AR TARGET SHEET

The following document was too large to scan as one unit, therefore it has been broken down into sections.

DOCUMENT # 98-EAP-145

EDMC # 0048796

SECTION 1 OF 4

0048796

Department of Energy
Richland Operations Office
P.O. Box 550
Richland, Washington 99352

MAR 10 1998

98-EAP-145

MAR 1998
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EDMC

Ms. L. J. Cusack, Manager
Hanford Facility RCRA Permit
State of Washington
Department of Ecology
1315 West Fourth Avenue
Kennewick, Washington 99336

Dear Ms. Cusack:

TRANSMITTAL OF THE RAW DATA PACKAGE FROM SAMPLING AT THE 303-K STORAGE FACILITY (S-3-1)

Please find enclosed the raw data package from sampling at the 303-K Storage Facility. The raw data package is from the 303-K Storage Facility sampling event of October 29 and 30, 1997. Submittal of the raw data package meets the requirement of the Hanford Facility Resource Conservation and Recovery Act Permit Condition V.14.B.b. Also enclosed are two tables for cross-referencing the sample numbers to the sampling locations.

Should you have questions regarding this transmittal, please contact Ellen M. Mattlin, of my staff, on (509) 376-2385.

Sincerely,

Paul J Kaspar for

James E. Rasmussen, Director
Environmental Assurance, Permits,
and Policy Division

EAP:EMM

Enclosures 2

cc w/o encl:
J. A. Remaize, BWHC
J. G. Adler, WMH
R. C. Bowman, WMH
R. H. Engelmann, WMH
J. A. Winterhalder, WMH

cc w/o encl:
J. K. Bartz, Ecology
C. D. Stuart, Ecology
J. J. Wallace, Ecology

Cross-Reference List of Sample Locations to Sample Numbers

Sample Type or Location	Sample Number	Sample Media
C1	BOMB44	Concrete
C2	BOMB46	"
C2 Duplicate	BOMB47	"
C3	BOMB45	"
Concrete Equipment Blank	BOMB48	Deionized Water
S1	BOM903	Soil
S2	BOM906	"
S3	BOM901	"
S4	BOM904	"
S5	BOM911	"
S6	BOM8Y8	"
S6 Duplicate	BOM8Y9	"
S7	BOM900	"
S8	BOM907	"
S8 Duplicate	BOM12	"
S9	BOM8Y7	"
S10	BOM904	"
S10 Duplicate	BOM908	"
S11 Upper	BOM914	"
S11 Lower	BOM909	"
S11 Lower Duplicate	BOM913	"
S12 Upper	BOM910	"
S12 Lower	BOM905	"
Soil Equipment Blank (1st Day)	BOM8Y6	Deionized water
Soil Equipment Blank (2nd Day)	BOMB49	"

Cross-Reference List of Sample Numbers to Sample Locations

Sample Number	Sample Type or Location	Sample Media
BOMB44	C1	Concrete
BOMB45	C3	"
BOMB46	C2	"
BOMB47	C2 Duplicate	"
BOMB48	Concrete Equipment Blank	Deionized Water
BOMB49	Soil Equipment Blank (2nd Day)	"
BOM8Y6	Soil Equipment Blank (1st Day)	"
BOM8Y7	S9	Soil
BOM8Y8	S6	"
BOM8Y9	S6 Duplicate	"
BOM900	S7	"
BOM901	S3	"
BOM902	S4	"
BOM903	S1	"
BOM904	S10	"
BOM905	S12 Lower	"
BOM906	S2	"
BOM907	S8	"
BOM908	S10 Duplicate	"
BOM909	S11 Lower	"
BOM910	S12 Upper	"
BOM911	S5	"
BOM912	S8 Duplicate	"
BOM913	S11 Lower Duplicate	"
BOM914	S11 Upper	"

Additional Information
Provided by
LAS

FEB 1998
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For
SDG# L10981

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MEMO

To: Data Package SDG# L10981
From: Sandra K Walls
Subject: Corrections Requested 2/2/98 / Received 2/27/98
Date: March 3, 1998

The attached FAX was received from LAS to address issues raised during log-in and technical verification of the data package L10981.

Direction was provided for Sample Management to correct some of the issues and explanations were provided concerning the remaining issues.

The attached FAX is to be treated as part of the data report and shall act as complete response to all issues raised.

The data package shall be considered complete and ready for validation at this time.

LAS LABORATORIES, INC.
- Fax Cover Sheet -

Date: 2/27/98

Pages: 2 (including cover)

To: Ms. Sandy Walls
Rust Federal Services

Fax Phone: 509-372-1616
Office Phone: 509-373-0064

RECORD COPY

From: Mary B. Ford
LAS Laboratories Inc.

Subject: **Response to Fax 2/5/98**

The document accompanying this FAX may contain information that is confidential and privileged. The information is intended for use of the individual or entity to whom it is directed. If you have received this FAX in error, please notify us by telephone immediately so we can arrange for the retrieval of the documents at no cost to you.

Dear Sandy:

This fax is to document the response to the issues raised in your fax dated 2/5/98.

1. SVOC table of contents: resubmission is not possible because you received the original report and a copy. Due to our closure we are no longer keeping document controlled copies of reports.

2. Pb analysis was performed by ICP Trace. This method has been used instead of furnace for a couple of years now. The deviation was approved during a telephone conversation but was not indicated in the case narrative.

3. ICP Trace page number 646 in the table of contents should be 464. Please correct this at Hanford since there is no data package at LAS to correct and resubmit.

4. There should only be one page to the radchem table of contents although it does indicated two pages. Please correct at Hanford since there is no data package at LAS to correct.
5. Form A-2 indicates missing TIC forms for semi-volatile analysis. A TIC form is not applicable since the client only requested the analysis of a single compound, pentachlorophenol.

6. Form A-6: a LAS level 4a was provided, the following documents are not reported in this report and are not available due to the closure of LAS: post digestion spike sample recovery, ICP serial dilution, ICP interelement correction factor and ICP linear range. Standard addition results are only provided for furnace analysis and therefore will not be reported. The instrument/method detection limit is reported on the result form for each sample.

I apologize for not being able to provide all the documentation requested. If I can be of any further assistance, please do not hesitate to call me at (702) 361-1626 ext. 326.

Sincerely,

Mary B. Ford
Project Manager

RECORD COPY

cc: Ms. Sharon Steele
Mr. Karl Pool

facsimile
TRANSMITTAL

to: Mary Ford
fax #: (702) 361-3137
re: Data Package L10981
date: 2/5/98
pages: 5 (including cover sheet)
cc: Briana Colley
Sharon Steele
Karl Pool

The attached checklists note missing items for the data report we received. Missing items have been circled. Please take a few minutes to look them over and provide missing information where possible. Also provide explanation for the items on the checklist that cannot be completed.

Also Please Provide:

The table of contents for the Semi-VOA section does not include page numbers. The rest of the contents pages in the package do provide page numbers. Please resubmit corrected semi-voa contents page with page numbers.

As 7060 and Pb 7421 were requested on the chain of custody but results were provided by 6010. Please enter into the appropriate case narratives an explanation for the deviation from the requested methods. Please resubmit corrected case narratives.

The table of contents for the General Chemistry and Inorganic Chemistry section lists an incorrect page number.
IX. Raw Data Package
B. ICP Trace 646
The page number should be 464. Please resubmit corrected contents page.

The table of contents for the radchem section notes page 1 of 2 but there is only one page of contents. Please resubmit corrected contents page.

IF YOU HAVE ANY PROBLEMS PROVIDING ANY OF THESE CORRECTIONS, PLEASE CONTACT ME AS SOON AS POSSIBLE.

Sandy Walls
(509) 373-0064

Package ID: L10981

SEMI-VOLATILE ORGANIC DATA VERIFICATION CHECKLIST - FORM A-2

Review the data package for completeness and check off the items below. If any data review elements are missing, contact the laboratory for re-submittal.

Data Package Item	Present?	Yes	No	N/A
Quality Control (QC) Summary				
* Surrogate Summary report		X		
* MS/MSD Summary report		X		
*Blank Summary report		X		
GC/MS tuning report		X		
Sample Data				
* Sample reports		X		
* TIC reports for each sample			X	
RIC reports for all samples		X		
Raw and corrected spectra for all detected results		X		
Raw and corrected library search data for all reported TIC		X		
Quantitation and calculation data for all TIC		X		
Standards Data				
Initial calibration report		X		
RIC and quantitation reports for initial calibration		X		
Continuing calibration reports		X		
RIC and quantitation reports for cont. calibrations		X		
Internal standards summary report		X		
Raw QC Data				
Tuning, spectra and mass lists		X		
Blank Data				
Blank analysis report		X		
TIC reports for all blanks			X	
RIC and quantitative reports for blanks		X		
Raw and corrected spectra for all detected results in blanks		X		
Raw and corrected library search data for all reported TIC		X		
Quantitation and caculation data for all TIC		X		
Matrix Spike/Matrix Spike Duplicate (MS/MSD) Data				
MS/MSD Analyis Reports		X		
RIC and quantitative reports for MS/MSD		X		
Additional Data				
Moisture % solids data sheets				X
Sample preparation sheets		X		

Comments Semi-VOA 8270

** LCS report and summary were also reported.

Note: Checklist items required by "summary" data packages are identified by an asterisk (*) in front of the item.

Package ID: L10981

INORGANIC ANALYSIS DATA VERIFICATION CHECKLIST - FORM A-6

Review the data package for completeness and check off the items below. If any data review elements are missing, contact the laboratory for re-submittal.

Data Package Item	Present?	Yes	No	N/A
Cover page (CLP only)				X
Sample Data				
* Inorganic analysis data sheets		X		
Standards Data				
Initial and continuing calibration verification		X		
CRDL standard for AA and ICP (Detection limit verification)		X		
QC Summary				
* Blanks		X		
ICP interference check summary		X		
* Spike sample recovery		X		
* Post-digestion spike sample recovery			X	
* Duplicates (MSD)		X		
* Laboratory control sample		X		
Standard addition results			X	
ICP serial dilutions			X	(Missing As & Pb)
Instrument detection limits			X	
ICP interelement correction factors			X	
ICP linear ranges			X	
Preparation log		X		
Instrument run log		X		
Raw Data				
ICP raw data		X		
Furnace AA raw data				X
Flame AA raw data				X
Mercury raw data		X		
Cyanide raw data				X
Additional Data				
Moisture % solids data sheets				X
Sample preparation sheets		X		

Comments Metals Results for Water Samples

ICP 6010 (Barium, Beryllium, Cadmium, Chromium, Nickel & Silver)

ICP Trace 6010 (Arsenic & Lead)

GFAA 7471 (Mercury)

** See also metals results for solid waste samples & metals results for soil samples

Note: Checklist items required by "summary" data packages are identified by an asterisk (*) in front of the item.

Package ID: L10981

INORGANIC ANALYSIS DATA VERIFICATION CHECKLIST - FORM A-6

Review the data package for completeness and check off the items below. If any data review elements are missing, contact the laboratory for re-submittal.

Data Package Item	Present?	Yes	No	N/A
Cover page (CLP only)				X
Sample Data				
* Inorganic analysis data sheets		X		
Standards Data				
Initial and continuing calibration verification		X		
CRDL standard for AA and ICP (Detection limit verification)		X		
QC Summary				
* Blanks		X		
ICP interference check summary		X		
* Spike sample recovery		X		
* Post-digestion spike sample recovery			X	
* Duplicates (MSD)		X		
* Laboratory control sample		X		
Standard addition results			X	
ICP serial dilutions			X	(Missing As & Pb)
Instrument detection limits			X	
ICP interelement correction factors			X	
ICP linear ranges			X	
Preparation log		X		
Instrument run log		X		
Raw Data				
ICP raw data		X		
Furnace AA raw data				X
Flame AA raw data				X
Mercury raw data		X		
Cyanide raw data				X
Additional Data				
Moisture % solids data sheets				X
Sample preparation sheets		X		

Comments Metals Results for Solid Waste Samples

ICP 6010 (Barium, Beryllium, Cadmium, Chromium, Nickel & Silver)

ICP Trace 6010 (Arsenic & Lead)

GFAA 7471 (Mercury)

** See also metals results for water samples & metals results for soil samples

Note: Checklist items required by "summary" data packages are identified by an asterisk (*) in front of the item.

Package ID: L10981

INORGANIC ANALYSIS DATA VERIFICATION CHECKLIST - FORM A-6

Review the data package for completeness and check off the items below. If any data review elements are missing, contact the laboratory for re-submittal.

Data Package Item	Present?	Yes	No	N/A
Cover page (CLP only)		___	___	X
Sample Data				
* Inorganic analysis data sheets		X	___	
Standards Data				
Initial and continuing calibration verification		X	___	
CRDL standard for AA and ICP (Detection limit verification)		X	___	
QC Summary				
* Blanks		X	___	
ICP interference check summary		X	___	___
* Spike sample recovery		X	___	
* Post-digestion spike sample recovery		___	X	___
* Duplicates (MSD)		X	___	
* Laboratory control sample		X	___	
Standard addition results		___	X	___
ICP serial dilutions		___	X	(Missing As & Pb)
Instrument detection limits		___	X	
ICP interelement correction factors		___	X	___
ICP linear ranges		___	X	___
Preparation log		X	___	
Instrument run log		X	___	___
Raw Data				
ICP raw data		X	___	___
Furnace AA raw data		___	___	X
Flame AA raw data		___	___	X
Mercury raw data		X	___	___
Cyanide raw data		___	___	X
Additional Data				
Moisture % solids data sheets		X	___	___
Sample preparation sheets		X	___	___

Comments Metals Results for Soil Samples

ICP 6010 (Barium, Beryllium, Cadmium, Chromium, Nickel & Silver)

ICP Trace 6010 (Arsenic & Lead)

GFAA 7471 (Mercury)

** See also metals results for water samples & metals results for solid waste samples

Note: Checklist items required by "summary" data packages are identified by an asterisk (*) in front of the item.

A Subsidiary of SPL Incorporated

LAS Laboratories, Inc.

FEB 1998
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WASTE MANAGEMENT HANFORD

ANALYTICAL DATA REPORT

FOR

METALS, CHLORIDE, NITRATE, NITRITE, SEMIVOLATILE ORGANICS AND URANIUM ISOTOPIC

PROOF COPY

LOG-IN NUMBER	L10981
QUOTATION NUMBER	Q709726-45DAY
DOCUMENT FILE NUMBER	1105756
SAF NUMBER	R98-001

LAS LABORATORIES, INC. • 975 Kelly Johnson Drive • Las Vegas, Nevada 89119-3705
Telephone 702-361-0220 • Facsimile 702-361-8146

RECORD COPY

January 26, 1998

Mr. Karl Pool
Waste Management Hanford
1820 Terminal Dr., Rm. 139
Richland, WA 99352

Note: LAS Laboratories, Inc. regrets to inform you of the laboratory shut down effective January 19, 1998. The original and a copy of the data package are enclosed in this data report. These data packages will be the only copies you will receive from us because of the operation's closure.

RE:

Log-in No:	**L10981**
Quotation No:	**Q709726-45DY**
Document File No:	**1105756**
SAF No:	**R98-001**

The attached data report contains the analytical results of samples that were submitted to LAS Laboratories, Inc. on 5 November 1997. The temperature of the cooler upon receipt was 3°C. All sample containers coincided with the chain-of-custody documentation. All sample containers were received intact. Samples were received in time to meet the analytical holding time requirements. All discrepancies (if applicable) identified upon receipt of the samples have been forwarded to the client and are documented in the enclosed chain-of-custody records. (See attached Sample Receiving Checklist for details).

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 Mary B. Ford at (702) 361-3955, extension 326.

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

Sincerely,

Mary B. Ford 1/26/98

Mary B. Ford
Acting Client Services Manager

cc: Client Services
Document Control

A2LA, ISO/IEC Guide 25, Section 13.2: The following results relate only to those samples tested. This report shall not be reproduced except in full, without the written approval of LAS.

CASE NARRATIVE
INORGANIC NON METALS ANALYSES

The routine calibration and quality control analyses performed for this batch include as applicable: initial and continuing calibration verification, initial and continuing calibration blanks, method blank(s), laboratory control sample(s), matrix spike sample(s), and duplicate sample(s).

Preparation and Analysis Requirements

All samples were received on November 5, 1997. The samples were logged in as L10981 and were prepared and analyzed for:

A. Method 300.0 Chloride, Nitrate, and Nitrite

Method Blanks

- Concentration levels of all requested analytes in method blanks were below reporting detection limits.

Holding Time Requirements

- All samples were analyzed within the method-specific holding times with the exception of samples analyzed in method 300.0 Nitrate and Nitrite. These samples were received and analyzed outside of holding time. Affected sample results are flagged with an "H".

Internal Quality Control

- All Internal Quality Control were within acceptance limits.

M.B. Watson-Garrett
Prepared By

12/23/97
Date

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CASE NARRATIVE
INORGANIC METALS ANALYSES
WATERS

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), and duplicate sample(s).

Preparation and Analysis Requirements

- All water samples for total metals analysis were received on November 5, 1997. The samples were prepared and analyzed as LAS Batch 1105 mw1. Sample BOMB48 (L10981-93) was used for matrix spike and matrix spike duplicate analyses.

Holding Time Requirements

- All samples were analyzed within the method-specific holding times with the following exception: The samples for mercury were analyzed outside of the twenty-eight day holding time. All associated samples are flagged with an "H".

Method Blanks

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

Internal Quality Control

- All Internal Quality Control were within acceptance limits.
- The samples were analyzed by Method 6010 ICP Metals, Method 6010 ICP Trace and Method 7470 Mercury.
- The run log included in this report has been electronically generated. The run log which has been signed by the analyst and secondary reviewer is included in the raw data and kept on file at LAS Laboratories, Inc.

Shellee McGrath
Prepared By

December 31, 1997
Date

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CASE NARRATIVE
INORGANIC METALS ANALYSES
SOLID WASTE

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), and duplicate sample(s).

Preparation and Analysis Requirements

- All solid waste samples for total metals analysis were received on November 5, 1997. The samples were prepared and analyzed as LAS Batch 1105 mw3. Sample BOMB44 (L10981-68) was used for matrix spike and matrix spike duplicate analyses.

Holding Time Requirements

- All samples were analyzed within the method-specific holding times with the following exception: The samples for mercury were analyzed outside of the twenty-eight day holding time. All associated samples are flagged with an "H".

Method Blanks

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

Internal Quality Control

- All Internal Quality Control were within acceptance limits with the following exception: The matrix spike recovery for mercury (-8.9%) was outside of acceptance limits. The matrix spike duplicate recovery for mercury was also outside of acceptance limits (57%). The acceptable recovery based on the LCSS ERA Lot#222 (mercury 63%) supports that the analytical system was operating within control limits.

- The RPD between the MS and MSD was outside of acceptance limits for mercury and lead. All associated samples are flagged with an "*".

- The matrix spike recovery for lead exceeded the 75-125% acceptance limit, however, the sample concentration is considered significant (i.e., greater than four times the spiking level) relative to the amount spiked into the sample. Therefore, the data are not qualified.

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- The samples were analyzed by Method 6010 ICP Metals, Method 6010 ICP Trace and Method 7471 Mercury.
- The run log included in this report has been electronically generated. The run log which has been signed by the analyst and secondary reviewer is included in the raw data and kept on file at LAS Laboratories, Inc.

Shellee McGrath
Prepared By

December 31, 1997
Date

CASE NARRATIVE
INORGANIC METALS ANALYSES
SOILS

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), and duplicate sample(s).

Preparation and Analysis Requirements

- All soil samples for total metals analysis were received on November 5, 1997. The samples were prepared and analyzed as LAS Batch 1105 mw2. Sample BOM909 (L10981-72) was used for matrix spike and matrix spike duplicate analyses.

Holding Time Requirements

- All samples were analyzed within the method-specific holding times with the following exception: The samples for mercury were analyzed outside of the twenty-eight day holding time. All associated samples are flagged with an "H".

Method Blanks

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

Internal Quality Control

- All Internal Quality Control were within acceptance limits.
- The samples were analyzed by Method 6010 ICP Metals, Method 6010 ICP Trace and Method 7471 Mercury.
- The run log included in this report has been electronically generated. The run log which has been signed by the analyst and secondary reviewer is included in the raw data and kept on file at LAS Laboratories, Inc.

Shellee McGrath
Prepared By

December 31, 1997
Date

Organic Analytes - Case Narrative

General Introduction

The Case Narrative associated with the determination of organic analytes is separated into three (3) sections as follows:

SECTION 1

A brief word processed description of each method reported in this package. This is a general summary of the procedures used and quality control measures applied. It is not intended to include client-specific requirements. Results relating to initial calibration criteria and continuing calibration criteria are included in this section. This section will also describe any unusual events or important observations from the processing of the samples for each method. The initials of the reporting specialist compiling the Case Narrative with the date compiled will be at the end of this section.

SECTION 2

2. An *Exception Report* for each method printed from our data base that summarizes the results of all quality control (QC) measures. A separate *Exception Report* is included for each "QC Group" necessary for each method. At LAS, a QC Group is also called a "workgroup", or more descriptively, a "QC Batch". Each *Exception Report* includes:
   a. A table listing all the samples in the QC Group by LAS Sample ID and Client Sample ID with the date analyzed and Analytical Batch.
   b. Statement(s) relating to holding times for all samples in the QC Group.
   c. Statement(s) relating to the Method Blank (MB) for all samples in the QC Group.
   d. A list of all samples in the QC Group requiring reanalysis for dilution(s) or QC outliers.
   e. A list of all samples in the QC Group that failed surrogate recovery criteria with the recovery obtained and the Acceptance Limits.
   f. A list of all QC Samples that failed recovery criteria with the recovery obtained and the Acceptance Limits. The QC Samples are a laboratory control sample (LCS) and a matrix spike (MS)/matrix spike duplicate (MSD) pair. If insufficient sample exists for a MS/MSD pair, a laboratory control sample duplicate (LCSD) is included. Some methods call for a LCS/LCSD pair instead of a MS/MSD and some for MS/MSD and LCS/LCSD pairs.
   g. A list of all samples in the QC Group that failed internal standard criteria with the integrated areas of the internal standard(s) and their retention times. Note: Applicable to gas chromatography/mass spectrometry GC/MS methods only.

SECTION 3

A table describing all LAS default data qualifiers (flags) used to qualify the data reported on the result forms. Client-specific qualifiers may augment or replace these LAS default qualifiers.

Method 8270 Semivolatile Organic Compounds

This method identifies and quantifies semivolatile organic compounds using gas chromatography/mass spectrometry (GC/MS). Samples are extracted with an organic solvent to separate the compounds of interest from the sample matrix. The extract may be subjected to certain cleanup procedures to remove potential interferences. The extract is then concentrated to a final volume, and the compounds in the extract are identified and quantified using GC/MS. The GC/MS identifies compounds based on the retention time of the compound and a comparison between the mass spectrum of the extract and a standard. Compounds are quantified based on the detector response of a "quant" ion from each compound compared to the response of an ion from an internal standard.

Each time that samples are extracted a collection of quality control check samples are also extracted. A MB is extracted to verify that the laboratory procedures are not contaminating the samples. A LCS is extracted that contains most or all target analytes in a matrix which does not interfere with the analytical procedure. Recoveries of the target analytes in the LCS are compared to control limits to verify that the analytical systems are operating properly. MS/MSD samples are also prepared with each extraction batch, when sufficient sample exists. The MS and MSD samples are portions of client samples that have been spiked identically to the LCS. Recoveries of the spiked target analytes can be used to estimate the accuracy and precision of the measurements in a real client sample matrix, and they can be used to determine the effect of the sample matrix on the analytical procedures. In cases where there is not enough sample for an MS and MSD, a duplicate of the LCS, a LCSD, is prepared. Every sample, MB, MS, MSD, and LCS is spiked with surrogate compounds before extraction. Recoveries of the surrogate compounds are used to verify performance of the analytical systems on a sample by sample basis. A group of samples extracted together is called an extraction batch or a QC Group. The procedure used for extraction depends on the sample matrix, so samples with different matrices (e.g. solids, aqueous liquids, solvent-miscible organic fluids, etc.) will be extracted in separate QC Groups.

Before extracts are analyzed the instrument must be tuned and must have an acceptable five-point initial calibration. Daily, the instrument is tuned and a continuing calibration verification is analyzed to determine if the initial calibration is still valid. Extracts are then run in twelve-hour sequences from the time of the tune. Each sample extract is spiked with internal standards before analysis. The internal standards verify stability of the instrument on a extract by extract basis. A group of extracts analyzed within a twelve-hour tune time is called an Analytical Batch. The Exception Report(s) in the following section describe any quality control outliers or comments pertaining to each QC Group.

Results relating to initial and continuing calibration criteria are as follows:
All initial calibration criteria were met.
All continuing calibration criteria were met.

Unusual events or important observations from the processing of the samples are as follows:

The following samples were analyzed outside of holding time: BOM911 (L10981-63), BOM911 (L10981-63) DL, BOM914 (L10981-51), and 55854MSD.

Lydia M. Coleman
Prepared By

January 26, 1998
Date

LAS LABORATORIES

SEMI-VOLATILE ORGANICS BY GC/MS
EXCEPTION REPORT
QC GROUP: 8270 SEMI-VOLATILES_55854

SAMPLE SUMMARY

LAS Sample ID		Client Sample ID	Date Analyzed	Analytical Batch
55854LCS		Lab Ctrl Sample	20-DEC-97 21:28	122097-8270-K2
55854MB		Method Blank	20-DEC-97 20:55	122097-8270-K2
55854MS		BOM911	21-DEC-97 07:54	122097-8270-K2
55854MSD		BOM911	13-JAN-98 18:08	011398-8270-K
L10981-58		BOM8Y7	21-DEC-97 04:35	122097-8270-K2
L10981-59		BOM8Y8	21-DEC-97 05:08	122097-8270-K2
L10981-60		BOM8Y9	21-DEC-97 05:41	122097-8270-K2
L10981-61		BOM900	21-DEC-97 06:14	122097-8270-K2
L10981-62		BOM901	21-DEC-97 06:47	122097-8270-K2
L10981-63	DL	BOM902	24-DEC-97 15:15	122497-8270-K
L10981-63		BOM902	12-JAN-98 13:21	011298-8270-K
L10981-52		BOM903	21-DEC-97 01:19	122097-8270-K2
L10981-53		BOM904	21-DEC-97 01:52	122097-8270-K2
L10981-54		BOM905	21-DEC-97 02:24	122097-8270-K2
L10981-55		BOM906	21-DEC-97 02:57	122097-8270-K2
L10981-56		BOM907	21-DEC-97 03:30	122097-8270-K2
L10981-57		BOM908	21-DEC-97 04:03	122097-8270-K2
L10981-46		BOM909	20-DEC-97 22:01	122097-8270-K2
L10981-47		BOM910	20-DEC-97 22:34	122097-8270-K2
L10981-48		BOM911	20-DEC-97 23:07	122097-8270-K2
L10981-49		BOM912	20-DEC-97 23:40	122097-8270-K2
L10981-50		BOM913	21-DEC-97 00:13	122097-8270-K2
L10981-51		BOM914	21-DEC-97 00:46	122097-8270-K2
L10981-51	RE	BOM914	24-DEC-97 14:43	122497-8270-K

HOLDING TIMES
__X__ The extraction holding times were met.
__X__ The analytical holding time was exceeded. See QC group summary for listing.

QC GROUP SUMMARY

The following analytical holding times were exceeded.

LAS Sample ID	Client Sample ID	Analysis Date	Analytical Holding Time
55854MSD	BOM911	13-JAN-98	22-DEC-97
L10981-63	BOM902	24-DEC-97	22-DEC-97
L10981-63	BOM902	12-JAN-98	22-DEC-97
L10981-51	BOM914	24-DEC-97	22-DEC-97

METHOD BLANK

__X__ No target analytes were detected in the method blank(s).

SAMPLE RESULTS

LAS LABORATORIES

SEMI-VOLATILE ORGANICS BY GC/MS
EXCEPTION REPORT
QC GROUP: 8270 SEMI-VOLATILES_55854

__X__ The following samples required reanalysis for either dilutions or QC outliers.

LAS Sample ID	Client Sample ID
L10981-63	BOM902
L10981-51	BOM914

__X__ The following samples required a dilution.

LAS Sample ID	Client Sample ID	Dilution
L10981-63	BOM902	10

SURROGATE RECOVERIES

__X__ All surrogate recoveries met criteria for this QC group.

QC SAMPLE RESULTS

__X__ All QC samples met criteria for this QC group.

__X__ The following samples failed the internal standard criteria for this QC group.

CUSTOMER SAMPLE ID	LAS SAMPLE ID	IS4 (PHN) Area #	RT #	IS5 (CRY) Area #	RT #	IS6 (PRY) Area #	RT
BOM914	L10981-51	163916	11.99	108298*	17.18	123827	19.8

IS4 (PHN) = Phenanthrene-d10
IS5 (CRY) = Chrysene-d12
IS6 (PRY) = Perylene-d12

LAS LABORATORIES

SEMI-VOLATILE ORGANICS BY GC/MS
EXCEPTION REPORT
QC GROUP: 8270 SEMI-VOLATILES_55968

SAMPLE SUMMARY

LAS Sample ID	Client Sample ID	Date Analyzed	Analytical Batch
55968LCS	Lab Ctrl Sample	20-DEC-97 15:06	122097-8270-K
55968MB	Method Blank	20-DEC-97 14:38	122097-8270-K
55968MS	BOMB44	20-DEC-97 16:11	122097-8270-K
55968MSD	BOMB44	20-DEC-97 16:44	122097-8270-K
L10981-45	BOMB44	20-DEC-97 15:37	122097-8270-K

HOLDING TIMES
__X__ All holding times were met for samples in this QC group.
__X__ The extraction holding times were met.
__X__ The analytical holding times were met.

METHOD BLANK

__X__ No target analytes were detected in the method blank(s).

SAMPLE RESULTS

__X__ No samples in the QC group required reanalysis.

__X__ No samples in the QC group required a dilution.

SURROGATE RECOVERIES

__X__ All surrogate recoveries met criteria for this QC group.

QC SAMPLE RESULTS

__X__ All QC samples met criteria for this QC group.

__X__ The following samples failed the internal standard criteria for this QC group.

CUSTOMER SAMPLE ID	LAS SAMPLE ID	IS1(DCB) Area #	RT #	IS2(NPT) Area #	RT #	IS3(ANT) Area #	RT
Lab Ctrl SampleRE	56559LCS RE	71929	5.52	216038	6.85	43416*	9.[illegible]

IS1 (DCB) = 1,4-Dichlorobenzene-d4
IS2 (NPT) = Naphthalene-d8
IS3 (ANT) = Acenaphthene-d10

LAS LABORATORIES

SEMI-VOLATILE ORGANICS BY GC/MS
EXCEPTION REPORT
QC GROUP: 8270 SEMI-VOLATILES_55968

CUSTOMER SAMPLE ID	LAS SAMPLE ID	IS4(PHN) Area #	RT #	IS5(CRY) Area #	RT #	IS6(PRY) Area #	RT #
Lab Ctrl SampleRE	56559LCS RE	116769	11.97	70227	17.16	5103*	19.79

IS4 (PHN) = Phenanthrene-d10
IS5 (CRY) = Chrysene-d12
IS6 (PRY) = Perylene-d12

CASE NARRATIVE
RADIOCHEMICAL ANALYSES

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

Holding Time Requirements

All holding time requirements were met.

Alpha Spectrometry I

Analytical Method Uranium Isotopic

The uranium isotopic analysis was performed using standard operating procedure, LAL-91-SOP-0108. The samples were analyzed in workgroups 55964, 55965 and 56823.

Workgroup 55964: Samples BOM905, BOM8Y7, BOM900, and BOM902 (L10981-35, 39, 42, and 44) were re-analyzed in workgroup 56823 due to low chemical recoveries. No results for these samples were reported with this workgroup. The instrument calibration verification met criteria. The yield tracer recoveries were within QC criteria. The method blank results were greater than the minimum detectable activity (MDA), but lower than the reporting detection limit (RDL); the data was reported. The laboratory control sample (LCS) recoveries were within QC criteria. The duplicate (DUP) recoveries were within QC criteria. No other re-analyses were performed.

Workgroup 55965: The instrument calibration verification met criteria. The yield tracer recoveries were within QC criteria. The method blank results were greater than the MDA, but below the RDL; the data was reported. The LCS recoveries were within QC criteria. The DUP recoveries were within QC criteria. Tailing corrections were made on the DUP and samples BOMB44, BOMB46, and BOMB47 (L10981-23, 25, and 26) due to tailing of the U-234 peak into the U-235 peak. The DUP and all client samples, with the exception of U-235 of sample BOMB46 (L10981-26), had MDAs above the RDL due to sample volumes used for analysis being reduced due to the elevated sample activity. Since the activity in the samples was well above the MDA, the data was reported. No re-analyses were performed.

Workgroup 56823: The instrument calibration verification met criteria. The yield tracer recoveries were within QC criteria. The U-234 and U-238 method blank results were greater than the MDA, but below the RDL; the data was reported. The U-235 method blank results were within QC criteria. The LCS recoveries were within QC criteria. The DUP recoveries were within QC criteria. Sample BOM902 (L10981-44) U-234 had an MDA above the RDL due to the sample volume used for analysis being reduced due to the elevated sample activity. Since the activity in the sample was well above the MDA, the data was reported. No re-analyses were performed.

Yvonne M. Jacoby
Prepared By

December 30, 1997
Date

LAS Laboratories, Inc.
DATA QUALIFIERS FOR INORGANIC ANALYSES

[Revised 02/28/97]

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

[1] Used as footnote designations on the QC summary form.

LAS Laboratories, Inc.
DATA QUALIFIERS FOR ORGANIC ANALYSES

[Revised 02/28/97]

For Use On The Analytical Data Reporting Forms	
A	***For CLP analyses Only*** -- The TIC is a suspected aldol-condensation product.
B	Any constituent that was also detected in the associated blank whose concentration was greater than the practical or reporting detection limit (PQL or RDL), or method detection limit (MDL) for client samples that require "J" flags to be reported.
C	Constituent confirmed by GC/MS analysis. *[pesticide/PCB analyses only]*
D	Constituent detected in the diluted sample. It also indicates that an accurate quantitation is not possible due to surrogates being diluted out of the samples during the course of the analysis.
E	Constituent concentration exceeded the calibration range.
G	The quantitation is not gasoline or diesel but believed to be some other combination of hydrocarbons.
H	Sample analysis performed outside of method- or client-specified maximum holding time requirement.
J	*Estimated value* -- (1) constituent detected at a level less than the RDL or PQL and greater than or equal to the MDL; (2) estimated concentration for TICs ***(For CLP Reporting Only)***.
N	***For CLP Reporting Only*** -- Tentatively identified constituents (TICs) identified based on mass spectral library search.
NQ	Analyte detected, but Not Quantified; see result from subsequent analysis
P	***For CLP Reporting Only*** -- The percent difference between the concentrations detected on both GC columns was greater than 25 percent *[pesticide/PCB analyses only]*.
U	***For CLP Reporting Only*** -- Constituent was analyzed for but not detected (sample quantitation must be corrected for dilution and percent moisture).
X, Y, or Z	Analyst-defined qualifier.
N/A (% Moisture)	N/A in the % moisture cell indicates that data are reported on an "*as received*" basis. A value in the % moisture cell indicates that data are reported based on a "*dry weight*" basis.
For Use On The QC Data Reporting Forms	
*****	QC data (i.e., percent recovery data for matrix spike, matrix spike duplicate, laboratory control standard, or surrogates; and RPD for matrix spike duplicate or unspiked duplicate) exceeded acceptance limits.
a[1]	The spike recovery and/or RPD for matrix spike and matrix spike duplicates cannot be evaluated due to insufficient spiking level compared to the elevated sample analyte concentration.
b[1]	The RPD cannot be computed because the sample and/or duplicate concentration was below the RDL.

[1] Used as footnote designations on the QC Summary Form.

LAS Laboratories, Inc.

DATA QUALIFIERS FOR RADIOCHEMICAL ANALYSES

[Revised 04/05/96]

For Use on the Analytical Data Reporting Forms	
B	Any constituent that was detected in the associated method blank at a concentration was greater than the reporting detection limit (RDL).
C	The minimum detectable activity exceeded the RDL due to the residue weight limitations forcing a volume reduction.
D	Constituent detected in the diluted sample.
E	Constituent concentration exceeded the calibration or attenuation curve range.
F	***For Alpha Spectrometry Only***-- Full width half max exceeded the 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.

SAMPLE LOGIN AND CHAIN OF CUSTODY

LAS LABORATORIES
LOGIN CHAIN OF CUSTODY REPORT (ln01)
Nov 06 1997, 06:17 pm

Login Number: L10981
Account: 756 Waste Management Hanford
Project: HANFORD 45 DAY

Laboratory Sample Number	Client Sample Number	Collect Date	Receive Date	PR	Due Date
L10981-1	BOMB44	30-OCT-97	05-NOV-97		20-DEC-97
Temp 3					
Location: 157					
SolidWaste 8	S RAD PERCENT SOLIDS				
SolidWaste 8	S SCREENING				
L10981-2	BOMB45	30-OCT-97	05-NOV-97		20-DEC-97
Temp 3					
Location: 157					
SolidWaste 8	S RAD PERCENT SOLIDS				
SolidWaste 8	S SCREENING				
L10981-3	BOMB46	30-OCT-97	05-NOV-97		20-DEC-97
Temp 3					
Location: 157					
SolidWaste 8	S RAD PERCENT SOLIDS				
SolidWaste 8	S SCREENING				
L10981-4	BOMB47	30-OCT-97	05-NOV-97		20-DEC-97
Temp 3					
Location: 157					
SolidWaste 8	S RAD PERCENT SOLIDS				
SolidWaste 8	S SCREENING				
L10981-5	BOM909	30-OCT-97	05-NOV-97		20-DEC-97
Temp 3					
Location: 157					
Soil 4	S RAD PERCENT SOLIDS				
Soil 4	S SCREENING	Hold:28-APR-98			
L10981-6	BOM910	30-OCT-97	05-NOV-97		20-DEC-97
Temp 3					
Location: 157					
Soil 4	S RAD PERCENT SOLIDS				
Soil 4	S SCREENING	Hold:28-APR-98			
L10981-7	BOM911	30-OCT-97	05-NOV-97		20-DEC-97
Temp 3					
Location: 157					
Soil 4	S RAD PERCENT SOLIDS				
Soil 4	S SCREENING	Hold:28-APR-98			

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1105756

LAS LABORATORIES
LOGIN CHAIN OF CUSTODY REPORT (ln01)
Nov 06 1997, 06:17 pm

Login Number: L10981
Account: 756 Waste Management Hanford
Project: HANFORD 45 DAY

Laboratory Sample Number	Client Sample Number	Collect Date	Receive Date	PR	Due Date
L10981-8	BOM912	30-OCT-97	05-NOV-97		20-DEC-97
Temp 3					
Location: 157					
Soil 4 S RAD PERCENT SOLIDS					
Soil 4 S SCREENING		Hold:	28-APR-98		
L10981-9	BOM913	30-OCT-97	05-NOV-97		20-DEC-97
Temp 3					
Location: 157					
Soil 4 S RAD PERCENT SOLIDS					
Soil 4 S SCREENING		Hold:	28-APR-98		
L10981-10	BOM914	30-OCT-97	05-NOV-97		20-DEC-97
Temp 3					
Location: 157					
Soil 4 S RAD PERCENT SOLIDS					
Soil 4 S SCREENING		Hold:	28-APR-98		
L10981-11	BOM903	29-OCT-97	05-NOV-97		20-DEC-97
Temp 3					
Location: 157					
Soil 4 S RAD PERCENT SOLIDS					
Soil 4 S SCREENING		Hold:	27-APR-98		
L10981-12	BOM904	29-OCT-97	05-NOV-97		20-DEC-97
Temp 3					
Location: 157					
Soil 4 S RAD PERCENT SOLIDS					
Soil 4 S SCREENING		Hold:	27-APR-98		
L10981-13	BOM905	30-OCT-97	05-NOV-97		20-DEC-97
Temp 3					
Location: 157					
Soil 4 S RAD PERCENT SOLIDS					
Soil 4 S SCREENING		Hold:	28-APR-98		
L10981-14	BOM906	29-OCT-97	05-NOV-97		20-DEC-97
Temp 3					
Location: 157					
Soil 4 S RAD PERCENT SOLIDS					
Soil 4 S SCREENING		Hold:	27-APR-98		

000021

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LAS LABORATORIES
LOGIN CHAIN OF CUSTODY REPORT (ln01)
Nov 06 1997, 06:17 pm

Login Number: L10981
Account: 756 Waste Management Hanford
Project: HANFORD 45 DAY

Laboratory Sample Number	Client Sample Number	Collect Date	Receive Date	PR	Due Date
L10981-15	BOM907	30-OCT-97	05-NOV-97		20-DEC-97
Temp 3					
Location: 157					
Soil 4 S RAD PERCENT SOLIDS					
Soil 4 S SCREENING	Hold:	28-APR-98			
L10981-16	BOM908	30-OCT-97	05-NOV-97		20-DEC-97
Temp 3					
Location: 157					
Soil 4 S RAD PERCENT SOLIDS					
Soil 4 S SCREENING	Hold:	28-APR-98			
L10981-17	BOM8Y7	29-OCT-97	05-NOV-97		20-DEC-97
Temp 3					
Location: 157					
Soil 4 S RAD PERCENT SOLIDS					
Soil 4 S SCREENING	Hold:	27-APR-98			
L10981-18	BOM8Y8	29-OCT-97	05-NOV-97		20-DEC-97
Temp 3					
Location: 157					
Soil 4 S RAD PERCENT SOLIDS					
Soil 4 S SCREENING	Hold:	27-APR-98			
L10981-19	BOM8Y9	29-OCT-97	05-NOV-97		20-DEC-97
Temp 3					
Location: 157					
Soil 4 S RAD PERCENT SOLIDS					
Soil 4 S SCREENING	Hold:	27-APR-98			
L10981-20	BOM900	29-OCT-97	05-NOV-97		20-DEC-97
Temp 3					
Location: 157					
Soil 4 S RAD PERCENT SOLIDS					
Soil 4 S SCREENING	Hold:	27-APR-98			
L10981-21	BOM901	29-OCT-97	05-NOV-97		20-DEC-97
Temp 3					
Location: 157					
Soil 4 S RAD PERCENT SOLIDS					
Soil 4 S SCREENING	Hold:	27-APR-98			

000022

1105756

LAS LABORATORIES
LOGIN CHAIN OF CUSTODY REPORT (ln01)
Nov 06 1997, 06:17 pm

Login Number: L10981
Account: 756 Waste Management Hanford
Project: HANFORD 45 DAY

Laboratory Sample Number	Client Sample Number	Collect Date	Receive Date	PR	Due Date
L10981-22	BOM902	29-OCT-97	05-NOV-97		20-DEC-97
Temp 3					
Location: 157					
Soil 4	S RAD PERCENT SOLIDS				
Soil 4	S SCREENING	Hold:27-APR-98			
L10981-23	BOMB44	30-OCT-97	05-NOV-97		20-DEC-97
Temp 3					
Location: 157					
SolidWaste 8	S U-ISOTOPIC LAL-0108	Hold:28-APR-98			
L10981-24	BOMB45	30-OCT-97	05-NOV-97		20-DEC-97
Temp 3					
Location: 157					
SolidWaste 8	S U-ISOTOPIC LAL-0108	Hold:28-APR-98			
L10981-25	BOMB46	30-OCT-97	05-NOV-97		20-DEC-97
Temp 3					
Location: 157					
SolidWaste 8	S U-ISOTOPIC LAL-0108	Hold:28-APR-98			
L10981-26	BOMB47	30-OCT-97	05-NOV-97		20-DEC-97
Temp 3					
Location: 157					
SolidWaste 8	S U-ISOTOPIC LAL-0108	Hold:28-APR-98			
L10981-27	BOM909	30-OCT-97	05-NOV-97		20-DEC-97
Temp 3					
Location: 157					
Soil 4	S U-ISOTOPIC LAL-0108	Hold:28-APR-98			
L10981-28	BOM910	30-OCT-97	05-NOV-97		20-DEC-97
Temp 3					
Location: 157					
Soil 4	S U-ISOTOPIC LAL-0108	Hold:28-APR-98			
L10981-29	BOM911	30-OCT-97	05-NOV-97		20-DEC-97
Temp 3					
Location: 157					
Soil 4	S U-ISOTOPIC LAL-0108	Hold:28-APR-98			
L10981-30	BOM912	30-OCT-97	05-NOV-97		20-DEC-97
Temp 3					
Location: 157					

000023

1105756

LAS LABORATORIES
LOGIN CHAIN OF CUSTODY REPORT (ln01)
Nov 06 1997, 06:17 pm

Login Number: L10981
Account: 756 Waste Management Hanford
Project: HANFORD 45 DAY

Laboratory Sample Number	Client Sample Number	Collect Date	Receive Date	PR	Due Date
Soil 4 S U-ISOTOPIC LAL-0108 Hold:28-APR-98					
L10981-31 Temp 3 Location: 157	BOM913 ✓	30-OCT-97	05-NOV-97		20-DEC-97
Soil 4 S U-ISOTOPIC LAL-0108 Hold:28-APR-98					
L10981-32 Temp 3 Location: 157	BOM914 ✓	30-OCT-97	05-NOV-97		20-DEC-97
Soil 4 S U-ISOTOPIC LAL-0108 Hold:28-APR-98					
L10981-33 Temp 3 Location: 157	BOM903 ✓	29-OCT-97	05-NOV-97		20-DEC-97
Soil 4 S U-ISOTOPIC LAL-0108 Hold:27-APR-98					
L10981-34 Temp 3 Location: 157	BOM904 ✓	29-OCT-97	05-NOV-97		20-DEC-97
Soil 4 S U-ISOTOPIC LAL-0108 Hold:27-APR-98					
L10981-35 Temp 3 Location: 157	BOM905 ✓	30-OCT-97	05-NOV-97		20-DEC-97
Soil 4 S U-ISOTOPIC LAL-0108 Hold:28-APR-98					
L10981-36 Temp 3 Location: 157	BOM906 ✓	29-OCT-97	05-NOV-97		20-DEC-97
Soil 4 S U-ISOTOPIC LAL-0108 Hold:27-APR-98					
L10981-37 Temp 3 Location: 157	BOM907 ✓	30-OCT-97	05-NOV-97		20-DEC-97
Soil 4 S U-ISOTOPIC LAL-0108 Hold:28-APR-98					
L10981-38 Temp 3 Location: 157	BOM908 ✓	30-OCT-97	05-NOV-97		20-DEC-97
Soil 4 S U-ISOTOPIC LAL-0108 Hold:28-APR-98					

000024

1105702

LAS LABORATORIES
LOGIN CHAIN OF CUSTODY REPORT (ln01)
Nov 06 1997, 06:17 pm

Login Number: L10981
Account: 756 Waste Management Hanford
Project: HANFORD 45 DAY

Laboratory Sample Number	Client Sample Number	Collect Date	Receive Date	PR	Due Date
L10981-39	BOM8Y7 ✓	29-OCT-97	05-NOV-97		20-DEC-97
Temp 3					
Location: 157					
Soil 4 S U-ISOTOPIC LAL-0108 Hold:27-APR-98					
L10981-40	BOM8Y8 ✓	29-OCT-97	05-NOV-97		20-DEC-97
Temp 3					
Location: 157					
Soil 4 S U-ISOTOPIC LAL-0108 Hold:27-APR-98					
L10981-41	BOM8Y9 ✓	29-OCT-97	05-NOV-97		20-DEC-97
Temp 3					
Location: 157					
Soil 4 S U-ISOTOPIC LAL-0108 Hold:27-APR-98					
L10981-42	BOM900 ✓	29-OCT-97	05-NOV-97		20-DEC-97
Temp 3					
Location: 157					
Soil 4 S U-ISOTOPIC LAL-0108 Hold:27-APR-98					
L10981-43	BOM901 ✓	29-OCT-97	05-NOV-97		20-DEC-97
Temp 3					
Location: 157					
Soil 4 S U-ISOTOPIC LAL-0108 Hold:27-APR-98					
L10981-44	BOM902 ✓	29-OCT-97	05-NOV-97		20-DEC-97
Temp 3					
Location: 157					
Soil 4 S U-ISOTOPIC LAL-0108 Hold:27-APR-98					
L10981-45	BOMB44 ✓	30-OCT-97	05-NOV-97		20-DEC-97
pentachlorophenol; Temp 3					
Location: 157					
SolidWaste 8 S 8270 SEMI-VOLATILES Hold:13-NOV-97					
L10981-46	BOM909 ✓	30-OCT-97	05-NOV-97		20-DEC-97
pentachlorophenol; Temp 3					
Location: 157					
Soil 4 S 8270 SEMI-VOLATILES Hold:13-NOV-97					
L10981-47	BOM910 ✓	30-OCT-97	05-NOV-97		20-DEC-97
pentachlorophenol; Temp 3					
Location: 157					
Soil 4 S 8270 SEMI-VOLATILES Hold:13-NOV-97					

000025

1105726

LAS LABORATORIES
LOGIN CHAIN OF CUSTODY REPORT (ln01)
Nov 06 1997, 06:17 pm

Login Number: L10981
Account: 756 Waste Management Hanford
Project: HANFORD 45 DAY

Laboratory Sample Number	Client Sample Number	Collect Date	Receive Date	PR	Due Date
L10981-48	BOM911 ✓	30-OCT-97	05-NOV-97		20-DEC-97
pentachlorophenol; Temp 3					
Location: 157					
Soil 4 S 8270 SEMI-VOLATILES		Hold:13-NOV-97			
L10981-49	BOM912 ✓	30-OCT-97	05-NOV-97		20-DEC-97
pentachlorophenol; Temp 3					
Location: 157					
Soil 4 S 8270 SEMI-VOLATILES		Hold:13-NOV-97			
L10981-50	BOM913 ✓	30-OCT-97	05-NOV-97		20-DEC-97
pentachlorophenol; Temp 3					
Location: 157					
Soil 4 S 8270 SEMI-VOLATILES		Hold:13-NOV-97			
L10981-51	BOM914 ✓	30-OCT-97	05-NOV-97		20-DEC-97
pentachlorophenol; Temp 3					
Location: 157					
Soil 4 S 8270 SEMI-VOLATILES		Hold:13-NOV-97			
L10981-52	BOM903 ✓	29-OCT-97	05-NOV-97		20-DEC-97
pentachlorophenol; Temp 3					
Location: 157					
Soil 4 S 8270 SEMI-VOLATILES		Hold:12-NOV-97			
L10981-53	BOM904 ✓	29-OCT-97	05-NOV-97		20-DEC-97
pentachlorophenol; Temp 3					
Location: 157					
Soil 4 S 8270 SEMI-VOLATILES		Hold:12-NOV-97			
L10981-54	BOM905 ✓	30-OCT-97	05-NOV-97		20-DEC-97
pentachlorophenol; Temp 3					
Location: 157					
Soil 4 S 8270 SEMI-VOLATILES		Hold:13-NOV-97			
L10981-55	BOM906 ✓	29-OCT-97	05-NOV-97		20-DEC-97
pentachlorophenol; Temp 3					
Location: 157					
Soil 4 S 8270 SEMI-VOLATILES		Hold:12-NOV-97			
L10981-56	BOM907 ✓	30-OCT-97	05-NOV-97		20-DEC-97
pentachlorophenol; Temp 3					
Location: 157					
Soil 4 S 8270 SEMI-VOLATILES		Hold:13-NOV-97			

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LAS LABORATORIES
LOGIN CHAIN OF CUSTODY REPORT (ln01)
Nov 06 1997, 06:17 pm

Login Number: L10981
Account: 756 Waste Management Hanford
Project: HANFORD 45 DAY

Laboratory Sample Number	Client Sample Number	Collect Date	Receive Date	PR	Due Date
L10981-57	BOM908	30-OCT-97	05-NOV-97		20-DEC-97
pentachlorophenol; Temp 3					
Location: 157					
Soil 4 S 8270 SEMI-VOLATILES		Hold:13-NOV-97			
L10981-58	BOM8Y7	29-OCT-97	05-NOV-97		20-DEC-97
pentachlorophenol; Temp 3					
Location: 157					
Soil 4 S 8270 SEMI-VOLATILES		Hold:12-NOV-97			
L10981-59	BOM8Y8	29-OCT-97	05-NOV-97		20-DEC-97
pentachlorophenol; Temp 3					
Location: 157					
Soil 4 S 8270 SEMI-VOLATILES		Hold:12-NOV-97			
L10981-60	BOM8Y9	29-OCT-97	05-NOV-97		20-DEC-97
pentachlorophenol; Temp 3					
Location: 157					
Soil 4 S 8270 SEMI-VOLATILES		Hold:12-NOV-97			
L10981-61	BOM900	29-OCT-97	05-NOV-97		20-DEC-97
pentachlorophenol; Temp 3					
Location: 157					
Soil 4 S 8270 SEMI-VOLATILES		Hold:12-NOV-97			
L10981-62	BOM901	29-OCT-97	05-NOV-97		20-DEC-97
pentachlorophenol; Temp 3					
Location: 157					
Soil 4 S 8270 SEMI-VOLATILES		Hold:12-NOV-97			
L10981-63	BOM902	29-OCT-97	05-NOV-97		20-DEC-97
pentachlorophenol; Temp 3					
Location: 157					
Soil 4 S 8270 SEMI-VOLATILES		Hold:12-NOV-97			
L10981-64	BOMB44	30-OCT-97	05-NOV-97		20-DEC-97
Temp 3					
Location: 157					
SolidWaste 8 S 300.0 CHLORIDE		Hold:27-NOV-97			
SolidWaste 8 S 300.0 NITRATE		Hold:01-NOV-97			
SolidWaste 8 S 300.0 NITRITE					

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LAS LABORATORIES
LOGIN CHAIN OF CUSTODY REPORT (ln01)
Nov 06 1997, 06:17 pm

Login Number: L10981
Account: 756 Waste Management Hanford
Project: HANFORD 45 DAY

Laboratory Sample Number	Client Sample Number	Collect Date	Receive Date	PR	Due Date
L10981-65	BOMB45 ✓	30-OCT-97	05-NOV-97		20-DEC-97
Temp 3					
Location: 157					
SolidWaste 8	S 300.0 CHLORIDE	Hold:27-NOV-97			
SolidWaste 8	S 300.0 NITRATE	Hold:01-NOV-97			
SolidWaste 8	S 300.0 NITRITE				
L10981-66	BOMB46 ✓	30-OCT-97	05-NOV-97		20-DEC-97
Temp 3					
Location: 157					
SolidWaste 8	S 300.0 CHLORIDE	Hold:27-NOV-97			
SolidWaste 8	S 300.0 NITRATE	Hold:01-NOV-97			
SolidWaste 8	S 300.0 NITRITE				
L10981-67	BOMB47 ✓	30-OCT-97	05-NOV-97		20-DEC-97
Temp 3					
Location: 157					
SolidWaste 8	S 300.0 CHLORIDE	Hold:27-NOV-97			
SolidWaste 8	S 300.0 NITRATE	Hold:01-NOV-97			
SolidWaste 8	S 300.0 NITRITE				
L10981-68	BOMB44 ✓	30-OCT-97	05-NOV-97		20-DEC-97
6010=Ba,Be,Cd,Cr,Ni,Ag,As,Pb; Temp 3					
Location: 157					
SolidWaste 8	S 6010 ICP METALS	Hold:28-APR-98			
SolidWaste 8	S 6010 ICP TRACE	Hold:28-APR-98			
SolidWaste 8	S 7471 MERCURY	Hold:27-NOV-97			
L10981-69	BOMB45 ✓	30-OCT-97	05-NOV-97		20-DEC-97
6010=Ba,Be,Cd,Cr,Ni,Ag,As,Pb; Temp 3					
Location: 157					
SolidWaste 8	S 6010 ICP METALS	Hold:28-APR-98			
SolidWaste 8	S 6010 ICP TRACE	Hold:28-APR-98			
SolidWaste 8	S 7471 MERCURY	Hold:27-NOV-97			
L10981-70	BOMB46 ✓	30-OCT-97	05-NOV-97		20-DEC-97
6010=Ba,Be,Cd,Cr,Ni,Ag,As,Pb; Temp 3					
Location: 157					
SolidWaste 8	S 6010 ICP METALS	Hold:28-APR-98			
SolidWaste 8	S 6010 ICP TRACE	Hold:28-APR-98			
SolidWaste 8	S 7471 MERCURY	Hold:27-NOV-97			

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1105756

LAS LABORATORIES
LOGIN CHAIN OF CUSTODY REPORT (ln01)
Nov 06 1997, 06:17 pm

Login Number: L10981
Account: 756 Waste Management Hanford
Project: HANFORD 45 DAY

Laboratory Sample Number	Client Sample Number	Collect Date	Receive Date	PR	Due Date
Soil 4 S 7471 MERCURY		Hold:27-NOV-97			
Soil 4 S PERCENT SOLIDS		Hold:05-NOV-97			
L10981-77	BOM914	30-OCT-97	05-NOV-97		20-DEC-97
6010=Ba,Be,Cd,Cr,Ni,Ag,As,Pb; Temp 3					
Location: 157					
Soil 4 S 6010 ICP METALS		Hold:28-APR-98			
Soil 4 S 6010 ICP TRACE		Hold:28-APR-98			
Soil 4 S 7471 MERCURY		Hold:27-NOV-97			
Soil 4 S PERCENT SOLIDS		Hold:05-NOV-97			
L10981-78	BOM903	29-OCT-97	05-NOV-97		20-DEC-97
6010=Ba,Be,Cd,Cr,Ni,Ag,As,Pb; Temp 3					
Location: 157					
Soil 4 S 6010 ICP METALS		Hold:27-APR-98			
Soil 4 S 6010 ICP TRACE		Hold:27-APR-98			
Soil 4 S 7471 MERCURY		Hold:26-NOV-97			
Soil 4 S PERCENT SOLIDS		Hold:05-NOV-97			
L10981-79	BOM904	29-OCT-97	05-NOV-97		20-DEC-97
6010=Ba,Be,Cd,Cr,Ni,Ag,As,Pb; Temp 3					
Location: 157					
Soil 4 S 6010 ICP METALS		Hold:27-APR-98			
Soil 4 S 6010 ICP TRACE		Hold:27-APR-98			
Soil 4 S 7471 MERCURY		Hold:26-NOV-97			
Soil 4 S PERCENT SOLIDS		Hold:05-NOV-97			
L10981-80	BOM905	30-OCT-97	05-NOV-97		20-DEC-97
6010=Ba,Be,Cd,Cr,Ni,Ag,As,Pb; Temp 3					
Location: 157					
Soil 4 S 6010 ICP METALS		Hold:28-APR-98			
Soil 4 S 6010 ICP TRACE		Hold:28-APR-98			
Soil 4 S 7471 MERCURY		Hold:27-NOV-97			
Soil 4 S PERCENT SOLIDS		Hold:05-NOV-97			
L10981-81	BOM906	29-OCT-97	05-NOV-97		20-DEC-97
6010=Ba,Be,Cd,Cr,Ni,Ag,As,Pb; Temp 3					
Location: 157					
Soil 4 S 6010 ICP METALS		Hold:27-APR-98			
Soil 4 S 6010 ICP TRACE		Hold:27-APR-98			
Soil 4 S 7471 MERCURY		Hold:26-NOV-97			
Soil 4 S PERCENT SOLIDS		Hold:05-NOV-97			

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110576

LAS LABORATORIES
LOGIN CHAIN OF CUSTODY REPORT (ln01)
Nov 06 1997, 06:17 pm

Login Number: L10981
Account: 756 Waste Management Hanford
Project: HANFORD 45 DAY

Laboratory Sample Number	Client Sample Number	Collect Date	Receive Date	PR	Due Date
L10981-82	BOM907 ✓	30-OCT-97	05-NOV-97		20-DEC-97

6010=Ba,Be,Cd,Cr,Ni,Ag,As,Pb; Temp 3
Location: 157

Soil	4	S	6010 ICP METALS	Hold:28-APR-98
Soil	4	S	6010 ICP TRACE	Hold:28-APR-98
Soil	4	S	7471 MERCURY	Hold:27-NOV-97
Soil	4	S	PERCENT SOLIDS	Hold:05-NOV-97

L10981-83	BOM908 ✓	30-OCT-97	05-NOV-97	20-DEC-97

6010=Ba,Be,Cd,Cr,Ni,Ag,As,Pb; Temp 3
Location: 157

Soil	4	S	6010 ICP METALS	Hold:28-APR-98
Soil	4	S	6010 ICP TRACE	Hold:28-APR-98
Soil	4	S	7471 MERCURY	Hold:27-NOV-97
Soil	4	S	PERCENT SOLIDS	Hold:05-NOV-97

L10981-84	BOM8Y7 ✓	29-OCT-97	05-NOV-97	20-DEC-97

6010=Ba,Be,Cd,Cr,Ni,Ag,As,Pb; Temp 3
Location: 157

Soil	4	S	6010 ICP METALS	Hold:27-APR-98
Soil	4	S	6010 ICP TRACE	Hold:27-APR-98
Soil	4	S	7471 MERCURY	Hold:26-NOV-97
Soil	4	S	PERCENT SOLIDS	Hold:05-NOV-97

L10981-85	BOM8Y8 ✓	29-OCT-97	05-NOV-97	20-DEC-97

6010=Ba,Be,Cd,Cr,Ni,Ag,As,Pb; Temp 3
Location: 157

Soil	4	S	6010 ICP METALS	Hold:27-APR-98
Soil	4	S	6010 ICP TRACE	Hold:27-APR-98
Soil	4	S	7471 MERCURY	Hold:26-NOV-97
Soil	4	S	PERCENT SOLIDS	Hold:05-NOV-97

L10981-86	BOM8Y9 ✓	29-OCT-97	05-NOV-97	20-DEC-97

6010=Ba,Be,Cd,Cr,Ni,Ag,As,Pb; Temp 3
Location: 157

Soil	4	S	6010 ICP METALS	Hold:27-APR-98
Soil	4	S	6010 ICP TRACE	Hold:27-APR-98
Soil	4	S	7471 MERCURY	Hold:26-NOV-97
Soil	4	S	PERCENT SOLIDS	Hold:05-NOV-97

L10981-87	BOM900 ✓	29-OCT-97	05-NOV-97	20-DEC-97

6010=Ba,Be,Cd,Cr,Ni,Ag,As,Pb; Temp 3
Location: 157

Soil	4	S	6010 ICP METALS	Hold:27-APR-98

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LAS LABORATORIES
LOGIN CHAIN OF CUSTODY REPORT (ln01)
Nov 06 1997, 06:17 pm

Login Number: L10981
Account: 756 Waste Management Hanford
Project: HANFORD 45 DAY

Laboratory Sample Number	Client Sample Number	Collect Date	Receive Date	PR	Due Date
Soil 4 S 6010 ICP TRACE		Hold:27-APR-98			
Soil 4 S 7471 MERCURY		Hold:26-NOV-97			
Soil 4 S PERCENT SOLIDS		Hold:05-NOV-97			
L10981-88	BOM901	29-OCT-97	05-NOV-97		20-DEC-97
6010=Ba,Be,Cd,Cr,Ni,Ag,As,Pb; Temp 3					
Location: 157					
Soil 4 S 6010 ICP METALS		Hold:27-APR-98			
Soil 4 S 6010 ICP TRACE		Hold:27-APR-98			
Soil 4 S 7471 MERCURY		Hold:26-NOV-97			
Soil 4 S PERCENT SOLIDS		Hold:05-NOV-97			
L10981-89	BOM902	29-OCT-97	05-NOV-97		20-DEC-97
6010=Ba,Be,Cd,Cr,Ni,Ag,As,Pb; Temp 3					
Location: 157					
Soil 4 S 6010 ICP METALS		Hold:27-APR-98			
Soil 4 S 6010 ICP TRACE		Hold:27-APR-98			
Soil 4 S 7471 MERCURY		Hold:26-NOV-97			
Soil 4 S PERCENT SOLIDS		Hold:05-NOV-97			
L10981-90	BOMB48	30-OCT-97	05-NOV-97		20-DEC-97
Temp 3					
Location: 157					
Water 1 S RAD SCREEN		Hold:28-APR-98			
L10981-91	BOM8Y6	29-OCT-97	05-NOV-97		20-DEC-97
Temp 3					
Location: 157					
Water 1 S RAD SCREEN		Hold:27-APR-98			
L10981-92	BOMB49	30-OCT-97	05-NOV-97		20-DEC-97
Temp 3					
Location: 157					
Water 1 S RAD SCREEN		Hold:28-APR-98			
L10981-93	BOMB48	30-OCT-97	05-NOV-97		20-DEC-97
6010=Ba,Be,Cd,Cr,Ni,Ag,As,Pb; Temp 3					
Location: 157					
Water 1 S 6010 ICP METALS		Hold:28-APR-98			
Water 1 S 6010 ICP TRACE		Hold:28-APR-98			
Water 1 S 7470 MERCURY		Hold:27-NOV-97			

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LAS LABORATORIES
LOGIN CHAIN OF CUSTODY REPORT (ln01)
Nov 06 1997, 06:17 pm

Login Number: L10981
Account: 756 Waste Management Hanford
Project: HANFORD 45 DAY

Laboratory Sample Number	Client Sample Number	Collect Date	Receive Date	PR	Due Date
L10981-94	BOM8Y6	29-OCT-97	05-NOV-97		20-DEC-97

6010=Ba,Be,Cd,Cr,Ni,Ag,As,Pb; Temp 3
Location: 157

Water	1	S	6010 ICP METALS	Hold:27-APR-98
Water	1	S	6010 ICP TRACE	Hold:27-APR-98
Water	1	S	7470 MERCURY	Hold:26-NOV-97

L10981-95	BOMB49	30-OCT-97	05-NOV-97	20-DEC-97

6010=Ba,Be,Cd,Cr,Ni,Ag,As,Pb; Temp 3
Location: 157

Water	1	S	6010 ICP METALS	Hold:28-APR-98
Water	1	S	6010 ICP TRACE	Hold:28-APR-98
Water	1	S	7470 MERCURY	Hold:27-NOV-97

L10981-96	REPORT TYPE	05-NOV-97	05-NOV-97	20-DEC-97

Location:

Water	1	S	EDD - DISK DEL.
Water	1	S	FORD
Water	1	S	GCMS4A
Water	1	S	INORG LAS 4A RPT
Water	1	S	RAD RPT TYPE 4

000033

Signature: [illegible]

Date: 11/6/97 1105750

410951

Waste Management Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	R98-001-2	Page 1 of 1

Collector: K.J. Yang	Company Contact: Karl Pool — Telephone No.: 372-2557	Project Coordinator: Steele, SM	Data Turnaround: 45 Days
Project Designation: 303-K Interior Concrete Samples	Sampling Location: 303-K	SAF No.: R98-001	
Ice Chest No.: SML-553	Field Logbook No.: N/A	Method of Shipment: Fed Ex	
Shipped To: Lockheed Environmental	Offsite Property No.: N/A	Bill of Lading/Air Bill No.: N/A	

POSSIBLE SAMPLE HAZARDS/REMARKS: Radioactive.

Special Handling and/or Storage: 4°C

Preservation	None	None	Cool 4C	None	None	HNO3 to pH <2					
Type of Container	P	P	aG	P	P	P					
No. of Container(s)	1	1	1	1	1	1					
Volume	20ml	20ml	125ml	125ml	125ml	500ml					
SAMPLE ANALYSIS	Activity Scan	Total Uranium	Semi-VOA - 8270A (TCL) (Pentachlorophenol)	IC Anions - 300.0 (Chloride, Nitrogen in Nitrate, Nitrogen in Nitrite)	See item (1) in Special Instructions	See item (1) in Special Instructions					

Sample No.	Matrix *	Sample Date	Sample Time										
B0MB44	Other Solid	10-30-97	1450	✓ X	X ✓	X ✓	X ✓	X ✓					
B0MB45	Other Solid	10-30-97	1450	✓ X	X ✓		X ✓	X ✓					
B0MB46	Other Solid	10-30-97	1440	✓ X	X ✓		X ✓	X ✓					
B0MB47	Other Solid	10-30-97	1440	✓ X	X ✓		X ✓	X ✓					
B0MB48	~~Other Solid~~ Water	10-30-97	1305	X					X ✓				

CHAIN OF POSSESSION	Sign/Print Names		
Relinquished By: K.J. Yang [signature]	Date/Time: 11-4-97 1210	Received By: [signature]	Date/Time: 11/05/97 1050
Relinquished By	Date/Time	Received By	Date/Time
Relinquished By	Date/Time	Received By	Date/Time
Relinquished By	Date/Time	Received By	Date/Time

SPECIAL INSTRUCTIONS

Other Solid Matrix is Concrete

Water matrix equipment blank to be run in same SDG as concrete

NO2, NO3 to be run for information only. WMH realizes that the 48 hour hold time may not be met

(1) ICP Metals - 6010A (SW-846) (Barium, Beryllium, Cadmium, Chromium, Nickel, Silver), Arsenic - 7060 - (GFAA), Lead - 7421- (GFAA), Mercury - 7471 - (CV)

Matrix *

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

LABORATORY SECTION	Received By	Title	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

000034

1105756

LIC 181

Waste Management Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	R98-002-3	Page 1 of 1

Collector: K.J. Lang	Company Contact: Karl Pool	Telephone No.: 372-2557	Project Coordinator: Steele, SM
Project Designation: 303-K Exterior Soil Samples	Sampling Location: 303-K		SAF No.: R98-002
Ice Chest No.: SML-553	Field Logbook No.: N/A		Method of Shipment: Fed Ex
Shipped To: Lockheed Environmental	Offsite Property No.: N/A		Bill of Lading/Air Bill No.: N/A

Data Turnaround: **45 Days**

POSSIBLE SAMPLE HAZARDS/REMARKS: Radioactive

Special Handling and/or Storage: 4°C

SAMPLE ANALYSIS												
Preservation				None	None	Cool 4C	None					
Type of Container				P	P	aG	P					
No. of Container(s)				1	1	1	1					
Volume				20ml	20ml	125ml	125ml					
				Activity Scan	Total Uranium	Semi-VOA - 8270A (TCL) (Pentachlorophenol)	See item (1) in Special Instructions					
Sample No.	Matrix *	Sample Date	Sample Time									
B0M909	Soil	10-30-97	1310	X ✓	X ✓	X ✓	X ✓					
B0M910	Soil	10-30-97	1310	X ✓	X ✓	X ✓	X ✓					
B0M911	Soil	10-30-97	1025	X ✓	X ✓	X ✓	X ✓					
B0M912	Soil	10-30-97	1107	X ✓	X ✓	X ✓	X ✓					
B0M913	Soil	10-30-97	1340	X ✓	X ✓	X ✓	X ✓					
B0M914	Soil	10-30-97	1120	X ✓	X ✓	X ✓	X ✓					

CHAIN OF POSSESSION	Sign/Print Names		
Relinquished By: K.J. Lang for Lang	Date/Time: 1210 11-4-97	Received By: [signature]	Date/Time: 1050 11-05-97
Relinquished By	Date/Time	Received By	Date/Time
Relinquished By	Date/Time	Received By	Date/Time
Relinquished By	Date/Time	Received By	Date/Time

SPECIAL INSTRUCTIONS

Water matrix equipment blank to be run in same SDG as soil

(1) ICP Metals - 6010A (SW-846) {Barium, Beryllium, Cadmium, Chromium, Nickel, Silver}, Arsenic - 7060 - (GFAA), Lead - 7421- (GFAA), Mercury - 7471 - (CV)

Matrix *

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

LABORATORY SECTION	Received By	Title	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

000035

105757

L10781

Waste Management Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	R98-002-2	Page 1 of 1

Collector: K.J. Yang	Company Contact: Karl Pool	Telephone No.: 372-2557	Project Coordinator: Steele, SM
Project Designation: 303-K Exterior Soil Samples	Sampling Location: 303-K		SAF No.: R98-002
Ice Chest No.: SML-553	Field Logbook No.: N/A		Method of Shipment: Fed Ex
Shipped To: Lockheed Environmental	Offsite Property No.: N/A		Bill of Lading/Air Bill No.: N/A

Data Turnaround: **45 Days**

POSSIBLE SAMPLE HAZARDS/REMARKS: Radioactive

Special Handling and/or Storage: 4°C

SAMPLE ANALYSIS												
Preservation				None	None	Cool 4C	None					
Type of Container				P	P	aG	P					
No. of Container(s)				1	1	1	1					
Volume				20ml	20ml	125ml	125ml					
				Activity Scan	Total Uranium	Semi-VOA - 8270A (TCL) (Pentachlorophenol)	See item (1) in Special Instructions					
Sample No.	Matrix *	Sample Date	Sample Time									
B0M903	Soil	10-29-97	1305	X ✓	X ✓	X ✓	X ✓					
B0M904	Soil	10-29-97	1234	X ✓	X ✓	X ✓	X ✓					
B0M905	Soil	10-30-97	1320	X ✓	X ✓	X ✓	X ✓					
B0M906	Soil	10-29-97	1140	X ✓	X ✓	X ✓	X ✓					
B0M907	Soil	10-30-97	1107	X ✓	X ✓	X ✓	X ✓					
B0M908	Soil	10-30-97	1022	X ✓	X ✓	X ✓	X ✓					

CHAIN OF POSSESSION	Sign/Print Names		
Relinquished By: K.J. Yang	Date/Time: 11-4-97 1210	Received By: [signature]	Date/Time: 11-05-97 1050
Relinquished By	Date/Time	Received By	Date/Time
Relinquished By	Date/Time	Received By	Date/Time
Relinquished By	Date/Time	Received By	Date/Time

SPECIAL INSTRUCTIONS

Water matrix equipment blank to be run in same SDG as soil

(1) ICP Metals - 6010A (SW-846) (Barium, Beryllium, Cadmium, Chromium, Nickel, Silver), Arsenic - 7060 - (GFAA), Lead - 7421 - (GFAA), Mercury - 7471 - (CV)

Matrix *

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

LABORATORY SECTION	Received By	Title	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

000035

105757

L10951

Waste Management Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	R98-002-1	Page 1 of 1

Collector K.J. Yang	**Company Contact** Karl Pool	**Telephone No.** 372-2557	**Project Coordinator** Steele, SM	**Data Turnaround** 45 Days
Project Designation 303-K Exterior Soil Samples	**Sampling Location** 303-K		**SAF No.** R98-002	
Ice Chest No. SML-553	**Field Logbook No.** N/A		**Method of Shipment** Fed Ex	
Shipped To Lockheed Environmental	**Offsite Property No.** N/A		**Bill of Lading/Air Bill No.** N/A	

POSSIBLE SAMPLE HAZARDS/REMARKS
Radioactive

Special Handling and/or Storage 4°C

Preservation	None	None	Cool 4C	None							
Type of Container	P	P	aG	P							
No. of Container(s)	1	1	1	1							
Volume	20ml	20ml	125ml	125ml							
SAMPLE ANALYSIS	Activity Scan	Total Uranium	Semi-VOA - 8270A (TCL) (Pentachlorophenol)	See item (1) in Special Instructions							
Sample No. / Matrix * / Sample Date / Sample Time											
80M8Y7 / Soil / 10-29-97 / 1210	X ✓	X ✓	X ✓	X ✓							
80M8Y8 / Soil / 10-29-97 / 1125	X ✓	X ✓	X ✓	X ✓							
80M8Y9 / Soil / 10-29-97 / 1125	X ✓	X ✓	X ✓	X ✓							
80M900 / Soil / 10-29-97 / 1155	X ✓	X ✓	X ✓	X ✓							
80M901 / Soil / 10-29-97 / 1216	X ✓	X ✓	X ✓	X ✓							
80M902 / Soil / 10-29-97 / 1236	X ✓	X ✓	X ✓	X ✓							

CHAIN OF POSSESSION — **Sign/Print Names**

Relinquished By	Date/Time	Received By	Date/Time
K.J. Yang	11-4-97 1210	[illegible]	11-05-97 1050

SPECIAL INSTRUCTIONS
Water matrix equipment blank to be run in same SDG as soil

(1) ICP Metals - 6010A (SW-846) {Barium, Beryllium, Cadmium, Chromium, Nickel, Silver}, Arsenic - 7060 - (GFAA), Lead - 7421- (GFAA), Mercury - 7471 - (CV)

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

LABORATORY SECTION	Received By	Title	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

110575

L10481

Waste Management Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	R98-002-7	Page 1 of 1

Collector: K.J. Yang	Company Contact: Telephone No.	Project Coordinator: Steele, SM	Data Turnaround: 45 Days
Project Designation: 303-K Exterior Soil Samples	Sampling Location: 303-K	SAF No.: R98-002	
Ice Chest No.: SML-553	Field Logbook No.: N/A	Method of Shipment: Fed Ex	
Shipped To: Lockheed Environmental	Offsite Property No.: N/A	Bill of Lading/Air Bill No.: N/A	

POSSIBLE SAMPLE HAZARDS/REMARKS: Radioactive.

Special Handling and/or Storage: 4°C

Preservation	None	HNO3 to pH <2										
Type of Container	P	P										
No. of Container(s)	1	1										
Volume	20ml	500ml										
SAMPLE ANALYSIS	Activity Scan	See item (1) in Special Instructions										

Sample No.	Matrix *	Sample Date	Sample Time										
B0M8Y6	Water ~~Soil~~	10-29-97	1025	X	X								
B0MB49	Water ~~Soil~~	10-30-97	1120	X	X								

CHAIN OF POSSESSION	Sign/Print Names		
Relinquished By: K.J. Yang [signature]	Date/Time: 11-4-97 1210	Received By: [signature]	Date/Time: 11-05-97 1050
Relinquished By	Date/Time	Received By	Date/Time
Relinquished By	Date/Time	Received By	Date/Time
Relinquished By	Date/Time	Received By	Date/Time

SPECIAL INSTRUCTIONS

(1) ICP Metals - 6010A (SW-846) {Barium, Beryllium, Cadmium, Chromium, Nickel, Silver}, Arsenic - 7060 - (GFAA), Lead - 7421- (GFAA), Mercury - 7471 - (CV)

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

LABORATORY SECTION	Received By	Title	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

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LAS
A Subsidiary of SPL Laboratories

Sample Login
Login Review Checklist

Login Number L10981

The Login Review Checklist documents the review of the information entered into the ACS database for accuracy and useability. For effective login review, five items are necessary. They are the Chain of Custody (COC) (or equivalent), the Sample Summary Report (SSR), the Login COC Report, the Sample Receiving Checklist, and the Quote/COC Reconciliation Form. This checklist should be affixed to each login package prior to distribution.

SAMPLE SUMMARY REPORT	YES	NO	N/A	COMMENT
1. Are all samples on the COC logged in or the proper discrepancies noted on the SSR?	✓			
2. Are all Client Sample IDs logged in correctly?	✓			
3. Are all matrices indicated correctly?	✓			
4. Are all analyses on the COC logged in for appropriate samples?	✓			
5. Are samples logged in for the proper products?	✓			

LOGIN CHAIN OF CUSTODY REPORT	YES	NO	N/A	COMMENT
1. Are the collect, receive, and due dates correct for every sample?	✓			
2. Have all appropriate comments been included?	✓			

SAMPLE RECEIVING CHECKLIST	YES	NO	N/A	COMMENT
1. Are all discrepancies between the COC and login noted (if applicable)?			✓	

LOGIN pH CHECK (applicable projects only)	YES	NO	N/A	COMMENT
1. Has the pH of all aqueous samples been checked and the report attached?	✓			

Login Specialist signature 11/6/97 date

Secondary Reviewer signature date

Project Management signature date

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revised 07-17-97, def, H:\fischer\acp\loginrev.chk

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LAS LABORATORIES, INC.
Sample Receiving Checklist

Page ___ of ___

Client Name: HANFORD Job No: L10981 Cooler ID:

COOLER CONDITION UPON RECEIPT

Temperature of cooler upon receipt: 3°
temperature of temp. blank upon receipt:

	yes	no	n/a	*Comments/Discrepancies
custody seals present	✓			
custody seals intact	✓			
chain of custody present	✓			
blue ice(or equiv.)present	✓			
blue ice(or equiv.)frozen	✓			
rad survey completed	✓			

SAMPLE CONDITION UPON RECEIPT

	yes	no	n/a	*Comments/Discrepancies
all bottles labeled	✓			
bottle custody seal present	✓			
bottle custody seal intact	✓			
samples intact	✓			
proper container used for sample	✓			
sample volume sufficient for analysis	✓			
proper pres. indicated on the COC	✓			
VOA's contain headspace		✓		
are samples bi-phasic(if so, indicate sample ID's):		✓		

MISCELLANEOUS ITEMS

	yes	no	n/a	*Comments/Discrepancies
samples with short holding times		✓		
samples to subcontract		✓		

ADDITIONAL COMMENTS/DISCREPANCIES

Completed by / date: [signature] 11/05/97
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*

VERSION 3.0(03-03-97)

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LAS LABORATORIES

LOGIN pH CHECK

CLIENT: Waste Management Hanford(756)
PROJECT: HANFORD 45 DAY
LOGIN: L10981
MATRIX: Water(1)

NO	LAL #	CLIENT ID	PRODUCT	pH
1	L10981-90	BOMB48	RAD SCREEN	5
2	L10981-91	BOM8Y6	RAD SCREEN	5
3	L10981-92	BOMB49	RAD SCREEN	5
4	L10981-93	BOMB48	6010 ICP METALS	2
5	L10981-93	BOMB48	6010 ICP TRACE	
6	L10981-93	BOMB48	7470 MERCURY	
7	L10981-94	BOM8Y6	6010 ICP METALS	
8	L10981-94	BOM8Y6	6010 ICP TRACE	
9	L10981-94	BOM8Y6	7470 MERCURY	
10	L10981-95	BOMB49	6010 ICP METALS	
11	L10981-95	BOMB49	6010 ICP TRACE	
12	L10981-95	BOMB49	7470 MERCURY	2
13	L10981-96	REPORT TYPE	EDD - DISK DEL.	
14	L10981-96	REPORT TYPE	FORD	
15	L10981-96	REPORT TYPE	GCMS4A	
16	L10981-96	REPORT TYPE	INORG LAS 4A RPT	
17	L10981-96	REPORT TYPE	RAD RPT TYPE 4	

Signature: [illegible] Date: 11/6/97

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LAS Laboratories
SAMPLE SUMMARY REPORT (su02 S1)
Waste Management Hanford

Client Sample Number	LAL Sample Number	SDG Number	Matrix	Method
BOM8Y6	L10981-91		Water	RAD SCREEN
	L10981-94		Water	6010 ICP METALS
	L10981-94		Water	6010 ICP TRACE
	L10981-94		Water	7470 MERCURY
BOM8Y7	L10981-17		Soil	RAD PERCENT SOLI
	L10981-17		Soil	SCREENING
	L10981-39		Soil	U-ISOTOPIC LAL-0
	L10981-58		Soil	8270 SEMI-VOLATI
	L10981-84		Soil	6010 ICP METALS
	L10981-84		Soil	6010 ICP TRACE
	L10981-84		Soil	7471 MERCURY
	L10981-84		Soil	PERCENT SOLIDS
BOM8Y8	L10981-18		Soil	RAD PERCENT SOLI
	L10981-18		Soil	SCREENING
	L10981-40		Soil	U-ISOTOPIC LAL-0
	L10981-59		Soil	8270 SEMI-VOLATI
	L10981-85		Soil	6010 ICP METALS
	L10981-85		Soil	6010 ICP TRACE
	L10981-85		Soil	7471 MERCURY
	L10981-85		Soil	PERCENT SOLIDS
BOM8Y9	L10981-19		Soil	RAD PERCENT SOLI
	L10981-19		Soil	SCREENING
	L10981-41		Soil	U-ISOTOPIC LAL-0
	L10981-60		Soil	8270 SEMI-VOLATI
	L10981-86		Soil	6010 ICP METALS
	L10981-86		Soil	6010 ICP TRACE
	L10981-86		Soil	7471 MERCURY
	L10981-86		Soil	PERCENT SOLIDS
BOM900	L10981-20		Soil	RAD PERCENT SOLI
	L10981-20		Soil	SCREENING
	L10981-42		Soil	U-ISOTOPIC LAL-0
	L10981-61		Soil	8270 SEMI-VOLATI
	L10981-87		Soil	6010 ICP METALS
	L10981-87		Soil	6010 ICP TRACE
	L10981-87		Soil	7471 MERCURY
	L10981-87		Soil	PERCENT SOLIDS
BOM901	L10981-21		Soil	RAD PERCENT SOLI
	L10981-21		Soil	SCREENING
	L10981-43		Soil	U-ISOTOPIC LAL-0
	L10981-62		Soil	8270 SEMI-VOLATI
	L10981-88		Soil	6010 ICP METALS
	L10981-88		Soil	6010 ICP TRACE
	L10981-88		Soil	7471 MERCURY
	L10981-88		Soil	PERCENT SOLIDS
BOM902	L10981-22		Soil	RAD PERCENT SOLI
	L10981-22		Soil	SCREENING
	L10981-44		Soil	U-ISOTOPIC LAL-0
	L10981-63		Soil	8270 SEMI-VOLATI

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LAS Laboratories
SAMPLE SUMMARY REPORT (su02 S1)
Waste Management Hanford

Client Sample Number	LAL Sample Number	SDG Number	Matrix	Method
	L10981-89		Soil	6010 ICP METALS
	L10981-89		Soil	6010 ICP TRACE
	L10981-89		Soil	7471 MERCURY
	L10981-89		Soil	PERCENT SOLIDS
BOM903	L10981-11		Soil	RAD PERCENT SOL
	L10981-11		Soil	SCREENING
	L10981-33		Soil	U-ISOTOPIC LAL-
	L10981-52		Soil	8270 SEMI-VOLAT
	L10981-78		Soil	6010 ICP METALS
	L10981-78		Soil	6010 ICP TRACE
	L10981-78		Soil	7471 MERCURY
	L10981-78		Soil	PERCENT SOLIDS
BOM904	L10981-12		Soil	RAD PERCENT SOL
	L10981-12		Soil	SCREENING
	L10981-34		Soil	U-ISOTOPIC LAL-
	L10981-53		Soil	8270 SEMI-VOLAT
	L10981-79		Soil	6010 ICP METALS
	L10981-79		Soil	6010 ICP TRACE
	L10981-79		Soil	7471 MERCURY
	L10981-79		Soil	PERCENT SOLIDS
BOM905	L10981-13		Soil	RAD PERCENT SOL
	L10981-13		Soil	SCREENING
	L10981-35		Soil	U-ISOTOPIC LAL-
	L10981-54		Soil	8270 SEMI-VOLAT
	L10981-80		Soil	6010 ICP METALS
	L10981-80		Soil	6010 ICP TRACE
	L10981-80		Soil	7471 MERCURY
	L10981-80		Soil	PERCENT SOLIDS
BOM906	L10981-14		Soil	RAD PERCENT SOL
	L10981-14		Soil	SCREENING
	L10981-36		Soil	U-ISOTOPIC LAL-
	L10981-55		Soil	8270 SEMI-VOLAT
	L10981-81		Soil	6010 ICP METALS
	L10981-81		Soil	6010 ICP TRACE
	L10981-81		Soil	7471 MERCURY
	L10981-81		Soil	PERCENT SOLIDS
BOM907	L10981-15		Soil	RAD PERCENT SOL
	L10981-15		Soil	SCREENING
	L10981-37		Soil	U-ISOTOPIC LAL-
	L10981-56		Soil	8270 SEMI-VOLAT
	L10981-82		Soil	6010 ICP METALS
	L10981-82		Soil	6010 ICP TRACE
	L10981-82		Soil	7471 MERCURY
	L10981-82		Soil	PERCENT SOLIDS
BOM908	L10981-16		Soil	RAD PERCENT SOL
	L10981-16		Soil	SCREENING
	L10981-38		Soil	U-ISOTOPIC LAL-
	L10981-57		Soil	8270 SEMI-VOLAT
	L10981-83		Soil	6010 ICP METALS

LAS Laboratories
SAMPLE SUMMARY REPORT (su02 S1)
Waste Management Hanford

Client Sample Number	LAL Sample Number	SDG Number	Matrix	Method
	L10981-83		Soil	6010 ICP TRACE
	L10981-83		Soil	7471 MERCURY
	L10981-83		Soil	PERCENT SOLIDS
BOM909	L10981-5		Soil	RAD PERCENT SOL
	L10981-5		Soil	SCREENING
	L10981-27		Soil	U-ISOTOPIC LAL-
	L10981-46		Soil	8270 SEMI-VOLAT
	L10981-72		Soil	6010 ICP METALS
	L10981-72		Soil	6010 ICP TRACE
	L10981-72		Soil	7471 MERCURY
	L10981-72		Soil	PERCENT SOLIDS
BOM910	L10981-6		Soil	RAD PERCENT SOL
	L10981-6		Soil	SCREENING
	L10981-28		Soil	U-ISOTOPIC LAL-
	L10981-47		Soil	8270 SEMI-VOLAT
	L10981-73		Soil	6010 ICP METALS
	L10981-73		Soil	6010 ICP TRACE
	L10981-73		Soil	7471 MERCURY
	L10981-73		Soil	PERCENT SOLIDS
BOM911	L10981-7		Soil	RAD PERCENT SOL
	L10981-7		Soil	SCREENING
	L10981-29		Soil	U-ISOTOPIC LAL-
	L10981-48		Soil	8270 SEMI-VOLAT
	L10981-74		Soil	6010 ICP METALS
	L10981-74		Soil	6010 ICP TRACE
	L10981-74		Soil	7471 MERCURY
	L10981-74		Soil	PERCENT SOLIDS
BOM912	L10981-8		Soil	RAD PERCENT SOL
	L10981-8		Soil	SCREENING
	L10981-30		Soil	U-ISOTOPIC LAL-
	L10981-49		Soil	8270 SEMI-VOLAT
	L10981-75		Soil	6010 ICP METALS
	L10981-75		Soil	6010 ICP TRACE
	L10981-75		Soil	7471 MERCURY
	L10981-75		Soil	PERCENT SOLIDS
BOM913	L10981-9		Soil	RAD PERCENT SOL
	L10981-9		Soil	SCREENING
	L10981-31		Soil	U-ISOTOPIC LAL-
	L10981-50		Soil	8270 SEMI-VOLAT
	L10981-76		Soil	6010 ICP METALS
	L10981-76		Soil	6010 ICP TRACE
	L10981-76		Soil	7471 MERCURY
	L10981-76		Soil	PERCENT SOLIDS
BOM914	L10981-10		Soil	RAD PERCENT SOL
	L10981-10		Soil	SCREENING
	L10981-32		Soil	U-ISOTOPIC LAL-
	L10981-51		Soil	8270 SEMI-VOLAT
	L10981-77		Soil	6010 ICP METALS
	L10981-77		Soil	6010 ICP TRACE

LAS Laboratories
SAMPLE SUMMARY REPORT (su02 S1)
Waste Management Hanford

Client Sample Number	LAL Sample Number	SDG Number	Matrix	Method
	L10981-77		Soil	7471 MERCURY
	L10981-77		Soil	PERCENT SOLIDS
BOMB44	L10981-1		SolidWaste	RAD PERCENT SOL
	L10981-1		SolidWaste	SCREENING
	L10981-23		SolidWaste	U-ISOTOPIC LAL-
	L10981-45		SolidWaste	8270 SEMI-VOLAT
	L10981-64		SolidWaste	300.0 CHLORIDE
	L10981-64		SolidWaste	300.0 NITRATE
	L10981-64		SolidWaste	300.0 NITRITE
	L10981-68		SolidWaste	6010 ICP METALS
	L10981-68		SolidWaste	6010 ICP TRACE
	L10981-68		SolidWaste	7471 MERCURY
BOMB45	L10981-2		SolidWaste	RAD PERCENT SOL
	L10981-2		SolidWaste	SCREENING
	L10981-24		SolidWaste	U-ISOTOPIC LAL-
	L10981-65		SolidWaste	300.0 CHLORIDE
	L10981-65		SolidWaste	300.0 NITRATE
	L10981-65		SolidWaste	300.0 NITRITE
	L10981-69		SolidWaste	6010 ICP METALS
	L10981-69		SolidWaste	6010 ICP TRACE
	L10981-69		SolidWaste	7471 MERCURY
BOMB46	L10981-3		SolidWaste	RAD PERCENT SOL
	L10981-3		SolidWaste	SCREENING
	L10981-25		SolidWaste	U-ISOTOPIC LAL-
	L10981-66		SolidWaste	300.0 CHLORIDE
	L10981-66		SolidWaste	300.0 NITRATE
	L10981-66		SolidWaste	300.0 NITRITE
	L10981-70		SolidWaste	6010 ICP METALS
	L10981-70		SolidWaste	6010 ICP TRACE
	L10981-70		SolidWaste	7471 MERCURY
BOMB47	L10981-4		SolidWaste	RAD PERCENT SOL
	L10981-4		SolidWaste	SCREENING
	L10981-26		SolidWaste	U-ISOTOPIC LAL-
	L10981-67		SolidWaste	300.0 CHLORIDE
	L10981-67		SolidWaste	300.0 NITRATE
	L10981-67		SolidWaste	300.0 NITRITE
	L10981-71		SolidWaste	6010 ICP METALS
	L10981-71		SolidWaste	6010 ICP TRACE
	L10981-71		SolidWaste	7471 MERCURY
BOMB48	L10981-90		Water	RAD SCREEN
	L10981-93		Water	6010 ICP METALS
	L10981-93		Water	6010 ICP TRACE
	L10981-93		Water	7470 MERCURY
BOMB49	L10981-92		Water	RAD SCREEN
	L10981-95		Water	6010 ICP METALS
	L10981-95		Water	6010 ICP TRACE
	L10981-95		Water	7470 MERCURY
REPORT TYPE	L10981-96		Water	EDD - DISK DEL.

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LAS Laboratories
SAMPLE SUMMARY REPORT (su02 S1)
Waste Management Hanford

Client Sample Number	LAL Sample Number	SDG Number	Matrix	Method
	L10981-96		Water	FORD
	L10981-96		Water	GCMS4A
	L10981-96		Water	INORG LAS 4A RP
	L10981-96		Water	RAD RPT TYPE 4

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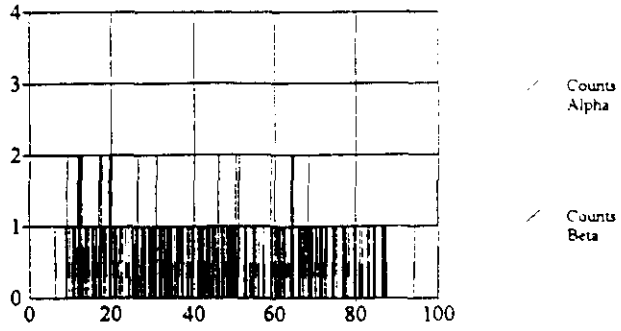
Position	Count_Date_and_Time	Sample_ID	Quench_Factor
1	11/3/1997 1:29 PM	BLANK	772.53

Alpha	7.70 cpm
Beta	18.60 cpm
Low_Energy	8.70 cpm

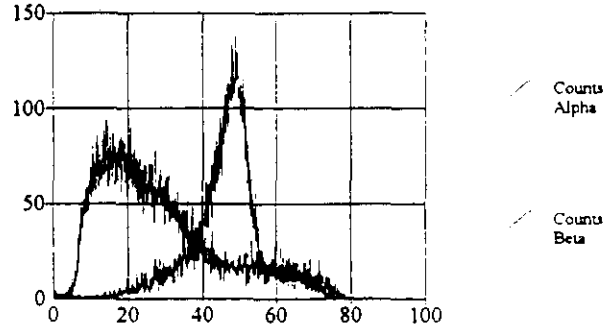
Alpha_Activity	0.50	pCi
Beta_Activity	0.80	pCi



Position	Count_Date_and_Time	Sample_ID	Quench_Factor
2	11/3/1997 1:40 PM	BOMB44TA	689.26

Alpha	1900.00 cpm
Beta	2530.70 cpm
Low_Energy	1809.60 cpm

Alpha_Activity	852.90	pCi
Beta_Activity	1132.40	pCi



$$\alpha \quad \frac{853 \text{ pCi}}{1.292 \text{ gr}} = 660.2 \text{ pCi/gr } \alpha$$

$$\beta^- \quad \frac{1132.40 \text{ pCi}}{1.292 \text{ grams}} = 876.47 \text{ pCi/gr } \beta^-$$

WSCF
ANALYTICAL LABORATORY REPORT

Attention: SHARON STEELE **Group #:** 97001735
Project Number MISC. :PROJ. HANFORD MNGMT. CONT.

Sample #	Client ID	Test Performed	Matrix	Method	RQ	Result	Units	MDL	Sampled	Received
W970004259	B0M8Y7TA	Alpha by liquid scintillation	SOLID	LA-508-421		9.11	pCi/g	0.00	10/29/97	10/31/97
W970004259	B0M8Y7TA	Alpha error by LC	SOLID	LA-508-421		8.9	%	0.00	10/29/97	10/31/97
W970004259	B0M8Y7TA	Beta by liquid scintillation	SOLID	LA-508-421		195.1	pCi/g	10.00	10/29/97	10/31/97
W970004259	B0M8Y7TA	Beta error by LC	SOLID	LA-508-421		1.6	%	0.00	10/29/97	10/31/97
W970004260	B0M8Y8TA	Alpha by liquid scintillation	SOLID	LA-508-421		15.14	pCi/g	10.00	10/29/97	10/31/97
W970004260	B0M8Y8TA	Alpha error by LC	SOLID	LA-508-421		6.8	%	0.00	10/29/97	10/31/97
W970004260	B0M8Y8TA	Beta by liquid scintillation	SOLID	LA-508-421		22.28	pCi/g	10.00	10/29/97	10/31/97
W970004260	B0M8Y8TA	Beta error by LC	SOLID	LA-508-421		7.2	%	0.00	10/29/97	10/31/97
W970004261	B0M8Y9TA	Alpha by liquid scintillation	SOLID	LA-508-421		16.85	pCi/g	10.00	10/29/97	10/31/97
W970004261	B0M8Y9TA	Alpha error by LC	SOLID	LA-508-421		6.5	%	0.00	10/29/97	10/31/97
W970004261	B0M8Y9TA	Beta by liquid scintillation	SOLID	LA-508-421		68.0	pCi/g	10.00	10/29/97	10/31/97
W970004261	B0M8Y9TA	Beta error by LC	SOLID	LA-508-421		3.4	%	0.00	10/29/97	10/31/97
W970004262	B0M900TA	Alpha by liquid scintillation	SOLID	LA-508-421		18.11	pCi/g	10.00	10/29/97	10/31/97
W970004262	B0M900TA	Alpha error by LC	SOLID	LA-508-421		7.8	%	0.00	10/29/97	10/31/97
W970004262	B0M900TA	Beta by liquid scintillation	SOLID	LA-508-421		31.32	pCi/g	10.00	10/29/97	10/31/97
W970004262	B0M900TA	Beta error by LC	SOLID	LA-508-421		6.3	%	0.00	10/29/97	10/31/97
W970004263	B0M901TA	Alpha by liquid scintillation	SOLID	LA-508-421		2.0	pCi/g	10.00	10/29/97	10/31/97
W970004263	B0M901TA	Alpha error by LC	SOLID	LA-508-421		24	%	0.00	10/29/97	10/31/97
W970004263	B0M901TA	Beta by liquid scintillation	SOLID	LA-508-421		9.42	pCi/g	10.00	10/29/97	10/31/97
W970004263	B0M901TA	Beta error by LC	SOLID	LA-508-421		8.4	%	0.00	10/29/97	10/31/97
W970004264	B0M902TA	Alpha by liquid scintillation	SOLID	LA-508-421		61.78	pCi/g	10.00	10/29/97	10/31/97
W970004264	B0M902TA	Alpha error by LC	SOLID	LA-508-421		3.2	%	0.00	10/29/97	10/31/97
W970004264	B0M902TA	Beta by liquid scintillation	SOLID	LA-508-421		108.2	pCi/g	10.00	10/29/97	10/31/97
W970004264	B0M902TA	Beta error by LC	SOLID	LA-508-421		2.5	%	0.00	10/29/97	10/31/97
W970004265	B0M903TA	Alpha by liquid scintillation	SOLID	LA-508-421		1.33	pCi/g	10.00	10/29/97	10/31/97
W970004265	B0M903TA	Alpha error by LC	SOLID	LA-508-421		33	%	0.00	10/29/97	10/31/97

MDL=Minimum Detection Limit
RQ=Result Qualifier

B - The analyte was detected in the associated method blank.
D - Compound concentration resulted from a dilution.
E - Compound concentration exceeded calibration range.
J - Estimated value.
Z - See Comments.
N - Identification is based on a mass spectral library search.
U - The analyte was analyzed for but not detected.

* - Indicates results that have NOT been validated.

W004
PROJECT HANFORD MANAGEMENT CONTRACTORS

WSCF
ANALYTICAL LABORATORY REPORT

Attention: SHARON STEELE **Group #:** 97001735
Project Number MISC. :PROJ. HANFORD MNGMT. CONT.

Sample #	Client ID	Test Performed	Matrix	Method	RQ	Result	Units	MDL	Sampled	Received
W970004265	B0M903TA	Beta by liquid scintillation	SOLID	LA-508-421		4.11	pCi/g	10.00	10/29/97	10/31/97
W970004265	B0M903TA	Beta error by LC	SOLID	LA-508-421		19	%	0.00	10/29/97	10/31/97
W970004266	B0M904TA	Alpha by liquid scintillation	SOLID	LA-508-421		4.19	pCi/g	10.00	10/29/97	10/31/97
W970004266	B0M904TA	Alpha error by LC	SOLID	LA-508-421		14	%	0.00	10/29/97	10/31/97
W970004266	B0M904TA	Beta by liquid scintillation	SOLID	LA-508-421		6.88	pCi/g	10.00	10/29/97	10/31/97
W970004266	B0M904TA	Beta error by LC	SOLID	LA-508-421		12	%	0.00	10/29/97	10/31/97
W970004267	B0M905TA	Alpha by liquid scintillation	SOLID	LA-508-421		4.69	pCi/g	10.00	10/29/97	10/31/97
W970004267	B0M905TA	Alpha error by LC	SOLID	LA-508-421		12	%	0.00	10/29/97	10/31/97
W970004267	B0M905TA	Beta by liquid scintillation	SOLID	LA-508-421		7.14	pCi/g	10.00	10/29/97	10/31/97
W970004267	B0M905TA	Beta error by LC	SOLID	LA-508-421		12	%	0.00	10/29/97	10/31/97
W970004268	B0M906TA	Alpha by liquid scintillation	SOLID	LA-508-421		2.04	pCi/g	10.00	10/29/97	10/31/97
W970004268	B0M906TA	Alpha error by LC	SOLID	LA-508-421		24	%	0.00	10/29/97	10/31/97
W970004268	B0M906TA	Beta by liquid scintillation	SOLID	LA-508-421		7.31	pCi/g	10.00	10/29/97	10/31/97
W970004268	B0M906TA	Beta error by LC	SOLID	LA-508-421		12	%	0.00	10/29/97	10/31/97
W970004269	B0M907TA	Alpha by liquid scintillation	SOLID	LA-508-421		5.40	pCi/g	10.00	10/29/97	10/31/97
W970004269	B0M907TA	Alpha error by LC	SOLID	LA-508-421		16	%	0.00	10/29/97	10/31/97
W970004269	B0M907TA	Beta by liquid scintillation	SOLID	LA-508-421		9.34	pCi/g	10.00	10/29/97	10/31/97
W970004269	B0M907TA	Beta error by LC	SOLID	LA-508-421		14	%	0.00	10/29/97	10/31/97
W970004270	B0M908TA	Alpha by liquid scintillation	SOLID	LA-508-421		7.24	pCi/g	10.00	10/29/97	10/31/97
W970004270	B0M908TA	Alpha error by LC	SOLID	LA-508-421		16	%	0.00	10/29/97	10/31/97
W970004270	B0M908TA	Beta by liquid scintillation	SOLID	LA-508-421		22.75	pCi/g	10.00	10/29/97	10/31/97
W970004270	B0M908TA	Beta error by LC	SOLID	LA-508-421		15	%	0.00	10/29/97	10/31/97
W970004271	B0M909TA	Alpha by liquid scintillation	SOLID	LA-508-421		16.38	pCi/g	10.00	10/29/97	10/31/97
W970004271	B0M909TA	Alpha error by LC	SOLID	LA-508-421		8.1	%	0.00	10/29/97	10/31/97
W970004271	B0M909TA	Beta by liquid scintillation	SOLID	LA-508-421		20.85	pCi/g	10.00	10/29/97	10/31/97
W970004271	B0M909TA	Beta error by LC	SOLID	LA-508-421		10	%	0.00	10/29/97	10/31/97

MDL=Minimum Detection Limit
RQ=Result Qualifier

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D - Compound concentration resulted from a dilution.
E - Compound concentration exceeded calibration range.
J - Estimated value.
Z - See Comments.
N - Identification is based on a mass spectral library search.
U - The analyte was analyzed for but not detected.

* - Indicates results that have NOT been validated.

W004

PROJECT HANFORD MANAGEMENT CONTRACTORS

000049

WSCF
ANALYTICAL LABORATORY REPORT

Attention: SHARON STEELE **Group #:** 97001735
Project Number MISC. :PROJ. HANFORD MNGMT. CONT.

Sample #	Client ID	Test Performed	Matrix	Method	RQ	Result	Units	MDL	Sampled	Received
W970004272	B0M910TA	Alpha by liquid scintillation	SOLID	LA-508-421		4.82	pCi/g	10.00	10/29/97	10/31/97
W970004272	B0M910TA	Alpha error by LC	SOLID	LA-508-421		14	%	0.00	10/29/97	10/31/97
W970004272	B0M910TA	Beta by liquid scintillation	SOLID	LA-508-421		71.72	pCi/g	10.00	10/29/97	10/31/97
W970004272	B0M910TA	Beta error by LC	SOLID	LA-508-421		2.9	%	0.00	10/29/97	10/31/97
W970004273	B0M911TA	Alpha by liquid scintillation	SOLID	LA-508-421		26.7	pCi/g	10.00	10/29/97	10/31/97
W970004273	B0M911TA	Alpha error by LC	SOLID	LA-508-421		5.2	%	0.00	10/29/97	10/31/97
W970004273	B0M911TA	Beta by liquid scintillation	SOLID	LA-508-421		28.6	pCi/g	10.00	10/29/97	10/31/97
W970004273	B0M911TA	Beta error by LC	SOLID	LA-508-421		5.3	%	0.00	10/29/97	10/31/97
W970004274	B0M912TA	Alpha by liquid scintillation	SOLID	LA-508-421		5.6	pCi/g	10.00	10/29/97	10/31/97
W970004274	B0M912TA	Alpha error by LC	SOLID	LA-508-421		10	%	0.00	10/29/97	10/31/97
W970004274	B0M912TA	Beta by liquid scintillation	SOLID	LA-508-421		144	pCi/g	10.00	10/29/97	10/31/97
W970004274	B0M912TA	Beta error by LC	SOLID	LA-508-421		1.9	%	0.00	10/29/97	10/31/97
W970004275	B0M913TA	Alpha by liquid scintillation	SOLID	LA-508-421		10	pCi/g	10.00	10/29/97	10/31/97
W970004275	B0M913TA	Alpha error by LC	SOLID	LA-508-421		9.3	%	0.00	10/29/97	10/31/97
W970004275	B0M913TA	Beta by liquid scintillation	SOLID	LA-508-421		426	pCi/g	10.00	10/29/97	10/31/97
W970004275	B0M913TA	Beta error by LC	SOLID	LA-508-421		1.2	%	0.00	10/29/97	10/31/97
W970004276	B0M914TA	Alpha by liquid scintillation	SOLID	LA-508-421		20.6	pCi/g	10.00	10/29/97	10/31/97
W970004276	B0M914TA	Alpha error by LC	SOLID	LA-508-421		7.8	%	0.00	10/29/97	10/31/97
W970004276	B0M914TA	Beta by liquid scintillation	SOLID	LA-508-421		176	pCi/g	10.00	10/29/97	10/31/97
W970004276	B0M914TA	Beta error by LC	SOLID	LA-508-421		2.4	%	0.00	10/29/97	10/31/97
W970004277	B0M8Y6TA	Alpha by liquid scintillation	SOLID	LA-508-421		nd	pCi/g	10.00	10/29/97	10/31/97
W970004277	B0M8Y6TA	Alpha error by LC	SOLID	LA-508-421		na	%	0.00	10/29/97	10/31/97
W970004277	B0M8Y6TA	Beta by liquid scintillation	SOLID	LA-508-421		0.3	pCi/g	10.00	10/29/97	10/31/97
W970004277	B0M8Y6TA	Beta error by LC	SOLID	LA-508-421		53	%	0.00	10/29/97	10/31/97
W970004278	B0MB49TA	Alpha by liquid scintillation	SOLID	LA-508-421		nd	pCi/g	10.00	10/29/97	10/31/97
W970004278	B0MB49TA	Alpha error by LC	SOLID	LA-508-421		na	%	0.00	10/29/97	10/31/97

MDL=Minimum Detection Limit
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E - Compound concentration exceeded calibration range.
J - Estimated value.
Z - See Comments.
N - Identification is based on a mass spectral library search.
U - The analyte was analyzed for but not detected.

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W004
PROJECT HANFORD MANAGEMENT CONTRACTORS

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WSCF
ANALYTICAL LABORATORY REPORT

Attention: SHARON STEELE **Group #:** 97001735
Project Number MISC. :PROJ. HANFORD MNGMT. CONT.

Sample #	Client ID	Test Performed	Matrix	Method	RQ	Result	Units	MDL	Sampled	Received
W970004278	BOMB49TA	Beta by liquid scintillation	SOLID	LA-508-421		0.5	pCi/g	10.00	10/29/97	10/31/97
W970004278	BOMB49TA	Beta error by LC	SOLID	LA-508-421		35	%	0.00	10/29/97	10/31/97
W970004279	BOMB44TA	Alpha by liquid scintillation	SOLID	LA-508-421		423	pCi/g	10.00	10/29/97	10/31/97
W970004279	BOMB44TA	Alpha error by LC	SOLID	LA-508-421		1.2	%	0.00	10/29/97	10/31/97
W970004279	BOMB44TA	Beta by liquid scintillation	SOLID	LA-508-421		1060	pCi/g	10.00	10/29/97	10/31/97
W970004279	BOMB44TA	Beta error by LC	SOLID	LA-508-421		0.7	%	0.00	10/29/97	10/31/97
W970004280	BOMB45TA	Alpha by liquid scintillation	SOLID	LA-508-421		4.7	pCi/g	10.00	10/29/97	10/31/97
W970004280	BOMB45TA	Alpha error by LC	SOLID	LA-508-421		12	%	0.00	10/29/97	10/31/97
W970004280	BOMB45TA	Beta by liquid scintillation	SOLID	LA-508-421		21.5	pCi/g	10.00	10/29/97	10/31/97
W970004280	BOMB45TA	Beta error by LC	SOLID	LA-508-421		6.8	%	0.00	10/29/97	10/31/97
W970004281	BOMB46TA	Alpha by liquid scintillation	SOLID	LA-508-421		82.4	pCi/g	10.00	10/29/97	10/31/97
W970004281	BOMB46TA	Alpha error by LC	SOLID	LA-508-421		3.2	%	0.00	10/29/97	10/31/97
W970004281	BOMB46TA	Beta by liquid scintillation	SOLID	LA-508-421		191	pCi/g	10.00	10/29/97	10/31/97
W970004281	BOMB46TA	Beta error by LC	SOLID	LA-508-421		2.2	%	0.00	10/29/97	10/31/97
W970004282	BOMB47TA	Alpha by liquid scintillation	SOLID	LA-508-421		204	pCi/g	10.00	10/29/97	10/31/97
W970004282	BOMB47TA	Alpha error by LC	SOLID	LA-508-421		2.6	%	0.00	10/29/97	10/31/97
W970004282	BOMB47TA	Beta by liquid scintillation	SOLID	LA-508-421		396	pCi/g	10.00	10/29/97	10/31/97
W970004282	BOMB47TA	Beta error by LC	SOLID	LA-508-421		1.9	%	0.00	10/29/97	10/31/97
W970004283	BOMB48TA	Alpha by liquid scintillation	SOLID	LA-508-421		nd	pCi/g	10.00	10/29/97	10/31/97
W970004283	BOMB48TA	Alpha error by LC	SOLID	LA-508-421		na	%	0.00	10/29/97	10/31/97
W970004283	BOMB48TA	Beta by liquid scintillation	SOLID	LA-508-421		0.3	pCi/g	10.00	10/29/97	10/31/97
W970004283	BOMB48TA	Beta error by LC	SOLID	LA-508-421		2.5	%	0.00	10/29/97	10/31/97

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W004
PROJECT HANFORD MANAGEMENT CONTRACTORS

000051

Contractor	OFF-SITE PROPERTY CONTROL	CONTROL NO. (To be obtained from PROPERTY MANAGEMENT)
Waste Management		W980-0038

PART I - TO BE COMPLETED BY ORIGINATOR

Department	Section	Unit
Hanford Tech Services	Environmental Op's	Sampling + Mobile Labs

The following items are to be shipped from ☑ Contractor ☐ Vendor

Routing Fed Ex 423579506067 ☑ Prepaid ☐ Collect

Shipped to
Company Lockheed Analytical
Address 975 Kelly Johnson Dr
City Las Vegas State NV Zip Code 89119
Country

Off-site Custodian
Att: Mary Ford

In-site Custodian Payroll No.

Qty.	Property No.	Description (include Manufacture Name, Model, Serial No.)	Acquisition Cost
1		Poly. Cooler - Environmental Samples, double bagged and packed on wet ice. Cooler # - SML-553 Weight - 75 lbs COC #'s - R98-002-7, R98-001-2, R98-002-1, -2, -3.	

☐ Classified ☑ Unclassified ☐ Shipped Under DOE Contract ☐ Shipped Under Contractor's Use Permit Contract

Necessity for the off-site use of this property
- ☐ Required for Project Work. List Project No. _____
- ☐ Business Trip
- ☐ Off-site Assignment
- ☐ Shipment to Subcontractor. List Subcontract No. _____
- ☑ Other (Please specify) Samples require confirmation analysis at second lab

CERTIFICATION OF THE RADIATION MONITORING RELEASE MUST BE SECURED THE SAME DAY THAT MATERIAL IS DELIVERED TO SHIPPING.

RM Clearance for Public Release	RM Survey No.	Date
N/A	N/A	N/A

Location of and Contact for Property (Name/Phone No./Bldg./Area)
K.J. Young / 372-0060 / 345 Hills / 1100

Date Ready for Shipment	Cost Code to be Charged	Approximate Date This Property will be Returned
11-4-97	772034 / 03800	N/A

Originated By	Date	Authorized By	Date
K.J. Young	11-4-97	K.J. Young	11-4-97
Property Representative Signature	Date	Property Management Approval	Date
		Kathy Casey	11/4/97

PART II - TO BE COMPLETED BY SHIPPING

Authorized Shipping Signature	Date
C.R. Nelson	11-04-97

DISTRIBUTION (AFTER FINAL SIGNATURES)

White - Property Management Yellow - Shipping Green - Accounts Payable Pink - Originator Goldenrod - Property Management

OC[illegible]52

BC-6001-579 (01/95)

110575

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Client - Waste Management Hanford **Log-in - L10981**

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RADIOCHEMISTRY

SAMPLE RESULT FORMS AND QC SUMMARIES

LAS LABORATORIES

RADIOCHEMISTRY DATA REPORT
Account Name: Waste Management Hanford
Project Name: HANFORD 45 DAY
Project Desc:

Client Sample ID: BOMB44
Date Collected: 30-OCT-97
Matrix: SolidWaste

Login Number: L10981
Date Received: 05-NOV-97
Percent Solids: 94.62

Constituent	Method	Batch	Activity	Error	MDA	Qualifier	Units	Analyzed	Lab ID
U-233/4	LAL-0108	55965	1960	140	12.		pCi/g	17-DEC-97	L10981-23
U-235	LAL-0108	55965	33.	31.	43.		pCi/g	17-DEC-97	L10981-23
U-238	LAL-0108	55965	1390	110	6.0		pCi/g	17-DEC-97	L10981-23

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LAS LABORATORIES

RADIOCHEMISTRY DATA REPORT
Account Name: Waste Management Hanford
Project Name: HANFORD 45 DAY
Project Desc:

Client Sample ID: BOMB45
Date Collected: 30-OCT-97
Matrix: SolidWaste

Login Number: L10981
Date Received: 05-NOV-97
Percent Solids: 98.9

Constituent	Method	Batch	Activity	Error	MDA	Qualifier	Units	Analyzed	Lab ID
U-233/4	LAL-0108	55965	2.11	0.24	0.036		pCi/g	17-DEC-97	L10981-24
U-235	LAL-0108	55965	0.161	0.063	0.036		pCi/g	17-DEC-97	L10981-24
U-238	LAL-0108	55965	1.79	0.22	0.036		pCi/g	17-DEC-97	L10981-24

LAS LABORATORIES

RADIOCHEMISTRY DATA REPORT
Account Name: Waste Management Hanford
Project Name: HANFORD 45 DAY
Project Desc:

Client Sample ID: BOMB46
Date Collected: 30-OCT-97
Matrix: SolidWaste

Login Number: L10981
Date Received: 05-NOV-97
Percent Solids: 88.84

Constituent	Method	Batch	Activity	Error	MDA	Qualifier	Units	Analyzed	Lab ID
U-233/4	LAL-0108	55965	232.	13.	0.41		pCi/g	17-DEC-97	L10981-25
U-235	LAL-0108	55965	3.4	2.1	2.8		pCi/g	17-DEC-97	L10981-25
U-238	LAL-0108	55965	190.	11.	0.24		pCi/g	17-DEC-97	L10981-25

LAS LABORATORIES

RADIOCHEMISTRY DATA REPORT
Account Name: Waste Management Hanford
Project Name: HANFORD 45 DAY
Project Desc:

Client Sample ID: BOMB47
Date Collected: 30-OCT-97
Matrix: SolidWaste

Login Number: L10981
Date Received: 05-NOV-97
Percent Solids: 91.41

Constituent	Method	Batch	Activity	Error	MDA	Qualifier	Units	Analyzed	Lab ID
U-233/4	LAL-0108	55965	570.	35.	1.2		pCi/g	17-DEC-97	L10981-26
U-235	LAL-0108	55965	4.0	6.9	9.7		pCi/g	17-DEC-97	L10981-26
U-238	LAL-0108	55965	442.	28.	1.2		pCi/g	17-DEC-97	L10981-26

LAS LABORATORIES

RADIOCHEMISTRY DATA REPORT
Account Name: Waste Management Hanford
Project Name: HANFORD 45 DAY
Project Desc:

Client Sample ID: BOM909
Date Collected: 30-OCT-97
Matrix: Soil

Login Number: L10981
Date Received: 05-NOV-97
Percent Solids: 96.31

Constituent	Method	Batch	Activity	Error	MDA	Qualifier	Units	Analyzed	Lab ID
U-233/4	LAL-0108	55964	15.1	1.0	0.073		pCi/g	15-DEC-97	L10981-27
U-235	LAL-0108	55964	0.89	0.18	0.047		pCi/g	15-DEC-97	L10981-27
U-238	LAL-0108	55964	15.5	1.1	0.057		pCi/g	15-DEC-97	L10981-27

LAS LABORATORIES

RADIOCHEMISTRY DATA REPORT
Account Name: Waste Management Hanford
Project Name: HANFORD 45 DAY
Project Desc:

Client Sample ID: BOM910
Date Collected: 30-OCT-97
Matrix: Soil

Login Number: L10981
Date Received: 05-NOV-97
Percent Solids: 96.01

Constituent	Method	Batch	Activity	Error	MDA	Qualifier	Units	Analyzed	Lab ID
U-233/4	LAL-0108	55964	13.55	0.96	0.069		pCi/g	15-DEC-97	L10981-28
U-235	LAL-0108	55964	0.83	0.17	0.054		pCi/g	15-DEC-97	L10981-28
U-238	LAL-0108	55964	13.38	0.95	0.058		pCi/g	15-DEC-97	L10981-28

LAS LABORATORIES

RADIOCHEMISTRY DATA REPORT
Account Name: Waste Management Hanford
Project Name: HANFORD 45 DAY
Project Desc:

Client Sample ID: BOM911
Date Collected: 30-OCT-97
Matrix: Soil

Login Number: L10981
Date Received: 05-NOV-97
Percent Solids: 96.02

Constituent	Method	Batch	Activity	Error	MDA	Qualifier	Units	Analyzed	Lab ID
U-233/4	LAL-0108	55964	41.1	2.5	0.091		pCi/g	15-DEC-97	L10981-29
U-235	LAL-0108	55964	3.14	0.41	0.071		pCi/g	15-DEC-97	L10981-29
U-238	LAL-0108	55964	34.7	2.1	0.071		pCi/g	15-DEC-97	L10981-29

LAS LABORATORIES

RADIOCHEMISTRY DATA REPORT
Account Name: Waste Management Hanford
Project Name: HANFORD 45 DAY
Project Desc:

Client Sample ID: BOM912
Date Collected: 30-OCT-97
Matrix: Soil

Login Number: L10981
Date Received: 05-NOV-97
Percent Solids: 95.99

Constituent	Method	Batch	Activity	Error	MDA	Qualifier	Units	Analyzed	Lab ID
U-233/4	LAL-0108	55964	8.33	0.64	0.073		pCi/g	15-DEC-97	L10981-30
U-235	LAL-0108	55964	0.336	0.10	0.060		pCi/g	15-DEC-97	L10981-30
U-238	LAL-0108	55964	7.78	0.61	0.052		pCi/g	15-DEC-97	L10981-30

LAS LABORATORIES

RADIOCHEMISTRY DATA REPORT
Account Name: Waste Management Hanford
Project Name: HANFORD 45 DAY
Project Desc:

Client Sample ID: BOM913
Date Collected: 30-OCT-97
Matrix: Soil

Login Number: L10981
Date Received: 05-NOV-97
Percent Solids: 95.6

Constituent	Method	Batch	Activity	Error	MDA	Qualifier	Units	Analyzed	Lab ID
U-233/4	LAL-0108	55964	14.7	1.0	0.082		pCi/g	15-DEC-97	L10981-31
U-235	LAL-0108	55964	0.80	0.16	0.022		pCi/g	15-DEC-97	L10981-31
U-238	LAL-0108	55964	14.7	1.0	0.060		pCi/g	15-DEC-97	L10981-31

LAS LABORATORIES

RADIOCHEMISTRY DATA REPORT
Account Name: Waste Management Hanford
Project Name: HANFORD 45 DAY
Project Desc:

Client Sample ID: BOM914
Date Collected: 30-OCT-97
Matrix: Soil

Login Number: L10981
Date Received: 05-NOV-97
Percent Solids: 92.66

Constituent	Method	Batch	Activity	Error	MDA	Qualifier	Units	Analyzed	Lab ID
U-233/4	LAL-0108	55964	34.6	2.1	0.11		pCi/g	15-DEC-97	L10981-32
U-235	LAL-0108	55964	2.05	0.32	0.069		pCi/g	15-DEC-97	L10981-32
U-238	LAL-0108	55964	35.1	2.1	0.097		pCi/g	15-DEC-97	L10981-32

LAS LABORATORIES

RADIOCHEMISTRY DATA REPORT
Account Name: Waste Management Hanford
Project Name: HANFORD 45 DAY
Project Desc:

Client Sample ID: BOM903
Date Collected: 29-OCT-97
Matrix: Soil

Login Number: L10981
Date Received: 05-NOV-97
Percent Solids: 93.61

Constituent	Method	Batch	Activity	Error	MDA	Qualifier	Units	Analyzed	Lab ID
U-233/4	LAL-0108	55964	0.88	0.16	0.068		pCi/g	15-DEC-97	L10981-33
U-235	LAL-0108	55964	0.096	0.056	0.048		pCi/g	15-DEC-97	L10981-33
U-238	LAL-0108	55964	0.75	0.15	0.037		pCi/g	15-DEC-97	L10981-33

LAS LABORATORIES

RADIOCHEMISTRY DATA REPORT
Account Name: Waste Management Hanford
Project Name: HANFORD 45 DAY
Project Desc:

Client Sample ID: BOM904
Date Collected: 29-OCT-97
Matrix: Soil

Login Number: L10981
Date Received: 05-NOV-97
Percent Solids: 95.89

Constituent	Method	Batch	Activity	Error	MDA	Qualifier	Units	Analyzed	Lab ID
U-233/4	LAL-0108	55964	8.21	0.65	0.079		pCi/g	15-DEC-97	L10981-34
U-235	LAL-0108	55964	0.63	0.14	0.059		pCi/g	15-DEC-97	L10981-34
U-238	LAL-0108	55964	8.35	0.65	0.052		pCi/g	15-DEC-97	L10981-34

LAS LABORATORIES

RADIOCHEMISTRY DATA REPORT
Account Name: Waste Management Hanford
Project Name: HANFORD 45 DAY
Project Desc:

Client Sample ID: BOM905
Date Collected: 30-OCT-97
Matrix: Soil

Login Number: L10981
Date Received: 05-NOV-97
Percent Solids: 92.38

Constituent	Method	Batch	Activity	Error	MDA	Qualifier	Units	Analyzed	Lab ID
U-233/4	LAL-0108	56823	9.00	0.70	0.079		pCi/g	22-DEC-97	L10981-35
U-235	LAL-0108	56823	0.46	0.12	0.039		pCi/g	22-DEC-97	L10981-35
U-238	LAL-0108	56823	8.64	0.68	0.062		pCi/g	22-DEC-97	L10981-35

LAS LABORATORIES

RADIOCHEMISTRY DATA REPORT
Account Name: Waste Management Hanford
Project Name: HANFORD 45 DAY
Project Desc:

Client Sample ID: BOM906
Date Collected: 29-OCT-97
Matrix: Soil

Login Number: L10981
Date Received: 05-NOV-97
Percent Solids: 92.93

Constituent	Method	Batch	Activity	Error	MDA	Qualifier	Units	Analyzed	Lab ID
U-233/4	LAL-0108	55964	7.57	0.59	0.055		pCi/g	15-DEC-97	L10981-36
U-235	LAL-0108	55964	0.59	0.13	0.038		pCi/g	15-DEC-97	L10981-36
U-238	LAL-0108	55964	7.47	0.59	0.066		pCi/g	15-DEC-97	L10981-36

LAS LABORATORIES

RADIOCHEMISTRY DATA REPORT
Account Name: Waste Management Hanford
Project Name: HANFORD 45 DAY
Project Desc:

Client Sample ID: BOM907
Date Collected: 30-OCT-97
Matrix: Soil

Login Number: L10981
Date Received: 05-NOV-97
Percent Solids: 94.98

Constituent	Method	Batch	Activity	Error	MDA	Qualifier	Units	Analyzed	Lab ID
U-233/4	LAL-0108	55964	4.84	0.48	0.080		pCi/g	15-DEC-97	L10981-37
U-235	LAL-0108	55964	0.47	0.13	0.068		pCi/g	15-DEC-97	L10981-37
U-238	LAL-0108	55964	4.66	0.47	0.064		pCi/g	15-DEC-97	L10981-37

LAS LABORATORIES

RADIOCHEMISTRY DATA REPORT
Account Name: Waste Management Hanford
Project Name: HANFORD 45 DAY
Project Desc:

Client Sample ID: BOM908
Date Collected: 30-OCT-97
Matrix: Soil

Login Number: L10981
Date Received: 05-NOV-97
Percent Solids: 92.88

Constituent	Method	Batch	Activity	Error	MDA	Qualifier	Units	Analyzed	Lab ID
U-233/4	LAL-0108	55964	6.14	0.56	0.078		pCi/g	15-DEC-97	L10981-38
U-235	LAL-0108	55964	0.38	0.12	0.075		pCi/g	15-DEC-97	L10981-38
U-238	LAL-0108	55964	5.75	0.54	0.068		pCi/g	15-DEC-97	L10981-38

LAS LABORATORIES

RADIOCHEMISTRY DATA REPORT
Account Name: Waste Management Hanford
Project Name: HANFORD 45 DAY
Project Desc:

Client Sample ID: BOM8Y7
Date Collected: 29-OCT-97
Matrix: Soil

Login Number: L10981
Date Received: 05-NOV-97
Percent Solids: 92.02

Constituent	Method	Batch	Activity	Error	MDA	Qualifier	Units	Analyzed	Lab ID
U-233/4	LAL-0108	56823	24.3	1.8	0.22		pCi/g	22-DEC-97	L10981-39
U-235	LAL-0108	56823	1.23	0.30	0.050		pCi/g	22-DEC-97	L10981-39
U-238	LAL-0108	56823	23.2	1.7	0.12		pCi/g	22-DEC-97	L10981-39

LAS LABORATORIES

RADIOCHEMISTRY DATA REPORT
Account Name: Waste Management Hanford
Project Name: HANFORD 45 DAY
Project Desc:

Client Sample ID: BOM8Y8
Date Collected: 29-OCT-97
Matrix: Soil

Login Number: L10981
Date Received: 05-NOV-97
Percent Solids: 95.16

Constituent	Method	Batch	Activity	Error	MDA	Qualifier	Units	Analyzed	Lab ID
U-233/4	LAL-0108	55964	24.6	1.6	0.090		pCi/g	15-DEC-97	L10981-40
U-235	LAL-0108	55964	1.71	0.28	0.072		pCi/g	15-DEC-97	L10981-40
U-238	LAL-0108	55964	23.4	1.5	0.077		pCi/g	15-DEC-97	L10981-40

LAS LABORATORIES

RADIOCHEMISTRY DATA REPORT
Account Name: Waste Management Hanford
Project Name: HANFORD 45 DAY
Project Desc:

Client Sample ID: BOM8Y9
Date Collected: 29-OCT-97
Matrix: Soil

Login Number: L10981
Date Received: 05-NOV-97
Percent Solids: 94.94

Constituent	Method	Batch	Activity	Error	MDA	Qualifier	Units	Analyzed	Lab ID
U-233/4	LAL-0108	55964	24.5	1.6	0.099		pCi/g	15-DEC-97	L10981-41
U-235	LAL-0108	55964	2.17	0.30	0.045		pCi/g	15-DEC-97	L10981-41
U-238	LAL-0108	55964	24.6	1.6	0.080		pCi/g	15-DEC-97	L10981-41

LAS LABORATORIES

RADIOCHEMISTRY DATA REPORT
Account Name: Waste Management Hanford
Project Name: HANFORD 45 DAY
Project Desc:

Client Sample ID: BOM900
Date Collected: 29-OCT-97
Matrix: Soil

Login Number: L10981
Date Received: 05-NOV-97
Percent Solids: 94.87

Constituent	Method	Batch	Activity	Error	MDA	Qualifier	Units	Analyzed	Lab ID
U-233/4	LAL-0108	56823	181.	12.	0.63		pCi/g	22-DEC-97	L10981-42
U-235	LAL-0108	56823	11.4	2.1	0.42		pCi/g	22-DEC-97	L10981-42
U-238	LAL-0108	56823	183.	12.	0.49		pCi/g	22-DEC-97	L10981-42

LAS LABORATORIES

RADIOCHEMISTRY DATA REPORT
Account Name: Waste Management Hanford
Project Name: HANFORD 45 DAY
Project Desc:

Client Sample ID: BOM901
Date Collected: 29-OCT-97
Matrix: Soil

Login Number: L10981
Date Received: 05-NOV-97
Percent Solids: 91.53

Constituent	Method	Batch	Activity	Error	MDA	Qualifier	Units	Analyzed	Lab ID
U-233/4	LAL-0108	55964	8.84	0.66	0.061		pCi/g	15-DEC-97	L10981-43
U-235	LAL-0108	55964	0.69	0.14	0.045		pCi/g	15-DEC-97	L10981-43
U-238	LAL-0108	55964	6.37	0.52	0.049		pCi/g	15-DEC-97	L10981-43

LAS LABORATORIES

RADIOCHEMISTRY DATA REPORT
Account Name: Waste Management Hanford
Project Name: HANFORD 45 DAY
Project Desc:

Client Sample ID: BOM902
Date Collected: 29-OCT-97
Matrix: Soil

Login Number: L10981
Date Received: 05-NOV-97
Percent Solids: 95.6

Constituent	Method	Batch	Activity	Error	MDA	Qualifier	Units	Analyzed	Lab ID
U-233/4	LAL-0108	56823	257.	17.	1.2		pCi/g	22-DEC-97	L10981-44
U-235	LAL-0108	56823	13.6	2.7	0.34		pCi/g	22-DEC-97	L10981-44
U-238	LAL-0108	56823	246.	16.	0.77		pCi/g	22-DEC-97	L10981-44

LAS LABORATORIES

METHOD BLANK DATA SUMMARY

Login/SDG Number: L10981

Analyte	Batch ID	Date Analyzed	Prep ID	Anal ID	Inst ID	LAL ID	Acceptance Criteria	MBB Result	IMPCTY 2 Sigma	MDA	Units	Data Qual
U-233/4	55964	15-DEC-97	DM	WAL	AL1-04	55964MBB1	1.0	0.292	0.0961	0.0571	pCi/g	
U-235	55964	15-DEC-97	DM	WAL	AL1-04	55964MBB1	1.0	0.0844	0.0500	0.0339	pCi/g	
U-238	55964	15-DEC-97	DM	WAL	AL1-04	55964MBB1	1.0	0.0838	0.0556	0.0544	pCi/g	
U-233/4	55965	17-DEC-97	JS,DM	WAL	AL1-26	55965MBB1	1.0	0.192	0.0775	0.0657	pCi/g	
U-235	55965	17-DEC-97	JS,DM	WAL	AL1-26	55965MBB1	1.0	0.0536	0.0406	0.0425	pCi/g	
U-238	55965	17-DEC-97	JS,DM	WAL	AL1-26	55965MBB1	1.0	0.0756	0.0503	0.0530	pCi/g	
U-233/4	56823	22-DEC-97	JS,DM	WAL	AL1-03	56823MBB1	1.0	0.133	0.0659	0.0555	pCi/g	
U-235	56823	22-DEC-97	JS,DM	WAL	AL1-03	56823MBB1	1.0	-0.00169	0.0164	0.0411	pCi/g	
U-238	56823	22-DEC-97	JS,DM	WAL	AL1-03	56823MBB1	1.0	0.0650	0.0425	0.0315	pCi/g	

LAS LABORATORIES

LCS DATA SUMMARY

Login/SDG Number: L10981

Analyte	Batch ID	Date Analyzed	Prep ID	Ana ID	Inst ID	LAL ID	LCS Result	UNCTY 2 sigma	Known Value	UNCTY 2 sigma	Units	% Rec	Data Qual	QC Limits
U-233/4	55964	15-DEC-97	DM	WAL	AL1-03	55964LCS1	11.5	0.818	10.9	0.547	pCi/g	105		80-120
U-238	55964	15-DEC-97	DM	WAL	AL1-03	55964LCS1	11.8	0.832	10.9	0.545	pCi/g	108		80-120
U-233/4	55965	17-DEC-97	JS,DM	WAL	AL1-25	55965LCS1	11.5	0.766	10.9	0.547	pCi/g	105		80-120
U-238	55965	17-DEC-97	JS,DM	WAL	AL1-25	55965LCS1	11.2	0.750	10.9	0.545	pCi/g	103		80-120
U-233/4	56823	22-DEC-97	JS,DM	WAL	AL1-02	56823LCS1	10.4	0.729	10.9	0.547	pCi/g	95.0		80-120
U-238	56823	22-DEC-97	JS,DM	WAL	AL1-02	56823LCS1	11.6	0.788	10.9	0.545	pCi/g	106		80-120

LAS LABORATORIES

DUPLICATE DATA SUMMARY

Login/SDG Number: L10981

Analyte	Batch ID	Date Analyzed	Prep ID	Anal ID	Inst ID	Client ID	LAL ID	SMP Result	UNCTY 2 Sigma	DUP Result	UNCTY 2 Sigma	Units	RER	RPD	Data Qual	RPD Limit
U-233/4	55964	15-DEC-97	DM	WAL	AL1-01	BOM909	L10981-27	15.1	1.03	14.1	0.978	pCi/g	0.483	7		20
U-235	55964	15-DEC-97	DM	WAL	AL1-01	BOM909	L10981-27	0.889	0.178	1.01	0.188	pCi/g	0.326	13		20
U-238	55964	15-DEC-97	DM	WAL	AL1-01	BOM909	L10981-27	15.5	1.05	14.9	1.02	pCi/g	0.299	4		20
U-233/4	55964	15-DEC-97	DM	WAL	AL1-02	BOM910	L10981-28	13.5	0.959	13.7	0.926	pCi/g	0.0590	0.8		20
U-235	55964	15-DEC-97	DM	WAL	AL1-02	BOM910	L10981-28	0.827	0.174	0.723	0.149	pCi/g	0.321	13		20
U-238	55964	15-DEC-97	DM	WAL	AL1-02	BOM910	L10981-28	13.4	0.950	13.8	0.933	pCi/g	0.217	3		20
U-233/4	55965	17-DEC-97	JS,DM	WAL	AL1-24	BOMB44	L10981-23	1960	136.	1790	127.	pCi/g	0.612	9		20
U-235	55965	17-DEC-97	JS,DM	WAL	AL1-24	BOMB44	L10981-23	32.7	31.3	39.6	32.5	pCi/g	0.107	19		20
U-238	55965	17-DEC-97	JS,DM	WAL	AL1-24	BOMB44	L10981-23	1390	106.	1250	98.0	pCi/g	0.710	11		20
U-233/4	56823	22-DEC-97	JS,DM	WAL	AL1-01	BOM905	L10981-35	9.00	0.703	9.22	0.943	pCi/g	0.133	2		20
U-235	56823	22-DEC-97	JS,DM	WAL	AL1-01	BOM905	L10981-35	0.457	0.124	0.595	0.212	pCi/g	0.411	26		20
U-238	56823	22-DEC-97	JS,DM	WAL	AL1-01	BOM905	L10981-35	8.64	0.683	8.81	0.916	pCi/g	0.104	2		20

NOTE: Data qualified as out of limits if RPD > 20% and RER > 1.

LAS LABORATORIES

TRACKING SHEET DATA REPORT (ba22)

EXTRACTION SHEET FOR: RAD PERCENT SOLIDS Extraction

WORKSHEET NUMBER: RAD PERCENT SOLIDS_55943

PWO : _____ DATE ASSIGNED : 12-08-97

CUSTOMER BAT NO.: 55943 DATE DUE : _____ ASSIGNED ANALYST : DGM

LAL BATCH NO. : _____ DATE COMPLETED : 12-08-97 REVIEWED BY : DH

	INITIAL OVEN CHECK	SAMPLES INTO OVEN	SAMPLES OUT OF OVEN
MATRIX: SOIL	DATE: _____	DATE: _____	DATE: _____
	TIME: _____	TIME: _____	TIME: _____
	OVEN TEMP: 110°	OVEN TEMP: 110°	OVEN TEMP: 110°

NO	LAL #	CLIENT ID	QC TYPE	WEIGHT	GROSS WEIGHT WET	GROSS WEIGHT DRY	SOLIDS	MOISTURE
1	L10981-1	BOMB44		1.0789	4.6304	4.4395	94.62	5.38
2	L10981-2	BOMB45		1.0747	4.4454	4.4083	98.90	1.10
3	L10981-3	BOMB46		1.0846	5.285	4.8164	88.84	11.16
4	L10981-4	BOMB47		1.0814	6.4129	5.9548	91.41	8.59

Definition of Gross Weight is: Container Weight + Sample Weight

Calculate the Percent Solids as follows:

$$\text{Percent Soilds} = \frac{(D-C)}{(W-C)} \times 100$$

Where:

D = Dry Weight of Sample
W = Wet Weight of Sample
C = Container Weight

LOCKHEED ANALYTICAL LABORATORY
% MOISTURE DETERMINATION AND SAMPLE ALIQUOT WORKSHEET

000027

Batch Number 55965
Date Started 12-08-97

Customer WAST MANAGT M. HAN
Matrix SOLID WASTE

Analyst D.C. MILLINGTON

Parent LAL ID	NO	Container Tare Wt.	Wet Weight Container + Sample	Dry Weight Container + Sample	% Moisture	Aliquot Dissolved	Final Solution Volume
10981-26	1	1.0789g	4.6304g	4.4395g			
24	2	1.0747g	4.4457g	4.4083g			
23	3	1.0846g	5.2850g	4.8164g			
25	4	1.0814g	6.4129g	5.9548g			
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						
	16						
	17						
	18						
	19						
	20						
	21						
	22						
	23						
	24						

Comments:

Balance no. 40020046 ( ) ( )
Initials [illegible] Date 12-08-97

LAS LABORATORIES

TRACKING SHEET DATA REPORT (bs22)

EXTRACTION SHEET FOR: RAD PERCENT SOLIDS Extraction

WORKSHEET NUMBER: RAD PERCENT SOLIDS_55942

PWO : _____ DATE ASSIGNED : _____

CUSTOMER BAT NO.: _____ DATE DUE : _____ ASSIGNED ANALYST : _____

LAL BATCH NO. : _____ DATE COMPLETED : _____ REVIEWED BY : _____

	INITIAL OVEN CHECK	SAMPLES INTO OVEN	SAMPLES OUT OF OVEN
MATRIX: SOIL	DATE: _____	DATE: _____	DATE: _____
	TIME: _____	TIME: _____	TIME: _____
	OVEN TEMP: _____	OVEN TEMP: _____	OVEN TEMP: _____

NO	LAL #	CLIENT ID	QC TYPE	WEIGHT	GROSS WEIGHT WET	GROSS WEIGHT DRY	SOLIDS	MOISTURE
1	L10981-5	BOM909		1.0736	4.7786	4.642	96.31	3.69
2	L10981-6	BOM910		1.0751	3.6811	3.577	96.01	3.99
3	L10981-7	BOM911		1.0677	4.8878	4.7358	96.02	3.98
4	L10981-8	BOM912		1.0794	4.119	3.9972	95.99	4.01
5	L10981-9	BOM913		1.0772	4.7771	4.6144	95.60	4.40
6	L10981-10	BOM914		1.1669	3.6981	3.5122	92.66	7.34
7	L10981-11	BOM903		1.0836	4.3495	4.1408	93.61	6.39
8	L10981-12	BOM904		1.0713	4.5315	4.3893	95.89	4.11
9	L10981-13	BOM905		1.0735	4.9111	4.6185	92.38	7.62
10	L10981-14	BOM906		1.0828	4.4529	4.2145	92.93	7.07
11	L10981-15	BOM907		1.08	4.819	4.6313	94.98	5.02
12	L10981-16	BOM908		1.0708	4.134	3.9159	92.88	7.12
13	L10981-17	BOM8Y7		1.0702	4.9682	4.657	92.02	7.98
14	L10981-18	BOM8Y8		1.0777	5.15	4.9527	95.16	4.84
15	L10981-19	BOM8Y9		1.0786	5.496	5.2723	94.94	5.06
16	L10981-20	BOM900		1.0665	4.761	4.5715	94.87	5.13
17	L10981-21	BOM901		1.0704	4.62	4.3192	91.53	8.47
18	L10981-22	BOM902		1.0735	5.8034	5.5953	95.60	4.40

Definition of Gross Weight is: Container Weight + Sample Weight

Calculate the Percent Solids as follows:

$$\text{Percent Soilds} = \frac{(D-C)}{(W-C)} \times 100$$

Where:

D = Dry Weight of Sample
W = Wet Weight of Sample
C = Container Weight

LOCKHEED ANALYTICAL LABORATORY
% MOISTURE DETERMINATION AND SAMPLE ALIQUOT WORKSHEET

000029

Batch Number 55964
Date Started 12-05-97

Customer WASTE MNGM. ITAN
Matrix SOIL

Analyst [illegible]

Parent LAL ID	NO	Container Tare Wt.	Wet Weight Container + Sample	Dry Weight Container + Sample	% Moisture	Aliquot Dissolved	Final Solution Volume
10981-42	1	1.0736g	4.7786g	4.6427g			
44	2	1.0751g	3.6811g	3.5770g			
30	3	1.0677g	4.8878g	4.7358g			
36	4	1.0794g	4.1190g	3.9972g			
38	5	1.0772g	4.7771g	4.6144g			
41	6	1.0669g	3.6981g	3.5122g			
39	7	1.0836g	4.3495g	4.1408g			
37	8	1.0713g	4.5315g	4.3893g			
31	9	1.0735g	4.9111g	4.6185g			
32	10	1.0828g	4.4290g	4.2145g			
40	11	1.0800g	4.8190g	4.6313g			
27	12	1.0708g	4.1340g	3.9159g			
29	13	1.0702g	4.9682g	4.6570g			
33	14	1.0777g	5.1500g	4.9527g			
28	15	1.0786g	5.4960g	5.2723g			
35	16	1.0665g	4.7610g	4.5715g			
	17						
43	18	1.0704g	4.6200g	4.3192g			
34	19	1.0735g	5.8034g	5.5953g			
	20						
	21						
	22						
	23						
	24						

Comments:

Balance no. 40010123 () _____ ()
Initials [illegible] Date 12-05-97

URANIUM ISOTOPIC
LAL-91-SOP-0108

Need Rad % Solids

000030A

LAS LABORATORIES

Sample Preparation Worksheet for Uranium Analysis

Date Prep Started : 12-08-97

Matrix : Soil

Workgroup Number : U-ISOTOPIC LAL-0108_55964

Prep Due Date : 27-Nov-97

CLIENT ID	LAS ID		CHILD ID	COMMENTS (Include initial aliquot and dilution factors)	Final Aliquot (mL/g sample)	Client	Collection Date
L10981-27	55964DUP1	1	55964-01	0.5614g	0.5614g	DUP	11/12/97
L10981-28	55964DUP2	2	55964-02	0.5386g	0.5386g	DUP	11/12/97
Lab Ctrl Sample	55964LCS1	3	55964-03			LCS	11/12/97
Method Blank	55964MBB1	4	55964-04			MB	11/12/97
BOM909	L10981-27	5	55964-05	0.5160g	0.5160g	Waste Management Han	10/30/97
BOM910	L10981-28	6	55964-06	0.5380g	0.5380g	Waste Management Han	10/30/97
BOM911	L10981-29	7	55964-07	0.5658g	0.5658g	Waste Management Han	10/30/97
BOM912	L10981-30	8	55964-08	0.5119g	0.5119g	Waste Management Han	10/30/97
BOM913	L10981-31	9	55964-09	0.5582g	0.5582g	Waste Management Han	10/30/97
BOM914	L10981-32	10	55964-10	0.5676g	0.5676g	Waste Management Han	10/30/97
BOM903	L10981-33	11	55964-11	0.5298g	0.5298g	Waste Management Han	10/29/97
BOM904 →	L10981-34	12	55964-12	0.5073g	0.5073g	Waste Management Han	10/29/97
BOM905	L10981-35	13	55964-13	0.5329g	0.5329g	Waste Management Han	10/30/97
BOM906	L10981-36	14	55964-14	-0.5345g	0.5345g	Waste Management Han	10/29/97
BOM907	L10981-37	15	55964-15	-0.5235g	0.5235g	Waste Management Han	10/30/97
BOM908	L10981-38	16	55964-16	0.5347g	0.5347g	Waste Management Han	10/30/97
BOM8Y7	L10981-39	17	55964-17	0.4999g 0.4999g	~~0.4999g~~	Waste Management Han	10/29/97
BOM8Y8	L10981-40	18	55964-18	0.5110g	0.5110g	Waste Management Han	10/29/97
BOM8Y9	L10981-41	19	55964-19	0.5562g	0.5562g	Waste Management Han	10/29/97
BOM900	L10981-42	20	55964-20	0.5223g	0.5223g	Waste Management Han	10/29/97
BOM901 →	L10981-43	21	55964-21	0.5081g	0.5081g	Waste Management Han	10/29/97
BOM902	L10981-44	22	55964-22	-0.5392g	0.5392g	Waste Management Han	10/29/97
		23					
		24					

COMMENTS: L-10981-34 AND 43 ARE TRITIUM CONT.

Amount of Tracer	U-232 0.5ml
Tracer Activity	10.81 pCi/ml
Tracer ID#	95-721-70-1

Cnt Rm Custody\Date : [signature] 12-15-97

Amount of LCS	U-238 0.5ml
LCS Activity	10.90 pCi/ml
LCS ID#	95-721-65-1

Balance Number : ~~40020021~~ ~~[signature]~~ 12-08-97 40020021 (1)

Pipette Number : 134488 (1) ( )

Tracer and LCS added by: [signature] 12-9-97

Witnessed by: [signature] 12-9-97

Sample Prep Analyst : [signature]

Checked by : [signature] 12-15-97

Workgroup Number: U-ISOTOPIC LAL-0108_55964

Sample	Parameter	Value	Error	MDA	Units
L10981-38	U-235	0.38252	0.124038	0.0751888	pCi/g
L10981-40	U-235	1.71014	0.283308	0.0720339	pCi/g
L10981-41	U-235	2.16696	0.304956	0.0452457	pCi/g
L10981-43	U-235	0.685277	0.140596	0.0454284	pCi/g
55964DUP1	U-238	14.8638	1.017	0.0555073	pCi/g
55964DUP2	U-238	13.7936	0.932915	0.0405662	pCi/g
55964LCS1	U-238	11.7503	0.831636	0.0417966	pCi/g
55964MBB1	U-238	0.0838377	0.0555756	0.0543552	pCi/g
L10981-27	U-238	15.4826	1.05466	0.0567245	pCi/g
L10981-28	U-238	13.3845	0.949807	0.0580869	pCi/g
L10981-29	U-238	34.7412	2.13792	0.0705566	pCi/g
L10981-30	U-238	7.78414	0.610193	0.0518668	pCi/g
L10981-31	U-238	14.7192	0.999476	0.0601835	pCi/g
L10981-32	U-238	35.0521	2.1456	0.0967943	pCi/g
L10981-33	U-238	0.750706	0.146476	0.0374783	pCi/g
L10981-34	U-238	8.34618	0.654804	0.0521768	pCi/g
L10981-36	U-238	7.46666	0.585637	0.0664293	pCi/g
L10981-37	U-238	4.65887	0.466308	0.0638421	pCi/g
L10981-38	U-238	5.75157	0.535437	0.0684486	pCi/g
L10981-40	U-238	23.4197	1.53517	0.0770372	pCi/g
L10981-41	U-238	24.6081	1.56075	0.0797344	pCi/g
L10981-43	U-238	6.37388	0.520604	0.0485837	pCi/g

RADIATION RESULTS CHECK REPORT

Workgroup Number: U-ISOTOPIC LAL-0108_55964

Sample	Parameter	Value	Error	MDA	Units
55964DUP1	U-233/4	14.1143	0.97819	0.0770103	pCi/g
55964DUP2	U-233/4	13.6609	0.926108	0.0490141	pCi/g
55964LCS1	U-233/4	11.4934	0.818487	0.0628101	pCi/g
55964MBB1	U-233/4	0.292217	0.09613	0.0571273	pCi/g
L10981-27	U-233/4	15.0856	1.03425	0.0734146	pCi/g
L10981-28	U-233/4	13.5499	0.958856	0.0691234	pCi/g
L10981-29	U-233/4	41.1193	2.46303	0.0911483	pCi/g
L10981-30	U-233/4	8.33099	0.64105	0.0733509	pCi/g
L10981-31	U-233/4	14.6808	0.998136	0.0824461	pCi/g
L10981-32	U-233/4	34.5609	2.12075	0.107007	pCi/g
L10981-33	U-233/4	0.881364	0.163483	0.0684882	pCi/g
L10981-34	U-233/4	8.21016	0.648399	0.0789147	pCi/g
L10981-36	U-233/4	7.56596	0.590618	0.0552501	pCi/g
L10981-37	U-233/4	4.83942	0.478487	0.0801103	pCi/g
L10981-38	U-233/4	6.14403	0.559266	0.0782406	pCi/g
L10981-40	U-233/4	24.6312	1.59812	0.089592	pCi/g
L10981-41	U-233/4	24.4823	1.55477	0.0994374	pCi/g
L10981-43	U-233/4	8.84307	0.656461	0.0609638	pCi/g
55964DUP1	U-235	1.00801	0.187997	0.0391755	pCi/g
55964DUP2	U-235	0.723239	0.149129	0.0405662	pCi/g
55964LCS1	U-235	0.653148	0.143443	0.0417966	pCi/g
55964MBB1	U-235	0.0844452	0.0500333	0.0338814	pCi/g
L10981-27	U-235	0.888699	0.178101	0.0469478	pCi/g
L10981-28	U-235	0.826977	0.173962	0.0535074	pCi/g
L10981-29	U-235	3.13767	0.40711	0.0705566	pCi/g
L10981-30	U-235	0.336333	0.10384	0.0603195	pCi/g
L10981-31	U-235	0.799122	0.162409	0.021875	pCi/g
L10981-32	U-235	2.05287	0.317776	0.0688929	pCi/g
L10981-33	U-235	0.0957007	0.0555629	0.0484283	pCi/g
L10981-34	U-235	0.629925	0.144985	0.0590774	pCi/g
L10981-36	U-235	0.586381	0.13026	0.0384264	pCi/g
L10981-37	U-235	0.466869	0.133873	0.0675907	pCi/g

LAS LABORATORIES

Count Data Sheet for Uranium By SOP 0108

Batch Number : 10855964

LAS ID	Child ID		QC	Detector Number	Count Date Time	Count Anlst	Aliquot Size (g)	U-232 Tracer Activity DPM	U-232 Tracer GROSS Counts	U-232 Tracer BKGD Counts	U-232 Tracer U-232 FWHM	U-233/4 GROSS Counts	U-233/4 BKGD Counts	U-235 GROSS Counts	U-235 BKGD Counts	U-238 GROSS Counts	U-238 BKGD Counts
55964DUP1	55964-01	1	DUP1	AL1-01	12/15/97 17:48	WAL	0.5614	12.00	1166	57	54	1679	11	120	1	1765	4
55964DUP2	55964-02	2	DUP2	AL1-02	12/15/97 17:49	WAL	0.5386	12.00	1370	52	73	1837	4	98	2	1854	2
55964LCS1	55964-03	3	LCS1	AL1-03	12/15/97 17:53	WAL	0.5000	12.00	1433	56	74	1502	8	86	2	1533	2
55964MBB1	55964-04	4	MBB1	AL1-04	12/15/97 17:54	WAL	0.5000	12.00	1505	53	73	43	7	12	1	14	6
L10981-27	55964-05	5	SMP1	AL1-05	12/15/97 17:57	WAL	0.5160	12.00	1234	43	55	1755	9	104	2	1799	4
L10981-28	55964-06	6	SMP2	AL1-07	12/15/97 17:59	WAL	0.5380	12.00	1154	36	53	1539	7	95	3	1519	4
L10981-29	55964-07	7		AL1-08	12/15/97 18:02	WAL	0.5658	12.00	828	16	71	3538	7	271	3	2988	3
L10981-30	55964-08	8		AL1-09	12/15/97 18:03	WAL	0.5119	12.00	1460	63	71	1137	14	49	8	1059	5
L10981-31	55964-09	9		AL1-11	12/15/97 18:05	WAL	0.5582	12.00	1218	44	55	1825	15	99	0	1826	6
L10981-32	55964-10	10		AL1-12	12/15/97 18:05	WAL	0.5676	12.00	856	42	72	3048	12	182	3	3090	9
L10981-33	55964-11	11		AL1-13	12/15/97 18:06	WAL	0.5298	12.00	1502	44	71	134	14	16	5	110	2
L10981-34	55964-12	12		AL1-14	12/15/97 18:08	WAL	0.5073	12.00	1366	51	71	1042	14	82	6	1055	4
~~L10981-35~~	~~55964-13~~	~~13~~		~~AL1-16~~	~~12/15/97 18:09~~	~~WAL~~	~~0.5329~~	~~12.00~~	~~349~~	~~50~~	~~72~~	~~7014~~	~~9~~	~~324~~	~~3~~	~~6973~~	~~7~~
L10981-36	55964-14	14		AL1-17	12/15/97 18:10	WAL	0.5345	12.00	1451	40	71	1076	7	84	2	1064	12
L10981-37	55964-15	15		AL1-18	12/15/97 18:11	WAL	0.5235	12.00	1154	36	71	538	10	54	6	516	5
L10981-38	55964-16	16		AL1-19	12/15/97 18:12	WAL	0.5347	12.00	1117	38	71	673	9	45	8	629	6
~~L10981-39~~	~~55964-17~~	~~17~~		~~AL1-20~~	~~12/15/97 18:13~~	~~WAL~~	~~0.4999~~	~~12.00~~	~~402~~	~~30~~	~~71~~	~~3806~~	~~10~~	~~256~~	~~2~~	~~4055~~	~~6~~
L10981-40	55964-18	18		AL1-21	12/15/97 18:14	WAL	0.5110	12.00	972	12	54	2255	8	158	4	2143	5
L10981-41	55964-19	19		AL1-22	12/15/97 18:15	WAL	0.5562	12.00	1012	33	72	2521	15	223	1	2531	8
~~L10981-42~~	~~55964-20~~	~~20~~		~~AL1-23~~	~~12/15/97 18:17~~	~~WAL~~	~~0.5223~~	~~12.00~~	~~532~~	~~50~~	~~90~~	~~5077~~	~~12~~	~~258~~	~~7~~	~~4986~~	~~5~~
L10981-43	55964-21	21		AL1-24	12/15/97 18:17	WAL	0.5081	12.00	1555	31	71	1286	10	101	4	926	5
~~L10981-44~~	~~55964-22~~	~~22~~		~~AL1-25~~	~~12/15/97 18:18~~	~~WAL~~	~~0.5392~~	~~12.00~~	~~268~~	~~29~~	~~72~~	~~7708~~	~~14~~	~~398~~	~~4~~	~~7676~~	~~9~~
		23															
		24															

U-232 Tracer ID # 95-721-70-1 Conc : 10.81 pCi/mL Volume : 0.5 mL Ref Date : 08/20/97 Exp Date : 08/20/99	U-Nat LCS ID # 95-721-65-1 Conc : 10.90 pCi/mL Volume : 0.5 mL Ref Date : 01/01/92 Exp Date : 07/08/99	Prep Analyst : DM Prep Date : 12/08/97

Comments: Samples L10981-35, L10981-39, L10981-42, & L10981-44 will be reprepped on another batch due to low chemical recoveries. WAL 12/17/97

Resolution check (✓) ROIs acceptable (✓)

Analyst: [signature] Date: 12-17-97 Checked by: [signature]

V96291

00033

LAS LABORATORIES

Calculation Sheet for U-233/4 By SOP 0108

Batch Number : 10855964

LAS ID	Child ID	QC	Detector Eff	Sample Count Time (sec)	Bkgd Count Time (sec)	Chem Recovery	U-233/4 LCS Activity = 10.940 Bkg Corr pCi/g	Count Error 2 sigma	Tot Prop Err 2 sigma	U-233/4 LLD	U-233/4 MDA	Data Qualifier
55964DUP1	55964-01	DUP1	0.2325	36000	86400	0.682	14.114	0.677	0.978	0.054	0.077	
55964DUP2	55964-02	DUP2	0.258	36000	86400	0.726	13.661	0.625	0.926	0.029	0.049	
55964LCS1	55964-03	LCS1	0.2367	36000	86400	0.827	11.493	0.583	0.818	0.042	0.063	
55964MBB1	55964-04	MBB1	0.2473	36000	86400	0.833	0.292	0.095	0.096	0.037	0.057	
L10981-27	55964-05	SMP1	0.2429	36000	86400	0.695	15.086	0.708	1.034	0.050	0.073	
L10981-28	55964-06	SMP2	0.2087	36000	86400	0.758	13.550	0.679	0.959	0.045	0.069	
L10981-29	55964-07		0.2508	36000	86400	0.455	41.119	1.356	2.463	0.060	0.091	
L10981-30	55964-08		0.2561	36000	86400	0.778	8.331	0.487	0.641	0.053	0.073	
L10981-31	55964-09		0.2405	36000	86400	0.693	14.681	0.676	0.998	0.061	0.082	
L10981-32	55964-10		0.2521	36000	86400	0.462	34.561	1.229	2.121	0.076	0.107	
L10981-33	55964-11		0.2331	36000	86400	0.884	0.881	0.157	0.163	0.050	0.068	
L10981-34	55964-12		0.235	36000	86400	0.795	8.210	0.502	0.648	0.057	0.079	
~~L10981-35~~	~~55964-13~~		~~0.2544~~	~~36000~~	~~86400~~	~~0.179~~	~~216.681~~	~~5.074~~	~~11.964~~	~~0.180~~	~~0.263~~	Y
L10981-36	55964-14		0.244	36000	86400	0.816	7.566	0.454	0.591	0.036	0.055	
L10981-37	55964-15		0.2373	36000	86400	0.667	4.839	0.413	0.478	0.056	0.080	
L10981-38	55964-16		0.2184	36000	86400	0.700	6.144	0.467	0.559	0.053	0.078	
~~L10981-39~~	~~55964-17~~		~~0.2098~~	~~36000~~	~~86400~~	~~0.258~~	~~105.543~~	~~3.358~~	~~6.255~~	~~0.170~~	~~0.245~~	Y
L10981-40	55964-18		0.2614	36000	86400	0.514	24.631	1.018	1.598	0.060	0.090	
L10981-41	55964-19		0.2396	36000	86400	0.579	24.482	0.959	1.555	0.073	0.099	
~~L10981-42~~	~~55964-20~~		~~0.2465~~	~~36000~~	~~86400~~	~~0.288~~	~~102.689~~	~~2.828~~	~~5.862~~	~~0.136~~	~~0.191~~	Y
L10981-43	55964-21		0.2472	36000	86400	0.866	8.843	0.485	0.656	0.042	0.061	
~~L10981-44~~	~~55964-22~~		~~0.2624~~	~~36000~~	~~86400~~	~~0.135~~	~~301.712~~	~~6.742~~	~~16.524~~	~~0.284~~	~~0.390~~	Y

Comments: 55964LCS1 U-234 LCS Recovery = 11.493/10.940 = 105.1 %.
L10981-27, 55964DUP1 RPD = 6.7 %, RER = 0.48
L10981-28, 55964DUP2 RPD = 0.8 %, RER = 0.06
MBB = 0.292 pCi/g => less than RDL(HAMDC).

The method blank for U-234, U-235, & U-238 is above the MDA but below the RDL. All remaining QC within limits. Report data.
L10981-35, 39, 42, & 44 will be reprepped on another batch.

Calculated by: _____ Checked by: _____

V96291

LAS LABORATORIES

Calculation Sheet for U-235 By SOP 0108

000035

Batch Number : 10855964

LAS ID	Child ID	QC	Detector Eff	Sample Count Time (sec)	Bkgd Count Time (sec)	Chem Recovery	U-235 LCS Activity = 0.502 Bkg Corr pCi/g	Count Error 2 sigma	Tot Prop Err 2 sigma	U-235 LLD	U-235 MDA	Data Qualifier
55964DUP1	55964-01	DUP1	0.2325	36000	86400	0.682	1.008	0.181	0.188	0.016	0.039	
55964DUP2	55964-02	DUP2	0.258	36000	86400	0.726	0.723	0.145	0.149	0.020	0.041	
55964LCS1	55964-03	LCS1	0.2367	36000	86400	0.827	0.653	0.140	0.143	0.021	0.042	
55964MBB1	55964-04	MBB1	0.2473	36000	86400	0.833	0.084	0.050	0.050	0.014	0.034	
L10981-27	55964-05	SMP1	0.2429	36000	86400	0.695	0.889	0.172	0.178	0.024	0.047	
L10981-28	55964-06	SMP2	0.2087	36000	86400	0.758	0.827	0.169	0.174	0.030	0.054	
L10981-29	55964-07		0.2508	36000	86400	0.455	3.138	0.376	0.407	0.039	0.071	
L10981-30	55964-08		0.2561	36000	86400	0.778	0.336	0.102	0.104	0.040	0.060	
L10981-31	55964-09		0.2405	36000	86400	0.693	0.799	0.157	0.162	0.000	0.022	
L10981-32	55964-10		0.2521	36000	86400	0.462	2.053	0.301	0.318	0.038	0.069	
L10981-33	55964-11		0.2331	36000	86400	0.884	0.096	0.055	0.056	0.030	0.048	
L10981-34	55964-12		0.235	36000	86400	0.795	0.630	0.142	0.145	0.038	0.059	
~~L10981-35~~	~~55964-13~~		~~0.2544~~	~~36000~~	~~86400~~	~~0.179~~	~~9.976~~	~~1.091~~	~~1.200~~	~~0.104~~	~~0.187~~	~~Y~~
L10981-36	55964-14		0.244	36000	86400	0.816	0.586	0.127	0.130	0.019	0.038	
L10981-37	55964-15		0.2373	36000	86400	0.667	0.467	0.132	0.134	0.043	0.068	
L10981-38	55964-16		0.2184	36000	86400	0.700	0.383	0.123	0.124	0.050	0.075	
~~L10981-39~~	~~55964-17~~		~~0.2098~~	~~36000~~	~~86400~~	~~0.258~~	~~7.084~~	~~0.871~~	~~0.940~~	~~0.076~~	~~0.151~~	~~Y~~
L10981-40	55964-18		0.2614	36000	86400	0.514	1.710	0.270	0.283	0.042	0.072	
L10981-41	55964-19		0.2396	36000	86400	0.579	2.167	0.285	0.305	0.019	0.045	
~~L10981-42~~	~~55964-20~~		~~0.2465~~	~~36000~~	~~86400~~	~~0.288~~	~~5.164~~	~~0.639~~	~~0.689~~	~~0.104~~	~~0.159~~	~~Y~~
L10981-43	55964-21		0.2472	36000	86400	0.866	0.685	0.136	0.141	0.027	0.045	
~~L10981-44~~	~~55964-22~~		~~0.2624~~	~~36000~~	~~86400~~	~~0.135~~	~~15.525~~	~~1.533~~	~~1.718~~	~~0.152~~	~~0.258~~	~~Y~~

Comments:

L10981-27, 55964DUP1 RPD = 12.6 %, RER = 0.33

L10981-28, 55964DUP2 RPD = 13.4 %, RER = 0.32

MBB = 0.084 pCi/g => less than RDL(HAMDC).

The method blank for U-234, U-235, & U-238 is above the MDA but below the RDL. All remaining QC within limits. Report data.

L10981-35, 39, 42, & 44 will be reprepped on another batch.

Calculated by: [signature]

Checked by: [signature]

V96291

LAS LABORATORIES

Calculation Sheet for U-238 By SOP 0108

000036

Batch Number : 10855964

LAS ID	Child ID	QC	Detector Eff	Sample Count Time (sec)	BKGD Count Time (sec)	Chem Recovery	U-238 LCS Activity = 10.900 Bkg Corr pCi/g	Count Error 2 sigma	Tot Prop Err 2 sigma	U-238 LLD	U-238 MDA	Data Qualifier
55964DUP1	55964-01	DUP1	0.2325	36000	86400	0.682	14.864	0.694	1.017	0.033	0.056	
55964DUP2	55964-02	DUP2	0.258	36000	86400	0.726	13.794	0.628	0.933	0.020	0.041	
55964LCS1	55964-03	LCS1	0.2367	36000	86400	0.827	11.750	0.589	0.832	0.021	0.042	
55964MBB1	55964-04	MBB1	0.2473	36000	86400	0.833	0.084	0.055	0.056	0.035	0.054	
L10981-27	55964-05	SMP1	0.2429	36000	86400	0.695	15.483	0.716	1.055	0.033	0.057	
L10981-28	55964-06	SMP2	0.2087	36000	86400	0.758	13.385	0.674	0.950	0.034	0.058	
L10981-29	55964-07		0.2508	36000	86400	0.455	34.741	1.246	2.138	0.039	0.071	
L10981-30	55964-08		0.2561	36000	86400	0.778	7.784	0.470	0.610	0.032	0.052	
L10981-31	55964-09		0.2405	36000	86400	0.693	14.719	0.676	0.999	0.038	0.060	
L10981-32	55964-10		0.2521	36000	86400	0.462	35.052	1.238	2.146	0.066	0.097	
L10981-33	55964-11		0.2331	36000	86400	0.884	0.751	0.142	0.146	0.019	0.037	
L10981-34	55964-12		0.235	36000	86400	0.795	8.346	0.505	0.655	0.031	0.052	
~~L10981-35~~	~~55964-13~~		~~0.2544~~	~~36000~~	~~86400~~	~~0.179~~	~~215.440~~	~~5.059~~	~~11.901~~	~~0.158~~	~~0.242~~	~~Y~~
L10981-36	55964-14		0.244	36000	86400	0.816	7.467	0.451	0.586	0.047	0.066	
L10981-37	55964-15		0.2373	36000	86400	0.667	4.659	0.404	0.466	0.039	0.064	
L10981-38	55964-16		0.2184	36000	86400	0.700	5.752	0.452	0.535	0.044	0.068	
~~L10981-39~~	~~55964-17~~		~~0.2098~~	~~36000~~	~~86400~~	~~0.258~~	~~112.502~~	~~3.465~~	~~6.607~~	~~0.132~~	~~0.207~~	Y
L10981-40	55964-18		0.2614	36000	86400	0.514	23.420	0.993	1.535	0.047	0.077	
L10981-41	55964-19		0.2396	36000	86400	0.579	24.608	0.960	1.561	0.053	0.080	
~~L10981-42~~	~~55964-20~~		~~0.2465~~	~~36000~~	~~86400~~	~~0.288~~	~~100.906~~	~~2.802~~	~~5.771~~	~~0.088~~	~~0.143~~	Y
L10981-43	55964-21		0.2472	36000	86400	0.866	6.374	0.412	0.521	0.030	0.049	
~~L10981-44~~	~~55964-22~~		~~0.2624~~	~~36000~~	~~86400~~	~~0.135~~	~~300.540~~	~~6.727~~	~~16.464~~	~~0.228~~	~~0.334~~	Y

Comments: 55964LCS1 U-238 LCS Recovery = 11.750/10.900 = 107.8 %.
L10981-27, 55964DUP1 RPD = 4.1 %, RER = 0.30
L10981-28, 55964DUP2 RPD = 3.0 %, RER = 0.22
MBB = 0.084 pCi/g => less than RDL(HAMDC).

The method blank for U-234, U-235, & U-238 is above the MDA but below the RDL. All remaining QC within limits. Report data.
L10981-35, 39, 42, & 44 will be reprepped on another batch.

Calculated by: _____ Checked by: _____

V96291

AlphaVision A36-BI Ver 1.20 12/16/97 3:49:06 AM

Southern Petroleum Laboratories-LAS 576A (AL1)

LAS Child ID: 55964-01
LAS Parent ID: 55964DUP1
Method Type: Uranium-Isotopic
Analysis Type: Relative Region-Of-Interest
Acquisition Date: 12/15/97 5:48:26 PM
Aliquot Volume: 0.56140 g
Tracer Amount: 12.00 dpm.

Detector: AL1-01
Number of Channels: 512
Live Time: 36,000.0 Sec.
Real Time: 36,001.6 Sec.

Detector Efficiency: 23.25 % Chemical Yield: 68.23 %
Total Efficiency: 15.86 %

Adj. Calibration (keV): 2,880.95 + 9.0490 * Channel #.
Init. Calibration (keV): 2,880.95 + 9.0146 * Channel #.

Spectrum File: C:\USER\DATA\55964-01.CHN
Background File: C:\USER\BKG\B0197346.CHN
Calibration File: C:\USER\CALIB\E0197295.CHN
Library File: C:\USER\ALPHA\ALPHAVIS.ALB

P E A K S

Nuclide	Energy (keV)	Centroid Channel	ROI Low	ROI High	FWHM (keV)	Width (keV)	Gross Sum	BKG Sum	Net CPM
U-234	4,776	209.4	174	217	72	72	1,679	4.58	2.79
U-235	4,396	167.4	153	173	54	54	120	0.42	0.20
U-238	4,196	145.3	110	152	72	72	1,765	1.67	2.94
U-232-tr	5,320	269.6	235	278	54	54	1,166	23.75	1.90

Note: Background count times are for 86,400 seconds (24 Hours). BKG Sum above is the background counts achieved in 24 hours normalized to the sample count time.

Analyzed By: _____ Checked By: _____

AlphaVision A36-BI Ver 1.20 12/16/97 3:49:50 AM

Southern Petroleum Laboratories-LAS 576A (AL1)

LAS Child ID: 55964-02
LAS Parent ID: 55964DUP2
Method Type: Uranium-Isotopic
Analysis Type: Relative Region-Of-Interest
Acquisition Date: 12/15/97 5:49:40 PM
Aliquot Volume: 0.53860 g
Tracer Amount: 12.00 dpm.

Detector: AL1-02
Number of Channels: 512
Live Time: 36,000.0 Sec.
Real Time: 36,001.6 Sec.

Detector Efficiency: 25.80 % Chemical Yield: 72.58 %
Total Efficiency: 18.73 %

Adj. Calibration (keV): 2,956.97 + 9.1267 * Channel #.
Init. Calibration (keV): 2,956.97 + 9.1274 * Channel #.

Spectrum File: C:\USER\DATA\55964-02.CHN
Background File: C:\USER\BKG\B0297346.CHN
Calibration File: C:\USER\CALIB\E0297295.CHN
Library File: C:\USER\ALPHA\ALPHAVIS.ALB

P E A K S

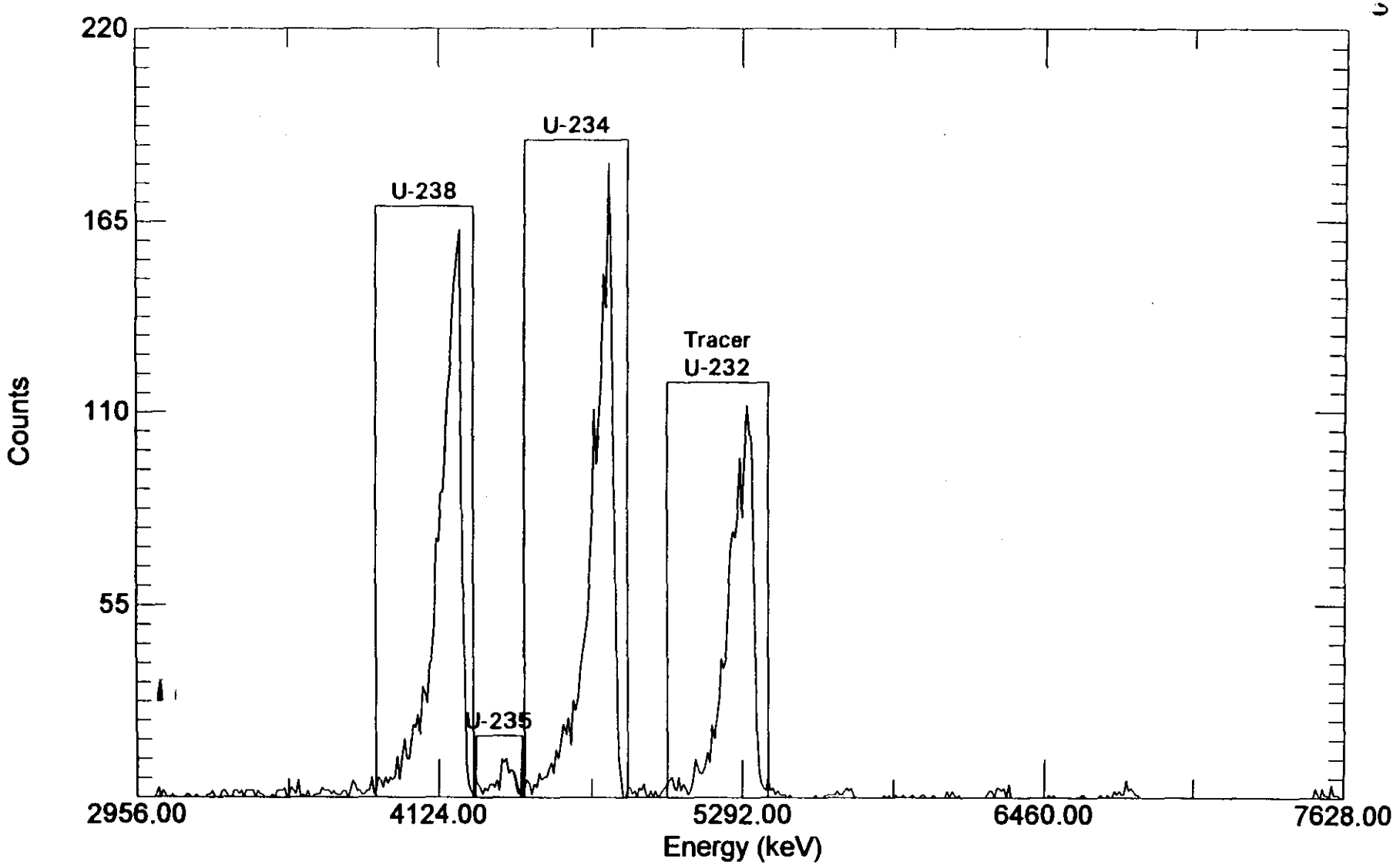
Nuclide	Energy (keV)	Centroid Channel	ROI Low	ROI High	FWHM (keV)	Width (keV)	Gross Sum	BKG Sum	Net CPM
U-234	4,776	199.3	164	207	73	73	1,837	1.67	3.06
U-235	4,396	157.7	144	163	73	73	98	0.83	0.16
U-238	4,196	135.8	101	143	73	73	1,854	0.83	3.09
U-232-tr	5,320	258.9	224	267	73	73	1,370	21.67	2.25

Note: Background count times are for 86,400 seconds (24 Hours). BKG Sum above is the background counts achieved in 24 hours normalized to the sample count time.

Analyzed By: _____ Checked By: _____

55964-02

AlphaVision Relative Region-Of-Interest (Slope Recalibration)



Acquired: 17:49:40 on 15-Dec-97
File: C:\USER\DATA\55964-02.CHN
Sample: 55964DUP2

Real Time: 36001.56 s. Live Time: 36000.00 s.
Detector: #2 AL1-02
Type: Uranium-Isotopic

AlphaVision A36-BI Ver 1.20 12/16/97 3:53:59 AM

Southern Petroleum Laboratories-LAS 576A (AL1)

LAS Child ID:	55964-03
LAS Parent ID:	55964LCS1
Method Type:	Uranium-Isotopic
Analysis Type:	Relative Region-Of-Interest
Acquisition Date:	12/15/97 5:53:47 PM
Aliquot Volume:	0.50000 g
Tracer Amount:	12.00 dpm.

Detector:	AL1-03
Number of Channels:	512
Live Time:	36,000.0 Sec.
Real Time:	36,001.6 Sec.

Detector Efficiency: 23.67 % Chemical Yield: 82.72 %
Total Efficiency: 19.58 %

Adj. Calibration (keV): 2,853.31 + 9.2589 * Channel #.
Init. Calibration (keV): 2,853.31 + 9.2467 * Channel #.

Spectrum File:	C:\USER\DATA\55964-03.CHN
Background File:	C:\USER\BKG\B0397346.CHN
Calibration File:	C:\USER\CALIB\E0397295.CHN
Library File:	C:\USER\ALPHA\ALPHAVIS.ALB

P E A K S

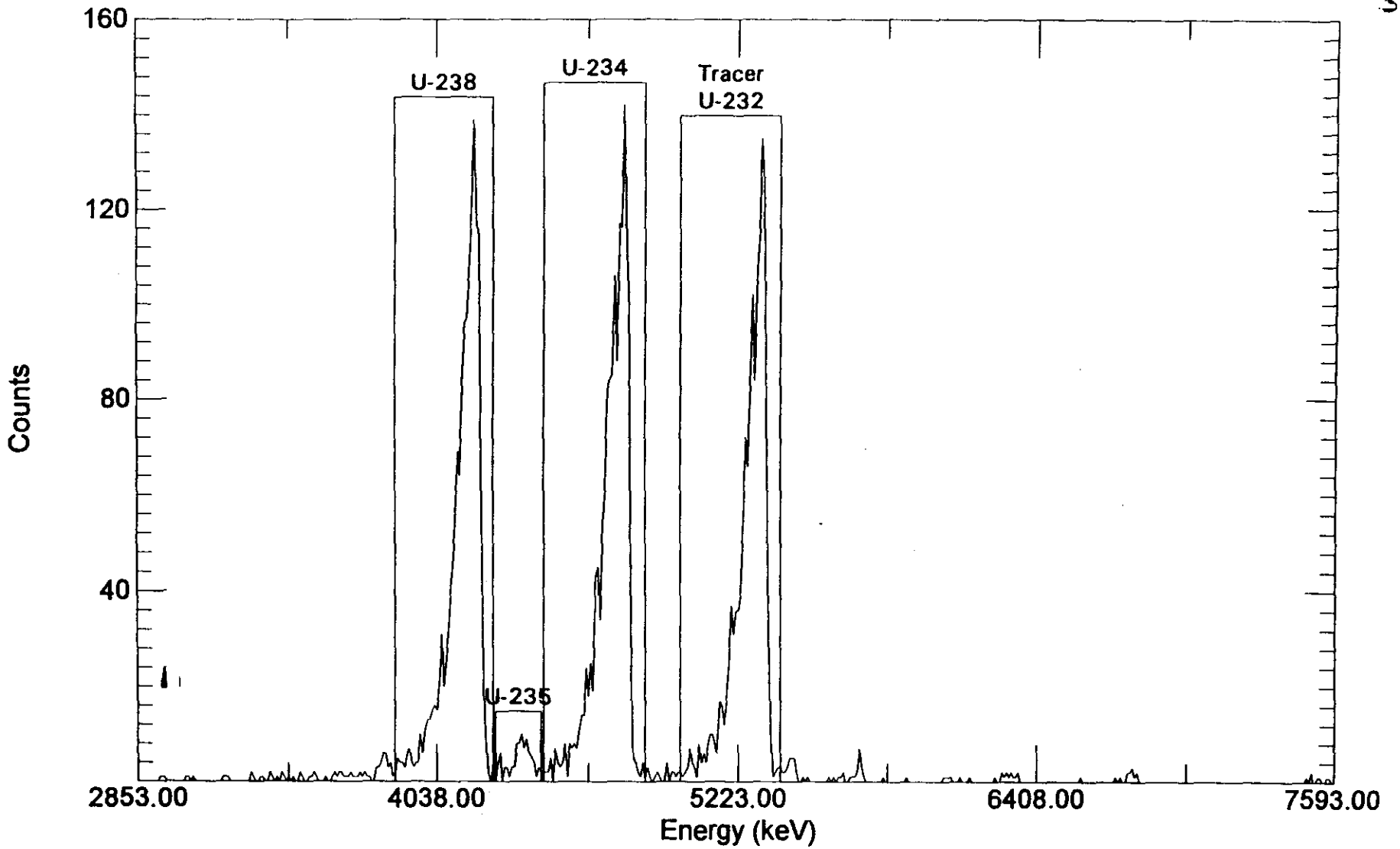
Nuclide	Energy (keV)	Centroid Channel	ROI Low	ROI High	FWHM (keV)	Width (keV)	Gross Sum	BKG Sum	Net CPM
U-234	4,776	207.6	173	216	56	56	1,502	3.33	2.50
U-235	4,396	166.6	153	172	37	37	86	0.83	0.14
U-238	4,196	145.0	110	152	56	56	1,533	0.83	2.55
U-232-tr	5,320	266.4	231	274	74	74	1,433	23.33	2.35

Note: Background count times are for 86,400 seconds (24 Hours). BKG Sum above is the background counts achieved in 24 hours normalized to the sample count time.

Analyzed By: _____ Checked By: _____

55964-03

AlphaVision Relative Region-Of-Interest (Slope Recalibration)



Acquired: 17:53:47 on 15-Dec-97
File: C:\USER\DATA\55964-03.CHN
Sample: 55964LCS1

Real Time: 36001.56 s. Live Time: 36000.00 s.
Detector: #3 AL1-03
Type: Uranium-Isotopic

AlphaVision A36-BI Ver 1.20 12/16/97 3:54:44 AM

Southern Petroleum Laboratories-LAS 576A (AL1)

LAS Child ID:	55964-04
LAS Parent ID:	55964MBB1
Method Type:	Uranium-Isotopic
Analysis Type:	Relative Region-Of-Interest
Acquisition Date:	12/15/97 5:54:35 PM
Aliquot Volume:	0.50000 g
Tracer Amount:	12.00 dpm.

Detector:	AL1-04
Number of Channels:	512
Live Time:	36,000.0 Sec.
Real Time:	36,001.6 Sec.

Detector Efficiency: 24.73 % Chemical Yield: 83.28 %
Total Efficiency: 20.60 %

Adj. Calibration (keV): 2,828.00 + 9.0795 * Channel #.
Init. Calibration (keV): 2,828.00 + 9.0715 * Channel #.

Spectrum File:	C:\USER\DATA\55964-04.CHN
Background File:	C:\USER\BKG\B0497346.CHN
Calibration File:	C:\USER\CALIB\E0497296.CHN
Library File:	C:\USER\ALPHA\ALPHAVIS.ALB

P E A K S

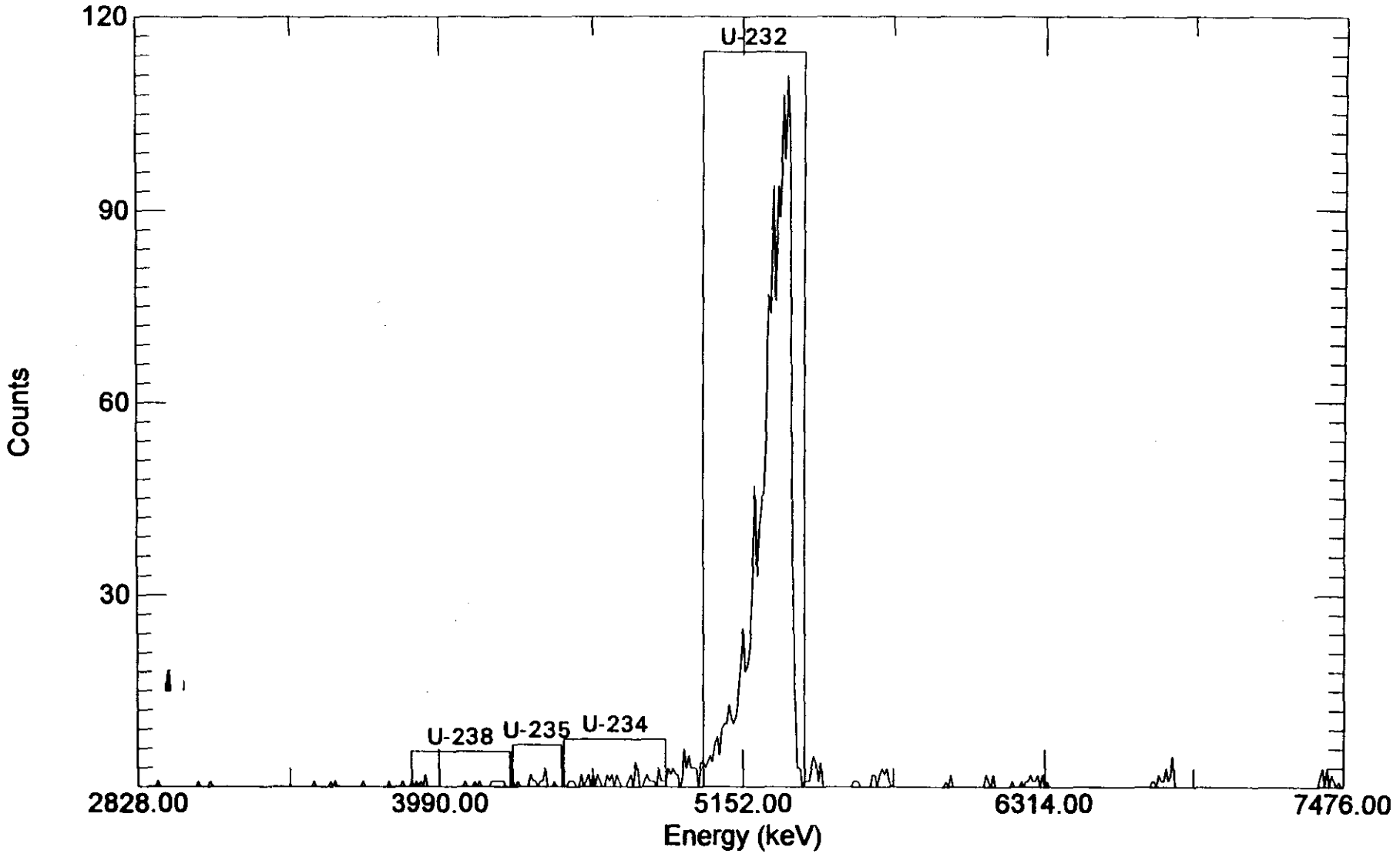
Nuclide	Energy (keV)	Centroid Channel	ROI Low	ROI High	FWHM (keV)	Width (keV)	Gross Sum	BKG Sum	Net CPM
U-234	4,776	214.5	180	223	18	18	43	2.92	0.07
U-235	4,396	172.7	159	179	18	18	12	0.42	0.02
U-238	4,196	150.7	116	158	18	18	14	2.50	0.02
U-232-tr	5,320	274.5	239	282	73	73	1,505	22.08	2.47

Note: Background count times are for 86,400 seconds (24 Hours). BKG Sum above is the background counts achieved in 24 hours normalized to the sample count time.

Analyzed By: _____ Checked By: _____

55964-04

AlphaVision Relative Region-Of-Interest (Slope Recalibration)



Acquired: 17:54:35 on 15-Dec-97
File: C:\USER\DATA\55964-04.CHN
Sample: 55964MBB1

Real Time: 36001.56 s. Live Time: 36000.00 s.
Detector: #4 AL1-04
Type: Uranium-Isotopic

AlphaVision A36-BI Ver 1.20 12/16/97 3:58:03 AM

Southern Petroleum Laboratories-LAS 576A (AL1)

LAS Child ID:	55964-05
LAS Parent ID:	L10981-27
Method Type:	Uranium-Isotopic
Analysis Type:	Relative Region-Of-Interest
Acquisition Date:	12/15/97 5:57:53 PM
Aliquot Volume:	0.51600 g
Tracer Amount:	12.00 dpm.
Detector:	AL1-05
Number of Channels:	512
Live Time:	36,000.0 Sec.
Real Time:	36,001.6 Sec.
Detector Efficiency:	24.29 %
Chemical Yield:	69.53 %
Total Efficiency:	16.89 %
Adj. Calibration (keV):	2,853.01 + 9.1787 * Channel #.
Init. Calibration (keV):	2,853.01 + 9.1659 * Channel #.
Spectrum File:	C:\USER\DATA\55964-05.CHN
Background File:	C:\USER\BKG\B0597346.CHN
Calibration File:	C:\USER\CALIB\E0597296.CHN
Library File:	C:\USER\ALPHA\ALPHAVIS.ALB

P E A K S

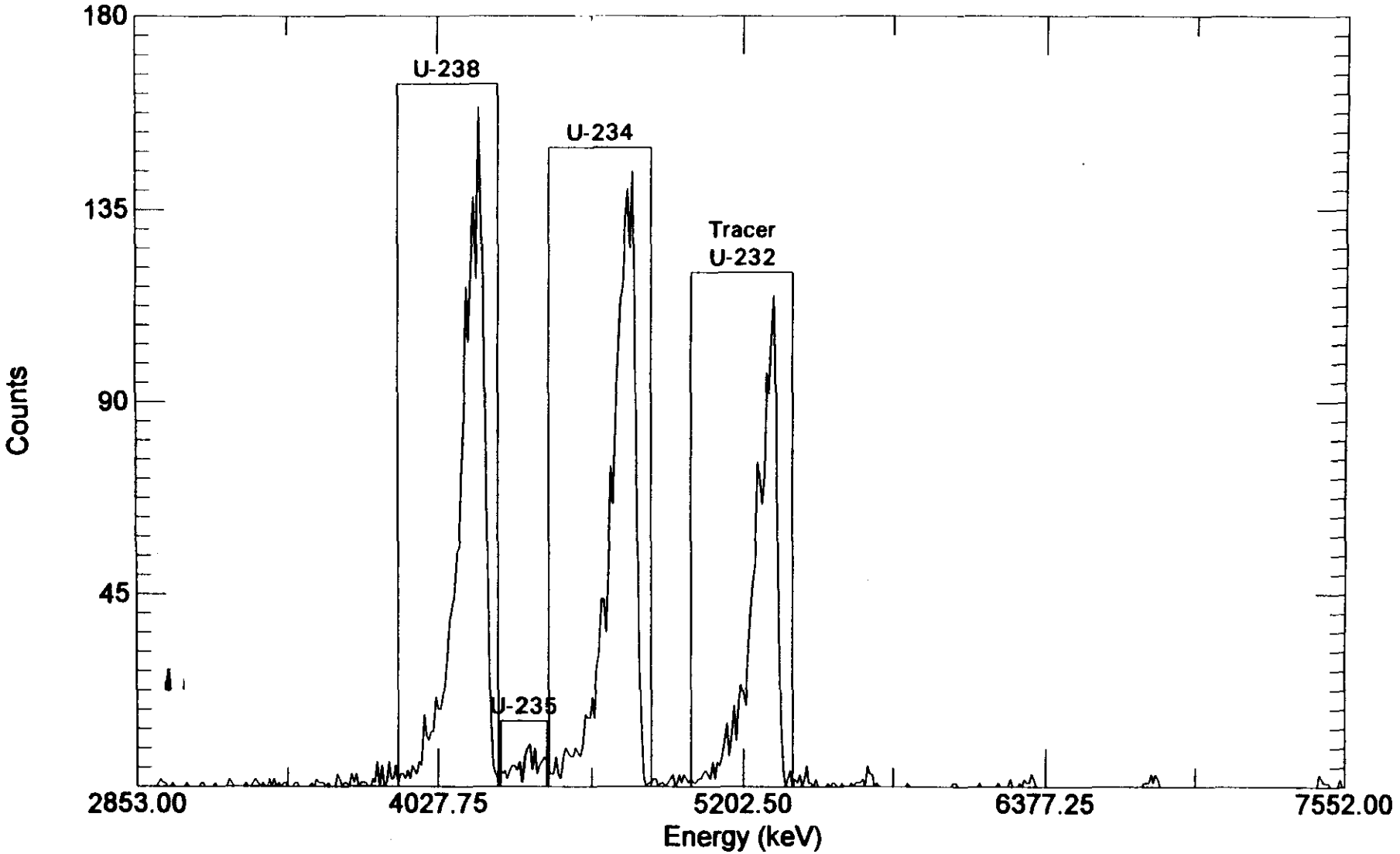
Nuclide	Energy (keV)	Centroid Channel	ROI Low	ROI High	FWHM (keV)	Width (keV)	Gross Sum	BKG Sum	Net CPM
U-234	4,776	209.5	174	217	73	73	1,755	3.75	2.92
U-235	4,396	168.1	154	173	37	37	104	0.83	0.17
U-238	4,196	146.3	111	153	73	73	1,799	1.67	3.00
U-232-tr	5,320	268.8	234	277	55	55	1,234	17.92	2.03

Note: Background count times are for 86,400 seconds (24 Hours). BKG Sum above is the background counts achieved in 24 hours normalized to the sample count time.

Analyzed By: _____ Checked By: _____

55964-05

AlphaVision Relative Region-Of-Interest (Slope Recalibration)



Acquired: 17:57:53 on 15-Dec-97
File: C:\USER\DATA\55964-05.CHN
Sample: L10981-27

Real Time: 36001.56 s. Live Time: 36000.00 s.
Detector: #5 AL1-05
Type: Uranium-Isotopic

AlphaVision A36-BI Ver 1.20 12/16/97 3:59:23 AM

Southern Petroleum Laboratories-LAS 576A (AL1)

LAS Child ID:	55964-06
LAS Parent ID:	L10981-28
Method Type:	Uranium-Isotopic
Analysis Type:	Relative Region-Of-Interest
Acquisition Date:	12/15/97 5:59:12 PM
Aliquot Volume:	0.53800 g
Tracer Amount:	12.00 dpm.
Detector:	AL1-07
Number of Channels:	512
Live Time:	36,000.0 Sec.
Real Time:	36,001.6 Sec.
Detector Efficiency:	20.87 %
Chemical Yield:	75.80 %
Total Efficiency:	15.82 %
Adj. Calibration (keV):	2,827.18 + 8.7897 * Channel #.
Init. Calibration (keV):	2,827.18 + 8.7891 * Channel #.
Spectrum File:	C:\USER\DATA\55964-06.CHN
Background File:	C:\USER\BKG\B0797346.CHN
Calibration File:	C:\USER\CALIB\E0797296.CHN
Library File:	C:\USER\ALPHA\ALPHAVIS.ALB

P E A K S

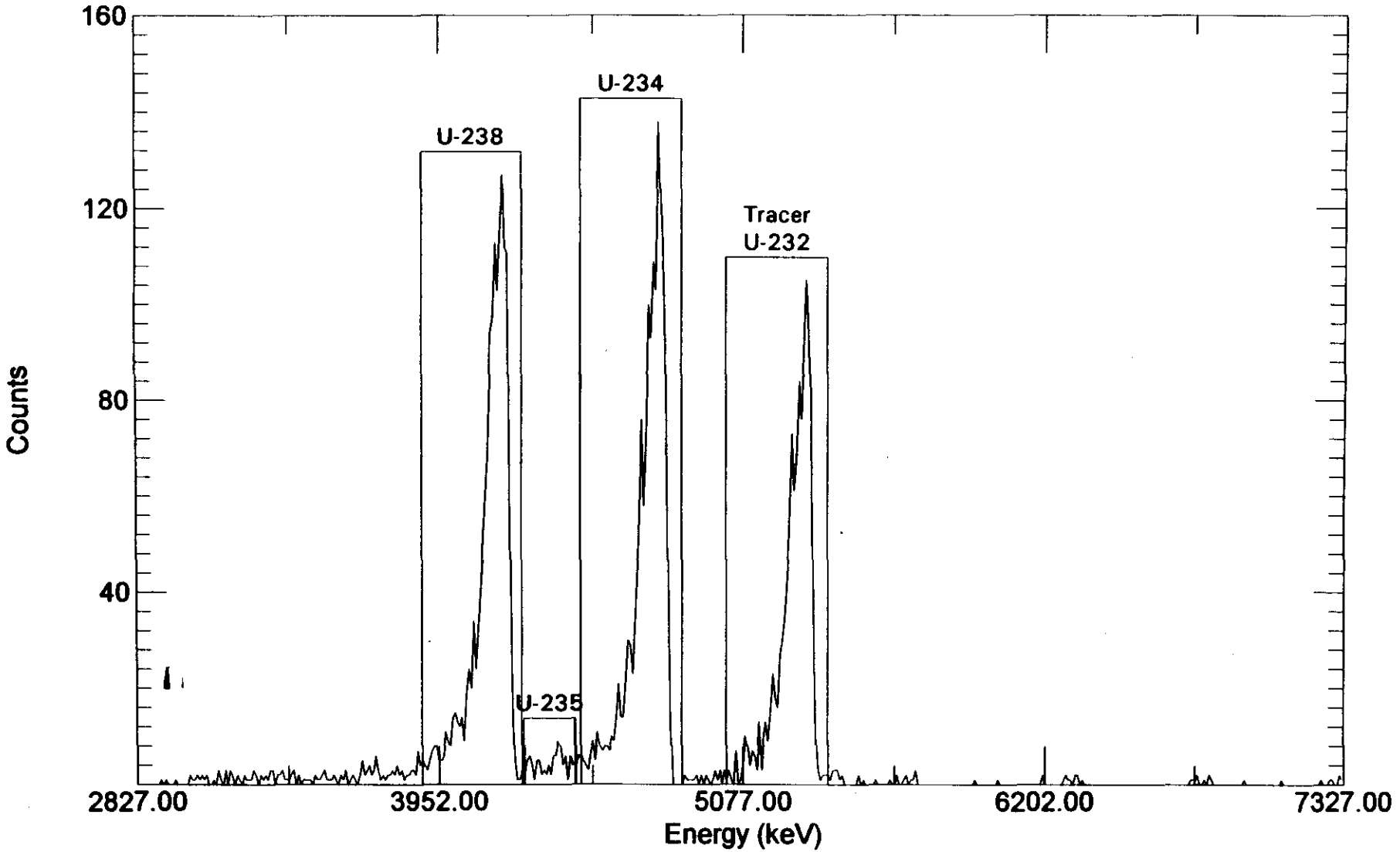
Nuclide	Energy (keV)	Centroid Channel	ROI Low	ROI High	FWHM (keV)	Width (keV)	Gross Sum	BKG Sum	Net CPM
U-234	4,776	221.7	187	230	53	53	1,539	2.92	2.56
U-235	4,396	178.5	164	185	53	53	95	1.25	0.16
U-238	4,196	155.7	121	163	70	70	1,519	1.67	2.53
U-232-tr	5,320	283.6	249	292	53	53	1,154	15.00	1.90

Note: Background count times are for 86,400 seconds (24 Hours). BKG Sum above is the background counts achieved in 24 hours normalized to the sample count time.

Analyzed By: _____ Checked By: _____

55964-06

AlphaVision Relative Region-Of-Interest (Slope Recalibration)



Acquired: 17:59:12 on 15-Dec-97
File: C:\USER\DATA\55964-06.CHN
Sample: L10981-28

Real Time: 36001.58 s. Live Time: 36000.00 s.
Detector: #7 AL1-07
Type: Uranium-Isotopic

AlphaVision A36-BI Ver 1.20 12/16/97 4:02:22 AM

Southern Petroleum Laboratories-LAS 576A (AL1)

LAS Child ID:	55964-07
LAS Parent ID:	L10981-29
Method Type:	Uranium-Isotopic
Analysis Type:	Relative Region-Of-Interest
Acquisition Date:	12/15/97 6:02:12 PM
Aliquot Volume:	0.56580 g
Tracer Amount:	12.00 dpm.
Detector:	AL1-08
Number of Channels:	512
Live Time:	36,000.0 Sec.
Real Time:	36,001.6 Sec.
Detector Efficiency:	25.08 %
Chemical Yield:	45.48 %
Total Efficiency:	11.41 %
Adj. Calibration (keV):	2,856.23 + 8.9048 * Channel #.
Init. Calibration (keV):	2,856.23 + 8.8701 * Channel #.
Spectrum File:	C:\USER\DATA\55964-07.CHN
Background File:	C:\USER\BKG\B0897346.CHN
Calibration File:	C:\USER\CALIB\E0897296.CHN
Library File:	C:\USER\ALPHA\ALPHAVIS.ALB

P E A K S

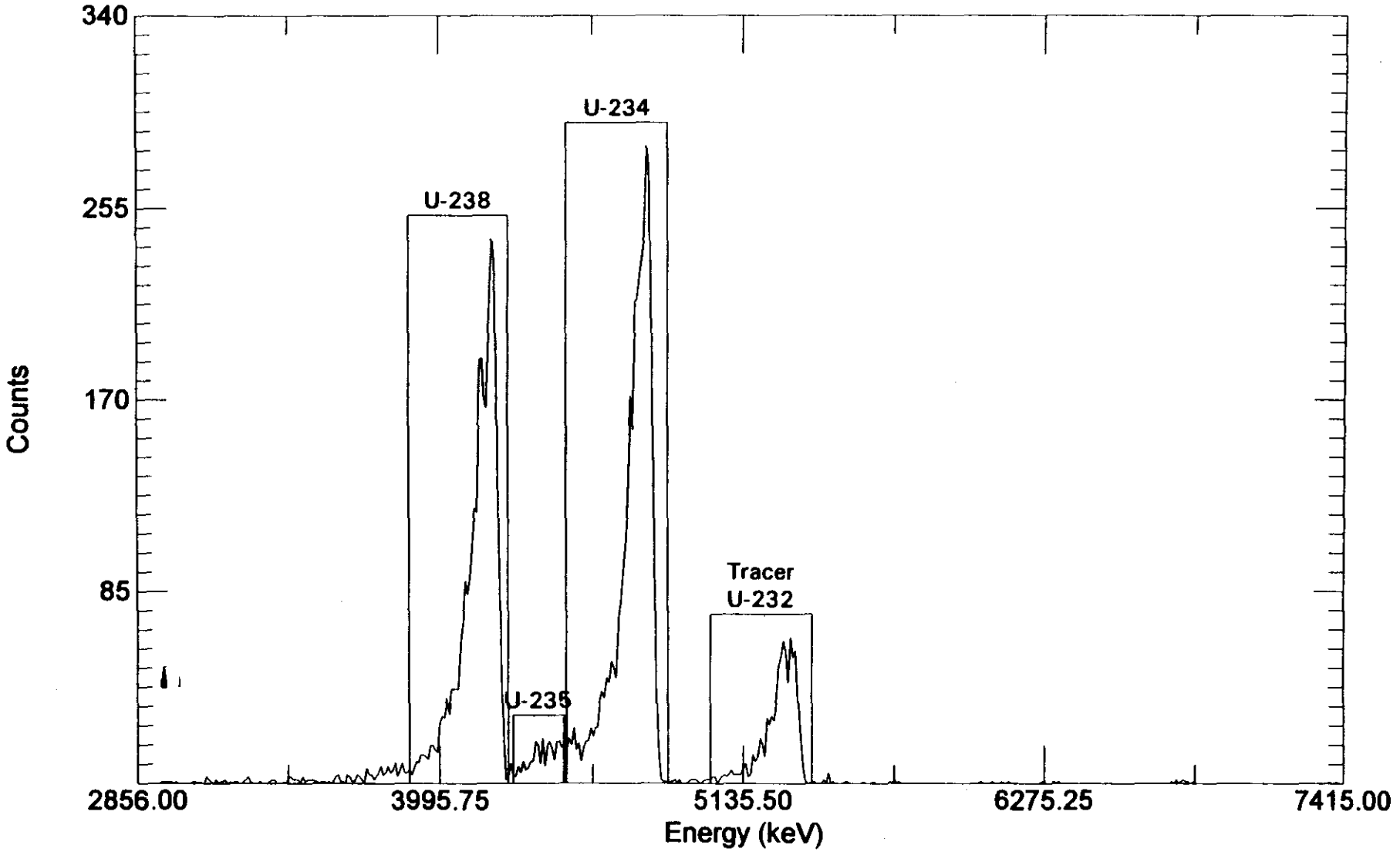
Nuclide	Energy (keV)	Centroid Channel	ROI Low	ROI High	FWHM (keV)	Width (keV)	Gross Sum	BKG Sum	Net CPM
U-234	4,776	215.6	181	224	53	53	3,538	2.92	5.89
U-235	4,396	172.9	159	180	267	267	271	1.25	0.45
U-238	4,196	150.5	115	157	71	71	2,988	1.25	4.98
U-232-tr	5,320	276.7	242	285	71	71	828	6.67	1.37

Note: Background count times are for 86,400 seconds (24 Hours). BKG Sum above is the background counts achieved in 24 hours normalized to the sample count time.

Analyzed By: _____ Checked By: _____

55964-07

AlphaVision Relative Region-Of-Interest (Slope Recalibration)



Acquired: 18:02:12 on 15-Dec-97
File: C:\USER\DATA\55964-07.CHN
Sample: L10981-29

Real Time: 36001.58 s. Live Time: 36000.00 s.
Detector: #8 AL1-08
Type: Uranium-Isotopic

AlphaVision A36-BI Ver 1.20 12/16/97 4:03:40 AM

Southern Petroleum Laboratories-LAS 576A (AL1)

LAS Child ID:	55964-08
LAS Parent ID:	L10981-30
Method Type:	Uranium-Isotopic
Analysis Type:	Relative Region-Of-Interest
Acquisition Date:	12/15/97 6:03:29 PM
Aliquot Volume:	0.51190 g
Tracer Amount:	12.00 dpm.
Detector:	AL1-09
Number of Channels:	512
Live Time:	36,000.0 Sec.
Real Time:	36,001.6 Sec.
Detector Efficiency:	25.61 %
Chemical Yield:	77.76 %
Total Efficiency:	19.91 %
Adj. Calibration (keV):	2,941.95 + 8.9326 * Channel #.
Init. Calibration (keV):	2,941.95 + 8.9245 * Channel #.
Spectrum File:	C:\USER\DATA\55964-08.CHN
Background File:	C:\USER\BKG\B0997346.CHN
Calibration File:	C:\USER\CALIB\E0997296.CHN
Library File:	C:\USER\ALPHA\ALPHAVIS.ALB

P E A K S

Nuclide	Energy (keV)	Centroid Channel	ROI Low	ROI High	FWHM (keV)	Width (keV)	Gross Sum	BKG Sum	Net CPM
U-234	4,776	205.3	170	213	71	71	1,137	5.83	1.89
U-235	4,396	162.8	149	169	36	36	49	3.33	0.08
U-238	4,196	140.4	105	147	71	71	1,059	2.08	1.76
U-232-tr	5,320	266.3	231	274	71	71	1,460	26.25	2.39

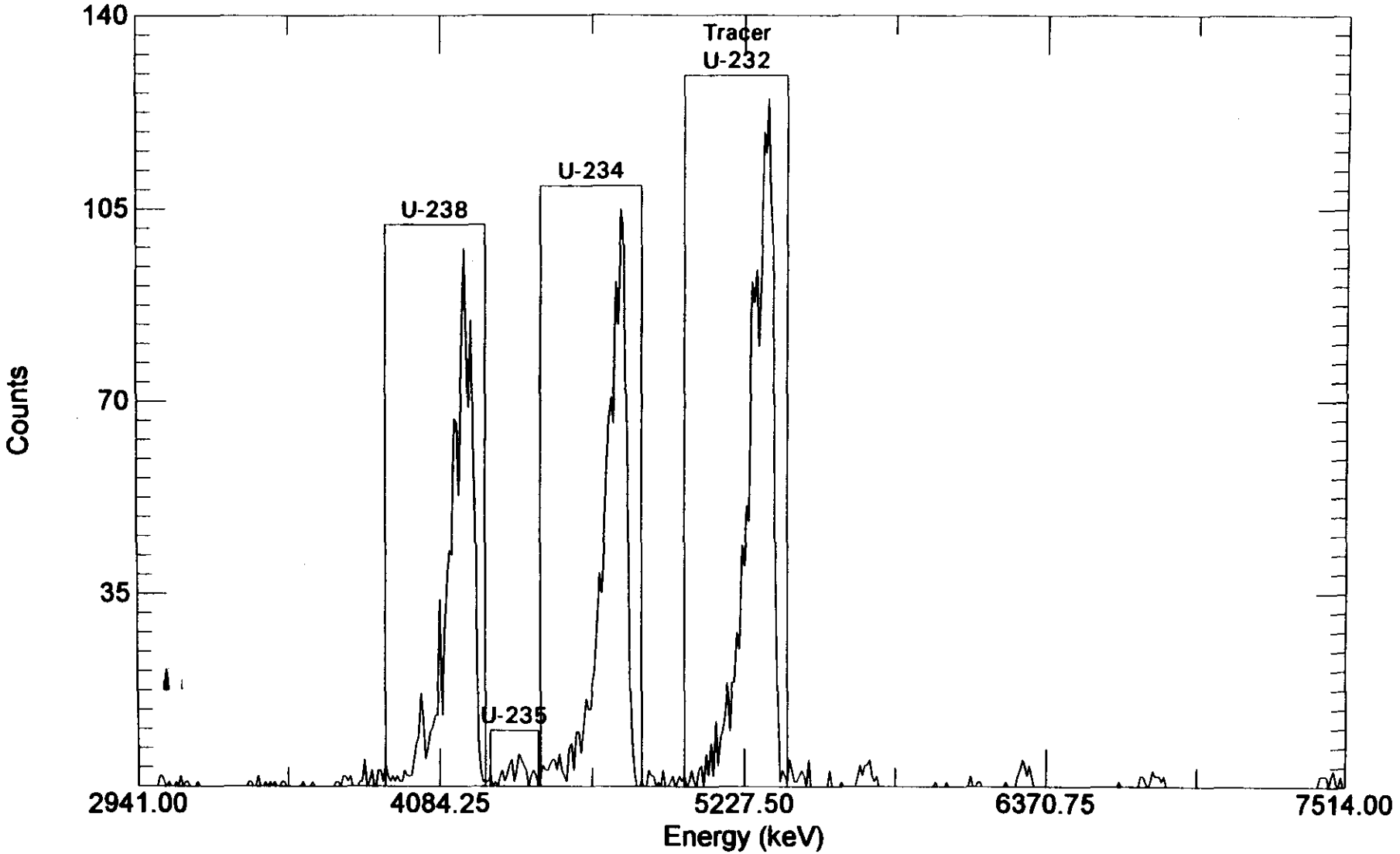
Note: Background count times are for 86,400 seconds (24 Hours). BKG Sum above is the background counts achieved in 24 hours normalized to the sample count time.

Analyzed By: _____ Checked By: _____

000051

55964-08

AlphaVision Relative Region-Of-Interest (Slope Recalibration)



Acquired: 18:03:29 on 15-Dec-97
File: C:\USER\DATA\55964-08.CHN
Sample: L10981-30

Real Time: 36001.58 s. Live Time: 36000.00 s.
Detector: #9 AL1-09
Type: Uranium-Isotopic

AlphaVision A36-BI Ver 1.20 12/16/97 4:05:19 AM

Southern Petroleum Laboratories-LAS 576A (AL1)

LAS Child ID:	55964-09
LAS Parent ID:	L10981-31
Method Type:	Uranium-Isotopic
Analysis Type:	Relative Region-Of-Interest
Acquisition Date:	12/15/97 6:05:09 PM
Aliquot Volume:	0.55820 g
Tracer Amount:	12.00 dpm.
Detector:	AL1-11
Number of Channels:	512
Live Time:	36,000.0 Sec.
Real Time:	36,001.6 Sec.
Detector Efficiency:	24.05 %
Chemical Yield:	69.28 %
Total Efficiency:	16.66 %
Adj. Calibration (keV):	2,911.71 + 9.1196 * Channel #.
Init. Calibration (keV):	2,911.71 + 9.1019 * Channel #.
Spectrum File:	C:\USER\DATA\55964-09.CHN
Background File:	C:\USER\BKG\B1197346.CHN
Calibration File:	C:\USER\CALIB\E1197296.CHN
Library File:	C:\USER\ALPHA\ALPHAVIS.ALB

P E A K S

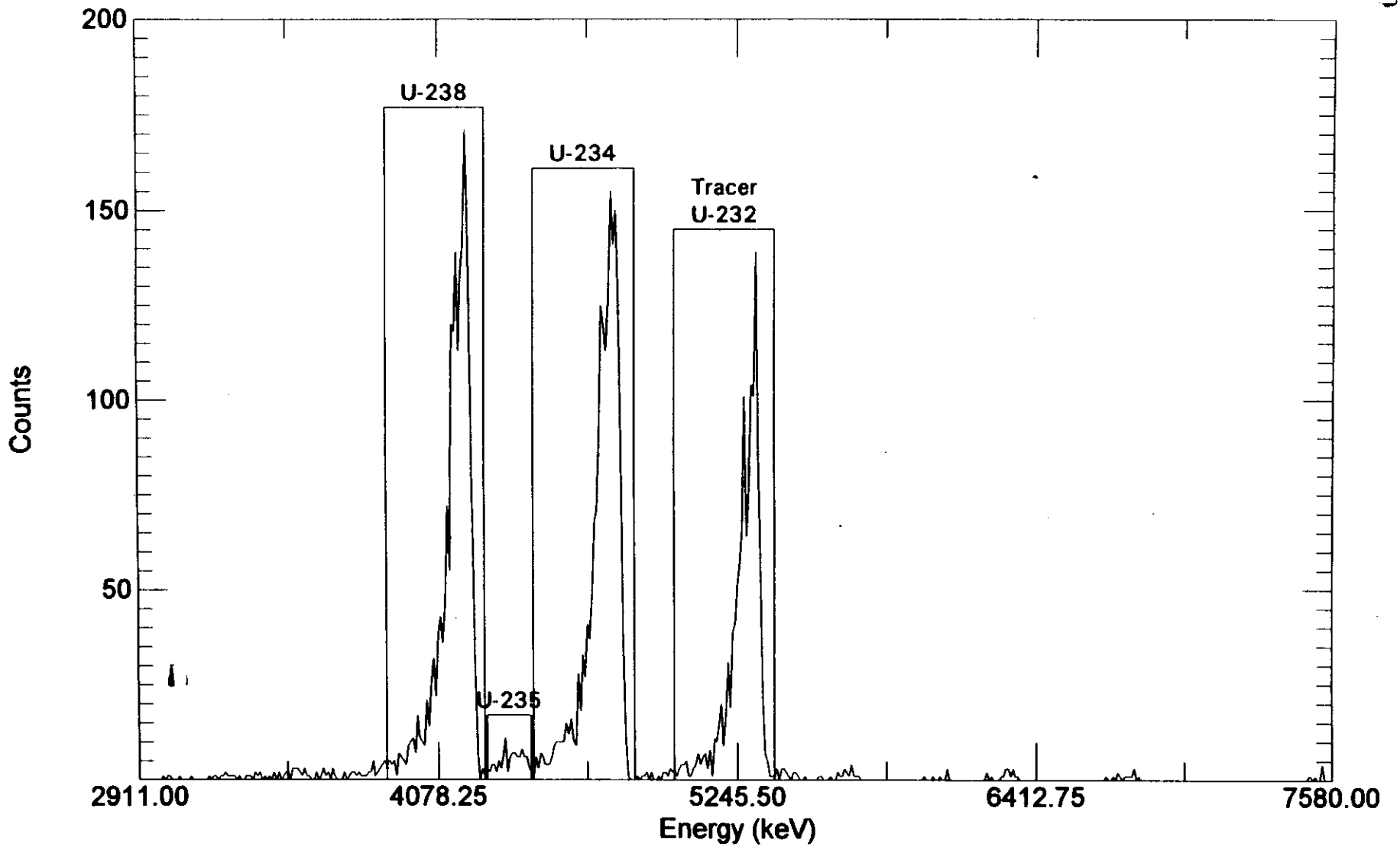
Nuclide	Energy (keV)	Centroid Channel	ROI Low	ROI High	FWHM (keV)	Width (keV)	Gross Sum	BKG Sum	Net CPM
U-234	4,776	204.4	169	212	73	73	1,825	6.25	3.03
U-235	4,396	162.8	149	168	91	91	99	0.00	0.17
U-238	4,196	140.8	106	148	55	55	1,826	2.50	3.04
U-232-tr	5,320	264.1	229	272	55	55	1,218	18.33	2.00

Note: Background count times are for 86,400 seconds (24 Hours). BKG Sum above is the background counts achieved in 24 hours normalized to the sample count time.

Analyzed By: _____ Checked By: _____

55964-09

AlphaVision Relative Region-Of-Interest (Slope Recalibration)



Acquired: 18:05:09 on 15-Dec-97
File: C:\USER\DATA\55964-09.CHN
Sample: L10981-31

Real Time: 36001.58 s. Live Time: 36000.00 s.
Detector: #11 AL1-11
Type: Uranium-Isotopic

AlphaVision A36-BI Ver 1.20 12/16/97 4:06:10 AM

Southern Petroleum Laboratories-LAS 576A (AL1)

LAS Child ID:	55964-10
LAS Parent ID:	L10981-32
Method Type:	Uranium-Isotopic
Analysis Type:	Relative Region-Of-Interest
Acquisition Date:	12/15/97 6:05:59 PM
Aliquot Volume:	0.56760 g
Tracer Amount:	12.00 dpm.
Detector:	AL1-12
Number of Channels:	512
Live Time:	36,000.0 Sec.
Real Time:	36,001.6 Sec.
Detector Efficiency:	25.21 %
Chemical Yield:	46.20 %
Total Efficiency:	11.65 %
Adj. Calibration (keV):	2,887.84 + 9.0347 * Channel #.
Init. Calibration (keV):	2,887.84 + 9.0059 * Channel #.
Spectrum File:	C:\USER\DATA\55964-10.CHN
Background File:	C:\USER\BKG\B1297346.CHN
Calibration File:	C:\USER\CALIB\E1297300.CHN
Library File:	C:\USER\ALPHA\ALPHAVIS.ALB

P E A K S

Nuclide	Energy (keV)	Centroid Channel	ROI Low	ROI High	FWHM (keV)	Width (keV)	Gross Sum	BKG Sum	Net CPM
U-234	4,776	209.0	174	217	54	54	3,048	5.00	5.07
U-235	4,396	166.9	153	173	90	90	182	1.25	0.30
U-238	4,196	144.8	110	152	54	54	3,090	3.75	5.14
U-232-tr	5,320	269.2	234	277	72	72	856	17.50	1.40

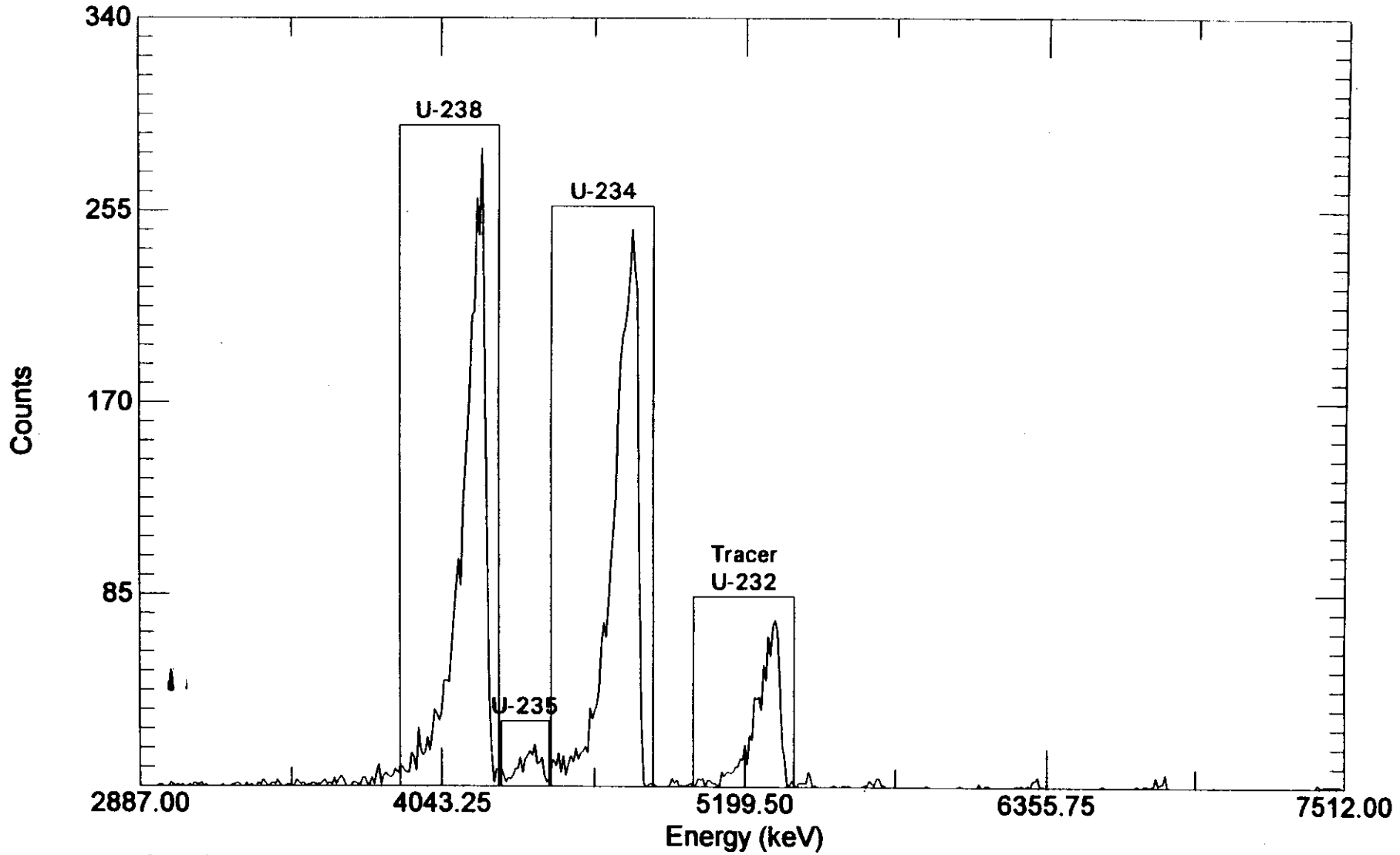
Note: Background count times are for 86,400 seconds (24 Hours). BKG Sum above is the background counts achieved in 24 hours normalized to the sample count time.

Analyzed By: _____ Checked By: _____

000055

55964-10

AlphaVision Relative Region-Of-Interest (Slope Recalibration)



Acquired: 18:05:59 on 15-Dec-97
File: C:\USER\DATA\55964-10.CHN
Sample: L10981-32

Real Time: 36001.58 s. Live Time: 36000.00 s.
Detector: #12 AL1-12
Type: Uranium-Isotopic

AlphaVision A36-BI Ver 1.20 12/16/97 4:06:59 AM

Southern Petroleum Laboratories-LAS 576A (AL1)

LAS Child ID:	55964-11
LAS Parent ID:	L10981-33
Method Type:	Uranium-Isotopic
Analysis Type:	Relative Region-Of-Interest
Acquisition Date:	12/15/97 6:06:49 PM
Aliquot Volume:	0.52980 g
Tracer Amount:	12.00 dpm.
Detector:	AL1-13
Number of Channels:	512
Live Time:	36,000.0 Sec.
Real Time:	36,001.6 Sec.
Detector Efficiency:	23.31 %
Chemical Yield:	88.40 %
Total Efficiency:	20.61 %
Adj. Calibration (keV):	2,923.37 + 8.8283 * Channel #.
Init. Calibration (keV):	2,923.37 + 8.7937 * Channel #.
Spectrum File:	C:\USER\DATA\55964-11.CHN
Background File:	C:\USER\BKG\B1397346.CHN
Calibration File:	C:\USER\CALIB\E1397300.CHN
Library File:	C:\USER\ALPHA\ALPHAVIS.ALB

P E A K S

Nuclide	Energy (keV)	Centroid Channel	ROI Low	ROI High	FWHM (keV)	Width (keV)	Gross Sum	BKG Sum	Net CPM
U-234	4,776	209.8	175	218	53	53	134	5.83	0.21
U-235	4,396	166.8	153	174	18	18	16	2.08	0.02
U-238	4,196	144.2	109	151	53	53	110	0.83	0.18
U-232-tr	5,320	271.5	237	280	71	71	1,502	18.33	2.47

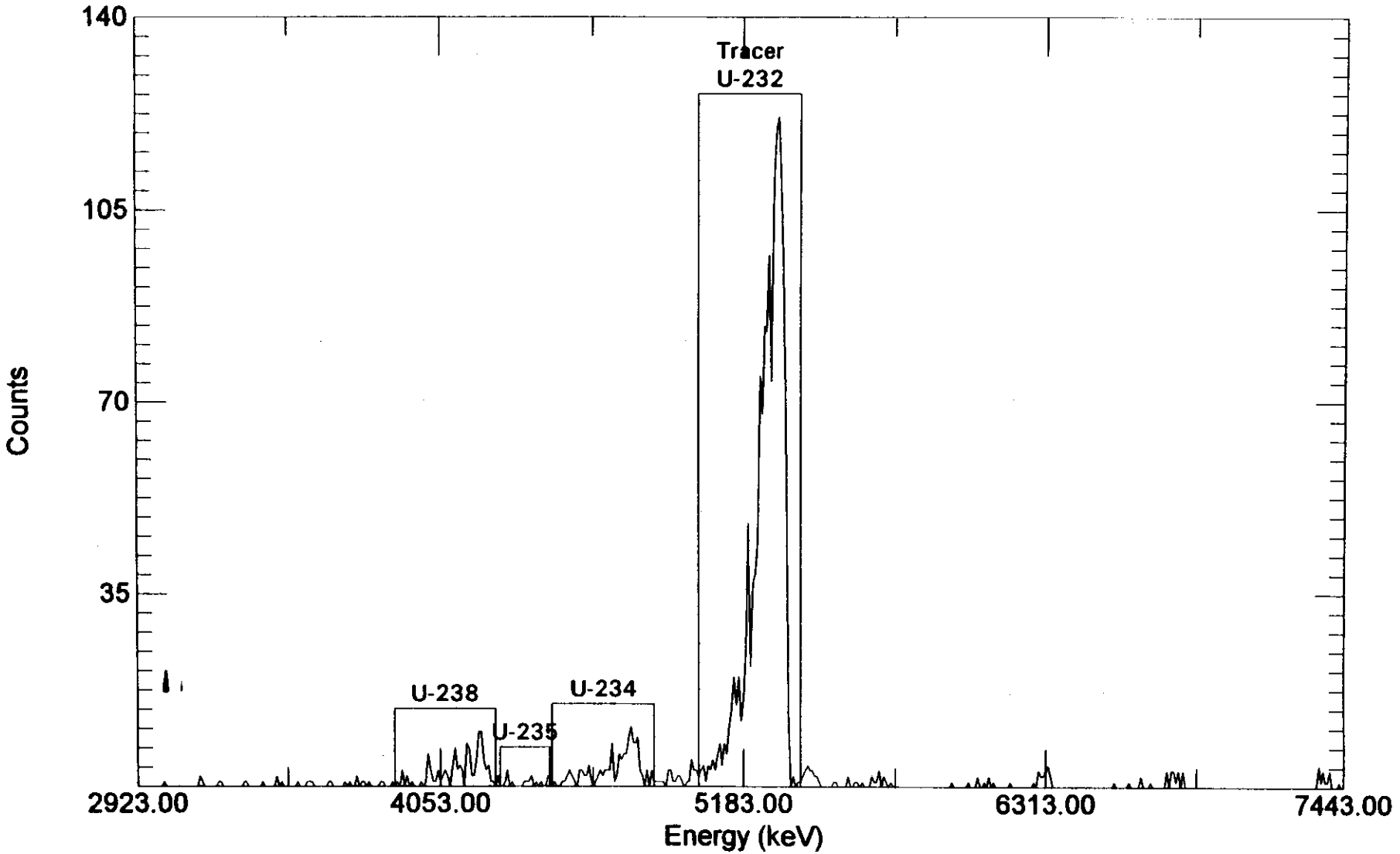
Note: Background count times are for 86,400 seconds (24 Hours). BKG Sum above is the background counts achieved in 24 hours normalized to the sample count time.

Analyzed By: _____ Checked By: _____

000057

55964-11

AlphaVision Relative Region-Of-Interest (Slope Recalibration)



Acquired: 18:06:49 on 15-Dec-97
File: C:\USER\DATA\55964-11.CHN
Sample: L10981-33

Real Time: 36001.56 s. Live Time: 36000.00 s.
Detector: #13 AL1-13
Type: Uranium-Isotopic

AlphaVision A36-BI Ver 1.20 12/16/97 4:09:00 AM

Southern Petroleum Laboratories-LAS 576A (AL1)

LAS Child ID:	55964-12
LAS Parent ID:	L10981-34
Method Type:	Uranium-Isotopic
Analysis Type:	Relative Region-Of-Interest
Acquisition Date:	12/15/97 6:08:50 PM
Aliquot Volume:	0.50730 g
Tracer Amount:	12.00 dpm.
Detector:	AL1-14
Number of Channels:	512
Live Time:	36,000.0 Sec.
Real Time:	36,001.6 Sec.
Detector Efficiency:	23.50 %
Chemical Yield:	79.48 %
Total Efficiency:	18.68 %
Adj. Calibration (keV):	2,920.74 + 8.8926 * Channel #.
Init. Calibration (keV):	2,920.74 + 8.8738 * Channel #.
Spectrum File:	C:\USER\DATA\55964-12.CHN
Background File:	C:\USER\BKG\B1497346.CHN
Calibration File:	C:\USER\CALIB\E1497300.CHN
Library File:	C:\USER\ALPHA\ALPHAVIS.ALB

P E A K S

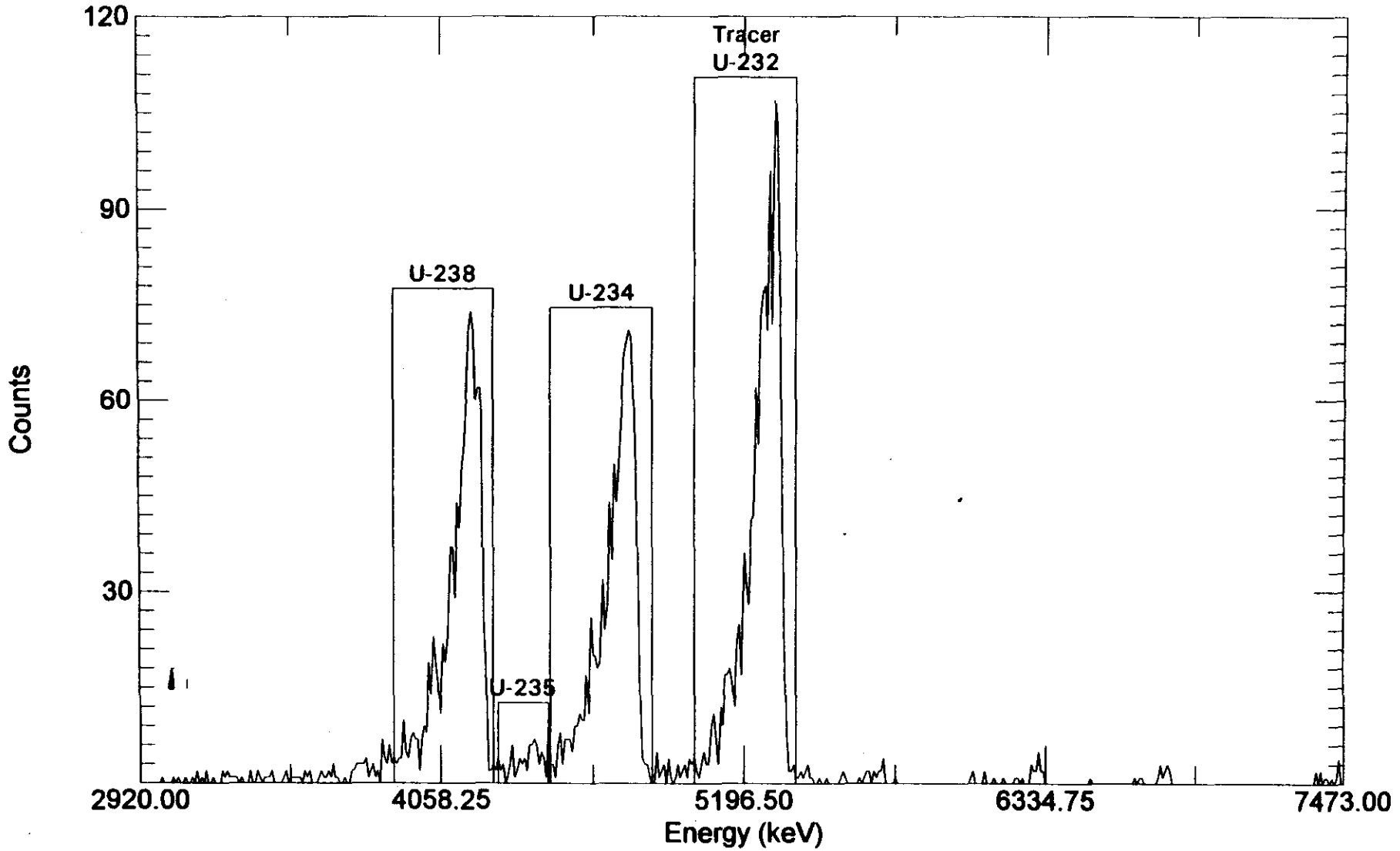
Nuclide	Energy (keV)	Centroid Channel	ROI Low	ROI High	FWHM (keV)	Width (keV)	Gross Sum	BKG Sum	Net CPM
U-234	4,776	208.6	174	217	53	53	1,042	5.83	1.73
U-235	4,396	165.9	152	173	71	71	82	2.50	0.13
U-238	4,196	143.4	108	150	71	71	1,055	1.67	1.76
U-232-tr	5,320	269.8	235	278	71	71	1,366	21.25	2.24

Note: Background count times are for 86,400 seconds (24 Hours). BKG Sum above is the background counts achieved in 24 hours normalized to the sample count time.

Analyzed By: _____ Checked By: _____

55964-12

AlphaVision Relative Region-Of-Interest (Slope Recalibration)



Acquired: 18:08:50 on 15-Dec-97
File: C:\USER\DATA\55964-12.CHN
Sample: L10981-34

Real Time: 36001.56 s. Live Time: 36000.00 s.
Detector: #14 AL1-14
Type: Uranium-Isotopic

AlphaVision A36-BI Ver 1.20 12/16/97 4:10:34 AM

Southern Petroleum Laboratories-LAS 576A (AL1)

LAS Child ID:	55964-14
LAS Parent ID:	L10981-36
Method Type:	Uranium-Isotopic
Analysis Type:	Relative Region-Of-Interest
Acquisition Date:	12/15/97 6:10:24 PM
Aliquot Volume:	0.53450 g
Tracer Amount:	12.00 dpm.
Detector:	AL1-17
Number of Channels:	512
Live Time:	36,000.0 Sec.
Real Time:	36,001.7 Sec.
Detector Efficiency:	24.40 %
Chemical Yield:	81.64 %
Total Efficiency:	19.92 %
Adj. Calibration (keV):	2,902.14 + 8.8228 * Channel #.
Init. Calibration (keV):	2,902.14 + 8.8079 * Channel #.
Spectrum File:	C:\USER\DATA\55964-14.CHN
Background File:	C:\USER\BKG\B1797346.CHN
Calibration File:	C:\USER\CALIB\E1797301.CHN
Library File:	C:\USER\ALPHA\ALPHAVIS.ALB

P E A K S

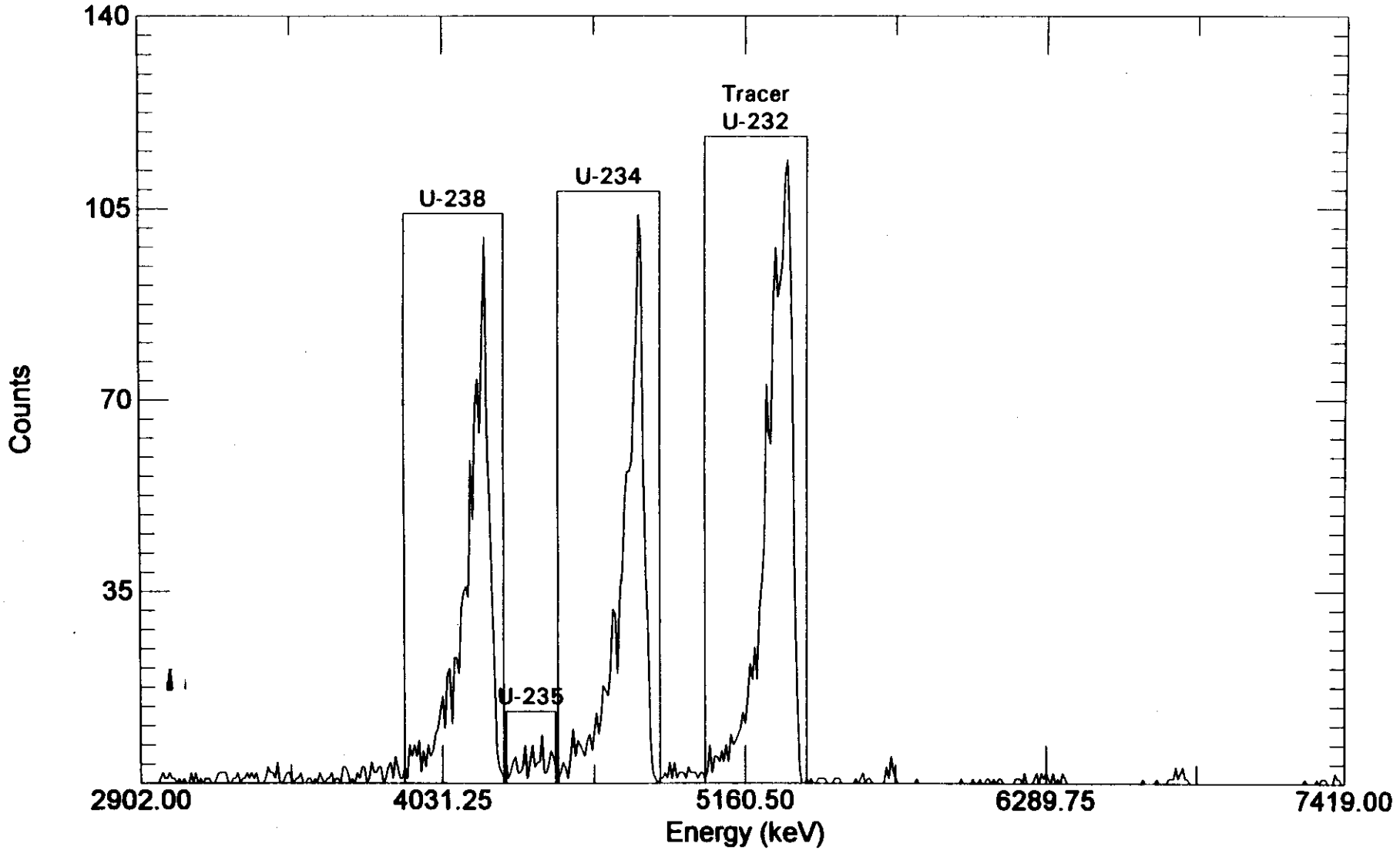
Nuclide	Energy (keV)	Centroid Channel	ROI Low	ROI High	FWHM (keV)	Width (keV)	Gross Sum	BKG Sum	Net CPM
U-234	4,776	212.4	177	220	53	53	1,076	2.92	1.79
U-235	4,396	169.3	155	176	18	18	84	0.83	0.14
U-238	4,196	146.6	112	154	53	53	1,064	5.00	1.76
U-232-tr	5,320	274.1	239	282	71	71	1,451	16.67	2.39

Note: Background count times are for 86,400 seconds (24 Hours). BKG Sum above is the background counts achieved in 24 hours normalized to the sample count time.

Analyzed By: _____ Checked By: _____

55964-14

AlphaVision Relative Region-Of-Interest (Slope Recalibration)



Acquired: 18:10:24 on 15-Dec-97
File: C:\USER\DATA\55964-14.CHN
Sample: L10981-36

Real Time: 36001.70 s. Live Time: 36000.00 s.
Detector: #17 AL1-17
Type: Uranium-Isotopic

000062

AlphaVision A36-BI Ver 1.20 12/16/97 4:11:34 AM

Southern Petroleum Laboratories-LAS 576A (AL1)

LAS Child ID:	55964-15
LAS Parent ID:	L10981-37
Method Type:	Uranium-Isotopic
Analysis Type:	Relative Region-Of-Interest
Acquisition Date:	12/15/97 6:11:22 PM
Aliquot Volume:	0.52350 g
Tracer Amount:	12.00 dpm.
Detector:	AL1-18
Number of Channels:	512
Live Time:	36,000.0 Sec.
Real Time:	36,001.7 Sec.
Detector Efficiency:	23.73 %
Chemical Yield:	66.66 %
Total Efficiency:	15.82 %
Adj. Calibration (keV):	2,918.36 + 8.9138 * Channel #.
Init. Calibration (keV):	2,918.36 + 8.8737 * Channel #.
Spectrum File:	C:\USER\DATA\55964-15.CHN
Background File:	C:\USER\BKG\B1897346.CHN
Calibration File:	C:\USER\CALIB\E1897301.CHN
Library File:	C:\USER\ALPHA\ALPHAVIS.ALB

P E A K S

Nuclide	Energy (keV)	Centroid Channel	ROI Low	ROI High	FWHM (keV)	Width (keV)	Gross Sum	BKG Sum	Net CPM
U-234	4,776	208.4	173	216	89	89	538	4.17	0.89
U-235	4,396	165.8	152	172	53	53	54	2.50	0.09
U-238	4,196	143.3	108	150	71	71	516	2.08	0.86
U-232-tr	5,320	269.5	234	277	71	71	1,154	15.00	1.90

Note: Background count times are for 86,400 seconds (24 Hours). BKG Sum above is the background counts achieved in 24 hours normalized to the sample count time.

Analyzed By: _____ Checked By: _____

AlphaVision A36-BI Ver 1.20 12/16/97 4:12:17 AM

Southern Petroleum Laboratories-LAS 576A (AL1)

LAS Child ID:	55964-16
LAS Parent ID:	L10981-38
Method Type:	Uranium-Isotopic
Analysis Type:	Relative Region-Of-Interest
Acquisition Date:	12/15/97 6:12:07 PM
Aliquot Volume:	0.53470 g
Tracer Amount:	12.00 dpm.
Detector:	AL1-19
Number of Channels:	512
Live Time:	36,000.0 Sec.
Real Time:	36,001.7 Sec.
Detector Efficiency:	21.84 %
Chemical Yield:	70.03 %
Total Efficiency:	15.29 %
Adj. Calibration (keV):	2,913.57 + 8.8782 * Channel #.
Init. Calibration (keV):	2,913.57 + 8.8476 * Channel #.
Spectrum File:	C:\USER\DATA\55964-16.CHN
Background File:	C:\USER\BKG\B1997346.CHN
Calibration File:	C:\USER\CALIB\E1997301.CHN
Library File:	C:\USER\ALPHA\ALPHAVIS.ALB

P E A K S

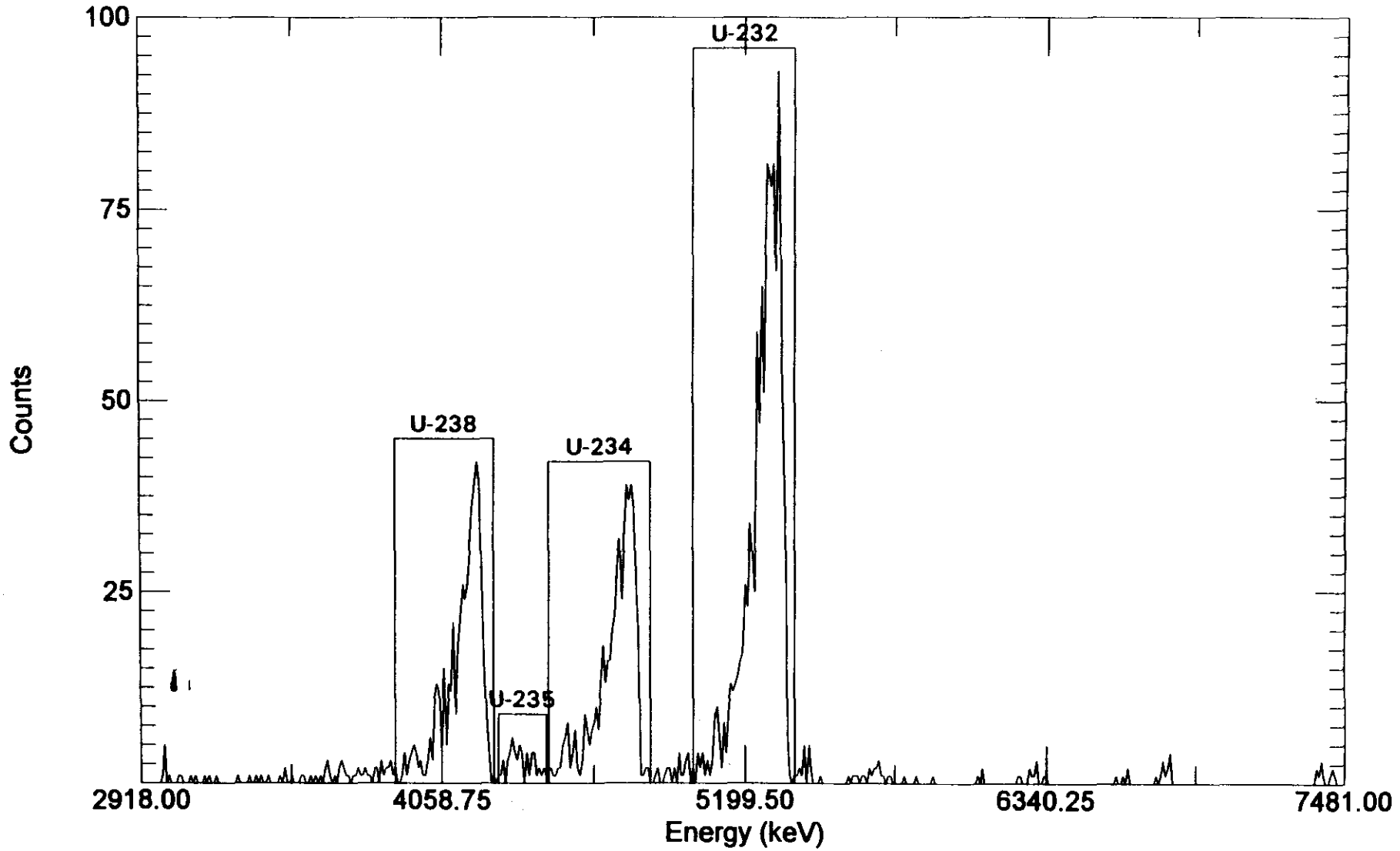
Nuclide	Energy (keV)	Centroid Channel	ROI Low	ROI High	FWHM (keV)	Width (keV)	Gross Sum	BKG Sum	Net CPM
U-234	4,776	209.8	175	218	53	53	673	3.75	1.12
U-235	4,396	167.0	153	174	18	18	45	3.33	0.07
U-238	4,196	144.4	109	151	89	89	629	2.50	1.04
U-232-tr	5,320	271.1	236	279	71	71	1,117	15.83	1.84

Note: Background count times are for 86,400 seconds (24 Hours). BKG Sum above is the background counts achieved in 24 hours normalized to the sample count time.

Analyzed By: _____ Checked By: _____

55964-15

AlphaVision Relative Region-Of-Interest (Slope Recalibration)

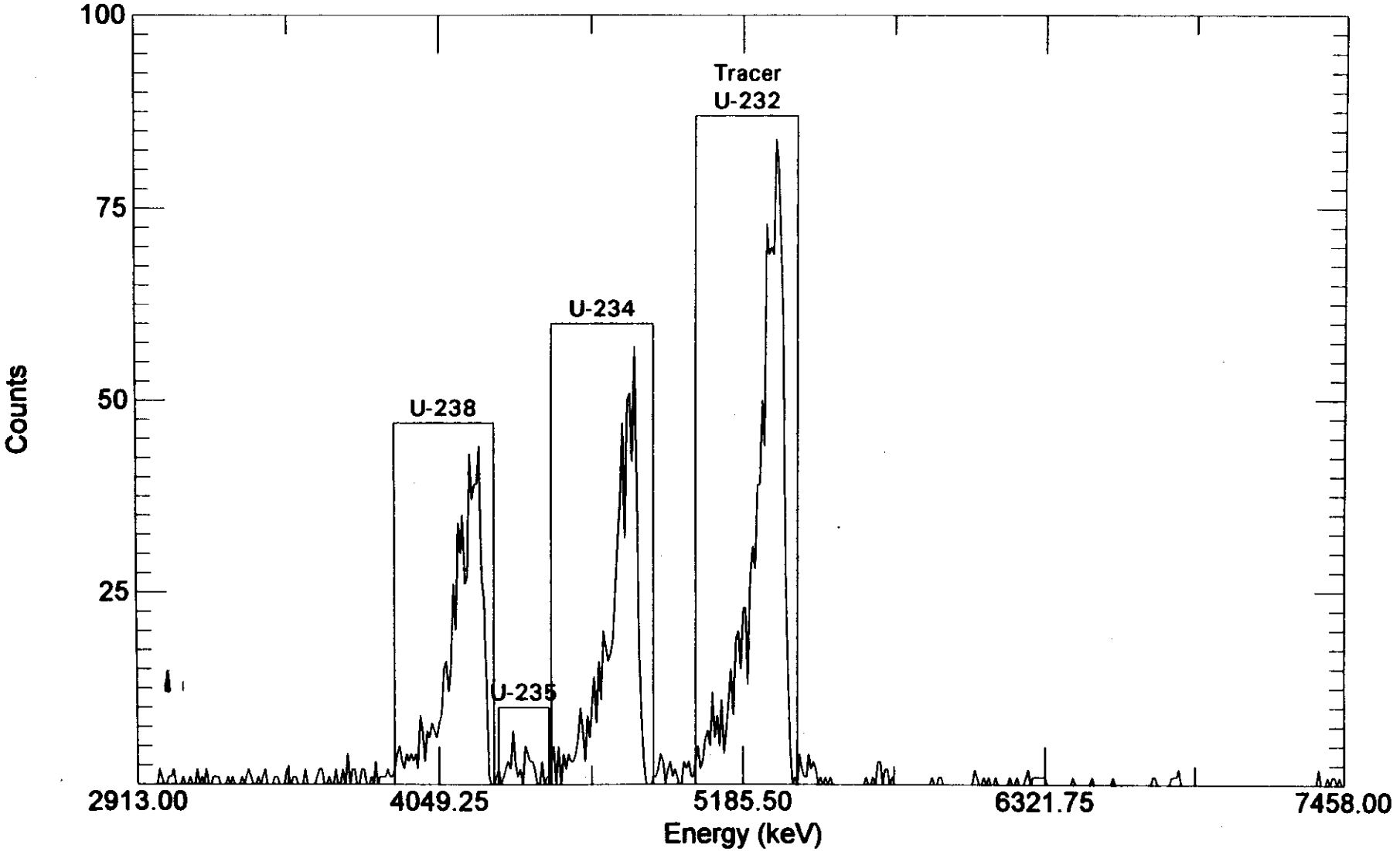


Acquired: 18:11:22 on 15-Dec-97
File: C:\USER\DATA\55964-15.CHN
Sample: L10981-37

Real Time: 36001.70 s. Live Time: 36000.00 s.
Detector: #18 AL1-18
Type: Uranium-Isotopic

55964-16

AlphaVision Relative Region-Of-Interest (Slope Recalibration)



Acquired: 18:12:07 on 15-Dec-97
File: C:\USER\DATA\55964-16.CHN
Sample: L10981-38

Real Time: 36001.70 s. Live Time: 36000.00 s.
Detector: #19 AL1-19
Type: Uranium-Isotopic

AlphaVision A36-BI Ver 1.20 12/16/97 4:14:36 AM

Southern Petroleum Laboratories-LAS 576A (AL1)

LAS Child ID: 55964-18
LAS Parent ID: L10981-40
Method Type: Uranium-Isotopic
Analysis Type: Relative Region-Of-Interest
Acquisition Date: 12/15/97 6:14:26 PM
Aliquot Volume: 0.51100 g
Tracer Amount: 12.00 dpm.

Detector: AL1-21
Number of Channels: 512
Live Time: 36,000.0 Sec.
Real Time: 36,001.7 Sec.

Detector Efficiency: 26.14 % Chemical Yield: 51.38 %
Total Efficiency: 13.43 %

Adj. Calibration (keV): 2,899.15 + 9.0637 * Channel #.
Init. Calibration (keV): 2,899.15 + 9.0369 * Channel #.

Spectrum File: C:\USER\DATA\55964-18.CHN
Background File: C:\USER\BKG\B2197346.CHN
Calibration File: C:\USER\CALIB\E2197301.CHN
Library File: C:\USER\ALPHA\ALPHAVIS.ALB

P E A K S

Nuclide	Energy (keV)	Centroid Channel	ROI Low	ROI High	FWHM (keV)	Width (keV)	Gross Sum	BKG Sum	Net CPM
U-234	4,776	207.1	172	215	54	54	2,255	3.33	3.75
U-235	4,396	165.1	151	171	54	54	158	1.67	0.26
U-238	4,196	143.1	108	150	73	73	2,143	2.08	3.57
U-232-tr	5,320	267.1	232	275	54	54	972	5.00	1.61

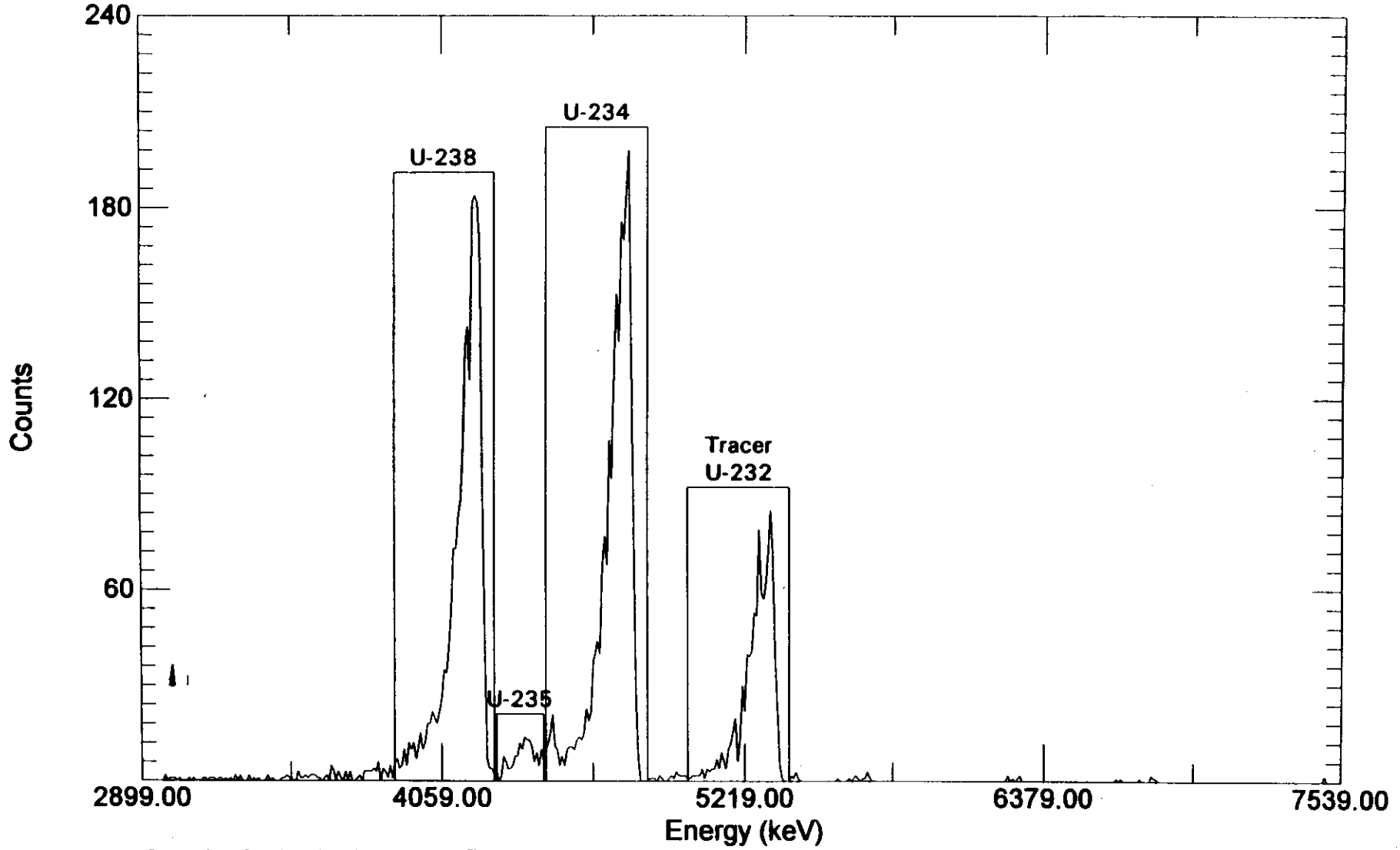
Note: Background count times are for 86,400 seconds (24 Hours). BKG Sum above is the background counts achieved in 24 hours normalized to the sample count time.

Analyzed By: _____ Checked By: _____

000067

55964-18

AlphaVision Relative Region-Of-Interest (Slope Recalibration)



Acquired: 18:14:26 on 15-Dec-97
File: C:\USER\DATA\55964-18.CHN
Sample: L10981-40

Real Time: 36001.70 s. Live Time: 36000.00 s.
Detector: #21 AL1-21
Type: Uranium-Isotopic

AlphaVision A36-BI Ver 1.20 12/16/97 4:15:49 AM

Southern Petroleum Laboratories-LAS 576A (AL1)

LAS Child ID:	55964-19
LAS Parent ID:	L10981-41
Method Type:	Uranium-Isotopic
Analysis Type:	Relative Region-Of-Interest
Acquisition Date:	12/15/97 6:15:39 PM
Aliquot Volume:	0.55620 g
Tracer Amount:	12.00 dpm.
Detector:	AL1-22
Number of Channels:	512
Live Time:	36,000.0 Sec.
Real Time:	36,001.7 Sec.
Detector Efficiency:	23.96 %
Chemical Yield:	57.87 %
Total Efficiency:	13.86 %
Adj. Calibration (keV):	2,896.88 + 8.9963 * Channel #.
Init. Calibration (keV):	2,896.88 + 8.9701 * Channel #.
Spectrum File:	C:\USER\DATA\55964-19.CHN
Background File:	C:\USER\BKG\B2297346.CHN
Calibration File:	C:\USER\CALIB\E2297303.CHN
Library File:	C:\USER\ALPHA\ALPHAVIS.ALB

P E A K S

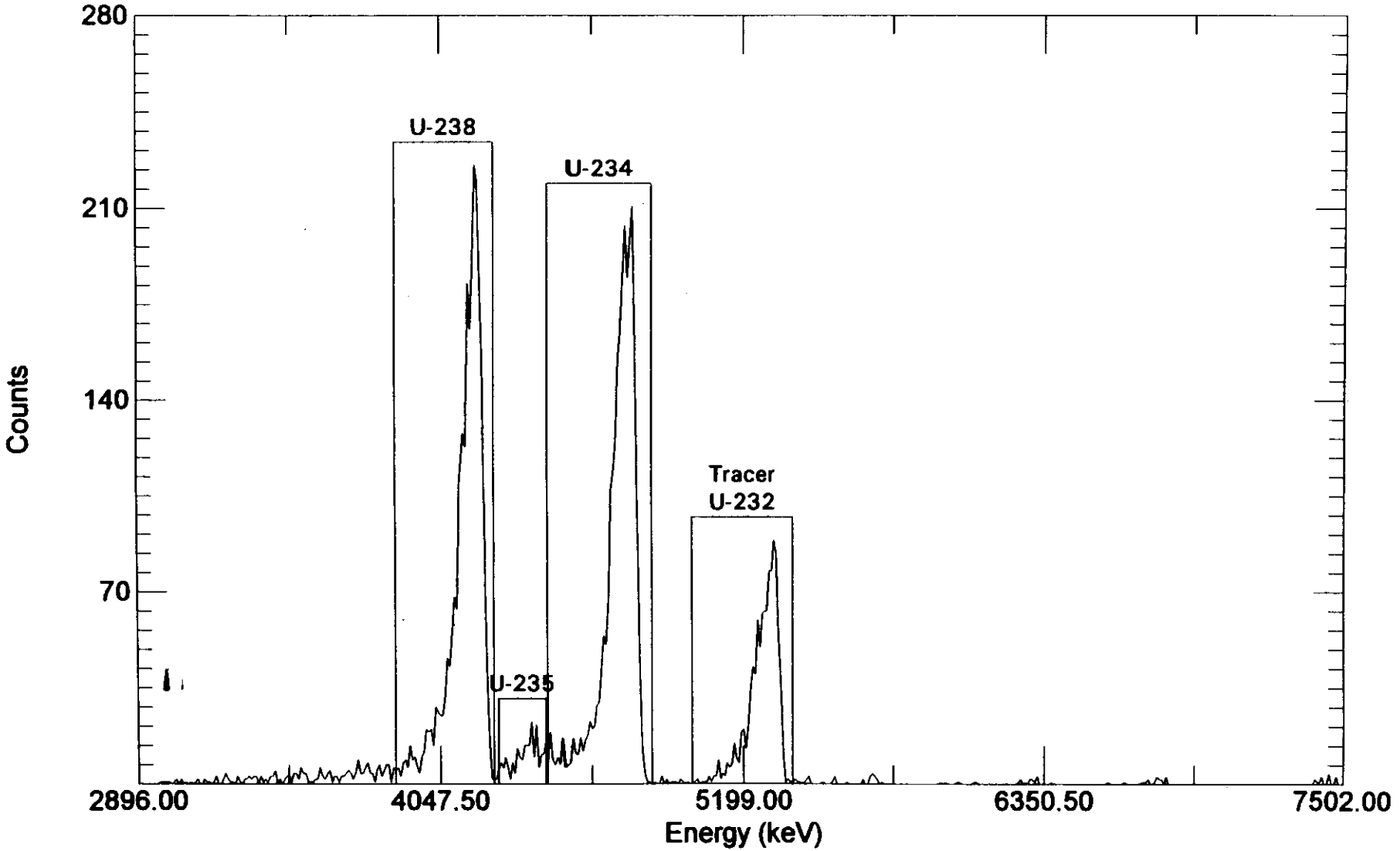
Nuclide	Energy (keV)	Centroid Channel	ROI Low	ROI High	FWHM (keV)	Width (keV)	Gross Sum	BKG Sum	Net CPM
U-234	4,776	208.9	174	217	72	72	2,521	6.25	4.19
U-235	4,396	166.6	153	173	36	36	223	0.42	0.37
U-238	4,196	144.4	109	151	72	72	2,531	3.33	4.21
U-232-tr	5,320	269.4	234	277	72	72	1,012	13.75	1.66

Note: Background count times are for 86,400 seconds (24 Hours). BKG Sum above is the background counts achieved in 24 hours normalized to the sample count time.

Analyzed By: _____ Checked By: _____

55964-19

AlphaVision Relative Region-Of-Interest (Slope Recalibration)



Acquired: 18:15:39 on 15-Dec-97
File: C:\USER\DATA\55964-19.CHN
Sample: L10981-41

Real Time: 36001.72 s. Live Time: 36000.00 s.
Detector: #22 AL1-22
Type: Uranium-Isotopic

AlphaVision A36-BI Ver 1.20 12/16/97 4:18:00 AM

Southern Petroleum Laboratories-LAS 576A (AL1)

LAS Child ID:	55964-21
LAS Parent ID:	L10981-43
Method Type:	Uranium-Isotopic
Analysis Type:	Relative Region-Of-Interest
Acquisition Date:	12/15/97 6:17:50 PM
Aliquot Volume:	0.50810 g
Tracer Amount:	12.00 dpm.
Detector:	AL1-24
Number of Channels:	512
Live Time:	36,000.0 Sec.
Real Time:	36,001.7 Sec.
Detector Efficiency:	24.72 % Chemical Yield: 86.64 %
Total Efficiency:	21.42 %
Adj. Calibration (keV):	2,912.00 + 8.8894 * Channel #.
Init. Calibration (keV):	2,912.00 + 8.8565 * Channel #.
Spectrum File:	C:\USER\DATA\55964-21.CHN
Background File:	C:\USER\BKG\B2497346.CHN
Calibration File:	C:\USER\CALIB\E2497303.CHN
Library File:	C:\USER\ALPHA\ALPHAVIS.ALB

P E A K S

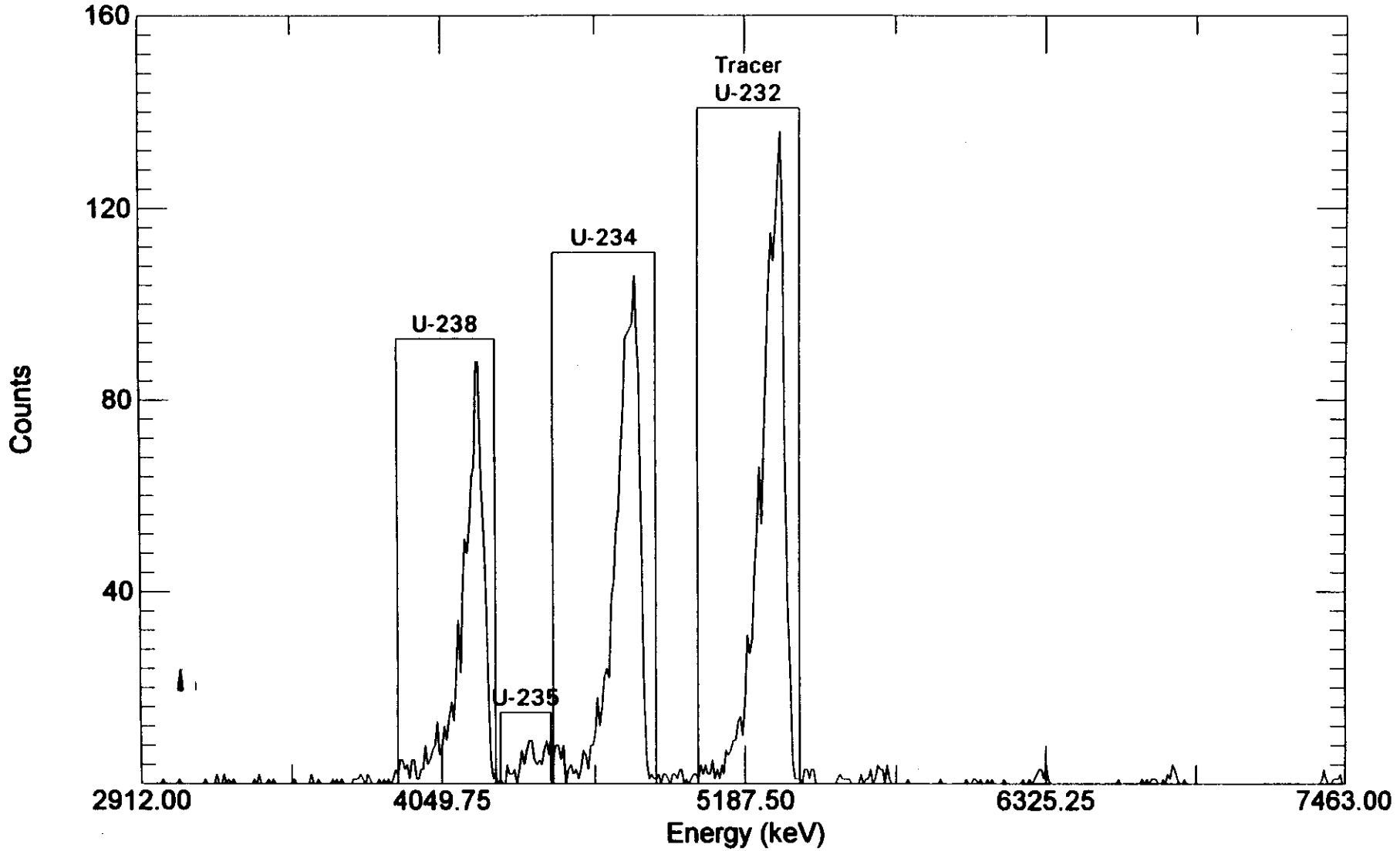
Nuclide	Energy (keV)	Centroid Channel	ROI Low	ROI High	FWHM (keV)	Width (keV)	Gross Sum	BKG Sum	Net CPM
U-234	4,776	209.7	175	218	53	53	1,286	4.17	2.14
U-235	4,396	166.9	153	174	18	18	101	1.67	0.17
U-238	4,196	144.4	109	151	71	71	926	2.08	1.54
U-232-tr	5,320	270.9	236	279	71	71	1,555	12.92	2.57

Note: Background count times are for 86,400 seconds (24 Hours). BKG Sum above is the background counts achieved in 24 hours normalized to the sample count time.

Analyzed By: _____ Checked By: _____

55964-21

AlphaVision Relative Region-Of-Interest (Slope Recalibration)



Acquired: 18:17:50 on 15-Dec-97
File: C:\USER\DATA\55964-21.CHN
Sample: L10981-43

Real Time: 36001.70 s. Live Time: 36000.00 s.
Detector: #24 AL1-24
Type: Uranium-Isotopic

LOCKHEED ANALYTICAL LABORATORY

% MOISTURE DETERMINATION AND SAMPLE ALIQUOT WORKSHEET

Batch Number 55965
Date Started 12-08-97

Customer WAST MANAGT M. HAN
Matrix SOLID WASTE

Analyst D. MILLINGTON

Parent LAL ID	NO	Container Tare Wt.	Wet Weight Container + Sample	Dry Weight Container + Sample	% Moisture	Aliquot Dissolved	Final Solution Volume
10981-26	1	1.0789g	4.6304g	4.4395g			
24	2	1.0747g	4.4457g	4.4083g			
23	3	1.0846g	5.2850g	4.8164g			
25	4	1.0814g	6.4129g	5.9548g			
	5						
	6						
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	21						
	22						
	23						
	24						

Comments:

Balance no. 40020046 ( ) _____ ( )
Initials [illegible] Date 12-08-97

000073

Needs Rad 7. Solids

LAS LABORATORIES

Sample Preparation Worksheet for Uranium Analysis

[redacted]

Date Prep Started : 12-15-97

Workgroup Number : U-ISOTOPIC LAL-0108_55965

Matrix : SolidWaste

Prep Due Date : 27-Nov-97

CLIENT ID	LAS ID		CHILD ID	COMMENTS (Include initial aliquot and dilution factors)	Final Aliquot ~~(ml/g sample)~~	Client	Collection Date
L10981-23	55965DUP1	1	55965-01	0.5314g x 0.5mL/100mL	.0027 ~~mL~~	DUP	11/12/97
Lab Ctrl Sample	55965LCS1	2	55965-02			LCS	11/12/97
Method Blank	55965MBB1	3	55965-03			MB	11/12/97
BOMB44	L10981-23	4	55965-04	0.5058g x 0.5mL/100mL	.0026 ~~mL~~	Waste Management Han	10/30/97
BOMB45	L10981-24	5	55965-05	0.5227g x 100mL/100mL	.5227 ~~mL~~	Waste Management Han	10/30/97
BOMB46	L10981-25	6	55965-06	0.5065g x 25mL/100mL	.127 ~~mL~~	Waste Management Han	10/30/97
BOMB47	L10981-26	7	55965-07	0.5077g x 5mL/100mL	.025 ~~mL~~	Waste Management Han	10/30/97
		8					
		9					
		10					
		11					
		12					
		13					
		14					
		15					
		16					
		17					
		18					
		19					
		20					
		21					
		22					
		23					
		24					

COMMENTS:

Amount of Tracer	U-232 0.5mL
Tracer Activity	10.81 Pci/mL
Tracer ID#	95-721-70-1

Cnt Rm Custody\Date : 12-17-97

Amount of LCS	U-238 0.5mL
LCS Activity	10.90 Pci/mL
LCS ID#	95-721-65-1

Balance Number : 40010123 (✓) ( )

Pipette Number : 134488 (✓) ( )

Tracer and LCS added by : 12-15-97

Witnessed by : 12/15/97

Sample Prep Analyst : JS

Checked by : 12-17-97

0000074

RADIATION RESULTS CHECK REPORT

Workgroup Number: U-ISOTOPIC LAL-0108_55965

Sample	Parameter	Value	Error	MDA	Units
55965DUP1	U-233/4	1794.59	127.418	11.4459	pCi/g
55965LCS1	U-233/4	11.4604	0.765662	0.066475	pCi/g
55965MBB1	U-233/4	0.192262	0.077509	0.0656916	pCi/g
L10981-23	U-233/4	1955.8	136.189	11.978	pCi/g
L10981-24	U-233/4	2.11473	0.244497	0.0357302	pCi/g
L10981-25	U-233/4	231.709	13.3169	0.406752	pCi/g
L10981-26	U-233/4	570	34.7955	1.22511	pCi/g
55965DUP1	U-235	39.5909	32.5101	43.6793	pCi/g
55965LCS1	U-235	0.565157	0.117641	0.042882	pCi/g
55965MBB1	U-235	0.0535813	0.0405978	0.042468	pCi/g
L10981-23	U-235	32.7355	31.3235	42.6587	pCi/g
L10981-24	U-235	0.160838	0.0628477	0.0357302	pCi/g
L10981-25	U-235	3.36336	2.11647	2.81033	pCi/g
L10981-26	U-235	4.00064	6.94165	9.71709	pCi/g
55965DUP1	U-238	1249.77	97.9746	9.34684	pCi/g
55965LCS1	U-238	11.175	0.750404	0.0541041	pCi/g
55965MBB1	U-238	0.0756442	0.0503294	0.0529828	pCi/g
L10981-23	U-238	1394.53	106.033	5.99357	pCi/g
L10981-24	U-238	1.78709	0.221552	0.0357302	pCi/g
L10981-25	U-238	190.405	11.2267	0.243662	pCi/g
L10981-26	U-238	442.343	28.2572	1.22511	pCi/g

LAS LABORATORIES

Count Data Sheet for Uranium By SOP 0108

Batch Number : 10855965

LAS ID	Child ID		QC	Detector Number	Count Date Time	Count Anlst	Aliquot Size (g)	U-232 Tracer Activity DPM	U-232 Tracer GROSS Counts	U-232 Tracer BKGD Counts	U-232 Tracer U-232 FWHM	U-233/4 GROSS Counts	U-233/4 BKGD Counts	U-235 GROSS Counts	U-235 BKGD Counts	U-238 GROSS Counts	U-238 BKGD Counts
55965DUP1	55965-01	1	DUP1	AL1-24	12/17/97 21:13	WAL	0.0027	12.00	1708	28	71	1523	9	142	217	1060	5
55965LCS1	55965-02	2	LCS1	AL1-25	12/17/97 21:14	WAL	0.5000	12.00	1871	31	54	1974	14	99	4	1922	8
55965MBB1	55965-03	3	MBB1	AL1-26	12/17/97 21:15	WAL	0.5000	12.00	1731	32	72	36	11	10	3	15	6
L10981-23	55965-04	4	SMP1	AL1-27	12/17/97 21:16	WAL	0.0026	12.00	1757	21	71	1648	10	129	203	1172	1
L10981-24	55965-05	5		AL1-28	12/17/97 21:17	WAL	0.5227	12.00	1747	22	71	356	2	28	2	301	2
L10981-25	55965-06	6		AL1-29	12/17/97 21:18	WAL	0.1270	12.00	895	31	72	4791	6	353	567	3935	1
L10981-26	55965-07	7		AL1-31	12/17/97 21:19	WAL	0.0250	12.00	1199	20	71	3136	3	260	476	2434	3
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		9															
		10															
		11															
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		13															
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		21															
		22															
		23															
		24															

U-232 Tracer ID # 95-721-70-1 Conc : 10.81 pCi/mL	U-Nat LCS ID # 95-721-65-1 Conc : 10.90 pCi/mL	Prep Analyst : JS,DM
Volume : 0.5 mL Ref Date : 08/20/97 Exp Date : 08/20/99	Volume : 0.5 mL Ref Date : 01/01/92 Exp Date : 07/08/99	Prep Date : 12/15/97

Comments: Tailing corrections were made on samples 55965DUP1, L10981-23, L10981-25, & L10981-26 due to tailing of U-234 peak into U-235 peak. See point by point for tail correction. WAL 12/22/97

Resolution check (✓) ROIs acceptable (✓)

Analyst: [signature] Date: 12/22/97 Checked by: [signature]

V96291

LAS LABORATORIES

Count Data Sheet for Uranium By SOP 0108

Batch Number : 10855965

LAS ID	Child ID		QC	Detector Number	Count Date Time	Count Anlst	Aliquot Size (g)	U-232 Tracer Activity DPM	U-232 Tracer GROSS Counts	U-232 Tracer BKGD Counts	U-232 Tracer U-232 FWHM	U-233/4 GROSS Counts	U-233/4 BKGD Counts	U-235 GROSS Counts	U-235 BKGD Counts	U-238 GROSS Counts	U-238 BKGD Counts
55965DUP1	55965-01	1	DUP1	AL1-24	12/17/97 21:13	WAL	0.0027	12.00	1708	28	71	1523	9	142	4	1060	5
55965LCS1	55965-02	2	LCS1	AL1-25	12/17/97 21:14	WAL	0.5000	12.00	1871	31	54	1974	14	99	4	1922	8
55965MBB1	55965-03	3	MBB1	AL1-26	12/17/97 21:15	WAL	0.5000	12.00	1731	32	72	36	11	10	3	15	6
L10981-23	55965-04	4	SMP1	AL1-27	12/17/97 21:16	WAL	0.0026	12.00	1757	21	71	1648	10	129	1	1172	1
L10981-24	55965-05	5		AL1-28	12/17/97 21:17	WAL	0.5227	12.00	1747	22	71	356	2	28	2	301	2
L10981-25	55965-06	6		AL1-29	12/17/97 21:18	WAL	0.1270	12.00	895	31	72	4791	6	353	3	3935	1
L10981-26	55965-07	7		AL1-31	12/17/97 21:19	WAL	0.0250	12.00	1199	20	71	3136	3	260	0	2434	3
		8															
		9															
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		23															
		24															

DO NOT REPORT

U-232 Tracer	U-Nat LCS	Prep
U-232 Tracer ID # 95-721-70-1 Conc : 10.81 pCi/mL	U-Nat LCS ID # 95-721-65-1 Conc : 10.90 pCi/mL	Prep Analyst : JS,DM
Volume : 0.5 mL Ref Date : 08/20/97 Exp Date : 08/20/99	Volume : 0.5 mL Ref Date : 01/01/92 Exp Date : 07/08/99	Prep Date : 12/15/97

Comments: _____

Resolution check (✓) ROIs acceptable (✓)

Analyst: _____ Date: 12-19-97 Checked by: _____

V96291

LAS LABORATORIES

Calculation Sheet for U-233/4 By SOP 0108

Batch Number : 10855965

LAS ID	Child ID	QC	Detector Eff	Sample Count Time (sec)	Bkgd Count Time (sec)	Chem Recovery	U-233/4 LCS Activity = 10.940 Bkg Corr pCi/g	Count Error 2 sigma	Tot Prop Err 2 sigma	U-233/4 LLD	U-233/4 MDA	Data Qualifier
55965DUP1	55965-01	DUP1	0.2472	43200	86400	0.793	1794.593	90.464	127.418	8.243	11.446	M
55965LCS1	55965-02	LCS1	0.2624	43200	86400	0.818	11.460	0.508	0.766	0.051	0.066	
55965MBB1	55965-03	MBB1	0.2592	43200	86400	0.766	0.192	0.077	0.078	0.049	0.066	
L10981-23	55965-04	SMP1	0.2484	43200	86400	0.814	1955.798	94.787	136.189	8.752	11.978	M
L10981-24	55965-05		0.2467	43200	86400	0.814	2.115	0.220	0.244	0.020	0.036	
L10981-25	55965-06		0.2202	43200	86400	0.462	231.709	6.566	13.317	0.276	0.407	
L10981-26	55965-07		0.2132	43200	86400	0.645	570.000	19.962	34.796	0.732	1.225	M

Comments: 55965LCS1 U-234 LCS Recovery = 11.460/10.940 = 104.8 %.
L10981-23, 55965DUP1 RPD = 8.6 %, RER = 0.61

MBB = 0.192 pCi/g => less than RDL(HAMDC).

55965DUP1 & L10981-23 U-234, U-235, & U-238 MDAs above RDL. L10981-26 U-234 & U-238 MDAs above RDL. Sample activities well above MDA. Sample volumes reduced due to elevated sample activity. MBB for U-234, U-235, & U-238 above MDA but below RDL. Remaining QC within limits. Report data.

Calculated by: [signature]

Checked by: [signature]

V96291

LAS LABORATORIES

Calculation Sheet for U-235 By SOP 0108

Batch Number : 10855965

U-235 LCS Activity = 0.502

LAS ID	Child ID	QC	Detector Eff	Sample Count Time (sec)	Bkgd Count Time (sec)	Chem Recovery	Bkg Corr pCi/g	Count Error 2 sigma	Tot Prop Err 2 sigma	U-235 LLD	U-235 MDA	Data Qualifier
55965DUP1	55965-01	DUP1	0.2472	43200	86400	0.793	39.591	32.450	32.510	40.477	43.679	M
55965LCS1	55965-02	LCS1	0.2624	43200	86400	0.818	0.565	0.114	0.118	0.027	0.043	
55965MBB1	55965-03	MBB1	0.2592	43200	86400	0.766	0.054	0.041	0.041	0.025	0.042	
L10981-23	55965-04	SMP1	0.2484	43200	86400	0.814	32.736	31.281	31.324	39.433	42.659	M
L10981-24	55965-05		0.2467	43200	86400	0.814	0.161	0.062	0.063	0.020	0.036	
L10981-25	55965-06		0.2202	43200	86400	0.462	3.363	2.110	2.116	2.679	2.810	M
L10981-26	55965-07		0.2132	43200	86400	0.645	4.001	6.939	6.942	9.224	9.717	M

Comments:

L10981-23, 55965DUP1 RPD = 19.0 %, RER = 0.11

MBB = 0.054 pCi/g => less than RDL(HAMDC).

55965DUP1 & L10981-23 U-234, U-235, & U-238 MDAs above RDL. L10981-26 U-234 & U-238 MDAs above RDL. Sample activities well above MDA. Sample volumes reduced due to elevated sample activity. MBB for U-234, U-235, & U-238 above MDA but below RDL. Remaining QC within limits. Report data.

Calculated by: _____

Checked by: _____

V96291

000079

LAS LABORATORIES

Calculation Sheet for U-238 By SOP 0108

Batch Number : 10855965

LAS ID	Child ID	QC	Detector Eff	Sample Count Time (sec)	BKGD Count Time (sec)	Chem Recovery	U-238 LCS Activity = 10.900 Bkg Corr pCi/g	Count Error 2 sigma	Tot Prop Err 2 sigma	U-238 LLD	U-238 MDA	Data Qualifier
55965DUP1	55965-01	DUP1	0.2472	43200	86400	0.793	1249.774	75.460	97.975	6.144	9.347	M
55965LCS1	55965-02	LCS1	0.2624	43200	86400	0.818	11.175	0.501	0.750	0.038	0.054	
55965MBB1	55965-03	MBB1	0.2592	43200	86400	0.766	0.076	0.050	0.050	0.036	0.053	
L10981-23	55965-04	SMP1	0.2484	43200	86400	0.814	1394.532	79.883	106.033	2.768	5.994	M
L10981-24	55965-05		0.2467	43200	86400	0.814	1.787	0.203	0.222	0.020	0.036	
L10981-25	55965-06		0.2202	43200	86400	0.462	190.405	5.950	11.227	0.113	0.244	
L10981-26	55965-07		0.2132	43200	86400	0.645	442.343	17.587	28.257	0.732	1.225	M

Comments: 55965LCS1 U-238 LCS Recovery = 11.175/10.900 = 102.5 %.
L10981-23, 55965DUP1 RPD = 10.9 %, RER = 0.71

MBB = 0.076 pCi/g => less than RDL(HAMDC).

55965DUP1 & L10981-23 U-234, U-235, & U-238 MDAs above RDL. L10981-26 U-234 & U-238 MDAs above RDL. Sample activities well above MDA. Sample volumes reduced due to elevated sample activity. MBB for U-234, U-235, & U-238 above MDA but below RDL. Remaining QC within limits. Report data.

Calculated by: [signature]

Checked by: [signature]

V96291

AlphaVision A36-BI Ver 1.20 12/22/97 1:44:28 PM

Southern Petroleum Laboratories-LAS 576A (AL1)

LAS Child ID:	55965-01
LAS Parent ID:	55965DUP1
Method Type:	Uranium-Isotopic
Analysis Type:	Relative Region-Of-Interest
Acquisition Date:	12/17/97 9:13:11 PM
Aliquot Volume:	0.00270 g
Tracer Amount:	12.00 dpm.
Detector:	AL1-24
Number of Channels:	512
Live Time:	43,200.0 Sec.
Real Time:	43,201.6 Sec.
Detector Efficiency:	24.72 %
Chemical Yield:	79.10 %
Total Efficiency:	19.55 %
Adj. Calibration (keV):	2,912.00 + 8.9074 * Channel #.
Init. Calibration (keV):	2,912.00 + 8.8565 * Channel #.
Spectrum File:	C:\USER\DATA\55965-01.CHN
Background File:	C:\USER\BKG\B2497353.CHN
Calibration File:	C:\USER\CALIB\E2497303.CHN
Library File:	C:\USER\ALPHA\ALPHAVIS.ALB

P E A K S

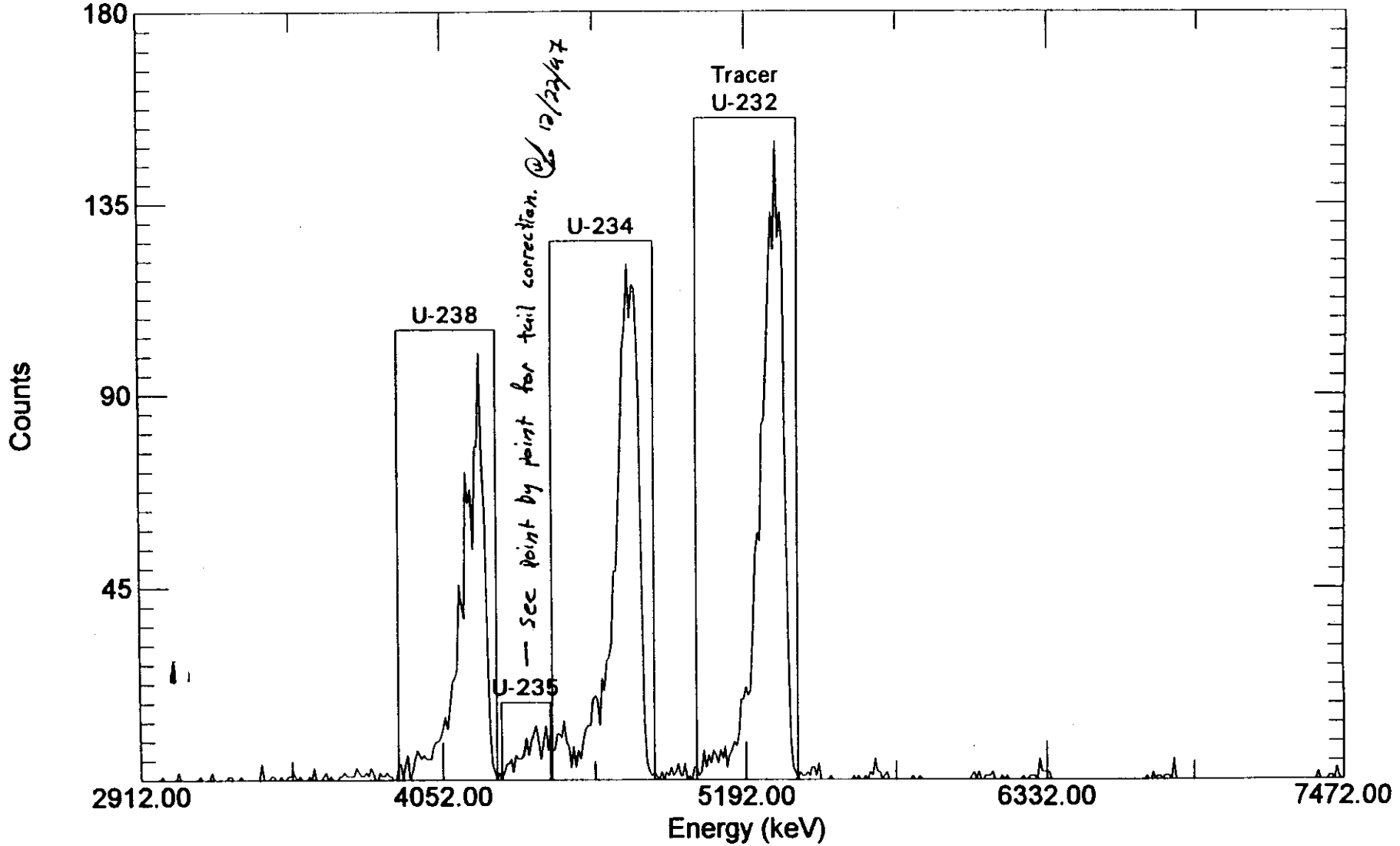
Nuclide	Energy (keV)	Centroid Channel	ROI Low	ROI High	FWHM (keV)	Width (keV)	Gross Sum	BKG Sum	Net CPM
U-234	4,776	209.2	174	217	71	71	1,523	3.50	2.11
U-235	4,396	166.6	153	173	53	53	142	0.50	0.20
U-238	4,196	144.1	109	151	71	71	1,060	0.50	1.47
U-232-tr	5,320	270.4	235	278	71	71	1,708	18.50	2.35

Note: Background count times are for 86,400 seconds (24 Hours). BKG Sum above is the background counts achieved in 24 hours normalized to the sample count time.

Analyzed By: _____ Checked By: _____

55965-01

AlphaVision Relative Region-Of-Interest (Slope Recalibration)



Acquired: 21:13:11 on 17-Dec-97
File: C:\USER\DATA\55965-01.CHN
Sample: 55965DUP1

Real Time: 43201.60 s. Live Time: 43200.00 s.
Detector: #24 AL1-24
Type: Uranium-Isotopic

000082

Maestro spectrum printed on 22-Dec-97 at 12:52:31
>AL1-24
>55965DUP1

0:	0	0	0	0	0	0	0
7:	0	0	1	0	0	0	0
14:	0	0	2	0	0	0	0
21:	0	0	0	0	1	0	0
28:	0	0	2	0	0	0	0
35:	0	0	1	1	0	0	0
42:	1	0	0	0	0	0	0
49:	0	0	4	0	0	0	1
56:	1	0	0	1	0	0	1
63:	1	2	1	0	1	0	0
70:	0	1	0	3	0	0	0
77:	1	2	0	1	0	0	0
84:	1	1	2	1	1	1	1
91:	3	2	1	1	2	1	3
98:	2	0	0	2	1	1	2
105:	1	1	0	0	3	4	0
112:	4	6	0	2	5	7	6
119:	5	6	5	5	5	8	9
126:	9	10	12	15	12	17	23
133:	24	26	46	41	38	72	65
140:	68	54	78	78	100	75	63
147:	35	13	4	2	0	2	0
154:	2	4	4	5	2	6	5
161:	5	6	10	6	9	11	13
168:	9	5	9	13	7	11	7
175:	7	11	11	10	14	9	8
182:	3	8	3	7	5	9	12
189:	13	13	19	20	19	13	24
196:	21	28	29	32	49	49	64
203:	77	101	106	121	108	116	115
210:	102	88	49	14	4	2	1
217:	2	1	0	2	0	2	1
224:	3	1	2	4	1	1	4
231:	0	1	0	3	3	1	2
238:	7	3	6	4	7	6	4
245:	7	5	8	3	6	7	9
252:	8	11	19	19	22	20	21
259:	36	53	58	56	83	84	99
266:	118	133	124	150	127	133	125
273:	71	35	10	3	2	0	2
280:	1	1	2	1	3	3	1
287:	4	0	0	0	0	1	0
294:	0	0	0	0	0	0	0
301:	0	1	0	1	0	0	1
308:	0	2	1	5	2	2	0
315:	1	2	0	0	0	0	0
322:	0	0	0	0	0	1	0
329:	0	1	0	0	0	0	0
336:	0	0	0	0	0	0	0
343:	0	0	0	0	0	0	0
350:	0	0	1	2	0	2	0
357:	0	1	1	1	2	0	0
364:	0	1	0	1	0	0	0
371:	0	0	0	1	0	0	1
378:	1	1	0	5	2	2	2
385:	2	0	0	0	0	0	0
392:	0	0	0	0	0	0	0
399:	0	0	0	0	0	0	0
406:	0	0	0	0	0	0	0
413:	0	0	0	0	0	0	0

Avg. # of cts/chn of Ends = 5.2
BKGD = 108.5 cts
Total calculated net cts for U-235 = 33.5 cts

First 3 chns of ROI = 6 cts
Last 3 chns of ROI = 25 cts
Total # of chns in ROI = 21
Total (Gross) cts for U-235 = 142 cts

000083

420:	0	0	0	0	0	0	0
427:	1	0	0	2	0	1	1
434:	0	1	1	1	0	5	0
441:	0	0	0	0	0	0	0
448:	0	0	0	0	0	0	0
455:	0	0	0	0	0	0	0
462:	0	0	0	0	0	0	0
469:	0	0	0	0	0	0	0
476:	0	0	0	0	0	0	0
483:	0	0	0	0	0	0	0
490:	0	0	0	0	0	0	0
497:	0	0	0	0	2	0	0
504:	0	0	1	1	0	3	1
511:	0						

AlphaVision A36-BI Ver 1.20 12/18/97 9:14:26 AM

Southern Petroleum Laboratories-LAS 576A (AL1)

LAS Child ID: 55965-02
LAS Parent ID: 55965LCS1
Method Type: Uranium-Isotopic
Analysis Type: Relative Region-Of-Interest
Acquisition Date: 12/17/97 9:14:16 PM
Aliquot Volume: 0.50000 g
Tracer Amount: 12.00 dpm.

Detector: AL1-25
Number of Channels: 512
Live Time: 43,200.0 Sec.
Real Time: 43,201.6 Sec.

Detector Efficiency: 26.24 % Chemical Yield: 81.84 %
Total Efficiency: 21.48 %

Adj. Calibration (keV): 2,902.94 + 9.0018 * Channel #.
Init. Calibration (keV): 2,902.94 + 8.9668 * Channel #.

Spectrum File: C:\USER\DATA\55965-02.CHN
Background File: C:\USER\BKG\B2597346.CHN
Calibration File: C:\USER\CALIB\E2597303.CHN
Library File: C:\USER\ALPHA\ALPHAVIS.ALB

P E A K S

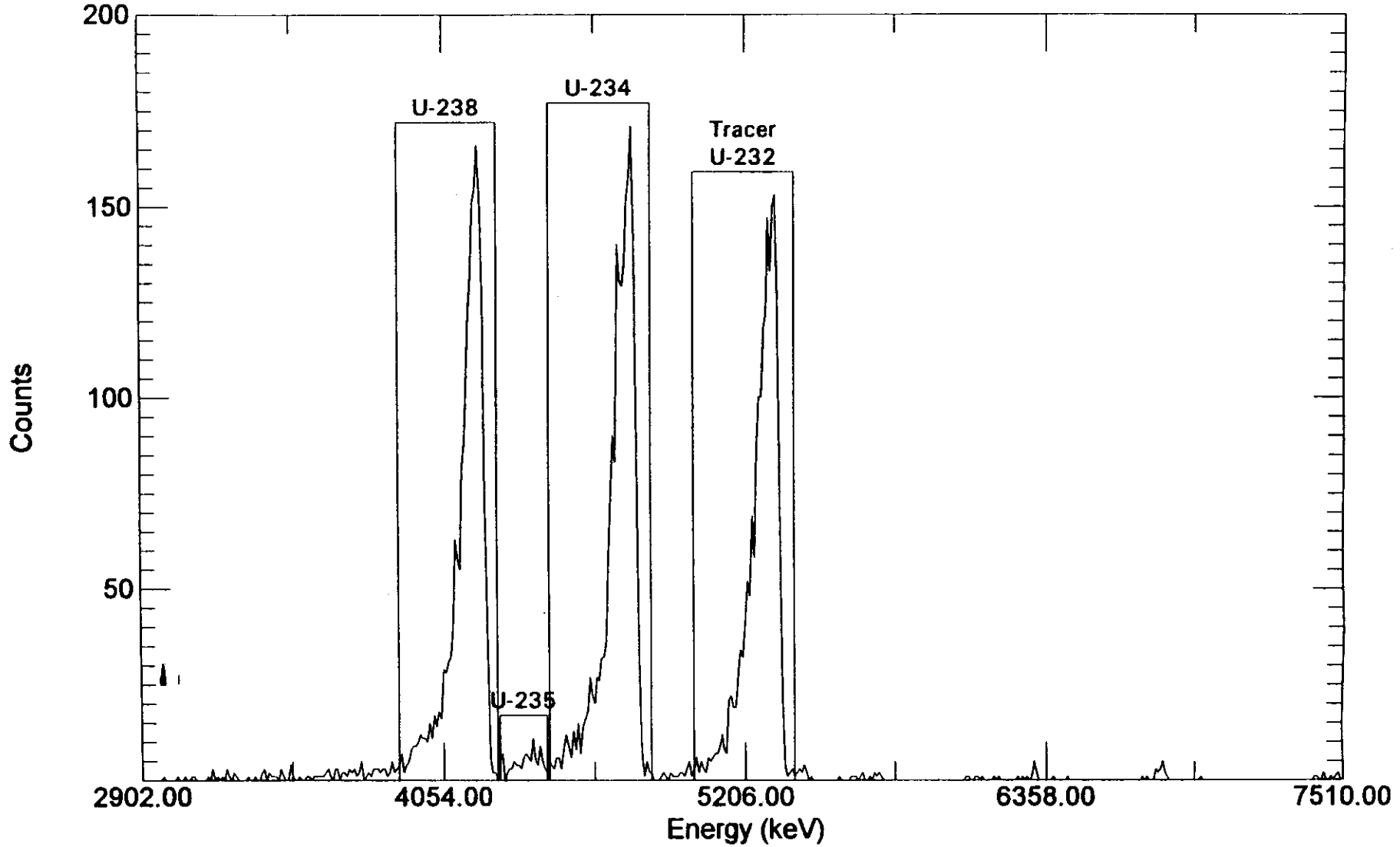
Nuclide	Energy (keV)	Centroid Channel	ROI Low	ROI High	FWHM (keV)	Width (keV)	Gross Sum	BKG Sum	Net CPM
U-234	4,776	208.1	173	216	72	72	1,974	7.00	2.73
U-235	4,396	165.9	152	172	36	36	99	2.00	0.13
U-238	4,196	143.6	109	151	54	54	1,922	4.00	2.66
U-232-tr	5,320	268.5	234	277	54	54	1,871	15.50	2.58

Note: Background count times are for 86,400 seconds (24 Hours). BKG Sum above is the background counts achieved in 24 hours normalized to the sample count time.

Analyzed By: _____ Checked By: _____

55965-02

AlphaVision Relative Region-Of-Interest (Slope Recalibration)



Acquired: 21:14:16 on 17-Dec-97
File: C:\USER\DATA\55965-02.CHN
Sample: 55965LCS1

Real Time: 43201.60 s. Live Time: 43200.00 s.
Detector: #25 AL1-25
Type: Uranium-Isotopic

AlphaVision A36-BI Ver 1.20 12/18/97 9:15:11 AM

Southern Petroleum Laboratories-LAS 576A (AL1)

LAS Child ID: 55965-03
LAS Parent ID: 55965MBB1
Method Type: Uranium-Isotopic
Analysis Type: Relative Region-Of-Interest
Acquisition Date: 12/17/97 9:15:01 PM
Aliquot Volume: 0.50000 g
Tracer Amount: 12.00 dpm.

Detector: AL1-26
Number of Channels: 512
Live Time: 43,200.0 Sec.
Real Time: 43,201.6 Sec.

Detector Efficiency: 25.92 % Chemical Yield: 76.58 %
Total Efficiency: 19.85 %

Adj. Calibration (keV): 2,912.21 + 8.9825 * Channel #.
Init. Calibration (keV): 2,912.21 + 8.9465 * Channel #.

Spectrum File: C:\USER\DATA\55965-03.CHN
Background File: C:\USER\BKG\B2697346.CHN
Calibration File: C:\USER\CALIB\E2697303.CHN
Library File: C:\USER\ALPHA\ALPHAVIS.ALB

P E A K S

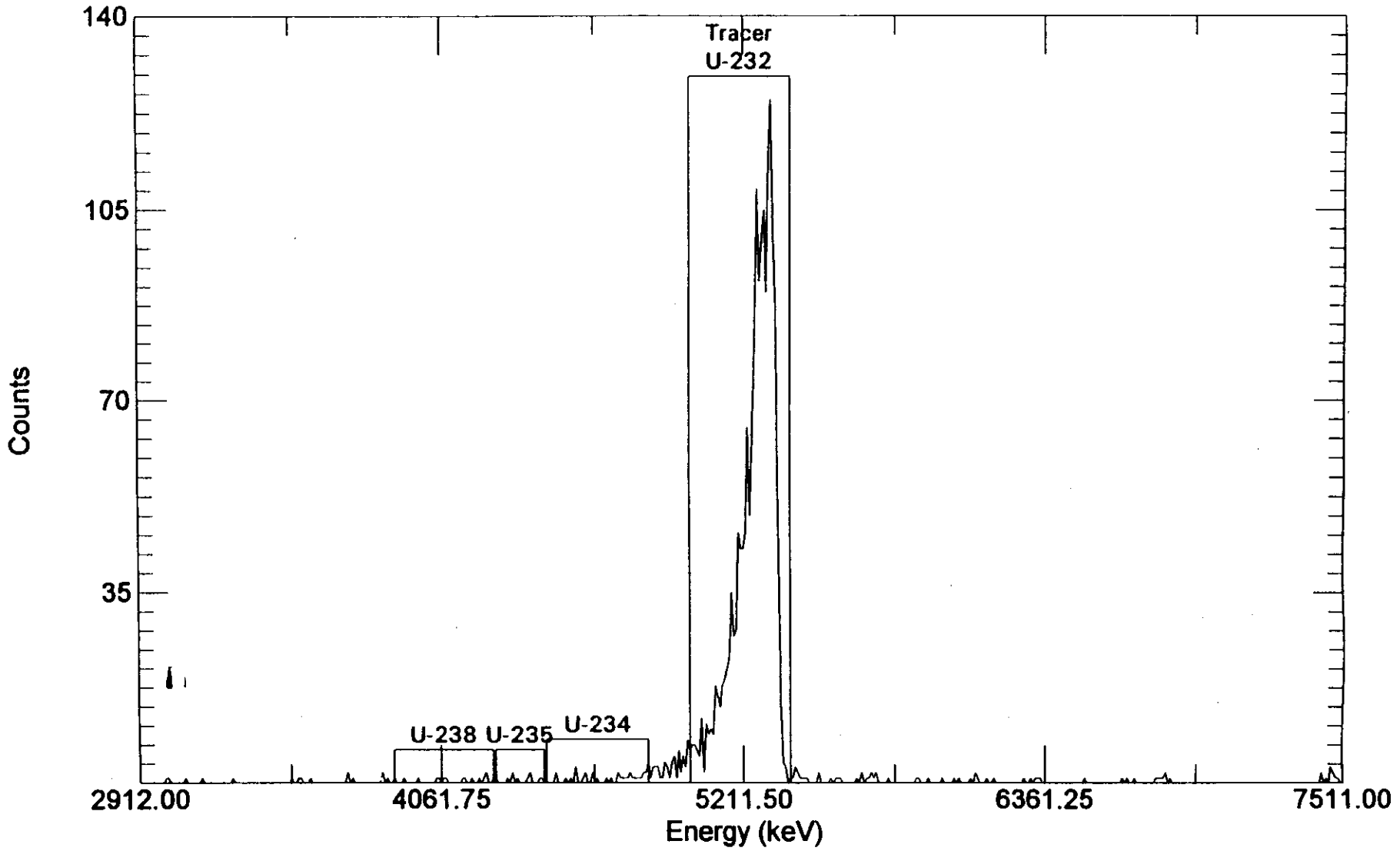
Nuclide	Energy (keV)	Centroid Channel	ROI Low	ROI High	FWHM (keV)	Width (keV)	Gross Sum	BKG Sum	Net CPM
U-234	4,776	207.5	172	215	18	18	36	5.50	0.04
U-235	4,396	165.2	151	171	36	36	10	1.50	0.01
U-238	4,196	142.9	108	150	18	18	15	3.00	0.02
U-232-tr	5,320	268.1	233	276	72	72	1,731	16.00	2.38

Note: Background count times are for 86,400 seconds (24 Hours). BKG Sum above is the background counts achieved in 24 hours normalized to the sample count time.

Analyzed By: _____ Checked By: _____

55965-03

AlphaVision Relative Region-Of-Interest (Slope Recalibration)



Acquired: 21:15:01 on 17-Dec-97
File: C:\USER\DATA\55965-03.CHN
Sample: 55965MBB1

Real Time: 43201.58 s. Live Time: 43200.00 s.
Detector: #26 AL1-26
Type: Uranium-Isotopic

000088

AlphaVision A36-BI Ver 1.20 12/18/97 9:16:27 AM

Southern Petroleum Laboratories-LAS 576A (AL1)

LAS Child ID:	55965-04
LAS Parent ID:	L10981-23
Method Type:	Uranium-Isotopic
Analysis Type:	Relative Region-Of-Interest
Acquisition Date:	12/17/97 9:16:18 PM
Aliquot Volume:	0.00260 g
Tracer Amount:	12.00 dpm.
Detector:	AL1-27
Number of Channels:	512
Live Time:	43,200.0 Sec.
Real Time:	43,201.6 Sec.
Detector Efficiency:	24.84 %
Chemical Yield:	81.38 %
Total Efficiency:	20.21 %
Adj. Calibration (keV):	2,972.45 + 8.8648 * Channel #.
Init. Calibration (keV):	2,972.45 + 8.8331 * Channel #.
Spectrum File:	C:\USER\DATA\55965-04.CHN
Background File:	C:\USER\BKG\B2797346.CHN
Calibration File:	C:\USER\CALIB\E2797302.CHN
Library File:	C:\USER\ALPHA\ALPHAVIS.ALB

P E A K S

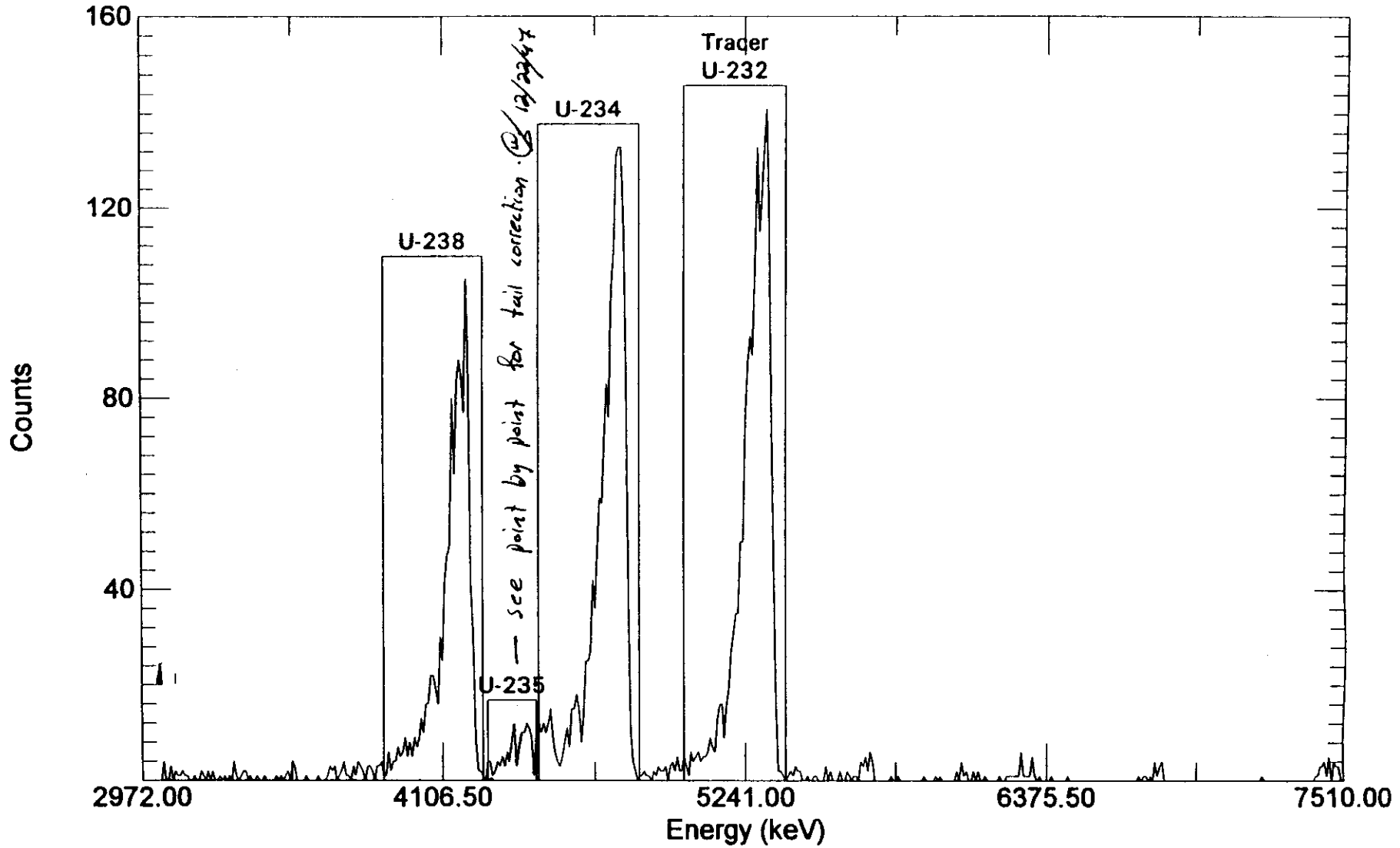
Nuclide	Energy (keV)	Centroid Channel	ROI Low	ROI High	FWHM (keV)	Width (keV)	Gross Sum	BKG Sum	Net CPM
U-234	4,776	203.4	168	211	71	71	1,648	5.00	2.28
U-235	4,396	160.6	147	167	106	106	129	0.50	0.18
U-238	4,196	138.0	103	145	53	53	1,172	0.50	1.63
U-232-tr	5,320	264.9	230	273	71	71	1,757	10.50	2.43

Note: Background count times are for 86,400 seconds (24 Hours). BKG Sum above is the background counts achieved in 24 hours normalized to the sample count time.

Analyzed By: _____ Checked By: _____

55965-04

AlphaVision Relative Region-Of-Interest (Slope Recalibration)



Acquired: 21:16:18 on 17-Dec-97
File: C:\USER\DATA\55965-04.CHN
Sample: L10981-23

Real Time: 43201.58 s. Live Time: 43200.00 s.
Detector: #27 AL1-27
Type: Uranium-Isotopic

Maestro spectrum printed on 19-Dec-97 at 13:08:05
>AL1-27
>L10981-23

0:	0	0	0	0	0	0	0
7:	0	0	4	0	0	3	0
14:	2	1	1	2	1	1	0
21:	0	1	0	0	2	1	0
28:	2	0	2	0	0	1	0
35:	1	0	1	0	4	1	0
42:	1	2	2	0	1	0	0
49:	1	0	0	1	0	0	0
56:	0	1	0	1	0	1	2
63:	0	4	3	0	0	0	0
70:	1	0	0	0	0	1	0
77:	0	0	1	3	2	3	0
84:	1	2	4	1	1	0	3
91:	1	4	3	2	0	3	3
98:	2	0	3	3	4	1	1
105:	6	2	4	4	7	5	6
112:	9	5	8	5	9	7	9
119:	13	10	16	16	22	22	19
126:	16	30	25	41	47	49	80
133:	64	83	88	85	77	105	90
140:	42	31	8	2	2	1	0
147:	4	4	1	2	4	3	5
154:	3	6	4	8	12	3	7
161:	10	10	12	11	9	1	10
168:	12	10	12	10	12	15	10
175:	6	4	3	5	8	11	7
182:	15	15	18	15	8	14	25
189:	25	27	42	36	48	59	58
196:	71	83	76	103	111	131	133
203:	133	119	94	46	11	4	2
210:	0	1	1	2	1	1	0
217:	2	1	3	2	2	3	0
224:	3	4	2	5	2	2	5
231:	3	1	6	4	5	6	4
238:	5	5	6	9	7	6	13
245:	16	16	9	16	19	27	31
252:	35	35	50	50	75	87	93
259:	89	108	133	115	123	133	141
266:	122	81	47	16	2	2	1
273:	0	1	2	1	3	2	2
280:	0	0	1	0	0	1	1
287:	0	0	0	3	0	2	0
294:	0	0	2	0	0	2	1
301:	0	1	1	0	4	3	5
308:	2	6	4	0	0	0	0
315:	0	0	0	1	0	0	1
322:	0	0	0	0	0	0	0
329:	0	0	0	1	0	0	0
336:	0	1	0	1	0	0	0
343:	0	0	0	2	0	4	1
350:	2	0	0	2	0	2	0
357:	0	1	0	0	0	0	0
364:	1	0	0	1	1	1	1
371:	1	1	6	1	1	1	1
378:	5	1	0	1	0	0	0
385:	0	1	0	0	0	0	0
392:	0	1	0	0	0	0	0
399:	0	0	0	0	0	0	0
406:	0	0	0	0	0	0	0
413:	0	0	0	0	0	0	0

Avg. # of cts/channel at ends = 4.8
BKG = 101.5
Net cts for U-235 = 27.5 cts (hand calculated)
First 3 channels of ROI = 9 cts
Last 3 channels of ROI = 20 cts
Total # of channels in ROI = 21
Total (gross) cts for U-235 = 129

010091

420:	0	0	0	1	0	1	1
427:	0	1	0	4	1	3	4
434:	0	0	0	0	0	0	0
441:	0	0	0	0	0	0	0
448:	0	0	0	0	0	0	0
455:	0	0	0	0	0	0	0
462:	0	0	0	0	0	0	0
469:	0	0	0	0	0	0	0
476:	0	1	0	0	0	0	0
483:	0	0	0	0	0	0	0
490:	0	0	0	0	0	0	0
497:	0	0	0	1	1	3	3
504:	4	1	5	0	4	3	3
511:	0						

AlphaVision A36-BI Ver 1.20 12/18/97 9:17:20 AM

Southern Petroleum Laboratories-LAS 576A (AL1)

LAS Child ID:	55965-05
LAS Parent ID:	L10981-24
Method Type:	Uranium-Isotopic
Analysis Type:	Relative Region-Of-Interest
Acquisition Date:	12/17/97 9:17:08 PM
Aliquot Volume:	0.52270 g
Tracer Amount:	12.00 dpm.
Detector:	AL1-28
Number of Channels:	512
Live Time:	43,200.0 Sec.
Real Time:	43,201.6 Sec.
Detector Efficiency:	24.67 %
Chemical Yield:	81.45 %
Total Efficiency:	20.09 %
Adj. Calibration (keV):	2,923.71 + 8.9079 * Channel #.
Init. Calibration (keV):	2,923.71 + 8.8807 * Channel #.
Spectrum File:	C:\USER\DATA\55965-05.CHN
Background File:	C:\USER\BKG\B2897346.CHN
Calibration File:	C:\USER\CALIB\E2897302.CHN
Library File:	C:\USER\ALPHA\ALPHAVIS.ALB

P E A K S

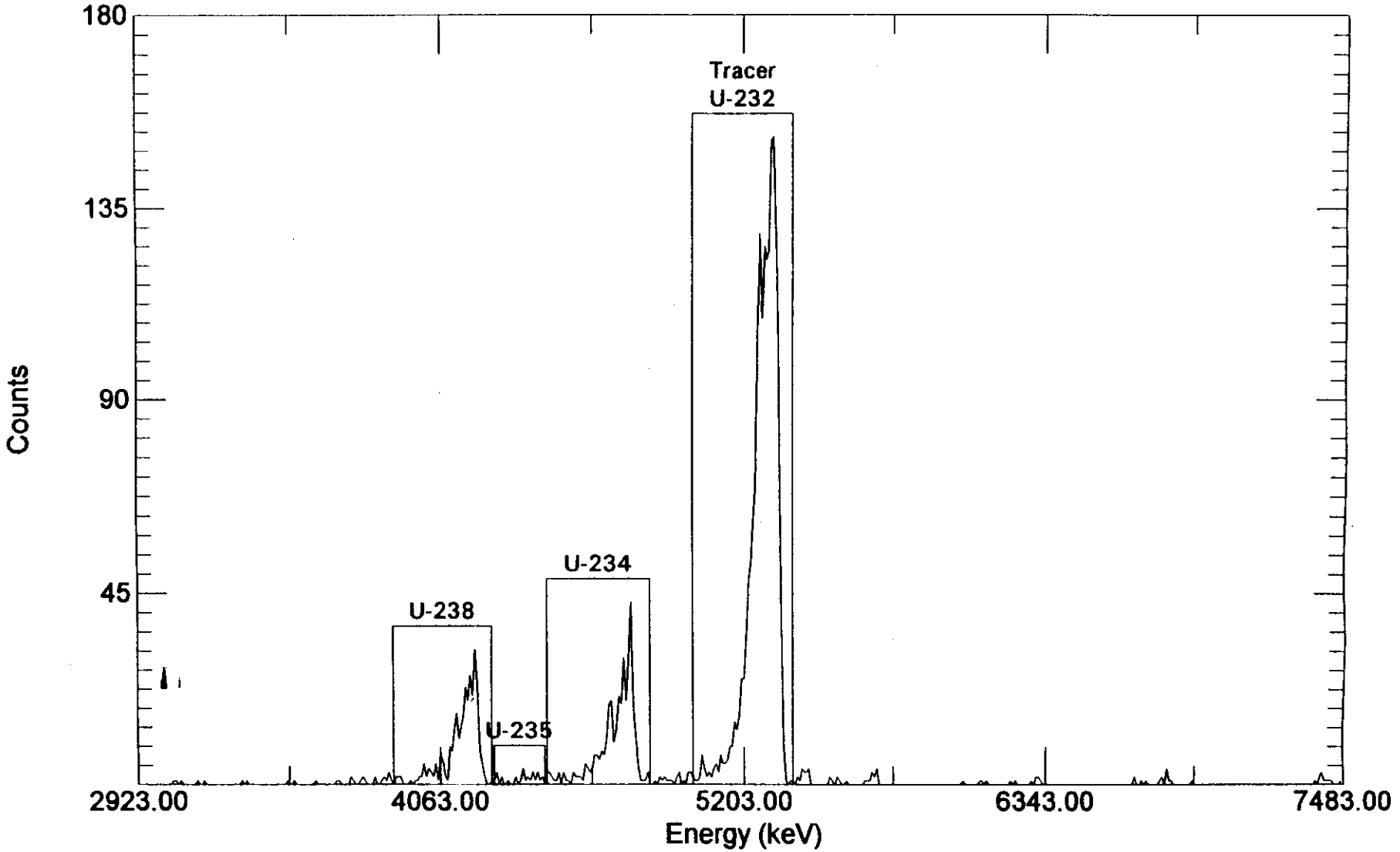
Nuclide	Energy (keV)	Centroid Channel	ROI Low	ROI High	FWHM (keV)	Width (keV)	Gross Sum	BKG Sum	Net CPM
U-234	4,776	207.9	173	216	36	36	356	1.00	0.49
U-235	4,396	165.3	151	172	18	18	28	1.00	0.04
U-238	4,196	142.8	108	150	53	53	301	1.00	0.42
U-232-tr	5,320	269.0	234	277	71	71	1,747	11.00	2.41

Note: Background count times are for 86,400 seconds (24 Hours). BKG Sum above is the background counts achieved in 24 hours normalized to the sample count time.

Analyzed By: _____ Checked By: _____

55965-05

AlphaVision Relative Region-Of-Interest (Slope Recalibration)



Acquired: 21:17:08 on 17-Dec-97
File: C:\USER\DATA\55965-05.CHN
Sample: L10981-24

Real Time: 43201.58 s. Live Time: 43200.00 s.
Detector: #28 AL1-28
Type: Uranium-Isotopic

AlphaVision A36-BI Ver 1.20 12/18/97 9:18:48 AM

Southern Petroleum Laboratories-LAS 576A (AL1)

LAS Child ID:	55965-06
LAS Parent ID:	L10981-25
Method Type:	Uranium-Isotopic
Analysis Type:	Relative Region-Of-Interest
Acquisition Date:	12/17/97 9:18:36 PM
Aliquot Volume:	0.12700 g
Tracer Amount:	12.00 dpm.
Detector:	AL1-29
Number of Channels:	512
Live Time:	43,200.0 Sec.
Real Time:	43,201.6 Sec.
Detector Efficiency:	22.02 %
Chemical Yield:	46.23 %
Total Efficiency:	10.18 %
Adj. Calibration (keV):	2,943.40 + 8.9858 * Channel #.
Init. Calibration (keV):	2,943.40 + 8.9329 * Channel #.
Spectrum File:	C:\USER\DATA\55965-06.CHN
Background File:	C:\USER\BKG\B2997346.CHN
Calibration File:	C:\USER\CALIB\E2997302.CHN
Library File:	C:\USER\ALPHA\ALPHAVIS.ALB

P E A K S

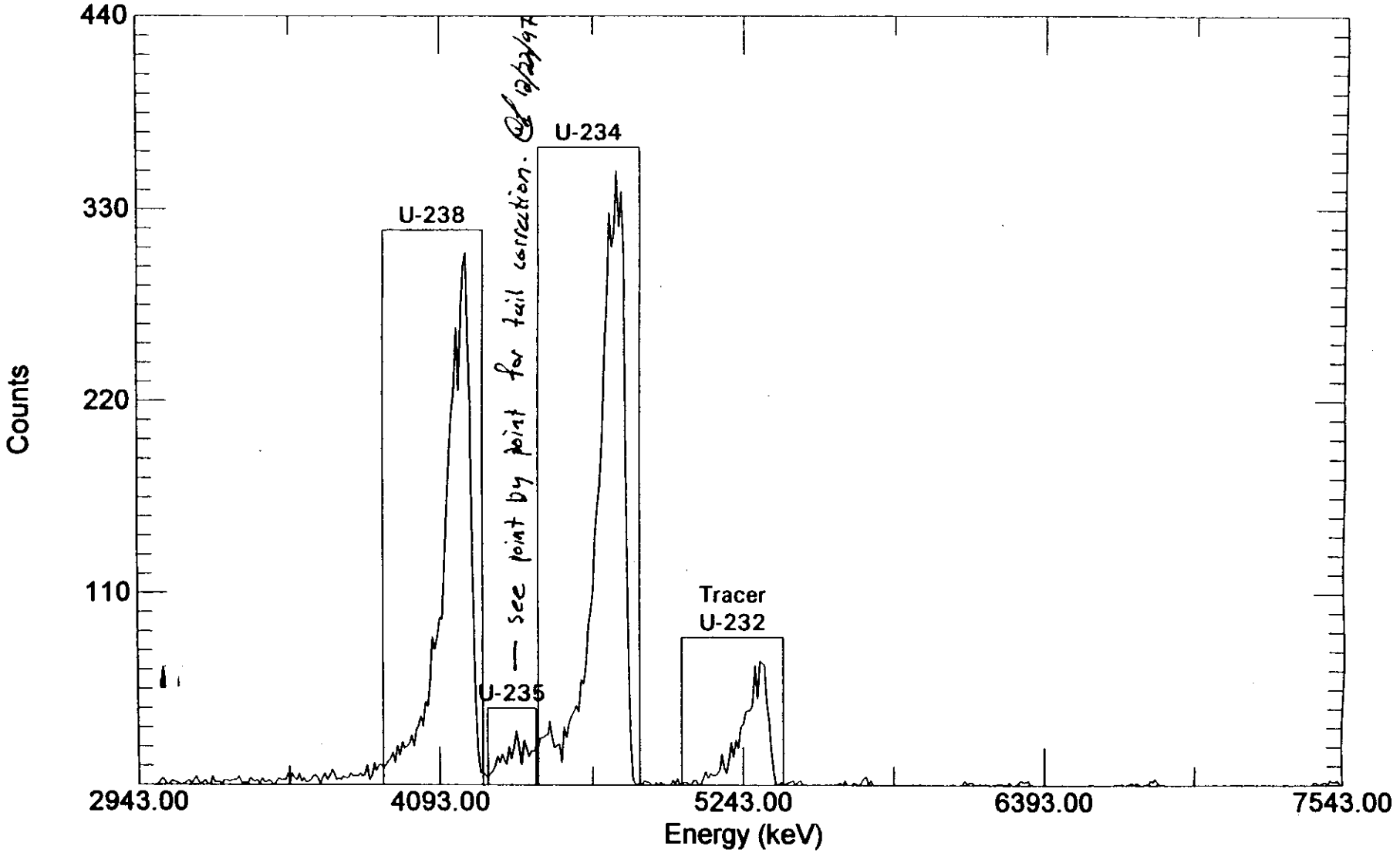
Nuclide	Energy (keV)	Centroid Channel	ROI Low	ROI High	FWHM (keV)	Width (keV)	Gross Sum	BKG Sum	Net CPM
U-234	4,776	203.9	169	212	72	72	4,791	3.00	6.65
U-235	4,396	161.7	148	168	18	18	353	1.50	0.49
U-238	4,196	139.4	104	146	72	72	3,935	0.50	5.46
U-232-tr	5,320	264.5	230	273	72	72	895	15.50	1.22

Note: Background count times are for 86,400 seconds (24 Hours). BKG Sum above is the background counts achieved in 24 hours normalized to the sample count time.

Analyzed By: _____ Checked By: _____

55965-06

AlphaVision Relative Region-Of-Interest (Slope Recalibration)



— see point by point for tail correction. 12/22/97

Acquired: 21:18:36 on 17-Dec-97
File: C:\USER\DATA\55965-06.CHN
Sample: L10981-25

Real Time: 43201.60 s. Live Time: 43200.00 s.
Detector: #29 AL1-29
Type: Uranium-Isotopic

Maestro spectrum printed on 22-Dec-97 at 12:58:24
>AL1-29
>L10981-25

0:	0	0	0	0	0	0	0
7:	0	1	3	4	3	0	1
14:	3	2	2	1	1	1	2
21:	3	1	3	5	2	1	2
28:	3	1	0	5	2	2	2
35:	1	3	3	2	3	3	3
42:	5	2	1	2	1	4	3
49:	2	3	1	4	2	2	3
56:	2	0	2	4	3	3	3
63:	7	2	7	4	3	7	2
70:	4	2	2	3	5	6	4
77:	1	4	7	3	5	9	7
84:	3	4	3	5	4	4	7
91:	5	5	5	7	5	6	12
98:	3	5	13	8	11	12	10
105:	11	14	15	19	13	23	17
112:	25	21	22	24	29	22	32
119:	34	40	34	48	45	58	85
126:	78	85	96	95	124	157	185
133:	212	224	262	226	274	298	305
140:	254	217	116	51	20	7	8
147:	6	4	7	8	11	17	13
154:	18	14	12	22	15	21	31
161:	23	12	26	21	16	20	19
168:	23	23	27	27	29	29	37
175:	28	21	23	24	13	34	27
182:	36	40	42	46	42	61	58
189:	68	91	100	110	142	160	172
196:	195	243	276	328	308	316	352
203:	320	340	301	186	85	25	3
210:	1	0	2	0	3	2	2
217:	0	0	2	0	2	1	0
224:	0	1	3	1	4	1	1
231:	2	2	1	1	3	3	0
238:	1	4	8	4	7	6	6
245:	7	9	18	10	7	14	25
252:	16	26	21	34	35	42	43
259:	43	47	69	50	72	70	69
266:	49	38	20	8	0	1	2
273:	1	1	2	2	3	1	2
280:	3	1	1	0	0	0	1
287:	0	1	0	0	1	0	1
294:	0	1	1	2	0	3	0
301:	0	0	2	1	0	2	4
308:	5	1	3	0	0	0	0
315:	0	0	0	0	0	0	0
322:	0	0	0	0	0	0	1
329:	0	0	1	0	0	0	0
336:	0	0	0	0	0	0	0
343:	0	0	1	0	0	0	1
350:	3	1	2	2	0	0	1
357:	1	0	1	0	0	0	0
364:	1	1	1	0	0	2	0
371:	0	0	2	3	2	2	3
378:	1	0	0	0	0	0	0
385:	0	0	0	0	0	0	0
392:	0	0	0	0	0	0	0
399:	0	0	0	0	0	1	0
406:	0	0	0	0	0	0	0
413:	0	0	1	0	1	0	0

Avg. # of cts/chn at ends = 13.5
BKGD = 289.5 cts
Hand Calculated Net cts for U-235 = 69.5 cts
First 3 chns of ROI = 19 cts
Last 3 chns of ROI = 62 cts
Total # of chns in ROI = 21
Total (gross) cts for U-235 = 353 cts

0000097

420:	1	2	0	2	1	0	0
427:	1	1	3	2	4	2	0
434:	1	0	0	0	0	0	0
441:	0	0	0	0	0	0	0
448:	0	0	0	0	0	0	0
455:	0	0	0	0	0	0	0
462:	0	0	0	0	0	0	0
469:	0	0	0	0	0	0	0
476:	0	0	0	0	0	0	0
483:	0	0	0	0	0	0	0
490:	0	0	0	0	0	0	0
497:	0	0	0	2	2	0	1
504:	2	2	1	3	2	2	3
511:	0						

AlphaVision A36-BI Ver 1.20 12/18/97 9:19:50 AM

Southern Petroleum Laboratories-LAS 576A (AL1)

LAS Child ID:	55965-07
LAS Parent ID:	L10981-26
Method Type:	Uranium-Isotopic
Analysis Type:	Relative Region-Of-Interest
Acquisition Date:	12/17/97 9:19:38 PM
Aliquot Volume:	0.02500 g
Tracer Amount:	12.00 dpm.
Detector:	AL1-31
Number of Channels:	512
Live Time:	43,200.0 Sec.
Real Time:	43,201.6 Sec.
Detector Efficiency:	21.32 %
Chemical Yield:	64.55 %
Total Efficiency:	13.76 %
Adj. Calibration (keV):	2,826.27 + 8.8877 * Channel #.
Init. Calibration (keV):	2,826.27 + 8.8426 * Channel #.
Spectrum File:	C:\USER\DATA\55965-07.CHN
Background File:	C:\USER\BKG\B3197346.CHN
Calibration File:	C:\USER\CALIB\E3197302.CHN
Library File:	C:\USER\ALPHA\ALPHAVIS.ALB

P E A K S

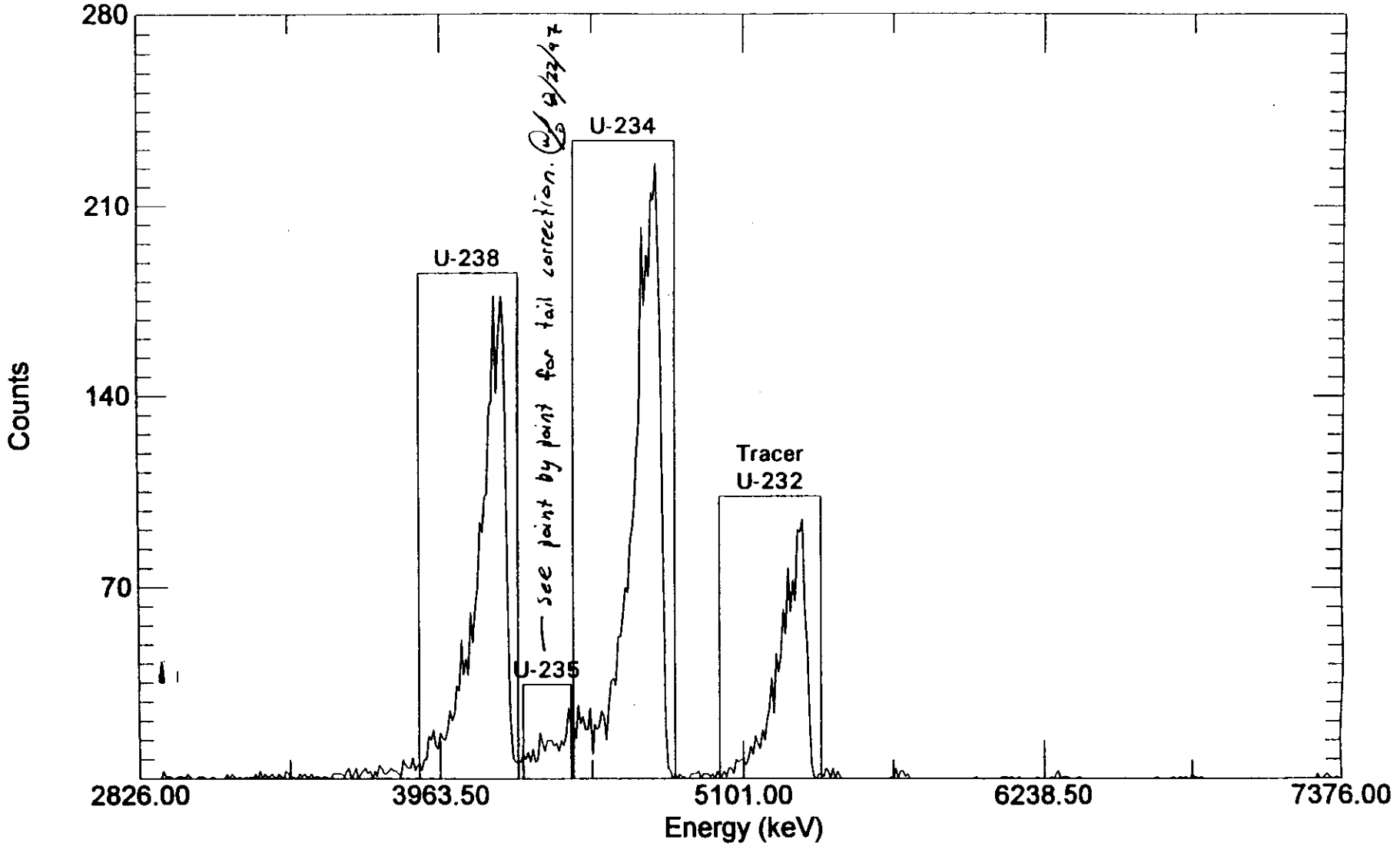
Nuclide	Energy (keV)	Centroid Channel	ROI Low	ROI High	FWHM (keV)	Width (keV)	Gross Sum	BKG Sum	Net CPM
U-234	4,776	219.4	184	227	71	71	3,136	1.50	4.35
U-235	4,396	176.6	163	183	18	18	260	0.00	0.36
U-238	4,196	154.1	119	161	71	71	2,434	1.50	3.38
U-232-tr	5,320	280.6	246	289	71	71	1,199	10.00	1.65

Note: Background count times are for 86,400 seconds (24 Hours). BKG Sum above is the background counts achieved in 24 hours normalized to the sample count time.

Analyzed By: _____ Checked By: _____

55965-07

AlphaVision Relative Region-Of-Interest (Slope Recalibration)



Acquired: 21:19:38 on 17-Dec-97
File: C:\USER\DATA\55965-07.CHN
Sample: L10981-26

Real Time: 43201.58 s. Live Time: 43200.00 s.
Detector: #31 AL1-31
Type: Uranium-Isotopic

Maestro spectrum printed on 22-Dec-97 at 12:59:08
>AL1-31
>L10981-26

0:	0	0	0	0	0	0	0
7:	0	0	0	3	1	1	1
14:	0	0	1	1	1	0	2
21:	1	0	0	0	1	1	1
28:	0	0	0	1	0	0	0
35:	0	0	2	0	2	1	0
42:	1	0	0	1	0	1	0
49:	2	0	3	0	2	1	1
56:	2	1	0	2	1	0	3
63:	2	1	1	0	0	2	1
70:	2	1	1	2	0	1	1
77:	0	1	1	0	0	2	2
84:	2	2	2	1	3	4	0
91:	2	4	0	2	3	4	2
98:	3	0	3	1	5	4	2
105:	2	3	4	3	3	2	1
112:	7	5	4	4	8	3	5
119:	5	3	7	7	16	14	18
126:	12	11	17	15	14	18	25
133:	21	24	34	32	51	38	44
140:	38	61	50	62	70	94	90
147:	103	104	136	138	177	141	163
154:	177	164	130	66	24	8	6
161:	6	6	9	7	10	6	11
168:	6	7	17	13	10	14	14
175:	14	12	13	10	14	12	16
182:	26	19	19	15	27	20	23
189:	18	18	26	9	20	18	19
196:	25	23	14	26	36	37	34
203:	52	52	60	70	68	87	92
210:	102	119	132	202	173	192	184
217:	215	212	226	192	161	90	19
224:	4	3	0	2	0	2	1
231:	1	0	0	2	2	2	3
238:	0	2	2	2	1	2	0
245:	3	1	1	3	1	4	4
252:	2	7	6	7	7	5	7
259:	12	9	16	13	11	18	14
266:	21	26	37	24	46	39	45
273:	62	53	77	61	73	65	91
280:	90	95	61	49	25	6	1
287:	0	2	2	1	4	3	0
294:	4	0	3	1	0	0	0
301:	0	0	0	0	0	0	0
308:	0	0	0	0	0	0	0
315:	0	0	0	0	1	0	4
322:	0	3	3	1	2	0	0
329:	0	0	0	0	0	0	0
336:	0	0	0	0	0	0	0
343:	0	0	0	0	0	0	0
350:	0	0	0	0	0	1	0
357:	0	0	0	0	0	0	0
364:	0	0	1	1	1	0	1
371:	0	0	1	0	0	0	0
378:	0	0	0	1	0	0	0
385:	0	0	1	0	2	3	0
392:	1	1	1	0	0	0	0
399:	1	0	0	0	0	0	0
406:	0	0	0	0	0	0	0
413:	0	0	0	0	0	0	0

First 3 CHNS of ROI = 26
3 CHNS at end of ROI = 42
Total # of CHNS in ROI = 21
Total (Gross) cts for U-235 = 260 cts
Avg. # of cts/CHN at ends = 11.3
BKGD = 238 cts
Hand calculated Net cts for U-235 = 22 cts

000101

420:	0	0	0	0	0	0	0
427:	0	0	0	0	0	0	1
434:	0	0	0	0	0	0	1
441:	0	0	1	0	1	0	0
448:	2	1	1	0	1	0	0
455:	0	0	0	0	0	0	0
462:	0	0	0	0	0	0	0
469:	0	0	0	0	0	0	0
476:	0	0	0	0	0	0	0
483:	0	0	0	0	0	0	0
490:	0	0	0	0	0	0	0
497:	0	0	0	0	0	2	0
504:	0	1	2	1	0	0	1
511:	0						

[redacted]

LAS LABORATORIES

Quicktum

Sample Preparation Worksheet for Uranium Analysis

Date Prep Started : 12-18-97

REPEAT

Matrix : Soil

Workgroup Number : U-ISOTOPIC LAL-0108_56823

Prep Due Date : 19-Dec-97

CLIENT ID	LAS ID		CHILD ID	COMMENTS (Include initial aliquot and dilution factors)	Final Aliquot (mL/1 Sample)	Client	Collection Date
L10981-35	56823DUP1	1	56823-01	0.5044g X 40mL/100mL	0.2018	DUP	12/17/97
Lab Ctrl Sample	56823LCS1	2	56823-02			LCS	12/17/97
Method Blank	56823MBB1	3	56823-03			MB	12/17/97
BOM905	L10981-35	4	56823-04	0.5268g X 80 mL / 100mL	0.4214	Waste Management Han	10/30/97
BOM8Y7	L10981-39	5	56823-05	0.5233g X 40 mL / 100 mL	0.2093	Waste Management Han	10/29/97
BOM900	L10981-42	6	56823-06	0.5175g X 10 mL / 100 mL	0.0520	Waste Management Han	10/29/97
BOM902	L10981-44	7	56823-07	0.5330g X 6 mL / 100 mL	0.0320	Waste Management Han	10/29/97
		8					
		9					
		10					
		11					
		12					
		13					
		14					
		15					
		16					
		17					
		18					
		19					
		20					
		21					
		22					
		23					
		24					

COMMENTS: Batch 108-56823 is a reprep of samples L10981-35,39,42,44 from batch 108-55964 due to low chemical recoveries. CL 12/22/97

Amount of Tracer	U-232 0.5ML
Tracer Activity	10.81 Pci/ML
Tracer ID#	95-721-70-1

Cnt Rm Custody\Date : CL 12/22/97

Amount of LCS	U-238 0.5ML
LCS Activity	10.90 Pci/ML
LCS ID#	95-721-65-1

Balance Number : 400 10123 (✓) ( )

Pipette Number : 134488 (✓) ( )

Tracer and LCS added by: 12-19-97

Witnessed by : JS 12-19-97

Sample Prep Analyst : JS

Checked by : CL 12/22/97

000103

RADIATION RESULTS CHECK REPORT

Workgroup Number: U-ISOTOPIC LAL-0108_56823

Sample	Parameter	Value	Error	MDA	Units
56823DUP1	U-233/4	9.21931	0.94334	0.177631	pCi/g
56823LCS1	U-233/4	10.4256	0.728985	0.0608218	pCi/g
56823MBB1	U-233/4	0.133292	0.0659412	0.0555089	pCi/g
L10981-35	U-233/4	8.99982	0.702937	0.0789512	pCi/g
L10981-39	U-233/4	24.2862	1.79003	0.220249	pCi/g
L10981-42	U-233/4	180.851	12.0129	0.633039	pCi/g
L10981-44	U-233/4	257.197	17.0696	1.16127	pCi/g
56823DUP1	U-235	0.595453	0.211706	0.0876211	pCi/g
56823LCS1	U-235	0.584761	0.124302	0.0300019	pCi/g
56823MBB1	U-235	-0.0016944	0.0163824	0.0411118	pCi/g
L10981-35	U-235	0.457393	0.124123	0.0389448	pCi/g
L10981-39	U-235	1.22952	0.300762	0.0497315	pCi/g
L10981-42	U-235	11.3786	2.0667	0.417763	pCi/g
L10981-44	U-235	13.6008	2.6653	0.344469	pCi/g
56823DUP1	U-238	8.80925	0.916128	0.160678	pCi/g
56823LCS1	U-238	11.5564	0.787819	0.0351827	pCi/g
56823MBB1	U-238	0.0649518	0.0424953	0.0314988	pCi/g
L10981-35	U-238	8.64368	0.682636	0.0624782	pCi/g
L10981-39	U-238	23.2019	1.72759	0.120842	pCi/g
L10981-42	U-238	182.761	12.11	0.489903	pCi/g
L10981-44	U-238	246.054	16.4808	0.771031	pCi/g

LAS LABORATORIES

Count Data Sheet for Uranium By SOP 0108

Batch Number : 10856823

LAS ID	Child ID		QC	Detector Number	Count Date Time	Count Anlst	Aliquot Size (g)	U-232 Tracer Activity DPM	U-232 Tracer GROSS Counts	U-232 Tracer BKGD Counts	U-232 Tracer U-232 FWHM	U-233/4 GROSS Counts	U-233/4 BKGD Counts	U-235 GROSS Counts	U-235 BKGD Counts	U-238 GROSS Counts	U-238 BKGD Counts
56823DUP1	56823-01	1	DUP1	AL1-01	12/22/97 23:08	WAL	0.2018	12.00	1437	39	72	494	12	32	1	471	9
56823LCS1	56823-02	2	LCS1	AL1-02	12/22/97 23:09	WAL	0.5000	12.00	1698	56	73	1620	12	91	1	1791	2
56823MBB1	56823-03	3	MBB1	AL1-03	12/22/97 23:10	WAL	0.5000	12.00	1618	55	55	23	8	1	3	10	1
L10981-35	56823-04	4	SMP1	AL1-04	12/22/97 23:10	WAL	0.4214	12.00	1547	39	73	1079	12	55	1	1034	6
L10981-39	56823-05	5		AL1-05	12/22/97 23:11	WAL	0.2093	12.00	1429	52	55	1333	23	67	0	1266	4
L10981-42	56823-06	6		AL1-07	12/22/97 23:12	WAL	0.0520	12.00	1171	35	70	2014	5	127	1	2034	2
L10981-44	56823-07	7		AL1-08	12/22/97 23:13	WAL	0.0320	12.00	1336	17	53	2028	11	107	0	1937	3
		8															
		9															
		10															
		11															
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		24															

U-232 Tracer ID # 95-721-70-1 Conc : 10.81 pCi/mL Volume : 0.5 mL Ref Date : 08/20/97 Exp Date : 08/20/99	U-Nat LCS ID # 95-721-65-1 Conc : 10.90 pCi/mL Volume : 0.5 mL Ref Date : 01/01/92 Exp Date : 07/08/99	Prep Analyst : JS,DM Prep Date : 12/18/97

Comments: Batch 108_56823 is a reprepp of samples L10981-35, 39, 42, & 44 from batch 108_55964 due to low chemical recoveries. WAL 12/24/97

Resolution check (✓) ROIs acceptable (✓)

Analyst: WL Date: 12/24/97 Checked by: JM

V96291

000105

LAS LABORATORIES

Calculation Sheet for U-233/4 By SOP 0108

Batch Number : 10856823

LAS ID	Child ID	QC	Detector Eff	Sample Count Time (sec)	Bkgd Count Time (sec)	Chem Recovery	U-233/4 LCS Activity = 10.940 Bkg Corr pCi/g	Count Error 2 sigma	Tot Prop Err 2 sigma	U-233/4 LLD	U-233/4 MDA	Data Qualifier
56823DUP1	56823-01	DUP1	0.2325	36000	86400	0.849	9.219	0.823	0.943	0.127	0.178	
56823LCS1	56823-02	LCS1	0.258	36000	86400	0.902	10.426	0.510	0.729	0.043	0.061	
56823MBB1	56823-03	MBB1	0.2367	36000	86400	0.936	0.133	0.066	0.066	0.037	0.056	
L10981-35	56823-04	SMP1	0.2473	36000	86400	0.860	9.000	0.540	0.703	0.056	0.079	
L10981-39	56823-05		0.2429	36000	86400	0.805	24.286	1.315	1.790	0.171	0.220	
L10981-42	56823-06		0.2087	36000	86400	0.770	180.851	7.908	12.013	0.389	0.633	
L10981-44	56823-07		0.2508	36000	86400	0.736	257.197	11.225	17.070	0.817	1.161	M

Comments: 56823LCS1 U-234 LCS Recovery = 10.426/10.940 = 95.3 %.
L10981-35, 56823DUP1 RPD = 2.4 %, RER = 0.13
MBB = 0.133 pCi/g => less than RDL(HAMDC).
L10981-44 U-234 MDA above RDL. Sample activity well above MDA. Sample volume reduced due to elevated sample activity. The MBB for U-234 and U-238 above MDA but below RDL. Remaining QC within limits. Report data.

Calculated by: _____ Checked by: _____

V96291

LAS LABORATORIES

Calculation Sheet for U-238 By SOP 0108

Batch Number : 10856823

LAS ID	Child ID	QC	Detector Eff	Sample Count Time (sec)	BKGD Count Time (sec)	Chem Recovery	U-238 LCS Activity = 10.900 Bkg Corr pCi/g	Count Error 2 sigma	Tot Prop Err 2 sigma	U-238 LLD	U-238 MDA	Data Qualifier
56823DUP1	56823-01	DUP1	0.2325	36000	86400	0.849	8.809	0.803	0.916	0.110	0.161	
56823LCS1	56823-02	LCS1	0.258	36000	86400	0.902	11.556	0.536	0.788	0.018	0.035	
56823MBB1	56823-03	MBB1	0.2367	36000	86400	0.936	0.065	0.042	0.042	0.013	0.031	
L10981-35	56823-04	SMP1	0.2473	36000	86400	0.860	8.644	0.528	0.683	0.040	0.062	
L10981-39	56823-05		0.2429	36000	86400	0.805	23.202	1.280	1.728	0.071	0.121	
L10981-42	56823-06		0.2087	36000	86400	0.770	182.761	7.947	12.110	0.246	0.490	
L10981-44	56823-07		0.2508	36000	86400	0.736	246.054	10.966	16.481	0.427	0.771	

Comments: 56823LCS1 U-238 LCS Recovery = 11.556/10.900 = 106.0 %.
L10981-35, 56823DUP1 RPD = 1.9 %, RER = 0.10
MBB = 0.065 pCi/g => less than RDL(HAMDC).
L10981-44 U-234 MDA above RDL. Sample activity well above MDA. Sample volume reduced due to elevated sample activity. The MBB for U-234 and U-238 above MDA but below RDL. Remaining QC within limits. Report data.

Calculated by: _____ Checked by: _____

V96291

AlphaVision A36-BI Ver 1.20 12/23/97 9:08:50 AM

Southern Petroleum Laboratories-LAS 576A (AL1)

LAS Child ID:	56823-01
LAS Parent ID:	56823DUP1
Method Type:	Uranium-Isotopic
Analysis Type:	Relative Region-Of-Interest
Acquisition Date:	12/22/97 11:08:36 PM
Aliquot Volume:	0.20180 g
Tracer Amount:	12.00 dpm.
Detector:	AL1-01
Number of Channels:	512
Live Time:	36,000.0 Sec.
Real Time:	36,001.2 Sec.
Detector Efficiency:	23.25 %
Chemical Yield:	84.87 %
Total Efficiency:	19.73 %
Adj. Calibration (keV):	2,880.95 + 9.0295 * Channel #.
Init. Calibration (keV):	2,880.95 + 9.0146 * Channel #.
Spectrum File:	C:\USER\DATA\56823-01.CHN
Background File:	C:\USER\BKG\B0197353.CHN
Calibration File:	C:\USER\CALIB\E0197295.CHN
Library File:	C:\USER\ALPHA\ALPHAVIS.ALB

P E A K S

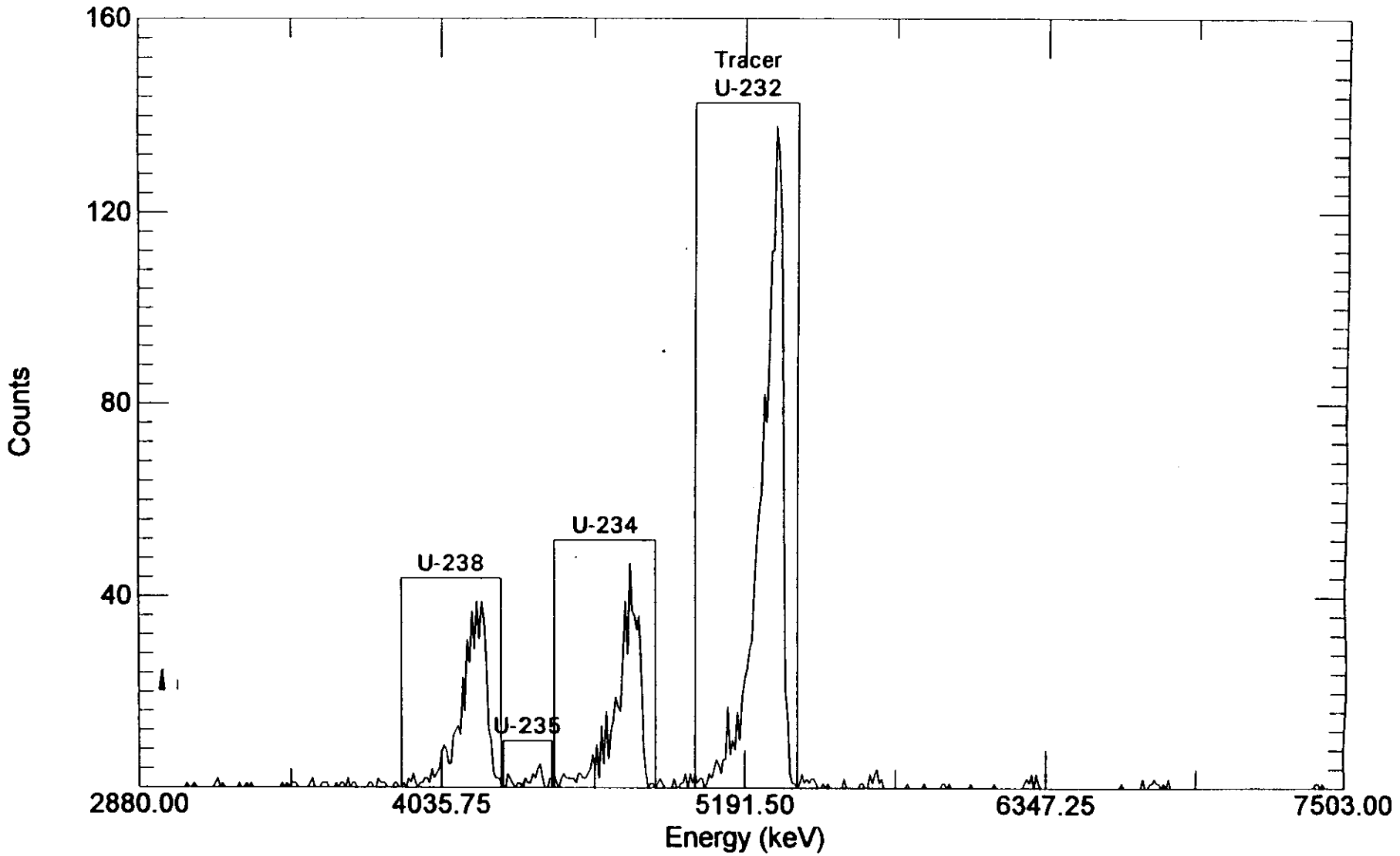
Nuclide	Energy (keV)	Centroid Channel	ROI Low	ROI High	FWHM (keV)	Width (keV)	Gross Sum	BKG Sum	Net CPM
U-234	4,776	209.9	175	218	54	54	494	5.00	0.81
U-235	4,396	167.8	154	174	54	54	32	0.42	0.05
U-238	4,196	145.6	111	153	54	54	471	3.75	0.78
U-232-tr	5,320	270.2	235	278	72	72	1,437	16.25	2.37

Note: Background count times are for 86,400 seconds (24 Hours). BKG Sum above is the background counts achieved in 24 hours normalized to the sample count time.

Analyzed By: _____ Checked By: _____

56823-01

AlphaVision Relative Region-Of-Interest (Slope Recalibration)



Acquired: 23:08:36 on 22-Dec-97
File: C:\USER\DATA\56823-01.CHN
Sample: 56823DUP1

Real Time: 36001.22 s. Live Time: 36000.00 s.
Detector: #1 AL1-01
Type: Uranium-Isotopic

AlphaVision A36-BI Ver 1.20 12/23/97 9:09:35 AM

Southern Petroleum Laboratories-LAS 576A (AL1)

LAS Child ID:	56823-02
LAS Parent ID:	56823LCS1
Method Type:	Uranium-Isotopic
Analysis Type:	Relative Region-Of-Interest
Acquisition Date:	12/22/97 11:09:28 PM
Aliquot Volume:	0.50000 g
Tracer Amount:	12.00 dpm.
Detector:	AL1-02
Number of Channels:	512
Live Time:	36,000.0 Sec.
Real Time:	36,001.2 Sec.
Detector Efficiency:	25.80 % Chemical Yield: 90.15 %
Total Efficiency:	23.26 %
Adj. Calibration (keV):	2,956.97 + 9.1624 * Channel #.
Init. Calibration (keV):	2,956.97 + 9.1274 * Channel #.
Spectrum File:	C:\USER\DATA\56823-02.CHN
Background File:	C:\USER\BKG\B0297353.CHN
Calibration File:	C:\USER\CALIB\E0297295.CHN
Library File:	C:\USER\ALPHA\ALPHAVIS.ALB

P E A K S

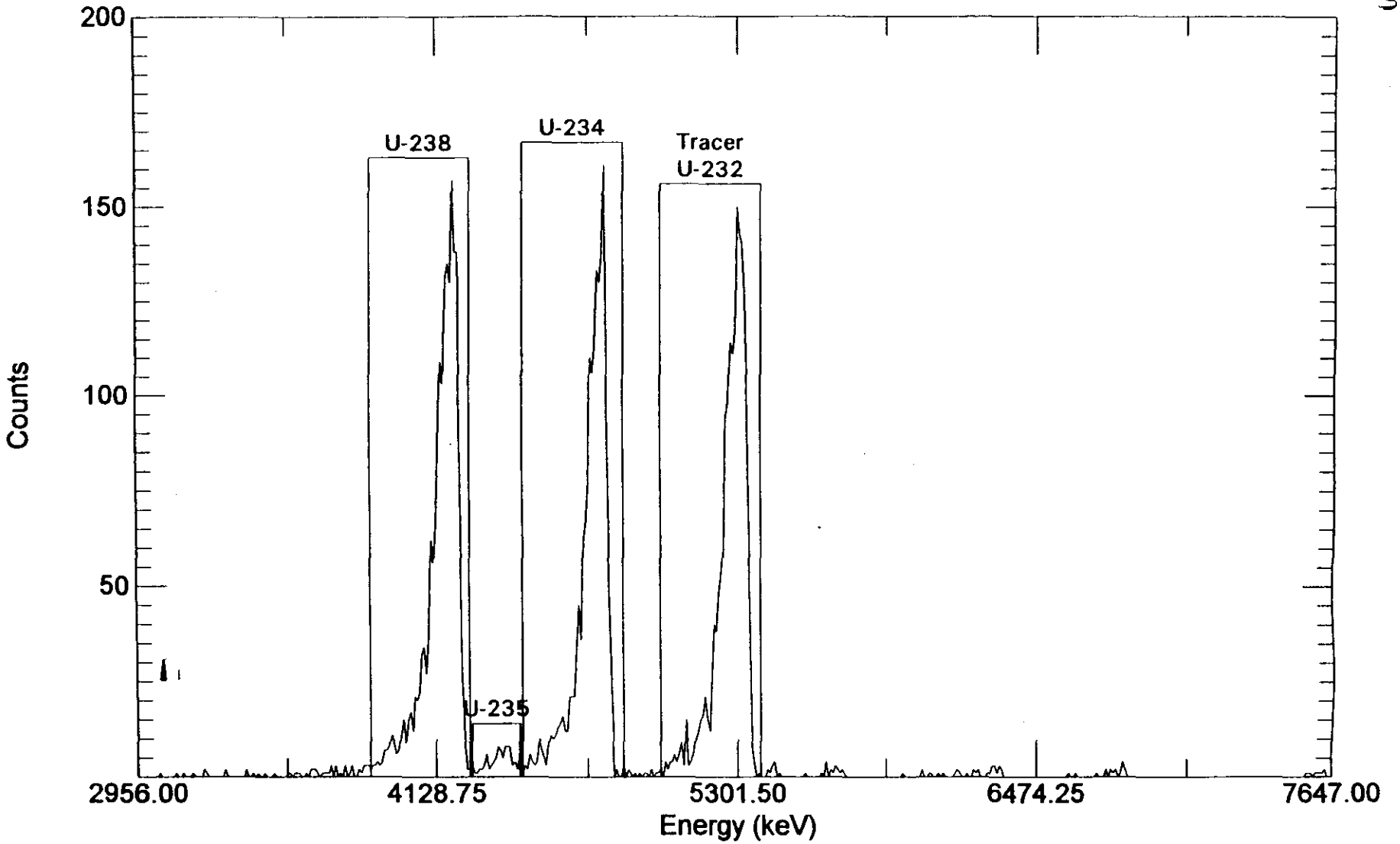
Nuclide	Energy (keV)	Centroid Channel	ROI Low	ROI High	FWHM (keV)	Width (keV)	Gross Sum	BKG Sum	Net CPM
U-234	4,776	198.5	164	207	55	55	1,620	5.00	2.69
U-235	4,396	157.1	143	163	73	73	91	0.42	0.15
U-238	4,196	135.2	100	142	92	92	1,791	0.83	2.98
U-232-tr	5,320	257.9	223	266	73	73	1,698	23.33	2.79

Note: Background count times are for 86,400 seconds (24 Hours). BKG Sum above is the background counts achieved in 24 hours normalized to the sample count time.

Analyzed By: _____ Checked By: _____

56823-02

AlphaVision Relative Region-Of-Interest (Slope Recalibration)



Acquired: 23:09:28 on 22-Dec-97
File: C:\USER\DATA\56823-02.CHN
Sample: 56823LCS1

Real Time: 36001.24 s. Live Time: 36000.00 s.
Detector: #2 AL1-02
Type: Uranium-Isotopic

AlphaVision A36-BI Ver 1.20 12/23/97 9:10:07 AM

Southern Petroleum Laboratories-LAS 576A (AL1)

LAS Child ID:	56823-03
LAS Parent ID:	56823MBB1
Method Type:	Uranium-Isotopic
Analysis Type:	Relative Region-Of-Interest
Acquisition Date:	12/22/97 11:10:01 PM
Aliquot Volume:	0.50000 g
Tracer Amount:	12.00 dpm.

Detector:	AL1-03
Number of Channels:	512
Live Time:	36,000.0 Sec.
Real Time:	36,001.2 Sec.

Detector Efficiency: 23.67 % Chemical Yield: 93.59 %
Total Efficiency: 22.15 %

Adj. Calibration (keV): 2,853.31 + 9.2419 * Channel #.
Init. Calibration (keV): 2,853.31 + 9.2467 * Channel #.

Spectrum File:	C:\USER\DATA\56823-03.CHN
Background File:	C:\USER\BKG\B0397353.CHN
Calibration File:	C:\USER\CALIB\E0397295.CHN
Library File:	C:\USER\ALPHA\ALPHAVIS.ALB

P E A K S

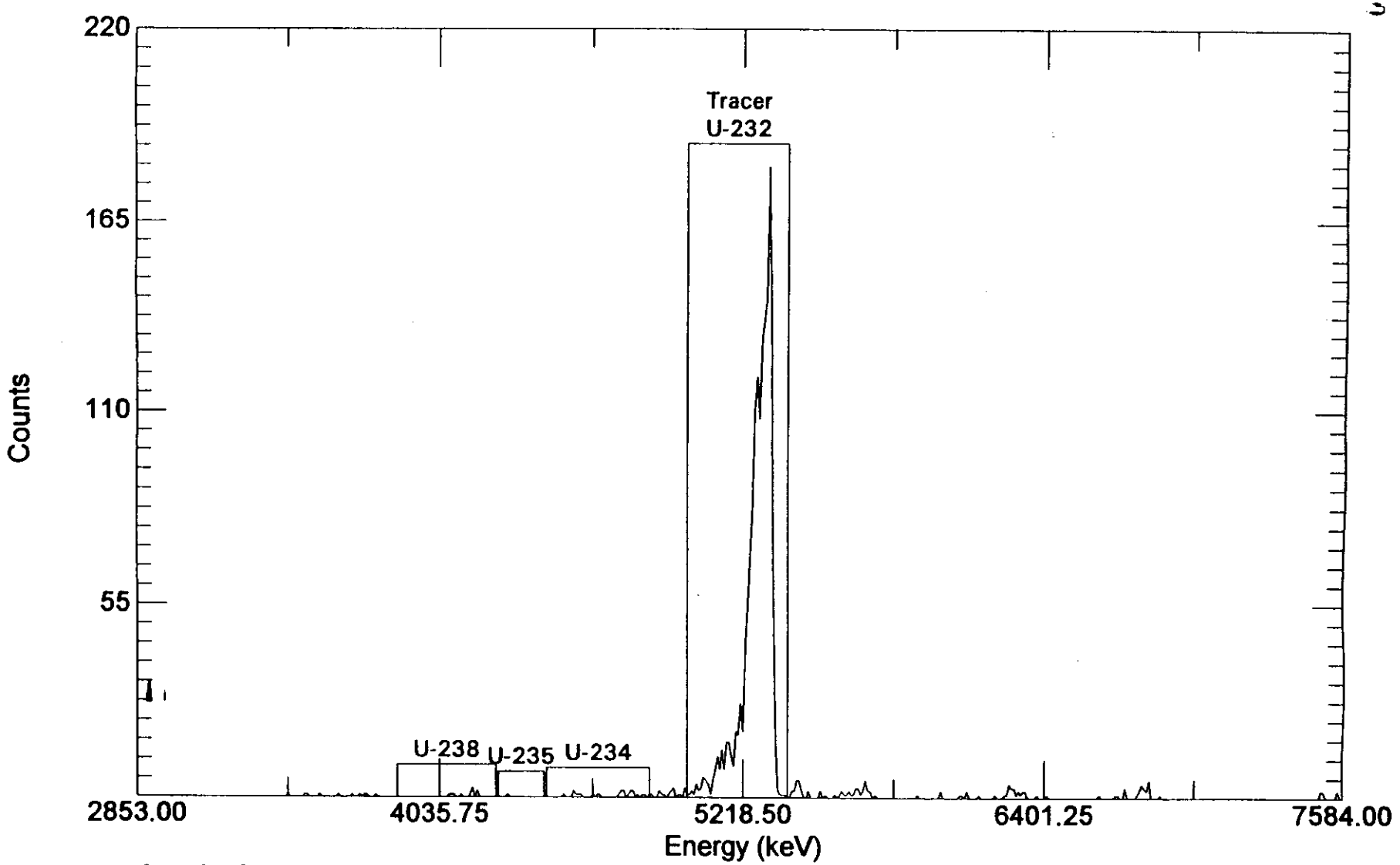
Nuclide	Energy (keV)	Centroid Channel	ROI Low	ROI High	FWHM (keV)	Width (keV)	Gross Sum	BKG Sum	Net CPM
U-234	4,776	208.0	173	216	55	55	23	3.33	0.03
U-235	4,396	166.9	153	172	18	18	1	1.25	-0.00
U-238	4,196	145.3	110	152	18	18	10	0.42	0.02
U-232-tr	5,320	266.9	232	275	55	55	1,618	22.92	2.66

Note: Background count times are for 86,400 seconds (24 Hours). BKG Sum above is the background counts achieved in 24 hours normalized to the sample count time.

Analyzed By: _____ Checked By: _____

56823-03

AlphaVision Relative Region-Of-Interest (Slope Recalibration)



Acquired: 23:10:01 on 22-Dec-97
File: C:\USER\DATA\56823-03.CHN
Sample: 56823MBB1

Real Time: 36001.22 s. Live Time: 36000.00 s.
Detector: #3 AL1-03
Type: Uranium-Isotopic

AlphaVision A36-BI Ver 1.20 12/23/97 9:10:58 AM

Southern Petroleum Laboratories-LAS 576A (AL1)

LAS Child ID:	56823-04
LAS Parent ID:	L10981-35
Method Type:	Uranium-Isotopic
Analysis Type:	Relative Region-Of-Interest
Acquisition Date:	12/22/97 11:10:51 PM
Aliquot Volume:	0.42140 g
Tracer Amount:	12.00 dpm.
Detector:	AL1-04
Number of Channels:	512
Live Time:	36,000.0 Sec.
Real Time:	36,001.2 Sec.
Detector Efficiency:	24.73 %
Chemical Yield:	85.97 %
Total Efficiency:	21.26 %
Adj. Calibration (keV):	2,828.00 + 9.0888 * Channel #.
Init. Calibration (keV):	2,828.00 + 9.0715 * Channel #.
Spectrum File:	C:\USER\DATA\56823-04.CHN
Background File:	C:\USER\BKG\B0497353.CHN
Calibration File:	C:\USER\CALIB\E0497296.CHN
Library File:	C:\USER\ALPHA\ALPHAVIS.ALB

P E A K S

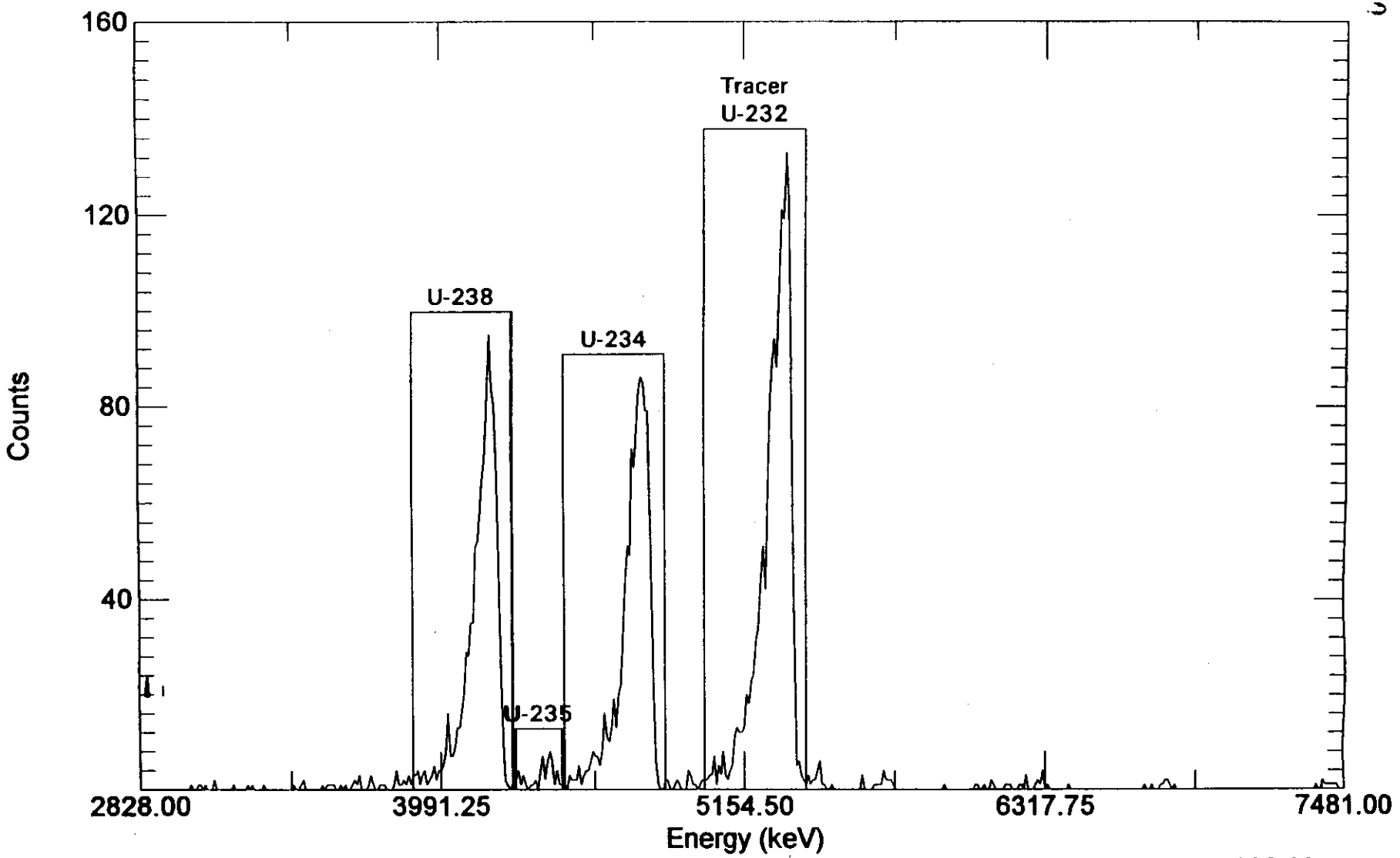
Nuclide	Energy (keV)	Centroid Channel	ROI Low	ROI High	FWHM (keV)	Width (keV)	Gross Sum	BKG Sum	Net CPM
U-234	4,776	214.3	179	222	73	73	1,079	5.00	1.79
U-235	4,396	172.5	159	178	55	55	55	0.42	0.09
U-238	4,196	150.5	116	158	55	55	1,034	2.50	1.72
U-232-tr	5,320	274.2	239	282	73	73	1,547	16.25	2.55

Note: Background count times are for 86,400 seconds (24 Hours). BKG Sum above is the background counts achieved in 24 hours normalized to the sample count time.

Analyzed By: _____ Checked By: _____

56823-04

AlphaVision Relative Region-Of-Interest (Slope Recalibration)



Acquired: 23:10:51 on 22-Dec-97
File: C:\USER\DATA\56823-04.CHN
Sample: L10981-35

Real Time: 36001.24 s. Live Time: 36000.00 s.
Detector: #4 AL1-04
Type: Uranium-Isotopic

AlphaVision A36-BI Ver 1.20 12/23/97 9:11:49 AM

Southern Petroleum Laboratories-LAS 576A (AL1)

LAS Child ID:	56823-05
LAS Parent ID:	L10981-39
Method Type:	Uranium-Isotopic
Analysis Type:	Relative Region-Of-Interest
Acquisition Date:	12/22/97 11:11:41 PM
Aliquot Volume:	0.20930 g
Tracer Amount:	12.00 dpm.
Detector:	AL1-05
Number of Channels:	512
Live Time:	36,000.0 Sec.
Real Time:	36,001.2 Sec.
Detector Efficiency:	24.29 %
Chemical Yield:	80.47 %
Total Efficiency:	19.55 %
Adj. Calibration (keV):	2,853.01 + 9.2205 * Channel #.
Init. Calibration (keV):	2,853.01 + 9.1659 * Channel #.
Spectrum File:	C:\USER\DATA\56823-05.CHN
Background File:	C:\USER\BKG\B0597353.CHN
Calibration File:	C:\USER\CALIB\E0597296.CHN
Library File:	C:\USER\ALPHA\ALPHAVIS.ALB

P E A K S

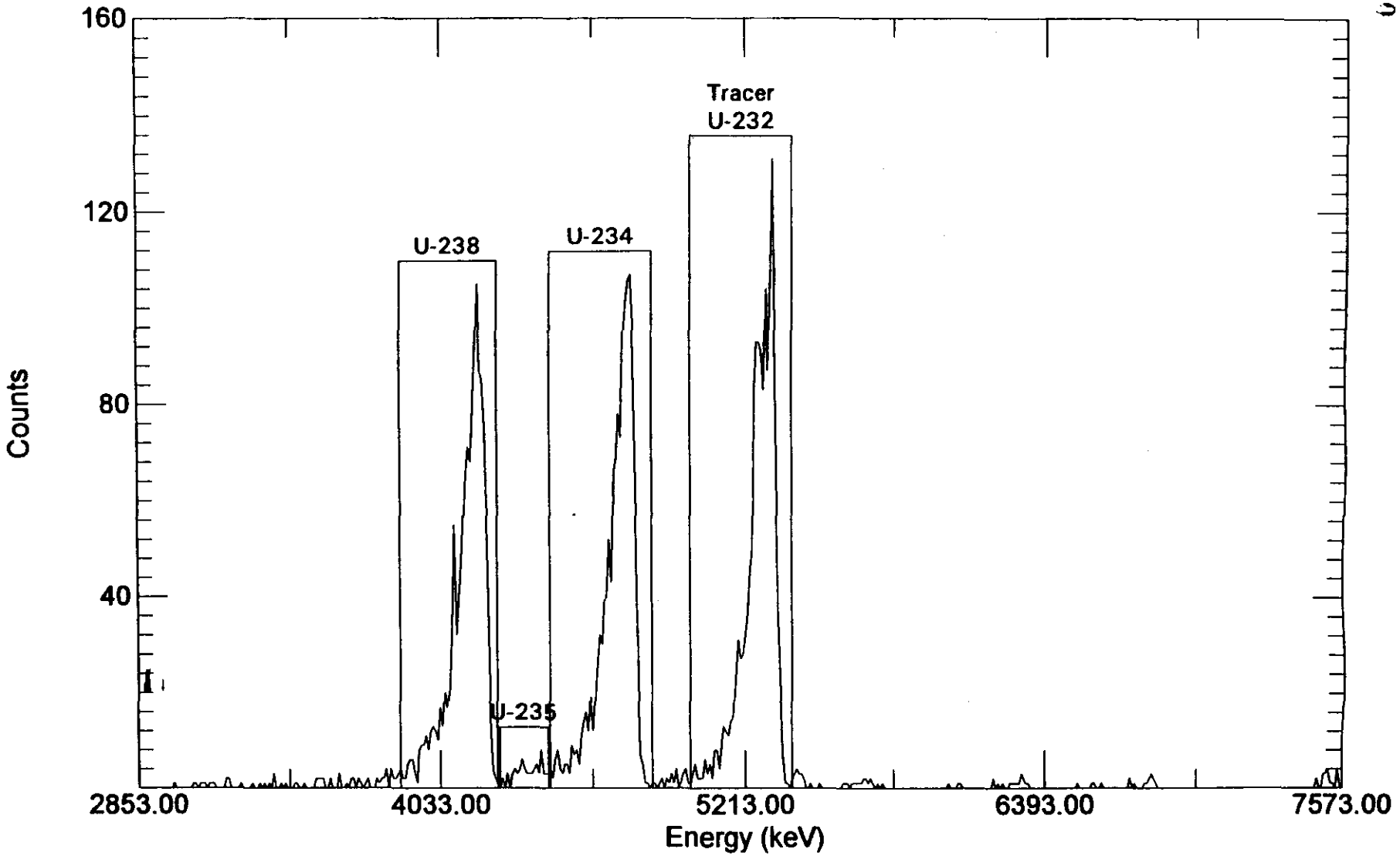
Nuclide	Energy (keV)	Centroid Channel	ROI Low	ROI High	FWHM (keV)	Width (keV)	Gross Sum	BKG Sum	Net CPM
U-234	4,776	208.5	174	217	55	55	1,333	9.58	2.21
U-235	4,396	167.3	153	173	18	18	67	0.00	0.11
U-238	4,196	145.7	111	152	55	55	1,266	1.67	2.11
U-232-tr	5,320	267.6	233	276	55	55	1,429	21.67	2.35

Note: Background count times are for 86,400 seconds (24 Hours). BKG Sum above is the background counts achieved in 24 hours normalized to the sample count time.

Analyzed By: _____ Checked By: _____

56823-05

AlphaVision Relative Region-Of-Interest (Slope Recalibration)

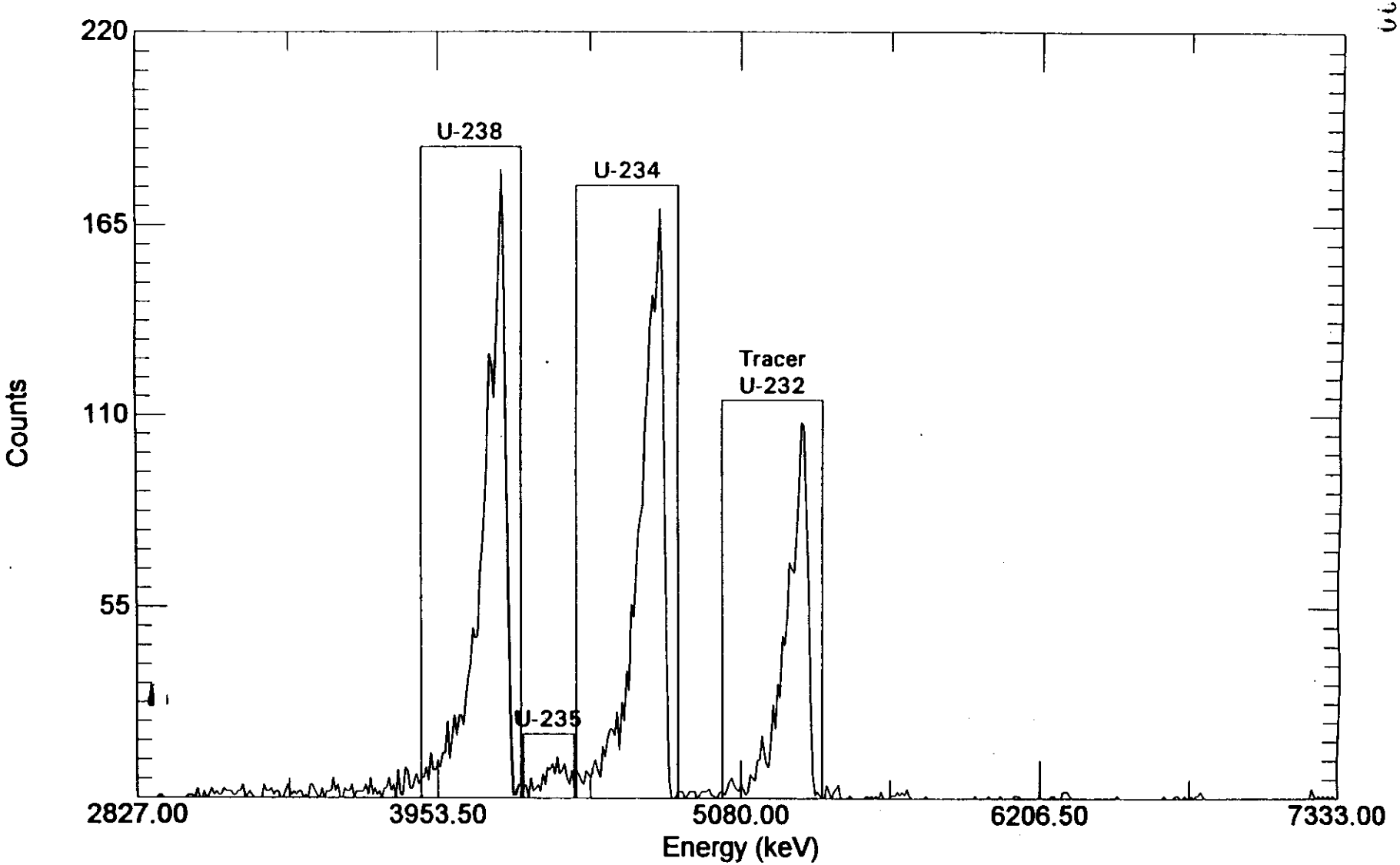


Acquired: 23:11:41 on 22-Dec-97
File: C:\USER\DATA\56823-05.CHN
Sample: L10981-39

Real Time: 36001.22 s. Live Time: 36000.00 s.
Detector: #5 AL1-05
Type: Uranium-Isotopic

56823-06

AlphaVision Relative Region-Of-Interest (Slope Recalibration)



Acquired: 23:12:44 on 22-Dec-97
File: C:\USER\DATA\56823-06.CHN
Sample: L10981-42

Real Time: 36001.22 s. Live Time: 36000.00 s.
Detector: #7 AL1-07
Type: Uranium-Isotopic

AlphaVision A36-BI Ver 1.20 12/23/97 9:13:40 AM

Southern Petroleum Laboratories-LAS 576A (AL1)

LAS Child ID:	56823-07
LAS Parent ID:	L10981-44
Method Type:	Uranium-Isotopic
Analysis Type:	Relative Region-Of-Interest
Acquisition Date:	12/22/97 11:13:31 PM
Aliquot Volume:	0.03200 g
Tracer Amount:	12.00 dpm.
Detector:	AL1-08
Number of Channels:	512
Live Time:	36,000.0 Sec.
Real Time:	36,001.2 Sec.
Detector Efficiency:	25.08 %
Chemical Yield:	73.59 %
Total Efficiency:	18.46 %
Adj. Calibration (keV):	2,856.23 + 8.8984 * Channel #.
Init. Calibration (keV):	2,856.23 + 8.8701 * Channel #.
Spectrum File:	C:\USER\DATA\56823-07.CHN
Background File:	C:\USER\BKG\B0897353.CHN
Calibration File:	C:\USER\CALIB\E0897296.CHN
Library File:	C:\USER\ALPHA\ALPHAVIS.ALB

P E A K S

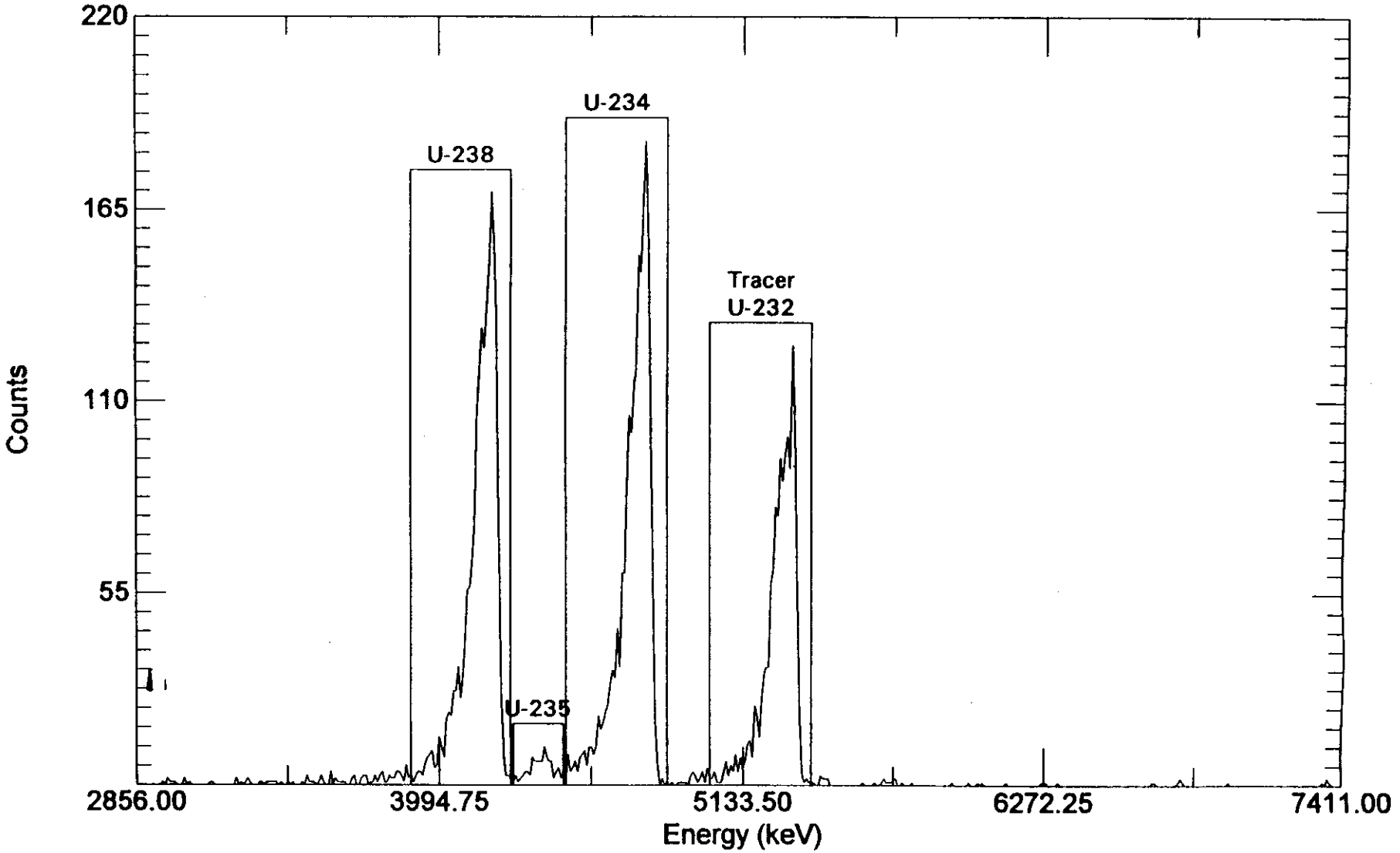
Nuclide	Energy (keV)	Centroid Channel	ROI Low	ROI High	FWHM (keV)	Width (keV)	Gross Sum	BKG Sum	Net CPM
U-234	4,776	215.7	181	224	53	53	2,028	4.58	3.37
U-235	4,396	173.0	159	180	71	71	107	0.00	0.18
U-238	4,196	150.6	116	158	53	53	1,937	1.25	3.23
U-232-tr	5,320	276.9	242	285	53	53	1,336	7.08	2.21

Note: Background count times are for 86,400 seconds (24 Hours). BKG Sum above is the background counts achieved in 24 hours normalized to the sample count time.

Analyzed By: _____ Checked By: _____

56823-07

AlphaVision Relative Region-Of-Interest (Slope Recalibration)



Acquired: 23:13:31 on 22-Dec-97
File: C:\USER\DATA\56823-07.CHN
Sample: L10981-44

Real Time: 36001.24 s. Live Time: 36000.00 s.
Detector: #8 AL1-08
Type: Uranium-Isotopic

RUN LOGS

LAS

[illegible] to re-order your logbook. RAD COUNTING ROOM

INSTRUMENT ID ALI REVIEWED BY LOGBOOK# LAS-96-LOG-1000 PAGE# 000090

START ANST	START DATE	START TIME	CHILD ID	LAL ID	DET#/ POS/	COUNT LENGTH	BATCH ID	GEOM PARAM	FILELMLANE	SAVE ANST	COMMENTS
[illegible]	12-15-97	18:15	55964-01	55964DUPI	1	36000	10855964	UPPER	~~10855964.1~~ [illegible]	N/A	55964-01
			-02	MB	2				55964-02		
			-03	LCSI	3				-03		
			-04	MBR	4				-04		
			-05	L10981-27	5				-05		
			-06	28	7				-06		
			-07	29	8				-07		
			-08	30	9				-08		
			-09	31	11				-09		
			-10	32	12				-10		
			-11	33	13				-11		
			-12	34	14				-12		
			-13	35	16				-13		
			-14	36	17				-14		
			-15	37	18				-15		
			-16	38	19				-16		
			-17	39	20				-17		
			-18	40	21				-18		
			-19	41	22				-19		
			-20	42	23				-20		
			-21	43	24				-21		
[illegible]			-22	44	25				-22		
[illegible]	12-16-97	19:00	56189-01	56189DUPI	1	36000	10856189	UPPER	56189-01		
			-02	LCSI	2				-02		
			-03	MBI	3				-03		
			-04	MSI	4				-04		
[illegible]			-05	L11040-1	5				-05		

UU0123A

RAD COUNTING ROOM

000091

INSTRUMENT ID _____ REVIEWED BY 1 _____ LOGBOOK# LAS-96-LOG-1000 PAGE# _____

START ANST	START DATE	START TIME	CHILD ID	LAL ID	DET#/ POS/	COUNT LENGTH	BATCH ID	GEOM PARAM	FILELMLANE	SAVE ANST	COMMENTS
[illegible]	12-17-97	21:20	56508-01	56508 DUPI	1	43200	10856508	UPPER	56508 - 01	N/A	
			-02	LCSI	2				-02		
			-03	MBBI	3				-03		
			-04	MSI	4				-04		
			-05	L10809-17	5				-05		
			-06	-18	7				-06		
			-07	-19	8				-07		
			-08	-20	9				-08		
			-09	-21	11				-09		
			-10	-22	12				-10		
			-11	-23	13				-11		
			-12	-24	14				-12		
			-13	-25	16				-13		
			-14	-26	17				-14		
			-15	-27	18				-15		
			-16	-28	19				-16		
			-17	-29	20				-17		
			-18	-30	21				-18		
			-19	-31	22				-19		
			-20	-32	23				-20		
			55965-01	55965DUPI	24		10855965		55965-01		
			-02	LCSI	25				02		
			-03	MBBI	26				03		
			-04	L10981-23	27				04		
			-05	-24	28				05		
			-06	-25	29				06		
[illegible]			-07	-26	31				07		
[illegible]	12-18-97	14:45	[illegible]	CAL VER	1-16	1800	—	B	C997352		
[illegible]		17:00			17-32		—	B			

00124

CONTINUING CALIBRATION VERIFICATION

ALPHA SPEC 576A
Calibration Verification Check
Am-241

ET ID	CNT DATE	ACTUAL COUNTS	ACTUAL CENTR	LOWER LIMIT	UPPER LIMIT	CENTR CHANGE
1	12/11/97	3623	289.8	286.5	291.5	
2	12/11/97	3842	278.4	274.6	279.6	
3	12/11/97	3724	285.7	282.2	287.2	
4	12/11/97	3741	293.9	290.5	295.5	
5	12/11/97	3588	287.9	284.7	289.7	
6	12/11/97	3828	283.0	280.0	285.0	
7	12/11/97	2874	303.5	300.0	305.0	
8	12/11/97	2639	297.2	294.0	299.0	
9	12/11/97	3380	286.4	282.5	287.5	
10	12/11/97	3709	288.0	284.5	289.5	
11	12/11/97	3752	283.5	280.3	285.3	
12	12/11/97	4123	289.3	286.0	291.0	
13	12/11/97	2614	292.1	288.9	293.9	
14	12/11/97	2880	289.9	286.6	291.6	
15	12/11/97	3071	288.2	285.3	290.3	
16	12/11/97	3885	287.9	284.6	289.6	
17	12/11/97	3711	294.0	290.8	295.8	
18	12/11/97	3672	289.9	286.8	291.8	
19	12/11/97	3149	291.4	288.2	293.2	
20	12/11/97	3108	290.8	287.7	292.7	
21	12/11/97	3928	286.6	283.7	288.7	
22	12/11/97	3545	289.2	286.1	291.1	
23	12/11/97	3319	287.0	284.0	289.0	
24	12/11/97	2609	291.3	288.1	293.1	
25	12/11/97	3441	288.7	285.5	290.5	
26	12/11/97	3667	288.4	285.2	290.2	
27	12/11/97	3399	285.4	282.0	287.0	
28	12/11/97	3874	288.9	286.0	291.0	
29	12/11/97	2414	285.3	282.1	287.1	
30	12/11/97	2416	289.2	286.2	291.2	
31	12/11/97	2607	301.1	298.3	303.3	
32	12/11/97	2437	299.8	296.7	301.7	

Notes : Centroid limits are calibrated centroid channel ± 1/3 expected FWHM (± 2.5 channels).
OUT indicates the centroid is outside ±2.5 channel limit.

Corrective Action : _____

Anlst: WL Date: 12-11-97

UC0126A

AL1CALSM.XLS

BACKGROUND DETERMINATION

ALPHA SPEC SYSTEM 1 (576A) BACKGROUND SUMMARY

Most recent uploaded background values

DET	Counts/24 hours U-234	U-235	U-238	FILENAME	DATE
1	9	3	4	B0197346	12/12/97
2	4	2	2	B0297346	12/12/97
3	8	2	2	B0397346	12/12/97
4	7	1	6	B0497346	12/12/97
5	11	2	4	B0597346	12/12/97
6	5	1	5	B0697346	12/12/97
7	7	3	4	B0797346	12/12/97
8	7	3	3	B0897346	12/12/97
9	14	8	5	B0997346	12/12/97
10	10	3	3	B1097346	12/12/97
11	15	0	6	B1197346	12/12/97
12	12	3	9	B1297346	12/12/97
13	14	5	2	B1397346	12/12/97
14	14	6	4	B1497346	12/12/97
15	18	3	6	B1597346	12/12/97
16	9	3	7	B1697346	12/12/97
17	7	2	12	B1797346	12/12/97
18	10	6	4	B1897346	12/12/97
19	9	8	7	B1997346	12/12/97
20	10	2	5	B2097346	12/12/97
21	9	4	5	B2197346	12/12/97
22	15	1	8	B2297346	12/12/97
23	12	7	5	B2397346	12/12/97
24	10	4	5	B2497346	12/12/97
25	13	5	8	B2597346	12/12/97
26	11	3	6	B2697346	12/12/97
27	9	2	1	B2797346	12/12/97
28	3	2	2	B2897346	12/12/97
29	6	3	1	B2997346	12/12/97
30	3	2	2	B3097346	12/12/97
31	3	0	3	B3197346	12/12/97
32	8	0	2	B3297346	12/12/97

* Indicates background counts above warning limit of 20 counts/24 hour period for nuclide.

12/15/97

ALPHA SPEC SYSTEM 1 (576A) BACKGROUND SUMMARY

Most recent uploaded background values

DET	Counts/24 hours U-234	U-235	U-238	FILENAME	DATE
1	12	1	9	B0197353	12/19/97
2	12	1	2	B0297353	12/19/97
3	8	3	1	B0397353	12/19/97
4	12	1	6	B0497353	12/19/97
* 5	* 23	* 0	4	B0597353	12/19/97
6	8	1	4	B0697353	12/19/97
7	5	1	2	B0797353	12/19/97
8	11	0	3	B0897353	12/19/97
9	14	6	12	B0997353	12/19/97
10	14	2	3	B1097353	12/19/97
11	13	3	9	B1197353	12/19/97
12	18	3	7	B1297353	12/19/97
13	5	3	1	B1397353	12/19/97
14	14	3	9	B1497353	12/19/97
15	14	1	3	B1597353	12/19/97
16	12	3	4	B1697353	12/19/97
17	6	1	6	B1797353	12/19/97
18	11	2	3	B1897353	12/19/97
19	9	3	7	B1997353	12/19/97
20	11	1	4	B2097353	12/19/97
21	11	0	2	B2197353	12/19/97
22	13	0	7	B2297353	12/19/97
23	7	5	8	B2397353	12/19/97
24	7	1	1	B2497353	12/19/97
25	10	0	4	B2597353	12/19/97
26	18	5	8	B2697353	12/19/97
27	15	5	5	B2797353	12/19/97
28	8	2	2	B2897353	12/19/97
29	9	5	5	B2997353	12/19/97
30	13	4	5	B3097353	12/19/97
31	4	0	0	B3197353	12/19/97
32	4	1	3	B3297353	12/19/97

* Indicates background counts above warning limit of 20 counts/24 hour period for nuclide.

Detector 5 U-234 background is still low enough to meet customer RDLs. Detector can be used for analysis.

CW 12/22/97

INITIAL CALIBRATION

LAS

a division of SPL

Laboratory Analytical Services
INTERDEPARTMENTAL COMMUNICATION

DATE 10/31/97

TO	Document Control	**DEPT./ ORGN.**	**BLDG./ ZONE** Bldg 9	**PLANT/ FAC.**	
FROM	Carl Schloesslin	**DEPT./ ORGN.** 5014	**BLDG./ ZONE** LAS	**PLANT/ FAC.**	**EXT.** 242

SUBJECT Alpha Spectroscopy System 1 (576A) Calibration

Attached is calibration data for detectors 1-32 of the Alpha Spec System 1 (AL1). This calibration was performed during October 1997 using AlphaVision software. Included in this package are:

1) Summary of the new energy and efficiency calibration for detectors 1-32. This summary is taken from LAL-91-LOG-0175-47 to -48.

2) Supporting documentation for the liquid standards and sources used, including copies of notebook pages substantiating standard dilutions and source certificates.

3) Summary, an IDC dated 3/23/93, of the preparation of in-house standard AC5500.

4) Summary, from LAL-92-LOG-0402, of the cross calibration of AC5500 to a NIST traceable standard (R-368) provided by Isotope Products, Inc. Included is a copy of the certificate for R-368.

5) Summary of 12-96 verification of AC5500 with R-368, taken from LAL-92-LOG-0402-42.

6 Software calibration report and standard spectrum for each detector.

cc: Andrea Tippett (report production)

PROJECT ALI Recalibration - Detectors 1-32 Continued From Page n/a

The 576A alpha spectroscopy system (ALI) was recalibrated using Alpha Vision software (ver 1.20) during the time period 10-22-97 to 10-30-97 using source AC5500 (see LAL-92-406-0402-1 for standard information. AC5500 was placed on the upper shelf and counted for 30 minutes per detector. Energy & efficiency calibration is from the Pu-239 & Cm-244 peaks and FWHM is taken from the Am-241 peak

DET	Filename	Energy Calibration (keV)	Efficiency %	FWHM (keV)
1	E0197295	2881.0 + 9.0146 * Chn	23.25	75
2	E0297295	2957.0 + 9.1274 * Chn	25.80	71
3	E0397295	2853.3 + 9.2467 * Chn	23.67	66
4	E0497296	2828.0 + 9.0715 * Chn	24.73	68
5	E0597296	2853.0 + 9.1659 * Chn	24.29	72
6	E0697296	2836.1 + 9.3801 * Chn	24.68	71
7	E0797296	2827.2 + 8.7891 * Chn	20.87	68
8	E0897296	2856.2 + 8.8701 * Chn	25.08	71
9	E0997296	2942.0 + 8.9245 * Chn	25.61	72
10	E1097296	2943.6 + 8.8584 * Chn	24.92	75
11	E1197296	2911.7 + 9.1019 * Chn	24.05	72
12	E1297300	2887.8 + 9.0059 * Chn	25.21	58
13	E1397300	2923.4 + 8.7937 * Chn	23.31	71
14	E1497300	2920.7 + 8.8738 * Chn	23.50	75
15	E1597303	2904.7 + 8.9681 * Chn	26.00	80
16	E1697300	2899.0 + 9.0091 * Chn	25.44	67
17	E1797301	2902.1 + 8.8079 * Chn	24.40	76
18	E1897301	2918.4 + 8.8737 * Chn	23.73	71
19	E1997301	2913.6 + 8.8476 * Chn	21.84	79
20	E2097301	2914.8 + 8.8593 * Chn	20.98	78
21	E2197301	2899.1 + 9.0369 * Chn	26.14	70
22	E2297303	2896.9 + 8.9701 * Chn	23.96	74
23	E2397303	2932.1 + 8.9143 * Chn	24.65	69
24	E2497303	2912.0 + 8.8565 * Chn	24.72	71

Continued on Page 48

Read and Understood By

C. Schroeder 10-31-97 TR 10/31/97

Signed Date

(AlphaVision)

Notebook No. 0175

PROJECT ALI Recalibration - Detectors 1-32 Cont.

Continued From Page 47

Det	Filename	Energy Calibration (keV)	Efficiency %	FWHM (keV)
25	E2597303	2902.9 + 8.9668 * Chn	26.24	69
26	E2697303	2912.2 + 8.9465 * Chn	25.92	74
27	E2797302	2972.5 + 8.8331 * Chn	24.84	73
28	E2897302	2923.7 + 8.8807 * Chn	24.67	72
29	E2997302	2943.4 + 8.9329 * Chn	22.02	71
30	E3097303	2939.5 + 8.8208 * Chn	21.98	80 keV
31	E3197302	2826.3 + 8.8426 * Chn	21.32	70
32	E3297302	2887.2 + 8.6852 * Chn	17.93	100

Centroid limits of the calibration verification control charts were modified to reflect this latest energy calibration. Efficiency control charts were also updated.

CS 10-31-97

Continued on Page n/a

Read and Understood By

000136

C Schlosselio 10-31-97 [signature] 10/31/97

STd. Diluted to 100 ml to make 91-0225-60-1 AA0030

CERTIFICATE OF CALIBRATION
ALPHA STANDARD SOLUTION

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

Description of Solution

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

Radioimpurities

None detected

Radioactive Daughters

None detected

Radionuclide Concentration

0.1994 µCi/gram.

Method of Calibration

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

Uncertainty of Measurement

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

NIST Traceability

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

Notes

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

Gary A. Gilmore
QUALITY CONTROL

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

AA0030

ISOTOPE VOLUME DILUTION RECORD

Isotope: Am-241 Vendor: IPL Reference Date: 11-1-91 12:00 PST

Total Activity: 0.997 µCi Vendor ID: 388-100-1 Receive Date: 10-30-1991

Total wt.(g) 5.0007 NIST traceable Y/N Cert # implicitly traceable ½ 432.7 ± 0.5 yea

Activity UNITS/g 0.1994 µCi/g ----converted to dpm/g 4.4267 x 10^5 dpm/g Receiver's Name Jimmy Morales

---

PRIMARY DILUTION: Prepared by volume

Date: 5-6-92 Preparer's Name. Joe Hutchinson

a: Decay corrected activity: 4.4267 x 10^5 dpm/g (* if <100yr decay correct to preparation date)

b: Wt. of Volumetric: 63.5665 g Balance wt check done (✓)

c: Wt. Volumetric + source: 68.4902 g Diluent: 0.5 N HCl

d: Wt. of source transfered (c-b): 4.9237 g e: Wt. of diluent + source: 100.44 g

f: Vol. of diluent + source: 100 mL g: Activity of dilution (a*d/e): N/A dpm/g

h: Density (e/f): N/A g/mL i: Activity by volume (g*h): 21700.26 dpm/g ~~dpm/mL~~

9774.89 pCi/g ⇒ 9800 pCi/g 9810 pCi/m

Dilution Log Book ID: 91-225-60-1

Working Level Dilution: Prepared by volume

Date: 5-6-92 Preparer's Name. Joe Hutchinson

A: Decay corrected activity: 9800 pCi/g ~~dpm/mL~~ (9810 pCi/ml) (* if <100yr decay correct to preparation date)

B: Wt. of Volumetric: N/A g Balance wt check done (✓)

C: Wt. Volumetric + source: N/A g Diluent: 0.1 N HNO_3

D: Wt. of source transfered: N/A g E: Wt. of diluent + source: N/A g

F: Vol. of source transferred: 1 mL G: Vol. of diluent + source: 250 mL

H: Activity of dilution (A*F/E): N/A dpm/g I: Density (E/G): N/A g/mL

I: Activity by volume (A*F/G) (H*I) or (A*D/E): ~~40 pCi/g~~ ~~dpm/mL~~ AW

40 pCi/ml

Dilution Log Book ID: 91-225-63

Reviewed by: EJ Date: 4/7/93

...OCOPY OF THE CERTIFICATE
... BEING MAILED TO YOU UNDER
SEPARATE COVER.

AAC096

National Institute of Standards & Technology

Certificate

Standard Reference Material 4320
Radioactivity Standard

Radionuclide	Curium-244
Source identification	SRM 4320
Source description	Liquid in 5-mL flame-sealed glass ampoule
Solution composition	Curium-244 in 1-molar nitric acid
Nominal mass	5.2 grams
Radioactivity concentration	57.4 Bq g^{-1}
Reference time	1200 EST April 1, 1989
Overall uncertainty	0.87 percent [(1)*]
Alpha-particle-emitting impurities (Activities at reference time)	^{243}Cm: 0.004 Bq/g ± 50% [(2)]
Half life	18.10 ± 0.02 years [(3)]
Measuring instrument	4πα liquid-scintillation counter

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

Gaithersburg, MD 20899
March, 1989

Stanley D. Rasberry, Chief
Office of Standard Reference Materials

*Notes on back

AA0096

ISOTOPE WEIGHT DILUTION RECORD

Isotope: Cm^{244} Vendor: NIST Reference Date: 4-1-89

Total Activity: – Vendor ID: SRM 4320 Receive Date: May 18, 1992

Total wt.(g) ~5.2g NIST traceable Y/N Cert. # SRM 4320 t½ 18.1 ± .02 y*

Activity UNITS/g 57.4 Bq/g ----converted to dpm/g 3444. Receiver's Name: Jimmy M.

± .87% uncertainty

2-23-
4-1-8
2.898

Decay correction $e^{-\lambda t}$ .6931.5 (2.898)/18.1

3444 (.86133) = 2966.4

PRIMARY DILUTION:

Date: 2/23/93 Preparer's Name. Agnes/Bob

a: Decay corrected activity: 2966.4 dpm/g (* if <100yr decay correct to prep. date) as of 2/23/93

b: Wt. of Volumetric: NA g

c: Wt. Volumetric + source: NA g

d: Wt of source transfered (c-b): 5.1382 g Diluent: 4M HNO_3

e: Total wt. @ 100 mL mark : 112.43 g

f: Activity of dilution (a*d/e-b): 135.57 ± .87% dpm/g

g: Density (g/mL) = (e-b/100 mL): 1.1243

h: Activity by volume = (f*g) 152.42 ± .87% dpm/mL

Dilution Log Book ID: LAL 92-353-51-1

standard in 1M HNO_3

U.S. Department of Commerce
National Institute of Standards and Technology
^{244}Cm Radioactivity Standard
Amount 57.4 Bq g^{-1}
Date 1200 EST April 1, 1989
SRM 4320
CAUTION
RADIOACTIVE

Working Level Dilution:

Date: 2/23/93 Preparer's Name. Agnes/Bob S.

A: Decay corrected activity: 135.57 dpm/g (from f: above)

B: Wt of source transfered: 3.1296 g Diluent: 4M HNO_3

C: Total weight of Dilution : 63.14 g

D: Activity of dilution A*B/C: 6.7197 ± .87% dpm/g

E: Density of Diluent: 1.1294 g/mL 4 M HNO^3 = 1.1294 ± .0007 g/mL

F: Activity by Volume = D*E 7.59 dpm/mL ← Decay Corrected to 2-23-93

Dilution Log Book ID: LAL-92-353-51-2

rgs

reviewed by rg 3/25/93

000140

AA002)

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

Calibration Certificate

Description

Principal radionuclide: PLUTONIUM-239 Half-life: 2.4×10^4 years

Nominal activity: 59 nano curies

Nominal volume: 5 ml in ampoule/bottle number: 2510-1

Measurement Activity of principal radionuclide

Activity per gram of this solution

11.8 nano curies of Plutonium-239

at 0400 hours PST on December 13, 1990

Activity of daughter radionuclide

The principal activity was accompanied at the quoted time by

curies Per gram

of the daughter nuclide

Total mass of this solution

APPROX. 5.0 grams

Method of measurement

The activity of the primary solution was measured by an internal gas flow proportional counter.

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

Useful Life

This radionuclide has decayed through half lives since it was obtained by EMSL-LV

We recommend that this solution should not be used after

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) see remarks	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 ± 0.13 %
(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

+2.7 % or - 2.7 %

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 + 3.1 %, - 3.1 % 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).

Plutonium-239 and impurities were assumed to decay 100 percent by alpha emission.

Chemical Composition of Solution

Carrier content per gram of solution:

Other components:

4M Nitric acid

Preservative:

Remarks

IMPURITIES:

Pu-238	0.033%	of the total activity
Pu-240	4.6×10^{-5}%	of the total activity
Pu-241	1.5×10^{-3}%	of the total activity
Pu-242	8.8×10^{-6}%	of the total activity
Pu-244	6.2×10^{-9}%	of the total activity

Date Certificate Prepared December 13, 1990

Approval Signature Paul R [illegible]

000142

AACOLD

ISOTOPE VOLUME DILUTION RECORD

Isotope: Pu-239 Vendor: EPA Reference Date: 0400 PST 1243-1

Total Activity: 59 Nano Ci Vendor ID: 2510-1 Receive Date: 8-26-1991

Total wt.(g) 5 NIST traceable Y/N Cert # _____ t½ 2.4 x 10⁴ years

Activity UNITS/g 11.8 nano Ci/g --converted to dpm/g 26196 Receiver's Name J.M.

PRIMARY DILUTION: ~~Prepared by volume~~ AW

Date: 9/23/91 Preparer's Name. LJ

a: Decay corrected activity: 26196 dpm/g (* if <100yr decay correct to preparation date)

b: Wt. of Volumetric: 61.9254 g Balance wt check done (✓)

c: Wt. Volumetric + source: 67.5322 g Diluent: 4M HNO_3

d: Wt. of source transfered (c-b): 5.6068 g e: Wt. of diluent + source: 112.5429 g

f: Vol. of diluent + source: 100 mL g: Activity of dilution (a*d/e): 1305 dpm/g

h: Density (e/f): 1.1254 g/mL i: Activity by volume (g*h): 1469 dpm/mL

Dilution Log Book ID: 91-199-53 (91-225-27-1)
transferred to ↑

Working Level Dilution: Prepared by volume

Date: 9/23/91 Preparer's Name. Lynn Tassi

A: Decay corrected activity: 1469 dpm/ml (* if <100yr decay correct to preparation date)

B: Wt. of Volumetric: N/A g Balance wt check done (_)

C: Wt. Volumetric + source: N/A g Diluent: 4M HNO_3

D: Wt. of source transfered: N/A g E: Wt. of diluent + source : N/A g

F: Vol. of source transferred: 1.0 mL G: Vol. of diluent + source : 100 mL

H: Activity of dilution (A*F/E): N/A dpm/g I: Density (E/G): N/A g/mL

I: Activity by volume (A*F/G) (H*I) or (A*D/E): 14.7 dpm/mL

Dilution Log Book ID: 91-199-54 ~~(91-225-81-1)~~ AW 91-225-27-2
Log Book transfer

Reviewed by: [signature] Date: 4/4/92

INTERDEPARTMENTAL COMMUNICATION

DATE 03-23-93

TO Russ, Terry, File DEPT./ ORGN. BLDG./ ZONE PLANT/ FAC.

FROM Bob Swoboda DEPT./ ORGN. 86-14 BLDG./ ZONE LAL PLANT/ FAC. K-01 EXT. 285

SUBJECT: Preparation of LAL Efficiency Source for Calibration

An alpha spec. source was prepared in a geometry that was identical to the samples. i.e. activities of sources were microprecipitated onto a Tuffryn Filter. The isotopes used Am-241, Cm-244, and Pu-239, duplicated those of the NIST (foil mounted) Certified Source. The following table identifies the LAL sources used and the amounts used although these activities are only relative and will be cross calibrated against the NIST (foil) source.

Isotope	LAL #	dpm/g	wt. trans.	total dpm	NIST ID
Am-241	91-225-60-1	≈9800	≈ .3 g	≈2900	Isotope-- Products
Cm-244	92-353-51-1	135.6	11.4063	1546.4	SRM-4320
Pu-239	91-199-53-1	1305	1.3291	1734.5	EPA- SRM 2510-1

LAL Source ID: AC-5500

The supporting documentation on the source dilution and NIST certificate (if applicable) is attached.

FORM LESC 426-2

Rec'd 12/24/91 AAØØ82

CERTIFICATE OF CALIBRATION
MIXED NUCLIDES STANDARD SOURCE

Radionuclide A:	Pu-239	Customer:	LOCKHEED ENGINEERING & SCIENCES Co
Radionuclide B:	Am-241	P.O. No.:	06LAB1245
Radionuclide C:	Cm-244	Catalog No.:	Custom
Half Life (Pu-239):	(2.411 ± 0.003) x 10^4 years	Reference Date:	December 1 1991
Half Life (Am-241):	432.7 ± 0.5 years	Source No.:	R-368
Half Life (Cm-244):	18.11 ± 0.02 years		

Contained Radioactivity

Pu-239:	0.0409	μCi	Cm-244:	0.0449	μCi
Am-241:	0.0398	μCi	Total Activity:	0.1256	μCi

Description of Source

a. Capsule type:	Planchet
b. Nature of active deposit:	Electrodeposited and diffusion bonded oxides
c. Active diameter/volume:	22 mm
d. Backing:	Platinum clad nickel
e. Cover:	None

CAUTION!
DELICATE SURFACE
DO NOT WIPE
ACTIVE AREA

Radioimpurities

None detected

Method of Calibration

The source was assayed by alpha spectrometry using a surface barrier detector.

Uncertainty of Measurement	Pu-239	Am-241	Cm-244
a. Systematic uncertainty:	1.7%	1.7%	1.7%
b. Random uncertainty in assay:	1.3%	1.3%	1.1%
c. Random uncertainty in weighing:	0.0%	0.0%	0.0%
d. Total uncertainty at the 99% confidence level:	3.0%	3.0%	2.8%

NIST Traceability

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

Notes

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

ISOTOPE PRODUCTS LABORATORIES
1800 N. Keystone Street.,
Burbank, California 91504
(818) 843 - 7000

QUALITY CONTROL

IPL Ref No. 388-103 00145

AN IN-HOUSE 3-NUCLIDE SOURCE WAS MADE USING PU-239, AM-241, AND CM-244 STANDARDS. A UNIFORM DEPOSIT OF 22 MM DIAMETER WAS MADE ON A 25 MM TUFFRYN FILTER BY CO-PRECIPITATING THE STANDARD WITH NEODYMIUM FLUORIDE THEN VACUUM FILTERING THE PRECIPITATE. THE FILTER WAS THEN MOUNTED ON A 25 MM STAINLESS STEEL DISK AND STORED IN A SMALL PETRI DISH. LAL ID AC5500

THIS IN-HOUSE SOURCE WAS THEN CROSS-CALIBRATED TO A NIST TRACEABLE SOURCE PURCHASED FROM ISOTOPE PRODUCTS LABORATORY, SOURCE NO. R-368, AS FOLLOWS:

DISTANCE FROM DETECTOR INCREASED TO REDUCE ANY POSSIBLE GEOMETRY DIFFERENCE BETWEEN FP- AND IN-HOUSE SOURCES

1) R-368 COUNTED @ SHELF G (~26 MM FR/DETECTOR ~1/2 WAY IN CHAMBER), THEN EFFICIENCY CALCULATED FOR EACH NUCLIDE USING PEAK FIT (AUTOMATIC) AND ROI (MANUAL) ANALYSIS:

(EFFICIENCY)

	PU-239	AM-241	CM-244	AVG
PEAK FIT	0.0284	0.0263	0.0256	0.0268
ROI	0.0273	0.0275	0.0267	0.0272

2) AC5500 COUNTED @ SHELF G. AVG. EFFICIENCY FROM 1) ABOVE APPLIED TO CPM RESULT TO DETERMINE DPM OF SOURCE.

(DPM) (3/3/93)

	PU-239	AM-241	CM-244
PEAK FIT	1674	3914	1482
ROI	1654	3950	1424

3) R-368 COUNTED @ SHELF 14 (~40 MM FR/DETECTOR BOTTOM OF CHAMBER), THEN EFF. CALCULATED FOR EACH NUCLIDE USING PEAK FIT (AUTOMATIC) AND ROI (MANUAL) ANALYSIS:

(EFFICIENCY)

	PU-239	AM-241	CM-244	AVG
PEAK FIT	0.0116	0.0113	0.0117	0.0115
ROI	0.0119	0.0119	0.0115	0.0117

Continued on Page 2

Read and Understood By

D Romanko 3/15/93 3-15-93

Signed Date

Rockwood Analytical Laboratory Notebook No. LAL-92-L06-0402
PROJECT SHELF A CALIBRATION (EFF) Continued From Page 1

4) AC5500 COUNTED @ SHELF K, AVG EFF FROM 3) ABOVE APPLIED TO EACH NUCLIDE CPM RESULT TO DETERMINE DPM OF SOURCE.

(DPM - 3/3/93)

	PU-239	AM-241	CM-244
PEAK FIT	1740	4008	1523
ROI	1719	4046	1454

5) RESULTS FROM 2) AND 4) AVERAGED (GOOD AGREEMENT).

(DPM - 3/3/93)

	PU-239	AM-241	CM-244
PEAK FIT	1707	3961	1503
ROI	1687	3998	1439

6) AC5500 COUNTED IN SHELF A ON ALL DETECTORS BETWEEN 3/9/93 AND 3/15/93. CM-244 PEAK USED (LESS (SMALLER) INTERFERENCE DUE TO OVERLAP OF PEAKS) WITH PEAK-FIT ANALYSIS TO DETERMINE EFFICIENCY OF SHELF A. VALUE OF 500 DPM USED FOR ALL CALCULATIONS (CM-244)

30 MIN COUNT EACH DET. TO ACHIEVE 10,000 NET COUNTS.

DET -	EFF	DET -	EFF	DET -	EFF
01	.2559	13	.2604	25	.2477
02	.2683	14	.2351	26	.2628
03	.2647	15	.2661	27	.2504
04	.2520	16	.2145	28	.2829
05	.2748	17	.2602	29	.2653
06	.2652	18	.2748	30	.2703
07	.2706	19	.2740	31	.2686
08	.2699	20	.2646	32	.2701
09	.2707	21	.2535		
10	.2687	22	.2720		
11	.2667	23	.2627		
12	.2673	24	.2527		

Continued on Page N/A

Read and Understood By

000147

TJ Romanko 3/15/93 [signature] 3-15-93
Signed Date Signed Date

AC5500 Cross Calibration With Isotope Products R-368

On 12-4-96 to 12-5-96 an activity verification of AC5500 was performed by cross calibration with Isotope Products electrodeposited foil source R-368. AC5500 is an in-house micro-precipitated standard made and cross calibrated with R-368 in March '95. This cross calibration is to verify that the integrity of AC5500 has remained unchanged and can still be used to calibrate the alpha spectroscopy systems.

Like the March '95 calibration, the two standards are each counted on two different shelves to eliminate geometry differences between the micro-precipitated and foil source. Shelf G and K are approximately 1 and 1.5 inches from the detector face respectively. Detector 5 of the Octete (AL2) was used for the cross calibration.

R-368 Counting Efficiency					
	Cm-244	Am-241	Pu-239	Average	STD
ROI - Shelf G	0.0416	0.0420	0.0422	0.0419	0.0003
PS&F - Shelf G	0.0412	0.0392	0.0404	0.0403	0.0010
ROI - Shelf K	0.0179	0.0179	0.0179	0.0179	0.0000
PS&F - Shelf K	0.0177	0.0168	0.0171	0.0172	0.0004

AC5500 dpm on 3/3/93 using R-368 Average Efficiency			
	Cm-244	Am-241	Pu-239
ROI - Shelf G	1433	4008	1721
ROI - Shelf K	1484	3999	1724
PS&F - Shelf G	1490	4000	1732
PS&F - Shelf K	1545	3984	1695

Using the Peak Search & Fit results above the average activities of AC5500 on 3/3/93 are:

Cm-244: 1518 dpm -->> 1503 dpm inital calibration.
Am-241: 3992 dpm -->> 3961 dpm inital calibration.
Pu-239: 1714 dpm -->> 1707 dpm inital calibration.

The results between this calibration and the initial calibration of AC5500 agree very closely. AC5500 can continue to be used for calibrating detectors. The activities of the initial calibration will continue to be used as the known activities.

Carl Schlosser 12-9-96

Continued on Page NA

Read and Understood By

C Schlosser 12-9-96 TK 12/11/96

AlphaVision A36-BI Ver 1.20 10/22/97 3:01:51 PM
Southern Petroleum Laboratories-LAS 576A (AL1)

E N E R G Y / E F F I C I E N C Y C A L I B R A T I O N

Standard Name:	AC5500
Certification Date:	3/ 3/93 12:00:00 PM
Sample Type:	Calibration
Analysis Type:	Absolute Peak Search And Fit
Acquisition Date:	10/22/97 2:31:41 PM
Detector:	AL1-01
Group:	D1 Calibration
Number of Channels:	512
Live Time:	1,800.00 Sec.
Real Time:	1,801.14 Sec.
Spectrum File:	C:\USER\CALIB\E0197295.CHN
Background File:	
Library File:	C:\USER\ALPHA\ALPHAVIS.ALB
Certificate File:	C:\USER\ALPHA\ALPHAVIS.ALB

---------- Results ----------

New Calibration:	2,880.9526 + 9.0146 * Chn.
Old Calibration:	2,889.2100 + 8.9829 * Chn.
New Efficiency:	23.25 %
Old Efficiency:	23.85 %

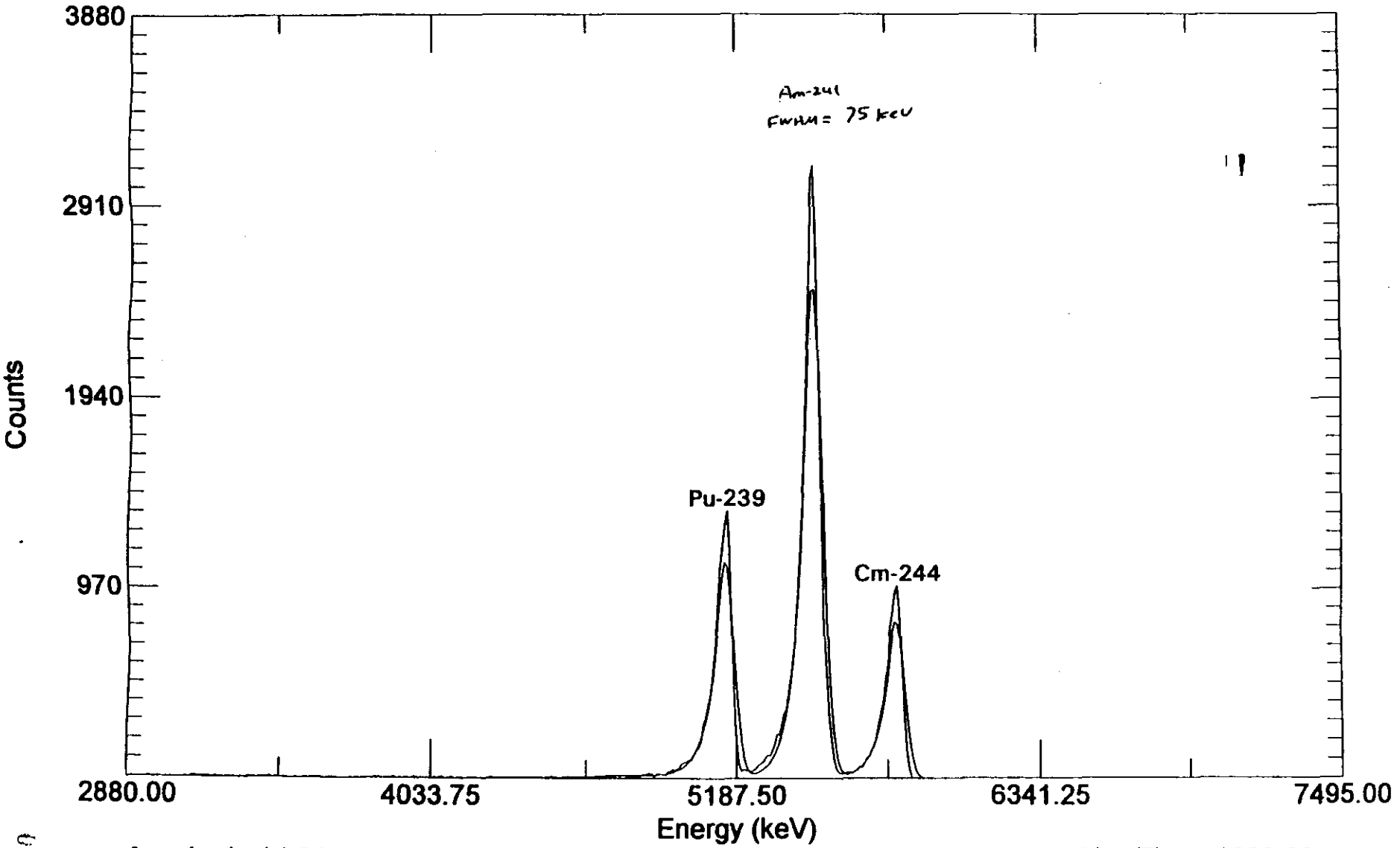
P E A K S U S E D I N C A L I B R A T I O N

	Channel	Energy (meV)	Activity DPM	FWHM	Gross Count	Bkg Count	Net Count	CPM
1:	Cm-244							
Obs:	324.37	5.8050	1,491.15	6.79	8,710.50	0.00	8,710.50	290.35
Exp:	324.37	5.8050	1,503.00					
	Peak Efficiency:		23.07 %					
2:	Pu-239							
Obs:	252.31	5.1554	1,720.46	6.82	12,000.34	0.00	12,000.34	400.01
Exp:	252.31	5.1554	1,707.00					
	Peak Efficiency:		23.44 %					

Calibrated By: C Schroeder 10-22-97

E0197295

AlphaVision Absolute Peak Search And Fit



Acquired: 14:31:41 on 22-Oct-97
File: C:\USER\CALIB\E0197295.CHN
Sample: AC5500

Real Time: 1801.14 s. Live Time: 1800.00 s.
Detector: #1 AL1-01
Type: Calibration

00150

AlphaVision A36-BI Ver 1.20 10/22/97 4:52:18 PM
Southern Petroleum Laboratories-LAS 576A (AL1)

E N E R G Y / E F F I C I E N C Y C A L I B R A T I O N

Standard Name:	AC5500
Certification Date:	3/ 3/93 12:00:00 PM
Sample Type:	Calibration
Analysis Type:	Absolute Peak Search And Fit
Acquisition Date:	10/22/97 4:22:09 PM
Detector:	AL1-02
Group:	D2 Calibration
Number of Channels:	512
Live Time:	1,800.00 Sec.
Real Time:	1,801.26 Sec.
Spectrum File:	C:\USER\CALIB\E0297295.CHN
Background File:	
Library File:	C:\USER\ALPHA\ALPHAVIS.ALB
Certificate File:	C:\USER\ALPHA\ALPHAVIS.ALB

---------- Results ----------

New Calibration:	2,956.9705 + 9.1274 * Chn.
Old Calibration:	2,951.3101 + 9.1079 * Chn.
New Efficiency:	25.80 %
Old Efficiency:	25.68 %

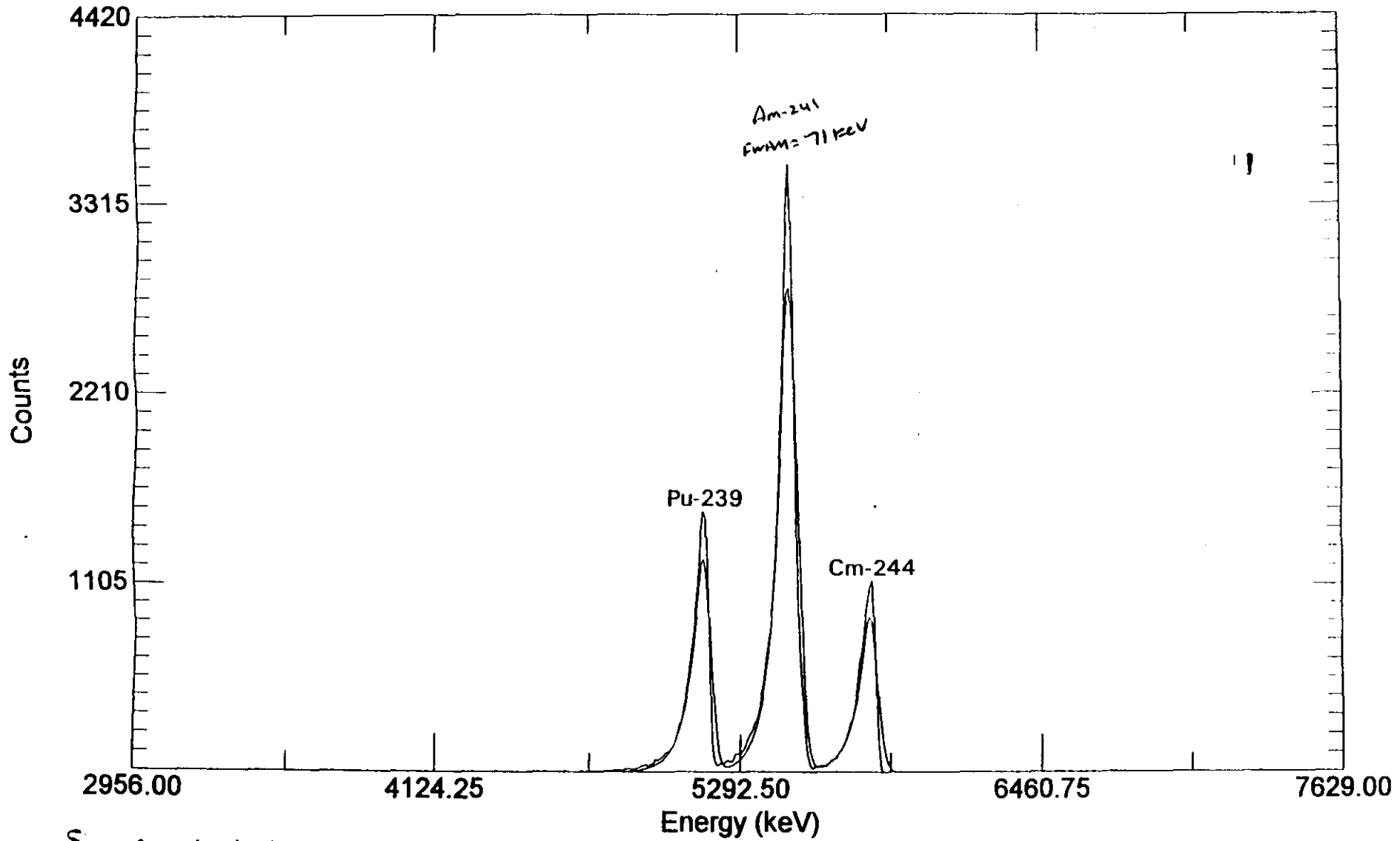
P E A K S U S E D I N C A L I B R A T I O N

	Channel	Energy (meV)	Activity DPM	FWHM	Gross Count	Bkg Count	Net Count	CPM
1:	Cm-244							
Obs:	312.03	5.8050	1,495.31	5.66	9,689.69	0.00	9,689.69	322.99
Exp:	312.03	5.8050	1,503.00					
	Peak Efficiency:		25.66 %					
2:	Pu-239							
Obs:	240.86	5.1554	1,715.73	5.86	13,275.77	0.00	13,275.77	442.53
Exp:	240.86	5.1554	1,707.00					
	Peak Efficiency:		25.93 %					

Calibrated By: C Schlosser 10-22-97

E0297295

AlphaVision Absolute Peak Search And Fit



Acquired: 16:22:09 on 22-Oct-97
File: C:\USER\CALIB\E0297295.CHN
Sample: AC5500

Real Time: 1801.26 s. Live Time: 1800.00 s.
Detector: #2 AL1-02
Type: Calibration

00152

AlphaVision A36-BI Ver 1.20 10/22/97 6:01:02 PM
Southern Petroleum Laboratories-LAS 576A (AL1)

E N E R G Y / E F F I C I E N C Y C A L I B R A T I O N

Standard Name: AC5500
Certification Date: 3/ 3/93 12:00:00 PM
Sample Type: Calibration
Analysis Type: Absolute Peak Search And Fit
Acquisition Date: 10/22/97 5:30:52 PM

Detector: AL1-03
Group: D3 Calibration
Number of Channels: 512
Live Time: 1,800.00 Sec.
Real Time: 1,801.16 Sec.

Spectrum File: C:\USER\CALIB\E0397295.CHN
Background File:
Library File: C:\USER\ALPHA\ALPHAVIS.ALB
Certificate File: C:\USER\ALPHA\ALPHAVIS.ALB

---------- Results ----------

New Calibration: 2,853.3140 + 9.2467 * Chn.
Old Calibration: 2,861.3601 + 9.2143 * Chn.

New Efficiency: 23.67 %
Old Efficiency: 24.56 %

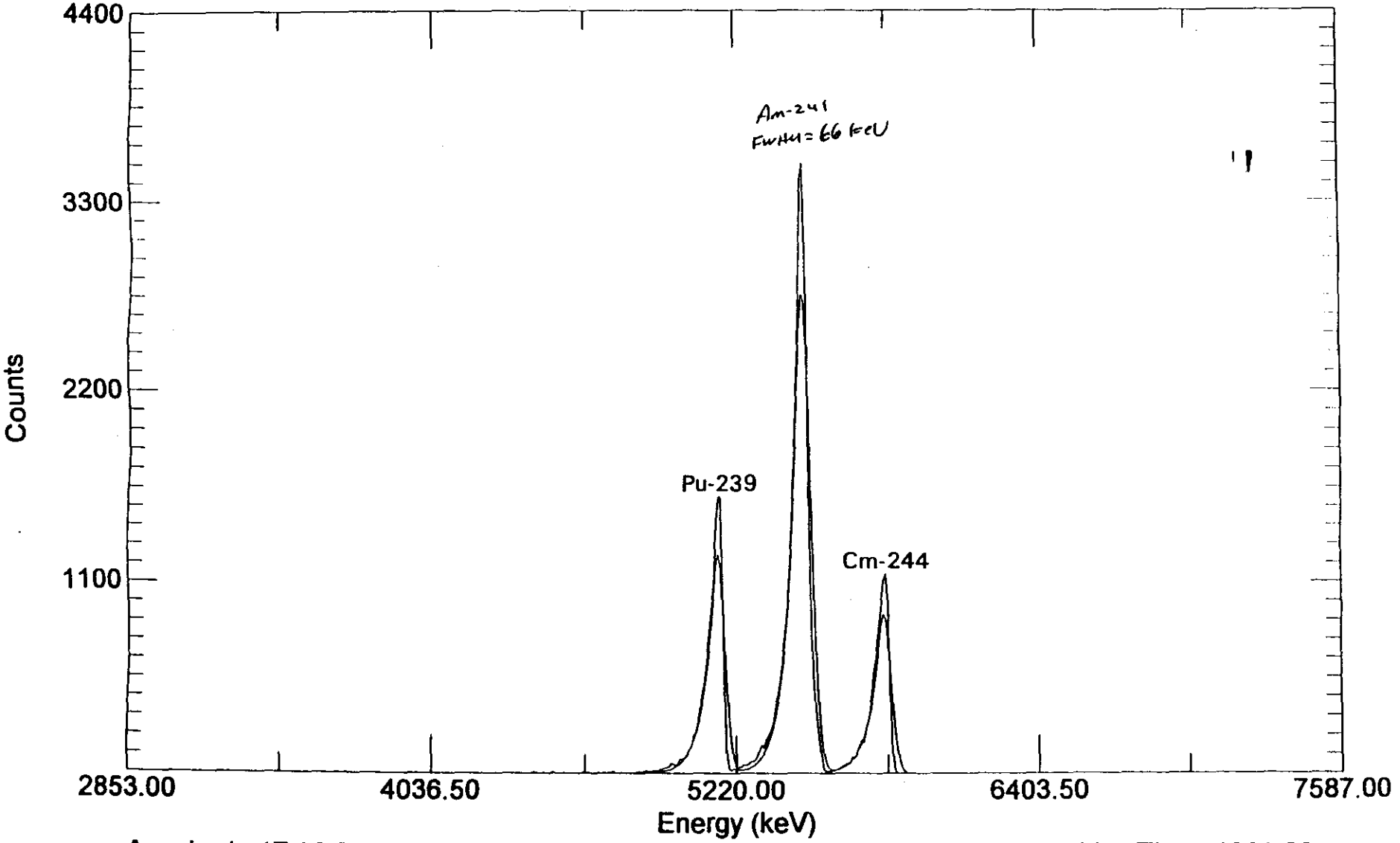
P E A K S U S E D I N C A L I B R A T I O N

	Channel	Energy (meV)	Activity DPM	FWHM	Gross Count	Bkg Count	Net Count	CPM
1:	Cm-244							
Obs:	319.21	5.8050	1,509.97	5.30	8,978.20	0.00	8,978.20	299.27
Exp:	319.21	5.8050	1,503.00					
	Peak Efficiency:		23.78 %					
2:	Pu-239							
Obs:	248.96	5.1554	1,699.08	4.94	12,063.39	0.00	12,063.39	402.11
Exp:	248.96	5.1554	1,707.00					
	Peak Efficiency:		23.56 %					

Calibrated By: L Schiavello 10-23-97

E0397295

AlphaVision Absolute Peak Search And Fit



Acquired: 17:30:52 on 22-Oct-97
File: C:\USER\CALIB\E0397295.CHN
Sample: AC5500

Real Time: 1801.16 s. Live Time: 1800.00 s.
Detector: #3 AL1-03
Type: Calibration

000154

AlphaVision A36-BI Ver 1.20 10/23/97 12:03:39 PM
Southern Petroleum Laboratories-LAS 576A (AL1)

E N E R G Y / E F F I C I E N C Y C A L I B R A T I O N

Standard Name:	AC5500
Certification Date:	3/ 3/93 12:00:00 PM
Sample Type:	Calibration
Analysis Type:	Absolute Peak Search And Fit
Acquisition Date:	10/23/97 11:33:30 AM
Detector:	AL1-04
Group:	D4 Calibration
Number of Channels:	512
Live Time:	1,800.00 Sec.
Real Time:	1,801.22 Sec.
Spectrum File:	C:\USER\CALIB\E0497296.CHN
Background File:	
Library File:	C:\USER\ALPHA\ALPHAVIS.ALB
Certificate File:	C:\USER\ALPHA\ALPHAVIS.ALB

---------- Results ----------

New Calibration:	2,827.9951 + 9.0715 * Chn.
Old Calibration:	2,832.6799 + 9.0442 * Chn.
New Efficiency:	24.73 %
Old Efficiency:	25.14 %

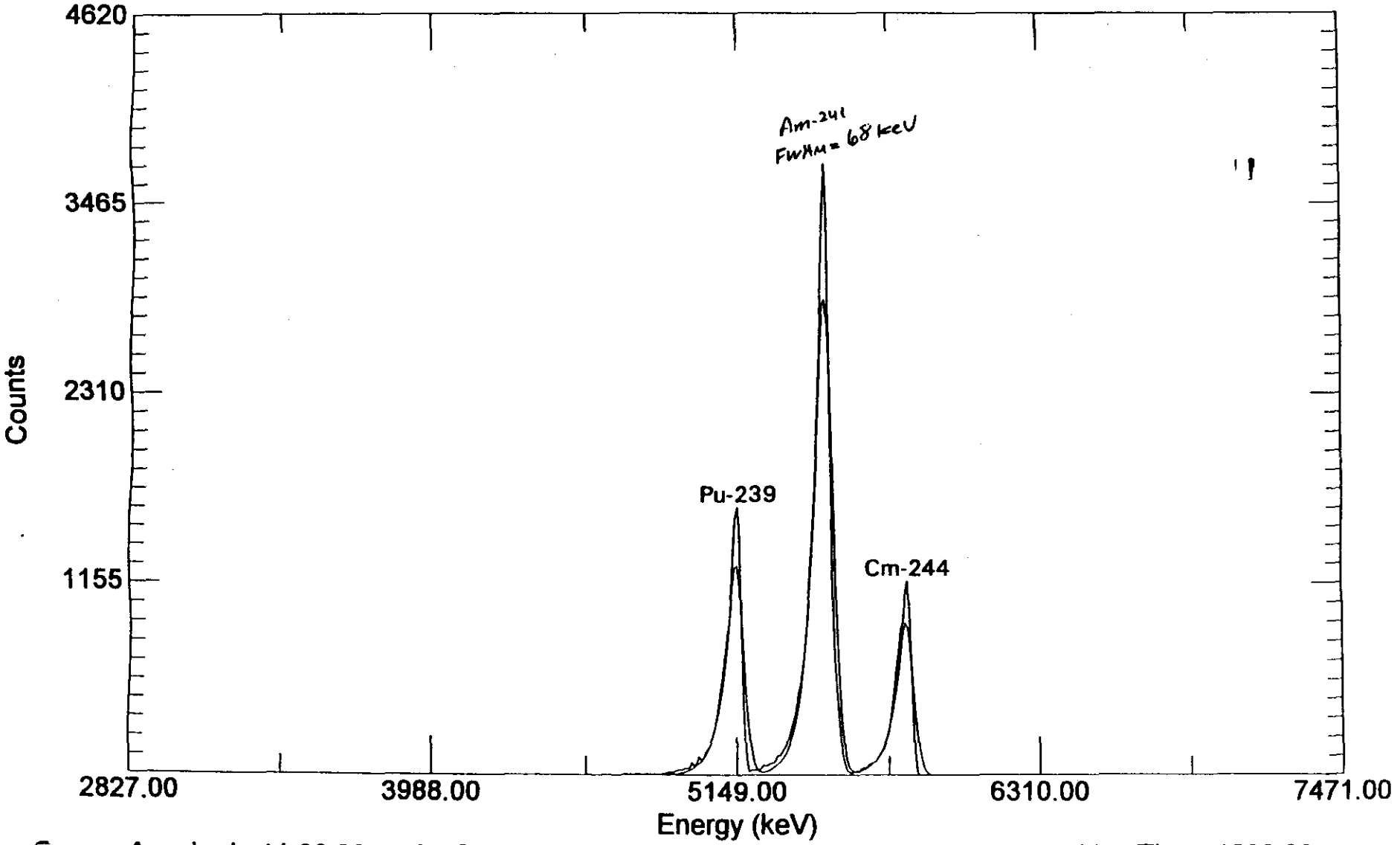
P E A K S U S E D I N C A L I B R A T I O N

	Channel	Energy (meV)	Activity DPM	FWHM	Gross Count	Bkg Count	Net Count	CPM
1:	Cm-244							
Obs:	328.17	5.8050	1,505.09	5.64	9,347.96	0.00	9,347.96	311.60
Exp:	328.17	5.8050	1,503.00					
	Peak Efficiency:		24.76 %					
2:	Pu-239							
Obs:	256.56	5.1554	1,704.63	5.46	12,643.08	0.00	12,643.08	421.44
Exp:	256.56	5.1554	1,707.00					
	Peak Efficiency:		24.69 %					

Calibrated By: L Schroeder 10-23-97

E0497296

AlphaVision Absolute Peak Search And Fit



Acquired: 11:33:30 on 23-Oct-97
File: C:\USER\CALIB\E0497296.CHN
Sample: AC5500

Real Time: 1801.22 s. Live Time: 1800.00 s.
Detector: #4 AL1-04
Type: Calibration

AlphaVision A36-BI Ver 1.20 10/23/97 12:45:16 PM
Southern Petroleum Laboratories-LAS 576A (AL1)

E N E R G Y / E F F I C I E N C Y C A L I B R A T I O N

Standard Name:	AC5500
Certification Date:	3/ 3/93 12:00:00 PM
Sample Type:	Calibration
Analysis Type:	Absolute Peak Search And Fit
Acquisition Date:	10/23/97 12:15:06 PM
Detector:	AL1-05
Group:	D5 Calibration
Number of Channels:	512
Live Time:	1,800.00 Sec.
Real Time:	1,801.20 Sec.
Spectrum File:	C:\USER\CALIB\E0597296.CHN
Background File:	
Library File:	C:\USER\ALPHA\ALPHAVIS.ALB
Certificate File:	C:\USER\ALPHA\ALPHAVIS.ALB

---------- Results ----------

New Calibration:	2,853.0110 + 9.1659 * Chn.
Old Calibration:	2,853.8501 + 9.1299 * Chn.
New Efficiency:	24.29 %
Old Efficiency:	24.13 %

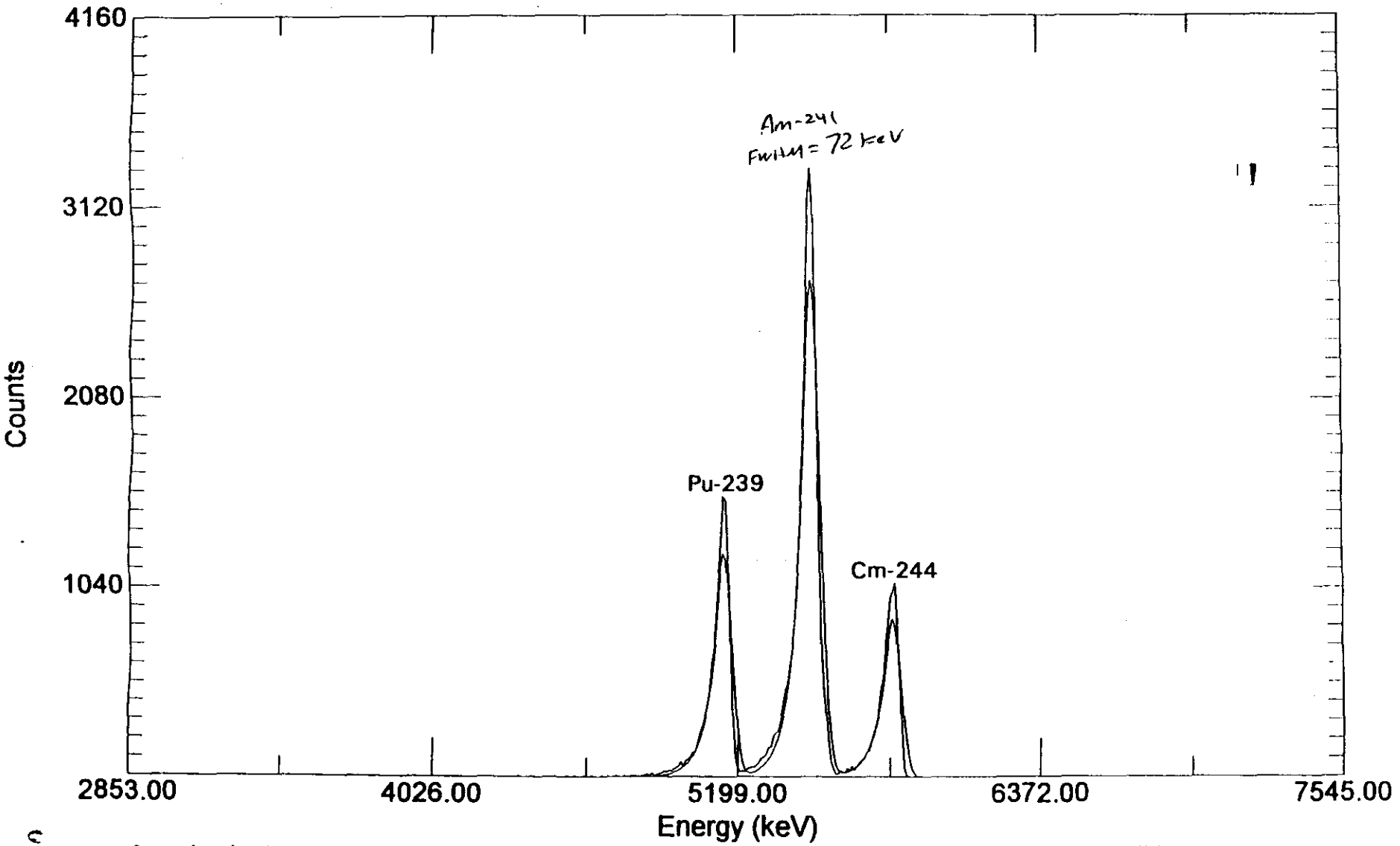
P E A K S U S E D I N C A L I B R A T I O N

	Channel	Energy (meV)	Activity DPM	FWHM	Gross Count	Bkg Count	Net Count	CPM
1:	Cm-244							
Obs:	322.06	5.8050	1,489.91	6.16	9,090.47	0.00	9,090.47	303.02
Exp:	322.06	5.8050	1,503.00					
	Peak Efficiency:		24.08 %					
2:	Pu-239							
Obs:	251.19	5.1554	1,721.87	5.82	12,545.71	0.00	12,545.71	418.19
Exp:	251.19	5.1554	1,707.00					
	Peak Efficiency:		24.50 %					

Calibrated By: C Schlosser 10-23-97

E0597296

AlphaVision Absolute Peak Search And Fit



Acquired: 12:15:06 on 23-Oct-97
File: C:\USER\CALIB\E0597296.CHN
Sample: AC5500

Real Time: 1801.20 s. Live Time: 1800.00 s.
Detector: #5 AL1-05
Type: Calibration

AlphaVision A36-BI Ver 1.20 10/23/97 1:42:33 PM
Southern Petroleum Laboratories-LAS 576A (AL1)

E N E R G Y / E F F I C I E N C Y C A L I B R A T I O N

Standard Name: AC5500
Certification Date: 3/ 3/93 12:00:00 PM
Sample Type: Calibration
Analysis Type: Absolute Peak Search And Fit
Acquisition Date: 10/23/97 1:12:14 PM

Detector: AL1-06
Group: D6 Calibration
Number of Channels: 512
Live Time: 1,800.00 Sec.
Real Time: 1,801.22 Sec.

Spectrum File: C:\USER\CALIB\E0697296.CHN
Background File:
Library File: C:\USER\ALPHA\ALPHAVIS.ALB
Certificate File: C:\USER\ALPHA\ALPHAVIS.ALB

---------- Results ----------

New Calibration: 2,836.0671 + 9.3801 * Chn.
Old Calibration: 2,837.8999 + 9.2988 * Chn.

New Efficiency: 24.68 %
Old Efficiency: ~~25.58 %~~ → Not applicable - Detector AL1-06 is a new detector

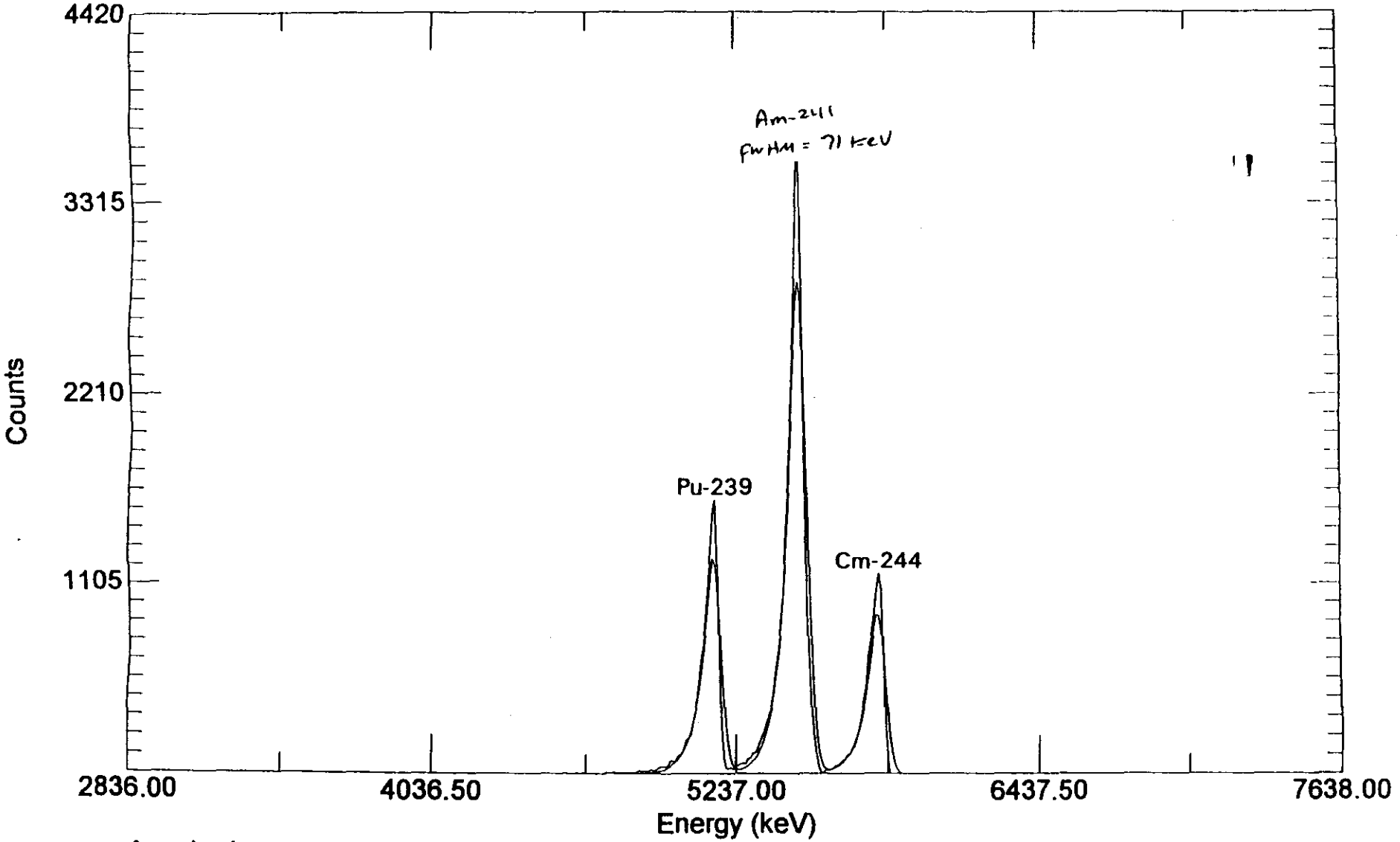
P E A K S U S E D I N C A L I B R A T I O N

	Channel	Energy (meV)	Activity DPM	FWHM	Gross Count	Bkg Count	Net Count	CPM
1:	Cm-244							
Obs:	316.51	5.8050	1,497.95	5.48	9,285.37	0.00	9,285.37	309.51
Exp:	316.51	5.8050	1,503.00					
	Peak Efficiency:		24.60 %					
2:	Pu-239							
Obs:	247.26	5.1554	1,712.74	5.69	12,678.43	0.00	12,678.43	422.61
Exp:	247.26	5.1554	1,707.00					
	Peak Efficiency:		24.76 %					

Calibrated By: L Schlocski 10-23-97

E0697296

AlphaVision Absolute Peak Search And Fit



Acquired: 13:12:14 on 23-Oct-97
File: C:\USER\CALIB\E0697296.CHN
Sample: AC5500

Real Time: 1801.22 s. Live Time: 1800.00 s.
Detector: #6 AL1-06
Type: Calibration

AlphaVision A36-BI Ver 1.20 10/23/97 2:28:30 PM
Southern Petroleum Laboratories-LAS 576A (AL1)

E N E R G Y / E F F I C I E N C Y C A L I B R A T I O N

Standard Name: AC5500
Certification Date: 3/ 3/93 12:00:00 PM
Sample Type: Calibration
Analysis Type: Absolute Peak Search And Fit
Acquisition Date: 10/23/97 1:58:17 PM

Detector: AL1-07
Group: D7 Calibration
Number of Channels: 512
Live Time: 1,800.00 Sec.
Real Time: 1,801.02 Sec.

Spectrum File: C:\USER\CALIB\E0797296.CHN
Background File:
Library File: C:\USER\ALPHA\ALPHAVIS.ALB
Certificate File: C:\USER\ALPHA\ALPHAVIS.ALB

---------- Results ----------

New Calibration: 2,827.1787 + 8.7891 * Chn.
Old Calibration: 2,832.7800 + 8.7674 * Chn.

New Efficiency: 20.87 %
Old Efficiency: 21.08 %

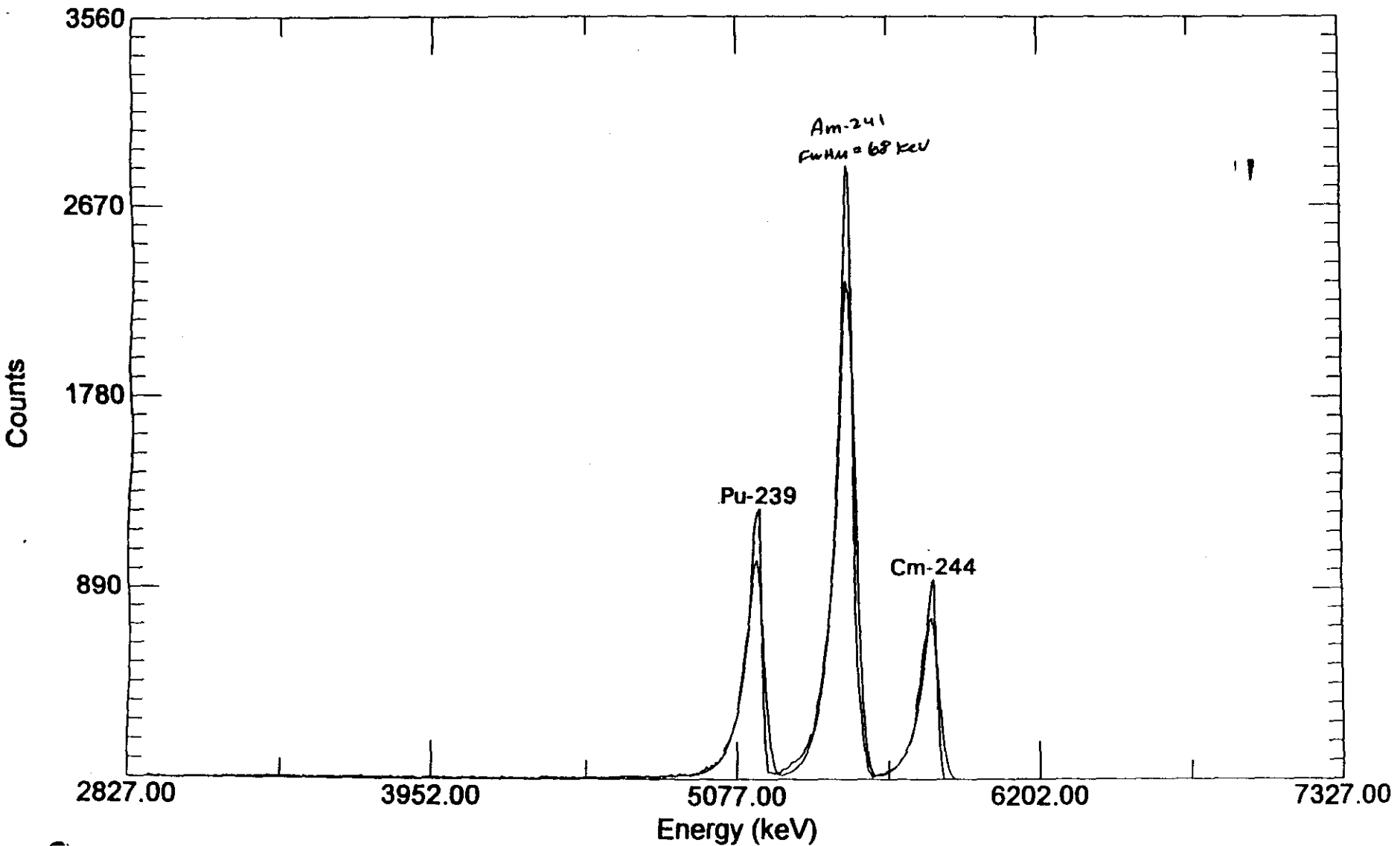
P E A K S U S E D I N C A L I B R A T I O N

	Channel	Energy (meV)	Activity DPM	FWHM	Gross Count	Bkg Count	Net Count	CPM
1:	Cm-244							
Obs:	338.80	5.8050	1,490.70	5.37	7,815.56	0.00	7,815.56	260.52
Exp:	338.80	5.8050	1,503.00					
	Peak Efficiency:		20.70 %					
2:	Pu-239							
Obs:	264.90	5.1554	1,720.97	5.57	10,774.98	0.00	10,774.98	359.17
Exp:	264.90	5.1554	1,707.00					
	Peak Efficiency:		21.04 %					

Calibrated By: C Schlosser 10-23-97

E0797296

AlphaVision Absolute Peak Search And Fit



Acquired: 13:58:17 on 23-Oct-97
File: C:\USER\CALIB\E0797296.CHN
Sample: AC5500

Real Time: 1801.02 s. Live Time: 1800.00 s.
Detector: #7 AL1-07
Type: Calibration

000162

AlphaVision A36-BI Ver 1.20 10/23/97 3:02:42 PM
Southern Petroleum Laboratories-LAS 576A (AL1)

E N E R G Y / E F F I C I E N C Y C A L I B R A T I O N

Standard Name:	AC5500
Certification Date:	3/ 3/93 12:00:00 PM
Sample Type:	Calibration
Analysis Type:	Absolute Peak Search And Fit
Acquisition Date:	10/23/97 2:32:34 PM
Detector:	AL1-08
Group:	D8 Calibration
Number of Channels:	512
Live Time:	1,800.00 Sec.
Real Time:	1,801.20 Sec.
Spectrum File:	C:\USER\CALIB\E0897296.CHN
Background File:	
Library File:	C:\USER\ALPHA\ALPHAVIS.ALB
Certificate File:	C:\USER\ALPHA\ALPHAVIS.ALB

---------- Results ----------

New Calibration:	2,856.2324 + 8.8701 * Chn.
Old Calibration:	2,851.7600 + 8.8516 * Chn.
New Efficiency:	25.08 %
Old Efficiency:	25.29 %

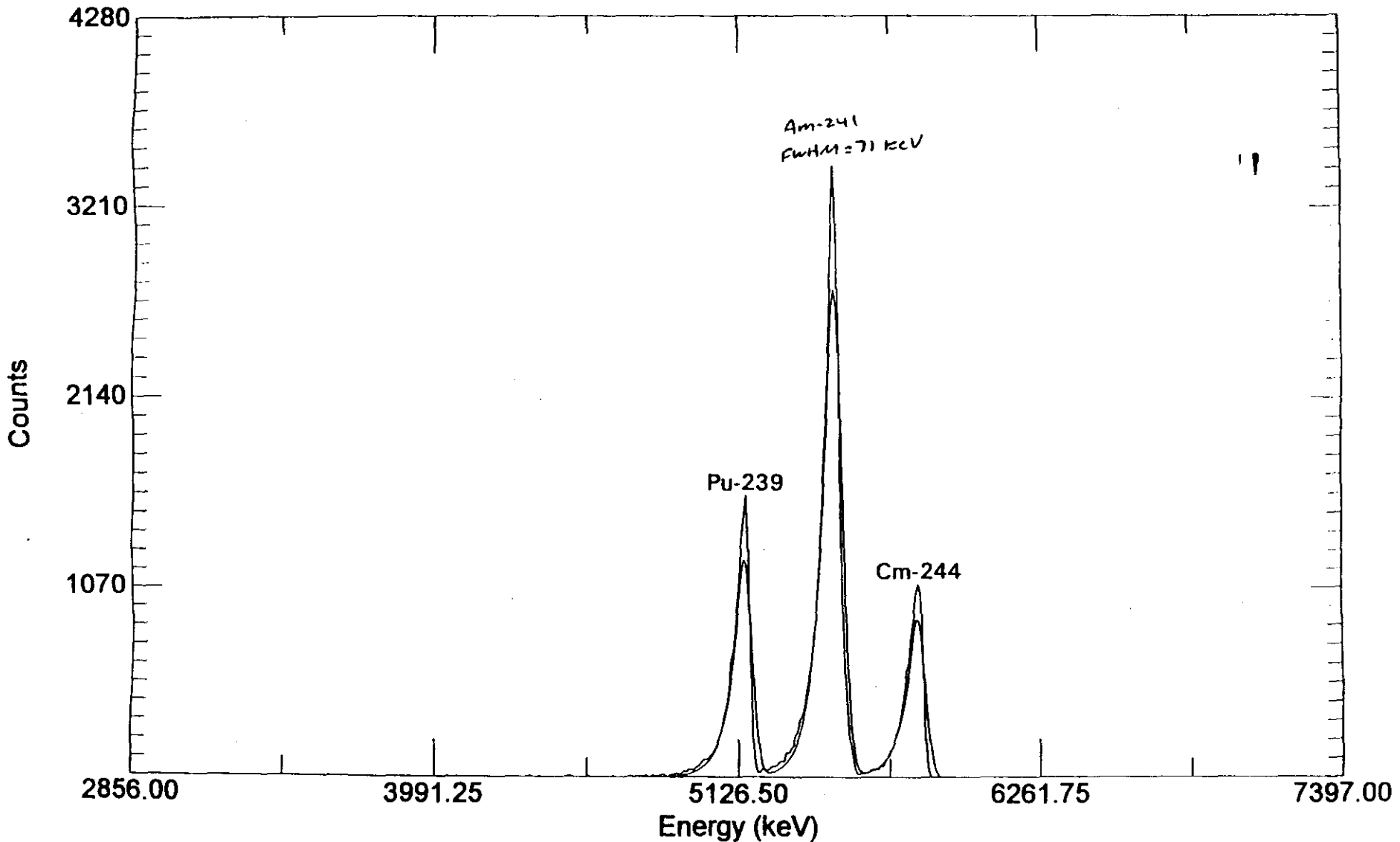
P E A K S U S E D I N C A L I B R A T I O N

	Channel	Energy (meV)	Activity DPM	FWHM	Gross Count	Bkg Count	Net Count	CPM
1:	Cm-244							
Obs:	332.43	5.8050	1,512.03	5.71	9,525.63	0.00	9,525.63	317.52
Exp:	332.43	5.8050	1,503.00					
	Peak Efficiency:		25.23 %					
2:	Pu-239							
Obs:	259.20	5.1554	1,696.75	5.65	12,765.14	0.00	12,765.14	425.50
Exp:	259.20	5.1554	1,707.00					
	Peak Efficiency:		24.93 %					

Calibrated By: L Schlosnalo 10-23-97

E0897296

AlphaVision Absolute Peak Search And Fit



Acquired: 14:32:34 on 23-Oct-97
File: C:\USER\CALIB\E0897296.CHN
Sample: AC5500

Real Time: 1801.20 s. Live Time: 1800.00 s.
Detector: #8 AL1-08
Type: Calibration

000164

AlphaVision A36-BI Ver 1.20 10/23/97 5:48:40 PM
Southern Petroleum Laboratories-LAS 576A (AL1)

E N E R G Y / E F F I C I E N C Y C A L I B R A T I O N

Standard Name:	AC5500
Certification Date:	3/ 3/93 12:00:00 PM
Sample Type:	Calibration
Analysis Type:	Absolute Peak Search And Fit
Acquisition Date:	10/23/97 3:32:27 PM
Detector:	AL1-09
Group:	D1 Calibration
Number of Channels:	512
Live Time:	1,800.00 Sec.
Real Time:	1,801.28 Sec.
Spectrum File:	C:\USER\CALIB\E0997296.CHN
Background File:	
Library File:	C:\USER\ALPHA\ALPHAVIS.ALB
Certificate File:	C:\USER\ALPHA\ALPHAVIS.ALB

---------- Results ----------

New Calibration:	2,941.9534 + 8.9245 * Chn.
Old Calibration:	2,941.9500 + 8.9245 * Chn.
New Efficiency:	25.61 %
Old Efficiency:	25.61 %

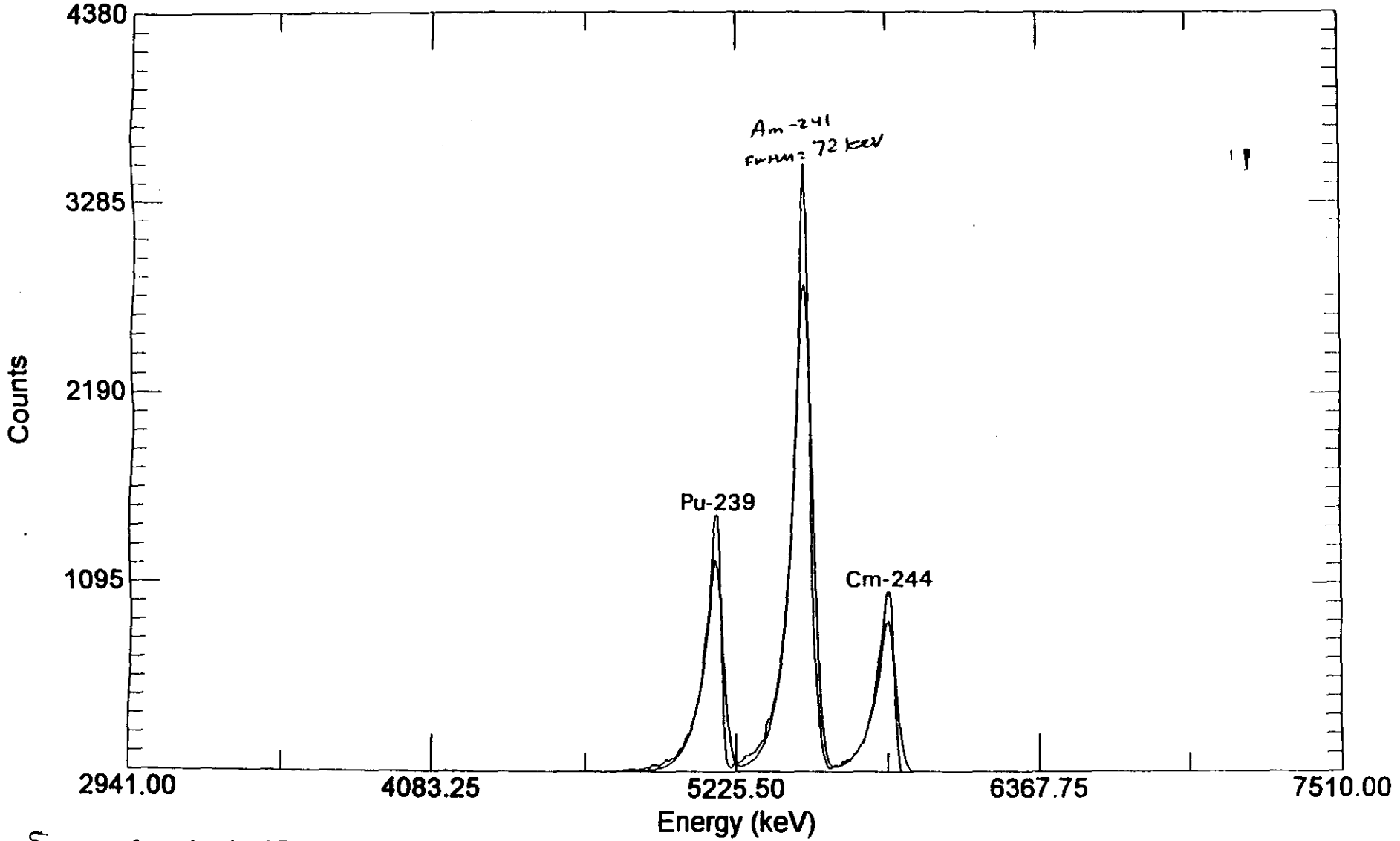
P E A K S U S E D I N C A L I B R A T I O N

	Channel	Energy (meV)	Activity DPM	FWHM	Gross Count	Bkg Count	Net Count	CPM
1:	Cm-244							
Obs:	320.80	5.8050	1,490.41	6.02	9,588.75	0.00	9,588.75	319.63
Exp:	320.80	5.8050	1,503.00					
	Peak Efficiency:		25.40 %					
2:	Pu-239							
Obs:	248.02	5.1554	1,721.30	5.76	13,224.79	0.00	13,224.79	440.83
Exp:	248.02	5.1554	1,707.00					
	Peak Efficiency:		25.83 %					

Calibrated By: C Schwendler 10-23-97

E0997296

AlphaVision Absolute Peak Search And Fit



Acquired: 15:32:27 on 23-Oct-97
File: C:\USER\CALIB\E0997296.CHN
Sample: AC5500

Real Time: 1801.28 s. Live Time: 1800.00 s.
Detector: #9 AL1-09
Type: Calibration

000166

AlphaVision A36-BI Ver 1.20 10/23/97 6:36:41 PM
Southern Petroleum Laboratories-LAS 576A (AL1)

E N E R G Y / E F F I C I E N C Y C A L I B R A T I O N

Standard Name:	AC5500
Certification Date:	3/ 3/93 12:00:00 PM
Sample Type:	Calibration
Analysis Type:	Absolute Peak Search And Fit
Acquisition Date:	10/23/97 6:06:29 PM
Detector:	AL1-10
Group:	D2 Calibration
Number of Channels:	512
Live Time:	1,800.00 Sec.
Real Time:	1,801.24 Sec.
Spectrum File:	C:\USER\CALIB\E1097296.CHN
Background File:	
Library File:	C:\USER\ALPHA\ALPHAVIS.ALB
Certificate File:	C:\USER\ALPHA\ALPHAVIS.ALB

---------- Results ----------

New Calibration:	2,943.6394 + 8.8584 * Chn.
Old Calibration:	2,944.5801 + 8.8487 * Chn.
New Efficiency:	24.92 %
Old Efficiency:	24.62 %

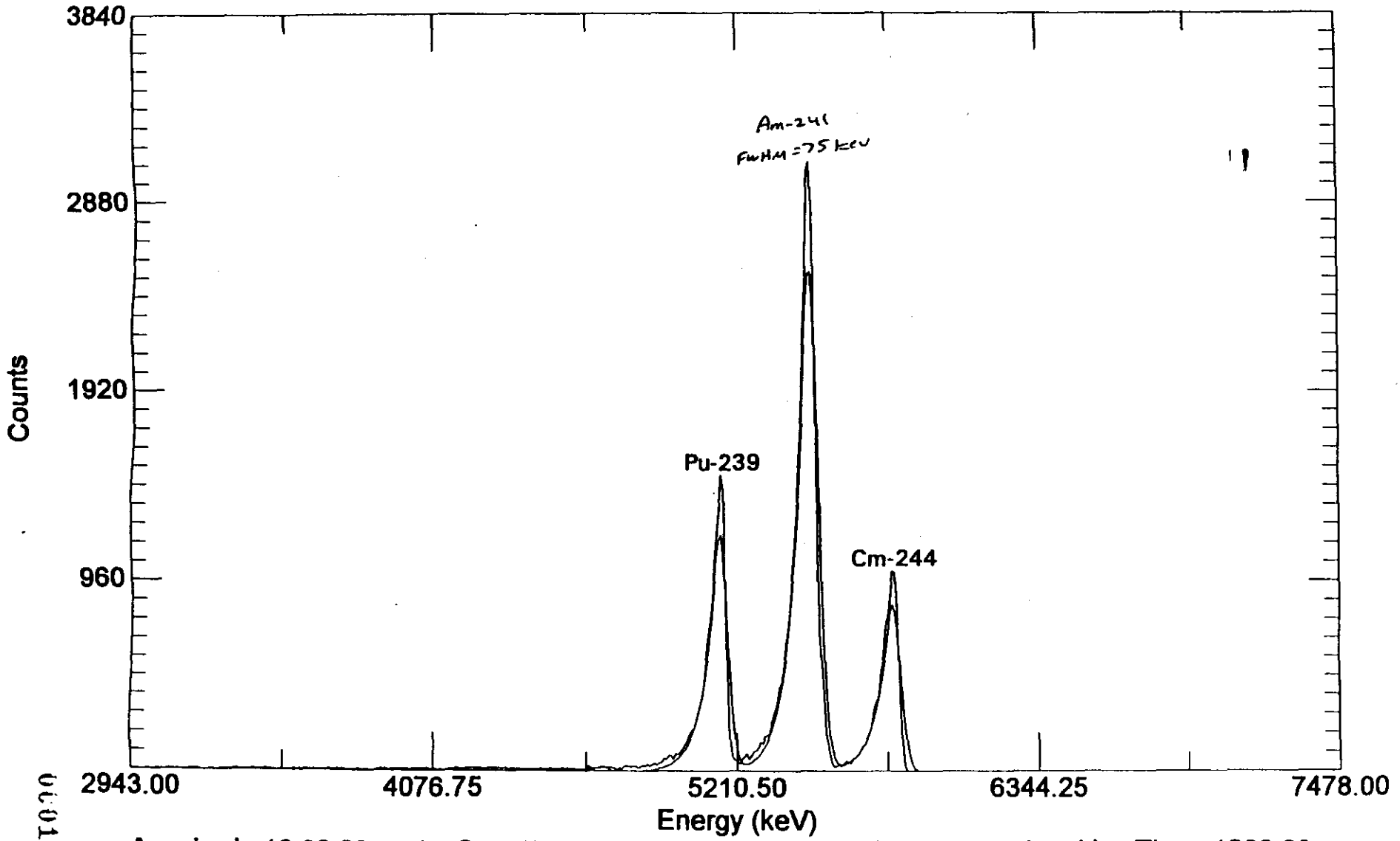
P E A K S U S E D I N C A L I B R A T I O N

	Channel	Energy (meV)	Activity DPM	FWHM	Gross Count	Bkg Count	Net Count	CPM
1:	Cm-244							
Obs:	323.01	5.8050	1,490.84	5.91	9,332.52	0.00	9,332.52	311.08
Exp:	323.01	5.8050	1,503.00					
	Peak Efficiency:		24.72 %					
2:	Pu-239							
Obs:	249.68	5.1554	1,720.81	5.95	12,864.18	0.00	12,864.18	428.81
Exp:	249.68	5.1554	1,707.00					
	Peak Efficiency:		25.12 %					

Calibrated By: C Schiavello 10-23-97

E1097296

AlphaVision Absolute Peak Search And Fit



Acquired: 18:06:29 on 23-Oct-97
File: C:\USER\CALIB\E1097296.CHN
Sample: AC5500

Real Time: 1801.24 s. Live Time: 1800.00 s.
Detector: #10 AL1-10
Type: Calibration

AlphaVision A36-BI Ver 1.20 10/23/97 7:21:25 PM

Southern Petroleum Laboratories-LAS 576A (AL1)

E N E R G Y / E F F I C I E N C Y C A L I B R A T I O N

Standard Name:	AC5500
Certification Date:	3/ 3/93 12:00:00 PM
Sample Type:	Calibration
Analysis Type:	Absolute Peak Search And Fit
Acquisition Date:	10/23/97 6:51:16 PM
Detector:	AL1-11
Group:	D3 Calibration
Number of Channels:	512
Live Time:	1,800.00 Sec.
Real Time:	1,801.22 Sec.
Spectrum File:	C:\USER\CALIB\E1197296.CHN
Background File:	
Library File:	C:\USER\ALPHA\ALPHAVIS.ALB
Certificate File:	C:\USER\ALPHA\ALPHAVIS.ALB

---------- Results ----------

New Calibration:	2,911.7139 + 9.1019 * Chn.
Old Calibration:	2,923.8701 + 9.0660 * Chn.
New Efficiency:	24.05 %
Old Efficiency:	24.14 %

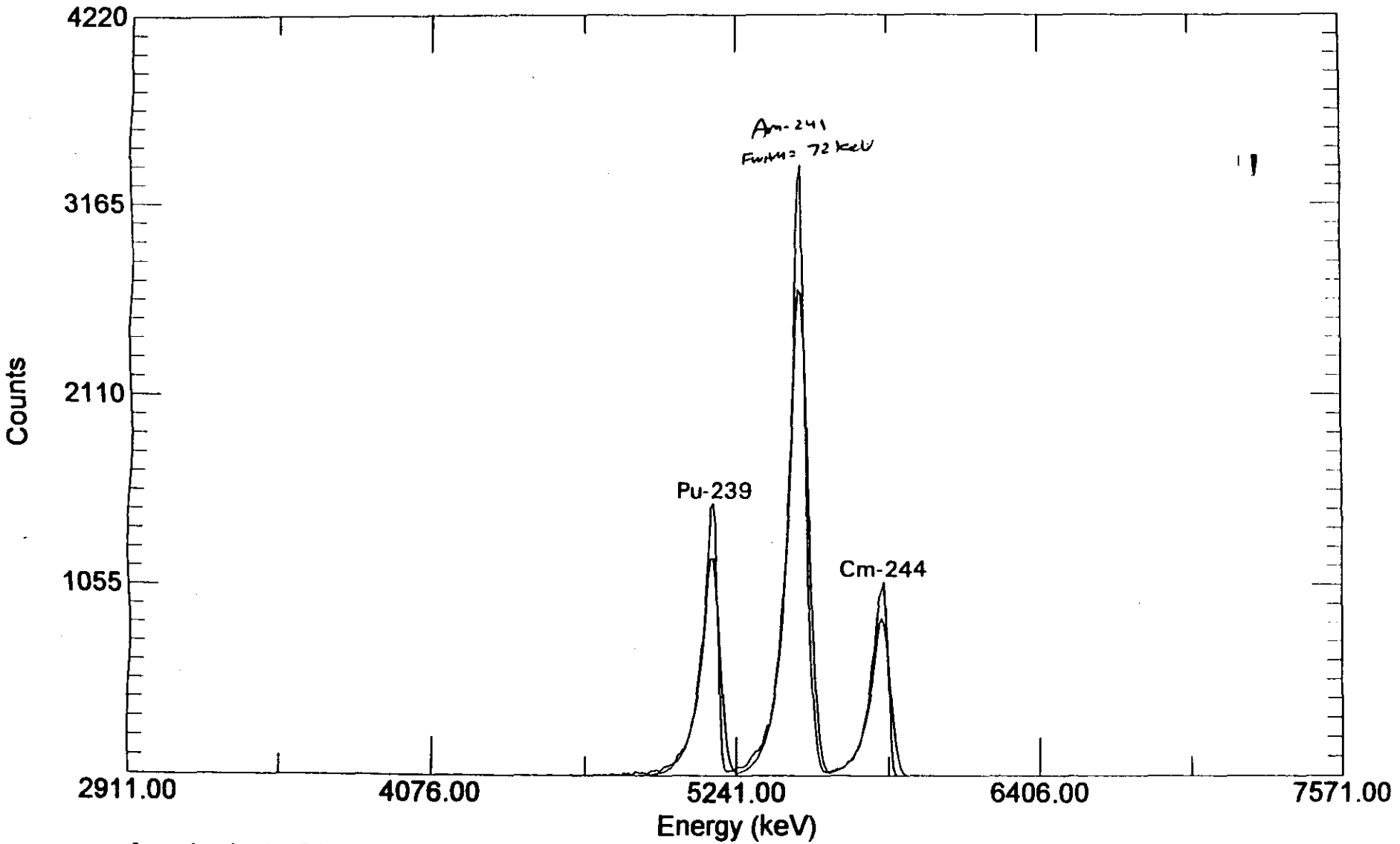
P E A K S U S E D I N C A L I B R A T I O N

	Channel	Energy (meV)	Activity DPM	FWHM	Gross Count	Bkg Count	Net Count	CPM
1:	Cm-244							
Obs:	317.87	5.8050	1,500.24	6.18	9,060.95	0.00	9,060.95	302.03
Exp:	317.87	5.8050	1,503.00					
	Peak Efficiency:		24.00 %					
2:	Pu-239							
Obs:	246.51	5.1554	1,710.13	5.83	12,334.61	0.00	12,334.61	411.15
Exp:	246.51	5.1554	1,707.00					
	Peak Efficiency:		24.09 %					

Calibrated By: C Schlosser 10-23-97

E1197296

AlphaVision Absolute Peak Search And Fit



Acquired: 18:51:16 on 23-Oct-97
File: C:\USER\CALIB\E1197296.CHN
Sample: AC5500

Real Time: 1801.22 s. Live Time: 1800.00 s.
Detector: #11 AL1-11
Type: Calibration

AlphaVision A36-BI Ver 1.20 10/27/97 10:08:03 AM
Southern Petroleum Laboratories-LAS 576A (AL1)

E N E R G Y / E F F I C I E N C Y C A L I B R A T I O N

Standard Name:	AC5500
Certification Date:	3/ 3/93 12:00:00 PM
Sample Type:	Calibration
Analysis Type:	Absolute Peak Search And Fit
Acquisition Date:	10/27/97 9:37:17 AM
Detector:	AL1-12
Group:	D4 Calibration
Number of Channels:	512
Live Time:	1,800.00 Sec.
Real Time:	1,801.24 Sec.
Spectrum File:	C:\USER\CALIB\E1297300.CHN
Background File:	
Library File:	C:\USER\ALPHA\ALPHAVIS.ALB
Certificate File:	C:\USER\ALPHA\ALPHAVIS.ALB

---------- Results ----------

New Calibration:	2,887.8369 + 9.0059 * Chn.
Old Calibration:	2,896.7600 + 8.9755 * Chn.
New Efficiency:	25.21 %
Old Efficiency:	25.32 %

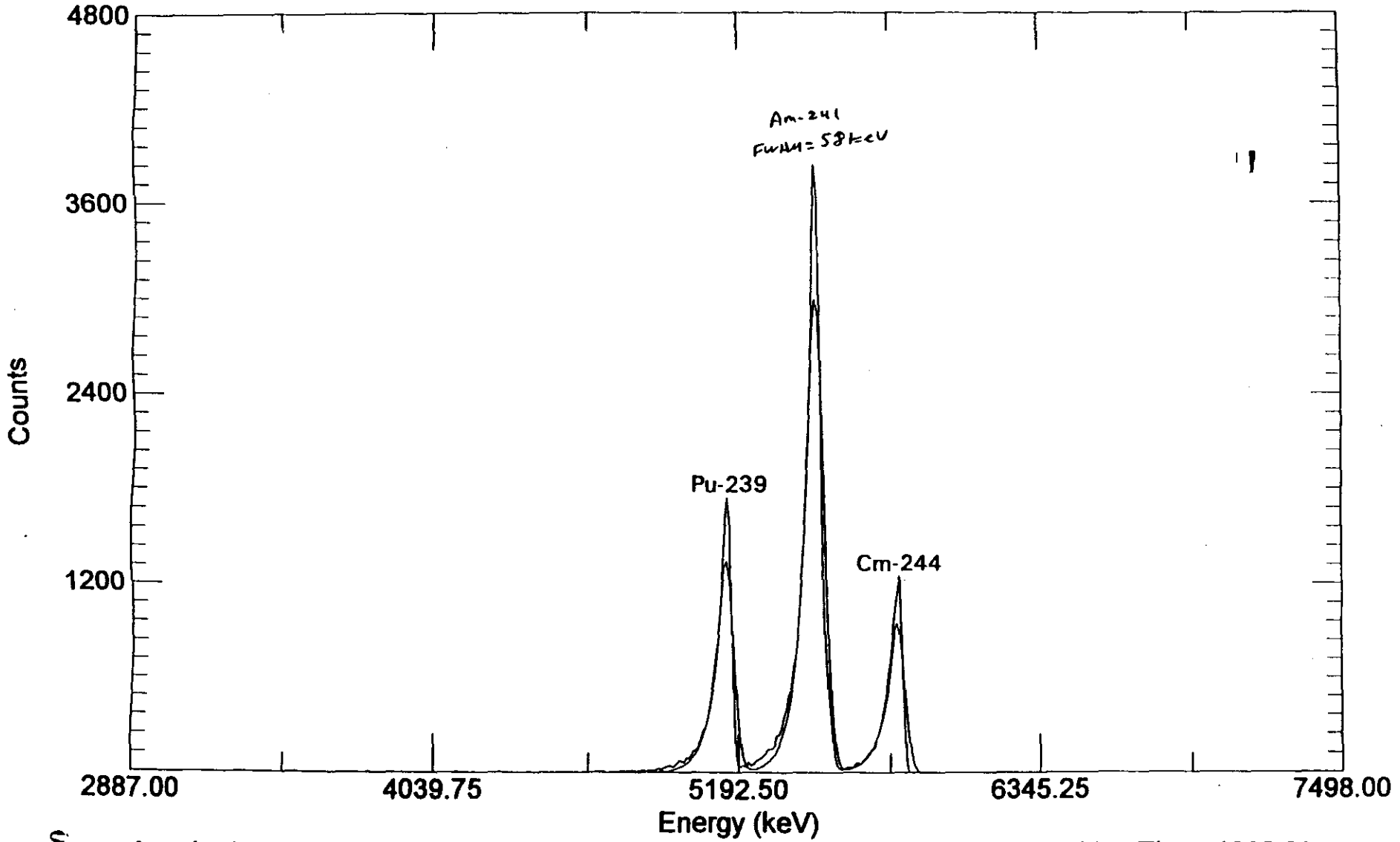
P E A K S U S E D I N C A L I B R A T I O N

	Channel	Energy (meV)	Activity DPM	FWHM	Gross Count	Bkg Count	Net Count	CPM
1:	Cm-244							
Obs:	323.91	5.8050	1,483.67	5.00	9,392.45	0.00	9,392.45	313.08
Exp:	323.91	5.8050	1,503.00					
	Peak Efficiency:		24.89 %					
2:	Pu-239							
Obs:	251.79	5.1554	1,728.95	5.10	13,075.88	0.00	13,075.88	435.86
Exp:	251.79	5.1554	1,707.00					
	Peak Efficiency:		25.54 %					

Calibrated By: C Schlosser 10-27-97

E1297300

AlphaVision Absolute Peak Search And Fit



Acquired: 09:37:17 on 27-Oct-97
File: C:\USER\CALIB\E1297300.CHN
Sample: AC5500

Real Time: 1801.24 s. Live Time: 1800.00 s.
Detector: #12 AL1-12
Type: Calibration

00172

AlphaVision A36-BI Ver 1.20 10/27/97 11:06:30 AM
Southern Petroleum Laboratories-LAS 576A (AL1)

E N E R G Y / E F F I C I E N C Y C A L I B R A T I O N

Standard Name: AC5500
Certification Date: 3/ 3/93 12:00:00 PM
Sample Type: Calibration
Analysis Type: Absolute Peak Search And Fit
Acquisition Date: 10/27/97 10:36:20 AM

Detector: AL1-13
Group: D5 Calibration
Number of Channels: 512
Live Time: 1,800.00 Sec.
Real Time: 1,801.16 Sec.

Spectrum File: C:\USER\CALIB\E1397300.CHN
Background File:
Library File: C:\USER\ALPHA\ALPHAVIS.ALB
Certificate File: C:\USER\ALPHA\ALPHAVIS.ALB

---------- Results ----------

New Calibration: 2,923.3704 + 8.7937 * Chn.
Old Calibration: 2,933.6799 + 8.7655 * Chn.

New Efficiency: 23.31 %
Old Efficiency: 22.81 %

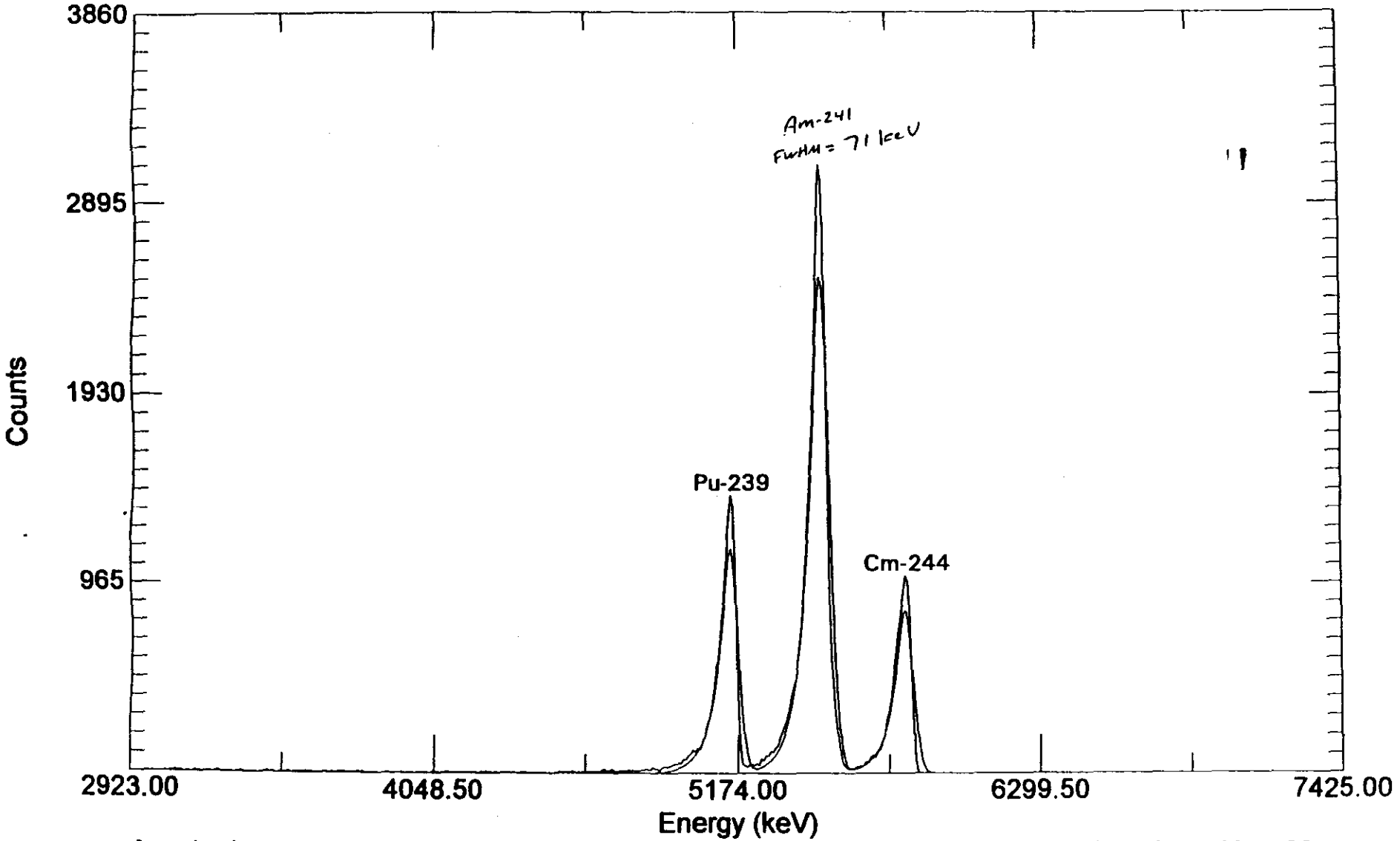
P E A K S U S E D I N C A L I B R A T I O N

	Channel	Energy (meV)	Activity DPM	FWHM	Gross Count	Bkg Count	Net Count	CPM
1:	Cm-244							
Obs:	327.69	5.8050	1,497.75	5.84	8,764.36	0.00	8,764.36	292.15
Exp:	327.69	5.8050	1,503.00					
	Peak Efficiency:		23.22 %					
2:	Pu-239							
Obs:	253.82	5.1554	1,712.96	5.64	11,975.03	0.00	11,975.03	399.17
Exp:	253.82	5.1554	1,707.00					
	Peak Efficiency:		23.39 %					

Calibrated By: L Schlesinger 10-27-97

E1397300

AlphaVision Absolute Peak Search And Fit



Acquired: 10:36:20 on 27-Oct-97
File: C:\USER\CALIB\E1397300.CHN
Sample: AC5500

Real Time: 1801.16 s. Live Time: 1800.00 s.
Detector: #13 AL1-13
Type: Calibration

00174

AlphaVision A36-BI Ver 1.2Q 10/27/97 1:16:11 PM
Southern Petroleum Laboratories-LAS 576A (AL1)

E N E R G Y / E F F I C I E N C Y C A L I B R A T I O N

Standard Name: AC5500
Certification Date: 3/ 3/93 12:00:00 PM
Sample Type: Calibration
Analysis Type: Absolute Peak Search And Fit
Acquisition Date: 10/27/97 12:45:29 PM

Detector: AL1-14
Group: D6 Calibration
Number of Channels: 512
Live Time: 1,800.00 Sec.
Real Time: 1,801.18 Sec.

Spectrum File: C:\USER\CALIB\E1497300.CHN
Background File:
Library File: C:\USER\ALPHA\ALPHAVIS.ALB
Certificate File: C:\USER\ALPHA\ALPHAVIS.ALB

---------- Results ----------

New Calibration: 2,920.7354 + 8.8738 * Chn.
Old Calibration: 2,918.8999 + 8.8787 * Chn.

New Efficiency: 23.50 %
Old Efficiency: 23.55 %

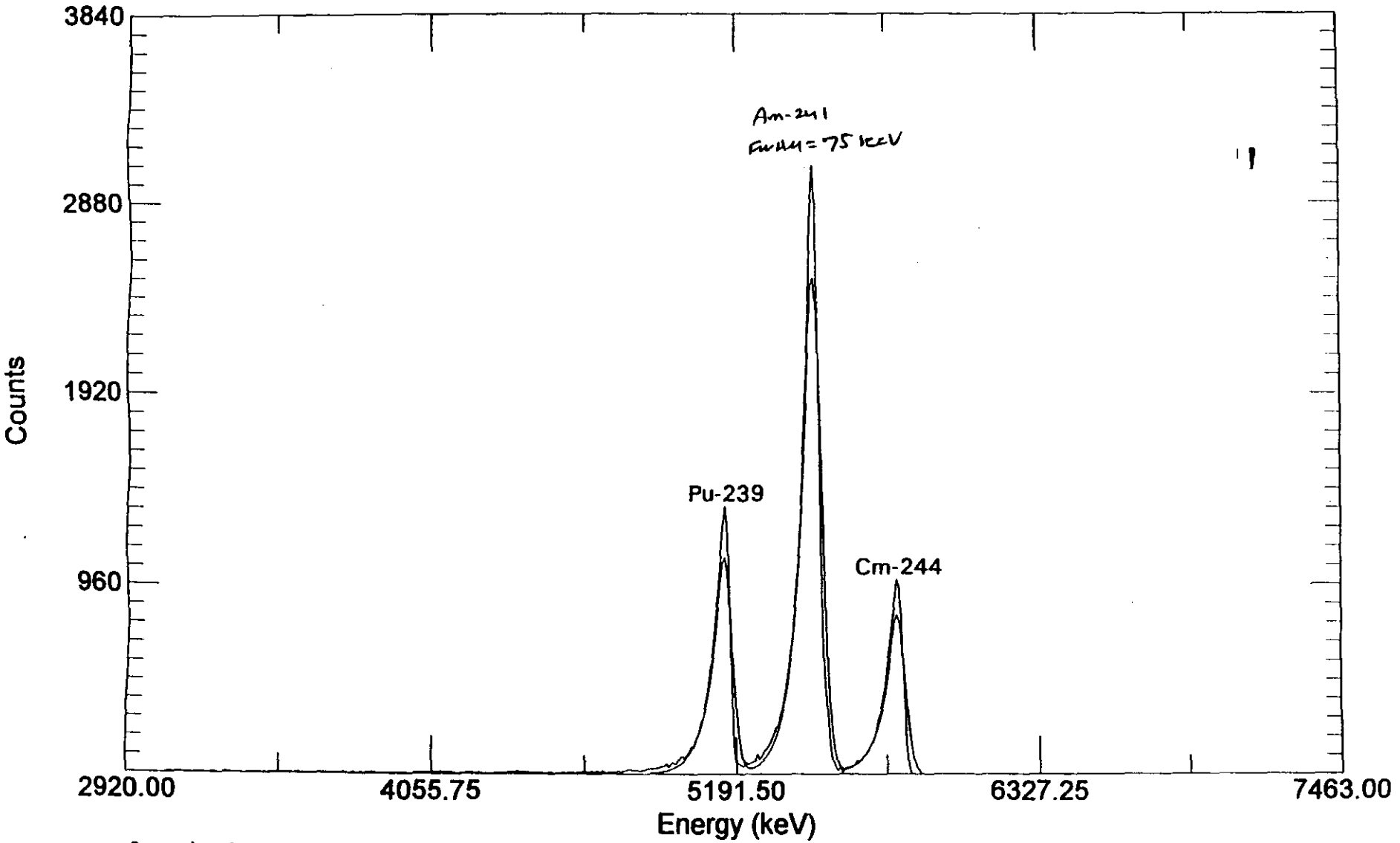
P E A K S U S E D I N C A L I B R A T I O N

	Channel	Energy (meV)	Activity DPM	FWHM	Gross Count	Bkg Count	Net Count	CPM
1:	Cm-244							
Obs:	325.03	5.8050	1,500.63	6.02	8,853.46	0.00	8,853.46	295.12
Exp:	325.03	5.8050	1,503.00					
	Peak Efficiency:		23.46 %					
2:	Pu-239							
Obs:	251.83	5.1554	1,709.70	6.11	12,050.68	0.00	12,050.68	401.69
Exp:	251.83	5.1554	1,707.00					
	Peak Efficiency:		23.54 %					

Calibrated By: C Schlosser 10-27-97

E1497300

AlphaVision Absolute Peak Search And Fit



Acquired: 12:45:29 on 27-Oct-97
File: C:\USER\CALIB\E1497300.CHN
Sample: AC5500

Real Time: 1801.18 s. Live Time: 1800.00 s.
Detector: #14 AL1-14
Type: Calibration

AlphaVision A36-BI Ver 1.20 10/30/97 12:18:27 PM

Southern Petroleum Laboratories-LAS 576A (AL1)

E N E R G Y / E F F I C I E N C Y C A L I B R A T I O N

Standard Name:	AC5500
Certification Date:	3/ 3/93 12:00:00 PM
Sample Type:	Calibration
Analysis Type:	Absolute Peak Search And Fit
Acquisition Date:	10/30/97 11:48:19 AM
Detector:	AL1-15
Group:	D7 Calibration
Number of Channels:	512
Live Time:	1,800.00 Sec.
Real Time:	1,801.26 Sec.
Spectrum File:	C:\USER\CALIB\E1597303.CHN
Background File:	
Library File:	C:\USER\ALPHA\ALPHAVIS.ALB
Certificate File:	C:\USER\ALPHA\ALPHAVIS.ALB

---------- Results ----------

New Calibration:	2,906.6572 + 8.9681 * Chn.
Old Calibration:	2,906.5901 + 8.9758 * Chn.
New Efficiency:	26.00 %
Old Efficiency:	25.56 %

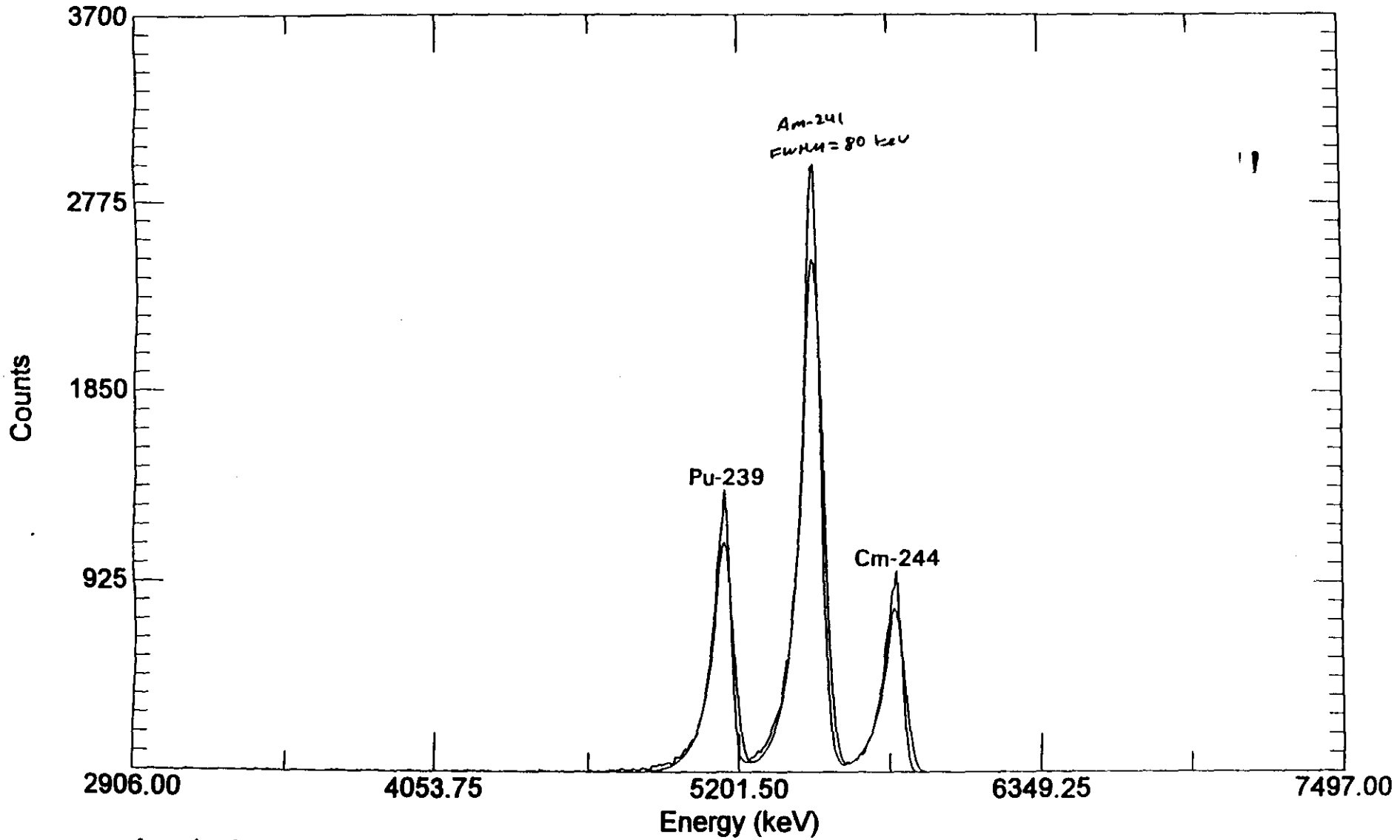
P E A K S U S E D I N C A L I B R A T I O N

	Channel	Energy (meV)	Activity DPM	FWHM	Gross Count	Bkg Count	Net Count	CPM
1:	Cm-244							
Obs:	323.18	5.8050	1,488.40	7.89	9,712.64	0.00	9,712.64	323.75
Exp:	323.18	5.8050	1,503.00					
	Peak Efficiency:		25.75 %					
2:	Pu-239							
Obs:	250.75	5.1554	1,723.58	8.04	13,441.12	0.00	13,441.12	448.04
Exp:	250.75	5.1554	1,707.00					
	Peak Efficiency:		26.25 %					

Calibrated By: C Schlemmler 10-30-97

E1597303

AlphaVision Absolute Peak Search And Fit



Acquired: 11:48:19 on 30-Oct-97
File: C:\USER\CALIB\E1597303.CHN
Sample: AC5500

Real Time: 1801.26 s. Live Time: 1800.00 s.
Detector: #15 AL1-15
Type: Calibration

001178

AlphaVision A36-BI Ver 1.20 10/27/97 3:05:56 PM
Southern Petroleum Laboratories-LAS 576A (AL1)

E N E R G Y / E F F I C I E N C Y C A L I B R A T I O N

Standard Name:	AC5500
Certification Date:	3/ 3/93 12:00:00 PM
Sample Type:	Calibration
Analysis Type:	Absolute Peak Search And Fit
Acquisition Date:	10/27/97 2:35:47 PM
Detector:	AL1-16
Group:	D8 Calibration
Number of Channels:	512
Live Time:	1,800.00 Sec.
Real Time:	1,801.26 Sec.
Spectrum File:	C:\USER\CALIB\E1697300.CHN
Background File:	
Library File:	C:\USER\ALPHA\ALPHAVIS.ALB
Certificate File:	C:\USER\ALPHA\ALPHAVIS.ALB

---------- Results ----------

New Calibration:	2,899.0061 + 9.0091 * Chn.
Old Calibration:	2,905.7500 + 8.9896 * Chn.
New Efficiency:	25.44 %
Old Efficiency:	25.20 %

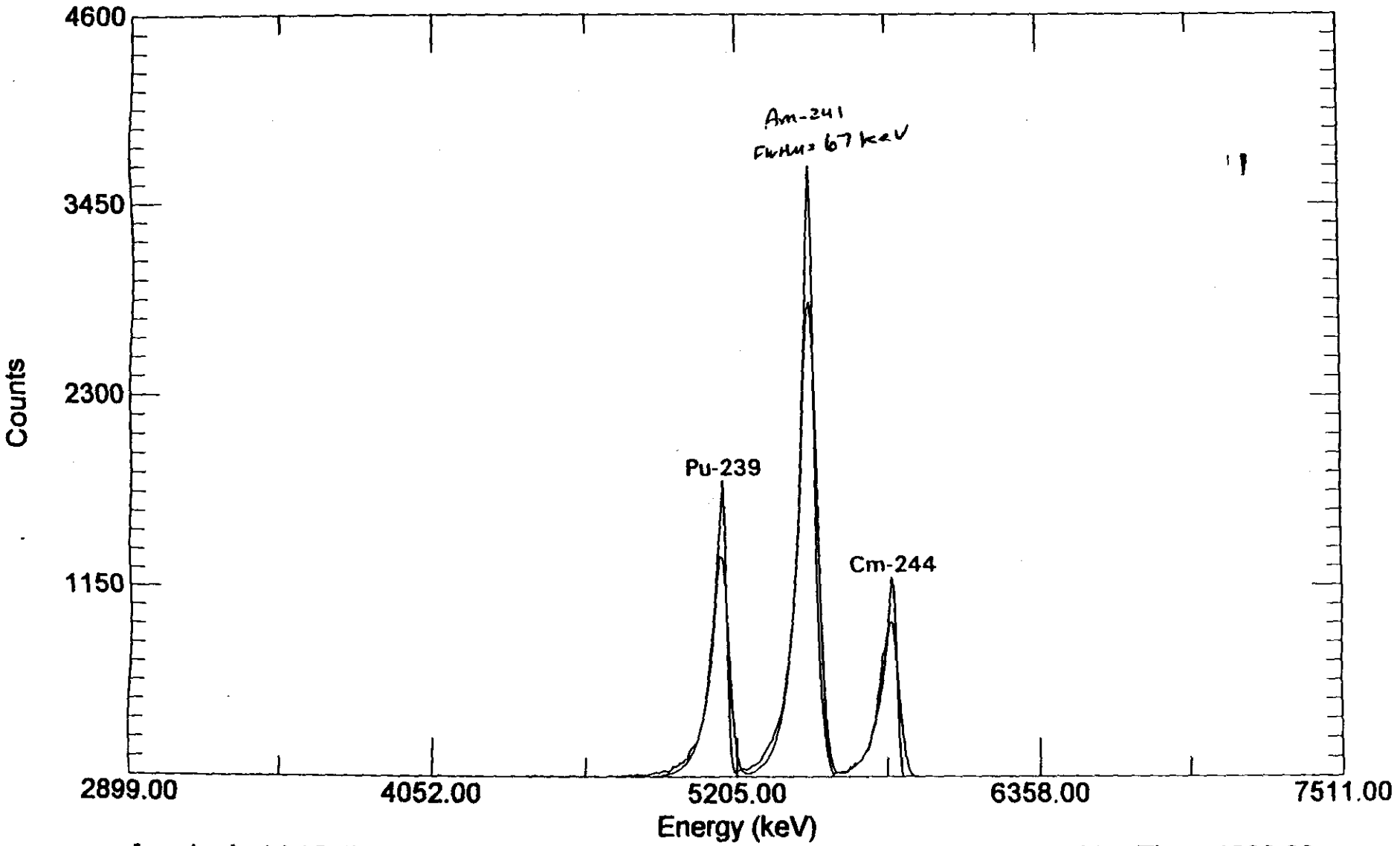
P E A K S U S E D I N C A L I B R A T I O N

	Channel	Energy (meV)	Activity DPM	FWHM	Gross Count	Bkg Count	Net Count	CPM
1:	Cm-244							
Obs:	322.56	5.8050	1,492.61	5.11	9,535.12	0.00	9,535.12	317.84
Exp:	322.56	5.8050	1,503.00					
	Peak Efficiency:		25.27 %					
2:	Pu-239							
Obs:	250.46	5.1554	1,718.80	5.11	13,117.75	0.00	13,117.75	437.26
Exp:	250.46	5.1554	1,707.00					
	Peak Efficiency:		25.62 %					

Calibrated By: L Schlesinger 10-27-97

E1697300

AlphaVision Absolute Peak Search And Fit



Acquired: 14:35:47 on 27-Oct-97
File: C:\USER\CALIB\E1697300.CHN
Sample: AC5500

Real Time: 1801.26 s. Live Time: 1800.00 s.
Detector: #16 AL1-16
Type: Calibration

00180

AlphaVision A36-BI Ver 1.20 10/28/97 9:42:13 AM
Southern Petroleum Laboratories-LAS 576A (AL1)

E N E R G Y / E F F I C I E N C Y C A L I B R A T I O N

Standard Name:	AC5500
Certification Date:	3/ 3/93 12:00:00 PM
Sample Type:	Calibration
Analysis Type:	Absolute Peak Search And Fit
Acquisition Date:	10/28/97 9:08:19 AM
Detector:	AL1-17
Group:	D1 Calibration
Number of Channels:	512
Live Time:	1,800.00 Sec.
Real Time:	1,801.26 Sec.
Spectrum File:	C:\USER\CALIB\E1797301.CHN
Background File:	
Library File:	C:\USER\ALPHA\ALPHAVIS.ALB
Certificate File:	C:\USER\ALPHA\ALPHAVIS.ALB

---------- Results ----------

New Calibration:	2,902.1436 + 8.8079 * Chn.
Old Calibration:	2,902.1399 + 8.8079 * Chn.
New Efficiency:	24.40 %
Old Efficiency:	24.40 %

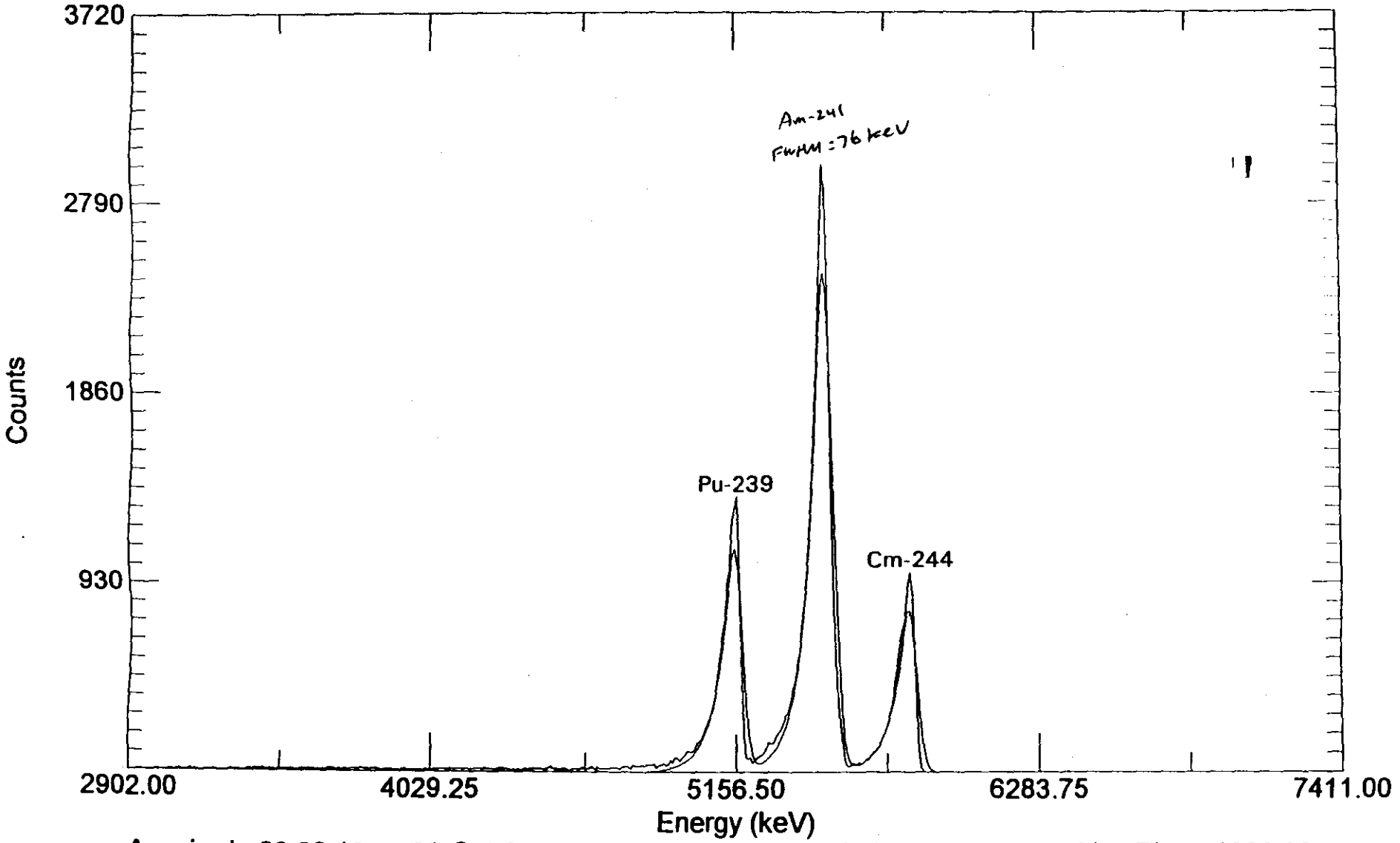
P E A K S U S E D I N C A L I B R A T I O N

	Channel	Energy (meV)	Activity DPM	FWHM	Gross Count	Bkg Count	Net Count	CPM
1:	Cm-244							
Obs:	329.57	5.8050	1,474.38	6.01	9,032.88	0.00	9,032.88	301.10
Exp:	329.57	5.8050	1,503.00					
	Peak Efficiency:		23.94 %					
2:	Pu-239							
Obs:	255.82	5.1554	1,739.50	6.50	12,733.06	0.00	12,733.06	424.44
Exp:	255.82	5.1554	1,707.00					
	Peak Efficiency:		24.87 %					

Calibrated By: C Schlosser 10-28-97

E1797301

AlphaVision Absolute Peak Search And Fit



Acquired: 09:08:19 on 28-Oct-97
File: C:\USER\CALIB\E1797301.CHN
Sample: AC5500

Real Time: 1801.26 s. Live Time: 1800.00 s.
Detector: #17 AL1-17
Type: Calibration

000182

AlphaVision A36-BI Ver 1.20 10/28/97 11:15:51 AM
Southern Petroleum Laboratories-LAS 576A (AL1)

E N E R G Y / E F F I C I E N C Y C A L I B R A T I O N

Standard Name:	AC5500
Certification Date:	3/ 3/93 12:00:00 PM
Sample Type:	Calibration
Analysis Type:	Absolute Peak Search And Fit
Acquisition Date:	10/28/97 10:45:41 AM
Detector:	AL1-18
Group:	D2 Calibration
Number of Channels:	512
Live Time:	1,800.00 Sec.
Real Time:	1,801.20 Sec.
Spectrum File:	C:\USER\CALIB\E1897301.CHN
Background File:	
Library File:	C:\USER\ALPHA\ALPHAVIS.ALB
Certificate File:	C:\USER\ALPHA\ALPHAVIS.ALB

---------- Results ----------

New Calibration:	2,918.3606 + 8.8737 * Chn.
Old Calibration:	2,925.0000 + 8.8488 * Chn.
New Efficiency:	23.73 %
Old Efficiency:	23.44 %

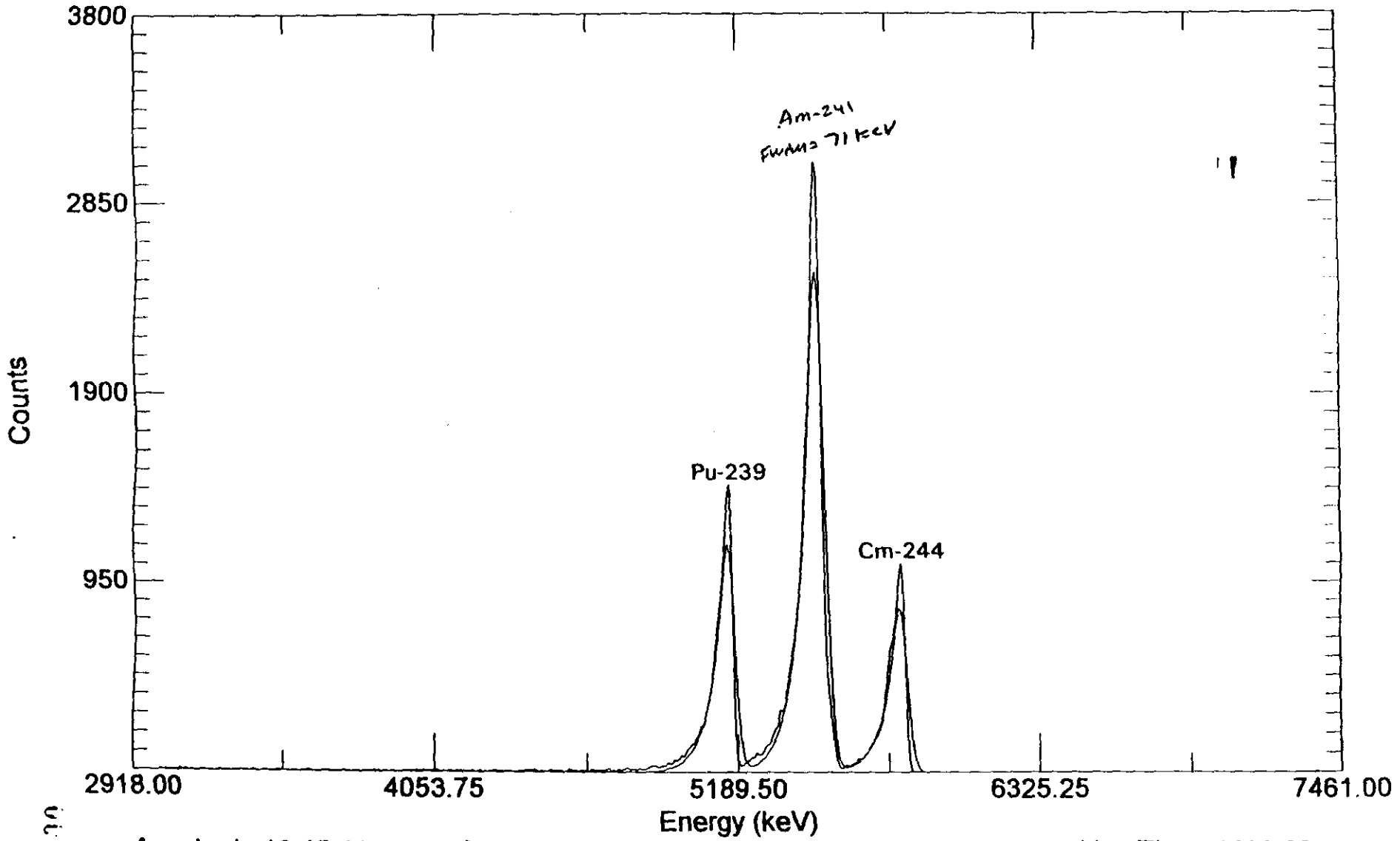
P E A K S U S E D I N C A L I B R A T I O N

	Channel	Energy (meV)	Activity DPM	FWHM	Gross Count	Bkg Count	Net Count	CPM
1:	Cm-244							
Obs:	325.30	5.8050	1,487.58	5.50	8,861.10	0.00	8,861.10	295.37
Exp:	325.30	5.8050	1,503.00					
	Peak Efficiency:		23.48 %					
2:	Pu-239							
Obs:	252.10	5.1554	1,724.51	5.62	12,273.42	0.00	12,273.42	409.11
Exp:	252.10	5.1554	1,707.00					
	Peak Efficiency:		23.97 %					

Calibrated By: L Schlossler 10-28-97

E1897301

AlphaVision Absolute Peak Search And Fit



Acquired: 10:45:41 on 28-Oct-97
File: C:\USER\CALIB\E1897301.CHN
Sample: AC5500

Real Time: 1801.20 s. Live Time: 1800.00 s.
Detector: #18 AL1-18
Type: Calibration

00184

AlphaVision A36-BI Ver 1.20 10/28/97 12:09:39 PM
Southern Petroleum Laboratories-LAS 576A (AL1)

E N E R G Y / E F F I C I E N C Y C A L I B R A T I O N

Standard Name: AC5500
Certification Date: 3/ 3/93 12:00:00 PM
Sample Type: Calibration
Analysis Type: Absolute Peak Search And Fit
Acquisition Date: 10/28/97 11:39:23 AM

Detector: AL1-19
Group: D3 Calibration
Number of Channels: 512
Live Time: 1,800.00 Sec.
Real Time: 1,801.12 Sec.

Spectrum File: C:\USER\CALIB\E1997301.CHN
Background File:
Library File: C:\USER\ALPHA\ALPHAVIS.ALB
Certificate File: C:\USER\ALPHA\ALPHAVIS.ALB

---------- Results ----------

New Calibration: 2,913.5676 + 8.8476 * Chn.
Old Calibration: 2,916.8301 + 8.8430 * Chn.

New Efficiency: 21.84 %
Old Efficiency: 22.27 %

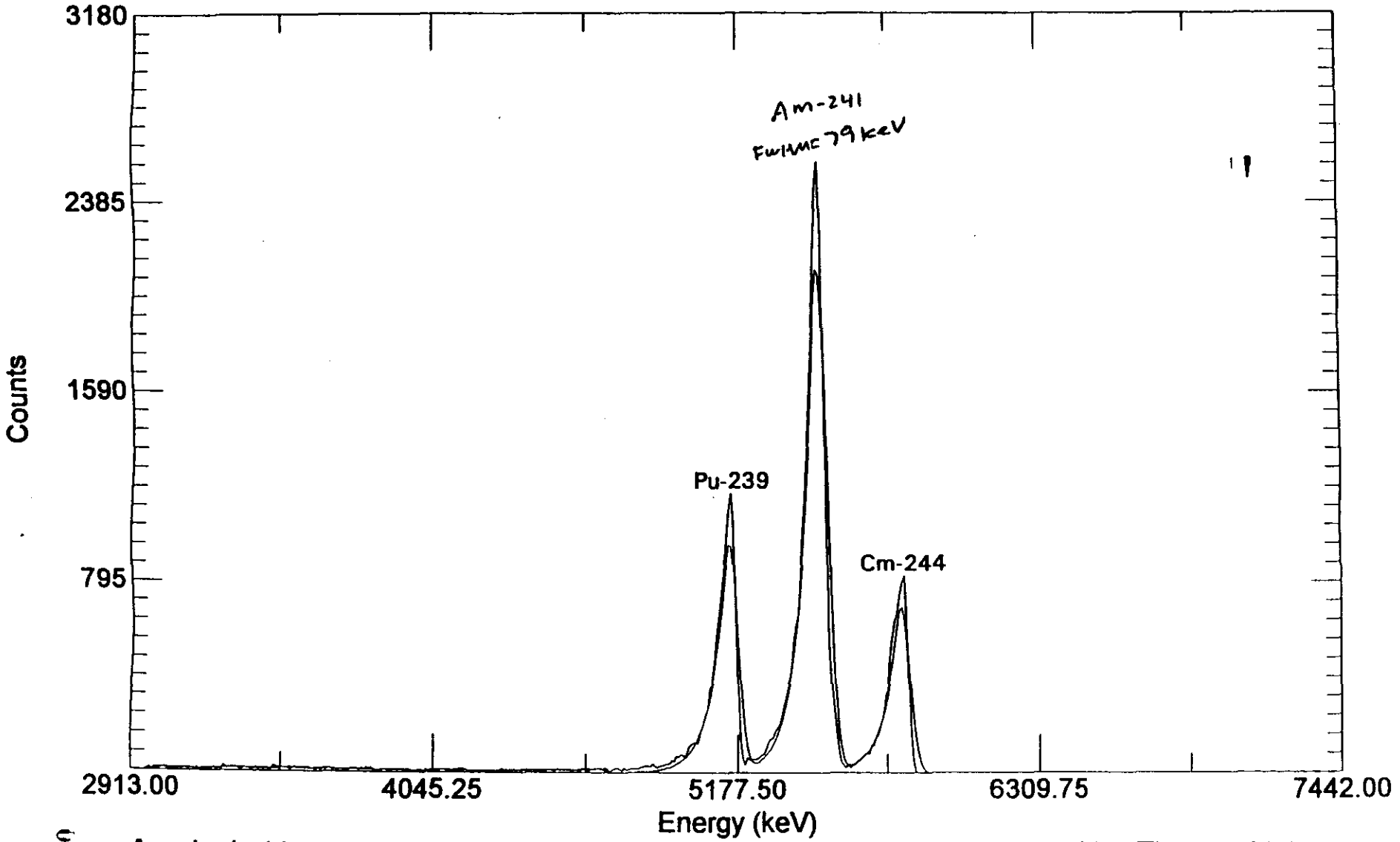
P E A K S U S E D I N C A L I B R A T I O N

	Channel	Energy (meV)	Activity DPM	FWHM	Gross Count	Bkg Count	Net Count	CPM
1:	Cm-244							
Obs:	326.80	5.8050	1,484.88	6.70	8,143.10	0.00	8,143.10	271.44
Exp:	326.80	5.8050	1,503.00					
	Peak Efficiency:		21.58 %					
2:	Pu-239							
Obs:	253.38	5.1554	1,727.58	6.77	11,319.68	0.00	11,319.68	377.32
Exp:	253.38	5.1554	1,707.00					
	Peak Efficiency:		22.11 %					

Calibrated By: C Schlosser 10-28-97

E1997301

AlphaVision Absolute Peak Search And Fit



Acquired: 11:39:23 on 28-Oct-97
File: C:\USER\CALIB\E1997301.CHN
Sample: AC5500

Real Time: 1801.12 s. Live Time: 1800.00 s.
Detector: #19 AL1-19
Type: Calibration

000186

AlphaVision A36-BI Ver 1.20 10/28/97 1:11:48 PM
Southern Petroleum Laboratories-LAS 576A (AL1)

E N E R G Y / E F F I C I E N C Y C A L I B R A T I O N

Standard Name:	AC5500
Certification Date:	3/ 3/93 12:00:00 PM
Sample Type:	Calibration
Analysis Type:	Absolute Peak Search And Fit
Acquisition Date:	10/28/97 12:41:32 PM
Detector:	AL1-20
Group:	D4 Calibration
Number of Channels:	512
Live Time:	1,800.00 Sec.
Real Time:	1,801.08 Sec.
Spectrum File:	C:\USER\CALIB\E2097301.CHN
Background File:	
Library File:	C:\USER\ALPHA\ALPHAVIS.ALB
Certificate File:	C:\USER\ALPHA\ALPHAVIS.ALB

---------- Results ----------

New Calibration:	2,914.8015 + 8.8593 * Chn.
Old Calibration:	2,920.2800 + 8.8380 * Chn.
New Efficiency:	20.98 %
Old Efficiency:	20.87 %

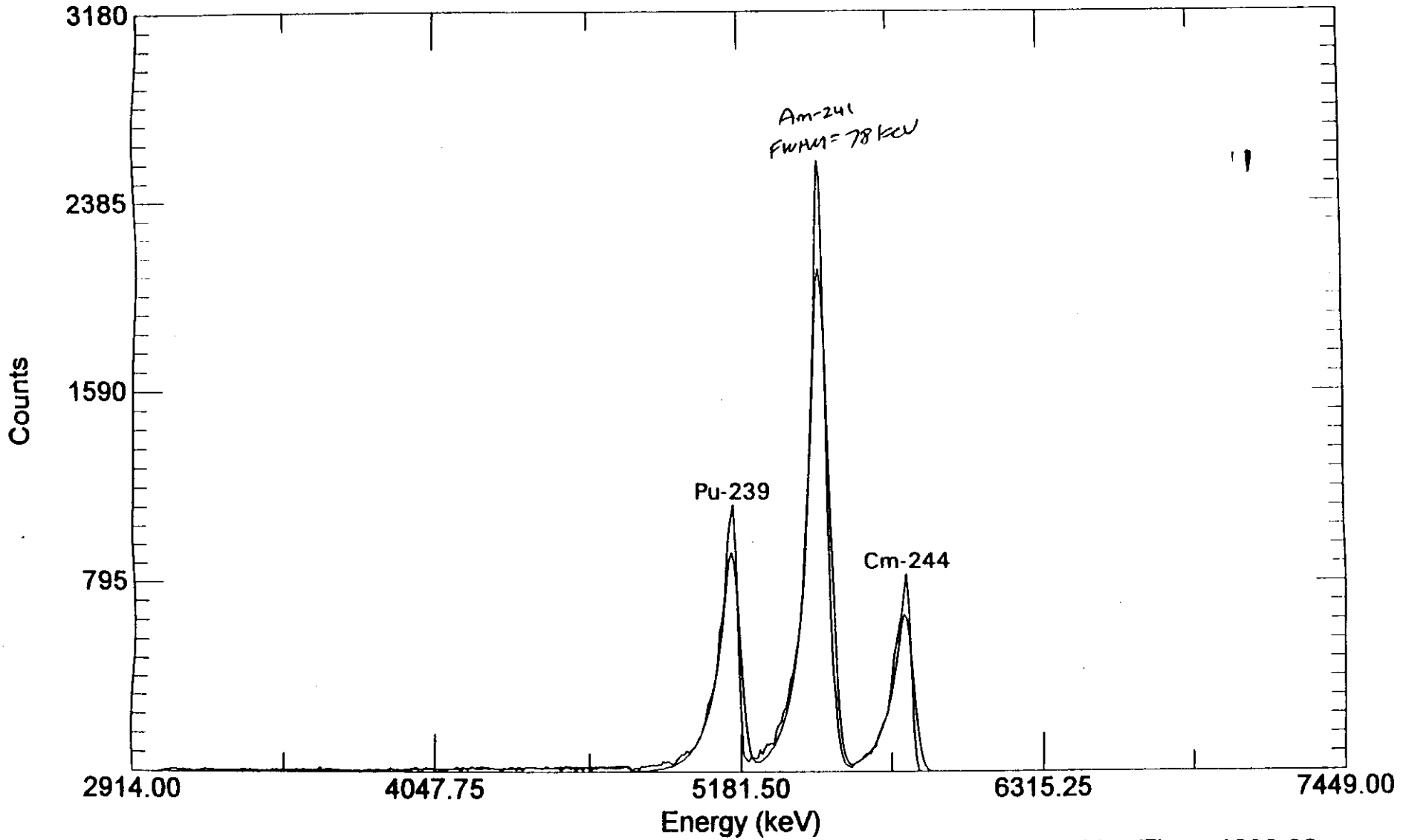
P E A K S U S E D I N C A L I B R A T I O N

	Channel	Energy (meV)	Activity DPM	FWHM	Gross Count	Bkg Count	Net Count	CPM
1:	Cm-244							
Obs:	326.23	5.8050	1,477.41	6.28	7,780.32	0.00	7,780.32	259.34
Exp:	326.23	5.8050	1,503.00					
	Peak Efficiency:		20.62 %					
2:	Pu-239							
Obs:	252.91	5.1554	1,736.07	6.52	10,923.47	0.00	10,923.47	364.12
Exp:	252.91	5.1554	1,707.00					
	Peak Efficiency:		21.33 %					

Calibrated By: C Schiavone 10-28-97

E2097301

AlphaVision Absolute Peak Search And Fit



Acquired: 12:41:32 on 28-Oct-97
File: C:\USER\CALIB\E2097301.CHN
Sample: AC5500

Real Time: 1801.08 s. Live Time: 1800.00 s.
Detector: #20 AL1-20
Type: Calibration

000188

AlphaVision A36-BI Ver 1.20 10/28/97 3:01:02 PM
Southern Petroleum Laboratories-LAS 576A (AL1)

E N E R G Y / E F F I C I E N C Y C A L I B R A T I O N

Standard Name: AC5500
Certification Date: 3/ 3/93 12:00:00 PM
Sample Type: Calibration
Analysis Type: Absolute Peak Search And Fit
Acquisition Date: 10/28/97 2:30:53 PM

Detector: AL1-21
Group: D1 Calibration
Number of Channels: 512
Live Time: 1,800.00 Sec.
Real Time: 1,801.32 Sec.

Spectrum File: C:\USER\CALIB\E2197301.CHN
Background File:
Library File: C:\USER\ALPHA\ALPHAVIS.ALB
Certificate File: C:\USER\ALPHA\ALPHAVIS.ALB

---------- Results ----------

New Calibration: 2,899.1458 + 9.0369 * Chn.
Old Calibration: 2,904.8000 + 9.0265 * Chn.

New Efficiency: 26.14 %
Old Efficiency: 25.54 %

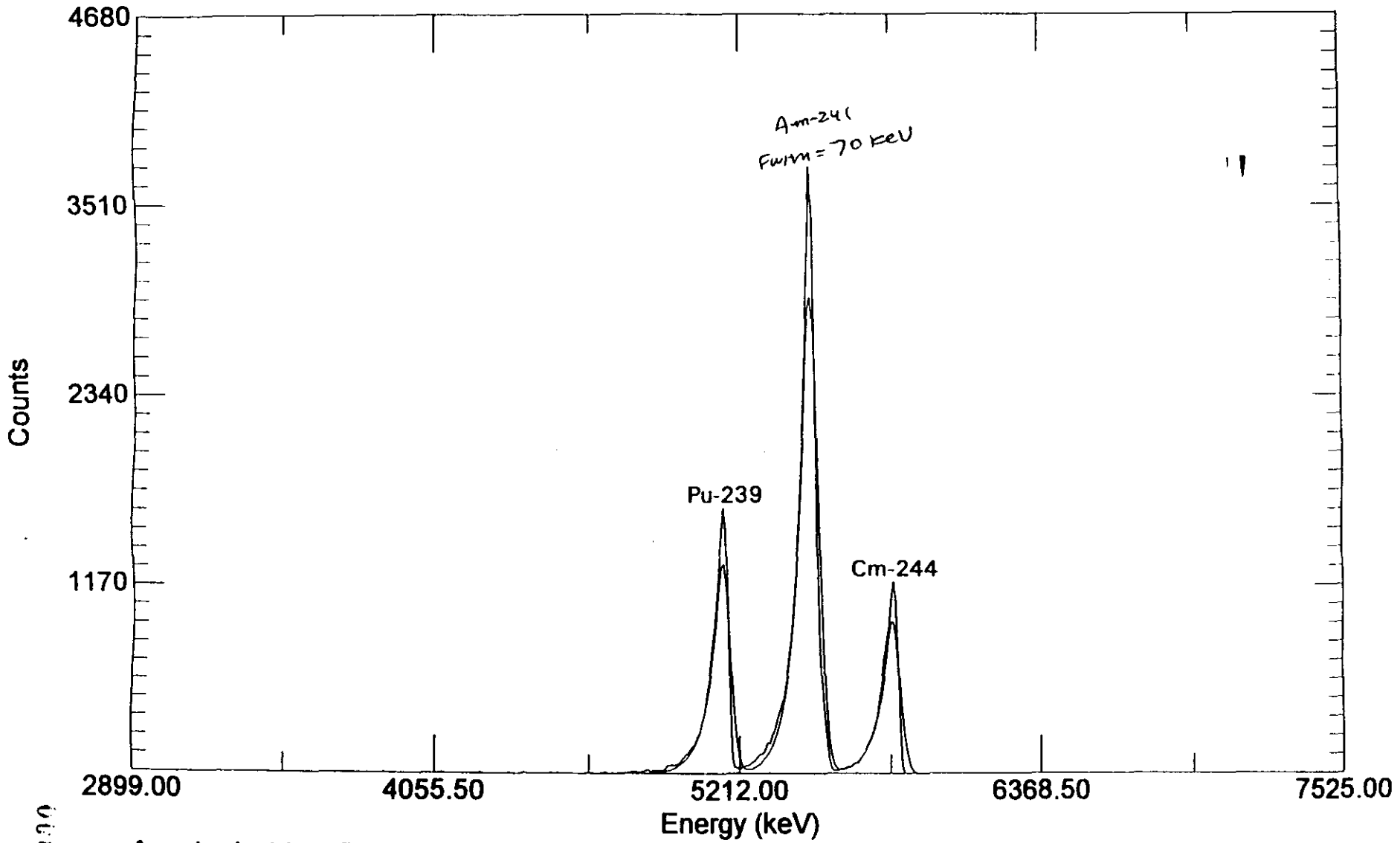
P E A K S U S E D I N C A L I B R A T I O N

	Channel	Energy (meV)	Activity DPM	FWHM	Gross Count	Bkg Count	Net Count	CPM
1:	Cm-244							
Obs:	321.55	5.8050	1,489.66	5.47	9,775.30	0.00	9,775.30	325.84
Exp:	321.55	5.8050	1,503.00					
	Peak Efficiency:		25.91 %					
2:	Pu-239							
Obs:	249.67	5.1554	1,722.15	5.57	13,502.50	0.00	13,502.50	450.08
Exp:	249.67	5.1554	1,707.00					
	Peak Efficiency:		26.37 %					

Calibrated By: L Schwartz 10-28-97

E2197301

AlphaVision Absolute Peak Search And Fit



Acquired: 14:30:53 on 28-Oct-97
File: C:\USER\CALIB\E2197301.CHN
Sample: AC5500

Real Time: 1801.32 s. Live Time: 1800.00 s.
Detector: #21 AL1-21
Type: Calibration

000190

AlphaVision A36-BI Ver 1.20 10/30/97 11:34:08 AM
Southern Petroleum Laboratories-LAS 576A (AL1)

E N E R G Y / E F F I C I E N C Y C A L I B R A T I O N

Standard Name:	AC5500
Certification Date:	3/ 3/93 12:00:00 PM
Sample Type:	Calibration
Analysis Type:	Absolute Peak Search And Fit
Acquisition Date:	10/30/97 11:03:55 AM
Detector:	AL1-22
Group:	D6 Calibration
Number of Channels:	512
Live Time:	1,800.00 Sec.
Real Time:	1,801.20 Sec.
Spectrum File:	C:\USER\CALIB\E2297303.CHN
Background File:	
Library File:	C:\USER\ALPHA\ALPHAVIS.ALB
Certificate File:	C:\USER\ALPHA\ALPHAVIS.ALB

---------- Results ----------

New Calibration:	2,896.8826 + 8.9701 * Chn.
Old Calibration:	2,903.8701 + 8.9501 * Chn.
New Efficiency:	23.96 %
Old Efficiency:	24.08 %

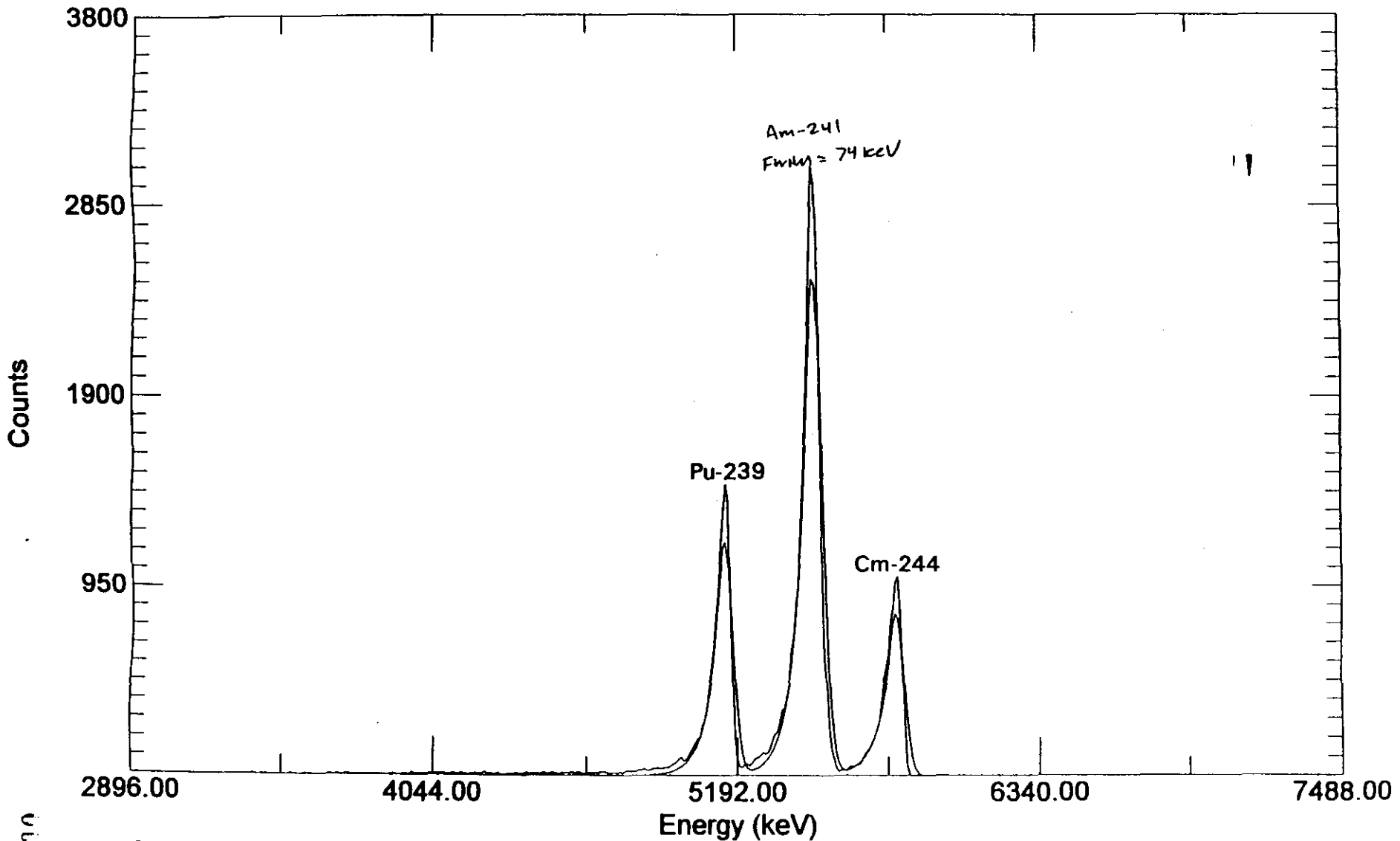
P E A K S U S E D I N C A L I B R A T I O N

	Channel	Energy (meV)	Activity DPM	FWHM	Gross Count	Bkg Count	Net Count	CPM
1:	Cm-244							
Obs:	324.20	5.8050	1,479.38	6.07	8,898.81	0.00	8,898.81	296.63
Exp:	324.20	5.8050	1,503.00					
	Peak Efficiency:		23.59 %					
2:	Pu-239							
Obs:	251.78	5.1554	1,733.83	6.07	12,463.64	0.00	12,463.64	415.45
Exp:	251.78	5.1554	1,707.00					
	Peak Efficiency:		24.34 %					

Calibrated By: C Schlocaslin 10-30-97

E2297303

AlphaVision Absolute Peak Search And Fit



Acquired: 11:03:55 on 30-Oct-97
File: C:\USER\CALIB\E2297303.CHN
Sample: AC5500

Real Time: 1801.20 s. Live Time: 1800.00 s.
Detector: #22 AL1-22
Type: Calibration

000192

AlphaVision A36-BI Ver 1.20 10/30/97 10:49:51 AM
Southern Petroleum Laboratories-LAS 576A (AL1)

E N E R G Y / E F F I C I E N C Y C A L I B R A T I O N

Standard Name:	AC5500
Certification Date:	3/ 3/93 12:00:00 PM
Sample Type:	Calibration
Analysis Type:	Absolute Peak Search And Fit
Acquisition Date:	10/30/97 10:19:42 AM
Detector:	AL1-23
Group:	D7 Calibration
Number of Channels:	512
Live Time:	1,800.00 Sec.
Real Time:	1,801.24 Sec.
Spectrum File:	C:\USER\CALIB\E2397303.CHN
Background File:	
Library File:	C:\USER\ALPHA\ALPHAVIS.ALB
Certificate File:	C:\USER\ALPHA\ALPHAVIS.ALB

---------- Results ----------

New Calibration:	2,932.0684 + 8.9143 * Chn.
Old Calibration:	2,937.8601 + 8.9012 * Chn.
New Efficiency:	24.65 %
Old Efficiency:	24.73 %

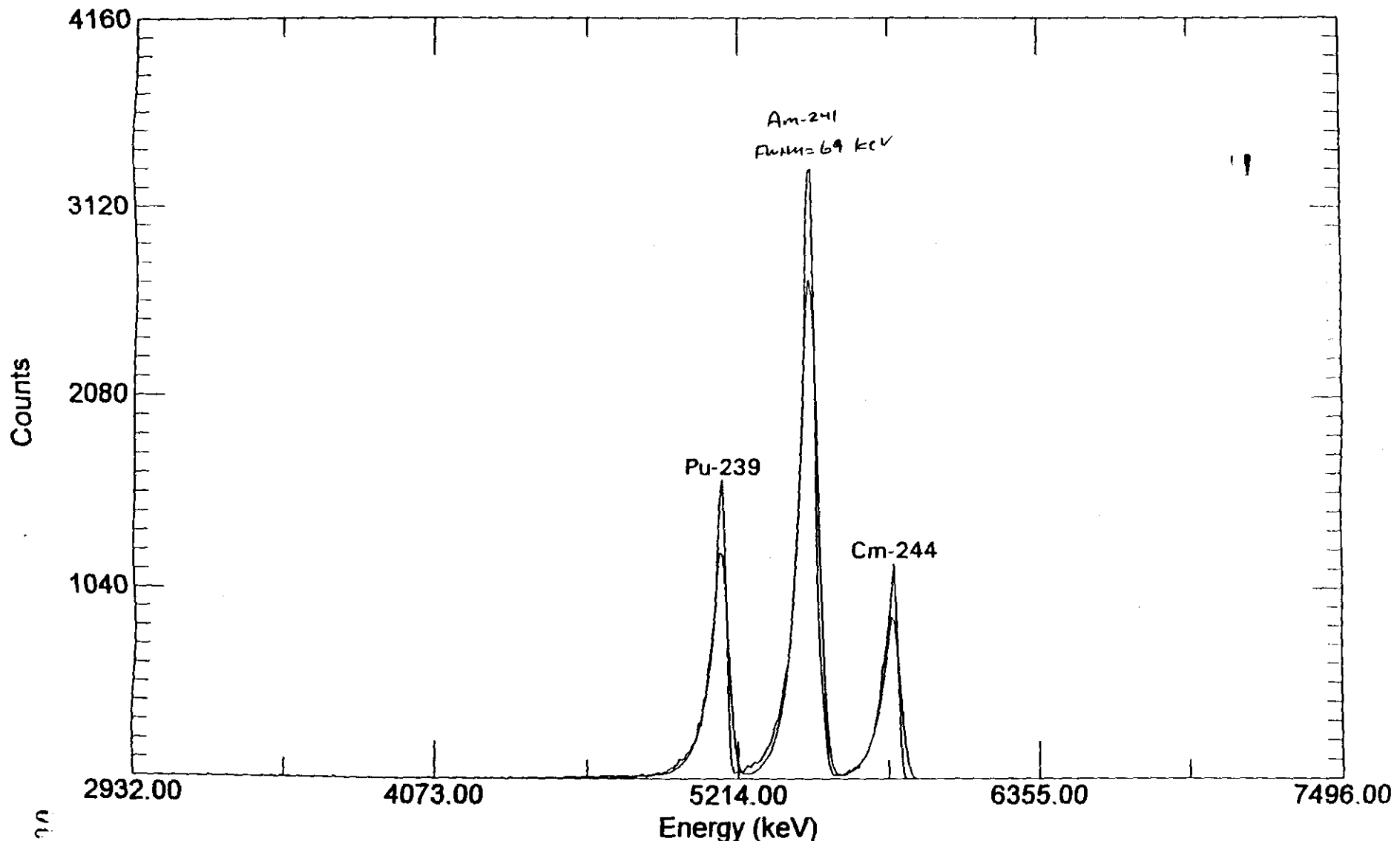
P E A K S U S E D I N C A L I B R A T I O N

	Channel	Energy (meV)	Activity DPM	FWHM	Gross Count	Bkg Count	Net Count	CPM
1:	Cm-244							
Obs:	322.28	5.8050	1,479.64	5.56	9,156.49	0.00	9,156.49	305.22
Exp:	322.28	5.8050	1,503.00					
	Peak Efficiency:		24.27 %					
2:	Pu-239							
Obs:	249.41	5.1554	1,733.53	5.50	12,819.96	0.00	12,819.96	427.33
Exp:	249.41	5.1554	1,707.00					
	Peak Efficiency:		25.04 %					

Calibrated By: C Schlenker 10-30-97

E2397303

AlphaVision Absolute Peak Search And Fit



Acquired: 10:19:42 on 30-Oct-97
File: C:\USER\CALIB\E2397303.CHN
Sample: AC5500

Real Time: 1801.24 s. Live Time: 1800.00 s.
Detector: #23 AL1-23
Type: Calibration

00194

AlphaVision A36-BI Ver 1.20 10/30/97 10:12:36 AM
Southern Petroleum Laboratories-LAS 576A (AL1)

E N E R G Y / E F F I C I E N C Y C A L I B R A T I O N

Standard Name: AC5500
Certification Date: 3/ 3/93 12:00:00 PM
Sample Type: Calibration
Analysis Type: Absolute Peak Search And Fit
Acquisition Date: 10/30/97 9:42:28 AM

Detector: AL1-24
Group: D8 Calibration
Number of Channels: 512
Live Time: 1,800.00 Sec.
Real Time: 1,801.24 Sec.

Spectrum File: C:\USER\CALIB\E2497303.CHN
Background File:
Library File: C:\USER\ALPHA\ALPHAVIS.ALB
Certificate File: C:\USER\ALPHA\ALPHAVIS.ALB

---------- Results ----------

New Calibration: 2,912.0034 + 8.8565 * Chn.
Old Calibration: 2,916.5100 + 8.8485 * Chn.

New Efficiency: 24.72 %
Old Efficiency: 25.37 %

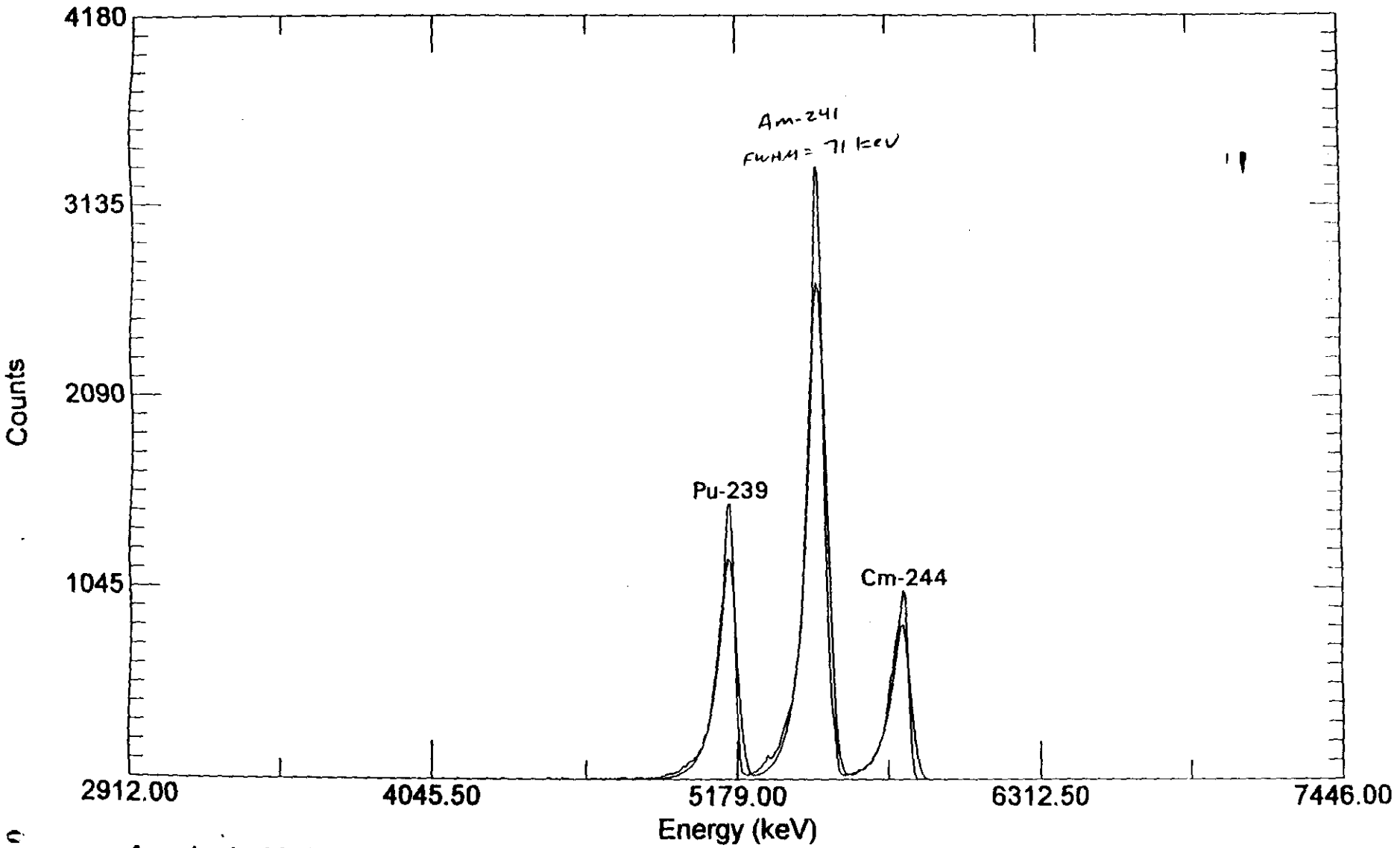
P E A K S U S E D I N C A L I B R A T I O N

	Channel	Energy (meV)	Activity DPM	FWHM	Gross Count	Bkg Count	Net Count	CPM
1:	Cm-244							
Obs:	326.65	5.8050	1,493.79	6.01	9,267.40	0.00	9,267.40	308.91
Exp:	326.65	5.8050	1,503.00					
	Peak Efficiency:		24.57 %					
2:	Pu-239							
Obs:	253.31	5.1554	1,717.46	5.99	12,733.14	0.00	12,733.14	424.44
Exp:	253.31	5.1554	1,707.00					
	Peak Efficiency:		24.87 %					

Calibrated By: L Schiocchet 10-30-97

E2497303

AlphaVision Absolute Peak Search And Fit



Acquired: 09:42:28 on 30-Oct-97
File: C:\USER\CALIB\E2497303.CHN
Sample: AC5500

Real Time: 1801.24 s. Live Time: 1800.00 s.
Detector: #24 AL1-24
Type: Calibration

AlphaVision A36-BI Ver 1.20 10/30/97 9:23:45 AM
Southern Petroleum Laboratories-LAS 576A (AL1)

E N E R G Y / E F F I C I E N C Y C A L I B R A T I O N

Standard Name:	AC5500
Certification Date:	3/ 3/93 12:00:00 PM
Sample Type:	Calibration
Analysis Type:	Absolute Peak Search And Fit
Acquisition Date:	10/30/97 8:53:36 AM
Detector:	AL1-25
Group:	D1 Calibration
Number of Channels:	512
Live Time:	1,800.00 Sec.
Real Time:	1,801.30 Sec.
Spectrum File:	C:\USER\CALIB\E2597303.CHN
Background File:	
Library File:	C:\USER\ALPHA\ALPHAVIS.ALB
Certificate File:	C:\USER\ALPHA\ALPHAVIS.ALB

---------- Results ----------

New Calibration:	2,902.9409 + 8.9668 * Chn.
Old Calibration:	2,907.9600 + 8.9572 * Chn.
New Efficiency:	26.24 %
Old Efficiency:	26.38 %

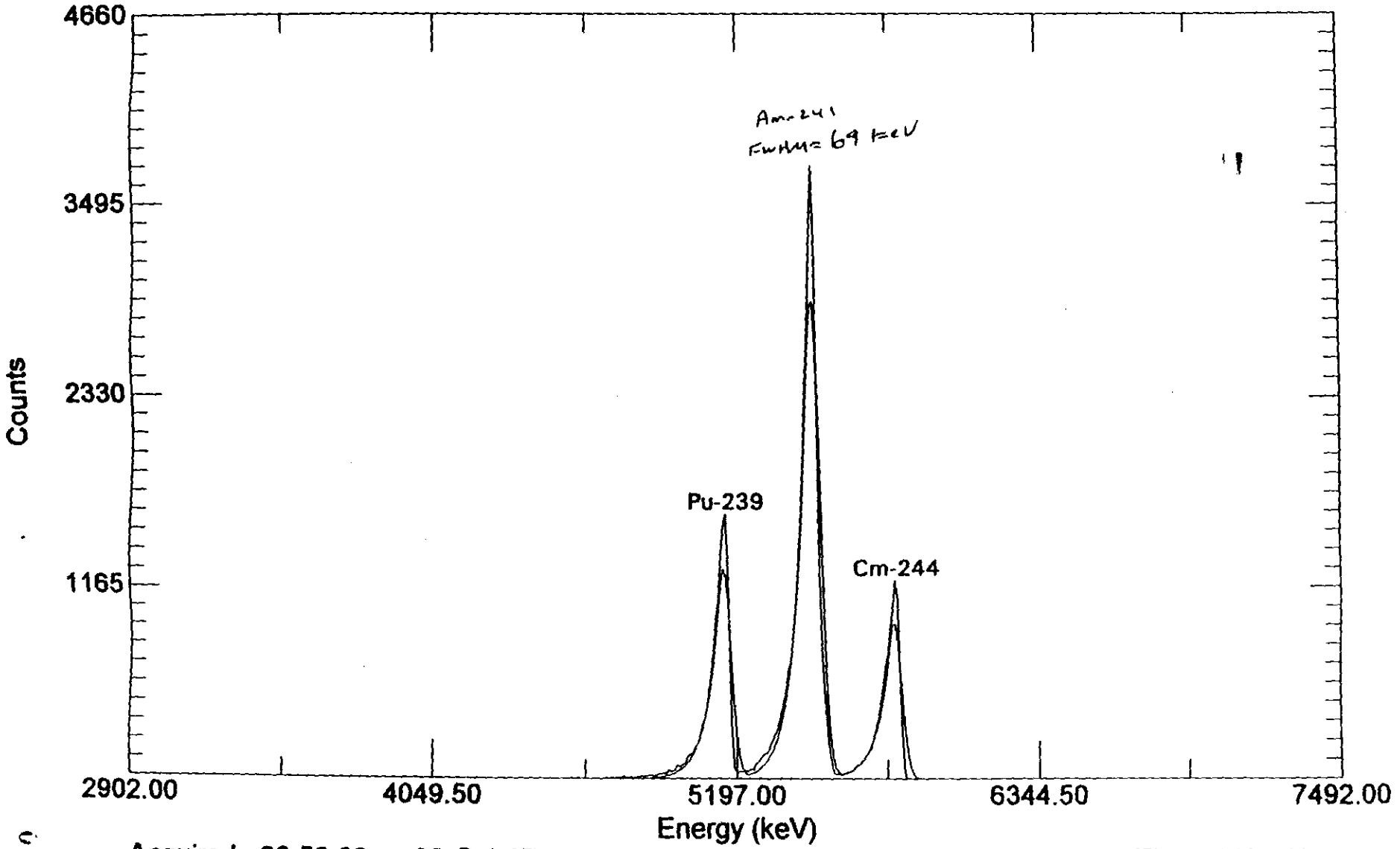
P E A K S U S E D I N C A L I B R A T I O N

	Channel	Energy (meV)	Activity DPM	FWHM	Gross Count	Bkg Count	Net Count	CPM
1:	Cm-244							
Obs:	323.64	5.8050	1,503.09	5.25	9,898.87	0.00	9,898.87	329.96
Exp:	323.64	5.8050	1,503.00					
	Peak Efficiency:		26.24 %					
2:	Pu-239							
Obs:	251.20	5.1554	1,706.90	5.73	13,433.60	0.00	13,433.60	447.79
Exp:	251.20	5.1554	1,707.00					
	Peak Efficiency:		26.24 %					

Calibrated By: L Schlenker 10-30-97

E2597303

AlphaVision Absolute Peak Search And Fit



Acquired: 08:53:36 on 30-Oct-97
File: C:\USER\CALIB\E2597303.CHN
Sample: AC5500

Real Time: 1801.30 s. Live Time: 1800.00 s.
Detector: #25 AL1-25
Type: Calibration

000198

AlphaVision A36-BI Ver 1.20 10/30/97 8:45:36 AM
Southern Petroleum Laboratories-LAS 576A (AL1)

E N E R G Y / E F F I C I E N C Y C A L I B R A T I O N

Standard Name:	AC5500
Certification Date:	3/ 3/93 12:00:00 PM
Sample Type:	Calibration
Analysis Type:	Absolute Peak Search And Fit
Acquisition Date:	10/30/97 8:15:26 AM
Detector:	AL1-26
Group:	D2 Calibration
Number of Channels:	512
Live Time:	1,800.00 Sec.
Real Time:	1,801.30 Sec.
Spectrum File:	C:\USER\CALIB\E2697303.CHN
Background File:	
Library File:	C:\USER\ALPHA\ALPHAVIS.ALB
Certificate File:	C:\USER\ALPHA\ALPHAVIS.ALB

---------- Results ----------

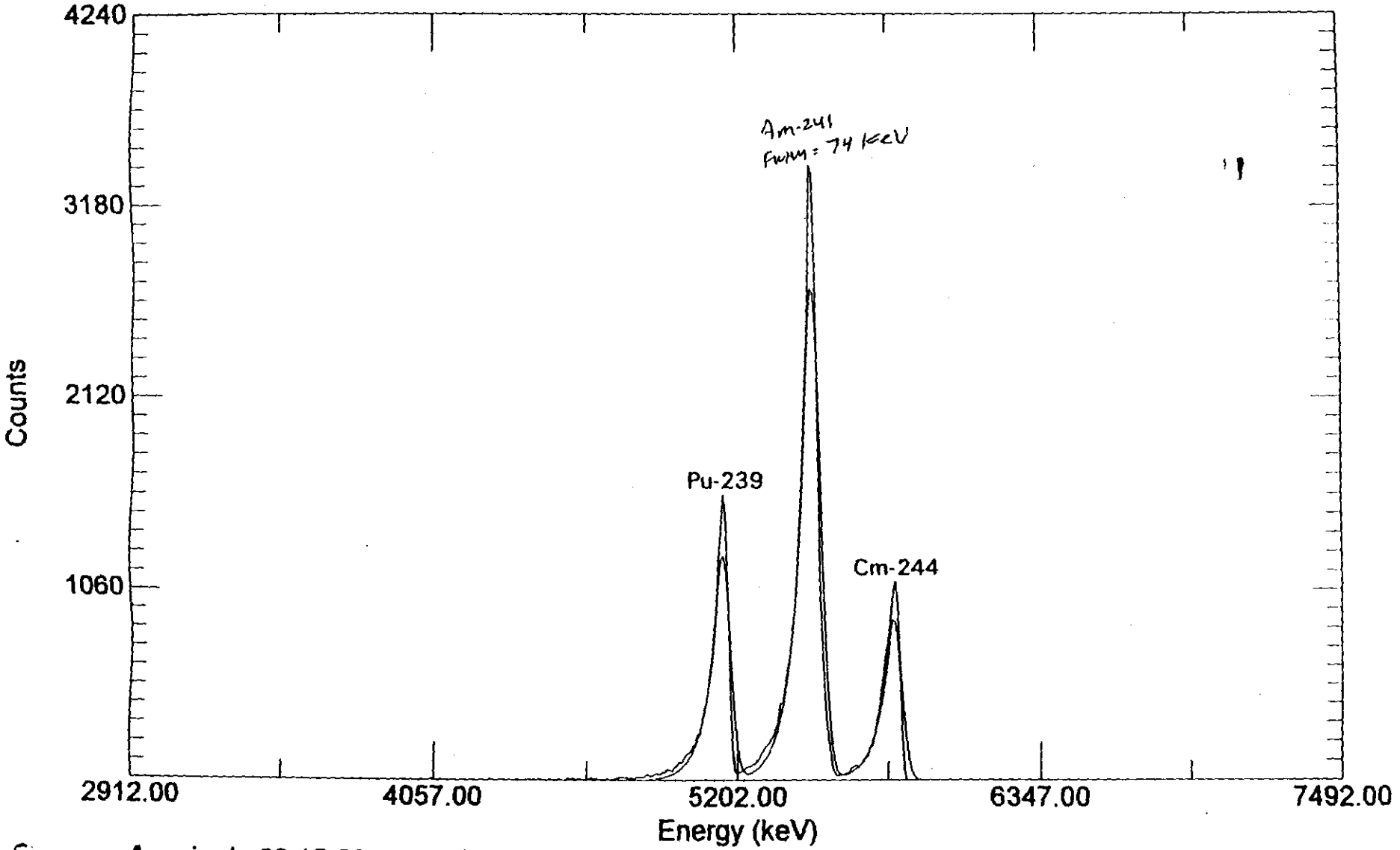
New Calibration:	2,912.2061 + 8.9465 * Chn.
Old Calibration:	2,917.6499 + 8.9278 * Chn.
New Efficiency:	25.92 %
Old Efficiency:	25.83 %

P E A K S U S E D I N C A L I B R A T I O N

	Channel	Energy (meV)	Activity DPM	FWHM	Gross Count	Bkg Count	Net Count	CPM
1:	Cm-244							
Obs:	323.34	5.8050	1,497.89	5.87	9,746.94	0.00	9,746.94	324.90
Exp:	323.34	5.8050	1,503.00					
	Peak Efficiency:		25.84 %					
2:	Pu-239							
Obs:	250.73	5.1554	1,712.80	5.61	13,319.08	0.00	13,319.08	443.97
Exp:	250.73	5.1554	1,707.00					
	Peak Efficiency:		26.01 %					

Calibrated By: C Schiessler 10-30-97

AlphaVision Absolute Peak Search And Fit



Acquired: 08:15:26 on 30-Oct-97
File: C:\USER\CALIB\E2697303.CHN
Sample: AC5500

Real Time: 1801.30 s. Live Time: 1800.00 s.
Detector: #26 AL1-26
Type: Calibration

AlphaVision A36-BI Ver 1.20 10/29/97 6:06:46 PM
Southern Petroleum Laboratories-LAS 576A (AL1)

E N E R G Y / E F F I C I E N C Y C A L I B R A T I O N

Standard Name:	AC5500
Certification Date:	3/ 3/93 12:00:00 PM
Sample Type:	Calibration
Analysis Type:	Absolute Peak Search And Fit
Acquisition Date:	10/29/97 5:36:34 PM
Detector:	AL1-27
Group:	D3 Calibration
Number of Channels:	512
Live Time:	1,800.00 Sec.
Real Time:	1,801.26 Sec.
Spectrum File:	C:\USER\CALIB\E2797302.CHN
Background File:	
Library File:	C:\USER\ALPHA\ALPHAVIS.ALB
Certificate File:	C:\USER\ALPHA\ALPHAVIS.ALB

---------- Results ----------

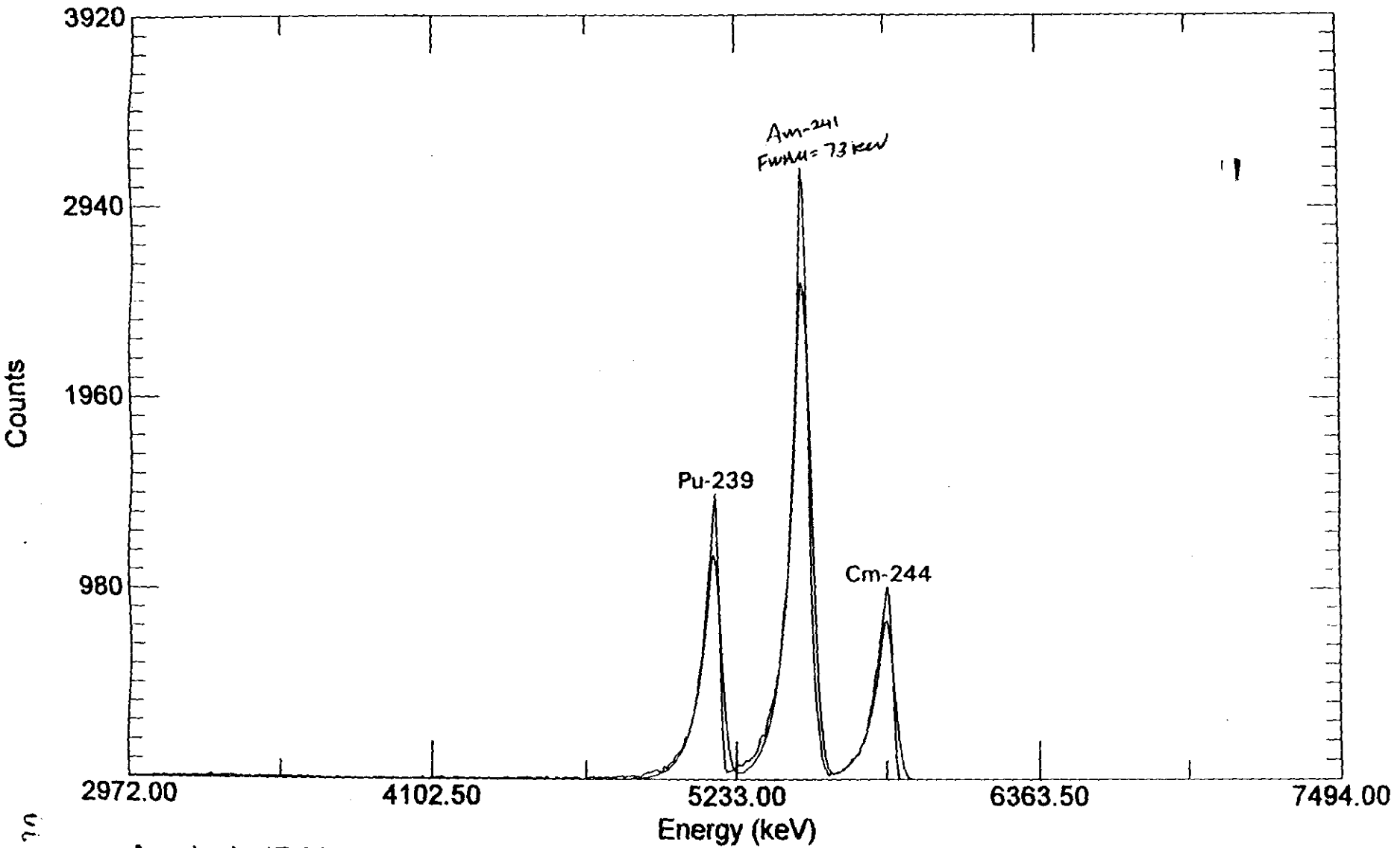
New Calibration:	2,972.4548 + 8.8331 * Chn.
Old Calibration:	2,979.6799 + 8.8145 * Chn.
New Efficiency:	24.84 %
Old Efficiency:	24.29 %

P E A K S U S E D I N C A L I B R A T I O N

	Channel	Energy (meV)	Activity DPM	FWHM	Gross Count	Bkg Count	Net Count	CPM
1:	Cm-244							
Obs:	320.67	5.8050	1,485.05	5.97	9,258.53	0.00	9,258.53	308.62
Exp:	320.67	5.8050	1,503.00					
	Peak Efficiency:		24.54 %					
2:	Pu-239							
Obs:	247.13	5.1554	1,727.39	5.97	12,868.96	0.00	12,868.96	428.97
Exp:	247.13	5.1554	1,707.00					
	Peak Efficiency:		25.13 %					

Calibrated By: C Schlosser 10-29-97

AlphaVision Absolute Peak Search And Fit



Acquired: 17:36:34 on 29-Oct-97
File: C:\USER\CALIB\E2797302.CHN
Sample: AC5500

Real Time: 1801.26 s. Live Time: 1800.00 s.
Detector: #27 AL1-27
Type: Calibration

AlphaVision A36-BI Ver 1.20 10/29/97 3:43:05 PM
Southern Petroleum Laboratories-LAS 578A (AL1)

E N E R G Y / E F F I C I E N C Y C A L I B R A T I O N

Standard Name:	AC5500
Certification Date:	3/ 3/93 12:00:00 PM
Sample Type:	Calibration
Analysis Type:	Absolute Peak Search And Fit
Acquisition Date:	10/29/97 3:12:56 PM
Detector:	AL1-28
Group:	D4 Calibration
Number of Channels:	512
Live Time:	1,800.00 Sec.
Real Time:	1,801.24 Sec.
Spectrum File:	C:\USER\CALIB\E2897302.CHN
Background File:	
Library File:	C:\USER\ALPHA\ALPHAVIS.ALB
Certificate File:	C:\USER\ALPHA\ALPHAVIS.ALB

---------- Results ----------

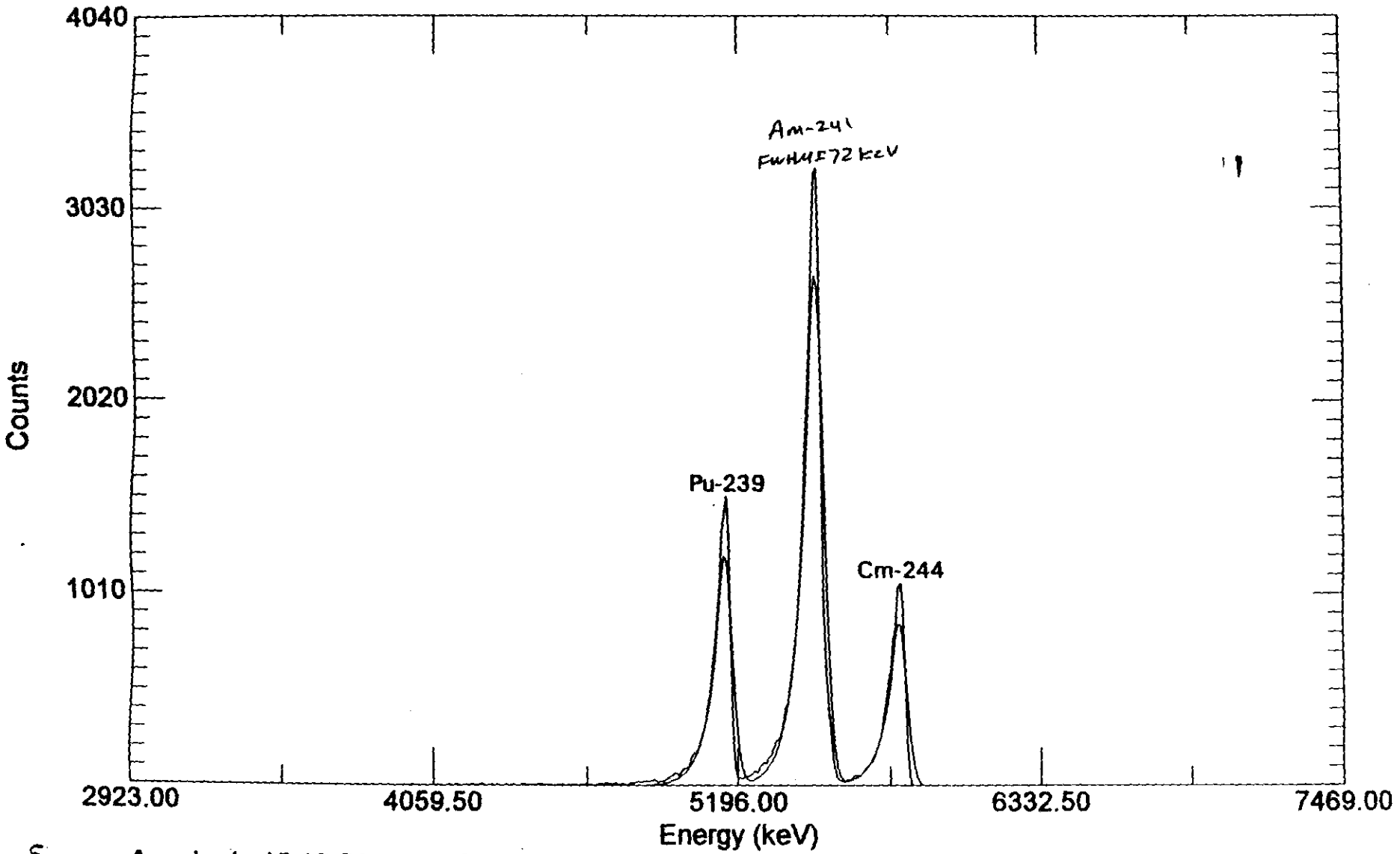
New Calibration:	2,923.7141 + 8.8807 * Chn.
Old Calibration:	2,927.8899 + 8.8690 * Chn.
New Efficiency:	24.67 %
Old Efficiency:	24.32 %

P E A K S U S E D I N C A L I B R A T I O N

	Channel	Energy (meV)	Activity DPM	FWHM	Gross Count	Bkg Count	Net Count	CPM
1:	Cm-244							
Obs:	324.44	5.8050	1,472.67	5.73	9,121.53	0.00	9,121.53	304.05
Exp:	324.44	5.8050	1,503.00					
	Peak Efficiency:		24.18 %					
2:	Pu-239							
Obs:	251.30	5.1554	1,741.44	5.98	12,889.00	0.00	12,889.00	429.63
Exp:	251.30	5.1554	1,707.00					
	Peak Efficiency:		25.17 %					

Calibrated By: C Schlosser 10-29-97

AlphaVision Absolute Peak Search And Fit



Acquired: 15:12:56 on 29-Oct-97
File: C:\USER\CALIB\E2897302.CHN
Sample: AC5500

Real Time: 1801.24 s. Live Time: 1800.00 s.
Detector: #28 AL1-28
Type: Calibration

00204

AlphaVision A36-BI Ver 1.20 10/29/97 2:36:35 PM
Southern Petroleum Laboratories-LAS 576A (AL1)

E N E R G Y / E F F I C I E N C Y C A L I B R A T I O N

Standard Name:	AC5500
Certification Date:	3/ 3/93 12:00:00 PM
Sample Type:	Calibration
Analysis Type:	Absolute Peak Search And Fit
Acquisition Date:	10/29/97 2:06:24 PM
Detector:	AL1-29
Group:	D5 Calibration
Number of Channels:	512
Live Time:	1,800.00 Sec.
Real Time:	1,801.12 Sec.
Spectrum File:	C:\USER\CALIB\E2997302.CHN
Background File:	
Library File:	C:\USER\ALPHA\ALPHAVIS.ALB
Certificate File:	C:\USER\ALPHA\ALPHAVIS.ALB

---------- Results ----------

New Calibration:	2,943.3997 + 8.9329 * Chn.
Old Calibration:	2,951.9700 + 8.9068 * Chn.
New Efficiency:	22.02 %
Old Efficiency:	22.12 %

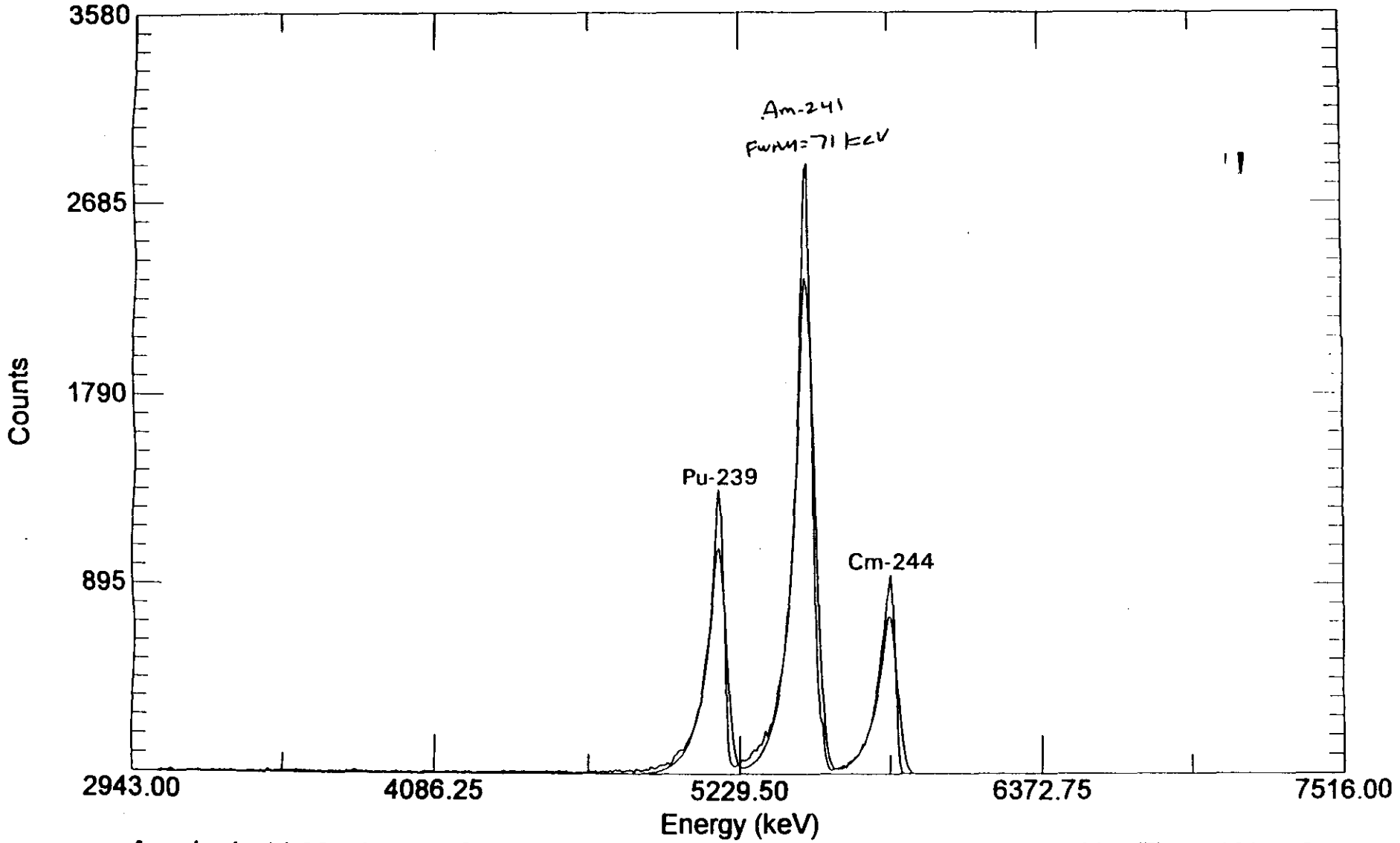
P E A K S U S E D I N C A L I B R A T I O N

	Channel	Energy (meV)	Activity DPM	FWHM	Gross Count	Bkg Count	Net Count	CPM
1:	Cm-244							
Obs:	320.34	5.8050	1,464.03	5.74	8,093.86	0.00	8,093.86	269.80
Exp:	320.34	5.8050	1,503.00					
	Peak Efficiency:		21.45 %					
2:	Pu-239							
Obs:	247.62	5.1554	1,751.26	5.89	11,569.14	0.00	11,569.14	385.64
Exp:	247.62	5.1554	1,707.00					
	Peak Efficiency:		22.59 %					

Calibrated By: C Schlesinger 10-29-97

E2997302

AlphaVision Absolute Peak Search And Fit



Acquired: 14:06:24 on 29-Oct-97
File: C:\USER\CALIB\E2997302.CHN
Sample: AC5500

Real Time: 1801.12 s. Live Time: 1800.00 s.
Detector: #29 AL1-29
Type: Calibration

AlphaVision A36-BI Ver 1.20 10/30/97 12:52:57 PM
Southern Petroleum Laboratories-LAS 576A (AL1)

E N E R G Y / E F F I C I E N C Y C A L I B R A T I O N

Standard Name:	AC5500
Certification Date:	3/ 3/93 12:00:00 PM
Sample Type:	Calibration
Analysis Type:	Absolute Peak Search And Fit
Acquisition Date:	10/30/97 12:22:44 PM
Detector:	AL1-30
Group:	D6 Calibration
Number of Channels:	512
Live Time:	1,800.00 Sec.
Real Time:	1,801.12 Sec.
Spectrum File:	C:\USER\CALIB\E3097303.CHN
Background File:	
Library File:	C:\USER\ALPHA\ALPHAVIS.ALB
Certificate File:	C:\USER\ALPHA\ALPHAVIS.ALB

---------- Results ----------

New Calibration:	2,939.4951 + 8.8208 * Chn.
Old Calibration:	2,938.8701 + 8.8277 * Chn.
New Efficiency:	21.98 %
Old Efficiency:	21.80 %

P E A K S U S E D I N C A L I B R A T I O N

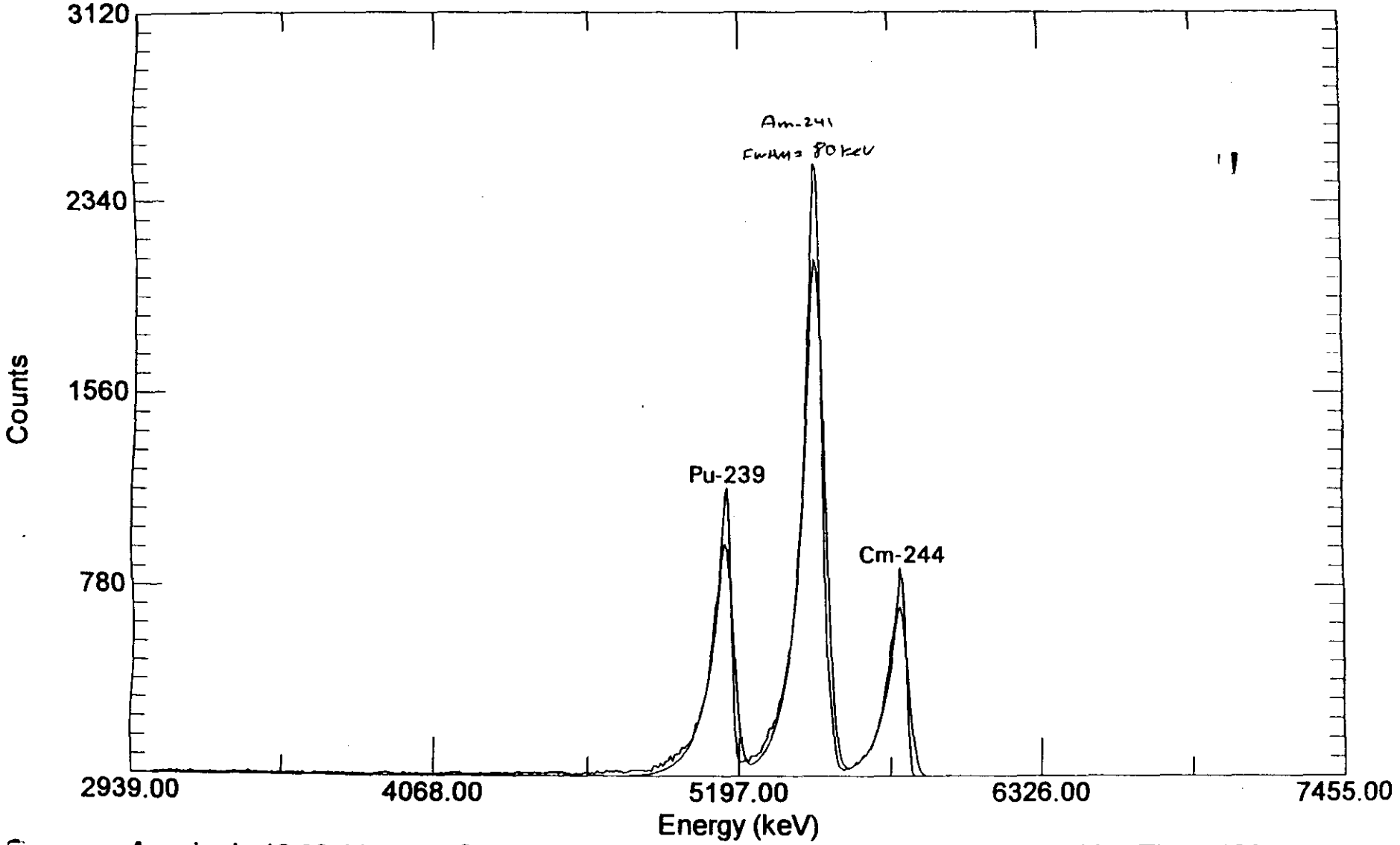
	Channel	Energy (meV)	Activity DPM	FWHM	Gross Count	Bkg Count	Net Count	CPM
1:	Cm-244							
Obs:	324.85	5.8050	1,475.16	5.77	8,136.71	0.00	8,136.71	271.22
Exp:	324.85	5.8050	1,503.00					
	Peak Efficiency:		21.57 %					
2:	Pu-239							
Obs:	251.21	5.1554	1,738.62	6.27	11,460.47	0.00	11,460.47	382.02
Exp:	251.21	5.1554	1,707.00					
	Peak Efficiency:		22.38 %					

Calibrated By: C Schroeder 10-30-97

010207

E3097303

AlphaVision Absolute Peak Search And Fit



Acquired: 12:22:44 on 30-Oct-97
File: C:\USER\CALIB\E3097303.CHN
Sample: AC5500

Real Time: 1801.12 s. Live Time: 1800.00 s.
Detector: #30 AL1-30
Type: Calibration

020208

AlphaVision A36-BI Ver 1.20 10/29/97 10:23:22 AM
Southern Petroleum Laboratories-LAS 576A (AL1)

E N E R G Y / E F F I C I E N C Y C A L I B R A T I O N

Standard Name:	AC5500
Certification Date:	3/ 3/93 12:00:00 PM
Sample Type:	Calibration
Analysis Type:	Absolute Peak Search And Fit
Acquisition Date:	10/29/97 9:24:10 AM
Detector:	AL1-31
Group:	D7 Calibration
Number of Channels:	512
Live Time:	1,800.00 Sec.
Real Time:	1,801.06 Sec.
Spectrum File:	C:\USER\CALIB\E3197302.CHN
Background File:	
Library File:	C:\USER\ALPHA\ALPHAVIS.ALB
Certificate File:	C:\USER\ALPHA\ALPHAVIS.ALB

---------- Results ----------

New Calibration:	2,826.2673 + 8.8426 * Chn.
Old Calibration:	2,826.2700 + 8.8426 * Chn.
New Efficiency:	21.32 %
Old Efficiency:	21.32 %

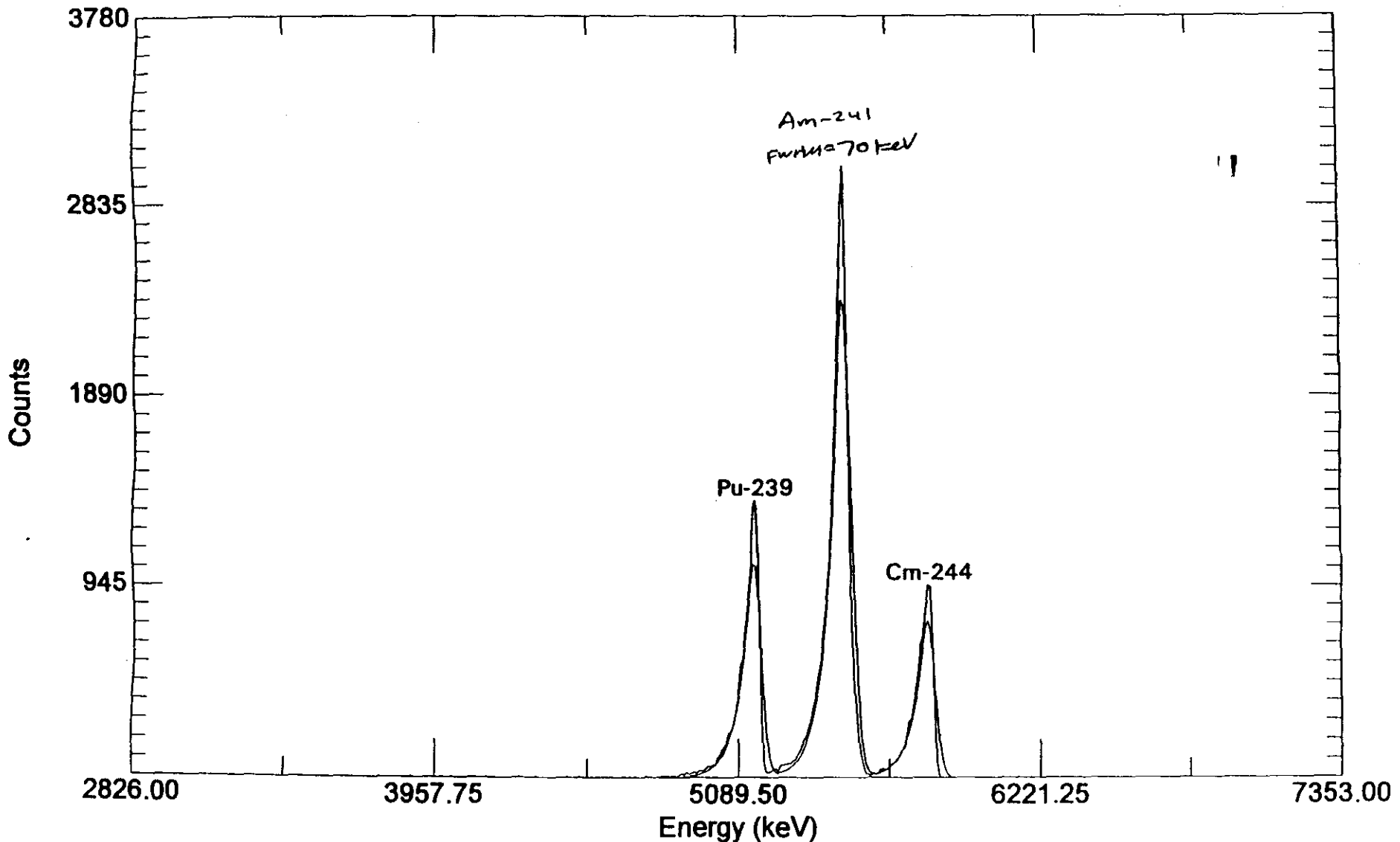
P E A K S U S E D I N C A L I B R A T I O N

	Channel	Energy (meV)	Activity DPM	FWHM	Gross Count	Bkg Count	Net Count	CPM
1:	Cm-244							
Obs:	336.86	5.8050	1,497.54	5.35	8,013.53	0.00	8,013.53	267.12
Exp:	336.86	5.8050	1,503.00					
	Peak Efficiency:		21.24 %					
2:	Pu-239							
Obs:	263.40	5.1554	1,713.20	5.47	10,954.47	0.00	10,954.47	365.15
Exp:	263.40	5.1554	1,707.00					
	Peak Efficiency:		21.39 %					

Calibrated By: C Schlenker 10-29-97

E3197302

AlphaVision Absolute Peak Search And Fit



Acquired: 09:24:10 on 29-Oct-97
File: C:\USER\CALIB\E3197302.CHN
Sample: AC5500

Real Time: 1801.06 s. Live Time: 1800.00 s.
Detector: #31 AL1-31
Type: Calibration

000210

AlphaVision A36-BI Ver 1.20 10/29/97 9:17:20 AM
Southern Petroleum Laboratories-LAS 576A (AL1)

E N E R G Y / E F F I C I E N C Y C A L I B R A T I O N

Standard Name:	AC5500
Certification Date:	3/ 3/93 12:00:00 PM
Sample Type:	Calibration
Analysis Type:	Absolute Peak Search And Fit
Acquisition Date:	10/29/97 8:47:06 AM
Detector:	AL1-32
Group:	D8 Calibration
Number of Channels:	512
Live Time:	1,800.00 Sec.
Real Time:	1,800.92 Sec.
Spectrum File:	C:\USER\CALIB\E3297302.CHN
Background File:	
Library File:	C:\USER\ALPHA\ALPHAVIS.ALB
Certificate File:	C:\USER\ALPHA\ALPHAVIS.ALB

---------- Results ----------

New Calibration:	2,887.1675 + 8.6852 * Chn.
Old Calibration:	2,886.3501 + 8.6875 * Chn.
New Efficiency:	17.93 %
Old Efficiency:	17.80 %

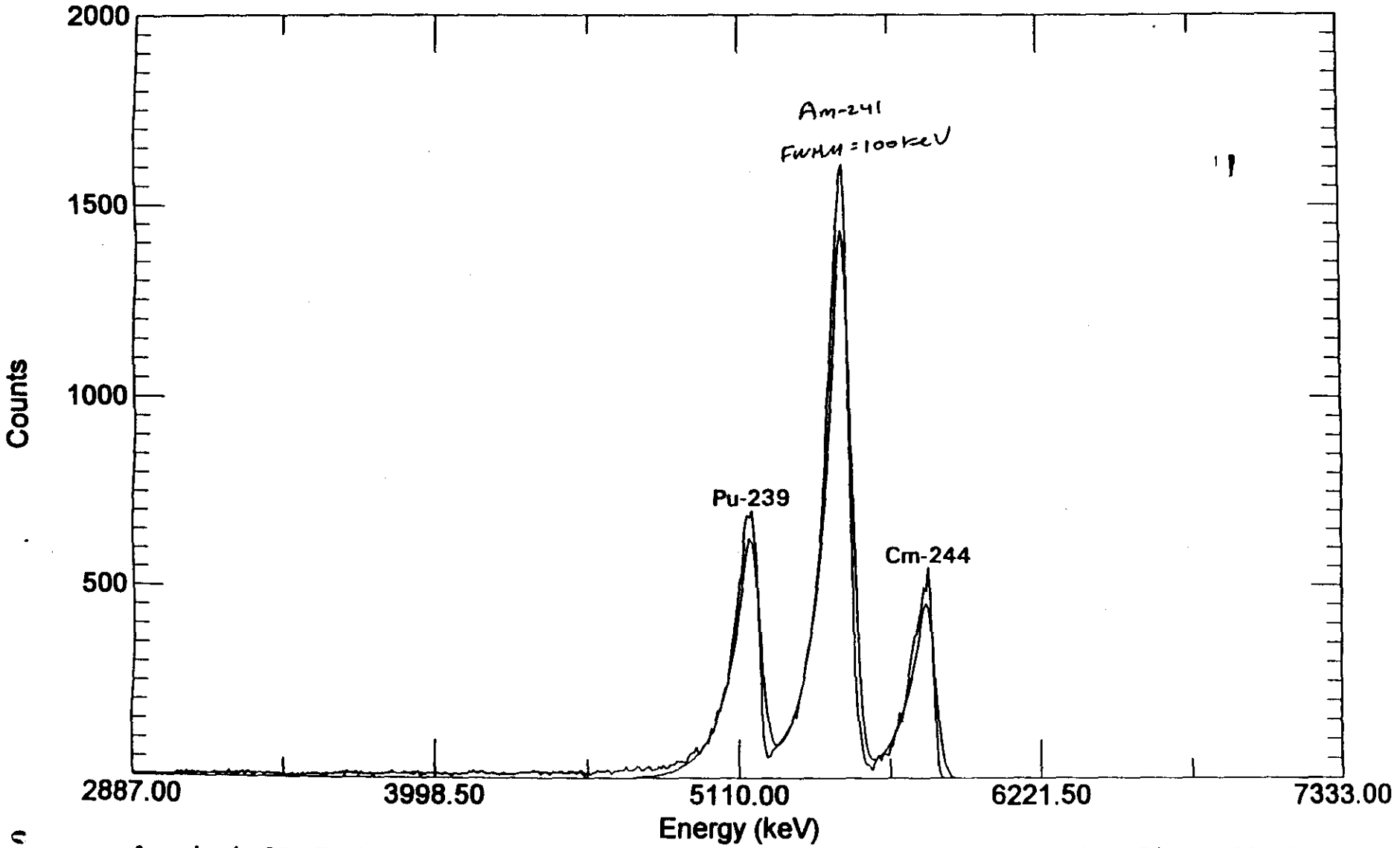
P E A K S U S E D I N C A L I B R A T I O N

	Channel	Energy (meV)	Activity DPM	FWHM	Gross Count	Bkg Count	Net Count	CPM
1:	Cm-244							
Obs:	335.95	5.8050	1,486.17	8.25	6,688.60	0.00	6,688.60	222.95
Exp:	335.95	5.8050	1,503.00					
	Peak Efficiency:		17.73 %					
2:	Pu-239							
Obs:	261.16	5.1554	1,726.11	9.81	9,282.65	0.00	9,282.65	309.42
Exp:	261.16	5.1554	1,707.00					
	Peak Efficiency:		18.13 %					

Calibrated By: C Schlosser 10-24-97

E3297302

AlphaVision Absolute Peak Search And Fit



Acquired: 08:47:06 on 29-Oct-97
File: C:\USER\CALIB\E3297302.CHN
Sample: AC5500

Real Time: 1800.92 s. Live Time: 1800.00 s.
Detector: #32 AL1-32
Type: Calibration

00212