lot Number: 05941D

Trace Metallic Impurities in the actual solution via ICP of the concentrate.

<u>Element</u>	<u>PPM</u>	<u>Element</u>	<u>PPM</u>	<u>Element</u>	<u>PPM</u>
Ag	<.05	Cu	<.05	P	<.05
Al	<.05	Fe	<.05	Pb	.06
As	<.05	Ga	<.05	Sb	<.10
B	<.05	In	<.05	Si	<.05
Ba	<.05	K	<.05	Sn	<.10
Be	<.05	Li	<.05	Ti	<.05
Bi	<.05	Mg	<.05	Tl	<.05
Ca	<.05	Mn	<.05	V	<.05
Cd	<.05	Mo	<.10	Zn	<.05
Co	<.05	Na	<.05	Zr	<.10
Cr	<.05	Ni	<.05		

Traceability Documentation For Solution Standard:

1. Classical Wet Assay: 10,050 ppm.

Titrimetry: EDTA titration using Methyl Thymol Blue as indicator. EDTA standardized against NIST Pb(NO₃)₂ SRM 928.

2. Instrumentation Analysis By Inductively Coupled Plasma Spectrometer[ICP]: 10,009 ppm via NIST SRM 3153a.

3. Balances are calibrated with NIST weight sets N.J. #92589 and #92550, according to NIST circular 547 3.4.3.

SPEX plasma solution standards are guaranteed stable and accurate to ± 0.5% of labeled concentration for one year from date of shipment. This value is the sum of cumulative errors associated with analytical determinations, pipetting and diluting to final volume. For these solutions we use high purity acids, 18 megohm double deionized water and triple rinsed bottles. All glassware used is class A.

Signed by: N. Kochendakota, Chemical Production Manager, Date: SEP 95

Kearney/Centaur Division
A.T. Kearney, Inc.
2952 George Washington Way
Richland, Washington 99352
509 375 5667
Facsimile 509 375 5151

Management
Consultants



ATKEARNEY

21 March 1996

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

Dear Ms. Kessner:

Enclosed are the radiochemistry data validation reports
for sample data groups W0872-QES and LK6168-LES.

Sincerely,

A handwritten signature in black ink, appearing to read "R. Bruce Christian".

R. Bruce Christian
Consultant

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

Date: March 21, 1996
To: Bechtel Hanford, Inc. (technical representative)
From: A.T. Kearney, Inc.
Project: 100-NR-2 Performance Monitoring, Round 0 - January Samples
Subject: Radiochemistry - Data Package No. LK6168-LAS (SDG No. LK6168)

INTRODUCTION

This memo presents the results of data validation on Summary Data Package No. LK6168-LAS prepared by Lockheed Analytical Services (LAS). A list of samples validated along with the analyses reported and the method of analysis is provided in the following table.

Sample ID	Sample Date	Media	Validation Level	Analysis
BOGYZ1	01/09/96	Water	C	Strontium-90 (LAL-92-SOP-0196)
BOGZJ9	01/09/96	Water	C	Strontium-90 (LAL-92-SOP-0196)

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

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

DATA QUALITY OBJECTIVES

- **Holding Times**

Holding times are calculated from Chain-of-Custody forms to determine the validity of the results. The maximum holding time for radiochemical analyses is six months.

All holding times were acceptable.

- **Instrument Calibration and Performance**

Instrument calibration is performed to establish that the counters used to determine radionuclide activities are capable of producing acceptable and reliable

000001

analytical data. Each counting system must be factory calibrated at installation and after any maintenance or repair. Calibration consists of an instrument efficiency determination for each applicable radionuclide. Continuing calibration checks are performed to verify that instrument performance is stable and reproducible.

Initial and continuing calibrations are not reviewed under Level C validation.

- **Blanks**

Laboratory Blanks

Blank samples are analyzed to determine if positive results are due to laboratory reagent, sample container, or detector contamination. If blank analysis results indicate the presence of an analyte above the MDA, the following qualifiers are applied: All positive sample results less than five times the highest blank concentration are qualified as estimates and flagged "J"; sample results below the MDA are elevated to the MDA and qualified as undetected and flagged "U"; sample results above the MDA and greater than five times the highest blank concentration are not qualified.

All blank results were acceptable.

- **Accuracy**

Accuracy is evaluated by analyzing distilled water and field samples spiked with known amounts of radionuclides. The sample activity as determined by analysis is compared to the known activity to assess accuracy. The acceptable laboratory control sample recovery range is 70% to 130%, while that for a matrix spike is 60% to 140%. In addition, samples may be spiked with a radiochemical tracer to assist in isolating the radioisotope of interest with the yield of the tracer being used in calculating sample activity. The acceptable range for tracer recovery is 20% to 105%. Spike sample results outside the above ranges result in associated sample results being qualified as estimates, rejected, or not qualified, depending on the activity of the individual sample.

All accuracy results were acceptable.

- **Precision**

Analytical precision is expressed by the RPD between the recoveries of duplicate matrix spike analyses performed on a sample. Precision may also be assessed using unspiked duplicate sample analyses. If both sample and replicate activities are greater than five times the CRDL and the RPD is less than 35 percent for soil

000002

samples and 20 percent for water samples, the results are acceptable. If either activities are less than five times the CRDL, a control limit of less than or equal to two times the CRDL is used for soil samples and less than or equal to the CRDL for water samples. If either the original or replicate value is below the CRDL, the applicable control limits are less than or equal to the CRDL for water samples and less than or equal to two times the CRDL for soil samples. If the RPD is outside the applicable control limit, associated results are qualified as estimated detects or estimated non-detects.

All precision results were acceptable.

Split Samples

Two sets of field split samples were submitted for analysis as shown below:

<u>Sample Number</u>	<u>Split Sample No.</u>	<u>Well Location</u>
BOGYX4(QES)	BOGYZ1(LAS)	NS-1
BOGZH4(QES)	BOGZJ9(LAS)	199-N-99A

Sample BOGYX4 was submitted to Quanterra Environmental Services (QES) and analyzed with SDG No. W0872-QES. The split sample results were compared using the validation guidelines for determining the RPD between a sample and its duplicate. All results fell within the required control limits. The analytical results for split sample pair BOGZH4/BOGZJ9 were not compared due to sample BOGZH4 not being submitted for validation.

- **Detection Levels**

Reported laboratory detection levels are reviewed to ensure that they are at or below the CRDL. All reported MDAs were at or below the analyte specific CRDL.

- **Completeness**

Data Package No. LK6168-LAS (SDG No. LK6168) was submitted for validation and verified for completeness. The completion rate was 100%.

MAJOR DEFICIENCIES

None found.

000003

MINOR DEFICIENCIES

None found.

REFERENCES

- EPA, 1987, *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods*, SW-846, Third Edition, Environmental Protection Agency, Washington, D.C.
- EPA, 1988a, *EPA Contract Laboratory Program Statement of Work for Organics Analyses, Multi-Media, Multi-Concentration*, U.S. Environmental Protection Agency, Washington, D.C.
- EPA, 1988b, *Laboratory Data Validation Functional Guidelines for Evaluating Organics Analyses*, U.S. Environmental Protection Agency, Washington, D.C.
- EPA, 1988c, *EPA Contract Laboratory Program Statement of Work for Inorganics Analyses, Multi-Media, Multi-Concentration*, U.S. Environmental Protection Agency, Washington, D.C.
- EPA, 1988d, *Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analyses*, U.S. Environmental Protection Agency, Washington, D.C.
- EPA, 1990, *EPA Contract Laboratory Program Statement of Work for Inorganic Analyses, Multi-media, Multi-Concentration*, U.S. Environmental Protection Agency, Washington, D.C.
- EPA, 1991, *EPA Contract Laboratory Program Statement of Work for Organics Analyses, Multi-Media, Multi-Concentration*, Environmental Protection Agency, Washington, D.C.
- WHC, 1992a, *Data Validation Procedures for Chemical Analyses*, WHC-SD-EN-SPP-002, Rev. 2, Westinghouse Hanford Company, October 1993.
- WHC, 1992b, *Data Validation Procedure for Radiological Analyses*, WHC-SD-EN-SPP-001, Rev. 2, Westinghouse Hanford Company, 1993.
- EPA, 1994, *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*, U.S. Environmental Protection Agency, Washington, D.C.

Appendix 1
Glossary of Data Reporting Qualifiers

000005

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

- U - Indicates the compound or analyte was analyzed for and not detected above the minimum detectable activity (MDA) in the sample. The value reported is the sample result corrected for sample dilution and moisture content by the laboratory. The data is usable for decision making purposes.
- UJ - Indicates the compound or analyte was analyzed for and not detected at concentrations above the minimum detectable activity (MDA) in the sample. Due to a QC deficiency identified during the data validation, the associated quantitation limit is an estimate, but is usable for decision making purposes.
- J - Indicates the compound or analyte was analyzed for and detected. Due to a QC deficiency identified during the data validation, the associated concentration is an estimate, but the data are usable for decision-making purposes.
- R - Indicates the compound or analyte was analyzed for, detected, and due to an identified QC deficiency, the data are unusable.
- UR - Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data is unusable due to an identified QC deficiency.

000006

Appendix 2
Summary of Data Qualification

000007

DATA QUALIFICATION SUMMARY

SDG: LK6168	REVIEWER: RBC	DATE: 03/21/96	PAGE <u>1</u> OF <u>1</u>
COMMENTS: No qualifiers assigned.			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON

000008

Appendix 3

Qualified Data Summary and Annotated Laboratory Reports

000009

LOCKHEED ANALYTICAL SERVICES

RAD DATA REPORT (ra01)

Bechtel Hanford, Inc. * Richland, WA

Bechtel Hanford Project (Project BECHTEL-HANFORD)

Client Sample ID: B0GZJ9

LAL Sample ID: L6168-2

Date Collected: 05-JAN-96

Date Received: 10-JAN-96

Matrix: Water

Login Number: L6168

SDG: LK6168

constituent	Analyzed	Batch	Activity	Error	MDA	DataQual	Units
Total radio-strontium	19-JAN-96	SR-90 LAL-0196_32462	7840	390	1.1		pci/L

*Review
3/20/96*

020

LOCKHEED ANALYTICAL SERVICES

RAD DATA REPORT (ra01)

Bechtel Hanford, Inc. * Richland, WA

Bechtel Hanford Project (Project BECHTEL-HANFORD)

Client Sample ID: B0GYZ1

LAL Sample ID: L6175-2

Date Collected: 09-JAN-96

Date Received: 11-JAN-96

Matrix: Water

Login Number: L6175

SDG: LK6168

Constituent	Analyzed	Batch	Activity	Error	MBA	Data Qual	Units
Total radio-strontium	19-JAN-96	SR-90 LAL-0196_32462	0.85	0.54	0.87		pCi/L

REC
3/20/96

021K

Page *1/1*

000012

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

000013

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



January 24, 1996

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

RE: Log-in No.: L6168/L6175
Quotation No.: Q400000-B
SAF: B96-036
Document File No.: 0110596A/0111596
WHC Document File No.: 317
SDG No.: LK6168



The attached data report contains the analytical results of samples that were submitted to Lockheed Analytical Services on 10 and 11 January 1996.

The temperature of the coolers upon receipt were 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) 375-4741.

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

000014

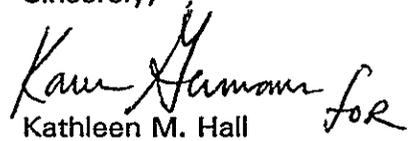
003

Lockheed Analytical Services

Log-in No.: L6168/L6175
Quotation No.: Q400000-B
SAF: B96-036
Document File No.: 0110596A/0111596
WHC Document File No.: 317
SDG No.: LK6168

" 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

000015

004

Lockheed Analytical Services

Log-in No.: L6168/L6175
Quotation No.: Q400000-B
SAF: B96-036
Document File No.: 0110596A/0111596
WHC Document File No.: 317
SDG No.: LK6168

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, duplicate samples.

NOTE: Chemical recoveries and minimum detectable activities (MDAs) can be found on the preparation sheets and calculation sheets on the attached raw data for each method.

Holding Time Requirements

All holding times were met.

Gas Proportional Counter

Analytical Method Total Strontium

The total strontium analysis was performed using standard operating procedure, LAL-92-SOP-0196. The samples were analyzed in workgroup 32462. The instrument calibration verification met criteria. The method blank was within QC criteria. The laboratory control sample recovery was within QC criteria. The duplicate recoveries were within QC criteria. No re-analyses were performed.

Yvonne M. Jacoby
Prepared By

January 24, 1996
Date

000016

~~005~~

Bechtel Hanford, Inc.

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

L6175

Data Turnaround

- Priority
- Normal

Collector <i>D. Bauer, M. Mehlman, P. St. John</i>	Company Contact J.V. Borghese	Telephone (509) 373-4790
Project Designation 100-NR-2 Monthly Performance Monitoring - Seeps	Sampling Location 100 N	SAF No. B96-036
Ice Chest No. <i>SMC-151</i>	Field Logbook No. <i>EFL-133-1</i>	Method of Shipment Federal Express
Shipped To Lockheed	Offsite Property No. <i>W96-0-0640-16</i>	Bill of Lading/Air Bill No. <i>2904649063</i>

Possible Sample Hazards/Remarks	Preservation	HNO ₃	Cool 4°C
		Type of Container	P/G <i>4</i>
Special Handling and/or Storage Maintain samples between 2°C and 6°C.	Volume	1L	20mL
SAMPLE ANALYSIS		Sr-90	Activity Scan

Sample No.	Matrix*	Date Sampled	Time Sampled										
B0GYZ1	W	1-9-96	1324			X	X						

CHAIN OF POSSESSION	Sign/Print Names	SPECIAL INSTRUCTIONS	Matrix*
Relinquished By <i>M. Mehlman</i>	Date/Time <i>1-10-96</i>	Received By <i>ERL</i>	Date/Time <i>0930</i>
Relinquished By <i>M. Mehlman</i>	Date/Time <i>0930</i>	Received By <i>B. Whitte</i>	Date/Time <i>1-10-96</i>
Relinquished By <i>ERL</i>	Date/Time <i>0900</i>	Received By	Date/Time
Relinquished By <i>K. Whitte</i>	Date/Time <i>1-10-96</i>	Received By	Date/Time
Relinquished By <i>[Signature]</i>	Date/Time	Received By	Date/Time
LABORATORY SECTION	Received By <i>[Signature]</i>	Title <i>Sample Custodian</i>	Date/Time <i>1-11-96 / 0900</i>
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

- 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

1000017

Bechtel Hanford, Inc.

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

LL6168

Data Turnaround

- Priority
- Normal

Collector <i>A. Rizzo / B. Fehler</i>	Company Contact J.V. Borghese	Telephone (509) 373-4790
Project Designation 100-NR-2 Monthly Performance Monitoring - Jan.	Sampling Location 100 N	SAF No. B96-036
Ice Chest No. <i>Hammer</i>	Field Logbook No. <i>EFL-1056</i>	Method of Shipment Federal Express
Shipped To Lockheed	Offsite Property No. <i>W96-0-0640-15</i>	Bill of Lading/Air Bill No. <i>2504647002</i>

Possible Sample Hazards/Remarks	Preservation	HNO ₃	Cool 4°C
	Type of Container	P/G	P/G
	No. of Container(s)	4	1
Special Handling and/or Storage Maintain samples between 2°C and 6°C.	Volume	1L	125mL
		Sr-90	Activity Scan

SAMPLE ANALYSIS

Sample No.	Matrix*	Date Sampled	Time Sampled				
B0GZJ9	W	1-5-96	1147			X	X
000018							

CHAIN OF POSSESSION	Sign/Print Names	SPECIAL INSTRUCTIONS	Matrix*
Relinquished By <i>[Signature]</i> Date/Time 0800	Received By <i>[Signature]</i> Date/Time 0900		<ul style="list-style-type: none"> 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
Relinquished By <i>AGR (EPL)</i> Date/Time 11/9/96	Received By <i>[Signature]</i> Date/Time 1-9-96		
Relinquished By <i>[Signature]</i> Date/Time 0830	Received By <i>[Signature]</i> Date/Time		
Relinquished By <i>[Signature]</i> Date/Time	Received By <i>[Signature]</i> Date/Time		

LABORATORY SECTION	Received By <i>[Signature]</i>	Title <i>Sample Custodian</i>	Date/Time <i>1-10-96/0900</i>
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

Appendix 5
Data Validation Supporting Documentation

000019

RADIOCHEMICAL DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT:	100-NR-2		DATA PACKAGE: LK6168		
VALIDATOR:	RBC	LAB:	LAS	DATE: 29 Feb 94	
CASE:	SDG: LK6168-LAS				
ANALYSES PERFORMED					
<input type="checkbox"/> Gross Alpha/Beta	<input checked="" type="checkbox"/> Strontium-90	<input type="checkbox"/> Technetium-99	<input type="checkbox"/> Alpha Spectroscopy	<input type="checkbox"/> Gamma Spectroscopy	
<input type="checkbox"/> Total Uranium	<input type="checkbox"/> Radium-22	<input type="checkbox"/> Tritium	<input type="checkbox"/>		
SAMPLES/MATRIX <i>Water</i>					
<i>BOGYZ1 + BOGZJ9</i>					

1. Completeness N/A

Technical verification forms present? Yes No N/A

Comments: _____

2. Initial Calibration N/A

Instruments/detectors calibrated within one year of sample analysis? Yes No N/A
 Initial calibration acceptable? Yes No N/A
 Standards NIST traceable? Yes No N/A
 Standards Expired? Yes No N/A

Comments: _____

3. Continuing Calibration N/A

Calibration checked within one week of sample analysis? . . . Yes No N/A

Calibration check acceptable? Yes No N/A

Calibration check standards NIST traceable? Yes No N/A

Calibration check standards expired? Yes No N/A

Comments: _____

4. Blanks N/A

Method blank analyzed? Yes No N/A

Method blank results acceptable? Yes No N/A

Analytes detected in method blank? Yes No N/A

Field blank(s) analyzed? Yes No N/A

Field blank results acceptable? Yes No N/A

Analytes detected in field blank(s)? Yes No N/A

Transcription/Calculation Errors? Yes No N/A

Comments: _____

5. Matrix Spikes N/A

Matrix spike analyzed? Yes No N/A

Spike recoveries acceptable? Yes No N/A

Spike source traceable? Yes No N/A

Spike source expired? Yes No N/A

Transcription/Calculation Errors? Yes No N/A

Comments: _____

6. Laboratory Control Samples N/A

LCS analyzed? Yes No N/A
LCS recoveries acceptable? Yes No N/A
LCS traceable? Yes No N/A
Transcription/Calculation Errors? Yes No N/A

Comments: _____

7. Chemical Recovery N/A

Chemical carrier added? Yes No N/A
Chemical recovery acceptable? Yes No N/A
Chemical carrier traceable? Yes No N/A
Chemical carrier expired? Yes No N/A
Transcription/Calculation errors? Yes No N/A

Comments: _____

8. Duplicates N/A

Duplicates Analyzed? Yes No N/A
RPD Values Acceptable? Yes No N/A
Transcription/Calculation Errors? Yes No N/A

Comments: _____

9. Field QC Samples N/A

Field duplicate sample(s) analyzed? Yes No N/A

Field duplicate RPD values acceptable? Yes No N/A

Field split sample(s) analyzed? Yes No N/A

Field split RPD values acceptable? Yes No N/A

Performance audit sample(s) analyzed? Yes No N/A

Performance audit sample results acceptable? Yes No N/A

Comments: _____
Field Splits BOG2H4 / BOG2J9 not compared
since BOG2H4 was not validated

10. Holding Times

Are sample holding times acceptable? Yes No N/A

Comments: _____

11. Results and Detection Limits (Levels D & E) N/A

Results reported for all required sample analyses? Yes No N/A

Results supported in raw data? Yes No N/A

Results Acceptable? Yes No N/A

Transcription/Calculation errors? Yes No N/A

MDA's meet required detection limits? Yes No N/A

Transcription/calculation errors? Yes No N/A

Comments: _____

A-4/4