

**START**

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**0043822**

LK3629 54  
2



# Lockheed Analytical Services

Ms. Doris Ayres  
Bechtel Hanford, Inc.  
345 Hill  
Richland, WA 99352



ANALYTICAL DATA REPORT

FOR

CHROMIUM AND RADIOCHEMISTRY



LOG-IN NUMBER:	<u>L3629</u>
QUOTATION NUMBER:	<u>Q400000-B</u>
SAF:	<u>94-104</u>
DOCUMENT FILE NUMBER:	<u>0113596A</u>
WHC DOCUMENT CONTROL NO:	<u>149</u>
SDG NUMBER:	<u>LK3629</u>

9613426.0834

 **Lockheed**  
*Environmental Systems & Technologies Co.*

Lockheed Analytical Services  
975 Kelly Johnson Drive  
Las Vegas, Nevada 89119-3705

Phone: (702) 361-0220  
Phone: (800) 582-7605  
Fax: (702) 361-8146

February 21, 1995

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



RE: Log-in No.: L3629  
Quotation No.: Q400000-B  
SAF: 94-104  
Document File No.: 0113596A  
WHC Document Control No.: 149  
SDG No.: LK3629

The attached data report contains the analytical results of samples that were submitted to Lockheed Analytical Services on 13 January 1995. The temperature of the cooler upon receipt was 4°C.

Sample containers received agree with the chain-of-custody documentation. Sample containers were received intact. Samples were received in time to meet the analytical holding time requirements.

The case narratives included in the following attachments provide a detailed description of all events that occurred during sample preparation, analysis, and data review specific to the samples and analytical methods requested.

A list of data qualifiers, chain-of-custody forms, sample receiving checklist, and log-in report are also enclosed representing the samples received within this group.

If you have any questions concerning the analysis or the data please call Kathleen Hall at (509) 943-4423.

**Lockheed Analytical Services**

Log-in No.: L3629  
Quotation No.: Q400000-B  
SAF: 94-104  
Document File No.: 0113596A  
WHC Document Control No.: 149  
SDG No.: LK3629

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

" I certify that this data package is in compliance with the SOW, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hard copy data package has been authorized by the Laboratory Manger or a designee, as verified by the following signature."

Sincerely,  
  
Kathleen M. Hall  
Client Services Representative

cc: Client Services  
Document Control

**Lockheed Analytical Services**

Log-in No.: L3629  
Quotation No.: Q400000-B  
SAF: 94-104  
Document File No.: 0113596A  
WHC Document Control No.: 149  
SDG No.: LK3629

**CASE NARRATIVE  
INORGANIC METALS ANALYSES**

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

**Holding Times-**

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

**Method Blanks-**

The method blanks were free of contamination.

**Internal Quality Control-**

All Internal Quality Control were within acceptance limits with the following exception: The duplicate sample precision for chromium was outside of acceptance limits. Poor duplicate sample precision may be attributed to inhomogeneity of the sample. Therefore, some variability may exist in sample results due to this inconsistency.

**Sample Results-**

Results are reported on a dry weight basis.

Shellee McGrath  
Prepared By

January 26, 1995  
Date

**Lockheed Analytical Services**

Log-in No.: L3629  
Quotation No.: Q400000-B  
SAF: 94-104  
Document File No.: 0113596A  
WHC Document Control No.: 149  
SDG No.: LK3629

## **CASE NARRATIVE RADIOCHEMICAL ANALYSES**

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

### **Holding Time Requirements**

All holding time requirements were met.

### **Analytical Method**

#### **Gamma Spectrum Analysis**

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

#### **Gross Alpha Beta**

The gross alpha beta analysis was performed using LAL-91-SOP-0060. The alpha matrix spike recovery was out of limits; however, because the LCS recovery was within limits, the data is considered acceptable. All other QC criteria were met.

#### **Plutonium Isotopic**

The plutonium analysis was performed using LAL-91-SOP-0108. No problems were encountered during analysis. All QC criteria were met.

#### **Strontium**

The strontium analysis was performed using LAL-91-SOP-0196. No problems were encountered during analysis. All QC criteria were met.

Yvonne M. Jacoby  
Prepared By

February 21, 1995  
Date

## TOTAL METALS RESULTS

Client Sample ID: BODDY2	Date Collected: 01-11-95	Matrix: soil
LAL Batch ID(s): 113 wh	Date Received: 01-13-95	Percent Solids: 78.5

Constituents	Method	Concentration (mg/kg)	IDL (mg/kg)	RDL (mg/kg)	Data Qualifier(s)	Date Analyzed	LAL ID
Chromium	6010	14	1.0	2.5	*	01-24-95	L3629-2

Comments:

RAD DATA REPORT (ra01)

Bechtel Hanford, Inc. \* Richland, WA

Bechtel Hanford Project (Project BECHTEL-HANFORD)

Client Sample ID: BODDY2

LAL Sample ID: L3629-4

Date Collected: 11-JAN-95

Date Received: 13-JAN-95

Matrix: Soil

Login Number: L3629

SDG: LK3629

Constituent	Analyzed	Batch	Activity	Error	MDA	DataQual	Units
Co-58	06-FEB-95	GAMMA SPEC LAL-0064_17979	0.12	0.11	0.18		pCi/g
Co-60	06-FEB-95	GAMMA SPEC LAL-0064_17979	3.17	0.26	0.094		pCi/g
Cs-137	06-FEB-95	GAMMA SPEC LAL-0064_17979	67.4	6.8	0.18		pCi/g
Eu-152	06-FEB-95	GAMMA SPEC LAL-0064_17979	45.2	3.3	0.30		pCi/g
Eu-154	06-FEB-95	GAMMA SPEC LAL-0064_17979	3.36	0.47	0.68		pCi/g
Eu-155	06-FEB-95	GAMMA SPEC LAL-0064_17979	0.08	0.24	0.40		pCi/g
Fe-59	06-FEB-95	GAMMA SPEC LAL-0064_17979	0.03	0.15	0.36		pCi/g
Pb-212	06-FEB-95	GAMMA SPEC LAL-0064_17979	1.05	0.23	0.30		pCi/g
Ra-226(GAMMA)	06-FEB-95	GAMMA SPEC LAL-0064_17979	1.9	1.9	3.0		pCi/g
U-235(GAMMA)	06-FEB-95	GAMMA SPEC LAL-0064_17979	-0.57	0.47	0.80		pCi/g
Gross Alpha	19-JAN-95	GR ALP/BETA LAL-0061_18040	15.2	6.3	6.7	C	pCi/g
Gross Beta	19-JAN-95	GR ALP/BETA LAL-0061_18040	112.2	9.4	5.4		pCi/g
Pu-238	30-JAN-95	PU-ISOTOPIC LAL-0108_18044	0.019	0.040	0.060		pCi/g
Pu-239/40	30-JAN-95	PU-ISOTOPIC LAL-0108_18044	1.27	0.27	0.049		pCi/g
Total radio-strontium	26-JAN-95	SR-90 LAL-0196_18045	1.93	0.28	0.33		pCi/g

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LOGIN CHAIN OF CUSTODY REPORT (ln01)  
 Jan 13 1995, 03:07 pm

Login Number: L3629  
 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
L3629-1 temp 4 Location: 157 Soil 4 S SCREENING	BODDY2	11-JAN-95	13-JAN-95	17-FEB-95
		Hold:10-JUL-95		
L3629-2 temp 4; Metals= Cr only Location: 157 Soil 4 S 6010 ICP METALS Soil 4 S PERCENT SOLIDS	BODDY2	11-JAN-95	13-JAN-95	17-FEB-95
		Hold:10-JUL-95		
		Hold:25-JAN-95		
L3629-3 temp 4; Metals= Cr only Location: 157	BODDY2	11-JAN-95	13-JAN-95	17-FEB-95
L3629-4 temp 4 Location: 157 Soil 4 S GAMMA SPEC LAL-0064 Soil 4 S GR ALP/BETA LAL-0061 Soil 4 S PU-ISOTOPIC LAL-0108 Soil 4 S SR-90 LAL-0196	BODDY2	11-JAN-95	13-JAN-95	17-FEB-95
		Hold:10-JUL-95		
L3629-5 temp 4 Location: 157	BODDY2	11-JAN-95	13-JAN-95	17-FEB-95
L3629-6 Location: Water 1 S EDD - DISK DEL. Water 1 S INORG TYPE 2 RPT +	REPORT TYPE	13-JAN-95	13-JAN-95	17-FEB-95

Signature: *U. Miller* 010  
 Date: 1-13-95

01135906

13-14

L3629

Westinghouse Hanford Company

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

1 of 1

Collector <i>D. Bowers / J. Famer / A. Simpson</i>	Company Contact David St. John	Telephone No. (509) 376-5376	<input type="checkbox"/> Surround <input checked="" type="checkbox"/> Priority <input checked="" type="checkbox"/> Normal
Project Designation 100-DR-1 Soil Washing Test	Sampling Location 100-DR-1	SAF No. 894-104	
Ice Chest No.	Field Logbook No. EFL-1159	Method of Shipment Hand Deliver	
Shipped Quantities <i>109 lbs ER-10 100 lbs Lockheed</i>	Offsite Property No. <i>W95-0-161-28</i>	Bill of Lading/Air Bill No. <i>2904016416 2904616425</i>	

Possible Sample Hazards/Remarks	Preservative	Cool	NONE	None	None	Cool											
	Type of Container	aGw	aGw	aGw	aGw	P											
	No. of Container(s)	2	1	1	1	1											
Special Handling and/or Storage Maintain between 2 C and 6 C.	Volume	40 ml	250 ml	1 L	500 ml	20ml											
SAMPLE ANALYSIS	chrom-ium	TCLP Metals Chromium	G.Alpha G.Beta Sr-90 Pu-239 Pu-240 Gamma Spec	G.Alpha G.Beta Sr-90 Pu-239 Pu-240 Gamma Spec	Activit y Scan												

Sample No.	Matrix*	Date Sampled	Time Sampled	chrom-ium	TCLP Metals Chromium	G.Alpha G.Beta Sr-90 Pu-239 Pu-240 Gamma Spec	G.Alpha G.Beta Sr-90 Pu-239 Pu-240 Gamma Spec	Activit y Scan										
BODDY2	s	1-11-95	0909	X	X	X	X											
BODDY4	S	1-11-95	1435	X	X	X	X											

CHAIN OF POSSESSION	Sign/Print Names	SPECIAL INSTRUCTIONS	Matrix*
Relinquished By <i>J.D. Famer</i>	Date/Time <i>1/11/95</i>	Received By <i>EAC</i>	Date/Time <i>1/11/95</i>
Relinquished By <i>EAC</i>	Date/Time <i>0830</i>	Received By <i>B. Whitten</i>	Date/Time <i>1-12-95</i>
Relinquished By	Date/Time	Received By	Date/Time
Relinquished By	Date/Time	Received By	Date/Time

>> DATA DELIVERABLE - SUMMARY. >> MOISTURE CONTENT SHOULD BE DETERMINED FOR ALL SOIL SAMPLES.

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 <i>N. Malle</i>	Title <i>Sample Custodian</i>	Date/Time <i>1-13-95 / 0915</i>
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

# Sample Login

## Login Review Checklist

Lot Number L362A

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

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

### Sample Summary Report

N/A

Yes No

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

### Login Chain of Custody Report

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

### Sample Receiving Checklist

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

M. Wells

1-13-95

Paul J. Dand

1-13-95

Primary review signature

Date

Secondary review signature

Date

Figure 1

# SAMPLE CHECK-IN LIST

(1 Per Shipping Container)

Date/Time Received 1-13-95 / 0915 Client Name Westinghouse  
 Project/Client # SAF 094-104 Batch or Case # N/A  
 Cooler ID (if noted on outside of cooler) none

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

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

<input checked="" type="checkbox"/> in good condition	<input type="checkbox"/> leaking
<input type="checkbox"/> broken	<input type="checkbox"/> have air bubbles
<input type="checkbox"/> other	
10. Coolant Present? Yes  No  Sample Temperature 4°C
11. The following paperwork should be accounted for. (N/A if not applicable):  
 Chain of Custody #(s) N/A  
 Request for Analysis #(s) N/A  
 Airbill # 29046116425 Carrier FedEx
12. Have any anomalies been identified above? Yes  No
13. Memos have been initiated for all anomalies identified above? Yes  No

Printed Name/Signature Anthony Miller *AM* Date/Time 1-13-95/0915

**Lockheed Analytical Services  
Sample Receiving Checklist**

Client Name: Westinghouse

Job No. L3629

Cooler ID:

**COOLER CONDITION UPON RECEIPT**

Temperature of cooler upon receipt:

4°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			<u>N/A</u>
are samples bi-phasic (if so, indicate sample ID'S):			<u>N/A</u>

**MISCELLANEOUS ITEMS**

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

**ADDITIONAL COMMENTS/DISCREPANCIES**

COC has ID # B000Y4 which has been logged in under another job, ID # B000Y2 is to be logged in separate from everything else per Kathleen Hall.

Completed by / date: N Miller 1-13-95

Sent to the client (date/initials):

\*\* Client's signature upon receipt:

Notes: \* = contact the appropriate CSR of any discrepancies immediately upon receipt

\*\* = please review this information and return via facsimile to the appropriate CSR (12) 361-8148

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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
BODDY2 -	L3629-1		Soil	SCREENING -
	L3629-2		Soil	6010 ICP METALS -
	L3629-2		Soil	PERCENT SOLIDS -
	L3629-4		Soil	GAMMA SPEC LAL-00-
	L3629-4		Soil	GR ALP/BETA LAL-0-
	L3629-4		Soil	PU-ISOTOPIC LAL-0-
	L3629-4		Soil	SR-90 LAL-0196 -
REPORT TYPE -	L3629-6		Water	EDD - DISK DEL -
	L3629-6		Water	INORG TYPE 2 RPT -

9613426.0846

**Golder Associates Inc.**

4104-148th Avenue, NE  
Redmond, WA 98052  
Telephone (206) 883-0777  
Fax (206) 882-5498

**RECORD COPY**



March 23, 1995



Our ref: 943-1610.083.0400  
94-1610/O/293

CH2M Hill  
P.O. Box 1510  
Richland, Washington 99352

ATTENTION: Ms. Jeanette Duncan

RE: TRANSMITTAL OF DATA VALIDATION PACKAGE,  
CONTRACT NO. MSH-SWV-315905

Dear Ms. Duncan:

This letter is to transmit the following data validation package:

<u>SAF#</u>	<u>Project</u>	<u>Data Package</u>	<u>Analyses</u>
B94-104	100 DR 1 Soil Washing	LK3629-LAS	Inorganics, Radiochemistry

Please call if you have any questions.

Sincerely,

GOLDER ASSOCIATES INC.

Christina I. Jensen  
Task Manager

Enclosures

3/27/95

Data Validation Check List

for Project 100-DR-1

HEIS Samp Number	Client Sample Number	Master DP File Number	DP Sequence Number	Laboratory	Y N	VOA	Y N	SEMI VOA	Y N	PEST/PCB	Y N	WETCHEM	Y N	METALS	COMMENTS	Y N	RADCHEM	Date OSM Rcvd DP	
BODDY2	<i>Split of BODDRI</i>	LK3629		LOCKHEED	N		N		N		N		N	Y	2/22/95	01/13/95 - SAF- B94-104	Y	2/22/95	2/22/95

Data Entry Complete: DP *Dsa 3-23-95*

DATATAC *9/2/95*  
*3/27/95*

*9614261847*

Validation Rcvd 3-24-95

9613426.0848

**RECORD COPY**  
MEMORANDUM



TO: 100-DR-1 Soil Washing Treatability Tests Project QA Record March 23, 1995  
FR: Anne Jensen, Golder Associates Inc. *aj*  
RE: INORGANIC DATA VALIDATION SUMMARY FOR DATA PACKAGE  
LK3629-LAS (943-1610.083 LK3629IN.DR1)

**INTRODUCTION**

This memo presents the results of data validation on data package LK3629-LAS prepared by Lockheed Analytical Services. Sample information is provided in the following table.

SAMPLE ID	COMMENTS	ANALYSIS	MEDIA
BODDY2*	FIELD SPLIT	INORGANICS SEE ATTACHMENT 4	SOIL
* - Indicates sample results which were 100% recalculated.			

Data validation was conducted to level D in accordance with the WHC statement of work (WHC 1994) and validation procedures (WHC 1993). Attachments 1 through 5 provide the following information as indicated below:

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

**DATA QUALITY OBJECTIVES**

This section presents a summary of the data quality in terms of the referenced validation criteria.

**Precision.** Goals for precision were met.

**Accuracy.** Goals for accuracy were met.

**Sample Result Verification.** All sample results were supported in the raw data.

**Detection Limits.** Detection limit goals were met for all sample results.

**Completeness.** The data package was complete for all requested analyses. One sample was validated in this data package with a total of one determination reported, which was deemed valid. This results in a completeness of 100%, which meets the 90% objective of the work plan.

**MAJOR DEFICIENCIES**

No major deficiencies were identified during data validation which required qualification of data as unusable.

**MINOR DEFICIENCIES**

No minor deficiencies were identified during data validation which required qualification of data.

**REFERENCES**

WHC 1993, Data Validation Procedures for Chemical Analyses, WHC-SD-EN-SPP-002, Rev. 2, 1993. Westinghouse Hanford Company, Richland, Washington.

WHC 1994, Environmental and Waste Characterization Analytical Data Validation, Purchase Order MSH-SWV-315905; Validation Statement of Work, Revision 1.0, September 7, 1994; Westinghouse Hanford Company, Richland, Washington.

ATTACHMENT 1

GLOSSARY OF DATA REPORTING QUALIFIERS

## GLOSSARY OF INORGANIC DATA REPORTING QUALIFIERS

- B** - Indicates the constituent was analyzed for and detected. The concentration reported is less than the contract required detection limit (CRDL) but greater than the instrument detection limit (IDL). The associated data should be considered usable for decision making purposes.
- U** - Indicates the constituent was analyzed for and not detected. The concentration reported is the sample detection limit corrected for aliquot size, dilution and percent solids (in the case of solid matrices) by the laboratory. The associated data should be considered usable for decision making purposes.
- UJ** - Indicates the constituent was analyzed for and not detected. Due to a minor quality control deficiency identified during data validation the concentration may not accurately reflect the sample detection limit. The associated data have been qualified as estimated but should be considered usable for decision making purposes.
- BJ** - Indicates the constituent was analyzed for and detected at a concentration less than the contract required detection limit (CRDL) but greater than the instrument detection limit (IDL). Due to a minor quality control deficiency identified during data validation the associated data have been qualified as estimated, but should be considered usable for decision making purposes.
- J** - Indicates the constituent was analyzed for and detected. Due to a minor quality control deficiency identified during data validation the associated data have been qualified as estimated, but should be considered usable for decision making purposes.
- UR** - Indicates the constituent was analyzed for and not detected. Due to a major quality control deficiency identified during data validation, the associated data have been qualified as unusable for decision making purposes.
- R** - Indicates the constituent was analyzed for and detected. Due to a major quality control deficiency identified during data validation, the associated data have been qualified as unusable for decision making purposes.

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ATTACHMENT 2  
SUMMARY OF DATA QUALIFICATIONS

9613426.1853

WHC-SD-EN-SPP-002, REV.2

DATA QUALIFICATION SUMMARY - FORM B-7

SDG:LK3629-LAS	REVIEWER: A. JENSEN	DATE: 3-22-95	PAGE 1 OF 1 3/23/95
COMMENTS: INORGANICS			
COMPOUND/ANALYTE	QUALIFIER	SAMPLES AFFECTED	REASON
NO QUALIFICATIONS REQUIRED			

9613426.0854

ATTACHMENT 3

QUALIFIED DATA SUMMARY and ANNOTATED LABORATORY REPORTS

Validated Data Summary, Data Package: LK3629-LAS

	Samp#	BODDY2	
	Date	1-11-95	
	Location	13	
	Depth	---	
	Type	SOIL	
	Comments	SPLIT	
Parameter	Units	Result	Q
CHROMIUM	MG/KG	14.400	

The decimal places shown do not reflect the precision reported by the laboratory

9613426.0855

800

*verified by  
3/22/95*



9613426.0857

ATTACHMENT 4

LABORATORY NARRATIVE and CHAIN-OF-CUSTODY DOCUMENTATION

**Lockheed**  
*Environmental Systems & Technologies Co.*

Lockheed Analytical Services  
 975 Kelly Johnson Drive  
 Las Vegas, Nevada 89119-3705

Phone: (702) 361-0220  
 Phone: (800) 582-7605  
 Fax: (702) 361-8146

February 21, 1995

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

RE:    Log-in No.:                    L3629  
       Quotation No.:                Q400000-B  
       SAF:                            94-104  
       Document File No.:            0113596A  
       WHC Document Control No.:    149  
       SDG No.:                        LK3629



The attached data report contains the analytical results of samples that were submitted to Lockheed Analytical Services on 13 January 1995. The temperature of the cooler upon receipt was 4°C.

Sample containers received agree with the chain-of-custody documentation. Sample containers were received intact. Samples were received in time to meet the analytical holding time requirements.

The case narratives included in the following attachments provide a detailed description of all events that occurred during sample preparation, analysis, and data review specific to the samples and analytical methods requested.

A list of data qualifiers, chain-of-custody forms, sample receiving checklist, and log-in report are also enclosed representing the samples received within this group.

If you have any questions concerning the analysis or the data please call Kathleen Hall at (509) 943-4423.

**Lockheed Analytical Services**

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SAF: 94-104  
Document File No.: 0113596A  
WHC Document Control No.: 149  
SDG No.: LK3629

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

" I certify that this data package is in compliance with the SOW, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hard copy data package has been authorized by the Laboratory Manger or a designee, as verified by the following signature."

Sincerely,  
  
for Kathleen M. Hall  
Client Services Representative

cc: Client Services  
Document Control

**Lockheed Analytical Services**

Log-in No.: L3629  
Quotation No.: Q400000-B  
SAF: 94-104  
Document File No.: 0113596A  
WHC Document Control No.: 149  
SDG No.: LK3629

**CASE NARRATIVE  
INORGANIC METALS ANALYSES**

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

**Holding Times-**

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

**Method Blanks-**

The method blanks were free of contamination.

**Internal Quality Control-**

All Internal Quality Control were within acceptance limits with the following exception: The duplicate sample precision for chromium was outside of acceptance limits. Poor duplicate sample precision may be attributed to inhomogeneity of the sample. Therefore, some variability may exist in sample results due to this inconsistency.

**Sample Results-**

Results are reported on a dry weight basis.

Shellee McGrath  
Prepared By

January 26, 1995  
Date

13014

Westinghouse Hanford Company

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

L3629

1 of 1

Collector <i>D. Bowers / J. Fancher / A. Simpson</i>	Company Contact David St. John	Telephone No. (509) 376-5376	<input type="checkbox"/> Priority <input checked="" type="checkbox"/> Normal
Project Designation 100-DR-1 Soil Washing Test	Sampling Location 100-DR-1	SAF No. 894-104	
Ice Chest No.	Field Logbook No. EFL-1159	Method of Shipment Hand Deliver	<i>ER-101</i>
Shipped Quantities <i>2991 lbs Locked</i>	Offsite Property No. <i>W95-0-161-28</i>	Bill of Lading/Air Bill No. <i>2904616425 2904616425</i>	

Possible Sample Hazards/Remarks	Preservative	Cool	NONE	None	None	Cool										
	Type of Container	aGw	aGw	aGw	aGw	P										
No. of Container(s)	2	1	1	1	1											
Special Handling and/or Storage Maintain between 2 C and 6 C.	Volume	40 ml	250 ml	1 L	500 ml	20ml										
SAMPLE ANALYSIS	chromium	TCLP Metals Chromium	G.Alpha Sr-90 Pu-239 Pu-240 Gamma Spec	G.Alpha G.Beta Sr-90 Pu-239 Pu-240 Gamma Spec	Activit y Scan											

Sample No.	Matrix*	Date Sampled	Time Sampled														
BDDP2	s	1-11-95	0909	X		X	X	X									
BDDP4	s	1-11-95	1435	X		X	X	X									

CHAIN OF POSSESSION	Sign/Print Names	SPECIAL INSTRUCTIONS	Matrix*
Relinquished By <i>J.D. Fancher</i>	Date/Time <i>11/13/95</i>	Received By <i>Eric</i>	Date/Time <i>1613</i>
Relinquished By <i>Eric</i>	Date/Time <i>0830</i>	Received By <i>B.W.H.</i>	Date/Time <i>1-11-95</i>
Relinquished By <i>B. White</i>	Date/Time <i>1-12-95</i>	Received By	Date/Time
Relinquished By	Date/Time	Received By	Date/Time

>> DATA DELIVERABLE - SUMMARY. >> MOISTURE CONTENT SHOULD BE DETERMINED FOR ALL SOIL SAMPLES.

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 <i>MMelle</i>	Title <i>Sample Custodian</i>	Date/Time <i>1/13/95 / 0915</i>
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

9613426.0862

ATTACHMENT 5

DATA VALIDATION SUPPORTING DOCUMENTATION

9613426.0863

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	<b>D</b>	E
PROJECT:	100-DR-1		DATA PACKAGE: LK3629-LAS		
VALIDATOR:	A. Jensen	LAB: Lockheed	DATE: 3/22/95		
CASE:			SDG:		
ANALYSES PERFORMED					
<input type="checkbox"/> CLP/ICP	<input type="checkbox"/> CLP/GFAA	<input type="checkbox"/> CLP/Hg	<input type="checkbox"/> CLP/Cyanide	<input type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/> SW-846/ICP	<input type="checkbox"/> SW-846/GFAA	<input type="checkbox"/> SW-846/Hg	<input type="checkbox"/> SW-846 Cyanide	<input type="checkbox"/>	<input type="checkbox"/>
SAMPLES/MATRIX					
BODDY2 / SOIL					

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

Is technical verification documentation present? . . . . . **Yes** No N/A  
 Is a case narrative present? . . . . . **Yes** No N/A

Comments: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

2. HOLDING TIMES

Are sample holding times acceptable? . . . . . **Yes** No N/A  
 Comments: \_\_\_\_\_

	Analysis	Sample Date	Analysis Date	Holding Time	Qualifier
BODDY2	Chromium	1/11/95	1/24/95	≤ 180 days	NONE

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

3. INSTRUMENT PERFORMANCE AND CALIBRATIONS

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

Comments: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

4. BLANKS

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

Comments: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

5. ACCURACY

- Were spike samples analyzed? . . . . .  Yes No N/A
- Are spike sample recoveries acceptable? . . . . .  Yes No N/A
- Were laboratory control samples (LCS) analyzed? . . . . .  Yes No N/A
- Are LCS recoveries acceptable? . . . . .  Yes No N/A

Comments: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

6. PRECISION

- Were laboratory duplicates analyzed? . . . . .  Yes No N/A
- Are laboratory duplicate samples RPD values acceptable? *see note 1*  Yes No N/A
- Were ICP serial dilution samples analyzed? . . . . .  Yes No N/A
- Are ICP serial dilution %D values acceptable? . . . . .  Yes No N/A
- Are field duplicate RPD values acceptable? . . . . . Yes No  N/A
- Are field split RPD values acceptable? *see note 1* . . . . . Yes No  N/A

Comments: ① Sample B0DDY2 is the field split of B0DDR1. A comparison of these results will be made in the final summary report.  
② Lab narrative states that the lab duplicate is outside control limits, however the RPD is 20.7%, which is well within the 35% limit allowed for soils.

7. FURNACE AA QUALITY CONTROL

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

Comments: No furnace work performed.

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8. REPORTED RESULTS AND DETECTION LIMITS

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

Comments: \_\_\_\_\_

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## MEMORANDUM



TO: 100-DR-1 Soil Washing Treatability Tests Project QA Record  
 FR: Anne Jensen, Golder Associates Inc. *aj*  
 RE: RADIOCHEMISTRY DATA VALIDATION SUMMARY FOR DATA PACKAGE  
 LK3629-LAS (943-1610.083 LK3629R.DR1)

## INTRODUCTION

This memo presents the results of data validation on data package LK3629-LAS prepared by Lockheed Analytical Services. Sample information is provided in the following table.

SAMPLE ID	COMMENTS	ANALYSIS	MEDIA
B0DDY2*	FIELD SPLIT	RADIOCHEMISTRY SEE ATTACHMENT 4	SOIL
* - Indicates sample results which were 100% recalculated.			

Data validation was conducted to level D in accordance with the WHC statement of work (WHC 1994), validation procedures (WHC 1993). Attachments 1 through 5 provide the following information as indicated below:

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

## DATA QUALITY OBJECTIVES

This section presents a summary of the data quality in terms of the referenced validation criteria.

**Precision.** Goals for precision were met, with the exception of deficiencies identified below.

**Accuracy.** Goals for accuracy were met.

**Sample Result Verification.** All sample results were supported in the raw data.

**Detection Limits.** Detection limit goals were met for all sample results, with the exception the minimum detectable activities (MDA's) exceeding the required detection limits (RDL's) for cobalt-60, cesium-137, europium-152, -154, -155 and radium-226. Data qualification is not required. Attachment 3 provides a summary of the results.

**Completeness.** The data package was complete for all requested analyses. A total of one sample was validated in this data package with a total of fifteen determinations reported, all of which were deemed valid. This results in a completeness of 100 percent, which meets the 90% objective of the work plan.

#### MAJOR DEFICIENCIES

No major deficiencies were identified during data validation which required qualification of data as unusable.

#### MINOR DEFICIENCIES

The following minor deficiencies were identified during data validation which required qualification of data.

##### Laboratory Duplicates

- The duplicate result for strontium-90 was out of range. Attachments 2 and 5 provide a summary of samples affected, data qualifications applied and supporting documentation.

#### FIELD QC

- Sample B0DDY2 was identified as the field split of sample B0DDR1. A comparison of these results will be made in the final summary report.

#### DATA REPORTING

- Reported sample results which are less than the minimum detectable activity (MDA) have been qualified as undetected (U) on the laboratory results form (see Attachment 3).

#### REFERENCES

WHC 1993, Data Validation Procedures for Radiochemical Analyses, WHC-SD-EN-SPP-001, Rev. 1, 1993. Westinghouse Hanford Company, Richland, Washington.

WHC 1994, Environmental and Waste Characterization Analytical Data Validation, Purchase Order MSH-SWV-315905; Validation Statement of Work, Revision 1.0, September 7, 1994; Westinghouse Hanford Company, Richland, Washington.

9613426.0868

ATTACHMENT 1

GLOSSARY OF DATA REPORTING QUALIFIERS

## ATTACHMENT 1

## GLOSSARY OF RADIOCHEMISTRY DATA REPORTING QUALIFIERS

- U - Indicates the constituent was analyzed for, but was not detected at a concentration above the minimum detectable activity (MDA). The concentration reported is the sample result corrected for sample aliquot size, dilution factors and percent solids (in the case of solid matrices) by the laboratory. The associated data should be considered usable for decision making purposes.
- UJ - Indicates the constituent was analyzed for and was not detected at a concentration above the MDA. Due to a quality control deficiency identified during data validation, the concentration reported may not accurately reflect the sample MDA. The associated data should be considered usable for decision making purposes.
- J - Indicates the constituent was analyzed for and detected. The concentration reported is qualified as estimated due to a quality control deficiency identified during data validation. The associated data should be considered usable for decision making purposes.
- UR - Indicates the constituent was analyzed for and not detected. The concentration reported is qualified as unusable due to a quality control deficiency identified during data validation. The associated data should be considered unusable for decision making purposes.
- R - Indicates the constituent was analyzed for and detected. The concentration reported is qualified as unusable due to a quality control deficiency identified during data validation. The associated data should be considered unusable for decision making purposes.

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ATTACHMENT 2  
SUMMARY OF DATA QUALIFICATIONS

9613426.0871

WHC-SD-EN-SPP-002, REV.2

DATA QUALIFICATION SUMMARY - FORM B-7

SDG: LK3629-LAS	REVIEWER: A. JENSEN	DATE: 3-22-95	PAGE <u>1</u> OF <u>1</u>
COMMENTS: RADIOCHEMISTRY			
COMPOUND/ANALYTE	QUALIFIER	SAMPLES AFFECTED	REASON
STRONTIUM-90	J	B0DDY2	DUPLICATE RESULT OUT OF RANGE

9613426.0872

ATTACHMENT 3

QUALIFIED DATA SUMMARY and ANNOTATED LABORATORY REPORTS

Validated Data Summary, Data Package: LK3629-LAS

Parameter	Samp#		80DDY2	
	Units	Result	Q	
	Samp#	1-11-95		
	Date			
	Location	13		
	Depth	---		
	Type	SOIL		
	Comments	SPLIT		
Parameter	Units	Result	Q	
COBALT-58	pCi/G	0.120	U	
COBALT-60	pCi/G	3.170		
CESIUM-137	pCi/G	67.400		
EUROPIUM-152	pCi/G	45.200		
EUROPIUM-154	pCi/G	3.360		
EUROPIUM-155	pCi/G	0.080	U	
IRON-59	pCi/G	0.030	U	
LEAD-212	pCi/G	1.050		
RADIUM-226	pCi/G	1.900	U	
URANIUM-235	pCi/G	-0.570	U	
GROSS ALPHA	pCi/G	15.200		
GROSS BETA	pCi/G	112.200		
PLUTONIUM-238	pCi/G	0.019	U	
PLUTONIUM-239/240	pCi/G	1.270		
STRONTIUM	pCi/G	1.930	J	

The decimal places shown do not reflect the precision reported by the laboratory

9613426.1873

800

verified aj.  
3/22/95

9613426.0874

## RAD DATA REPORT (ra01)

Bechtel Hanford, Inc. \* Richland, WA

Bechtel Hanford Project (Project BECHTEL-HANFORD)

Client Sample ID: BODDY2

LAL Sample ID: L3629-4

Date Collected: 11-JAN-95

Date Received: 13-JAN-95

Matrix: Soil

Login Number: L3629

SDG: LK3629

Constituent	Analyzed	Batch	Activity	Error	MDA	Detected	Units
Co-58	06-FEB-95	GAMMA SPEC LAL-0064_17979	0.12 U	0.11	0.18		pCi/g
Co-60	06-FEB-95	GAMMA SPEC LAL-0064_17979	3.17	0.26	0.094		pCi/g
Cs-137	06-FEB-95	GAMMA SPEC LAL-0064_17979	67.4	6.8	0.18		pCi/g
Eu-152	06-FEB-95	GAMMA SPEC LAL-0064_17979	45.2	3.3	0.30		pCi/g
Eu-154	06-FEB-95	GAMMA SPEC LAL-0064_17979	3.36	0.47	0.68		pCi/g
Eu-155	06-FEB-95	GAMMA SPEC LAL-0064_17979	0.08 U	0.24	0.40		pCi/g
Fe-59	06-FEB-95	GAMMA SPEC LAL-0064_17979	0.03 U	0.15	0.36		pCi/g
Pb-212	06-FEB-95	GAMMA SPEC LAL-0064_17979	1.05	0.23	0.30		pCi/g
Ra-226(GAMMA)	06-FEB-95	GAMMA SPEC LAL-0064_17979	1.9 U	1.9	3.0		pCi/g
U-235(GAMMA)	06-FEB-95	GAMMA SPEC LAL-0064_17979	-0.57 U	0.47	0.80		pCi/g
Gross Alpha	19-JAN-95	GR ALP/BETA LAL-0061_18040	15.2	6.3	6.7	C	pCi/g
Gross Beta	19-JAN-95	GR ALP/BETA LAL-0061_18040	112.2	9.4	5.4		pCi/g
Pu-238	30-JAN-95	PU-ISOTOPIC LAL-0108_18044	0.019 U	0.040	0.060		pCi/g
Pu-239/40	30-JAN-95	PU-ISOTOPIC LAL-0108_18044	1.27	0.27	0.049		pCi/g
Total radio-strontium	26-JAN-95	SR-90 LAL-0196_18045	1.93 J	0.28	0.33		pCi/g

verified at  
3/22/95  
042

ATTACHMENT 4

LABORATORY NARRATIVE and CHAIN-OF-CUSTODY DOCUMENTATION



*Environmental Systems & Technologies Co.*

Lockheed Analytical Services  
975 Kelly Johnson Drive  
Las Vegas, Nevada 89119-3705

Phone: (702) 361-0220  
Phone: (800) 582-7605  
Fax: (702) 361-8146

February 21, 1995

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

RE:   Log-in No.:                   L3629  
      Quotation No.:               Q400000-B  
      SAF:                         94-104  
      Document File No.:         0113596A  
      WHC Document Control No.: 149  
      SDG No.:                    LK3629



The attached data report contains the analytical results of samples that were submitted to Lockheed Analytical Services on 13 January 1995. The temperature of the cooler upon receipt was 4°C.

Sample containers received agree with the chain-of-custody documentation. Sample containers were received intact. Samples were received in time to meet the analytical holding time requirements.

The case narratives included in the following attachments provide a detailed description of all events that occurred during sample preparation, analysis, and data review specific to the samples and analytical methods requested.

A list of data qualifiers, chain-of-custody forms, sample receiving checklist, and log-in report are also enclosed representing the samples received within this group.

If you have any questions concerning the analysis or the data please call Kathleen Hall at (509) 943-4423.

**Lockheed Analytical Services**

Log-in No.: L3629  
Quotation No.: Q400000-B  
SAF: 94-104  
Document File No.: 0113596A  
WHC Document Control No.: 149  
SDG No.: LK3629

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

" I certify that this data package is in compliance with the SOW, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hard copy data package has been authorized by the Laboratory Manger or a designee, as verified by the following signature."

Sincerely,  
  
Kathleen M. Hall  
Client Services Representative

cc: Client Services  
Document Control

**Lockheed Analytical Services**

Log-in No.: L3629  
Quotation No.: Q400000-B  
SAF: 94-104  
Document File No.: 0113596A  
WHC Document Control No.: 149  
SDG No.: LK3629

## **CASE NARRATIVE RADIOCHEMICAL ANALYSES**

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

### **Holding Time Requirements**

All holding time requirements were met.

### **Analytical Method**

#### **Gamma Spectrum Analysis**

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

#### **Gross Alpha Beta**

The gross alpha beta analysis was performed using LAL-91-SOP-0060. The alpha matrix spike recovery was out of limits; however, because the LCS recovery was within limits, the data is considered acceptable. All other QC criteria were met.

#### **Plutonium Isotopic**

The plutonium analysis was performed using LAL-91-SOP-0108. No problems were encountered during analysis. All QC criteria were met.

#### **Strontium**

The strontium analysis was performed using LAL-91-SOP-0196. No problems were encountered during analysis. All QC criteria were met.

Yvonne M. Jacoby  
Prepared By

February 21, 1995  
Date

13-14

L3629

Westinghouse Hanford Company

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

1 of 1

Collector <i>D. B. Wags / J. F. Fumher / A. Simpson</i>	Company Contact David St. John	Telephone No. (509) 376-5376	<input type="checkbox"/> Surround <input checked="" type="checkbox"/> Priority <input checked="" type="checkbox"/> Normal
Project Designation 100-DR-1 Soil Washing Test	Sampling Location 100-DR-1	SAF No. 894-104	
Ice Chest No.	Field Logbook No. EFL-1159	Method of Shipment Hand Deliver	<i>ER-10</i>
Shipped <i>Quarantined Locked</i>	Offsite Property No. <i>W95-0-161-28</i>	Bill of Lading/Air Bill No. <i>2904016416 2904616425</i>	

Possible Sample Hazards/Remarks	Preservative	Cool	NONE	None	None	Cool	Type of Container	No. of Container(s)	Volume	chromium	TCLP Metals Chromium	G.Alpha G.Beta Sr-90 Pu-239 Pu-240 Gamma Spec	G.Alpha G.Beta Pu-239 Pu-240 Gamma Spec	Activity Scan
	aGW	aGW	aGW	aGW	P									
Special Handling and/or Storage Maintain between 2 C and 6 C.		40 ml	250 ml	1 L	500 ml	20ml		2	1	1	1	1		
	014 SAMPLE ANALYSIS													

Sample No.	Matrix*	Date Sampled	Time Sampled											
BODDY2	s	1-11-95	0909	X	X	X	X							
BODDY4	S	1-11-95	1435	X	X	X	X							

<b>CHAIN OF POSSESSION</b>	Sign/Print Names	<b>SPECIAL INSTRUCTIONS</b>	<b>Matrix*</b>
Relinquished By <i>J.D. Fumher</i>	Date/Time <i>11/11/95 1613</i>	Received By <i>Eric</i>	Date/Time <i>1613</i>
Relinquished By <i>Eric</i>	Date/Time <i>0830</i>	Received By <i>B. Whitte</i>	Date/Time <i>1-11-95</i>
Relinquished By <i>B. Whitte</i>	Date/Time <i>1-12-95</i>	Received By	Date/Time
Relinquished By	Date/Time	Received By	Date/Time

>> DATA DELIVERABLE - SUMMARY. >> MOISTURE CONTENT SHOULD BE DETERMINED FOR ALL SOIL SAMPLES.

- 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>M. Melle</i>	Title <i>Sample Custodian</i>	Date/Time <i>1-13-95 / 0915</i>
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

9613426.0880

ATTACHMENT 5  
DATA VALIDATION SUPPORTING DOCUMENTATION

RADIOCHEMICAL DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	<b>D</b>	E
PROJECT: 100-DR-1	DATA PACKAGE: <del>W</del> LK3629-LAS				
VALIDATOR: A. Jensen	LAB: Lockheed		DATE: 3/21/95		
CASE:	SDG:				
ANALYSES PERFORMED					
<input checked="" type="checkbox"/> Gross Alpha/Beta	<input checked="" type="checkbox"/> Strontium-90	<input type="checkbox"/> Technetium-99	<input checked="" type="checkbox"/> Alpha Spectroscopy	<input checked="" type="checkbox"/> Gamma Spectroscopy	
<input type="checkbox"/> Total Uranium	<input type="checkbox"/> Radium-22	<input type="checkbox"/> Tritium	<input type="checkbox"/>		
SAMPLES/MATRIX					
BODDY2 / SOIL					

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: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

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? . . . . . see note ②  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: ② Sample BODDY2 is the field split of sample BODDR1. A comparison of these results will be made in the final summary report.

10. Holding Times

Are sample holding times acceptable? . . . . .  Yes  No  N/A

Comments:

	Analysis Type	Sample Date	Analysis Date	Analysis Holding Time	Qualifier
	AlphaSpec	1/11/95	1/30/95	≤ 180 days	NONE
BODDY2:	GammaSpec	↓	2/6/95	↓	↓
	Gross α/B	↓	1/19/95	↓	↓
	Strontium	↓	1/26/95	↓	↓

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? . . . . . see note ③ Yes  No  N/A
- Transcription/calculation errors? . . . . . Yes  No  N/A

Comments: ③ The MDA's exceed the RDL's for cobalt-60, cesium-137, europium-152, 154, 155, and radium-226. Data qualification is not required.

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LOCKHEED ANALYTICAL SERVICES  
RADIOCHEMISTRY ANALYTES

## QC Data Summary for Sample Duplicate Analysis

Analyte	Batch ID	Client ID	LAL ID	Date Analyzed	Sample Result	Error 2 sigma	Duplicate Result	Error 2 sigma	RER	RPD	Q
Gamma (Ce-137)	17979	BODDY4	L3630-15	02/02/95	32.0	3.27	32.7	3.33	0.10	2	
Gross alpha	18040	BODDY2	L3629-4	01/20/95	15.17	6.27	12.85	5.83	0.19	17	
Gross beta	18040	BODDY2	L3629-4	01/20/95	112.16	9.40	105.45	9.14	0.36	6	
Pu-239	18044	BODDY2	L3629-4	01/30/95	1.272	0.27	0.925	0.21	0.72	32	
Sr-90	18045	BODDY2	L3629-4	01/26/95	1.93	0.28	4.22	0.38	3.47	74	*

The duplicate result for strontium-90 is out of range (ie, greater than 2 times the RDL).

Data qualification is applied to sample BODDY2: "J".

verified as  
3/22/95  
AAA

LK3629.WK1

Gross Alpha	
HEIS No.:	BODDY2
Detector	B3
Lab ID:	L3629-4
Aliquot, g :	1.00E-01
Net counts:	37
Bkg counts:	5.8
Spl count time:	100
Bkg count time:	100
EFFIC:	0.092
Calc.:	15.2
Rptd:	15.2
MDA calc:	6.8
MDA rptd:	6.7

Gross Beta	
HEIS No.:	BODDY2
Detector	B3
Lab ID:	L3629-4
Aliquot:	1.00E-01
Net counts:	1131
Bkg counts:	100.5
Spl count time:	100
Bkg count time:	100
a into b X TALK:	0.273
EFFIC:	0.409
Calc.:	112.2
Rptd:	112.2
MDA calc:	5.4
MDA rptd:	5.4

Strontium 90	
HEIS No.:	BODDY2
DETECTOR:	C3
Sample:	L3629-4
DECAY:	1
Sample amt (G):	1.02E+00
GROSS CNTS:	615
Count time:	200
GROSS BKG:	204
EFFIC.:	0.443
INGROWTH:	1.057
Yield:	1
Calc:	1.94
Rptd:	1.93
MDA, Calc:	0.33
MDA, rptd:	0.33

LK3629.WK1

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LK3629.WK1

Isotopic Plutonium	
HEIS No.	BDDY2
Lab ID	L3629-4
Aliquot, g	1.028
Net counts tracer	289.5
DPM Tracer	9.19
PU-238 Nt cnt smpl	1.3
Efficiency	0.211
Yield	0.624
Count time, blank	1440.0
DPM, blank 238	0.031
Pu-238 Result, calc.	0.018
Pu-238 Result, rptd	0.019
Pu-238 MDA, calc.	0.069
Pu-238 MDA, rptd.	0.060
U-239/40 Nt ct smpl	90.8
Pu-239/40 Rslt, calc	1.26
Pu-239/40 Rslt, rptd	1.27
DPM, blank 239	0.020
Pu-239/40 MDA, calc	0.046
Pu-239/40 MDA, rptd	0.049

LK3629.WK1

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