
Hydrogen Safety Project Chemical Analysis Support Task

Window "E" Analyses

T. E. Jones
J. A. Campbell
E. W. Hoppe

L. R. Greenwood
B. M. Gillespie

September 1992

Work supported by the U.S. Department of Energy
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Pacific Northwest Laboratory
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by Battelle Memorial Institute



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HYDROGEN SAFETY PROJECT
CHEMICAL ANALYSIS SUPPORT TASK

WINDOW "E" ANALYSES

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J. A. Campbell
E. W. Hoppe
L. R. Greenwood
B. M. Gillespie

September 1992

Prepared for
the U.S. Department of Energy
under Contract DE-AC06-76RL0 183D

Pacific Northwest Laboratory
Richland, Washington 99352

SUMMARY

Core samples taken from tank 101-SY at Hanford during "window E" were analyzed for organic and radiochemical constituents by staff of the Analytical Chemistry Laboratory at Pacific Northwest Laboratory. Westinghouse Hanford Company submitted these samples to the laboratory.

The procedures used and the chain of custody were carefully documented. Results are reported on Contract Laboratory Program report forms as required by the Technical Project Plan 19067. The results will be used by the 101-SY Hydrogen Safety Project.

CONTRIBUTORS LIST

PROJECT MANAGEMENT OFFICE

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BM Gillespie, Co-ACL Project Manager
BO Barnes, Quality Engineer
JL Reilly, Senior Clerk

QUALITY CONTROL OFFICER

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SW Thompson

CHELATOR/PEROXIDE ANALYSIS

JA Campbell, Sub-Task Leader

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1. 101-SY Sample Numbers

INTRODUCTION

This data package contains the results obtained by Pacific Northwest Laboratory (PNL) staff in the characterization of samples for the 101-SY Hydrogen Safety Project. The samples were submitted for analysis by Westinghouse Hanford Company (WHC) under the Technical Project Plan (TPP) 19067 and the Quality Assurance Plan MCS-027. The analytical procedures required for analysis were defined in the Test Instructions (TI) prepared by the PNL 101-SY Analytical Chemistry Laboratory (ACL) Project Management Office in accordance with the TPP and the QA Plan.

The samples (Table 1) were submitted with the appropriate WHC Chain of Custody (COC) and Sample Analysis Request Forms. The samples were delivered to the "B" hot cells in the 325 Building in the 300 Area.

The requested analysis for these samples was Ni-59/63, Nb-93m/94, Se-79, Am-241/243, Np-237, noble metals, chelator/peroxide and semivolatile organic analysis. The requirement for noble metals analysis by ICP-MS was deleted after the samples arrived (samples 92-05073, 92-05079, 92-05082, and 92-05088). Chelator/Peroxide analysis was performed under a developmental task in the Atomic and Molecular Chemistry Section at PNL. A report is presented in Appendix E1.

The quality control (QC) requirements for each sample are defined in the test instructions for each sample. The QC requirements outlined in the procedures and requested in the WHC LOI and Test Plan were followed.

The data are reported in appendices sections. Four appendices are provided: one for Test Instruction, one for Chain of Custody, one that contains the physical analysis primary data, one that contains the radiochemistry primary data and one that contains the primary organic analytical data.

TABLE 1: 101-SY Sample Numbers

<u>WHC Sample Number</u>	<u>PNL ALO Sample Number</u>
#1200	92-05070
#1197	92-05071
#1295	92-05072
#1211	92-05073
#1212	92-05074
#1199	92-05075
#1213	92-05076
#1215	92-05077
#1296	92-05078
#1297	92-05079
#1298	92-05080
#1214	92-05081
#1195	92-05082
#1196	92-05083
#1198	92-05084 *
#1203	92-05085
#1204	92-05086
#1206	92-05087
#1207	92-05088
#1299	92-05089
#1306	92-05090
#1307	92-05091
#1309	92-05092
#1310	92-05093

* Vial 1198 was broken during the cask unloading process.

CERTIFICATION STATEMENT

I certify that this data package is in compliance with the terms and conditions of the TPP 19067 and QA Plan MCS-027 for completeness. Release of the data contained in this hard copy data package has been authorized by the ACL Project Manager or the Project Manager's designee, as verified by the following signature.

B. M. Gillespie
B. M. Gillespie
101-SY ACL Project Manager

8-28-92
Date

APPENDIX A

TEST INSTRUCTIONS

HSP WINDOW E SAMPLE TEST INSTRUCTIONS
FOR 101-SY COMPOSITE ANALYSES

DATE PREPARED : March 25, 1992 PREPARED BY : Tom Jones

SAMPLE NUMBERS : 92-05070 - 92-05093

APPROVED BY : 28 Jan Date 4/3/92
Task Manager

CONTROLLING DOCUMENTS :

TEST PLAN: 19067

Controlling Procedure: PNL-ALO-010

INTRODUCTION

This Test Instruction (TI) defines the scope of work to be completed on the 24 Window "E" core composite samples from Tank 101-SY. 101-SY analyses are currently considered to be the highest priority of all tank analyses. Please expedite analyses.

This TI is based on the test plan identified above. Any deviation on the instructions contained in this TI will require that the Project Manager be notified of these changes. The analyses will be done at a QA Level 2, except for Chelator/Peroxide analyses.

All analyses are to be completed following the identified procedures. Any deviations for the procedure must be documented and this documentation must accompany the analytical data. All analytical data are returned to the Project Management Office.

REQUESTED ANALYSES

Requested Analysis

Task Leader

Noble Metals by ICP-MS
(Pd, Rh, Ru)
Chelator/Peroxides

D. Koppenaal
J. Campbell

SVOA

E. Hoppe

Radionuclides
(Am, Nb, Ni, Np, Se)

L. Greenwood

HSP WINDOW E SAMPLE TEST INSTRUCTIONS
FOR 101-SY COMPOSITE ANALYSES

SAMPLE IDENTIFICATION

<u>ACL Number</u>	<u>Vial</u>	<u>Weight</u>	<u>ACL Number</u>	<u>Vial</u>	<u>Weight</u>

RadChem Analyses

92-05070	1200	5g	92-05074	1212	5g
92-05076	1213	5g	92-05080	1298	5g
92-05086	1204	5g	92-05087	1206	5g
92-05092	1309	5g	92-05093	1310	5g

Chelator/Peroxides

92-05071	1197	15g	92-05075	1199	15g
92-05077	1215	15g	92-05089	1299	15g
92-05090	1306	10g	92-05081	1214	15g
92-05083	1196	15g	92-05084	1198*	10g

Semi-Volatile Organic Analyses

92-05072	1295	10g	92-05078	1296	10g
92-05085	1203	5g	92-05091	1307	5g

Noble Metals

92-05073	1211	5g	92-05079	1297	5g
92-05082	1195	5g	92-05088	1207	5g

* Vial 1198 was broken during the cask unloading process.

B-HOT CELL SAMPLE PREPARATION

RadChem Samples:

Complete a KOH Fusion (PNL-ALO-102) for each of the 8 RadChem samples. The eight samples should be prepared in two batches. A methods blank shall be prepared with each sample preparation batch. 92-05688 and 92-05689 will be used as the sample numbers for the fusion methods blanks. The work package for this scope of work is M-99911.

HSP WINDOW E SAMPLE TEST INSTRUCTIONS
FOR 101-SY COMPOSITE ANALYSES

B-HOT CELL SAMPLE PREPARATION (continued)

SVOA Organic Sample Prep:

Two 10 g samples were received from WHC: Vial 1295 - 92-05072 and Vial 1296 - 92-05078. The materials in these two vial should be split into two separate samples and labeled as "A" and "B". The resulting six samples should be transferred to the Organic Analysis group for SVOA analyses following CLP analysis and reporting protocols. The work package for this scope of work is M-99912.

Chelator/Peroxides Sample Prep

The sample preparation for the chelator/peroxide analyses must be coordinated with Jim Campbell. Please proceed with this work. Chelator/peroxide analysis support will be charged to work package M-99912.

Noble Metals Metal Analysis Sample Prep

The sample preparation for noble metals analysis by ICP-MS must be coordinated with Dave Koppenaal's group. Sample fusion and preservation may require unusual steps. Noble metals analysis support is charged to work package M-99914.

APPENDIX B

CHAIN OF CUSTODY

**B1 - WESTINGHOUSE CHAIN OF CUSTODY AND
SAMPLE ANALYSIS REQUEST FORMS**

Westinghouse Hanford Company	CHAIN OF CUSTODY																								
Contact <u>Bruce Herz</u> Telephone <u>3-2529</u> Sample Collected by <u>Bruce Herz 83155</u> Date <u>3/10/92</u> Sample Location <u>101-S4 Window E</u> Laboratory Notebook _____ Remarks <u>Protect from Beta/Gamma emissions</u> _____ Method of Shipment _____ Shipped from _____ Shipped to _____ Possible Sample Hazards <u>Radioactive material in a caustic matrix.</u> _____																									
Sample Identification																									
<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 10%; border-bottom: 1px solid black;">1200</td> <td style="border-bottom: 1px solid black;">101-S4 Window E Core Composite Bulk sample</td> </tr> <tr> <td style="border-bottom: 1px solid black;">1197</td> <td style="border-bottom: 1px solid black;">same as #1200</td> </tr> <tr> <td style="border-bottom: 1px solid black;">1295</td> <td style="border-bottom: 1px solid black;">same as #1200</td> </tr> <tr> <td style="border-bottom: 1px solid black;">1211</td> <td style="border-bottom: 1px solid black;">same as #1200</td> </tr> <tr> <td style="border-bottom: 1px solid black;">1212</td> <td style="border-bottom: 1px solid black;">same as #1200</td> </tr> <tr> <td style="border-bottom: 1px solid black;">1199</td> <td style="border-bottom: 1px solid black;">same as #1200</td> </tr> <tr> <td style="border-bottom: 1px solid black;">1213</td> <td style="border-bottom: 1px solid black;">same as #1200</td> </tr> <tr> <td style="border-bottom: 1px solid black;">1215</td> <td style="border-bottom: 1px solid black;">same as #1200</td> </tr> <tr> <td style="border-bottom: 1px solid black;">~~1212~~</td> <td style="border-bottom: 1px solid black;">~~same as #1200~~ ^{Bd}</td> </tr> <tr><td style="border-bottom: 1px solid black;"> </td><td style="border-bottom: 1px solid black;"> </td></tr> <tr><td style="border-bottom: 1px solid black;"> </td><td style="border-bottom: 1px solid black;"> </td></tr> <tr><td style="border-bottom: 1px solid black;"> </td><td style="border-bottom: 1px solid black;"> </td></tr> </table>		1200	101-S4 Window E Core Composite Bulk sample	1197	same as #1200	1295	same as #1200	1211	same as #1200	1212	same as #1200	1199	same as #1200	1213	same as #1200	1215	same as #1200	~~1212~~	~~same as #1200~~ ^{Bd}						
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1199	same as #1200																								
1213	same as #1200																								
1215	same as #1200																								
~~1212~~	~~same as #1200~~ ^{Bd}																								
Chain of Possession																									
Relinquished by: <u>Bruce Herz</u>	Received by: <u>R. Ekblom</u>	Date/Time: _____																							
Relinquished by: <u>R. Ekblom</u>	Received by: <u>John K. Row</u>	Date/Time: <u>3-10-92 2230</u>																							
Relinquished by: _____	Received by: _____	Date/Time: _____																							
Relinquished by: _____	Received by: _____	Date/Time: _____																							

SAMPLE ANALYSIS REQUEST

PART 1: FIELD SECTION

Collector Bruce Hey 83155 Date Sampled 3/10/92
 Company Contact WHC - PCL Telephone 3-2529

Sample No.	Type of Sample Container	Type of Sample	Analysis Requested
1200	25 ml vial	sludge	Fusion Digest: Am-241, Se-79 Nb-93/94, Ni-59/63, Np-237
1197	25 ml vial	sludge	Chelators / Peroxides
1295	25 ml vial	sludge	Semi-VOA
1211	25 ml vial	sludge	Noble Metals
1199	25 ml vial	sludge	Chelators / Peroxides
1213	25 ml vial	sludge	Fusion Digest: Am-241, Se-79 Nb-93/94, Ni-59/63, Np-237
1215	25 ml vial	sludge	Chelators / Peroxides
1212	25 ml vial	sludge	Fusion Digest: Am-241, Se-79 Nb-93/94, Ni-59/63, Np-237

Field Information: _____

Special Handling and/or Storage Protect from Beta/Gamma emissions

Possible Sample Hazards Radioactive material in a caustic matrix

Part 2: LABORATORY SECTION

Received by _____ Title _____ Date _____

Analysis Required _____

SAMPLE RECEIPT FORM

Delivered by: B-PIANT OVERPAK Date/Time: 3-10-92 2230

Received by: JK Raw

Customer Sample Number(s): 1200, 1197, 1295, 1211, 1199, 1213, 1215, 1212

ALO Sample Number(s): _____

1. Customer Chain-of-Custody Form: Present X Absent _____
2. Additional Shipping Forms (list):
SAR
ORSR
3. Custody Seals on Shipping and/or Sample Containers and their Conditions.
Present X Absent _____
If Present, Condition: GOOD
4. Sample Tag(s) ID Numbers if not Recorded on the Chain-of-Custody Record or on Sample Vial.
Notes: N/A
5. Condition of Shipping Container (i.e., broken container, dented, breached plastic bag, temperature of sample container as defined in Section 3.0 in PNL-ALO-051, etc.) OK - 24°C
6. Condition of Sample Vials.
OK
7. Verification of Agreement or Nonagreement of Information on Receiving Documents.
Agreement
8. Resolution of Problems or Discrepancies.
N/A

RETURN COMPLETED FORM TO PROJECT MANAGER

Westinghouse Hanford Company	CHAIN OF CUSTODY	
Contact <u>BE Hey 83155</u> Telephone <u>3-2529</u>		
Sample Collected by <u>BE Hey</u> Date <u>3/12/92</u>		
Sample Location <u>101-S4 Window E</u>		
Laboratory Notebook <u>WHC-N-576</u>		
Remarks _____		
Method of Shipment <u>lead packed in doorstep or pig / carrier / N-55 overpack</u>		
Shipped from <u>WHC - 222-S laboratory door 13</u>		
Shipped to <u>PNL - 325 B door</u>		
Possible Sample Hazards <u>Radioactive material in a caustic (pH ≈ 13) matrix</u>		
Sample Identification		
<u>1296 101-S4 Window E core composite #2</u>		
<u>1297 " " " " " "</u>		
<u>1298 " " " " " "</u>		
<u>1214 " " " " " "</u>		
<u>1195 101-S4 Window E core composite #3</u>		
<u>1196 " " " " " "</u>		
<u>1198 " " " " " "</u>		
<u>1203 " " " " " "</u>		

Chain of Possession		
Relinquished by: <u>BE Hey</u>	Received by: <u>LL Sims</u>	Date/Time: <u>3-12-92 18:45</u>
Relinquished by: <u>LL Sims</u>	Received by: <u>John K. Bor</u>	Date/Time: <u>3-12-92 2105</u>
Relinquished by: _____	Received by: _____	Date/Time: _____
Relinquished by: _____	Received by: _____	Date/Time: _____

SAMPLE ANALYSIS REQUEST

PART 1: FIELD SECTION

Collector BE Hey 83155 Date Sampled 10/12/92
 Company Contact BE Hey Telephone 3-2529

Sample No.	Type of Sample Container	Type of Sample	Analysis Requested
1296	25 ml vial	sludge	Semi-VOA
1297	25 ml vial	sludge	Noble Metals: Pd, Rh, Ru
1298	25 ml vial	sludge	Fusion Digest: Am-241, Sr-90, Nb-93/94, Ni-59/63, Np-237
1214	25 ml vial	sludge	Chelators / Peroxides
1195	25 ml vial	sludge	Noble Metals: Pd, Rh, Ru.
1196	25 ml vial	sludge	Chelators / Peroxides
1198	25 ml vial	sludge	Chelators / Peroxides
1203	25 ml vial	sludge	Semi-VOA

Field Information: Protect from Beta/Gamma emissions.

Special Handling and/or Storage Radioactive material in a caustic matrix.

Possible Sample Hazards _____

Part 2: LABORATORY SECTION

Received by _____ Title _____ Date _____

Analysis Required _____

SAMPLE RECEIPT FORM

Delivered by: B Plant Overpak Date/Time: 3-12-92 210 S

Received by: John K. Brown

Customer Sample Number(s): 1296, 1297, 1298, 1214, 1195, 1196, 1198, 1203

ALO Sample Number(s): _____

1. Customer Chain-of-Custody Form: Present X Absent _____

2. Additional Shipping Forms (list):

ORSR
SAR

3. Custody Seals on Shipping and/or Sample Containers and their Conditions.

Present X Absent _____

If Present, Condition: Good

4. Sample Tag(s) ID Numbers if not Recorded on the Chain-of-Custody Record or on Sample Vial.

Notes: N/A

5. Condition of Shipping Container (i.e., broken container, dented, breached plastic bag, temperature of sample container as defined in Section 3.0 in PNL-ALO-051, etc.)

GOOD 24°C

6. Condition of Sample Vials. ALL VIALS IN GOOD CONDITION
WHEN RECEIVED. VIAL 1198 BROKEN
JKB 3-12-92 DURING UNLOADING.

7. Verification of Agreement or Nonagreement of Information on Receiving Documents.

AGREE

8. Resolution of Problems or Discrepancies.

N/A

RETURN COMPLETED FORM TO PROJECT MANAGER

SAMPLE ANALYSIS REQUEST

PART 1: FIELD SECTION

Collector Bruce Hey Date Sampled 3/16/92
 Company Contact Bruce Hey 3-2529 Telephone _____

Sample No.	Type of Sample Container	Type of Sample	Analysis Requested
1204 -	25 ml vial	sludge	Fusion digest: Am-241, Se-79 Nb-93/94, Ni-59/63, Np-237
1206 -	25 ml vial	sludge	Fusion digest: Am-241, Se-79 Nb-93/94, Ni-59/63, Np-237
1207 -	25 ml vial	sludge	Noble metals: Pd, Rh, Ru
1299 -	25 ml vial	sludge	Chelators / peroxides
1306 -	25 ml vial		chelators / peroxides
1307 -	25 ml vial		Semi-VOA
1309 -	25 ml vial		Fusion digest: Am-241, Se-79 Nb-93/94, Ni-59/63, Np-237
1310 -	25 ml vial		Fusion digest: Am-241, Se-79 Nb-93/94, Ni-59/63, Np-237
not (1301) ✓			

Field Information: _____

Special Handling and/or Storage Protect your person from beta and gamma emissions

Possible Sample Hazards Radioactive material in a caustic (pH 13) matrix

Part 2: LABORATORY SECTION

Received by _____ Title _____ Date _____

Analysis Required _____

SAMPLE RECEIPT FORM

Delivered by: B:PIANT OVERPAK Date/Time: 3-17-92 2050

Received by: J. K. RAN

Customer Sample Number(s): 1204, 1206, 1207, 1299, 1306, 1307, 1309

ALO Sample Number(s): _____ 1310

1. Customer Chain-of-Custody Form: Present X Absent _____

2. Additional Shipping Forms (list):

ORSR, COC

3. Custody Seals on Shipping and/or Sample Containers and their Conditions.

Present X Absent _____

If Present, Condition: GOOD

4. Sample Tag(s) ID Numbers if not Recorded on the Chain-of-Custody Record or on Sample Vial.

Notes:

5. Condition of Shipping Container (i.e., broken container, dented, breached plastic bag, temperature of sample container as defined in Section 3.0 in PNL-ALO-051, etc.)

23°C GOOD

6. Condition of Sample Vials.

GOOD

7. Verification of Agreement or Nonagreement of Information on Receiving Documents

AGREE

8. Resolution of Problems or Discrepancies.

N/A

RETURN COMPLETED FORM TO PROJECT MANAGER

B2 - PNL CHAIN OF CUSTODY FORMS

Chain of Custody Number HSP-W/E-01
ALO CHAIN OF CUSTODY

<u>92-05070</u> ALO SAMPLE NUMBER	<u>RADCHEM ANALYSES</u> ANALYSIS REQUESTED	<u>VIAL 1200</u> SAMPLE DESCRIPTION
SENDER <u><i>[Signature]</i></u>		<u>4/3/92</u> DATE
RECEIVER <u><i>[Signature]</i></u>		<u>4-3-92</u> DATE

<u>92-05074</u> ALO SAMPLE NUMBER	<u>RADCHEM ANALYSES</u> ANALYSIS REQUESTED	<u>VIAL 1212</u> SAMPLE DESCRIPTION
SENDER <u><i>[Signature]</i></u>		<u>4/3/92</u> DATE
RECEIVER <u><i>[Signature]</i></u>		<u>4-3-92</u> DATE

<u>92-05076</u> ALO SAMPLE NUMBER	<u>RADCHEM ANALYSES</u> ANALYSIS REQUESTED	<u>VIAL 1213</u> SAMPLE DESCRIPTION
SENDER <u><i>[Signature]</i></u>		<u>4/3/92</u> DATE
RECEIVER <u><i>[Signature]</i></u>		<u>4-3-92</u> DATE

<u>92-05080</u> ALO SAMPLE NUMBER	<u>RADCHEM ANALYSES</u> ANALYSIS REQUESTED	<u>VIAL 1298</u> SAMPLE DESCRIPTION
SENDER <u><i>[Signature]</i></u>		<u>4/3/92</u> DATE
RECEIVER <u><i>[Signature]</i></u>		<u>4-3-92</u> DATE

Original - Project Management Office
Copy - Sender
Copy - Receiver

Applicable Test Instruction
II-HSP-WINOW E-001

Chain of Custody Number HSP-W/E-02
ALO CHAIN OF CUSTODY

<u>92-05086</u> ALO SAMPLE NUMBER	<u>RADCHEM ANALYSES</u> ANALYSIS REQUESTED	<u>VIAL 1204</u> SAMPLE DESCRIPTION
SENDER <u><i>[Signature]</i></u>		<u>4/3/92</u> DATE
RECEIVER <u><i>[Signature]</i></u>		<u>4-3-92</u> DATE

<u>92-05087</u> ALO SAMPLE NUMBER	<u>RADCHEM ANALYSES</u> ANALYSIS REQUESTED	<u>VIAL 1206</u> SAMPLE DESCRIPTION
SENDER <u><i>[Signature]</i></u>		<u>4/3/92</u> DATE
RECEIVER <u><i>[Signature]</i></u>		<u>4-3-92</u> DATE

<u>92-05092</u> ALO SAMPLE NUMBER	<u>RADCHEM ANALYSES</u> ANALYSIS REQUESTED	<u>VIAL 1309</u> SAMPLE DESCRIPTION
SENDER <u><i>[Signature]</i></u>		<u>4/3/92</u> DATE
RECEIVER <u><i>[Signature]</i></u>		<u>4-3-92</u> DATE

<u>92-05093</u> ALO SAMPLE NUMBER	<u>RADCHEM ANALYSES</u> ANALYSIS REQUESTED	<u>VIAL 1310</u> SAMPLE DESCRIPTION
SENDER <u><i>[Signature]</i></u>		<u>4/3/92</u> DATE
RECEIVER <u><i>[Signature]</i></u>		<u>4-3-92</u> DATE

Original - Project Management Office
Copy - Sender
Copy - Receiver

Applicable Test Instruction
TI-HSP-WINDOW E-001

Chain of Custody Number HSP-W/E-03
ALO CHAIN OF CUSTODY

<u>92-05071</u> ALO SAMPLE NUMBER	<u>CHELATOR/PEROXIDES</u> ANALYSIS REQUESTED	<u>VIAL 1197</u> SAMPLE DESCRIPTION
SENDER <u>John K. Brown</u>		<u>6-4-92</u> DATE
RECEIVER <u>J.A. Campbell</u>		<u>6-4-92</u> DATE

<u>92-05075</u> ALO SAMPLE NUMBER	<u>CHELATOR/PEROXIDES</u> ANALYSIS REQUESTED	<u>VIAL 1199</u> SAMPLE DESCRIPTION
SENDER <u>John K. Brown</u>		<u>6-4-92</u> DATE
RECEIVER <u>J.A. Campbell</u>		<u>6-4-92</u> DATE

<u>92-05077</u> ALO SAMPLE NUMBER	<u>CHELATOR/PEROXIDES</u> ANALYSIS REQUESTED	<u>VIAL 1215</u> SAMPLE DESCRIPTION
SENDER <u>John K. Brown</u>		<u>6-4-92</u> DATE
RECEIVER <u>J.A. Campbell</u>		<u>6-4-92</u> DATE

<u>92-05089</u> ALO SAMPLE NUMBER	<u>CHELATOR/PEROXIDES</u> ANALYSIS REQUESTED	<u>VIAL 1299</u> SAMPLE DESCRIPTION
SENDER <u>John K. Brown</u>		<u>6-4-92</u> DATE
RECEIVER <u>J.A. Campbell</u>		<u>6-4-92</u> DATE

Original - Project Management Office
Copy - Sender
Copy - Receiver

Applicable Test Instruction
TI-HSP-WIN00W E-001

Chain of Custody Number HSP-W/E-04
ALO CHAIN OF CUSTODY

92-05090 ALO SAMPLE NUMBER	CHELATOR/PEROXIDES ANALYSIS REQUESTED	VIAL 1306 SAMPLE DESCRIPTION
SENDER <u>John K. Bon</u>		<u>6-4-92</u> DATE
RECEIVER <u>J.A. Campbell</u>		<u>6-4-92</u> DATE

92-05081 ALO SAMPLE NUMBER	CHELATOR/PEROXIDES ANALYSIS REQUESTED	VIAL 1214 SAMPLE DESCRIPTION
SENDER <u>John K. Bon</u>		<u>6-4-92</u> DATE
RECEIVER <u>J.A. Campbell</u>		<u>6-4-92</u> DATE

92-05083 ALO SAMPLE NUMBER	CHELATOR/PEROXIDES ANALYSIS REQUESTED	VIAL 1196 SAMPLE DESCRIPTION
SENDER <u>John K. Bon</u>		<u>6-4-92</u> DATE
RECEIVER <u>J.A. Campbell</u>		<u>6-4-92</u> DATE

92-05084 ALO SAMPLE NUMBER	CHELATOR/PEROXIDES ANALYSIS REQUESTED	VIAL 1198 SAMPLE DESCRIPTION
SENDER <u>John K. Bon</u>		<u>6-4-92</u> DATE
RECEIVER <u>J.A. Campbell</u>		<u>6-4-92</u> DATE

Original - Project Management Office
Copy - Sender
Copy - Receiver

Applicable Test Instruction
TI-HSP-WINDOW E-001

Chain of Custody Number HSP-W/E-05
ALO CHAIN OF CUSTODY

<u>92-05072</u> ALO SAMPLE NUMBER	<u>SVOA ANALYSES</u> ANALYSIS REQUESTED	<u>VIAL 1295</u> SAMPLE DESCRIPTION
SENDER <u><i>Wang</i></u>		<u>4/7/92</u> DATE
RECEIVER <u><i>MJ Steele</i></u>		<u>4-7-92</u> DATE

<u>92-05078</u> ALO SAMPLE NUMBER	<u>SVOA ANALYSES</u> ANALYSIS REQUESTED	<u>VIAL 1296</u> SAMPLE DESCRIPTION
SENDER <u><i>Wang</i></u>		<u>4/7/92</u> DATE
RECEIVER <u><i>MJ Steele</i></u>		<u>4-7-92</u> DATE

<u>92-05085</u> ALO SAMPLE NUMBER	<u>SVOA ANALYSES</u> ANALYSIS REQUESTED	<u>VIAL 1203</u> SAMPLE DESCRIPTION
SENDER <u><i>Wang</i></u>		<u>4/7/92</u> DATE
RECEIVER <u><i>MJ Steele</i></u>		<u>4-7-92</u> DATE

<u>92-05091</u> ALO SAMPLE NUMBER	<u>SVOA ANALYSES</u> ANALYSIS REQUESTED	<u>VIAL 1307</u> SAMPLE DESCRIPTION
SENDER <u><i>Wang</i></u>		<u>4/7/92</u> DATE
RECEIVER <u><i>MJ Steele</i></u>		<u>4-7-92</u> DATE

Original - Project Management Office
Copy - Sender
Copy - Receiver

Applicable Test Instruction
TI-HSP-WINDOW E-001

Chain of Custody Number HSP-W/E-07
ALO CHAIN OF CUSTODY

<u>92-05688</u> ALO SAMPLE NUMBER	<u>RADCHEM ANALYSES</u> ANALYSIS REQUESTED	<u>BLANK</u> SAMPLE DESCRIPTION
SENDER <u>[Signature]</u>	<u>4/3/92</u> DATE	
RECEIVER <u>[Signature]</u>	<u>4/3/92</u> DATE	

<u>92-05689</u> ALO SAMPLE NUMBER	<u>RADCHEM ANALYSES</u> ANALYSIS REQUESTED	<u>BLANK</u> SAMPLE DESCRIPTION
SENDER <u>[Signature]</u>	<u>4/3/92</u> DATE	
RECEIVER <u>[Signature]</u>	<u>4/3/92</u> DATE	

<u>ALO SAMPLE NUMBER</u>	<u>ANALYSIS REQUESTED</u>	<u>SAMPLE DESCRIPTION</u>
SENDER _____	_____	DATE _____
RECEIVER _____	_____	DATE _____

<u>ALO SAMPLE NUMBER</u>	<u>ANALYSIS REQUESTED</u>	<u>SAMPLE DESCRIPTION</u>
SENDER _____	_____	DATE _____
RECEIVER _____	_____	DATE _____

Original - Project Management Office
Copy - Sender
Copy - Receiver

Applicable Test Instruction
TI-HSP-WINDOW E-001

B3 - SAMPLE PREP SHEETS

Shielded Analytical Laboratory
Bench Sheet

Page 1 of 1

Project Id.:

Project No.: ^{DS4/6/92}
19067
~~17667~~

Weight % Solids

1.0154

92-5070 (1200)

8.9719
7.9586

1.0133g Wet

8.5694

7.9586

0.6111g Dry

$$\frac{0.6111g}{1.0133g} = 0.6031 \times 100 = 60.31\% \text{ solids}$$

IN 1500 4/1/92 104°C
OUT 1500 4/1/92 100°C

92-5080 (1298)

9.4372
8.3921

1.0401g Wet

9.0212

8.3921

0.6241g Dry

$$\frac{0.6241g}{1.0401g} = 0.6000 \times 100 = 60.00\% \text{ solids}$$

Analyst:

A. K.

Date:

4/1/92

Reviewer:

Theresa Hays
28

Date:

4/2/92

Procedures Used:

_____ PNL-ALO-101, Acid Digestion for Metals Analysis
 _____ PNL-ALO-102, Fusion of Hanford Tank Waste Solids
 _____ PNL-ALO-103, Water Leach of Sludges, Soils, and Other Solid Samples
 _____ PNL-ALO-104, Extraction Procedure Toxicity
 _____ PNL-ALO-106, Acid Digestion for Preparation of Samples for
 _____ Radiochemical Analysis
 _____ PNL-ALO-107, Leach Procedure for Preparing Sludges, Soils and Other
 _____ Solid Samples for Free Cyanide Analysis
 _____ PNL-ALO-108, Aqueous Leach of Sludges, Soils and Other Solid Samples
 _____ for Anion Analysis
 ✓ _____ PNL-ALO-330 Hexadecane Extracts for Volatile Organic Compounds
 ✓ _____ PNL-ALO-504, Percent Solids Determination of Soils/Sludges/Solids
 _____ PNL-ALO-120, Procedure for Extraction of Single Shell Tank Samples
 _____ for the Analysis of Semivolatile Organic Compounds
 _____ PNL-ALO-130, Procedure for the Receipt and Inspection of Single
 _____ Shell Tank (SST) Samples
 _____ WHC-053-1, Laboratory Procedure for Measurement of Physical and
 _____ Rheological Properties of Solutions, Slurries and
 _____ Sludges
 _____ 7.40.9 Laboratory Procedure for the Physical Characterization of
 _____ Fluids
 _____ 7.40.16 Separation of Carbon from Soil/Sediment/Sludge Samples
 _____ 7.40.24 Measurement of Carbon-14 in Zircaloy Cladding Crud Layer
 _____ 7.40.25 Distillation of Caustic Trap Solutions for C-14 Separation
 _____ 7.40.29 Specific Gravity of Highly Radioactive Solutions
 _____ 7.40.30 Bulk Density of Highly Radioactive Free-Flowing Granular
 _____ Solids
 _____ 7.40.34 Tritium in Irradiated Cladding Materials
 _____ 7.40.36 Analysis of Solid Samples for Carbonate by Use of
 _____ Coulometrics Model 5011 Coulometer.
 _____ 7.40.37 Determination of Carbon in Solids Using the Coulometrics
 _____ Carbon Dioxide Coulometer
 _____ 7.40.42 Determination of Carbon-14 in Radioactive Liquids, Soils,
 _____ and Sludges
 _____ 7.40.47 Determination of TC, TOC and TIC in Radioactive Liquids,
 _____ Soils, and Sludges by Hot Persulfate Method
 ✓ _____ Other T1-HSP-Window E-001

M&TE Used:

✓ _____ Cell 2 Balance 360-06-01-016 Mettler AE 160
 _____ Cell 6 Balance 362-06-01-038 Mettler AE 200
 _____ Counter Balance 360-06-01-024 Sartorius R 2000
 _____ Corning pH meter Model 240 S/N 6629

Shielded Analytical Laboratory
Bench Sheet

Page 1 of 2

Project Id.:

Project No.: 19067

4/8/92
DS

101 SP. SEMI-VOLTS.

92-05072A(1295A)	92-05072A(1295A)
25.7149 1A	25.6765 2A
24.7005	24.6984
1.0144g	0.9781

92-05072B(1295B)	92-05072B(1295B)
25.7767 1B	25.2817 2B
24.7616	24.2570
1.0151g	1.0247g

92-05078A(1296A)	92-05078A(1296A)
25.8774 1A	25.3208 2A
24.8476	24.3076
1.0298g	1.0132g

92-05078B(12961B)	92-05078B(1296 2B)
25.4362	25.2535
24.3858	24.1126
1.0504g	1.1409g

Analyst:

Date:

Reviewer:

Date:

A. Ho

4-6-92

W. H. H. H.

4/6/92

Procedures Used:

_____ PNL-ALO-101, Acid Digestion for Metals Analysis
 _____ PNL-ALO-102, Fusion of Hanford Tank Waste Solids
 _____ PNL-ALO-103, Water Leach of Sludges, Soils, and Other Solid Samples
 _____ PNL-ALO-104, Extraction Procedure Toxicity
 _____ PNL-ALO-106, Acid Digestion for Preparation of Samples for
 _____ Radiochemical Analysis
 _____ PNL-ALO-107, Leach Procedure for Preparing Sludges, Soils and Other
 _____ Solid Samples for Free Cyanide Analysis
 _____ PNL-ALO-108, Aqueous Leach of Sludges, Soils and Other Solid Samples
 _____ for Anion Analysis
 _____ PNL-ALO-330 Hexadecane Extracts for Volatile Organic Compounds
 _____ PNL-ALO-504, Percent Solids Determination of Soils/Sludges/Solids
 _____ PNL-ALO-120, Procedure for Extraction of Single Shell Tank Samples
 _____ for the Analysis of Semivolatile Organic Compounds
 _____ PNL-ALO-130, Procedure for the Receipt and Inspection of Single
 _____ Shell Tank (SST) Samples
 _____ WHC-053-1, Laboratory Procedure for Measurement of Physical and
 _____ Rheological Properties of Solutions, Slurries and
 _____ Sludges
 _____ 7.40.9 Laboratory Procedure for the Physical Characterization of
 _____ Fluids
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 _____ 7.40.24 Measurement of Carbon-14 in Zircaloy Cladding Crud Layer
 _____ 7.40.25 Distillation of Caustic Trap Solutions for C-14 Separation
 _____ 7.40.29 Specific Gravity of Highly Radioactive Solutions
 _____ 7.40.30 Bulk Density of Highly Radioactive Free-Flowing Granular
 _____ Solids
 _____ 7.40.34 Tritium in Irradiated Cladding Materials
 _____ 7.40.36 Analysis of Solid Samples for Carbonate by Use of
 _____ Coulometrics Model 5011 Coulometer.
 _____ 7.40.37 Determination of Carbon in Solids Using the Coulometrics
 _____ Carbon Dioxide Coulometer
 _____ 7.40.42 Determination of Carbon-14 in Radioactive Liquids, Soils,
 _____ and Sludges
 _____ 7.40.47 Determination of TC, TOC and TIC in Radioactive Liquids,
 _____ Soils, and Sludges by Hot Persulfate Method
 ✓ _____ Other TL HSP-Window E-001

M&TE Used:

✓ _____ Cell 2 Balance 360-06-01-016 Mettler AE 160
 _____ Cell 6 Balance 362-06-01-038 Mettler AE 200
 _____ Counter Balance 360-06-01-024 Sartorius R 200D
 _____ Corning pH meter Model 240 S/N 6629

Shielded Analytical Laboratory
Bench Sheet

Page 2 of 2

Project Id.:

Project No.:

1/0/54 SCHI. 06/51

1176671

92-05085-1 (1303)

92-05085-2

25.0168
24.0497

25.3268
24.2678

0.9671 g.

1.0656 g.

92-05091-1 (1307)

92-05091-2

25.5712

25.2668

24.4637

24.2431

1.1075 g.

1.0237 g.

92-05072A-3

92-05072A-4

92-05072A-5

25.6750

25.2241

25.3053

24.6806

24.2115

24.2628

0.9944 g.

1.0126 g.

1.0425 g.

Analyst:

Date:

Reviewer:

Date:

N.G.

4/6/92

[Signature]

4/6/92

Procedures Used:

- ____ PNL-ALO-101, Acid Digestion for Metals Analysis
- ____ PNL-ALO-102, Fusion of Hanford Tank Waste Solids
- ____ PNL-ALO-103, Water Leach of Sludges, Soils, and Other Solid Samples
- ____ PNL-ALO-104, Extraction Procedure Toxicity
- ____ PNL-ALO-106, Acid Digestion for Preparation of Samples for Radiochemical Analysis
- ____ PNL-ALO-107, Leach Procedure for Preparing Sludges, Soils and Other Solid Samples for Free Cyanide Analysis
- ____ PNL-ALO-108, Aqueous Leach of Sludges, Soils and Other Solid Samples for Anion Analysis
- ____ PNL-ALO-330 Hexadecane Extracts for Volatile Organic Compounds
- ____ PNL-ALO-504, Percent Solids Determination of Soils/Sludges/Solids
- ____ PNL-ALO-120, Procedure for Extraction of Single Shell Tank Samples for the Analysis of Semivolatile Organic Compounds
- ____ PNL-ALO-130, Procedure for the Receipt and Inspection of Single Shell Tank (SST) Samples
- ____ WHC-053-1, Laboratory Procedure for Measurement of Physical and Rheological Properties of Solutions, Slurries and Sludges
- ____ 7.40.9 Laboratory Procedure for the Physical Characterization of Fluids
- ____ 7.40.16 Separation of Carbon from Soil/Sediment/Sludge Samples
- ____ 7.40.24 Measurement of Carbon-14 in Zircaloy Cladding Crud Layer
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- ____ 7.40.29 Specific Gravity of Highly Radioactive Solutions
- ____ 7.40.30 Bulk Density of Highly Radioactive Free-Flowing Granular Solids
- ____ 7.40.34 Tritium in Irradiated Cladding Materials
- ____ 7.40.36 Analysis of Solid Samples for Carbonate by Use of Coulometrics Model 5011 Coulometer.
- ____ 7.40.37 Determination of Carbon in Solids Using the Coulometrics Carbon Dioxide Coulometer
- ____ 7.40.42 Determination of Carbon-14 in Radioactive Liquids, Soils, and Sludges
- ____ 7.40.47 Determination of TC, TOC and TIC in Radioactive Liquids, Soils, and Sludges by Hot Persulfate Method
- ✓ Other TL HSP-Window E-001

M&TE Used:

✓	Cell 2 Balance	360-06-01-016	Mettler AE 160
____	Cell 6 Balance	362-06-01-038	Mettler AE 200
____	Counter Balance	360-06-01-024	Sartorius R 200D
____	Corning pH meter Model 240	S/N 6629	

SAMPLE PREP DATA SHEET
(325-B Hot Cells)

Date: 4/6/92

Analyst: N. Hei
6-3089 P7-22

Review: [Signature]

Project #1	Project #2	Project #3
Program: <u>10154</u>		
Customer: <u>T. Jones</u>		
Acct. or WP#: <u>M99912</u>		
LRB#: <u>—</u>		
M&TE: <u>(2)</u>		

Program	ALD #	Sample #	Analyte or Analysis	Sample Wt Wet (g)	Sample Wt Dry (g)	Water Wt (g)	Total Vol (ml)	Spike ID	Spike Vol (ml)	Dilution Factor	Diluent Matrix	Pipet Calib (ml)	Miscellaneous
10154	92-5072A	1	Semi-Vol	1.0144									
	↓	2		0.9781									
	92-5072B	1		1.0151									
	↓	2		1.0247									
	92-5078A	1		1.0298									
	↓	2		1.0132									
	92-5078B	1		1.0504									
	↓	2		1.1409									
	92-5085	1		0.9671									
	↓	2		1.0656									
	92-5091	1		1.1075									
	↓	2		1.0237									
	92-5072A	3		0.9944									
	↓	4		1.0126									
✓	↓	5	✓	1.0425									

Shielded Analytical Laboratory
Bench Sheet

Page 1 of 1

Project Id.: 101 5Y

Project No. ^{19067 4-9-92}
~~17667~~

WINDOW E

RADchem Samples

KOH Fusion

BATCH #1

92-05070	92-05070	92-05074	92-05074
1200 (wet)	1200 (Dry)	1212 (wet)	1212 (Dry)
N: #1		N: #2	
47.5476	47.2745	47.6441	47.4808
46.7786	46.7786	46.8062	46.8062
0.7690g	0.4959	0.9379g	0.6746

92-05076	92-05076	92-05080	92-05080
1213 (wet)	1213 (Dry)	1298 (wet)	1298 (Dry)
N: #3		N: #4	
47.1383	46.9783	47.4401	47.2252
46.5129	46.5129	46.7380	46.7380
0.6253g	0.4654g	0.7021g	0.4872

92-05688 N: #5 TOTAL vol = 250 ml
BLANK

35 ml. of each was given to Radchem + a separate
35 ml. of each was given to 329 for N: #4 analyses.

Analyst:

Date:

Reviewer:

Date:

A. Hoi

4-3-92

Shangshang

4/6/92

Procedures Used:

<u>X</u>	PNL-ALO-101, Acid Digestion for Metals Analysis
<u> </u>	PNL-ALO-102, Fusion of Hanford Tank Waste Solids
<u> </u>	PNL-ALO-103, Water Leach of Sludges, Soils, and Other Solid Samples
<u> </u>	PNL-ALO-104, Extraction Procedure Toxicity
<u> </u>	PNL-ALO-106, Acid Digestion for Preparation of Samples for Radiochemical Analysis
<u> </u>	PNL-ALO-107, Leach Procedure for Preparing Sludges, Soils and Other Solid Samples for Free Cyanide Analysis
<u> </u>	PNL-ALO-108, Aqueous Leach of Sludges, Soils and Other Solid Samples for Anion Analysis
<u> </u>	PNL-ALO-330 Hexadecane Extracts for Volatile Organic Compounds
<u> </u>	PNL-ALO-504, Percent Solids Determination of Soils/Sludges/Solids
<u> </u>	PNL-ALO-120, Procedure for Extraction of Single Shell Tank Samples for the Analysis of Semivolatile Organic Compounds
<u> </u>	PNL-ALO-130, Procedure for the Receipt and Inspection of Single Shell Tank (SST) Samples
<u> </u>	WHC-053-1, Laboratory Procedure for Measurement of Physical and Rheological Properties of Solutions, Slurries and Sludges
<u> </u>	7.40.9 Laboratory Procedure for the Physical Characterization of Fluids
<u> </u>	7.40.16 Separation of Carbon from Soil/Sediment/Sludge Samples
<u> </u>	7.40.24 Measurement of Carbon-14 in Zircaloy Cladding Crud Layer
<u> </u>	7.40.25 Distillation of Caustic Trap Solutions for C-14 Separation
<u> </u>	7.40.29 Specific Gravity of Highly Radioactive Solutions
<u> </u>	7.40.30 Bulk Density of Highly Radioactive Free-Flowing Granular Solids
<u> </u>	7.40.34 Tritium in Irradiated Cladding Materials
<u> </u>	7.40.36 Analysis of Solid Samples for Carbonate by Use of Coulometrics Model 5011 Coulometer.
<u> </u>	7.40.37 Determination of Carbon in Solids Using the Coulometrics Carbon Dioxide Coulometer
<u> </u>	7.40.42 Determination of Carbon-14 in Radioactive Liquids, Soils, and Sludges
<u> </u>	7.40.47 Determination of TC, TOC and TIC in Radioactive Liquids, Soils, and Sludges by Hot Persulfate Method
<u>X</u>	Other <u>TI-HSP-WINDOW E-001</u>

M&TE Used:

<u>X</u>	Cell 2 Balance	360-06-01-016	Mettler AE 160
<u> </u>	Cell 6 Balance	362-06-01-038	Mettler AE 200
<u> </u>	Counter Balance	360-06-01-024	Sartorius R 2000
<u> </u>	Corning pH meter Model 240	S/N 6629	

~~7270A~~

TI-NSP-

ISSUED BY: RT STEELE

DATE: 4-1-52

CONTROLLING PROCEDURE: PNL-ALO-010

ANALYST: A. G. He

DATE: 4-3-92

QA PLAN: ALO-003 IMPACT LEVEL: II

REVIEW: Markus Brown

DATE: 4/6/92

CORE ID: NA

37

Shielded Analytical Laboratory
Bench Sheet

Page 1 of 1

Project Id.: 101 57

Project No.: 19067 ^{RP}
~~17667~~ 4-9-92

Window E

Rad Chem Samples

KOH Fusion

BATCH #2

92-05086	92-05086	92-05087	92-05087
1204 (wet) #6	1204 (Dry)	1206 (wet) #7	1206 (Dry)
49.3888	49.2185	47.4127	47.2436
48.8265	48.8265	46.8394	46.8394
0.5623 g	0.3920	0.5733 g	0.4042

92-05092	92-05092	92-05093	92-05093
1309 (wet) #8	1309 (Dry)	1310 (wet) #9	1310 (Dry)
47.4816	47.3516	47.5711	47.3450
46.8655	46.8655	47.0063	47.0063
0.6161 g	0.4861	0.5648 g	0.3887

92-05689

TOTAL 1101 = 250 ml.

BLANK #10

35 ml. of each was given to Rad Chem & a separate

35 ml. of each was given to 329 for Ni-63 analysis

Analyst:

A. Hori

Date:

4-3-92

Reviewer:

[Signature]

Date:

4/6/92

Procedures Used:

<u> X </u>	PNL-ALO-101, Acid Digestion for Metals Analysis
<u> </u>	PNL-ALO-102, Fusion of Hanford Tank Waste Solids
<u> </u>	PNL-ALO-103, Water Leach of Sludges, Soils, and Other Solid Samples
<u> </u>	PNL-ALO-104, Extraction Procedure Toxicity
<u> </u>	PNL-ALO-106, Acid Digestion for Preparation of Samples for Radiochemical Analysis
<u> </u>	PNL-ALO-107, Leach Procedure for Preparing Sludges, Soils and Other Solid Samples for Free Cyanide Analysis
<u> </u>	PNL-ALO-108, Aqueous Leach of Sludges, Soils and Other Solid Samples for Anion Analysis
<u> </u>	PNL-ALO-330 Hexadecane Extracts for Volatile Organic Compounds
<u> </u>	PNL-ALO-504, Percent Solids Determination of Soils/Sludges/Solids
<u> </u>	PNL-ALO-120, Procedure for Extraction of Single Shell Tank Samples for the Analysis of Semivolatile Organic Compounds
<u> </u>	PNL-ALO-130, Procedure for the Receipt and Inspection of Single Shell Tank (SST) Samples
<u> </u>	WHC-053-1, Laboratory Procedure for Measurement of Physical and Rheological Properties of Solutions, Slurries and Sludges
<u> </u>	7.40.9 Laboratory Procedure for the Physical Characterization of Fluids
<u> </u>	7.40.16 Separation of Carbon from Soil/Sediment/Sludge Samples
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<u> </u>	7.40.47 Determination of TC, TOC and TIC in Radioactive Liquids, Soils, and Sludges by Hot Persulfate Method
<u> X </u>	Other <u>TI-HSP-WINDOW E-001</u>

M&TE Used:

<u> </u>	Cell 2 Balance	360-06-01-016	Mettler AE 160
<u> </u>	Cell 6 Balance	362-06-01-038	Mettler AE 200
<u> </u>	Counter Balance	360-06-01-024	Sartorius R 2000
<u> </u>	Corning pH meter Model 240	S/N 6629	

TI NO.: TI-MSA
W-100W
8-9-1 WBS NO.: NA

CONTROLLING PROCEDURE: PNL-ALO-010

QA PLAN: ALO-003 IMPACT LEVEL: II

CORE ID: NA

[illegible]

Shielded Analytical Laboratory
Bench Sheet

Page 1 of 1

Project Id.: 101 SY

Project No.: 19067
~~17667~~ DS
4/7/92

[Ni] in RadChem
Samples

Made 11x dilutions for the following samples
to check the level of stable Ni resulting from
the KOH-Ni fusions:

92-05070

92-05086

92-05074

92-05087

92-05076

92-05092

92-05080

92-05093

92-05688

92-05689

1 ml Pipet 19°C DIW

10.001 Fixed Glass

1.0012

$\bar{x} = 1.0013$

1.0001

$S = .0014$

1.0020

1.0032

.9998

.14%

Rel. = 1.0029 me

Analyst:

[Signature]

Date:

4/7/92

Reviewer:

[Signature]

Date:

4/7/92

Procedures Used:

- ____ PNL-ALO-101, Acid Digestion for Metals Analysis
- ____ PNL-ALO-102, Fusion of Hanford Tank Waste Solids
- ____ PNL-ALO-103, Water Leach of Sludges, Soils, and Other Solid Samples
- ____ PNL-ALO-104, Extraction Procedure Toxicity
- ____ PNL-ALO-106, Acid Digestion for Preparation of Samples for Radiochemical Analysis
- ____ PNL-ALO-107, Leach Procedure for Preparing Sludges, Soils and Other Solid Samples for Free Cyanide Analysis
- ____ PNL-ALO-108, Aqueous Leach of Sludges, Soils and Other Solid Samples for Anion Analysis
- ____ PNL-ALO-330 Hexadecane Extracts for Volatile Organic Compounds
- ____ PNL-ALO-504, Percent Solids Determination of Soils/Sludges/Solids
- ____ PNL-ALO-120, Procedure for Extraction of Single Shell Tank Samples for the Analysis of Semivolatile Organic Compounds
- ____ PNL-ALO-130, Procedure for the Receipt and Inspection of Single Shell Tank (SST) Samples
- ____ WHC-053-1, Laboratory Procedure for Measurement of Physical and Rheological Properties of Solutions, Slurries and Sludges
- ____ 7.40.9 Laboratory Procedure for the Physical Characterization of Fluids
- ____ 7.40.16 Separation of Carbon from Soil/Sediment/Sludge Samples
- ____ 7.40.24 Measurement of Carbon-14 in Zircaloy Cladding Crud Layer
- ____ 7.40.25 Distillation of Caustic Trap Solutions for C-14 Separation
- ____ 7.40.29 Specific Gravity of Highly Radioactive Solutions
- ____ 7.40.30 Bulk Density of Highly Radioactive Free-Flowing Granular Solids
- ____ 7.40.34 Tritium in Irradiated Cladding Materials
- ____ 7.40.36 Analysis of Solid Samples for Carbonate by Use of Coulometrics Model 5011 Coulometer.
- ____ 7.40.37 Determination of Carbon in Solids Using the Coulometrics Carbon Dioxide Coulometer
- ____ 7.40.42 Determination of Carbon-14 in Radioactive Liquids, Soils, and Sludges
- ____ 7.40.47 Determination of TC, TOC and TIC in Radioactive Liquids, Soils, and Sludges by Hot Persulfate Method
- X Other Special request from Kaye. Authorized by P.M.O.

M&TE Used:

____ Cell 2 Balance	360-06-01-016	Mettler AE 160
____ Cell 6 Balance	362-06-01-038	Mettler AE 200
____ Counter Balance	360-06-01-024	Sartorius R 2000
____ Corning pH meter Model 240 S/N 6629		

SAMPLE PREP DATA SHEET
(325-B Hot Cells)

Date: 4/6/92

Analyst: *[Signature]*
6-3089 P7, 22

Review: *[Signature]*

	Project #1	Project #2	Project #3
Program:	101SY		
Customer:	Kaje		
Acct. or WP#:	M9911		
LRB#:	—		
MBTE:	—		

Program	ALO #	Sample #	Analyte or Analysis	Sample Wt Wet (g)	Sample Wt Dry (g)	Water Wt (g)	Total Vol (ml)	Spike ID	Spike Vol (ml)	Dilution Factor	Diluent Matrix	Pipet Calib (ml)	Miscellaneous
101SY	92-05070	1200	N _i (ICP)	0.7690			250			11X	2% HCL	1.0029	
	92-05074	1212		0.8379								10.001	
	92-05076	1213		0.6253									
	92-05080	1298		0.7021									
	92-05688	BLANK		—									
101SY	92-05086	1204	N _i (ICP)	0.5623			250			11X	2% HCL		
	92-05087	1206		0.5733									
	92-05092	1309		0.6161									
	92-05093	1310		0.5648									
	92-05139	BLANK		—									

Shielded Analytical Laboratory
Bench Sheet

Page 1 of 1

Project Id.: 1015Y

Project No.: ¹⁹⁰⁶⁷~~17667~~ 4/8/92 DS

1306 (92-05090)	1299 (92-05089)
32.7807	32.4189
30.8438	30.3981
1.8969 g.	2.0208 g.

1214 (92-05081)	1199 (92-05075)
32.3881	33.1724
30.4557	31.0507
1.9324 g.	2.1217 g.

WEIGHED THE ABOVE ⁵¹²~~Following~~ 4-7-92 SAMPLES & ADDED
~ 20ml Milli-Q WATER. SAMPLES WERE THEN
PUT ON TO STIR FOR 24 hrs BEFORE FILTERING.

Analyst:

John K. Bar

Date:

4-7-92

Reviewer:

Ricky L. Hark

Date:

4-8-92

Procedures Used:

_____ PNL-ALO-101, Acid Digestion for Metals Analysis
 _____ PNL-ALO-102, Fusion of Hanford Tank Waste Solids
 _____ PNL-ALO-103, Water Leach of Sludges, Soils, and Other Solid Samples
 _____ PNL-ALO-104, Extraction Procedure Toxicity
 _____ PNL-ALO-106, Acid Digestion for Preparation of Samples for
 _____ Radiochemical Analysis
 _____ PNL-ALO-107, Leach Procedure for Preparing Sludges, Soils and Other
 _____ Solid Samples for Free Cyanide Analysis
 _____ PNL-ALO-108, Aqueous Leach of Sludges, Soils and Other Solid Samples
 _____ for Anion Analysis
 _____ PNL-ALO-330 Hexadecane Extracts for Volatile Organic Compounds
 _____ PNL-ALO-504, Percent Solids Determination of Soils/Sludges/Solids
 _____ PNL-ALO-120, Procedure for Extraction of Single Shell Tank Samples
 _____ for the Analysis of Semivolatile Organic Compounds
 _____ PNL-ALO-130, Procedure for the Receipt and Inspection of Single
 _____ Shell Tank (SST) Samples
 _____ WHC-053-1, Laboratory Procedure for Measurement of Physical and
 _____ Rheological Properties of Solutions, Slurries and
 _____ Sludges
 _____ 7.40.9 Laboratory Procedure for the Physical Characterization of
 _____ Fluids
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 _____ 7.40.30 Bulk Density of Highly Radioactive Free-Flowing Granular
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 _____ Coulometrics Model 5011 Coulometer.
 _____ 7.40.37 Determination of Carbon in Solids Using the Coulometrics
 _____ Carbon Dioxide Coulometer
 _____ 7.40.42 Determination of Carbon-14 in Radioactive Liquids, Soils,
 _____ and Sludges
 _____ 7.40.47 Determination of TC, TOC and TIC in Radioactive Liquids,
 _____ Soils, and Sludges by Hot Persulfate Method
 X Other TL-HSP-WINDOW E-001

M&TE Used:

X _____ Cell 2 Balance 360-06-01-016 Mettler AE 160
 _____ Cell 6 Balance 362-06-01-038 Mettler AE 200
 _____ Counter Balance 360-06-01-024 Sartorius R 2000
 _____ Corning pH meter Model 240 S/N 6629

19067/TI

Shielded Analytical Laboratory
Bench Sheet

Page 1 of 1

Project Id.: 1015Y

Project No.: 19067 DS
A494512 4/13/92

1196 (92-05083)	1196 DUPLICATE (92-05093)
32.8883	32.5032
30.8964	30.3488
1.9919 g.	2.1544 g.

1197 (92-05071)	1215 (92-05077)
32.6847	33.1535
30.4329	31.1804
2.2518 g.	1.9731 g.

WEIGHED ABOVE SAMPLES & ADDED ~20ml
MILLI Q H₂O & STARTED 24 hr. STIR TIME IN
PREPARATION FOR CHEMICAL EXTRACTION

Analyst:

John K. Brown

Date:

4/9/92

Reviewer:

Rick L. Stute

Date:

4/13/92

Procedures Used:

_____ PNL-ALO-101, Acid Digestion for Metals Analysis
 _____ PNL-ALO-102, Fusion of Hanford Tank Waste Solids
 _____ PNL-ALO-103, Water Leach of Sludges, Soils, and Other Solid Samples
 _____ PNL-ALO-104, Extraction Procedure Toxicity
 _____ PNL-ALO-106, Acid Digestion for Preparation of Samples for
 Radiochemical Analysis
 _____ PNL-ALO-107, Leach Procedure for Preparing Sludges, Soils and Other
 Solid Samples for Free Cyanide Analysis
 _____ PNL-ALO-108, Aqueous Leach of Sludges, Soils and Other Solid Samples
 for Anion Analysis
 _____ PNL-ALO-330 Hexadecane Extracts for Volatile Organic Compounds
 _____ PNL-ALO-504, Percent Solids Determination of Soils/Sludges/Solids
 _____ PNL-ALO-120, Procedure for Extraction of Single Shell Tank Samples
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 Soils, and Sludges by Hot Persulfate Method
 _____ X Other TI-HSP-WINDOW E-001

M&TE Used:

_____ X Cell 2 Balance 360-06-01-016 Mettler AE 160
 _____ Cell 6 Balance 362-06-01-038 Mettler AE 200
 _____ Counter Balance 360-06-01-024 Sartorius R 2000
 _____ Corning pH meter Model 240 S/N 6629

OP

19067/T

Shielded Analytical Laboratory
Bench Sheet

Page 1 of 1

Project Id.: 101 SY

Project No.: M99912

1306 (92-05090)
53.4591
51.4483
2.0108g.

WEIGHED ABOVE SAMPLE & ADDED ~20ml
MILLI Q WATER & PUT ON TO STIR FOR 24 hrs
IN PREPARATION FOR CHELATOR ANALYSIS.

Analyst:

John K. Ben

Date:

4-16-92

Reviewer:

Richard L. Stule

Date:

4/16/92

Procedures Used:

_____ PNL-ALO-101, Acid Digestion for Metals Analysis
 _____ PNL-ALO-102, Fusion of Hanford Tank Waste Solids
 _____ PNL-ALO-103, Water Leach of Sludges, Soils, and Other Solid Samples
 _____ PNL-ALO-104, Extraction Procedure Toxicity
 _____ PNL-ALO-106, Acid Digestion for Preparation of Samples for
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 _____ PNL-ALO-107, Leach Procedure for Preparing Sludges, Soils and Other
 _____ Solid Samples for Free Cyanide Analysis
 _____ PNL-ALO-108, Aqueous Leach of Sludges, Soils and Other Solid Samples
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 _____ 7.40.47 Determination of TC, TOC and TIC in Radioactive Liquids,
 _____ Soils, and Sludges by Hot Persulfate Method
 X Other TL-HSP-WINDOW E-001

M&TE Used:

X _____ Cell 2 Balance 360-06-01-016 Mettler AE 160
 _____ Cell 6 Balance 362-06-01-038 Mettler AE 200
 _____ Counter Balance 360-06-01-024 Sartorius R 200D
 _____ Corning pH meter Model 240 S/N 6629

4P

Shielded Analytical Laboratory
Bench Sheet

Page 1 of 1

Project Id.:

Project No.: 19007

10154 Chelator TOC's

SM99912

Sample Id	SpI Size	IC	OC	% Rec
Blank 1)	—	—	120	—
2)	—	—	115	—
Std (BIFI)	3.4 mg	—	1340	90% R 1360
2)	5.4 mg	—	2112	92% R 2160
92-05071 #1197	.0534 g	256	765	—
92-05077 #1215	.0617 g	290	780	—
92-05090 #1306	.0690 g	650	1018	—
92-05075 #1199	.0582 ⁵ g ^{320 H₂O}	325	556	—
92-05089 #1299	.0589 g	350	930	—
92-05081 #1214	.0684 g	280	956	—
92-05083 #1196-1	.0552 g	420	920	—
#1196-2	.0538 g	391	928	—
Blank 3	—	—	110	—
Std 3	6.5 mg	—	2491	91% R

Analyst:

Date:

Reviewer:

Date:

[Signature]

4/12/92

[Signature]

4/21/92

Procedures Used:

_____	PNL-ALO-101, Acid Digestion for Metals Analysis
_____	PNL-ALO-102, Fusion of Hanford Tank Waste Solids
_____	PNL-ALO-103, Water Leach of Sludges, Soils, and Other Solid Samples
_____	PNL-ALO-104, Extraction Procedure Toxicity
_____	PNL-ALO-106, Acid Digestion for Preparation of Samples for Radiochemical Analysis
_____	PNL-ALO-107, Leach Procedure for Preparing Sludges, Soils and Other Solid Samples for Free Cyanide Analysis
_____	PNL-ALO-108, Aqueous Leach of Sludges, Soils and Other Solid Samples for Anion Analysis
_____	PNL-ALO-330 Hexadecane Extracts for Volatile Organic Compounds
_____	PNL-ALO-504, Percent Solids Determination of Soils/Sludges/Solids
_____	PNL-ALO-120, Procedure for Extraction of Single Shell Tank Samples for the Analysis of Semivolatile Organic Compounds
_____	PNL-ALO-130, Procedure for the Receipt and Inspection of Single Shell Tank (SST) Samples
_____	WHC-053-1, Laboratory Procedure for Measurement of Physical and Rheological Properties of Solutions, Slurries and Sludges
_____	7.40.9 Laboratory Procedure for the Physical Characterization of Fluids
_____	7.40.16 Separation of Carbon from Soil/Sediment/Sludge Samples
_____	7.40.24 Measurement of Carbon-14 in Zircaloy Cladding Crud Layer
_____	7.40.25 Distillation of Caustic Trap Solutions for C-14 Separation
_____	7.40.29 Specific Gravity of Highly Radioactive Solutions
_____	7.40.30 Bulk Density of Highly Radioactive Free-Flowing Granular Solids
_____	7.40.34 Tritium in Irradiated Cladding Materials
_____	7.40.36 Analysis of Solid Samples for Carbonate by Use of Coulometrics Model 5011 Coulometer.
_____	7.40.37 Determination of Carbon in Solids Using the Coulometrics Carbon Dioxide Coulometer
_____	7.40.42 Determination of Carbon-14 in Radioactive Liquids, Soils, and Sludges
<u>X</u> _____	7.40.47 Determination of TC, TOC and TIC in Radioactive Liquids, Soils, and Sludges by Hot Persulfate Method
_____	Other _____

M&TE Used:

<u>X</u> _____	Cell 2 Balance	360-06-01-016	Mettler AE 160
_____	Cell 6 Balance	362-06-01-038	Mettler AE 200
_____	Counter Balance	360-06-01-024	Sartorius R 2000
_____	Corning pH meter Model 240	S/N 6629	

Shielded Analytical Laboratory
Bench Sheet

Page 1 of 1

Project Id.:

Project No.: 19067

operator TOC

M99912

4/24/92

LOT#
BIF

SAMPLE	SIZE	TC	OC
BIK 1)	—		118
BIK 2)	—		110
STD. 1)	4.0		1610
STD. 2)	5.0		1965

92-05083 #1196-1R .1315 g.	1250	2280
	TC	OC

4/27/92 BIK-1	—	113
BIK 2	—	104
STD 1	6.9	3695 2760 94%
STD 2	4.7	1810 1880 91%

92-05071 #1197R .1984 g.	1799	3761
92-05075 #1199R .1283 g.	1206	1885
92-05081 #1214R .0943 g.	797	1190
92-05077 #1215R .1872 g.	1885	2330
92-05089 #1299R .2158 g.	2507	3447
92-05090 #1306R .2097 g.	2290	1386
STD 3	2.6 mg.	1042 1040 90%
BIK 3	—	100

Analyst:

Date:

Reviewer:

Date:

Michael Hagan

4/27/92

Robert L. Stahl

4/29/92

Procedures Used:

_____ PNL-ALO-101, Acid Digestion for Metals Analysis
 _____ PNL-ALO-102, Fusion of Hanford Tank Waste Solids
 _____ PNL-ALO-103, Water Leach of Sludges, Soils, and Other Solid Samples
 _____ PNL-ALO-104, Extraction Procedure Toxicity
 _____ PNL-ALO-106, Acid Digestion for Preparation of Samples for
 _____ Radiochemical Analysis
 _____ PNL-ALO-107, Leach Procedure for Preparing Sludges, Soils and Other
 _____ Solid Samples for Free Cyanide Analysis
 _____ PNL-ALO-108, Aqueous Leach of Sludges, Soils and Other Solid Samples
 _____ for Anion Analysis
 _____ PNL-ALO-330 Hexadecane Extracts for Volatile Organic Compounds
 _____ PNL-ALO-504, Percent Solids Determination of Soils/Sludges/Solids
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 _____ PNL-ALO-130, Procedure for the Receipt and Inspection of Single
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 _____ 7.40.37 Determination of Carbon in Solids Using the Coulometrics
 _____ Carbon Dioxide Coulometer
 _____ 7.40.42 Determination of Carbon-14 in Radioactive Liquids, Soils,
 _____ and Sludges
X 7.40.47 Determination of TC, TOC and TIC in Radioactive Liquids,
 _____ Soils, and Sludges by Hot Persulfate Method
 _____ Other TI-HSP-Window E-001

M&TE Used:

<u>X</u>	Cell 2 Balance	360-06-01-016	Mettler AE 160
_____	Cell 6 Balance	362-06-01-038	Mettler AE 200
_____	Counter Balance	360-06-01-024	Sartorius R 2000
_____	Corning pH meter Model 240	S/N 6629	

Shielded Analytical Laboratory
Bench Sheet

Page 1 of 2

Project Id.: 10154

Project No.: M99912

Chelators TUGs

1197 (92-05071)	1199 (92-05075)
17.3775	17.2689
15.2785	15.3723
2.0990 g	1.8966 g

1215 (92-05077)	1299 (92-05089)
17.6745	17.6268
15.4685	15.4912
2.2060 g	2.1356 g

1306 (92-05090)	1214 (92-05091)
17.2391	17.7224
15.3407	15.4594
1.8984 g	2.2630 g

1196 (92-05083)	~~1196 (92-05083)~~
17.1716	4-21-92 JIR
15.2659	15.5276

1.9057 g. CONTACTED ABOVE SAMPLES WITH
15 ml DIW For 1 hr. & CENTER (uged). DISCARDED CLEAR
LIQUID & TOOK REMAINING SOLIDS TO DRYNESS.

Analyst:

Date:

Reviewer:

Date:

John K. Ruv

4-21-92

Rick L. Stuck

4/22/92

Procedures Used:

_____ PNL-ALO-101, Acid Digestion for Metals Analysis
 _____ PNL-ALO-102, Fusion of Hanford Tank Waste Solids
 _____ PNL-ALO-103, Water Leach of Sludges, Soils, and Other Solid Samples
 _____ PNL-ALO-104, Extraction Procedure Toxicity
 _____ PNL-ALO-106, Acid Digestion for Preparation of Samples for
 _____ Radiochemical Analysis
 _____ PNL-ALO-107, Leach Procedure for Preparing Sludges, Soils and Other
 _____ Solid Samples for Free Cyanide Analysis
 _____ PNL-ALO-108, Aqueous Leach of Sludges, Soils and Other Solid Samples
 _____ for Anion Analysis
 _____ PNL-ALO-330 Hexadecane Extracts for Volatile Organic Compounds
 _____ PNL-ALO-504, Percent Solids Determination of Soils/Sludges/Solids
 _____ PNL-ALO-120, Procedure for Extraction of Single Shell Tank Samples
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 _____ PNL-ALO-130, Procedure for the Receipt and Inspection of Single
 _____ Shell Tank (SST) Samples
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 _____ Sludges
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 _____ and Sludges
 _____ 7.40.47 Determination of TC, TOC and TIC in Radioactive Liquids,
 _____ Soils, and Sludges by Hot Persulfate Method
 _____ Other TI-HSP-WINDOW E-001

M&TE Used:

_____ X Cell 2 Balance 360-06-01-016 Mettler AE 160
 _____ Cell 6 Balance 362-06-01-038 Mettler AE 200
 _____ Counter Balance 360-06-01-024 Sartorius R 200D
 _____ Corning pH meter Model 240 S/N 6629

Shielded Analytical Laboratory
Bench Sheet

Page 2 of 2

Project Id.: 10157

Project No.: M99912

Chelator TOCs

1199 (92-05075)	1215 (92-05077)
15.5006	15.6557
15.3723	15.4685
0.1283g	0.1872

1299 (92-05089)	1214 (92-05081)
15.7070	15.5537
15.4912	15.4594
0.2158g	0.0943g

1306 (92-05090)	1197 (92-05071)
15.5504	15.4769
15.3407	15.2785
0.2097g	0.1984g

1196 (92-05081)	THESE WEIGHTS REPRESENT	
15.3974	THE DRIED SOLIDS LEFT FROM	
15.2659	THE PREVIOUS DAYS WATER LEACHES	
0.1315g		

Analyst:

John K. Brown

Date:

4-22-92

Reviewer:

Rick T. Stule

Date:

4/22/92

Procedures Used:

_____ PNL-ALO-101, Acid Digestion for Metals Analysis
 _____ PNL-ALO-102, Fusion of Hanford Tank Waste Solids
 _____ PNL-ALO-103, Water Leach of Sludges, Soils, and Other Solid Samples
 _____ PNL-ALO-104, Extraction Procedure Toxicity
 _____ PNL-ALO-106, Acid Digestion for Preparation of Samples for
 _____ Radiochemical Analysis
 _____ PNL-ALO-107, Leach Procedure for Preparing Sludges, Soils and Other
 _____ Solid Samples for Free Cyanide Analysis
 _____ PNL-ALO-108, Aqueous Leach of Sludges, Soils and Other Solid Samples
 _____ for Anion Analysis
 _____ PNL-ALO-330 Hexadecane Extracts for Volatile Organic Compounds
 _____ PNL-ALO-504, Percent Solids Determination of Soils/Sludges/Solids
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 _____ Other TI-HSP-WINDOW E-001

M&TE Used:

_____ X Cell 2 Balance 360-06-01-016 Mettler AE 160
 _____ Cell 6 Balance 362-06-01-038 Mettler AE 200
 _____ Counter Balance 360-06-01-024 Sartorius R 200D
 _____ Corning pH meter Model 240 S/N 6629

(325-B Hot Cells)

REPORT RESULTS IN: _____

CONTROLLING PROCEDURE: PNL-ALO-010

QA PLAN: ALO-003 IMPACT LEVEL: II

CORE ID: _____

WORK PACKAGE NO.	ALD NUMBER	Analytical Procedure	Analyte or Analysis	SAMPLE WT	WATER WT (g)	TOTAL VOL (mL)	SPIKE ID	SPIKE VOL (mL)	DILUTION FACTOR	DILUENT MATRIX	PIPET CALIB (mL)	MISCELLANEOUS
m99912	92-05090		Peraxide	2.0108g	20g							
	92-05093			1.9919g								
	92-05093			2.1544g								
	92-05071			2.2518g								
	92-05077			1.9731g								
	92-05099			2.0208g								
	92-05081			1.9324g								
	92-05075			2.1217g								

APPENDIX C

PHYSICAL ANALYSIS PRIMARY DATA

C1 - WEIGHT PERCENT SOLIDS RESULTS

~~17667~~
19067
DS
4/6/92

Percent Solids Data Form

Date 4/2/92

Sample ID # 92-5070(#1200)

Analyst SAH

Reviewer [Signature]

Tare Wt. + Wet Sample : 9.9719

Tare Wt. : 7.9586

Wet Sample Wt: = 1.0133 g.

Time/Date into Oven : 1500 4/1/92

Oven Temp. : 104°C

Time/Date out Oven : 1500 4/2/92

Oven Temp. : 106°C

Tare Wt. + Dry Sample : 8.5697

Tare Wt. : 7.9586

Dry Sample Wt. : 0.6111 g.

% Solids = $\frac{(\text{Dry Sample Wt})}{(\text{Wet Sample Wt.})} \times 100\%$

% Solids = 60.3 %

~~+7667~~
19067
4/6/92
DS

Percent Solids Data Form

Date 4/2/92

Sample ID # 92-5080 (#1298)

Analyst SBH

Reviewer [Signature]

Tare Wt. + Wet Sample : 9.4372

Tare Wt. : 8.3971

Wet Sample Wt: = 1.0401 g.

Time/Date into Oven : 1500 4/1/92

Oven Temp. : 104 °C

Time/Date out Oven : 1500 4/2/92

Oven Temp. : 106 °C

Tare Wt. + Dry Sample : 9.4212 ^{0.01442}

Tare Wt. : 8.3971

Dry Sample Wt. : 0.6241 g.

% Solids = $\frac{(\text{Dry Sample Wt})}{(\text{Wet Sample Wt.})} \times 100\%$

% Solids = 60.0 %

APPENDIX D

RADIOCHEMISTRY ANALYSIS PRIMARY DATA

**D1 - AMERICIUM 241/243 and
CURIUM 242/243/244
ANALYSIS RESULTS**

KJ Kuhl-Klinger
File/LB

Date August 26, 1992
To BM Gillespie
From LR Greenwood *LRG*
Subject Narratives for 101-SY Data

All of the following analyses were performed in building 325 of the 300 area. All analyses were performed without notable exceptions according to the approved procedures. Some detailed comments are given below.

Se-79: Analyses were performed according to procedure 7-40.15. The sample size was 10 ml of the dissolved fusion.

Am/Cm: Analyses were performed according to procedures 7-40.65 and PNL ALO-422. The activity of the samples was sufficiently high that the Am and Cm fractions were resolved by alpha energy analysis. It should be noted that ²⁴²Cm represents less than 1% of the total Am+Cm activity, thus leading to the higher uncertainty for these data.

Np: Analyses were performed according to procedures PNL-ALO-425 and PNL-ALO-422. The sample size was 2 ml (maximum allowed) with counting times of 360-390 minutes. Those samples reported as positive results are very close to our detection limit based primarily on counting statistics. Sample 92-5070 had a higher count rate than the other samples. However, the alpha energy analysis showed that the activity was not due to Np. We thus reported a less than value based on the detector background.

DATA REPORT
PNL Analytical chemistry Lab.
Radioanalytical group, 325 Building

05/ 28/ 92

Client: T.E.JONES
WP #: M-99913

Cognizant scientist: L R Greenwood Date: 5/29/92

Reviewer: L S Kellogg Date: 5-29-92

ALO #	Customer ID	Cm-243 & 244 dpm/g	Am-241 dpm/g	Cm-242 dpm/g	Np-237 dpm/g	Se-79 dpm/g
92-5070	VIAL 1200	8.95E+3	7.37E+4	2E+2	< 40	6.3E+2
92-5074	VIAL 1212	8.94E+3	1.08E+5	4E+2	51	4.7E+2
92-5076	VIAL 1213	5.16E+3	1.03E+5	2E+2	< 56	5.2E+2
92-5080	VIAL 1298	8.67E+3	1.54E+5	1E+3 1E+3 COU 7-14-92	65	5.9E+2
92-5086	VIAL 1204	1.80E+4	3.90E+5	1E+3	< 80	5.9E+2
92-5087	VIAL 1206	1.46E+4	4.02E+5		< 83	4.9E+2
92-5092	VIAL 1309	2.94E+4	5.93E+5	2E+3	67	5.1E+2
92-5093	VIAL 1310	1.76E+4	4.21E+5	1E+3	< 92	3.5E+2 LRG 3.4E+2 7/27/92
92-5688	METHODS BLANK	6.3 dpm/ml	6.3 dpm/ml		< 1.3E-1 dpm/ml	< 2.7E-1 dpm/ml
92-5689	METHODS BLANK	4.1 "	4.5 "		< 1.4E-1 "	< 2.9E-1 "
REAGENT BLANK FUSION MATRIX			< 4.5E-1 "		< 1.9E-1 " (1)	2.7E-1 " (2)

STANDARDS RECOVERY %

99

94

The recovery for the standards run with the samples was included in the calculation of an historical average recovery, individual sample results were corrected using that average.

Customer : T.E.JONES Date Received : 04/ 06/ 92 Work order : M-99911 ARF(SOW) : TI-HSP-WINDOW E

A.L.O. No. : 92-5070 Description : VIAL 1200

#17 #28 #90

DF

--- 0.7690 --> 250 ml. --- 0.99832 --> 0.49757 ml --- 2(0.10023) ---

Pipet LRB BNW Page(s) No. _____

Std LRB BNW Page(s) No. _____

M. & T.E. _____

Standard card ID 5-Am-PJR, 4-6-92

Blank card ID B-Am-PJR, 4-6-92

Analyst

PJ Raney

Date

4-8-92
10

Analysts Yield Factor +/- _____

Cm-241,243	Am-241	M. & T.E. Log Book:	WM00579 BNW52341 p 73	WA42546 BNW52825 p	WA BNW52343 p

Instrument	P.A.C. - 1	G.E. ASC.	Ludlum -
Eff. Factor	0.5090	0.37927	0.4

Total counts		Date	4/13/92		
edge correction		Total counts	5078		
Background		Count time	100"		
Net counts		Bkg C/M	0.45		
Alpha fract		Bkg cnt time	100"		
		Corrected C/M	50.33		

Analyst

Anne E. Taylor

10/2

$$\frac{50.33 \text{ cpm} (250 \text{ ml}) (0.49757 \text{ ml})}{0.5090 \text{ d/c} (0.7690 \text{ g}) (0.99832 \text{ ml}) (0.20046 \text{ ml})} = 7.9924 \text{ E} + 4 \text{ d/ml/gm}$$

c/d 2-67-28-92
adjust for spike yield (.9646 Historical)

EO Harvey 5-7-92

$$\begin{aligned} 241 \text{ Am} &= 7.1132 \text{ E} + 4 \\ \times 0.89 &= 7.374 \text{ E} + 4 \\ 243, 244 \text{ Cm} &= 8.6318 \text{ E} + 3 \\ \times 0.108 &= 8.945 \text{ E} + 3 \\ 242 \text{ Cm} &= 2.3977 \text{ E} + 2 \\ \times 0.003 &= 2.486 \text{ E} + 2 \\ \div .9646 &= 2.486 \text{ E} + 2 \end{aligned}$$

Rybarington 5-4-92

Y-29.92

10108	10111	1	3584

0	0	0	0	0	0	0	0
8	0	0	4	7	5	8	6
16	10	6	5	5	5	5	2
24	4	4	6	7	6	8	6
32	6	8	4	4	17	5	5
40	6	8	14	10	9	10	12
48	12	10	11	12	8	11	6
56	9	9	10	12	3	8	12
64	9	12	12	15	11	8	6
72	17	8	14	9	20	14	8
80	15	4	14	12	22	11	9
88	14	15	14	17	19	19	17
96	17	19	16	17	17	16	17
104	17	11	11	26	19	25	23
112	20	11	24	20	28	27	26
120	26	36	19	21	33	36	30
128	28	37	33	26	25	36	32
136	30	42	45	26	36	34	36
144	43	48	46	43	47	52	52
152	44	59	57	55	49	58	59
160	51	63	56	58	54	69	65
168	57	71	79	64	71	103	68
176	64	82	78	89	80	72	78
184	99	109	101	126	114	97	115
192	125	130	140	109	129	122	152
200	158	178	168	150	178	173	194
208	177	208	198	203	220	234	215
216	284	282	286	321	286	311	302
224	347	354	425	409	467	532	532
232	596	668	750	832	952	1072	1167
240	1158	1038	736	424	213	131	69
248	42	37	31	49	52	49	50
256	64	66	82	75	94	102	114
264	137	138	142	131	84	49	13
272	①	①	②	0	1	0	2
280	1	5	3	1	2	5	2
288	5	3	4	6	2	①	①
296	0	0	0	0	0	0	0
304	0	1	1	1	0	1	0
312	1	0	0	0	0	0	0
320	0	0	0	1	0	0	0
328	0	0	0	0	0	0	0
336	0	0	0	0	0	0	0
344	1	2	4	1	2	1	0
352	2	0	0	0	0	0	0
360	0	0	0	0	0	0	0
368	0	0	0	0	0	0	0

245
352
595
1132
60
63
135
3
0
1
0
0
0

$245 - 1 = 244$
 $352 - 1 = 351$
 $595 - 1 = 594$
 $1132 - 1 = 1131$
 $60 - 1 = 59$
 $63 - 1 = 62$
 $135 - 1 = 134$
 $3 - 1 = 2$
 $0 - 1 = -1$
 $1 - 1 = 0$
 $0 - 1 = -1$
 $0 - 1 = -1$
 $0 - 1 = -1$

$244 - 1 = 243$
 $351 - 1 = 350$
 $594 - 1 = 593$
 $1131 - 1 = 1130$
 $59 - 1 = 58$
 $62 - 1 = 61$
 $134 - 1 = 133$
 $2 - 1 = 1$
 $-1 - 1 = -2$
 $-1 - 1 = -2$
 $-1 - 1 = -2$
 $-1 - 1 = -2$

$243 - 1 = 242$
 $350 - 1 = 349$
 $593 - 1 = 592$
 $1130 - 1 = 1129$
 $58 - 1 = 57$
 $61 - 1 = 60$
 $133 - 1 = 132$
 $1 - 1 = 0$
 $-2 - 1 = -3$
 $-2 - 1 = -3$
 $-2 - 1 = -3$
 $-2 - 1 = -3$

$242 - 1 = 241$
 $349 - 1 = 348$
 $592 - 1 = 591$
 $1129 - 1 = 1128$
 $57 - 1 = 56$
 $60 - 1 = 59$
 $132 - 1 = 131$
 $0 - 1 = -1$
 $-3 - 1 = -4$
 $-3 - 1 = -4$
 $-3 - 1 = -4$
 $-3 - 1 = -4$

$241 - 1 = 240$
 $348 - 1 = 347$
 $591 - 1 = 590$
 $1128 - 1 = 1127$
 $56 - 1 = 55$
 $59 - 1 = 58$
 $131 - 1 = 130$
 $-1 - 1 = -2$
 $-4 - 1 = -5$
 $-4 - 1 = -5$
 $-4 - 1 = -5$
 $-4 - 1 = -5$

$240 - 1 = 239$
 $347 - 1 = 346$
 $590 - 1 = 589$
 $1127 - 1 = 1126$
 $55 - 1 = 54$
 $58 - 1 = 57$
 $130 - 1 = 129$
 $-2 - 1 = -3$
 $-5 - 1 = -6$
 $-5 - 1 = -6$
 $-5 - 1 = -6$
 $-5 - 1 = -6$

$239 - 1 = 238$
 $346 - 1 = 345$
 $589 - 1 = 588$
 $1126 - 1 = 1125$
 $54 - 1 = 53$
 $57 - 1 = 56$
 $129 - 1 = 128$
 $-3 - 1 = -4$
 $-6 - 1 = -7$
 $-6 - 1 = -7$
 $-6 - 1 = -7$
 $-6 - 1 = -7$

$238 - 1 = 237$
 $345 - 1 = 344$
 $588 - 1 = 587$
 $1125 - 1 = 1124$
 $53 - 1 = 52$
 $56 - 1 = 55$
 $128 - 1 = 127$
 $-4 - 1 = -5$
 $-7 - 1 = -8$
 $-7 - 1 = -8$
 $-7 - 1 = -8$
 $-7 - 1 = -8$

$237 - 1 = 236$
 $344 - 1 = 343$
 $587 - 1 = 586$
 $1124 - 1 = 1123$
 $52 - 1 = 51$
 $55 - 1 = 54$
 $127 - 1 = 126$
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 $-8 - 1 = -9$
 $-8 - 1 = -9$
 $-8 - 1 = -9$
 $-8 - 1 = -9$

$236 - 1 = 235$
 $343 - 1 = 342$
 $586 - 1 = 585$
 $1123 - 1 = 1122$
 $51 - 1 = 50$
 $54 - 1 = 53$
 $126 - 1 = 125$
 $-6 - 1 = -7$
 $-9 - 1 = -10$
 $-9 - 1 = -10$
 $-9 - 1 = -10$
 $-9 - 1 = -10$

$235 - 1 = 234$
 $342 - 1 = 341$
 $585 - 1 = 584$
 $1122 - 1 = 1121$
 $50 - 1 = 49$
 $53 - 1 = 52$
 $125 - 1 = 124$
 $-7 - 1 = -8$
 $-10 - 1 = -11$
 $-10 - 1 = -11$
 $-10 - 1 = -11$
 $-10 - 1 = -11$

$234 - 1 = 233$
 $341 - 1 = 340$
 $584 - 1 = 583$
 $1121 - 1 = 1120$
 $49 - 1 = 48$
 $52 - 1 = 51$
 $124 - 1 = 123$
 $-8 - 1 = -9$
 $-11 - 1 = -12$
 $-11 - 1 = -12$
 $-11 - 1 = -12$
 $-11 - 1 = -12$

$233 - 1 = 232$
 $340 - 1 = 339$
 $583 - 1 = 582$
 $1120 - 1 = 1119$
 $48 - 1 = 47$
 $51 - 1 = 50$
 $123 - 1 = 122$
 $-9 - 1 = -10$
 $-12 - 1 = -13$
 $-12 - 1 = -13$
 $-12 - 1 = -13$
 $-12 - 1 = -13$

$232 - 1 = 231$
 $339 - 1 = 338$
 $582 - 1 = 581$
 $1119 - 1 = 1118$
 $47 - 1 = 46$
 $50 - 1 = 49$
 $122 - 1 = 121$
 $-10 - 1 = -11$
 $-13 - 1 = -14$
 $-13 - 1 = -14$
 $-13 - 1 = -14$
 $-13 - 1 = -14$

$231 - 1 = 230$
 $338 - 1 = 337$
 $581 - 1 = 580$
 $1118 - 1 = 1117$
 $46 - 1 = 45$
 $49 - 1 = 48$
 $121 - 1 = 120$
 $-11 - 1 = -12$
 $-14 - 1 = -15$
 $-14 - 1 = -15$
 $-14 - 1 = -15$
 $-14 - 1 = -15$

$230 - 1 = 229$
 $337 - 1 = 336$
 $580 - 1 = 579$
 $1117 - 1 = 1116$
 $45 - 1 = 44$
 $48 - 1 = 47$
 $120 - 1 = 119$
 $-12 - 1 = -13$
 $-15 - 1 = -16$
 $-15 - 1 = -16$
 $-15 - 1 = -16$
 $-15 - 1 = -16$

$229 - 1 = 228$
 $336 - 1 = 335$
 $579 - 1 = 578$
 $1116 - 1 = 1115$
 $44 - 1 = 43$
 $47 - 1 = 46$
 $119 - 1 = 118$
 $-13 - 1 = -14$
 $-16 - 1 = -17$
 $-16 - 1 = -17$
 $-16 - 1 = -17$
 $-16 - 1 = -17$

$228 - 1 = 227$
 $335 - 1 = 334$
 $578 - 1 = 577$
 $1115 - 1 = 1114$
 $43 - 1 = 42$
 $46 - 1 = 45$
 $118 - 1 = 117$
 $-14 - 1 = -15$
 $-17 - 1 = -18$
 $-17 - 1 = -18$
 $-17 - 1 = -18$
 $-17 - 1 = -18$

$227 - 1 = 226$
 $334 - 1 = 333$
 $577 - 1 = 576$
 $1114 - 1 = 1113$
 $42 - 1 = 41$
 $45 - 1 = 44$
 $117 - 1 = 116$
 $-15 - 1 = -16$
 $-18 - 1 = -19$
 $-18 - 1 = -19$
 $-18 - 1 = -19$
 $-18 - 1 = -19$

$226 - 1 = 225$
 $333 - 1 = 332$
 $576 - 1 = 575$
 $1113 - 1 = 1112$
 $41 - 1 = 40$
 $44 - 1 = 43$
 $116 - 1 = 115$
 $-16 - 1 = -17$
 $-19 - 1 = -20$
 $-19 - 1 = -20$
 $-19 - 1 = -20$
 $-19 - 1 = -20$

$225 -$

(4)

92-5074

4-29-92

TN-1750	P H A							
LT= 10108	RT= 75647							
10108 10111	1 1536	0	512 34816	0	0			
0	0	0	0	0	0	0	0	0
8	0	7	10	15	9	13	15	13
16	19	18	13	22	12	12	14	16
24	14	15	19	21	13	12	18	15
32	20	13	20	18	16	4	14	26
40	12	13	16	21	14	20	13	14
48	21	21	15	14	12	25	18	18
56	16	13	22	32	22	23	26	23
64	32	23	19	20	20	27	27	27
72	14	22	16	28	30	29	24	24
80	22	34	32	35	21	24	37	42
88	28	38	36	31	26	45	22	30
96	24	36	40	38	47	37	38	44
104	45	30	45	36	55	41	45	48
112	47	40	44	55	52	36	61	51
120	53	59	42	39	55	54	53	64
128	49	55	56	53	50	65	68	65
136	67	64	62	72	72	60	66	73
144	89	73	75	85	85	87	97	83
152	79	86	82	89	88	97	104	106
160	113	107	102	101	126	108	112	116
168	94	111	125	111	142	138	118	153
176	156	157	140	138	171	157	165	162
184	180	173	188	225	186	207	226	221
192	228	219	214	246	254	256	237	302
200	251	285	307	280	324	300	325	283
208	310	355	291	331	340	324	342	355
216	392	401	419	431	438	406	441	474
224	501	510	513	554	604	688	676	787
232	879	1032	1103	1361	1606	1771	2157	2263
240	1874	1142	488	322	179	95	40	26
248	40	36	42	44	38	44	41	36
256	50	44	60	68	101	109	114	133
264	177	171	171	124	41	6	1	1
272	6	3	0	3	2	3	3	1
280	5	4	4	7	3	7	11	7
288	4	6	3	1	3	0	0	0
296	0	0	0	0	0	0	0	0
304	0	0	0	0	0	0	0	0
312	0	0	0	0	0	0	0	0
320	0	0	0	0	0	0	0	0
328	0	0	0	0	0	0	0	0
336	0	0	0	0	0	0	0	0
344	0	0	0	0	0	0	0	0
352	0	0	0	0	0	0	0	0
360	0	0	0	0	0	0	0	0
368	0	0	0	0	0	0	0	0
376	0	0	0	0	0	0	0	0
384	0	0	0	0	0	1	0	0
392	0	0	0	0	0	0	0	0
400	0	0	0	p				

10000 - 7000 = 3000
 10000 - 10000 = 0

10000 - 10000 = 0
 10000 - 10000 = 0

10000 - 10000 = 0
 10000 - 10000 = 0

14310

Americium A/C.....7-40.65

Customer : T.E.JONES Date Received : 04/ 06/ 92 Work order : M-99911 ARF(SOW) : TI-HSP-WINDOW E

A.L.O. No. : 92-5074 Description : VIAL 1212

#77 #28 #40

DF

--- 0.8379 g → 250 ml --- 0.99832 ml → 0.49757 ml --- 2(0.10023) ml ---

Pipet LRB BMW Page(s) No. _____

Std LRB BMW Page(s) No. _____

M. & T.E. _____

Standard card ID 5-Am-PJR, 4-6-92

Blank card ID B-Am-PJR, 4-6-92

Analyst

PJRaney

Date 4-8-92
10

Analysts Yield Factor +/- _____

	Am-241,243	Am-241	M. & T.E. Log Book:	WM00582 BMW52341 p 23	WA42546 BMW52825 p	WA BMW52343 p
			Instrument	P.A.C. - 2	G.E. ASC.	Ludlum -
			Eff. Factor	0.5050	0.37927	0.4
			Date	4/16/92		
Total counts			Total counts	7900		
edge correction			Count time	100"		
Background			Bkg C/M	1.79		
Net counts			Bkg cnt time	100"		
Alpha fract			Corrected C/M	77.21		

Analyst

Anne C. H. Hickey

$$\frac{77.21 \text{ cpm} (250 \text{ ml}) (0.49757 \text{ ml})}{0.8379 \text{ g} (0.5050 \text{ g}) (0.99832 \text{ ml}) (0.20046 \text{ ml})} = 1.1342 \text{ E} + 5$$

c/d 2-8-92

adjusted for spike yield (.9646 H. solvent)

Col. Harvey 5-7-92

$$\begin{aligned} 241 \text{ Am} &= 1.0435 \text{ E} + 5 \\ \times 0.920 &= 1.0818 \text{ E} + 5 \\ 243,244 \text{ Cm} &= 8.6199 \text{ E} + 3 \\ \times 0.076 &= 8.937 \text{ E} + 3 \\ 242 \text{ Cm} &= 3.4026 \text{ E} + 2 \\ \times 0.003 &= 3.521 \text{ E} + 2 \end{aligned}$$

R. Barrington 5-4-92

92074

Americium A/C.....7-40.65

Customer : T.E.JONES Date Received : 04/ 06/ 92 Work order : M-99911 ARF(SOW) : TI-HSP-WINDOW E

A.L.O. No. : 92-5076 Description : VIAL 1213

#77 #28 H90

DF

--- 0.6253 --> 2.50 ml --- 0.99832 --> 0.49757... 2(0.10023) ---

Pipet LRB 8MW Page(s) No. _____

Std _____ LRB 8MW Page(s) No. _____

M. & T.E. _____

Standard card ID S-Am-PJR, 4-6-92

Blank card ID B-Am-PJR, 4-6-92

Analyst

Date 4-8-92
10

Analysts Yield Factor +/- _____

	Cm-241,243	Am-241	M. & T.E.	UN00582	WA42546	WA
			Log Book:	BNW52341 p 13	BNW52825 p	BNW52343 p
			Instrument	P.A.C. - 2	G.E. ASC.	Ludlum -
			Eff. Factor	0.50 50	0.37927	0.4
			Date	4/13/92	1/1	1/1
Total counts			Total counts	5460		
edge correction			Count time	100"		
Background			Bkg C/M	1.21		
Net counts			Bkg cnt time	100"		
Alpha fract			Corrected C/M	52.89		

Analyst

Steve C. C. C.

$$\frac{52.89 \text{ (250 ml)} (0.49757 \text{ ml})}{0.5050 (0.6253 \text{ g}) (0.99832 \text{ ml}) (0.20046 \text{ ml})} = 1.0411 \text{ E}+3$$

adjusting for spike yield (Historical .7646)

$$\frac{241 \text{ Am}}{K0.950} = 9.8904 \text{ E}+4$$

$$\frac{241 \text{ Am}}{K0.048} = 4.9979 \text{ E}+3$$

$$\frac{241 \text{ Am}}{K0.002} = 2.0822 \text{ E}+2$$

$$C_{\text{Am}}^{241} = 1.025 \text{ E}+5 \frac{\text{dpm}}{\text{g}}$$

$$C_{\text{Am}}^{243+244} = 5.157 \text{ E}+3$$

$$C_{\text{Am}}^{241} = 2.159 \text{ E}+2$$

Zybaring 5-482

G. C. C. 5-7-92

① 92.5076
4-28-92

TN-1750 P H A
LT= 10108 RT= 75647

10108	10111	1	0	0	512	34816	0	0	
0	0	0	0	0	0	0	0	0	0
8	0	3	8	9	2	4	13	7	
16	13	7	11	4	8	6	10	11	
24	12	7	8	10	9	8	8	15	
32	8	13	9	6	5	8	14	15	
40	14	7	17	20	8	18	15	24	
48	11	10	21	19	16	14	22	17	
56	14	19	11	16	12	16	11	11	
64	30	11	15	13	8	15	12	15	
72	10	19	14	11	18	19	16	21	
80	23	14	26	10	19	30	21	21	
88	26	20	18	20	26	23	18	26	
96	26	23	25	26	30	23	32	25	
104	29	26	28	35	20	35	28	27	
112	32	32	35	22	40	38	28	42	
120	31	37	32	40	38	41	33	48	
128	30	46	42	62	68	49	46	54	
136	50	46	55	47	59	57	56	60	
144	62	59	61	75	68	77	89	75	
152	66	75	77	83	72	84	84	91	
160	93	100	93	104	89	81	89	99	
168	92	104	98	105	109	100	121	113	
176	105	116	115	112	140	122	115	132	
184	141	148	146	144	156	163	162	178	
192	184	189	159	208	198	207	238	201	
200	214	218	222	272	259	260	258	273	
208	260	272	295	294	301	322	360	378	
216	343	379	368	435	415	442	499	500	
224	533	536	610	604	666	701	746	844	
232	933	1067	1097	1114	1118	1055	758	351	
240	189	138	59	26	22	14	55	19	
248	23	17	26	25	27	18	33	32	
256	26	44	44	41	38	66	66	55	
264	42	20	1	1	1	0	0	0	
272	0	2	2	1	2	2	3	2	
280	0	1	4	2	4	2	4	2	
288	2	0	0	1	0	0	0	0	
296	0	0	0	0	0	0	0	0	
304	0	0	0	0	0	0	0	0	
312	0	0	0	0	0	0	0	0	
320	0	0	0	0	0	0	0	0	
328	0	0	0	0	0	0	0	0	

3.95
7076 - 1000 - 95 = 7076
3.96 - 1 - 0 = 3.96
2.147
2.1 - 1 - 0 = 2.1
0.002
1289

92074

Americium A/C.....7-40.65

Customer : T.E. JONES Date Received : 04/ 06/ 92 Work order : M-99911 ARF(SOW) : TI-HSP-WINDOW E

A.L.O. No. : 92-5080 Description : VIAL 1298

DF --- 0.7021 g --> 250 ml. --- 0.99832 ml --> 0.49757 ml ... 2(0.10023) ml ...
 #77 #28 #90 Re-plated 4-14-92
 #88-0.04936ml

Pipet LRB BMW Page(s) No. _____

Std LRB BMW Page(s) No. _____

M. & T.E. _____

Standard card ID S-Am, PGR, 4-6-92

Blank card ID B-Am - PGR, 4-6-92

Analyst PJ Roney Date 4-8-92
10
14

Analysts Yield Factor +/- _____

	Cm-241,243	Am-241	M. & T.E.	WM005 79	WA42546	WA
			Log Book:	BMW52341 p 23	BMW52825 p	BMW52343 p
			Instrument	P.A.C. - 1	G.E. ASC.	Ludlum -
			Eff. Factor	0.50 90	0.37927	0.4
			Date	4/15/92	1/1	1/1
Total counts			Total counts	2275		
edge correction			Count time	100"		
Background			Bkg C/M	0.40		
Net counts			Bkg cnt time	100"		
Alpha fract			Corrected C/M	22.35		

Analyst Anna E. Roney

$$\frac{22.35 \text{ cpm} (250 \text{ ml})(0.49757 \text{ ml})}{0.509026 (0.7021 \text{ g})(0.99832 \text{ ml})(0.04936 \text{ ml})} = 1.5787 \text{ E}+5 \text{ d/m/g}$$

4/18/92

adjusted for spike 9.14 (historical ave) of 96.46%

$$C_m^{241} = 1.54 \text{ E}+5 \text{ d/m/g}$$

$$C_m^{243,244} = 8.67 \text{ E}+3 \text{ "}$$

$$C_m^{242} = 7.82 \text{ E}+2 \text{ "}$$

CO Harvey 5-7-92

$$\begin{aligned} & \frac{241 \text{ Am}}{0.941} = 1.4856 \text{ E}+5 \\ & \frac{243,244 \text{ Cm}}{0.053} = 8.3671 \text{ E}+3 \\ & \frac{242 \text{ Cm}}{0.006} = 9.4722 \text{ E}+2 \end{aligned}$$

Rybanington 3-4-92

92-5080
4-29-92

0	0	0	0	0	0	0	4	1
8	1	1	1	2	0	0	1	3
16	1	1	3	0	1	2	0	2
24	1	1	3	1	2	0	3	1
32	0	3	2	1	2	0	2	2
40	0	3	0	4	1	2	2	2
48	3	1	2	4	2	2	3	1
56	2	0	1	1	2	0	3	0
64	3	2	4	5	5	2	1	1
72	4	1	3	1	8	7	2	3
80	4	5	3	3	6	2	1	4
88	3	8	6	5	4	2	5	4
96	4	8	6	6	8	6	12	4
104	8	1	6	5	3	4	7	4
112	5	7	5	10	4	9	9	5
120	8	5	6	7	4	11	10	11
128	9	7	5	10	12	7	9	12
136	16	8	15	14	16	12	13	13
144	13	12	13	17	12	25	17	16
152	12	17	14	24	20	19	15	17
160	21	18	22	20	25	25	19	35
168	23	35	19	26	31	35	39	42
176	43	23	36	33	43	38	36	52
184	54	43	60	45	47	57	69	54
192	62	60	82	71	60	65	63	83
200	81	77	100	82	106	93	94	101
208	106	116	129	130	116	123	147	138
216	145	152	156	157	182	185	212	223
224	223	242	260	264	350	323	403	461
232	492	616	638	691	497	224	123	92
240	35	22	11	7	4	9	10	8
248	9	10	11	9	14	12	14	20
256	19	19	27	29	26	24	36	40
264	36	14	1	1	2	1	2	2
272	3	1	0	1	1	1	3	3
280	3	5	6	6	0	2	0	1
288	0	1	3	1	1	0	0	0
296	0	0	0	0	0	0	0	0
304	0	0	0	0	0	0	0	0
312	0	0	0	0	0	0	0	0
320	0	0	0	0	0	0	0	0
328	0	0	0	0	0	0	0	0
336	0	0	0	0	0	0	0	0
344	0	0	0	0	0	0	0	0
352	0	0	0	0	0	0	0	0
360	0	0	0	0	0	0	0	0
368	0	0	0	1	0	0	0	0
376	0	0	0	0	0	0	0	0
384	0	0	0	0	0	0	0	0
392	0	0	0	0	0	0	1	0
400	1	0	0	0	0	0	2	0

Americium A/C.....7-40.65

92074

Customer : T.E. JONES Date Received : 04/ 06/ 92 Work order : M-99911 ARF(SOW) : TI-HSP-WINDOW E

A.L.O. No. : 92-5086 Description : VIAL 1204

DF --- 0.5623 --> 250 ml --- 0.99832 --> 0.49757 --- 2(0.10023) ...
 #77 #28 #90 ← Replated 4-14-92
 #92 - 0.10023
 #90. ml

Pipet LRB BMW Page(s) No. _____

Std LRB BMW Page(s) No. _____

M. & T.E. _____

Standard card ID S-Am, *PGR*, 4-6-92 Blank card ID B-Am, *DR*, 4-6-92

Analyst *PG Roney* Date 4-8-92
 10
 14

Analysts Yield Factor +/- _____

Cm-241,243	Am-241	M. & T.E. Log Book:	UM005 <i>29</i> BNW52341 p <i>23</i>	WA42546 BNW52825 p	WA BNW52343 p
		Instrument	P.A.C. <i>1</i>	G.E. ASC.	Ludlum
		Eff. Factor	0.50 <i>10</i>	0.37927	0.4
		Date	4/15/92		
Total counts		Total counts	9141		
edge correction		Count time	100		
Background		Bkg C/M	0.40		
Net counts		Bkg cnt time	100		
Alpha fract		Corrected C/M	91.01		

Analyst *Wm. J. H. Clark*

$$\frac{91.01 \text{ cpm} (250 \text{ ml}) (0.49757 \text{ ml})}{(0.9090 \text{ g}) (0.5623 \text{ g}) (0.99832 \text{ ml}) (0.10023 \text{ ml})} = 3.953 \text{ E}+5$$

c/kg 7-29-92

adjusted for same yield (.9646 Historical)

$$\begin{aligned} 241 \text{ Am} &= 3.7672 \text{ E}+5 \\ \times 0.953 & \div .9646 = 3.70 \text{ E}+5 \\ 243,244 \text{ Cm} &= 1.7393 \text{ E}+4 \\ \times 0.044 & \div .9646 = 1.80 \text{ E}+4 \\ 242 \text{ Cm} &= 1.1859 \text{ E}+3 \\ \times 0.003 & \div .9646 = 1.22 \text{ E}+3 \end{aligned}$$

W. J. H. Clark 5-4-92

60 Roney

⑦

7

92-5086
4-29-92

TN-1750 P H A

LT= 10108 RT= 75647

10108	10111	1	3072	0	512	34816	0	0
0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0
16	0	0	0	0	1	7	6	6
24	4	1	10	7	3	6	6	11
32	5	7	5	11	2	14	3	6
40	8	10	6	8	5	5	5	7
48	6	5	8	8	9	7	12	9
56	4	10	6	6	10	9	9	8
64	8	12	9	10	12	16	10	8
72	9	14	12	10	8	8	6	12
80	8	18	12	8	15	19	12	21
88	16	9	17	17	12	14	16	13
96	14	17	9	14	10	22	17	16
104	17	18	16	23	19	28	15	25
112	24	21	27	21	26	19	23	13
120	24	23	25	23	33	37	42	28
128	31	30	30	35	33	30	35	39
136	35	41	46	50	49	33	54	33
144	41	51	54	53	50	50	44	63
152	64	57	56	58	68	68	83	56
160	75	72	62	76	77	86	85	88
168	--	84	91	102	115	106	100	120
176	111	133	107	124	148	126	138	153
184	167	146	169	165	169	190	200	215
192	202	196	236	210	211	249	273	257
200	251	266	275	294	301	322	346	332
208	367	371	371	392	417	405	408	426
216	431	466	534	532	553	580	591	658
224	649	722	773	780	797	848	900	935
232	962	1115	1165	1313	1392	1497	1682	1980
240	2117	2419	2479	2659	1844	876	482	293
248	142	47	22	24	40	28	40	42
256	32	32	61	53	47	48	60	69
264	70	83	105	95	96	135	102	89
272	20	1	3	0	2	2	2	7
280	4	2	2	2	4	3	4	9
288	3	5	4	7	6	8	10	6
296	3	4	0	0	1	0	0	0
304	0	0	1	2	3	1	2	0
312	0	0	0	0	0	0	0	0
320	0	0	0	0	0	0	0	0
328	0	0	0	0	0	0	0	1
336	0	0	0	0	0	0	0	1
344	1	1	0	1	5	4	0	0
352	0	2	0	0	0	0	0	0
360	0	0	0	0	0	0	0	0
368	0	0	0	0	0	0	0	0

408-544
77 1,963
10077-93-20 = 1,507
775-4-1 = 771
0.100
17228

92074

Americium A/C.....7-40.65

Customer : T.E. JONES Date Received : 04/ 06/ 92 Work order : M-99911 ARF(SOW) : T1-HSP-WINDOW E

A.L.O. No. : 92-5087 Description : VIAL 1206

#77

#28

#90

Re-plated 7-14-92
BGR #90 - 0.10023 ml.

DF

... 0.5733 → 250
g ml.... 0.99832 → 0.49757 ... 2(0.10023) ...
ml. ml. ml. ml.Re-plated 4-16-92
BGR #77 0.04936 ml
Cott

Pipet LRB BW Page(s) No. _____

Std _____ LRB BW Page(s) No. _____

M. & T.E. _____

Standard card ID S-Am-BGR, 4-6-92

Blank card ID B-Am-BGR 4-6-92

Analyst BGR Date 4-8-92
10
14

Analysts Yield Factor _____ +/- _____

Cm-241, 243		Am-241	M. & T.E.	WM005 <u>82</u>	WA42546	WA
			Log Book:	BNW52341 p <u>23</u>	BNW52825 p	BNW52343 p
			Instrument	P.A.C. - <u>2</u>	G.E. ASC.	Ludlum -
			Eff. Factor	0.50 <u>50</u>	0.37927	0.4
			Date	<u>4/16/92</u>		
Total counts			Total counts	<u>4792</u>		
edge correction			Count time	<u>100"</u>		
Background			Bkg C/M	<u>1.79</u>		
Net counts			Bkg cnt time	<u>100"</u>		
Alpha fract			Corrected C/M	<u>46.13</u>		

Analyst Wm. E. Hickey

$$\frac{46.13 \text{cpm} (250 \text{ml}) (0.49757 \text{ml})}{0.5050 \text{d/c} (0.5733 \text{g}) (0.99832 \text{ml}) (0.04936 \text{ml})} = 4.0222 \text{E} + 5 \text{d/ml/g}$$

a/d 7-29-92
adjust for yield (96.46 Historic)

241 Am = 3.8814 E+5
 $\frac{248,244 \text{ cpm}}{242 \text{ cm}} = 96.46 = 4.024 \text{E} + 5$
 $\frac{248,244 \text{ cpm}}{242 \text{ cm}} = 1.4078 \text{E} + 5$
 $\frac{248,244 \text{ cpm}}{242 \text{ cm}} = 1.4078 \text{E} + 5$
 242 cm - absent
 Ribarington 5-4-92
 as Haver 5-7-92

(13)

92-5087
4-29-92

TN-1750	P H A	LT= 10875	RT= 76411	1	2048	0	512	34816	0	0
0	0	0	0	0	0	0	0	0	0	2
8	3	0	0	0	1	0	1	0	1	2
16	0	2	3	0	0	0	1	0	1	1
24	2	0	1	1	1	2	1	0	1	1
32	2	0	0	1	1	1	1	1	1	1
40	0	0	0	0	0	0	2	1	0	0
48	0	3	1	2	1	1	1	2	3	3
56	1	2	1	0	0	0	0	0	0	0
64	1	0	3	3	0	0	0	0	2	2
72	1	0	0	2	3	0	0	0	1	1
80	2	2	1	2	2	0	0	2	1	0
88	1	2	1	0	1	0	1	1	0	0
96	1	0	1	2	2	2	2	2	0	0
104	0	0	0	2	2	1	1	2	1	1
112	1	0	3	2	0	1	1	1	1	1
120	1	1	1	1	1	3	2	2	2	2
128	1	2	2	4	2	2	2	2	2	2
136	3	2	1	2	2	2	2	2	2	2
144	5	4	3	2	2	4	2	2	4	4
152	2	2	1	3	3	3	4	1	1	1
160	5	2	1	3	2	8	5	8	6	6
168	7	5	12	9	8	9	9	12	28	28
176	6	6	3	9	10	6	9	37	54	54
184	11	14	16	9	16	8	13	130	279	279
192	23	20	23	18	18	19	25	1280	412	412
200	27	31	35	41	44	39	64	9	28	28
208	56	56	65	77	93	90	105	80	0	0
216	137	157	166	209	188	251	263	1	1	1
224	392	452	488	676	716	921	1099	3	4	3
232	1638	1862	2067	2419	2586	1754	749	0	0	0
240	255	95	42	12	4	3	8	0	0	0
248	5	13	12	13	11	21	20	0	0	0
256	33	36	44	62	67	81	72	0	0	0
264	71	50	10	0	2	0	1	0	0	0
272	0	0	2	1	0	0	0	0	0	0
280	1	1	5	2	3	5	4	0	0	0
288	3	5	3	8	0	1	0	0	0	0
296	0	0	0	0	0	0	0	0	0	0
304	0	0	0	0	0	0	0	0	0	0
312	0	0	0	0	0	0	0	0	0	0
320	0	0	0	0	0	0	0	0	0	0
328	0	1	0	0	0	0	0	0	0	0
336	0	0	0	0	0	1	0	0	0	0
344	0	1	0	0	1	0	0	0	0	0
352	0	0	0	0	0	0	0	0	0	0
360	0	0	1	0	0	0	0	0	0	0
368	0	0	0	0	0	0	0	0	0	0
376	0	0	0	0	0	0	0	0	0	0
384	0	0	0	0	0	0	0	0	0	0
392	0	0	0	0	0	0	0	0	0	0
400	0	0	0	0	0	0	0	0	0	0
408	0	0	0	0	0	0	0	0	0	0
416	0	0	0	0	0	0	0	0	0	0

92074

A.L.O. No. : 92-5092 Description : VIAL 1309

DF

Pipet LRB BMW Page(s) No.

Std	LRB BNU	Page(s) No.

M. & T.E.

Standard card ID S-Am-100 4-6-97 Blank card ID B-Am-100 4-6-97

Analyst DJ Loney Date 4-8-92
10
14

Analysts Yield Factor _____ +/- _____

			M. & T.E.	WM00582	WA42546	WA
	CM-241,243	Am-241	Log Book:	BNW52341 p 23	BNW52825 p	BNW52343 p
			Instrument	P.A.C. - 2	G.E. ASC.	Ludlum -
			Eff. Factor	0.5050	0.37927	0.4
			Date	4/15/92		
Total counts			Total counts	152.54		
edge correction			Count time	100"		
Background			Bkg C/M	1.79		
Net counts			Bkg cnt time	100"		
Alpha fract			Corrected C/M	1.50 .75		

Analyst Anne E. G. Smith

$$\frac{150.75 \text{ ppm} (250 \text{ ml}) (0.49757 \text{ ml})}{0.5050 \text{ g} (0.6161 \text{ g}) (0.99832 \text{ ml}) (0.10023 \text{ ml})} = 6.0234 \text{ E} + 5$$

adjusting for Spike yield (9646 Historical)

$$\begin{aligned} A_{241} &= 5.93 \text{ E} + 2 \text{ } \frac{\text{dpm}}{\text{g m}} \\ C_{243+244} &= 2.94 \text{ E} + 2 \text{ } \frac{\text{dpm}}{\text{g m}} \\ C_{242} &= 1.57 \text{ E} + 3 \text{ } \frac{\text{dpm}}{\text{g m}} \end{aligned}$$

$$\begin{aligned} \frac{241 \text{ cm}}{0.95} &= 5.7222 \text{ E}+5 \\ \frac{240.24 \text{ cm}}{0.047} &= 2.831 \text{ E}+4 \\ \frac{242 \text{ cm}}{0.003} &= 1.807 \text{ E}+3 \end{aligned}$$

R. Barrington 5-4-92

Col Harvey 5-7-22

②

92-5092

4-29-92

TN-1750 P H A

LT= 10108 RT= 75647

10108	10111	1	512	0	512	34816	0	0	
0	0	0	0	0	0	0	0	0	0
8	0	3	26	20	25	29	27	38	
16	26	30	41	21	22	30	31	21	
24	38	31	34	31	29	33	35	41	
32	40	33	40	31	30	37	36	34	
40	41	40	34	47	46	54	42	37	
48	38	40	39	40	36	43	44	46	
56	41	49	40	52	51	46	54	39	
64	53	52	50	53	55	56	60	47	
72	42	49	49	66	45	58	66	55	
80	70	42	62	63	61	63	65	83	
88	76	84	72	71	59	63	74	92	
96	68	88	75	90	80	64	73	90	
104	89	99	103	92	89	93	82	89	
112	82	99	99	81	105	103	104	101	
120	105	126	112	120	129	112	123	119	
128	108	131	142	118	150	159	134	138	
136	141	161	136	164	183	143	168	188	
144	173	186	190	214	198	184	187	210	
152	179	190	218	209	226	229	228	255	
160	263	250	251	283	279	294	298	266	
168	311	333	318	355	350	362	352	378	
176	376	381	415	428	442	423	447	456	
184	499	527	541	550	491	561	578	553	
192	619	557	646	697	644	672	713	713	
200	753	765	828	805	851	868	864	858	
208	878	886	861	948	919	914	998	1055	
216	1025	1062	1127	1096	1214	1236	1294	1363	
224	1333	1420	1549	1688	1913	2101	2420	2622	
232	3075	3534	4112	4939	5695	6292	6218	4790	
240	2409	1249	683	322	113	77	65	65	
248	52	79	81	50	80	84	81	114	
256	138	141	183	192	273	281	316	277	
264	232	72	7	4	5	3	4	2	
272	9	4	5	5	5	5	9	10	
280	10	16	13	25	20	17	13	7	
288	3	1	0	0	0	0	0	0	
296	0	0	0	1	0	1	0	0	
304	0	0	0	0	0	0	0	0	
312	0	0	0	0	0	0	0	0	
320	0	0	0	0	0	0	0	1	
328	0	0	3	1	0	0	0	0	

0.247
 $277 \times 12 - 182 - 601 = 37072$
 10047
 $12 - 4 = 8$
 1952
 0.003
 124
 39248
 78

Americium A/C.....7-40.65

A.L.O. No. : 92-5093 Description : VIAL 1310

DF

... 0.5648 g → 250 ml. #77 #28 #90 ← Re-plated #90 4-4-92 age
 ... 0.49832 ml. → 0.49757 ml 2(0.10023) ml ... 0.10023 ml

Pipet LRB BNU Page(s) No.

Std _____ LR8 BNV _____ Page(s) No. _____

M. & T.E. _____

Standard card ID 5-Am-19K 4-6-92 Blank card ID B-Am-19K 4-6-92

Analyst VJ Koney Date 4-8-92
10
14

Analysts Yield Factor _____ +/- _____

			M. & T.E.	W005 <u>82</u>	W442546	WA
Co-241,243	Am-241	Log Book:		BW52341 p <u>73</u>	BW52825 p	BW52343 p
		Instrument	P.A.C. - <u>2</u>	G.E. ASC.	Ludlum -	
		Eff. Factor	0.50 <u>50</u>	0.37927	0.4	
		Date	<u>4/15/92</u>	<u>1/1/</u>	<u>1/1/</u>	
Total counts		Total counts	<u>9906</u>			
edge correction		Count time	<u>100"</u>			
Background		Bkg C/M	<u>1.79</u>			
Net counts		Bkg cnt time	<u>100"</u>			
Alpha fract		Corrected C/M	<u>97.27</u>			

Analyst Mrs. E. K. Lister

97.27 cpm (250 ml) (0.49757 ml)

0.5050 gpc (0.5648 g) (0.99832 ml) (0.10023 ml)
0.6767-29-92

adjusted for spike yield (1966 historical)

$$A_m^{241} = 4.2065 \pm 5 \text{ g cm}^{-3}$$
$$C_m^{243 \text{ to } 254} = 1.758 \text{ E} + 4$$
$$\rho_{\text{un}}^{242} = 1.3186 \text{ E}+3$$
$$\frac{4.2395 \text{E}+5}{\times 0.95} = 4.0572 \text{E}+5$$
$$\frac{273,244 \text{ cm}}{\times 0.040} = 1.6958 \text{E}+4$$
$$\frac{242 \text{ Cm}}{\times 0.003} = 1.2719 \text{ E} + 3$$

Ry Barrington 5-4-92

60 Harvey 5-8-92

Don't use
(6) + (3)

3

92-5083 replate

4-29-92

TN-1750 P H A

LT= 28277 RT= 28278

28277	28278	0	1024	0	512	34816	0	0	
0	0	0	0	0	0	0	0	0	0
8	0	0	1	1	1	1	1	0	0
16	0	1	2	2	2	1	7	3	3
24	1	3	2	5	0	0	2	2	3
32	0	4	4	1	4	4	1	3	1
40	1	1	3	0	3	0	0	5	1
48	3	3	1	3	3	0	0	3	1
56	6	4	0	2	1	3	4	4	6
64	6	2	2	1	4	2	2	2	0
72	4	4	7	5	2	5	2	2	2
80	5	2	6	5	7	2	4	4	6
88	4	2	1	3	3	6	3	3	2
96	4	5	4	2	3	10	3	3	3
104	3	6	1	7	6	7	5	7	7
112	10	4	9	12	8	9	4	4	6
120	8	8	13	4	4	5	10	8	8
128	5	7	12	13	12	6	15	9	9
136	14	10	10	12	9	5	10	11	11
144	13	11	11	13	8	13	17	16	16
152	20	10	9	10	16	21	20	11	11
160	22	12	14	26	26	27	27	24	24
168	19	27	24	32	30	24	25	37	37
176	33	31	34	34	42	45	33	44	44
184	47	34	46	50	48	51	49	45	45
192	56	58	74	55	61	66	48	80	80
200	73	68	87	82	108	94	94	93	93
208	113	143	132	125	128	149	145	149	149
216	188	167	190	200	210	245	223	281	281
224	281	270	274	317	302	340	368	388	388
232	483	527	547	601	650	800	869	968	968
240	989	1173	1113	719	380	197	132	44	44
248	16	12	8	9	9	9	13	16	16
256	11	13	17	12	17	32	31	33	33
264	32	44	33	39	50	43	33	21	21
272	1	1	1	2	0	1	0	1	1
280	1	1	1	0	3	4	3	2	2
288	2	2	5	3	3	4	7	3	3
296	2	2	0	0	0	0	0	0	0
304	0	0	0	1	1	0	0	0	0
312	0	0	0	1	0	0	0	0	0
320	0	0	0	0	0	0	0	0	0
328	0	0	0	0	0	0	0	0	0
336	0	0	0	0	0	1	0	0	0
344	0	0	0	0	0	0	0	0	0
352	0	1	1	0	0	0	0	0	0
360	0	0	0	0	0	0	0	0	0

21-15-4
 7231-22 -18-7237
 304-1-0 - 304
 24-0-1 = 24
 7565

Americium A/C.....7-40.65

92105

Customer : _____ Date Received 0/ 0/ 0 Work order : _____ ARF(SOW) : _____

A.L.O. No. Am-BLANK Description : _____
(*Reagent*)

DF ---- .99832 ---> .49757 ---- .20046

Dilution Factor = 2.4863E+00 +/- 1.11%

Analysts Yield Factor .9646 +/- 6.0%

Handwritten: 3, 4, 241, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000

M. & T.E.	UM005	UA42546	UA
Log Book:	BMV52341 p	BMV52825 p	BMV52343 p
Instrument	P.A.C. -	G.E. ASC.	Ludlum -
Eff. Factor	.4220	0.37927	0.4
Date	4/ 15/ 92		
Total counts	0	1	73
Edge Bkg	0	0	
System Bkg	0	0	
Net counts	.0	1.0	
A fraction	.0000	1.0000	
Bkg C/M			.156
Bkg cnt time			900
Corrected C/M			.03

* Only Americium-241 detected

Calculation and Results

	Activities dpm/ML	Uncertainties %	Less than dpm/ML	MDA dpm/ML
<i>3 4</i> Am-241 & 243	0.00E+00	160.8	4.48E-01	5.03E-01
Am-241	1.90E-01	160.8	4.48E-01	5.03E-01

Calculated by G O Harvey Date 5-13-92

Reviewed by _____ Date _____

B-Am- , 4-6-92

Americium A/C.....7-40.65

0

Customer: TE Jones Date Received: 04/04/92 Work order: M999/11 ARF(SOW): WENDONE ^{TE-HSP-}

A.L.O. No.: Am Blank Description: 1X KOH Fusion Solution (Simulated)
#77 #28 #90

DF

--- 0.99832 ---> 0.49757 --- 2(0.10000) ---
Sim. ml. ml.

1X KOH Fusion Solution

Pipet LRB BMW _____ Page(s) No. _____

Std _____ LRB BMW _____ Page(s) No. _____

M. & T.E. _____

Standard card ID S-Am-BR, 4-6-92 Blank card ID B-Am-BR 4-6-92

Analyst PJ Roney Date 4-8-92
18

Analysts Yield Factor _____ +/- _____

	M. & T.E.	WM005	WA42546	WA82319
Cm-241,243	Am-241	Log Book:	BNW52341 p	BNW52825 p
			BNW52343 p	174
	Instrument	P.A.C. -	G.E. ASC.	Ludlum - 6
	Eff. Factor	0.50	0.37927	0.4222
	Date			4/15/92
Total counts				73
edge correction				390"
Background				0.156
Net counts				900"
Alpha fract				0.031

Analyst June & Haglisky

92074

Americium A/C.....7-40.65

Customer : T.E. JONES Date Received 4/ 6/ 92 Work order : M-99911 ARF(SQM) : TI-HSP-WINDOW E
 A.L.O. No. 92-5688 Description : METHODS BLANK

DF ---- .99832 ---> .49757 ---- .20046

Dilution Factor = 2.4863E+00 +/- 1.11%

Analysts Yield Factor .9646 +/- 6.0%

3 4/7/92
~~Am-241, 243~~ | Am-241

M. & T.E. | WM005 | WA42546 | WA
 Log Book: | BNW52341 p | BNW52825 p | BNW52343 p

Instrument | P.A.C. - I | G.E. ASC. | Ludlum -
 Eff. Factor | .5090 | 0.37927 | 0.4

Total counts	376	349	Date	4/ 13/ 92		
Edge Bkg	25	0	Total counts	292		
System Bkg	3	0	Count time	100		
Net counts	348.0	349.0	Bkg C/M	.450		
A fraction	.4993	.5007	Bkg cnt time	100		
			Corrected C/M	2.47		

Calculation and Results

	Activities dpm/ml	Uncertainties %	Less than dpm/ml	MDA dpm/ml
<i>Am 241</i> Am-241 & 243	6.25E+00	22.2	8.69E-01	1.74E+00
<i>Calc</i> <i>5-8-92 Am-241</i> <i>243 & 244</i> <i>Cm</i>	6.26E+00	22.2	8.69E-01	1.74E+00

Calculated by L. O. Harvey Date 5-8-92

Reviewed by R. Barrington Date 5-8-92

92074

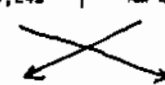
Americium A/C.....7-40.65

Customer : T.E.JONES Date Received 4/ 6/ 92 Work order : M-99911 ARF(SOW) : TI-HSP-WINDOW E
 A.L.O. No. 92-5688 Description : METHODS BLANK

DF ---- .99832 ---> .49757 ---- .20046

Dilution Factor = 2.4863E+00 +/- 1.11%

Analysts Yield Factor .9646 +/- 6.0%

Ca-241,243 Am-241 	M. & T.E.	WM005	WA42546	WA
	Log Book:	BNW52341 p	BNW52825 p	BNW52343 p
	Instrument	<u>Ludlum</u>	G.E. ASC.	Ludlum
	Eff. Factor	.4217	0.37927	0.4
	Date	4/ 16/ 92		
Total counts	376	349	Total counts	1020
Edge Bkg	25	0	Count time	450
System Bkg	3	0	Bkg C/M	.201
Net counts	348.0	349.0	Bkg cnt time	900
A fraction	.4993	.5007	Corrected C/M	2.07

Calculation and Results

	Activities dpm/ml	Uncertainties %	Less than dpm/ml	MDA dpm/ml
<i>Am-241</i>				
<i>Ca-241 + 243</i>	6.30E+00	18.1	2.71E-01	5.42E-01
<i>Ca-243 + 244</i>	6.32E+00	18.1	2.71E-01	5.42E-01

Calculated by LO Harvey Date 5-8-92

Reviewed by Subasingh Date 5-8-92

Americium A/C.....7-40.65

92074

Customer : T.E. JONES Date Received : 04/ 06/ 92 Work order : M-99911 ARF(SOW) : T1-HSP-WINDOW E

A.L.O. No. : 92-5688 Description : METHODS BLANK

#177 #128 #190

DF ... Blank --> 250 ml. ... 0.99832 ml. --> 0.49757 ml. ... 2(0.10023) ml. ...

Pipet LRB BMW Page(s) No. _____

Std LRB BMW Page(s) No. _____

M. & T.E. _____

Standard card ID S-Am-PJR, 4-6-92

Blank card ID B-Am-PJR, 4-6-92

Analyst PJR Date 4-8-92
10

Analysts Yield Factor +/- _____

Total counts	edge correction	Background	Net counts	Alpha fract	M. & T.E. Log Book:	LM005 79	WA42546	WA82314
						BNW52341 p 23	BNW52825 p	BNW52343 p 144
Total counts	edge correction	Background	Net counts	Alpha fract	Instrument Eff. Factor	P.A.C. - 1	G.E. ASC.	Ludlum - 1
						0.5090	0.37927	0.4217
Total counts	edge correction	Background	Net counts	Alpha fract	Date	4/13/92	1/1	4/16/92
						292	1020	450
Total counts	edge correction	Background	Net counts	Alpha fract	Count time	100"	0.45	0.201
						100"	900"	2.006
Total counts	edge correction	Background	Net counts	Alpha fract	Bkg C/M	2.47	2.47	2.006
						2.47	2.47	2.006
Total counts	edge correction	Background	Net counts	Alpha fract	Bkg cnt time	2.47	2.47	2.006
						2.47	2.47	2.006
Total counts	edge correction	Background	Net counts	Alpha fract	Corrected C/M	2.47	2.47	2.006
						2.47	2.47	2.006

Analyst PJR

$$\frac{2.066 \text{ epm} (250 \text{ ml}) (0.49757 \text{ ml})}{0.4217 \text{ d/c} (0.99832 \text{ ml}) (0.20046 \text{ ml})} = 3.0448 \text{ E+3 dpm/sample}$$

adjusted for decay (7.29-92) (7.646 H. historic)

$$\begin{aligned} 241 \text{ Am} &= 1.5204 \text{ E+3} \\ 243 \text{ Am} &= 1.5777 \text{ E+3} \\ 244 \text{ Am} &= 1.576 \text{ E+3} \\ 245 \text{ Am} &= 1.5248 \text{ E+3} \\ 246 \text{ Am} &= 1.5777 \text{ E+3} \\ 247 \text{ Am} &= 1.5777 \text{ E+3} \\ 248 \text{ Am} &= 1.5777 \text{ E+3} \\ 249 \text{ Am} &= 1.5777 \text{ E+3} \\ 250 \text{ Am} &= 1.5777 \text{ E+3} \end{aligned}$$

See
Computer calc
for dpm/ml

Ribarrington 15-4-92

(12)

92-5688

4-29-92

TN-1750 P H A

LT= 10875 RT= 76411

10875 10875 1 1536

	0	512	34816	0	0	0	0
0	0	0	0	0	0	0	0
8	0	0	0	1	1	0	0
16	0	0	0	1	0	1	0
24	0	0	0	1	0	1	0
32	0	1	0	0	0	0	2
40	0	0	0	1	1	0	0
48	0	0	0	0	1	0	0
56	3	0	0	0	0	0	0
64	0	0	0	1	1	0	0
72	0	0	0	0	0	0	1
80	2	0	2	0	1	0	1
88	0	0	0	1	0	0	2
96	0	2	0	0	0	3	1
104	2	1	0	1	2	2	1
112	2	3	0	0	1	2	0
120	2	1	1	1	1	1	0
128	2	3	2	2	2	2	1
136	1	5	2	3	1	2	1
144	1	2	1	2	1	3	4
152	1	3	1	4	3	2	4
160	3	1	2	3	1	4	4
168	1	3	3	0	3	4	6
176	4	5	2	4	0	6	4
184	6	4	5	5	6	7	10
192	6	7	3	6	5	9	12
200	12	9	11	15	16	6	7
208	10	7	10	13	11	5	6
216	12	10	11	9	10	12	7
224	17	16	20	19	21	25	39
232	41	51	43	56	53	50	33
240	16	12	15	8	5	12	9
248	9	8	12	8	7	15	8
256	16	30	20	32	32	46	48
264	44	56	38	16	2	0	0
272	1	0	0	0	0	1	0
280	0	0	0	0	0	1	0
288	0	0	0	0	1	0	0
296	0	0	0	0	0	0	0
304	0	0	0	0	0	0	0
312	0	0	0	0	0	0	0
320	0	0	0	0	0	0	0
328	0	0	0	0	0	0	0
336	0	0	0	0	0	0	0
344	0	0	0	0	0	0	0
352	0	0	0	0	0	0	0
360	0	0	0	0	0	0	0

$376 - 33 = 343$
 $41 - 33 = 8$
 $349 - 0 - 0 = 349$
697

Americium A/C.....7-40.65

92074

Customer : T.E.JONES Date Received 4/ 6/ 92 Work order : M-99911 ARF(SOW) : TI-HSP-WINDOW E

A.L.O. No. 92-5689 Description : METHODS BLANK

DF ---- .99832 ---> .49757 ---- .20046

Dilution Factor = 2.4863E+00 +/- 1.11%

Analytcs Yield Factor .9646 +/- 6.0%

* ~~Co-243, 244~~	Am-241	M. & T.E.	WM005	WA42546	WA
		Log Book:	BNW52341 p	BNW52825 p	BNW52343 p
		Instrument	Model 2	G.E. ASC.	Ludlum
		Eff. Factor	.4163	0.37927	0.4
		Date	4/ 16/ 92		
Total counts	209	168	Total counts	697	
Edge Bkg	20	0	Count time	450	
System Bkg	8	0	Bkg C/M	.161	
Net counts	181.0	168.0	Bkg cnt time	900	
A fraction	.5186	.4814	Corrected C/M	1.39	

Calculation and Results

Activities dpm/ml	Uncertainties %	Less than dpm/ml	MDA dpm/ml
4.46E+00	24.9	2.47E-01	4.94E-01
4.14E+00	24.9	2.47E-01	4.94E-01

* ~~Co-243~~ ^{Am-241}
 5-8-92 ~~Co-243 + 244~~
 4 C.M. ~~Am-241~~

Calculated by G. O. Harvey Date 5-8-92Reviewed by R. Bassington Date 5-8-92

Customer : T.E.JONES Date Received : 04/ 06/ 92 Work order : M-99911 ARF(SOW) : T1-HSP-WINDOW E

A.L.O. No. : 92-5689 Description : METHODS BLANK

DF

--- Blank --> 2.58 ml. --- 0.99832 ml. --> 0.49757 ml. --- 2(0.10023) ml. ---

Pipet LRB BMW Page(s) No. _____

Std LRB BMW Page(s) No. _____

M. & T.E. _____

Standard card ID S-Am-PJL 4-6-92

Blank card ID B-Am-PJL 4-6-92

Analyst PJLoney

Date 4-8-92

10

Analysts Yield Factor +/- _____

	Ca-241,243	Am-241	M. & T.E.	WMO05	WA2546	WA2744
			Log Book:	BNV52341 p	BNV52825 p	BNV52343 p 144
			Instrument	P.A.C. -	G.E. ASC.	Ludlum - 2
			Eff. Factor	0.50	0.37927	0.4163
			Date			4/16/92
Total counts			Total counts			427
edge correction			Count time			450"
Background			Bkg C/M			2.161
Net counts			Bkg cnt time			160"
Alpha fract			Corrected C/M			1.358

Analyst PJLoney

$$\frac{1.388 \text{ cpm}(250 \text{ ml})(0.49757 \text{ ml})}{0.4163 \text{ dpc}(0.99832 \text{ ml})(0.20046 \text{ ml})} = 2.0724 \text{ E}+3$$

adjust for spike yield (.9646 Harstener)

$$\begin{aligned} 241 \text{ Am} &= 1.0756 \text{ E}+3 \\ \times 0.519 & \\ \div .9646 &= 1.115 \text{ E}+3 \\ \text{d/m/samples} & \\ 243,244 \text{ Cm} &= 9.9684 \text{ E}+2 \\ \times 0.481 & \\ \div .9646 &= 1.033 \text{ E}+3 \\ 242 \text{ Cm} &\text{ absent} \end{aligned}$$

OR 4.46 E+3 dpm Sample Am 241

4.13 E+3 dpm Sample Cm 243+244

Barrington 5-4-92

See Computer
calc for dpm/ml
values

(14)

TN-1750 P H A
 LT= 10875 RT= 76411
 10875 10875 1 2560

(14)

92-5689 4-28-82

				0	512	34816	0	0	
0	0	0	0	0	0	0	0	0	1
8	0	0	1	0	0	0	0	0	1
16	0	1	0	0	0	0	1	0	0
24	0	1	0	1	1	0	0	0	0
32	0	0	1	1	1	0	1	0	0
40	1	0	1	0	0	0	0	0	0
48	0	0	1	0	0	0	0	1	0
56	1	1	0	1	1	0	2	0	0
64	2	0	0	0	0	1	0	2	1
72	0	1	3	0	0	0	1	1	1
80	1	1	0	2	0	0	2	1	1
88	0	0	1	1	0	0	0	0	0
96	1	0	1	0	0	0	0	3	1
104	0	3	1	2	2	0	0	1	0
112	2	2	5	2	1	2	2	0	1
120	1	1	1	1	3	2	2	0	1
128	3	1	1	0	1	1	1	2	1
136	4	4	2	2	0	0	0	1	2
144	0	2	1	0	2	0	0	2	4
152	3	2	1	3	0	2	2	1	2
160	1	3	3	4	1	1	1	4	2
168	2	3	2	4	4	4	4	2	1
176	0	5	5	2	3	4	4	10	9
184	5	3	4	6	4	5	5	7	5
192	4	7	9	4	11	7	7	5	5
200	5	3	6	8	7	7	7	1	3
208	9	6	9	3	6	10	10	7	3
216	10	4	15	9	11	8	8	8	14
224	12	16	20	12	21	6	22	22	22
232	16	16	34	31	40	28	27	27	23
240	20	9	5	7	8	4	3	3	1
248	2	4	4	3	5	12	3	3	8
256	11	8	13	9	6	17	13	13	20
264	24	22	31	27	14	4	2	2	1
272	0	0	0	0	0	0	0	0	0
280	0	0	0	0	0	0	0	0	1
288	0	0	1	0	0	0	0	0	0
296	0	0	0	0	0	0	0	0	0
304	0	0	0	0	0	1	0	0	0
312	0	0	0	0	0	0	0	0	0
320	0	0	0	0	0	0	0	0	0
328	0	0	0	0	0	0	0	0	0
336	0	0	0	0	0	0	0	0	0
344	0	0	0	0	0	2	0	0	0
352	1	0	0	0	0	0	0	0	0
360	0	0	0	0	0	0	0	0	0
368	0	0	0	0	0	0	0	0	0
376	0	0	0	0	0	0	0	0	0
384	0	0	0	0	0	0	0	0	0
392	0	0	0	0	0	0	0	0	0
400	0	0	0	0	0	0	0	0	0
408	0	0	0	0	0	0	0	0	0
416	0	0	0	0	0	0	0	0	0
424	0	0	0	0	0	0	0	0	0
432	0	0	0	1	0	0	0	0	0
440	0	0	0	0	0	0	0	0	0
448	0	0	0	0	0	0	0	0	0
456	0	0	0	0	0	0	0	0	0
464	0	0	0	0	0	0	0	0	0
472	0	0	0	0	0	0	0	0	0
480	0	0	0	0	0	0	0	0	0
488	0	0	0	0	0	0	0	0	0
496	0	0	0	0	0	0	0	0	0

200-0-0-0 = 181
 0.5 3

168-0-0-0 = 168
 0.5 3

3-0

D2 - NEPTUNIUM 237 ANALYSIS RESULTS

KJ Kuhl-Klinger
File/LB

Date August 26, 1992
To BM Gillespie
From LR Greenwood *LRG*
Subject Narratives for 101-SY Data

All of the following analyses were performed in building 325 of the 300 area. All analyses were performed without notable exceptions according to the approved procedures. Some detailed comments are given below.

Se-79: Analyses were performed according to procedure 7-40.15. The sample size was 10 ml of the dissolved fusion.

Am/Cm: Analyses were performed according to procedures 7-40.65 and PNL ALO-422. The activity of the samples was sufficiently high that the Am and Cm fractions were resolved by alpha energy analysis. It should be noted that ²⁴²Cm represents less than 1% of the total Am+Cm activity, thus leading to the higher uncertainty for these data.

Np: Analyses were performed according to procedures PNL-ALO-425 and PNL-ALO-422. The sample size was 2 ml (maximum allowed) with counting times of 360-390 minutes. Those samples reported as positive results are very close to our detection limit based primarily on counting statistics. Sample 92-5070 had a higher count rate than the other samples. However, the alpha energy analysis showed that the activity was not due to Np. We thus reported a less than value based on the detector background.

DATA REPORT
PNL Analytical chemistry Lab.
Radioanalytical group, 325 Building

05/ 28/ 92

Client: T.E.JONES
WP #: M-99913

Cognizant scientist: L.R. Greenwood Date: 5/29/92

Reviewer: L.S. Kellogg Date: 5-29-92

ALO #	Customer ID	Cm-243 & 244 dpm/g	Am-241 dpm/g	Cm-242 dpm/g	Np-237 dpm/g	Se-79 dpm/g
92-5070	VIAL 1200	8.95E+3	7.37E+4	2E+2	< 40	6.3E+2
92-5074	VIAL 1212	8.94E+3	1.08E+5	4E+2	51	4.7E+2
92-5076	VIAL 1213	5.16E+3	1.03E+5	2E+2	< 56	5.2E+2
92-5080	VIAL 1298	8.67E+3	1.54E+5	1E+3 <i>1E+3 COU 7-14-92</i>	65	5.9E+2
92-5086	VIAL 1204	1.80E+4	3.90E+5	1E+3	< 80	5.9E+2
92-5087	VIAL 1206	1.46E+4	4.02E+5		< 83	4.9E+2
92-5092	VIAL 1309	2.94E+4	5.93E+5	2E+3	67	5.1E+2
92-5093	VIAL 1310	1.76E+4	4.21E+5	1E+3	< 92	3.5E+2 <i>LRJ 3-4E+2 7/27/92</i>
92-5688	METHODS BLANK	6.3 dpm/ml	6.3 dpm/ml		< 1.3E-1 dpm/ml	< 2.7E-1 dpm/ml
92-5689	METHODS BLANK	4.1 "	4.5 "		< 1.4E-1 "	< 2.9E-1 "
REAGENT BLANK FUSION MATRIX			< 4.5E-1 "		< 1.9E-1 " (1)	2.7E-1 " (2)
STANDARDS RECOVERY %			99			94

The recovery for the standards run with the samples was included in the calculation of an historical average recovery, individual sample results were corrected using that average.

Customer : T.E.JONES Date Received 4/ 6/ 92 Work order : M-99911 ARF(SOW) : TI-HSP-WINDOW E
 A.L.O. No. 92-5070 Description : VIAL 1200

DF ----- .76900 ----> 250.00000 ----- 1.99664 ----> .99832 ----- .49544

Dilution Factor = 3.2809E+02 +/- 1.11%
 Analysts Yield Factor .8606 +/- 10.2%

M. & T.E.	WM005	WA42546	WA
Log Book:	BMW52341 p	BMW52825 p	BMW52343 p
Instrument	P.A.C. -	G.E. ASC.	Ludlum -
Eff. Factor	.4217	0.37927	0.4
Date	4/ 14/ 92		
Total counts	255		
Count time	360		
Bkg C/M	.1870		
Bkg cnt time	900		
Corrected C/M	.52		

AEA Shows Activity is all Pu

Calculation and Results

COH

	Activities dpm/gm	Uncertainties %	Less than dpm/gm	MDA dpm/gm
Neptunium-237	4.71E+02	20.5	4.17E+01	8.35E+01

Calculated by 6 O Harvey Date 4-30-92

Reviewed by S S Kellogg Date 5-15-92

$$= < 1.65 \sqrt{\frac{.187}{360} + \frac{.187}{900}} \frac{(250)(.99832)}{(0.4217)(.769)(1.99664)(.49544)(.8606)}$$

$$= < 4.02 E+1 \frac{\text{dpm}}{\text{gm}}$$

COH 5-6-92

NP 92-5070

(10)

Looks like all Pu Co H

TN-1750 P H A

LT= 6271 RT= 137343

6271	6271	2	512	0	512	34816	0	0	
0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0
24	0	0	0	0	0	0	0	0	0
32	0	0	0	0	0	0	1	0	0
40	0	0	0	0	0	1	0	0	0
48	1	0	0	0	0	0	0	0	0
56	0	0	0	0	0	1	0	0	0
64	0	0	0	0	0	0	0	0	0
72	1	0	0	0	0	0	0	0	1
80	0	0	0	0	0	1	0	0	0
88	1	0	1	0	0	0	0	0	0
96	0	0	0	0	0	0	0	0	0
104	0	0	0	1	0	0	0	0	0
112	0	0	0	0	0	1	1	1	0
120	1	1	0	0	1	0	1	1	2
128	0	0	0	0	0	0	0	0	0
136	0	0	0	0	0	2	0	0	0
144	0	0	0	0	0	0	0	0	0
152	1	0	0	0	0	0	0	0	1
160	2	0	0	0	1	1	1	1	1
168	0	0	2	3	0	0	1	1	1
176	0	1	1	0	0	1	1	1	1
184	1	0	1	0	2	1	1	1	1
192	1	3	2	7	3	7	6	7	7
200	14	26	42	61	45	122	138	156	
208	63	2	0	0	0	0	0	0	2
216	0	0	0	0	0	0	1	0	0
224	0	1	0	0	0	0	1	2	0
232	1	3	0	1	2	0	2	1	0
240	2	0	0	0	0	0	0	0	0
248	0	0	0	0	0	0	0	0	0
256	0	0	0	0	0	0	0	0	0
264	0	0	0	0	0	0	0	0	0
272	0	0	0	0	0	0	0	0	0
280	0	0	0	0	0	0	0	0	0
288	0	0	0	0	0	0	0	0	0
296	0	0	0	0	0	0	0	0	0
304	0	0	0	0	0	0	0	0	0
312	0	0	0	0	0	0	0	0	0
320	0	0	0	0	0	0	0	0	0
328	0	0	0	0	0	0	0	0	0

Neptunium-237.....HTA-4-14

Customer : T.E.JONES Date Received : 04/ 06/ 92 Work order : M-99911 ARF(SOW) : TI-HSP-WINDOW EA.L.O. No. : 92-5070 Description : VIAL 1200

#77 #77

DF --- 0.7690 --> 250 --- 2(0.99832) --> 0.99832 --- 0.49544 ---
 j ml. ml ml ml

Pipet LRB BMW _____ Page(s) No. _____

Std _____ LRB BMW _____ Page(s) No. _____

M. & T.E. _____

Standard card ID S-Np-PJR, 4-6-92Blank card ID B-Np-PJR, 4-6-92Analyst PJ RoneyDate 4-10-92

M. & T.E.	LM005	WA42546	WA82314
Log Book:	BNW52341 p	BNW52825 p	BNW52343 p 194
Instrument	P.A.C. -	G.E. ASC.	Ludlum - 1
Eff. Factor	0.50	0.37927	0.4217
Date	___/___/___	___/___/___	4/11/92
Total counts	___	___	255
Count time	___	___	360"
Bkg C/M	___	___	0.187
Bkg cnt time	___	___	900"
Corrected C/M	___	___	0.521

Analysts Yield Factor, 8606 +/- 10.2Analyst Anne E. Kachubsky

Neptunium-237.....HTA-4-14

92074

Customer : T.E.JONES Date Received 4/ 6/ 92 Work order : M-99911 ARF(SOW) : TI-HSP-WINDOW EA.L.O. No. 92-5074 Description : VIAL 1212

OF ----- .83790 ----> 250.00000 ----- 1.99664 ----> .99832 ----- .49854

Dilution Factor = 2.9924E+02 +/- 1.11%

Analysts Yield Factor .8606 +/- 10.2%

M. & T.E.	WM005	WA42546	WA
Log Book:	BNW52341 p	BNW52825 p	BNW52343 p
Instrument	P.A.C. -	G.E. ASC.	Ludlum -
Eff. Factor	.4163	0.37927	0.4
Date	4/ 14/ 92		
Total counts	79		
Count time	360		
Bkg C/M	.1580		
Bkg cnt time	900		
Corrected C/M	.06		

Calculation and Results

	Activities dpm/gm	Uncertainties %	Less than dpm/gm	MDA dpm/gm
Neptunium-237	5.13E+01	90.0	3.56E+01	7.11E+01

Calculated by GO Harvey Date 4-25-92Reviewed by S. Barrington Date 5-5-92

Neptunium-237.....HTA-4-14

Customer : T.E.JONES Date Received : 04/ 06/ 92 Work order : M-99911 ARF(SOW) : TI-HSP-WINDOW EA.L.O. No. : 92-5074 Description : VIAL 1212

#77 #77

DF --- 0.8379 --> 250 --- 2(0.99832) --> 0.99832 --- 6.49854 ---

g ml ml ml

Pipet LRB BMW _____ Page(s) No. _____

Std _____ LRB BMW _____ Page(s) No. _____

M. & T.E. _____

Standard card ID S-Np-PR, 4-6-92 Blank card ID B-Np-PR, 4-6-92Analyst PJ Roney Date 4-7-92

M. & T.E.	WM005	WA42546	WA94744
Log Book:	BNW52341 p	BNW52825 p	BNW52343 p 144
Instrument	P.A.C. -	G.E. ASC.	Ludlum - 2
Eff. Factor	0.50	0.37927	0.4163
Date	___/___/___	___/___/___	4/14/92
Total counts	___	___	79
Count time	___	___	360"
Bkg C/M	___	___	0.158
Bkg cnt time	___	___	700"
Corrected C/M	___	___	0.061

Analysts Yield Factor _____ +/- _____

Analyst Anne E. Kozlisky

Customer : T.E.JONES Date Received 4/ 6/ 92 Work order : M-99911 ARF(SOW) : TI-HSP-WINDOW EA.L.O. No. 92-5076 Description : VIAL 1213

DF ----- .62530 ----> 250.00000 ----- 1.99664 ----> .99832 ----- .49544

Dilution Factor = 4.0349E+02 +/- 1.11%

Analysts Yield Factor .8606 +/- 10.2%

M. & T.E.	WM005	WA42546	WA
Log Book:	BWWS2341 p	BWWS2825 p	BWWS2343 p
Instrument	P.A.C. -	G.E. ASC.	Ludlum -
Eff. Factor	.4355	0.37927	0.4
Date	4/ 14/ 92		
Total counts	91		
Count time	360		
Bkg C/M	.2570		
Bkg cnt time	900		
Corrected C/M	.00		

Calculation and Results

	Activities dpm/gm	Uncertainties %	Less than dpm/gm	MDA dpm/gm
Neptunium-237	-4.55E+00	*****	5.62E+01	1.16E+02

Calculated by L O Harvey Date 4-29-92Reviewed by R. Barrington Date 5-5-92

Neptunium-237.....HTA-4-14

Customer : T.E. JONES Date Received : 04/ 06/ 92 Work order : M-99911 ARF(SOW) : TI-HSP-WINDOW E

A.L.O. No. : 92-5076 Description : VIAL 1213

DF --- 0.6253 --> 250 --- 2(0.99832) --> 0.99832 --- 0.49544 ---
 g. ml. ml. ml.

Pipet LRB BMW Page(s) No.

Std LRB BMW Page(s) No.

M. & T.E.

Standard card ID 5-Np, 4-6-92 Blank card ID B-Np, 4-6-92

Analyst PJ Raley Date 4-10-92

M. & T.E.	WM005	WA42546	WA82316
Log Book:	BNW52341 p	BNW52825 p	BNW52343 p 144
Instrument	P.A.C. -	G.E. ASC.	Ludlum - 3
Eff. Factor	0.50	0.37927	0.4355
Date	___/___/___	___/___/___	4/14/92
Total counts	___	___	91
Count time	___	___	360"
Bkg C/M	___	___	0.257
Bkg cnt time	___	___	900"
Corrected C/M	___	___	0.004

Analysts Yield Factor +/-

Analyst Anne E. Kaskidy

Neptunium-237.....HTA-4-14

92074

Customer : T.E.JONES Date Received 4/ 6/ 92 Work order : M-99911 ARF(SOW) : T1-HSP-WINDOW EA.L.O. No. 92-5080 Description : VIAL 1298

DF ----- .70210 ----> 250.00000 ----- 1.99664 ----> .99832 ----- .49854

Dilution Factor = 3.5712E+02 +/- 1.11%

Analyst's Yield Factor .8606 +/- 10.2%

M. & T.E.	WM005	WA42546	WA
Log Book:	BNW52341 p	BNW52825 p	BNW52343 p
Instrument	P.A.C. -	G.E. ASC.	Ludlum -
Eff. Factor	.4364	0.37927	0.4
Date	4/ 14/ 92		
Total counts	117		
Count time	360		
Bkg C/M	.2570		
Bkg cnt time	900		
Corrected C/M	.07		

Calculation and Results

	Activities dpm/gm	Uncertainties %	Less than dpm/gm	MDA dpm/gm
Neptunium-237	<u>6.47E+01</u>	99.9	5.12E+01	1.02E+02

Calculated by Le O Harvey Date 4-29-92Reviewed by R. Barrington Date 5-5-92

Customer : T.E.JONES Date Received : 04/ 06/ 92 Work order : M-99911 ARF(SOW) : TI-HSP-WINDOW EA.L.O. No. : 92-5080 Description : VIAL 1298

OF

#77 #77

... 0.70 ^g / --> 250 _{ml.} ... 2(0.99832) --> 0.99832 ... 0.49854 ...

 ml ml ml

Pipet LRB BMW _____ Page(s) No. _____

Std _____ LRB BMW _____ Page(s) No. _____

M. & T.E. _____

Standard card ID S-Np-PGR, 4-6-92 Blank card ID B-Np-PGR, 4-6-92Analyst PJ Raney Date 4-10-92

M. & T.E.	WM005	WA42546	WA82317
Log Book:	BNW52341 p	BNW52825 p	BNW52343 p 1A
Instrument	P.A.C. -	G.E. ASC.	Ludlum - 4
Eff. Factor	0.50	0.37927	0.4364
Date	___/___/___	___/___/___	4/14/92
Total counts	___	___	117
Count time	___	___	360"
Bkg C/M	___	___	0.257
Bkg cnt time	___	___	900"
Corrected C/M	___	___	0.068

Analysts Yield Factor _____ +/- _____

Analyst Jane E Kozlisky

Customer : T.E.JONES Date Received 4/ 6/ 92 Work order : M-99911 ARF(SOW) : TI-HSP-WINDOW EA.L.O. No. 92-5086 Description : VIAL 1204

DF ----- .56230 ----> 250.00000 ----- 1.99664 ----> .99832 ----- .49544

Dilution Factor = 4.4869E+02 +/- 1.11%

Analysts Yield Factor .8606 +/- 10.2%

M. & T.E.	WM005	WA42546	WA
Log Book:	BNW52341 p	BNW52825 p	BNW52343 p
Instrument	P.A.C. -	G.E. ASC.	Ludlum -
Eff. Factor	.4194	0.37927	0.4
Date	4/ 14/ 92		
Total counts	88		
Count time	360		
Bkg C/M	.2310		
Bkg cnt time	900		
Corrected C/M	.01		

Calculation and Results

	Activities dpm/gm	Uncertainties %	Less than dpm/gm	MDA dpm/gm
Neptunium-237	1.67E+01	446.1	7.95E+01	1.27E+02

Calculated by Lo O Harvey Date 4-29-92Reviewed by R. Harrison Date 5-5-92

A.L.O. No. : 92-5086 Description : VIAL 1204

DF --- 0.5623 $\rightarrow$ 250 --- 2(0.99832) $\rightarrow$ 0.99832 --- 0.49544 ---

g ml ml ml

Pipet LRB BMW Page(s) No.

Std _____ LRB BNW _____ Page(s) No. _____

M. & T.E. _____

Standard card ID 5-N-19K 4-6-92 Blank card ID B-N-19K 4-6-92

Analyst W. J. Lane Date 4-10-92

M. & T.E.	WM005	WA42546	WA92318
Log Book:	BNW52341 p	BNW52825 p	BNW52343 p 14

Instrument	P.A.C. -	G.E. ASC.	Ludlum - 5
Eff. Factor	0.50	0.37927	0.4194

Date	___/___/___	___/___/___	4/14/92
Total counts	_____	_____	38
Count time	_____	_____	360"
Bkg C/M	_____	_____	0.231
Bkg cnt time	_____	_____	900"
Corrected C/M	_____	_____	0.013

Analysts Yield Factor +/-

Analyst Anne E. Korshen

Neptunium-237.....HTA-4-14

92074

Customer : T.E.JONES Date Received 4/ 6/ 92 Work order : M-99911 ARF(SOW) : TI-HSP-WINDOW EA.L.O. No. 92-5087 Description : VIAL 1206

DF ---- .57330 ----> 250.00000 ---- 1.99664 ----> .99832 ---- .49544

Dilution Factor = 4.4009E+02 +/- 1.11%

Analysts Yield Factor .8606 +/- 10.2%

M. & T.E.	LM005	WA42546	WA
Log Book:	BNW52341 p	BNW52825 p	BNW52343 p
Instrument	P.A.C. -	G.E. ASC.	Ludlum -
Eff. Factor	.4222	0.37927	0.4
Date	4/ 14/ 92		
Total counts	68		
Count time	360		
Bkg C/M	.1640		
Bkg cnt time	900		
Corrected C/M	.02		

Calculation and Results

	Activities dpm/gm	Uncertainties %	Less than dpm/gm	MDA dpm/gm
Neptunium-237	3.01E+01	209.6	<u>8.33E+01</u>	1.05E+02

Calculated by G O Harvey Date 4-25-92Reviewed by Riparrington Date 5-5-92

Neptunium-237.....HTA-4-14

Customer : T.E. JONES Date Received : 04/ 06/ 92 Work order : M-99911 ARF(SOW) : TI-HSP-WINDOW EA.L.O. No. : 92-5087 Description : VIAL 1206

DF --- 0.5733 --> 2.50 --- 2(0.99832) --> 0.99832 --- 0.49544 ---
 g ml ml ml

Pipet LRB BNW _____ Page(s) No. _____

Std _____ LRB BNW _____ Page(s) No. _____

M. & T.E. _____

Standard card ID S-Np- BJR, 4-6-92Blank card ID B-Np- BJR, 4-6-92Analyst DRaneyDate 4-7-92

M. & T.E.	WM005	WA42546	WA82319
Log Book:	BNW52341 p	BNW52825 p	BNW52343 p 134
Instrument	P.A.C. -	G.E. ASC.	Ludlum - 6
Eff. Factor	0.50	0.37927	0.4222
Date	___/___/___	___/___/___	4/14/92
Total counts	___	___	68
Count time	___	___	360"
Bkg C/M	___	___	0.164
Bkg cnt time	___	___	900"
Corrected C/M	___	___	0.025

Analysts Yield Factor _____ +/- _____

Analyst Diane E. Gorkhly

Customer : T.E.JONES Date Received 4/ 6/ 92 Work order : M-99911 ARF(SOM) : T1-HSP-WINDOW E
 A.L.O. No. 92-5688 Description : METHODS BLANK

DF ---- 1.99664 ----> .99832 ---- .49854

Dilution Factor = 1.0029E+00 +/- .99%
 Analysts Yield Factor .8606 +/- 10.2%

M. & T.E.	WM005	WA42546	WA
Log Book:	BNW52341 p	BNW52825 p	BNW52343 p
Instrument	P.A.C. -	G.E. ASC.	Ludlum -
Eff. Factor	.4163	0.37927	0.4
Date	4/ 15/ 92		
Total counts	67		
Count time	390		
Bkg C/M	.1680		
Bkg cnt time	900		
Corrected C/M	.00		

Calculation and Results

	Activities dpm/ml	Uncertainties %	Less than dpm/ml	MDA dpm/ml
Neptunium-237	1.06E-02	*****	<u>1.26E-01</u>	2.39E-01

Calculated by LO Harry Date 4-22-92

Reviewed by R. Barrington Date 5-5-92

Customer : T.E.JONES Date Received : 04/06/92 Work order : M-99911 ARF(SOW) : TI-HSP-WINDOW EA.L.O. No. : 92-5688 Description : METHODS BLANK

DF

#77 #77

... Blank → 250 ml. --- 2(0.99832) ml. --- 0.99832 ml. --- 0.99854 ml. ---

Pipet LRB BNW _____ Page(s) No. _____

Std _____ LRB BNW _____ Page(s) No. _____

M. & T.E. _____

Standard card ID 5-Np PPR, 4-6-92Blank card ID B-Np PPR, 4-6-92Analyst PPRaneyDate 4-7-92

M. & T.E.	WM005	WA42546	WA 94944
Log Book:	BNW52341 p	BNW52825 p	BNW52343 p 144
Instrument	P.A.C. -	G.E. ASC.	Ludlum - 2
Eff. Factor	0.50	0.37927	0.4163
Date	___/___/___	___/___/___	4/15/92
Total counts	___	___	67
Count time	___	___	390"
Bkg C/M	___	___	0.169
Bkg cnt time	___	___	900"
Corrected C/M	___	___	0.004

Analysts Yield Factor _____ +/- _____

Analyst Thane E Kachisky

Customer : T.E.JONES Date Received 4/ 6/ 92 Work order : M-99911 ARF(SOW) : TI-HSP-WINDOW EA.L.O. No. 92-5689 Description : METHODS BLANK

DF ---- 1.99664 ---> .99832 ---- .49854

Dilution Factor = 1.0029E+00 +/- .99%

Analysts Yield Factor .8606 +/- 10.2%

M. & T.E.	WM005	WA42546	WA
Log Book:	BNW52341 p	BNW52825 p	BNW52343 p
Instrument	P.A.C. -	G.E. ASC.	Ludlum -
Eff. Factor	.4355	0.37927	0.4
Date	4/ 15/ 92		
Total counts	100		
Count time	390		
Bkg C/M	.2630		
Bkg cnt time	900		
Corrected C/M	-.01		

Calculation and Results

	Activities dpm/ml	Uncertainties %	Less than dpm/ml	MDA dpm/ml
Neptunium-237	-1.76E-02	916.7	<u>1.37E-01</u>	2.83E-01

Calculated by T. O. Koenig Date 4-22-92Reviewed by R. Barrington Date 5-5-92

Customer : T.E.JONES Date Received : 04/ 06/ 92 Work order : M-99911 ARF(SOW) : TI-HSP-WINDOW EA.L.O. No. : 92-5689 Description : METHODS BLANK

DF

#77 #77

... Blank --> 250ml. ... 2(0.49544) ... 0.49544 ...

ml ml ml

Pipet LRB BMW _____ Page(s) No. _____

Std _____ LRB BMW _____ Page(s) No. _____

M. & T.E. _____

Standard card ID S-Np-PJR, 4-6-92Blank card ID B-Np-PJR, 4-6-92Analyst PJRDate 4-10-92

M. & T.E.	WM005	WA42546	WA 82316
Log Book:	BNW52341 p	BNW52825 p	BNW52343 p 144
Instrument	P.A.C. -	G.E. ASC.	Ludlum - 3
Eff. Factor	0.50	0.37927	0.4 355
Date	___/___/___	___/___/___	4/15/92
Total counts	___	___	100
Count time	___	___	390"
Bkg C/M	___	___	0.263
Bkg cnt time	___	___	900"
Corrected C/M	___	___	~ 0.007

Analysts Yield Factor _____ +/- _____

Analyst Anne E. Kozlowski

92074

Neptunium-237.....HTA-4-14

Customer : T.E.JONES Date Received 4/ 6/ 92 Work order : M-99911 ARF(SOW) : TI-HSP-WINDOW EA.L.O. No. 92-5092 Description : VIAL 1309

DF ---- .61610 ---> 250.00000 ---- 1.99664 ----> .99832 ---- .49854

Dilution Factor = 4.0697E+02 +/- 1.11%

Analysts Yield Factor .8606 +/- 10.2%

M. & T.E.	WM005	WA42546	WA
Log Book:	BMW52341 p	BMW52825 p	BMW52343 p
Instrument	P.A.C. -	G.E. ASC.	Ludlum -
Eff. Factor	.4364	0.37927	0.4
Date	4/ 15/ 92		
Total counts	110		
Count time	390		
Bkg C/M	.2200		
Bkg cnt time	900		
Corrected C/M	.06		

Calculation and Results

	Activities dpm/gm	Uncertainties %	Less than dpm/gm	MDA dpm/gm
Neptunium-237	6.72E+01	98.8	5.26E+01	1.05E+02

Calculated by G. O. Harvey Date 4-28-92Reviewed by R. Barrington Date 5-5-92

Neptunium-237.....HTA-4-14

92074

Customer : T.E. JONES Date Received : 04/ 06/ 92 Work order : M-99911 ARF(SOW) : TI-HSP-WINDOW EA.L.O. No. : 92-5092 Description : VIAL 1309

#77 #77

OF ... 0.6161 ... 250 ... 2(0.9982) ... 0.9983 ... 0.49854 ...

g ml ml ml ml

Pipet LRB BMW _____ Page(s) No. _____

Std _____ LRB BMW _____ Page(s) No. _____

M. & T.E. _____

Standard card ID S-Np. PAR, 4-6-92Blank card ID B-Np. PAR, 4-6-92Analyst PJ Roney Date 4-7-92

M. & T.E.	WM005	WA42546	WA 82317
Log Book:	BMU52341 p	BMU52825 p	BMU52343 p 144
Instrument	P.A.C. -	G.E. ASC.	Ludlum - 4
Eff. Factor	0.50	0.37927	0.4364
Date	1/1/	1/1/	4/15/92
Total counts			110
Count time			390"
Bkg C/M			0.220
Bkg cnt time			900"
Corrected C/M			0.062

Analysts Yield Factor _____ +/- _____

Analyst Ann E. Hochstetler

Customer : T.E.JONES Date Received 4/ 6/ 92 Work order : M-99911 ARF(SOW) : TI-HSP-WINDOW EA.L.O. No. 92-5093 Description : VIAL 1310

DF ---- .56480 ---> 250.00000 ---- 1.99664 ---> .99832 ---- .49544

Dilution Factor = 4.4671E+02 +/- 1.11%

Analysts Yield Factor .8606 +/- 10.2%

M. & T.E.	WM005	WA42546	WA
Log Book:	BNW52341 p	BNW52825 p	BNW52343 p
Instrument	P.A.C. -	G.E. ASC.	Ludlum -
Eff. Factor	.4194	0.37927	0.4
Date	4/ 15/ 92		
Total counts	93		
Count time	390		
Bkg C/M	.2120		
Bkg cnt time	900		
Corrected C/M	.03		

Calculation and Results

	Activities dpm/gm	Uncertainties %	Less than dpm/gm	MDA dpm/gm
Neptunium-237	3.27E+01	215.8	9.22E+01	1.18E+02

Calculated by _____ Date _____

Reviewed by S. Bannington Date 5-5-92

Neptunium-237.....HTA-4-14

Customer : T.E.JONES Date Received : 04/ 06/ 92 Work order : M-99911 ARF(SOW) : TI-HSP-WINDOW EA.L.O. No. : 92-5093 Description : VIAL 1310

0.5648g

#77

#77

DF

--- Blank --> 25aml. --- 2(0.99932) --> 0.99932 --- 0.49544 ---

PJR

ml

ml

ml

Pipet LRB BMW 4-7-92 Page(s) No. _____

Std _____ LRB BMW _____ Page(s) No. _____

M. & T.E. _____

Standard card ID S-Np- PJR, 4-6-92 Blank card ID B-Np- PJR, 4-6-92Analyst PJRDate 4-7-92

M. & T.E.	WM005	WA42546	WA82318
Log Book:	BNW52341 p	BNW52825 p	BNW52343 p 144
Instrument	P.A.C. -	G.E. ASC.	Ludlum - 5
Eff. Factor	0.50	0.37927	0.4194
Date	___/___/___	___/___/___	4/15/92
Total counts	___	___	93
Count time	___	___	390"
Bkg C/M	___	___	0.212
Bkg cnt time	___	___	900"
Corrected C/M	___	___	+ 0.026

Analysts Yield Factor _____ +/- _____

Analyst Thomas E. Kachinsky

Customer : _____ Date Received 0/ 0/ 0 Work order : _____ ARF(SOW) : _____A.L.O. No. sim-blk Description : _____

DF ---- 1.99664 ----> .99832 ---- .49854

Dilution Factor = 1.0029E+00 +/- .99%

Analysts Yield Factor .8606 +/- 10.2%

M. & T.E.	WN005	WA42546	WA
Log Book:	BNW52341 p	BNW52825 p	BNW52343 p
Instrument	P.A.C. -	G.E. ASC.	Ludlum -
Eff. Factor	.4217	0.37927	0.4
Date	4/ 15/ 92		
Total counts	85		
Count time	390		
Bkg C/M	.1940		
Bkg cnt time	900		
Corrected C/M	.02		

Calculation and Results

	Activities dpm/ml	Uncertainties %	Less than dpm/ml	MDA dpm/ml
Neptunium-237	6.62E-02	228.0	1.93E-01	2.53E-01

Calculated by C O Harvey Date 4-25-92Reviewed by R J Barrington Date 5-5-92

5-Np-BR, 4-6-92

Neptunium-237.....HTA-4-14

Customer: T.E. Jones Date Received 04-06-92 Work order: H99911 ARF(SOW): FI-HSP- WINDRWE

A.L.O. No. Np Std Description: Std. in 2ml of Sim KOH Fusion

DF #90 #77
— 0.10023 → 0.99832 — 0.10001 — — — —

Pipet LRB BNW _____ Page(s) No. _____

Std 1.4775E5 LRB BNW 52815 Page(s) No. 70
4-4-90 4-1-92

M. & T.E. _____

Std Card ID: 5-Np-BR, 4-6-92

Blank Card ID: B-Np-BR, 4-6-92

Analyzed by PJ Roney Date 4-7-92

M. & T.E.	WM005 <u>79</u>	WA42546	WA _____
Log Book:	BNW52341 p <u>73</u>	BNW52825 p _____	BNW52343 p _____
Instrument	P.A.C. - <u>1</u>	G.E. ASC.	Ludlum - _____
Eff. Factor	0.50 <u>90</u>	0.37927	0.4 _____
Date	<u>4/16/92</u>	_____	_____
Total counts	<u>7134</u>	_____	_____
Count time	<u>10"</u>	_____	_____
Bkg C/M	<u>0.45</u>	_____	_____
Bkg cnt time	<u>100"</u>	_____	_____
Corrected C/M	_____	_____	_____

Analysts Yield Factor _____ +/- _____

Counted by Shane E. English Date _____

Calculation and Results

Calculated by _____ Date _____

Reviewed by _____ Date _____

Neptunium-237.....HTA-4-14

Customer : _____ Date Received 0/ 0/ 0 Work order : _____ ARF(SOW) : _____

A.L.O. No. _____ Description : _____

DF ---- .10023 ----> .99832 ---- .10001

Dilution Factor = 9.9593E+01 +/- 1.11%

Analysts Yield Factor ***** +/- 7.0%

M. & T.E.	WM005	WA42546	WA
Log Book:	BNW52341 p	BNW52825 p	BNW52343 p
Instrument	P.A.C. -	G.E. ASC.	Ludlum -
Eff. Factor	.5090	0.37927	0.4
Date	4/ 16/ 92		
Total counts	7134		
Count time	10		
Bkg C/M	.4500		
Bkg cnt time	100		
Corrected C/M	712.95		

Calculation and Results

	Activities dpm/ml	Uncertainties %	Less than dpm/ml	MDA dpm/ml
Neptunium-237	1.39E+05	7.9	7.48E+01	1.50E+02

94.08 %

Calculated by E O Harvey Date 4-28-92Reviewed by R Farrington Date 5-5-92

B-Np-^{Ind} ^{Date} 4-6-92

Neptunium-237.....HTA-4-14

Customer : I.E. Jones Date Received 04-06-92 Work order : M99911 ARF(SOW) : WINDOW E

A.L.O. No. Np B/K Description : Sim. KOH Fusion

OF

#77 #77
— 2(0.99832) → 0.99832 — 0.49854 — — — —

Pipet LRB BNW _____ Page(s) No. _____

Std _____ LRB BNW _____ Page(s) No. _____

M. & T.E. _____

Std Card ID: S-Np-^{Ind} 4-6-92

Blank Card ID: B-Np-^{Ind} 4-6-92

Analyzed by PJ Poney Date 4-7-92

M. & T.E.	WM005	WA42546	WA82314
Log Book:	BNW52341 p	BNW52825 p	BNW52343 p 144
Instrument	P.A.C. -	G.E. ASC.	Ludlum - 1
Eff. Factor	0.50	0.37927	0.4217
Date	___/___/___	___/___/___	4/15/92
Total counts	___	___	85
Count time	___	___	390" MK 4-15-92
Bkg C/M	___	___	0.194
Bkg cnt time	___	___	900"
Corrected C/M	___	___	0.024

Analysts Yield Factor _____ +/- _____

Counted by Anne E Kozlinsky Date _____

Calculation and Results

Calculated by _____ Date _____

Reviewed by _____ Date _____

D3 - SELENIUM 79 ANALYSIS RESULTS

KJ Kuhl-Klinger
File/LB

Date August 26, 1992
To BM Gillespie
From LR Greenwood *LRG*
Subject Narratives for 101-SY Data

All of the following analyses were performed in building 325 of the 300 area. All analyses were performed without notable exceptions according to the approved procedures. Some detailed comments are given below.

Se-79: Analyses were performed according to procedure 7-40.15. The sample size was 10 ml of the dissolved fusion.

Am/Cm: Analyses were performed according to procedures 7-40.65 and PNL ALO-422. The activity of the samples was sufficiently high that the Am and Cm fractions were resolved by alpha energy analysis. It should be noted that ²⁴²Cm represents less than 1% of the total Am+Cm activity, thus leading to the higher uncertainty for these data.

Np: Analyses were performed according to procedures PNL-ALO-425 and PNL-ALO-422. The sample size was 2 ml (maximum allowed) with counting times of 360-390 minutes. Those samples reported as positive results are very close to our detection limit based primarily on counting statistics. Sample 92-5070 had a higher count rate than the other samples. However, the alpha energy analysis showed that the activity was not due to Np. We thus reported a less than value based on the detector background.

DATA REPORT
PNL Analytical chemistry Lab.
Radioanalytical group, 325 Building

05/ 28/ 92

Client: T.E.JONES
WP #: M-99913

Cognizant scientist: L R Greenwood Date: 5/29/92

Reviewer: L S Kellogg Date: 5-29-92

ALO #	Customer ID	Cm-243 & 244 dpm/g	Am-241 dpm/g	Cm-242 dpm/g	Np-237 dpm/g	Se-79 dpm/g
92-5070	VIAL 1200	8.95E+3	7.37E+4	2E+2	< 40	6.3E+2
92-5074	VIAL 1212	8.94E+3	1.08E+5	4E+2	51	4.7E+2
92-5076	VIAL 1213	5.16E+3	1.03E+5	2E+2	< 56	5.2E+2
92-5080	VIAL 1298	8.67E+3	1.54E+5	1E+3 <i>1E+3 COH 7-14-92</i>	65	5.9E+2
92-5086	VIAL 1204	1.80E+4	3.90E+5	1E+3	< 80	5.9E+2
92-5087	VIAL 1206	1.46E+4	4.02E+5		< 83	4.9E+2
92-5092	VIAL 1309	2.94E+4	5.93E+5	2E+3	67	5.1E+2
92-5093	VIAL 1310	1.76E+4	4.21E+5	1E+3	< 92	3.5E+2 <i>LRG</i> 3.4E+2 <i>7/27/92</i>
92-5688	METHODS BLANK	6.3 dpm/ml	6.3 dpm/ml		< 1.3E-1 dpm/ml	< 2.7E-1 dpm/ml
92-5689	METHODS BLANK	4.1 "	4.5 "		< 1.4E-1 "	< 2.9E-1 "
REAGENT BLANK FUSION MATRIX			< 4.5E-1 "		< 1.9E-1 " (1)	2.7E-1 " (2)
						< 2.9E-1 "
STANDARDS RECOVERY %			99		94	

The recovery for the standards run with the samples was included in the calculation of an historical average recovery, individual sample results were corrected using that average.

92074

Selenium-79.....7-40.15

Customer : T.E. JONES Date Received 4/ 6/ 92 Work order : M-99913 ARF(SOW) : II-HSP-WINDOW EA.L.O. No. 92-5070 Description : VIAL 1200

DF ---- .76900 ----> 250.00000 ---- 10.06426

Dilution Factor = 3.2302E+01 +/- .70%

M. & T.E. Log Book:	WM _____ BNW _____ p ____	Carrier Information
Count 1	46.90	V. of Carrier 1.9813 ml
Count 2	47.05	Carrier's con. 10.3975 mg/ml
Count 3	47.80	Net weight 19.9200 mg
Count 4	47.35	Wt. (100 %) 20.6006 mg
count 5	49.90	Chemical R.C. .9670

Calculation and Results

	Activities dpm/GM	Uncertainties %	Less than dpm/GM	MDA dpm/GM
Selenium-79	6.32E+02	11.6	4.70E+01	9.41E+01

Calculated by LR Greenwood Date 5/28/92Reviewed by LS Kilgus Date 5-29-92

Customer : T.E.JONES Date Received : 04/ 06/ 92 Work order : M-99911 ARF(SOW) : TI-HSP-WINDOW E

A.L.O. No. : 92-5070 Description : VIAL 1200

DF

--- 0.7690 --> 250 --- 2(5.032/3) ---
 g ml ml

Pipet LRB BMW Page(s) No. _____

Std LRB BMW Page(s) No. _____

M. & T.E. _____

Standard card ID 5-Se-PJR, 4-6-92

Blank card ID B-Se-PJR, 4-6-92

Analyst PJR

Date 4-28-92

29
5-1-92

Analysts Yield Factor +/- _____

M. & T.E. _____
 Log Book: BMW P _____
 Count Dis ± 3
 Count 1 46.81
 Count 2 47.05
 Count 3 47.80
 Count 4 47.35
 Count 5 47.90

Carrier Information
 V. of Carrier 2(0.99063) ml
 Carrier's con. 10.3975 mg/ml
 Net weight _____ mg
 Wt. (100 %) _____ mg
 Chemical R.C. _____

#65
BNW54042, p.9

Analyst _____

Carrier
 2 ml of 10.3975 mg/ml Se carrier
 #65 2(0.99063) ml BNW54042, p.9

#1 Sample + Tare 0.02826
 Tare 0.00834g
 0.01992g
 5-28-92

LRA 7/27/92

32.285
 (47.80 - 31.815) 250 (1.98126)(10.3975)(1.21845) = 6.4907 E+2
 1.21845
 5-28-92 (0.7690)(10.06426)(19.92) 6.311
 LRA 5-28-92

92074

Selenium-79.....7-40.15

Customer : T.E. JONES Date Received 4/ 6/ 92 Work order : M-99913 ARF(SOW) : II-HSP-WINDOW EA.L.O. No. 92-5074 Description : VIAL 1212

DF ---- .83790 ----> 250.00000 ---- 10.06426

Dilution Factor = 2.9646E+01 +/- .70%

M. & T.E. Log Book:	WM BNW p	Carrier Information
Count 1	45.50	V. of Carrier 1.9813 ml
Count 2	44.50	Carrier's con. 10.3975 mg/ml
Count 3	43.80	Net weight 19.0300 mg
Count 4	43.90	Wt. (100 %) 20.6006 mg
count 5	43.80	Chemical R.C. .9238

Calculation and Results

	Activities dpm/GM	Uncertainties %	Less than dpm/GM	MDA dpm/GM
Selenium-79	<u>4.70E+02</u>	13.9	4.52E+01	9.04E+01

Calculated by L.R. Greenwood Date 5-28-92Reviewed by L.D. Kellogg Date 5-29-92

Customer : T.E.JONES Date Received : 04/ 06/ 92 Work order : M-99911 ARF(SOW) : TI-HSP-WINDOW EA.L.O. No. : 92-5074 Description : VIAL 1212

#95

DF

--- 0.8379 --> 250 --- 2(5.0323) ---
g ml. ml

Pipet LRB BNW _____ Page(s) No. _____

Std _____ LRB BNW _____ Page(s) No. _____

M. & T.E. _____

Standard card ID S-Se- PGR , 4-6-92Blank card ID B-Se- PGR , 4-6-92Analyst P. RoneyDate 4-28-92

29

Analysts Yield Factor _____ +/- _____

5-1-92

M. & T.E.	WM _____
Log Book:	BNW _____ P _____
Count 1	45.50
Count 2	44.50
Count 3	43.90
Count 4	43.90
Count 5	43.80

44.30 .75

Carrier Information	
V. of Carrier	2(0.99063) ml
Carrier's con.	10.3975 mg/ml
Net weight	_____ mg
Wt. (100 %)	_____ mg
Chemical R.C.	_____ mg

#65
BNW 54042, P.9

Analyst _____

#2 Sample + ture 0.02735
ture 0.00832g
0.01903

92074

Selenium-79.....7-40.15

Customer : T.E. JONES Date Received 4/ 6/ 92 Work order : M-99913 ARF(SOW) : TI-HSP-WINDOW EA.L.O. No. 92-5076 Description : VIAL 1213

DF ---- .62530 ----> 250.00000 ---- 10.06426

Dilution Factor = 3.9726E+01 +/- .70%

M. & T.E. Log Book:	WM BNW p	Carrier Information
Count 1	41.50	V. of Carrier 1.9813 ml
Count 2	41.85	Carrier's con. 10.3975 mg/ml
Count 3	44.75	Net weight 19.6500 mg
Count 4	41.30	Wt. (100 %) 20.6006 mg
count 5	43.50	Chemical R.C. .9539

Calculation and Results

	Activities dpm/GM	Uncertainties %	Less than dpm/GM	MDA dpm/GM
Selenium-79	5.22E+02	15.6	5.86E+01	1.17E+02

Calculated by J R Greenwood Date 5-28-92Reviewed by L S Kilbegg Date 5-28-92

Customer : T.E.JONES Date Received : 04/ 06/ 92 Work order : M-99911 ARF(SOW) : TI-HSP-WINDOW EA.L.O. No. : 92-5076 Description : VIAL 1213

DF

... 0.6253 ^{#95} --> 2.50 _{ml.} ... 2(5.03213) _{ml.} ...

Pipet LRB BMW _____ Page(s) No. _____

Std _____ LRB BMW _____ Page(s) No. _____

M. & T.E. _____

Standard card ID 5-Se - PGR, 4-6-92Blank card ID B-Se - PGR, 4-6-92Analyst P. RaneyDate 4-28-92295-1-92

Analysts Yield Factor _____ +/- _____

M. & T.E.	WM _____
Log Book:	BMW _____ p _____
Count position <u>5</u>	
Count 1	<u>41.50</u>
Count 2	<u>41.85</u>
Count 3	<u>44.75</u>
Count 4	<u>41.80</u>
count 5	<u>43.50</u>

Carrier Information	
V. of Carrier	<u>2(0.99063)</u> ml
Carrier's con.	<u>10.3975</u> mg/ml
Net weight	_____ mg
Wt. (100 %)	_____ mg
Chemical R.C.	_____

#65
BNW 54042, p.9.

Analyst _____

#3 Sample + tare 0.02900
 tare 0.00835
0.01965

92074

Selenium-79.....7-40.15

Customer : T. E. JONES Date Received 4/ 6/ 92 Work order : M-99913 ARF(SOW) : TI-HSP-WINDOW EA.L.O. No. 92-5080 Description : VIAL 1298

DF ---- .70210 ----> 250.00000 ---- 10.06426

Dilution Factor = 3.5380E+01 +/- .70%

M. & T.E.	WM	Carrier
Log Book:	BNW p	Information
Count 1	46.35	V. of Carrier 1.9813 ml
Count 2	46.70	Carrier's con. 10.3975 mg/ml
Count 3	44.25	Net weight 20.1700 mg
Count 4	47.00	Wt. (100 %) 20.6006 mg
count 5	44.60	Chemical R.C. .9791

Calculation and Results

Activities	Uncertainties	Less than	MDA
dpm/GM	%	dpm/GM	dpm/GM
Selenium-79 5.94E+02	12.7	5.09E+01	1.02E+02

Calculated by L.R. Greenwood Date 5-28-92Reviewed by L.S. Kilbegg Date 5-29-92

Customer : T.E.JONES Date Received : 04/ 06/ 92 Work order : M-99911 ARF(SOW) : TI-HSP-WINDOW EA.L.O. No. : 92-5080 Description : VIAL 1298

DF

--- 0.7021 _g --> 250 _{ml.} --- 2(5.03213) _{ml} ---

Pipet LRB BMW _____ Page(s) No. _____

Std _____ LRB BMW _____ Page(s) No. _____

M. & T.E. _____

Standard card ID S-5e-PJR, 4-6-92Blank card ID B-5e-PJR, 4-6-92Analyst PJ RaneyDate 4-28-92Analysts Yield Factor +/-29
5-1-92

M. & T.E.	WM _____
Log Book:	BMW _____ p _____
Count position 6	
Count 1	46.35
Count 2	46.70
Count 3	44.25
Count 4	47.00
count 5	44.68

Carrier Information	
V. of Carrier	2(0.99063) ml #65
Carrier's con.	10.3975 mg/ml BNL 54042, p.9
Net weight	_____ mg
Wt. (100 %)	_____ mg
Chemical R.C.	_____

Analyst _____

#4 Sample + tare

tare

0.00530
PJR
 5-1-92

 0.02834
 0.00817
0.02017

92074

Selenium-79.....7-40.15

Customer : T.E. JONES Date Received 4/ 6/ 92 Work order : M-99913 ARF(SOW) : TI-HSP-WINDOW EA.L.O. No. 92-5086 Description : VIAL 1204

DF ---- .56230 ----> 250.00000 ---- 10.06426

Dilution Factor = 4.4176E+01 +/- .70%

M. & T.E. Log Book:	WM BNW p	Carrier Information
Count 1	41.95	V. of Carrier 1.9813 ml
Count 2	42.55	Carrier's con. 10.3975 mg/ml
Count 3	43.35	Net weight 19.8400 mg
Count 4	44.50	Wt. (100 %) 20.6006 mg
count 5	41.70	Chemical R.C. .9631

Calculation and Results

	Activities dpm/GM	Uncertainties %	Less than dpm/GM	MDA dpm/GM
Selenium-79	5.88E+02	15.4	6.46E+01	1.29E+02

Calculated by L.R. Greenwood Date 5-28-92Reviewed by L.S. Kellogg Date 5-28-92

Customer : T.E.JONES Date Received : 04/ 06/ 92 Work order : M-99911 ARF(SOW) : TI-HSP-WINDOW EA.L.O. No. : 92-5086 Description : VIAL 1204

#45

DF

... 0.5623 g --> 2.50 ml. ... 2(5.03213) ml ...

Pipet LRB BMW _____ Page(s) No. _____

Std _____ LRB BMW _____ Page(s) No. _____

M. & T.E. _____

Standard card ID 5-56 - PGR, 4-6-92Blank card ID 13-56, PGR, 4-6-92Analyst PGRDate 4-28-92

39

5-1-92

Analysts Yield Factor +/-

M. & T.E.	WM _____
Log Book:	BMW _____ p _____
Count position 7	
Count 1	41.95
Count 2	42.55
Count 3	43.35
Count 4	44.50
count 5	41.20

Carrier Information	
V. of Carrier	2(0.99063) ml #65
Carrier's con.	10.3975 mg/ml BNU 54042, P.9
Net weight	_____ mg
Wt. (100 %)	_____ mg
Chemical R.C.	_____

Analyst _____

#5 sample + tare

tare

0.00877

0.02809

0.00825

0.01984

PGR
5-1-92

92074

Selenium-79.....7-40.15

Customer : T.E. JONES Date Received 4/ 6/ 92 Work order : M-99913 ARF(SOW) : II-HSP-WINDOW EA.L.O. No. 92-5087 Description : VIAL 1206

OF ---- .57330 ----> 250.00000 ---- 10.06426

Dilution Factor = 4.3329E+01 +/- .70%

M. & T.E. Log Book:	WM BNW p	Carrier Information
Count 1	39.35	V. of Carrier 1.9813 ml
Count 2	42.35	Carrier's con. 10.3975 mg/ml
Count 3	40.60	Net weight 19.9800 mg
Count 4	41.30	Wt. (100 %) 20.6006 mg
count 5	43.00	Chemical R.C. .9699

Calculation and Results

	Activities dpm/GM	Uncertainties %	Less than dpm/GM	MDA dpm/GM
Selenium-79	4.92E+02	17.4	6.29E+01	1.26E+02

Calculated by L.R. Greenwood Date 5-28-92Reviewed by L.S. Kellogg Date 5-28-92

Customer : T.E.JONES Date Received : 04/ 06/ 92 Work order : M-99911 ARF(SOW) : TI-HSP-WINDOW E

A.L.O. No. : 92-5087 Description : VIAL 1206

DF

--- 0.5733 $\rightarrow$ 250 $\rightarrow$ 1(503213) ---
 8 ml. ml. ml.

Pipet LRB BMW _____ Page(s) No. _____

Std _____ LRB BMW _____ Page(s) No. _____

M. & T.E. _____

Standard card ID 5-Se-PgR, 4-6-92

Blank card ID B-Se-PgR, 4-6-92

Analyst

PgRaney

Date 4-28-92

29
5-1-92

Analysts Yield Factor _____ +/- _____

M. & T.E.
Log Book:WM _____
BMW _____ p _____Carrier
Information

Count 1	37.35
Count 2	42.35
Count 3	40.6
Count 4	41.30
count 5	43.0

V. of Carrier	2(0.99063) ml
Carrier's con.	10.3975 mg/ml
Net weight	mg
Wt. (100 %)	mg
Chemical R.C.	

#65
BNW 54042, pg 9

Analyst _____

#6

sample + tare
tare

0.00838g

PgRaney

5-1-92

0.02861

0.00863

0.01998

92074

Selenium-79.....7-40.15

Customer : T.E. JONES Date Received 4/ 6/ 92 Work order : M-99913 ARF(SOW) : TI-HSP-WINDOW EA.L.O. No. 92-5092 Description : VIAL 1309

DF ---- .61610 ----> 250.00000 ---- 10.06426

Dilution Factor = 4.0319E+01 +/- .70%

M. & T.E. Log Book:	WM BNW p	Carrier Information
Count 1	41.65	V. of Carrier 1.9813 ml
Count 2	41.55	Carrier's con. 10.3975 mg/ml
Count 3	39.85	Net weight 17.1100 mg
Count 4	40.75	Wt. (100 %) 20.6006 mg
count 5	40.85	Chemical R.C. .8306

Calculation and Results

	Activities dpm/GM	Uncertainties %	Less than dpm/GM	MDA dpm/GM
Selenium-79	<u>5.11E+02</u>	18.0	6.84E+01	1.37E+02

Calculated by L R Greenwood Date 5-28-92Reviewed by L S Kellogg Date 5-28-92

Customer : T.E.JONES Date Received : 04/ 06/ 92 Work order : M-99911 ARF(SOW) : T1-HSP-WINDOW E

A.L.O. No. : 92-5092 Description : VIAL 1309

DF 0.6161g ~~0.06~~ → 259 ml. --- 2(5.03213) ---

Pipet LRB BMW Page(s) No.

Std LRB BMW Page(s) No.

M. & T.E.

Standard card ID S-S-PGR, 4-6-92

Blank card ID B-S-PGR, 4-6-92

Analyst PGRaney

Date 4-28-92

Analysts Yield Factor +/-

29
5-1-92

M. & T.E.	WM
Log Book:	BMW p
Count Position #11	
Count 1	41.65
Count 2	41.55
Count 3	39.85
Count 4	40.25
Count 5	40.85

Carrier Information	
V. of Carrier	2(0.99063) ml
Carrier's con.	10.3475 mg/ml
Net weight	mg
Wt. (100 %)	mg
Chemical R.C.	

#65
BNW5402, P9

Analyst

#7 sample + tare
tare 0.00828
PGR
4-24-92

0.02519
0.00808
0.01711

92074

Selenium-79.....7-40.15

Customer : T.E. JONES Date Received 4/ 6/ 92 Work order : M-99913 ARF(SOW) : TI-HSP-WINDOW EA.L.O. No. 92-5093 Description : VIAL 1310

DF ----- .56480 ----> 250.00000 ----- 10.06426

Dilution Factor = 4.3981E+01 +/- .70%

M. & T.E. WM
Log Book: BNW p Carrier
Information

Count 1	36.90
Count 2	39.50
Count 3	39.30
Count 4	38.85
count 5	37.25

V. of Carrier	1.9813 ml
Carrier's con.	10.3975 mg/ml
Net weight	~~10.9200~~ mg
Wt. (100 %)	20.6006 mg
Chemical R.C.	~~9678~~

.944

19.45 $\pm$ 2%
7/27/92

Calculation and Results

	Activities dpm/GM	Uncertainties %	Less than dpm/GM	MDA dpm/GM
Selenium-79	<u>3.37E+02</u>	24.5	6.40E+01	1.28E+02

3.45E+2
 $\pm$ 2%
7-27-92Calculated by L.R. Greenwood Date 5-28-92Reviewed by L.S. Kelley Date 5-28-92

Customer : T.E.JONES Date Received : 04/ 06/ 92 Work order : M-99911 ARF(SOW) : TI-HSP-WINDOW EA.L.O. No. : 92-5093 Description : VIAL 1310

DF

#5

--- 0.5648 _g --7 250 _{ml.} --- 2(5.03213) _{ml} ---

Pipet LRB BMW _____ Page(s) No. _____

Std _____ LRB BMW _____ Page(s) No. _____

M. & T.E. _____

Standard card ID 5-Se-PGR, 4-6-92Blank card ID B-Se-PGR, 4-6-92Analyst PJ RaneyDate 4-28-92

Analysts Yield Factor _____ +/- _____

29
5-1-92

M. & T.E.	LM _____
Log Book:	BW _____ p _____
Count Position 12	
Count 1	36.28
Count 2	37.50
Count 3	37.30
Count 4	38.85
Count 5	37.25

Carrier Information	
V. of Carrier	2(0.99063) ml
Carrier's con.	10.3975 mg/ml
Net weight	_____ mg
Wt. (100 %)	_____ mg
Chemical R.C.	_____

#65
BNW 54042, p.9

Analyst _____

#8 sample + tare

tare

0.00848g0.00829g

PGR 4-29-92

PGR 5-1-92

0.02769

0.00829g

0.01945

92074

Selenium-79.....7-40.15

Customer : T.F. JONES Date Received 4/ 6/ 92 Work order : M-99913 ARF(SOW) : TI-HSP-WINDOW EA.L.O. No. 92-5688 Description : METHODS BLANK

DF

---- 10.06426

Dilution Factor = 9.9362E-02 +/- .05%

M. & T.E. Log Book:	WM BNW p	Carrier Information
Count 1	33.15	V. of Carrier 1.9813 ml
Count 2	33.80	Carrier's con. 10.3975 mg/ml
Count 3	32.15	Net weight 19.4600 mg
Count 4	32.95	Wt. (100 %) 20.6006 mg
count 5	34.20	Chemical R.C. .9446

Calculation and Results

	Activities dpm/ML	Uncertainties %	Less than dpm/ML	MDA dpm/ML
Selenium-79	1.24E-01	142.9	2.72E-01	2.96E-01

Report Value
5-28-92

Calculated by L R Greenwood Date 5/28/92Reviewed by L S Kellogg Date 5-29-92

Customer : T.E.JONES Date Received : 04/ 06/ 92 Work order : M-99911 ARF(SOW) : TI-HSP-WINDOW E

A.L.O. No. : 92-5688 Description : METHODS BLANK

#95

DF

--- Blank --> 250 ml. --- 2(5.032/3) ml. ---

Pipet LRB BW Page(s) No.

Std LRB BW Page(s) No.

M. & T.E.

Standard card ID S-Se PR, 4-6-92

Blank card ID B-Se PR, 4-6-92

Analyst

PR Raney

Date 4-28-92

29

Analysts Yield Factor +/-

5-1-92

M. & T.E.	WM
Log Book:	BW p
Count position 13	
Count 1	33.15
Count 2	33.80
Count 3	32.15
Count 4	32.95
count 5	34.20

mean 33.25

net 33.25 - 32.285 = 0.965

Analyst

Carrier Information

V. of Carrier	2(0.99063) ml	#65
Carrier's con.	10 3975 mg/ml	BW 54042, p. 9.
Net weight	mg	
Wt. (100 %)	mg	
Chemical R.C.		

Ha Sample + tare

tare

-9.00833

PR 5-1-92

0.00824

PR 5-1-92

0.02776

0.00830g

0.01946

92074

Selenium-79.....7-40.15

Customer : T.E. JONES Date Received 4/ 6/ 92 Work order : M-99913 ARF(SOW) : TI-HSP-WINDOW EA.L.O. No. 92-5689 Description : METHODS BLANK

DF ---- 10.06426

Dilution Factor = 9.9362E-02 +/- .05%

M. & T.E. Log Book:	WM BNW p	Carrier Information
Count 1	32.25	V. of Carrier 1.9813 ml
Count 2	32.25	Carrier's con. 10.3975 mg/ml
Count 3	31.90	Net weight 20.1200 mg
Count 4	31.85	Wt. (100 %) 20.6006 mg
count 5	33.00	Chemical R.C. .9767

Calculation and Results

Activities dpm/ML	Uncertainties %	Less than dpm/ML	MDA dpm/ML
Selenium-79 -4.34E-03	*** 7999. LR 5/28/92	1.42E-01	2.87E-01 Report value LR 5-28-92

Calculated by LR Greenwood Date 5-28-92Reviewed by L S Kellogg Date 5-28-92

Customer : T.E.JONES Date Received : 04/ 06/ 92 Work order : M-99911 ARF(SOW) : TI-HSP-WINDOW E

A.L.O. No. : 92-5689 Description : METHODS BLANK

DF

#95

... Blank --> 250 ml. ... 2(5.03213) ml. ...

Pipet LRB BNW _____ Page(s) No. _____

Std _____ LRB BNW _____ Page(s) No. _____

M. & T.E. _____

Standard card ID S-S R, 4-6-92

Blank card ID B-S R, 4-6-92

Analyst

P. Poney

Date 4-28-92

Analysts Yield Factor +/- _____

29
5-1-92

M. & T.E.	LM
Log Book:	BNW p
Count position 14	
Count 1	32.25
Count 2	32.25
Count 3	31.90
Count 4	31.85
count 5	33.0

Carrier Information	
V. of Carrier	26.99063 ml
Carrier's con.	10.3975 mg/ml
Net weight	mg
Wt. (100 %)	mg
Chemical R.C.	

#65
BNW 54042, 89.

Analyst _____

#10 Sample + turn

turn

0.00835
PgR 5-1-920.02843
0.00831g
.02012

Selenium-79.....7-40.15

⁰
~~92119~~ *LR*
5-28-92

Customer : TE Jones Date Received 0/ 0/ 0 Work order : 199913 ARF(SOW) : _____
A.L.O. No. REAG-BLANK Description : B-5e-PJR-4-22-92

DF ---- 6.21354

Dilution Factor = 1.6094E-01 +/- .20%

M. & T.E. Log Book:	WM BNW p	Carrier Information
Count 1	35.40	V. of Carrier 1.9813 ml
Count 2	33.60	Carrier's con. 10.3975 mg/ml
Count 3	32.90	Net weight 20.0200 mg
Count 4	34.65	Wt. (100 %) 20.6006 mg
count 5	31.60	Chemical R.C. .9718

Calculation and Results

	Activities dpm/ML	Uncertainties %	Less than dpm/ML	MDA dpm/ML
Selenium-79	2.71E-01	103.0	2.33E-01	4.66E-01

Calculated by L R Greenwood Date 5/28/92

Reviewed by L S Kelley Date 5-29-92

Selenium-79.....7-40.15

TE-HSP

Customer : 1015Y Date Received : 4/16/92 Work order : M99911 ARF(SOW) : WENDOWIE
 A.L.O. No. : SEB/K Description : 6.2 BPR 5-20-92
6.2 ml of 1x 5.0m Kolt Fusion Solution

DF

--- 6.21354 --- --- --- --- ---

Pipet LRB BNW 5404Z Page(s) No. 14

Std _____ LRB BNW _____ Page(s) No. _____

M. & T.E. _____

Standard card ID S-Se-BPR, 4-22-92

Blank card ID B-Se-BPR, 4-22-92

Analyst

P. J. Roney

Date

M. & T.E.

Log Book:

WM

BNW p

Count Position

Count 1

35.4

Count 2

33.6

Count 3

32.9

Count 4

34.65

count 5

31.60Mean 32.6

Carrier

Information

Vol. Carrier (ml) 2(0.99036) #65

Conc. Carrier (mg/ml) 10.3975

Wt. (Se carrier)

Wt. (100 %)

Analysts Y. F.

Err(A.Y.F.)

Analyst

5.02258 ml - #95
0.99036 ml - #65
2(0.1003) ml - #57
6.21354 - Total Volume
 (ml)

#2 Sample + Tare - 0.02807 g.
 #2 Tare - 0.00805
20.02

Selenium-79.....7-40.15

92119 + R⁹
5-28-92

Customer : TE Jones Date Received 0/ 0/ 0 Work order : _____ ARF(SOW) : _____
A.L.O. No. REAG-BLANK Description : B-5e 4-6-92

DF ---- 10.06426

Dilution Factor * 9.9362E-02 +/- .05%

M. & T.E. Log Book:	WM BNW p	Carrier Information
Count 1	34.09	V. of Carrier 1.9813 ml
Count 2	29.20	Carrier's con. 10.3975 mg/ml
Count 3	32.20	Net weight 20.1700 mg
Count 4	30.95	Wt. (100 %) 20.6006 mg
count 5	32.15	Chemical R.C. .9791

Calculation and Results

Activities dpm/ML	Uncertainties %	Less than dpm/ML	MDA dpm/ML
Selenium-79 -7.01E-02	239.2	1.42E-01	2.86E-01

Report

Calculated by L R Greenwood Date 5-28-92

Reviewed by S S Killogg Date 5-29-92

Selenium-79.....7-40.15

0

Customer : T.E. Jones Date Received : 04/06/92 Work order : 149911 ARF(SOW) : VENDOR E ^{TS - HSP}

A.L.O. No. : Se B/K Description : Used 10ml of 1X Sim. KOH Fusion

OF

--- 2(5.0321) --- --- --- --- ---

Pipet LRB BMW _____ Page(s) No. _____

Std _____ LRB BMW _____ Page(s) No. _____

M. & T.E. _____

Standard card ID 5-Se-BR, 4-6-92 Blank card ID B-Se, 4-6-92

Analyst PJ Raney Date 4-28-92
29
5-1-92

M. & T.E.	WM
Log Book:	BMW p
Count 1	34.09
Count 2	29.20
Count 3	32.20
Count 4	30.95
Count 5	32.15

Concentration 9

Carrier	Information
Vol of Carrier (ml)	2 (0.99063) #65
Conc. Carrier (mg/ml)	10.3975 8NW54042, p.9.
Wt. (Se carrier)	
Wt. (100 %)	
Analysts Y. F.	
Err(A.Y.F.)	

Analyst _____

#12 Sample + tare 0.02849
tare 0.00839g BR
tare 0.00832g 5-1-92
0.02017g

Batch Calculation for Se-79

JR Greenwood 5-28-92

Counting Time for all individual sample 20 minutes

Background Counting Information

Number of backgrounds 2

Count 1	Count 2	Count 3	Count 4	Count 5	Mean	SD (mean)
32.75	33.80	31.65	33.15	32.90	32.85	.78
31.50	31.60	31.25	32.35	31.90	31.72	.42

Standard Counting Information

No. of STD	Activity in dpm/ml	Date of To	Date of counting
2	4.0350E+04		

STD VOL	Count 1	Count 2	Count 3	Count 4	Count 5	Mean	-Bkg
.1000	3369.60	3370.70	3358.70	3394.60	3368.35	3340.10	13.30
.1000	3316.80	3308.05	3339.45	3301.40	3313.45	3283.54	14.43

147

JR 5/28/92

See corrected sheet
4/29/92 5/28/92

Batch Calculation for Se-79

Counting Time for all individual sample 100 minutes

20 4/29/92 5/28/92

Background Counting information

Number of backgrounds 2

Count 1	Count 2	Count 3	Count 4	Count 5	Mean	SD (mean)
32.75	33.80	31.65	33.15	32.90	32.85	.78
31.50	31.60	31.25	32.35	31.90	31.72	.42

$\bar{X} = 32.285$

Standard Counting Information

No. of STD	Activity in dpm/ml	Date of To	Date of counting
2	4.0350E+04		

STD VOL	Count 1	Count 2	Count 3	Count 4	Count 5	Mean	SD
.1000	3369.60	3370.70	3358.70	3394.60	3368.35	3340.10	13.30
.1000	3316.80	3308.05	3339.45	3301.40	3313.45	3283.54	14.43

$$\text{Pos 2 std} \quad \frac{4.035 \text{ E } 3}{3372.39 - 32.285} = 1.20805$$

$$\text{Pos 10 std} \quad \frac{4.035 \text{ E } 3}{3315.83 - 32.285} = 1.22875 \quad \bar{X}_2 = 1.21845 \text{ d/c}$$

All samples counted 100 minutes
Backgrounds counted 100 min each = 200 min

$$\text{Critical level } L_c = 1.65 \left[\frac{32.285}{200} \left(1 + \frac{200}{100} \right) \right]^{1/2} = 1.148$$

$$\text{Minimum detectable activity mDA} = \frac{3}{200} + (2)(L_c) = \frac{3}{200} + (2)(1.148) = 2.311$$

Col Harvey

David J. Kelley 5-27-92

Batch Calculation for Selenium-79

Counting Time for all the individual sample minutes

Background Counting Information

Count 1	Count 2	Count 3	Count 4	Count 5	Mean	SD(mean)
③ 32.75	33.8	31.65	33.15	32.90		
⑦ 31.50	31.60	31.25	32.35	31.90		

Standard Counting Information

No. of STD Activity in dpm/ml

X-59 4.035 E+4

4.038 x 10⁴ on 8-21-95

STD VOL	Count 1	Count 2	Count 3	Count 4	Count 5	Mean
③	3369.6	3370.7	3359.7	3394.60	3368.35	
④	3316.80	3308.25	3339.45	3301.40	3313.45	
①	3402.65	3386.45	3357.65			
⑦	3317.65	3302.05	3315.60			

Liquid Scintillation Counting Log Sheet

Program

Analyst

Number: 15

C O HARVEY

Date 5-21-92

Position	A.L.O. Sample No.	Sample Description
1	¹⁴ C standard	
2	Blank (reagent)	
3	BKG	
4		
5	Packard Blank	2605, 29.40 27.20
6		
7	¹⁴ C standard	
8	Blank (reagent)	
9	BKG	
10		
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		
21		
22		
23		
24		
25		
26		
27		
28		
29		
30		

PROGRAM # = 15
 REGION A: LL-UL = 0- 4 LCR = 0 BKG = .00 % 2 SIGMA = .0
 REGION B: LL-UL = 4- 156 LCR = 0 BKG = .00 % 2 SIGMA = .0
 REGION C: LL-UL = 156-2000 LCR = 0 BKG = .00 % 2 SIGMA = .0
 TIME = 20.00 K = 1.000 QIP = SIS

P#	S#	TIME	CPMA/K	%DEV	CPMB/K	%DEV	CPMC/K	%DEV	SIE	SIS	FLAGS	MIN
15	1	20.00	304.00	2.56	3357.65	.77	14.95	11.5	.000	10.427		21
15	2	20.00	10.95	13.5	32.45	7.85	15.00	11.5	.000	8.642		42
15	3	20.00	13.35	12.2	31.65	7.95	14.90	11.5	.000	7.726		62
15	5	20.00	11.00	13.4	27.90	8.47	19.20	10.2	.000	9.085		83
15	7	20.00	345.45	2.41	3315.60	.78	14.75	11.6	.000	10.673		103
15	8	20.00	11.10	13.4	32.55	7.84	13.70	12.0	.000	8.305		124
15	9	20.00	18.10	10.5	31.25	8.00	14.25	11.8	.000	7.252		144

PROGRAM # = 15 21/05/92 22:09
 REGION A: LL-UL = 0- 4 LCR = 0 BKG = .00 % 2 SIGMA = .0
 REGION B: LL-UL = 4- 156 LCR = 0 BKG = .00 % 2 SIGMA = .0
 REGION C: LL-UL = 156-2000 LCR = 0 BKG = .00 % 2 SIGMA = .0
 TIME = 20.00 K = 1.000 QIP = SIS

P#	S#	TIME	CPMA/K	%DEV	CPMB/K	%DEV	CPMC/K	%DEV	SIE	SIS	FLAGS	MIN
15	1	20.00	309.50	2.54	3386.45	.77	16.35	11.0	.000	10.547		20
15	2	20.00	11.00	13.4	32.50	7.84	12.65	12.5	.000	8.394		42
15	3	20.00	11.25	13.3	33.80	7.69	14.10	11.9	.000	8.715		62
15	5	20.00	9.40	14.5	29.40	8.25	19.00	10.2	.000	9.754		84
15	7	20.00	352.95	2.38	3302.05	.78	15.35	11.4	.000	10.638		105
15	8	20.00	10.60	13.7	32.90	7.80	14.95	11.5	.000	8.462		125
15	9	20.00	15.85	11.2	31.60	7.96	15.40	11.4	.000	7.683		146

PROGRAM # = 15 22/05/92 04:03
 REGION A: LL-UL = 0- 4 LCR = 0 BKG = .00 % 2 SIGMA = .0
 REGION B: LL-UL = 4- 156 LCR = 0 BKG = .00 % 2 SIGMA = .0
 REGION C: LL-UL = 156-2000 LCR = 0 BKG = .00 % 2 SIGMA = .0
 TIME = 20.00 K = 1.000 QIP = SIS

P#	S#	TIME	CPMA/K	%DEV	CPMB/K	%DEV	CPMC/K	%DEV	SIE	SIS	FLAGS	MIN
15	1	20.00	310.95	2.54	3402.65	.77	14.55	11.7	.000	10.469		21
15	2	20.00	10.25	13.9	33.50	7.73	14.15	11.8	.000	8.864		41
15	3	20.00	10.00	14.1	32.75	7.81	14.90	11.5	.000	8.605		62
15	5	20.00	10.50	13.8	26.05	8.76	19.00	10.2	.000	8.727		83
15	7	20.00	340.15	2.42	3317.65	.78	14.70	11.6	.000	10.622		103
15	8	20.00	11.15	13.3	32.05	7.90	14.55	11.7	.000	9.064		124
15	9	20.00	13.10	12.3	31.50	7.97	14.00	11.9	.000	7.402		144

PROGRAM #= 15 22/05/92 14:25
 REGION A: LL-UL= 0- 4 LCR= 0 BKG= .00 % 2 SIGMA= .0
 REGION B: LL-UL= 4- 156 LCR= 0 BKG= .00 % 2 SIGMA= .0
 REGION C: LL-UL= 156-2000 LCR= 0 BKG= .00 % 2 SIGMA= .0
 TIME= 20.00 K= 1.000 QIP=SIS

P#	S#	TIME	CPMA/K	%DEV	CPMB/K	%DEV	CPMC/K	%DEV	SIE	SIS	FLAGS	MIN
15	3	20.00	12.45	12.6	33.15	7.77	15.35	11.4	.000	9.308		21
15	9	20.00	13.70	12.0	32.35	7.86	13.65	12.1	.000	7.576		42

PROGRAM #= 15 22/05/92 10:22
 REGION A: LL-UL= 0- 4 LCR= 0 BKG= .00 % 2 SIGMA= .0
 REGION B: LL-UL= 4- 156 LCR= 0 BKG= .00 % 2 SIGMA= .0
 REGION C: LL-UL= 156-2000 LCR= 0 BKG= .00 % 2 SIGMA= .0
 TIME= 20.00 K= 1.000 QIP=SIS

P#	S#	TIME	CPMA/K	%DEV	CPMB/K	%DEV	CPMC/K	%DEV	SIE	SIS	FLAGS	MIN
15	3	20.00	11.70	13.0	32.90	7.80	15.85	11.2	.000	8.793		20
15	9	20.00	13.40	12.2	31.90	7.92	13.90	12.0	.000	7.388		242

Liquid Scintillation Counting Log Sheet

Program

Number: 19

Analyst C O HARVEY

Date 5-20-92

Position	A.L.O. Sample No.	Sample Description
1	Reagent Blank	85c PJR 4-6-92
2	¹⁴ C standard 5	
3	92-5070	Vial 1200
4	92-5074	Vial 1212
5	92-5076	Vial 1213
6	92-5080	Vial 1298
7	92-5086	Vial 1204
8	92-5087	Vial 1206
9	Reagent Blank	BS 4-22-92
10	¹⁴ C standard II	
11	92-5092	Vial 1309
12	92-5093	Vial 1310
13	92-5688	METHODS Blank
14	92-5689	METHODS Blank
15		
16		
17		
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27		
28		
29		
30		

PROGRAM # = 15
 REGION A: LL-UL = 0- 4 LCR = 0 BKG = .00 % 2 SIGMA = .0
 REGION B: LL-UL = 4- 156 LCR = 0 BKG = .00 % 2 SIGMA = .0
 REGION C: LL-UL = 156-2000 LCR = 0 BKG = .00 % 2 SIGMA = .0
 TIME = 20.00 K = 1.000 QIP = SIS

20/05/92 09:43

P#	S#	TIME	CPMA/K	%DEV	CPMB/K	%DEV	CPMC/K	%DEV	SIE	SIS	FLAGS	MIN
15	1	20.00	14.50	11.7	35.40	7.52	16.15	11.1	.000	7.574		21
15	2	20.00	347.15	2.40	3369.60	.77	14.10	11.9	.000	9.883		42
15	3	20.00	16.30	11.0	46.90	6.53	15.00	11.5	.000	7.839		62
15	4	20.00	14.10	11.9	45.50	6.63	15.25	11.4	.000	7.768		83
15	5	20.00	14.55	11.7	41.50	6.94	15.00	11.5	.000	7.819		103
15	6	20.00	14.40	11.7	46.35	6.57	14.85	11.6	.000	8.012		124
15	7	20.00	15.10	11.5	41.95	6.90	15.05	11.5	.000	7.859		144
15	8	20.00	14.85	11.6	39.35	7.13	13.45	12.1	.000	8.034		165
15	9	20.00	12.85	12.4	34.05	7.66	13.35	12.2	.000	8.328		185
15	10	20.00	344.85	2.41	3316.80	.78	14.80	11.6	.000	10.852		206
15	11	20.00	14.00	11.9	41.65	6.93	15.10	11.5	.000	7.535		227
15	12	20.00	14.10	11.9	36.90	7.36	14.35	11.8	.000	7.922		247
15	13	20.00	13.00	12.4	33.15	7.77	15.15	11.4	.000	7.429		268
15	14	20.00	12.90	12.4	32.25	7.87	14.10	11.9	.000	7.954		288

PROGRAM #= 15
 REGION A: LL-UL= 0- 4 LCR= 0 BKG= .00 % 2 SIGMA= .0
 REGION B: LL-UL= 4- 156 LCR= 0 BKG= .00 % 2 SIGMA= .0
 REGION C: LL-UL= 156-2000 LCR= 0 BKG= .00 % 2 SIGMA= .0
 TIME= 20.00 K= 1.000 QIP=SIS

P#	S#	TIME	CPMA/K	%DEV	CPMB/K	%DEV	CPMC/K	%DEV	SIE	SIS	FLAGS	MIN
15	1	20.00	16.30	11.0	33.60	7.72	15.20	11.4	.000	7.931		20
15	2	20.00	313.45	2.53	3370.70	.77	14.20	11.8	.000	10.557		41
15	3	20.00	17.60	10.6	47.05	6.52	15.80	11.2	.000	8.383		61
15	4	20.00	14.15	11.8	44.50	6.70	13.65	12.1	.000	8.330		82
15	5	20.00	14.20	11.8	41.85	6.91	13.95	11.9	.000	8.322		102
15	6	20.00	12.75	12.5	46.70	6.54	14.45	11.7	.000	7.993		123
15	7	20.00	12.70	12.5	42.55	6.86	14.10	11.9	.000	7.993		144
15	8	20.00	12.55	12.6	42.35	6.87	14.90	11.5	.000	9.284		164
15	9	20.00	12.90	12.4	29.20	8.28	16.65	10.9	.000	8.020		185
15	10	20.00	347.60	2.40	3308.05	.78	16.50	11.0	.000	10.415		205
15	11	20.00	13.30	12.2	41.55	6.94	15.00	11.5	.000	7.827		226
15	12	20.00	13.15	12.3	39.50	7.12	15.15	11.4	.000	8.072		247
15	13	20.00	13.05	12.3	33.80	7.69	13.30	12.2	.000	7.430		267
15	14	20.00	11.10	13.4	32.25	7.87	13.30	12.2	.000	8.459		288

PROGRAM # = 15
 REGION A: LL-UL = 0- 4 LCR = 0 BKG = .00 % 2 SIGMA = .0
 REGION B: LL-UL = 4- 156 LCR = 0 BKG = .00 % 2 SIGMA = .0
 REGION C: LL-UL = 156-2000 LCR = 0 BKG = .00 % 2 SIGMA = .0
 TIME = 20.00 K = 1.000 QIP = SIS

P#	S#	TIME	CPMA/K	%DEV	CPMB/K	%DEV	CPMC/K	%DEV	SIE	SIS	FLAGS	MIN
15	1	20.00	12.05	12.8	32.90	7.80	14.50	11.7	.000	8.951		21
15	2	20.00	315.55	2.52	3358.70	.77	15.75	11.2	.000	10.369		41
15	3	20.00	15.10	11.5	47.80	6.47	15.00	11.5	.000	8.873		62
15	4	20.00	14.25	11.8	43.80	6.76	15.50	11.3	.000	7.776		82
15	5	20.00	11.60	13.1	44.75	6.69	15.95	11.2	.000	8.374		103
15	6	20.00	13.20	12.3	44.25	6.72	16.95	10.8	.000	8.141		123
15	7	20.00	13.55	12.1	43.35	6.79	14.00	11.9	.000	9.069		144
15	8	20.00	12.50	12.6	40.60	7.02	14.85	11.6	.000	8.644		164
15	9	20.00	11.65	13.1	32.20	7.88	15.45	11.3	.000	7.861		185
15	10	20.00	353.95	2.38	3339.45	.77	14.40	11.7	.000	10.549		206
15	11	20.00	12.55	12.6	39.85	7.08	13.70	12.0	.000	8.282		226
15	12	20.00	12.80	12.5	39.30	7.13	15.15	11.4	.000	8.660		247
15	13	20.00	11.75	13.0	32.15	7.89	13.15	12.3	.000	8.226		267
15	14	20.00	12.70	12.5	31.90	7.92	14.90	11.5	.000	7.823		288

PROGRAM # = 15
 REGION A: LL-UL = 0- 4 LCR = 0 BKG = .00 % 2 SIGMA = .0
 REGION B: LL-UL = 4- 156 LCR = 0 BKG = .00 % 2 SIGMA = .0
 REGION C: LL-UL = 156-2000 LCR = 0 BKG = .00 % 2 SIGMA = .0
 TIME = 20.00 K = 1.000 QIP = SIS

P#	S#	TIME	CPMA/K	%DEV	CPMB/K	%DEV	CPMC/K	%DEV	SIE	SIS	FLAGS	MIN
15	1	20.00	12.45	12.6	34.65	7.60	15.35	11.4	.000	8.135		21
15	2	20.00	314.60	2.52	3394.60	.77	15.55	11.3	.000	10.499		42
15	3	20.00	15.30	11.4	47.35	6.50	13.85	12.0	.000	7.858		62
15	4	20.00	13.80	12.0	43.90	6.75	13.80	12.0	.000	8.766		83
15	5	20.00	14.05	11.9	41.30	6.96	14.60	11.7	.000	7.958		103
15	6	20.00	13.35	12.2	47.00	6.52	14.60	11.7	.000	8.168		124
15	7	20.00	11.65	13.1	44.50	6.70	14.25	11.8	.000	7.278		144
15	8	20.00	13.75	12.0	41.30	6.96	15.10	11.5	.000	8.309		165
15	9	20.00	10.35	13.9	30.95	8.04	13.75	12.0	.000	8.867		185
15	10	20.00	354.15	2.38	3301.40	.78	15.70	11.2	.000	10.664		206
15	11	20.00	11.55	13.1	40.75	7.01	14.05	11.9	.000	8.735		227
15	12	20.00	12.85	12.4	38.85	7.17	13.50	12.1	.000	8.729		247
15	13	20.00	10.95	13.5	32.95	7.79	13.95	11.9	.000	7.746		268
15	14	20.00	11.55	13.1	31.85	7.92	13.10	12.3	.000	8.155		288

PROGRAM #= 15 21/05/92 05:13
 REGION A: LL-UL= 0- 4 LCR= 0 BKG= .00 % 2 SIGMA= .0
 REGION B: LL-UL= 4- 156 LCR= 0 BKG= .00 % 2 SIGMA= .0
 REGION C: LL-UL= 156-2000 LCR= 0 BKG= .00 % 2 SIGMA= .0
 TIME= 20.00 K= 1.000 QIP=SIS

P#	S#	TIME	CPMA/K	%DEV	CPMB/K	%DEV	CPMC/K	%DEV	SIE	SIS	FLAGS	MIN
15	1	20.00	11.65	13.1	31.60	7.96	15.45	11.3	.000	7.712		20
15	2	20.00	304.05	2.56	3368.35	.77	14.40	11.7	.000	10.661		41
15	3	20.00	15.10	11.5	49.90	6.33	15.45	11.3	.000	8.413		61
15	4	20.00	12.05	12.8	43.80	6.76	13.65	12.1	.000	9.561		82
15	5	20.00	12.00	12.9	43.50	6.78	15.90	11.2	.000	8.276		103
15	6	20.00	13.45	12.1	44.60	6.70	13.60	12.1	.000	8.280		123
15	7	20.00	12.25	12.7	41.70	6.93	14.55	11.7	.000	8.140		144
15	8	20.00	12.35	12.7	43.00	6.82	15.15	11.4	.000	9.129		164
15	9	20.00	11.60	13.1	32.15	7.89	15.00	11.5	.000	7.771		185
15	10	20.00	347.70	2.40	3313.45	.78	13.90	12.0	.000	10.457		205
15	11	20.00	11.75	13.0	40.85	7.00	12.60	12.6	.000	8.928		226
15	12	20.00	12.00	12.9	37.25	7.33	14.65	11.6	.000	8.563		248
15	13	20.00	11.15	13.3	34.20	7.65	13.70	12.0	.000	8.848		268
15	14	20.00	10.65	13.7	33.00	7.78	12.55	12.6	.000	8.490		289

D4 - NIOBIUM 93/94 ANALYSIS RESULTS

Date June 25, 1992

LR Greenwood
File/LB

To Tom Jones

From Nancy Wynhoff *Nancy Wynhoff*Subject ^{94}Nb and ^{93}Nb Analysis Results for 101-SY
Composite Samples

Aliquots of the eight fused samples and their associated fusion method blanks submitted from the Tank 101-SY 24 Window "E" core composite samples were prepared for analysis according to procedure PNL-ALO-472, Determination of ^{93}Nb and ^{94}Nb . Also prepared were the following QC samples: one sample duplicate, one method blank, one method blank spike and one matrix spike. A known activity of ^{95}Zr - ^{95}Nb tracer standard was added to each sample to serve as a yield monitor, a niobium separation was performed and the samples were prepared for counting. The ^{95}Nb yield and ^{94}Nb activity were determined by gamma spectroscopy and the ^{93}Nb activity was determined by low energy photon gamma spectroscopy (LEPS). All gamma counting was performed according to procedure PNL-ALO-464, Procedure for Gamma Counting and Data Reduction in the Low-Level Counting Room, 329 Building, or PNL-ALO-450, Gamma Energy Analysis, for gamma counting performed in 325 Building. All work was performed in buildings 325, 329 and 329T5 in the 300 Area.

The ^{94}Nb results for all of the samples and blanks showed no detectable activity, so a minimum detectable activity (MOA) has been reported. The blank spike and matrix spike had good recoveries of 89% and 90% respectively. Since the duplicate sample results were both below the MOA, precision could not be estimated from their results.

The ^{93}Nb results from the first gamma counts showed detectable activity in all samples and in two of the three blanks. In evaluating the data we determined that one possible source of positive interference at the low levels being measured in these sample aliquots was the presence of ^{95}Nb , the daughter (half-life = 3.6 days) of the ^{95}Zr tracer. ^{95}Nb decay also produces the Nb K _{α} x-rays used to determine the ^{93}Nb activity. More time was needed between the Nb-Zr separation and the LEPS counting to be sure this interference had decayed to insignificant quantities.

The samples were recounted after the ^{95}Nb had decayed to sufficiently low levels. The results generally decreased when compared to the first count but all were positive for ^{93}Nb . All three blanks contain detectable ^{93}Nb at 3000 - 7800 dpm/g. This is approximately 10 to 20% of the activity in the highest activity sample in this set. Since it is very unlikely that all three blanks could have been cross-contaminated at this level and since the method blank, BL-5070, has a constant count rate in the time-frame of a month, it is likely that another source of ^{93}Nb or Nb K _{α} x-rays is present. A brief, preliminary check shows that Nb x-ray fluorescence induced by the interaction of ^{95}Nb beta particles with the stable Nb (added as carrier) in the prepared sample is a

possible source of positive interference at the activity levels of the blanks. Another possible interference is ^{93}Nb as an impurity in the ^{95}Zr - ^{95}Nb tracer solution.

Based on this evaluation of the data, the ^{93}Nb results are being reported both with and without ~~correction-a~~ blank correction. The correction entails subtracting the activity found in the method blank, BL-5070, from the activity in each sample's aliquot. I consider the blank-corrected data to be more reliable since the two possible interferences being considered would be reflected in the activity of the method blank. We are currently evaluating both the possible Nb x-ray fluorescence interference and the use of pure ^{95}Nb tracer instead of ^{95}Zr - ^{95}Nb so that there will be no 3.6 day ^{95}Nb present to delay the LEPS counting for ^{93}Nb . I anticipate that these evaluations will solve the problems encountered on these analyses before any future ^{93}Nb analyses are performed.

For the ^{93}Nb results, the relative percent difference for the duplicate sample (blank-corrected) is 110% which is not unexpected near the detection limit. (The individual 1σ uncertainties are 28% and 77% for the individual results.) The spike recoveries are excellent at 93% for the blank spike and 104% for the matrix spike. These are not blank-corrected since this correction is less than 1% at the activity levels in these spiked samples. The reported error estimates are based on the propagation of the estimates of individual measurement uncertainties, for example, volume and counting uncertainties.

If you have any questions, please contact me at 6-8706 or by cc:mail.

NB101SYF.RES

N. L. G. W. H. 6/25/92
Analyst Date

J. K. Fading 6/25/92
Reviewer

Results for Nb-94 and Nb-93a Analyses for Tank 101-SY

ACL I.D.	Nb-93m				Blank-corrected				Nb-93a	
	Nb-94	+/-	Conc.	Nb-94	Nb-93m	+/-	Nb-93m	+/-	Conc.	Nb-93a
	dpm/g	1 sigma	dpm/g	Recovery	dpm/g	1 sigma	dpm/g	1 sigma	dpm/g	Recovery
92-5070	< 160				3,400	21%	1,100	77%		
92-5070 Duplicate	< 320				6,800	12%	3,800	28%		
92-5074	< 130				8,500	10%	6,400	19%		
92-5076	< 1400				7,800	10%	4,200	40%		
92-5080	< 160				15,000	10%	13,000	17%		
92-5080 Hot Cell Blank*	< 800				7,800	22%	4,400	52%		
92-5086	< 230				9,700	11%	6,500	23%		
92-5087	< 300				13,000	9%	9,900	19%		
92-5092	< 370				31,000	9%	28,000	17%		
92-5093	< 120				14,000	10%	11,000	19%		
92-5089 Hot Cell Blank*	< 270				3,200	20%	(220)	400%		
BL-5070 Blank*	< 270				3,400	17%	0			
BS-5070 Blank Spike*	114,000	4%	120,000	89%	429,000	9%			460,000	93%
MS-5070 Matrix Spike	75,000	4%	93,000	90%	312,000	9%			299,000	104%

* Based on nominal 0.5 gram sample size followed by the same dilutions and aliquots as the samples.

Errors are estimated by the propagation of individual measurement uncertainty estimates.

NB101SYF

Niobium-94 and -93m Analysis
For 101-SY Samples

Don's new 5-4-92

5-5-92 Log standard number W-91 (^{93m}Nb) into ~~NLM~~ system (Bob brought this standard over and knows where it is). Make an accurate dilution of this standard as follows: 0.5ml (calibrated pipet) to 50 ml in 1 M HNO₃ and 0.3M HF, use a ~~teflon or plastic~~ volumetric flask. Log this new standard dilution into ~~NLM's~~ *DRES* system with a -100 suffix. *5-5-92*

Prepare an Amersham standard to calibrate Elwood's detectors: 0.1ml (calibrated pipet) of #54124-70-0, stipled uniformly onto filter with Nb determination geometry.

Analyze the following samples for ⁹⁴Nb and ^{93m}Nb according to PNL-ALO-472, Rev. 0.

Sample ID	Aliquot Volume	Spike vol. and ID
92-05070	5 ml	
92-05074	5 ml	
92-05076	5 ml	
92-05080	5 ml	
92-05086	5 ml	
92-05087	5 ml	
92-05688	5 ml	
92-05689	5 ml	
92-05092	5 ml	
92-05093	5 ml	
DUP-05070	5 ml	
MS-05070	5 ml	diluted ^{93m} Nb 0.25ml <i>SV/24.84.100</i> 50 ul 54124-33-1 ⁹⁴ Nb
BL-05070	5 ml 9 M HNO ₃	
BS-05070	5 ml 9 M HNO ₃	0.25ml diluted ^{93m} Nb 50 ul 54124-33-1 ⁹⁴ Nb

SV/24.36-0
Add 0.25 ml of ⁹⁵Nb tracer to each sample with a calibrated pipet. This is the appropriate time to pipet the standard directly on a filter paper for 100% yield calculation (Step 4.3).

Procedure PNL-AL0-472, Rev.0, Nb-94 & Nb-93m

Date Sample Prep Started 5-6-92 Date Completed 5-6-92
 93M/Nb-54124-84-100 13A-6 250.3151.21 5-6-92
 Zr-95/Nb-95 Tracer Volume - LRB 54371 Pg 33
 Pipette No. 13A-6 Volume 250.3 +/- 1.2 Date Pipetted 5-6-92
 Spike ID 54124-36-0 Spike Activity 76 mCi 5/1/92
 Nb-94 Spike Volume - to blank spike LRB 54371 Pg 34
 Pipette No. 5A-5 Volume 49.41 +/- 0.1 Date Pipetted 5-6-92
 Spike ID 54124-33-1 Spike Activity 76 mCi 5/1/92

Sample ID, Aliquot Size, Dilution, and Leachate Volume Sep. time 5-7-92 1330
LRB 54371-Pg 34
 Balance Number 510-06-01-011 Temperature (if weighing liquid samples) _____

Sample ID	Beaker-#	Blk - Spt	Sample Wt or Vol	Final Leachate Vol. (mL)	Dilution	Volume for Nb anal.
92-05070	1200			160.2mg		5ml
DU P 05070	1200			258.1mg		
92-05074	1212			277.0mg		
92-05076	1213			118.9mg		
92-05080	1298			319.9mg		
92-05086	1204			281.6mg		
92-05087	1206			251.5mg		
92-05688	Blank			268.8mg		
92-05689	Blank			300.5mg		
92-05092	1309			328.9mg		
92-05093	1310			309.2mg		
MR 05070				286.0mg		↓

Other Volumes (e.g., if a pipet was used for small aqueous samples or leach aliquots)

Aliquot of: all samples LRB 54371-Pg 34
 Pipette No. 5A-26 Volume 49.93ml +/- 0.17ml Date Pipetted 5-6-92

Aliquot of: _____
 Pipette No. _____ Volume _____ +/- _____ Date Pipetted _____

Aliquot of: _____
 Pipette No. _____ Volume _____ +/- _____ Date Pipetted _____

Steven B. Boudaryski 5-15-92 7/26/92 6/2/92
 Analyst Date Reviewer Date

NB DATA.LOG

Page 2 of 2

Date Sample Prep Started 5-6-92 Date Completed _____

Pipette No. _____ Volume _____ +/- _____ Date Pipetted _____
Spike ID _____ Spike Activity _____

Pipette No. _____ Volume _____ +/- _____ Date Pipetted _____
Spike ID _____ Spike Activity _____

Balance Number	Temperature (if weighing liquid samples)

[illegible]

Aliquot of:			
Pipette No.	Volume	+/-	Date Pipetted

Aliquot of:				
Pipette No.	<table border="1" style="width: 85%;"><tr><td style="text-align: center;">Volume</td><td style="text-align: center;">+/-</td><td style="text-align: center;">Date Pipetted</td></tr></table>	Volume	+/-	Date Pipetted
Volume	+/-	Date Pipetted		

Aliquot of:			
Pipette No.	Volume	+/-	Date Pipetted

Analyst _____ Date _____ Reviewer _____ Date _____

NBDATA.LOG

**HANFORD TASK WASTE CHARACTERIZATION
SAMPLE PREP DATA SHEET
(325-B Hot Cells)**

TI NO.: ^{TI-HSP-}
WIN 0001
8-981 WBS NO.: NA

ISSUED BY: RT STEELE DATE: 4-1-92

CONTROLLING PROCEDURE: PNL-ALO-010

ANALYST: D. G. He DATE: 4-3-92

QA PLAN: ALO-003 IMPACT LEVEL: II

REVIEW: W. L. H. H. DATE: 4/6/92

CORE ID: NA

[illegible]

Batch 7

TI-WSP-

REVIEW: [Signature] DATE: 4/6/92

QA PLAN: ALO-003 IMPACT LEVEL: II

CORE ID: NA

[illegible]

NIOBIUM ANALYSIS

Page 1 of 2

Spreadsheet filename: NBCALC

Revision 1: 6/1/92, NLW

Assumes tracer added to final aliquot

Sample ID: 92-5070 LEPS recount

Date Calculated: 06/19/92

Data filename: NB5070R

M&TE No.

Diode HH

Nb-94 & 95 Spectrum: 9205070.hh;1

Zr/Nb-95 Tracer: 54124-76-0

volume added, ml: 0.2503 0.0012 error *****Half-lives*****

Zr-95 dpm/ml: 4.415E+03 4.500E+01 error Zr-95= 64.02 days

Nb-95 dpm/ml: 9.892E+03 1.151E+02 error Nb-95= 34.97 days

On: Date: 05/13/92 01:00 Time

Nb Sep Date: 05/07/92 13:30 Time

total dpm Nb-95= 2629.44 34.53 error at Nb sep time

Sample Amount: 0.7690 0.0002 error

g, ml or sample? g

Reporting Units

Leach Volume, ml: 250 0.01 error

Activity: dpm

Vol to dilute, ml: 1 0.00001 error

per ? : g

Diluted to, ml: 1 0.00001 error

Final Aliquot, ml: 4.993 0.17 error

Nb-94 & 95 Counting Data from Prepared Sample

Sample dpm Nb-95= 1.128E+03 1.06 % error at Nb sep time

Sample dpm Nb-94= 1.082E+00 100.00 % error

*****RESULTS*****

Yield Nb-95= 0.429 0.007 error

Nb-94 dpm/g= 164.223 164.341 error = 100.07 %

MDA = < 164.223

GENERIC FORMULAS

Nb-94 Activity =
$$\frac{\text{net dpm} \times \text{leach vol} \times \text{diln vol}}{\text{yield} \times \text{sample amt} \times \text{diln aliquot} \times \text{aliquot}}$$

% recovery =
$$\frac{\text{dpm recovered}}{\text{dpm added}} \times 100$$

Nb-93m Activity =
$$\frac{\text{net cpm} \times \text{d/c} \times \text{leach vol} \times \text{diln vol}}{\text{yield} \times \text{sample amt} \times \text{diln aliquot} \times \text{aliquot}}$$

NIOBIDIUM ANALYSIS

Page 2 of 2

Spreadsheet filename: NBCALC

Revision 1: 6/1/92, NLW

Sample ID: 92-5070 LEPS recount

Date Calculated: 06/19/92

Data filename: NB5070R

Nb-93m Spectrum: 925070nb.a1;2

Weight Nb ppt, mg: 160.2 0.2 error

Counted on: A

M&TE No. Diode A

On: Date: 06/18/92 14:44 Time

Nb-93m d/c = 67.213 5.185 error

NB-93M COUNTING DATA:

Diode B or 325 LEPS Enter data under correct diode.

If %error >= 50%, enter MDA. If not, MDA = NA

net cps: 1.00 1.00 % error

MDA, in cps: NA

Diode A

peak channel no.: 83

bkgd: 71 - 75 <-- first ROI

Count time, min.: 1042.93

131 <-- counts

Nb-93m counts--> 179

156

222

162

peak channel + 254

141

5 lower + 353

145

4 higher 336

101 - 105 <-- second ROI

321

143 <-- counts

261

135

207

132

168

117

166

106

gross counts: 2467.000

1368 :normalized ROI total

net cpm: 0.332

0.722 :cpm in bkgd spectrum

error, cpm: 0.065

avg BKG.A1;18;2:bkgd filename

% error 19.576

2120.9 :total bkgd counts

*****RESULTS*****

Nb-93m dpm/g= 3384.452 723.648 error = 21.382 %

MDA =

Entered by NLW Date 6/19/92

Reviewed by A. L. Sady Date 6/23/92

RECOUNT FOR NB-93M ON 92-5878

SAMPLE ID..... SY:925878NB.A1;2

OF CHANNELS..... 2848

DIODE I.D..... A

SHELF NUMBER..... 8

CALIBRATION..... 8.2 KEV/CH

TIME ZERO 6/18/92 AT 14:44: 8

COUNTED..... 6/18/92 AT 14:44: 8

(8.88 MINUTES DECAY TIME)

LIVE COUNT TIME.... 17 HOURS 22 MINUTES 56 SECONDS (1842.93 MIN.)

ELAPSED TIME..... 17 HOURS 22 MINUTES 56 SECONDS (1842.93 MIN.)

(DEAD TIME = 8.888)

FLUX CORRECTION.... 8.8888

GEOM CORRECTION.... 8.8888 8.8888 8.8888 8.8888 8.8888

WEIGHT..... 1.88888 GRAMS

ANTI: 8 SLP: 8 AREA: 8 P-T: 8 ERR: 8 ZER: 8 OPR: 8 NOV: -1

172

MJD-rmk
6/19/92

11.10.92 6/23/92

RECOUNT FOR NB-93M ON 92-5070

SY:925070NB.A1;2 COUNTED 6/18/92 @ 14:44: 0 GAIN: 8.2 KEV/CHAN

	0	50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950
0	62576	168	128	115	92	81	74	97	73	85	77	70	64	60	52	65	67	60	40	61
1	0	153	143	129	110	103	87	85	92	72	67	64	81	73	56	51	62	53	57	51
2	0	197	135	131	115	90	88	103	74	77	89	80	55	67	64	61	44	70	62	52
3	0	174	132	108	98	95	93	79	89	81	81	70	68	82	52	61	42	51	48	53
4	0	182	117	109	115	91	86	110	96	90	85	72	76	73	50	60	53	60	51	64
5	0	163	106	155	110	97	87	91	79	83	58	62	66	71	65	68	76	64	65	61
6	0	145	119	143	90	80	112	81	113	76	68	72	62	62	70	61	51	54	57	58
7	0	138	122	156	102	112	98	83	80	84	73	71	72	61	56	68	69	61	65	62
8	5	131	117	168	102	94	91	98	75	83	67	72	69	61	81	61	61	35	65	64
9	478	142	123	243	89	107	90	99	72	87	61	64	64	70	55	70	57	59	49	55
10	943	143	132	287	121	96	100	95	77	88	78	81	61	70	60	57	67	60	55	48
11	749	161	148	217	120	99	96	98	76	140	76	59	73	72	60	66	62	52	51	41
12	506	157	109	202	118	83	90	95	75	127	74	68	83	51	52	70	59	44	67	41
13	403	191	109	143	118	105	106	137	89	157	62	86	81	70	65	65	56	72	57	51
14	308	227	118	130	127	101	89	127	72	131	77	95	76	60	75	68	64	57	58	51
15	245	284	120	113	145	107	141	142	87	128	75	69	107	62	63	61	42	56	50	38
16	240	227	113	110	121	102	151	108	83	107	91	67	102	62	62	54	47	54	35	74
17	103	227	134	110	124	106	153	100	86	83	68	70	99	65	67	74	68	74	48	61
18	203	159	109	106	122	98	133	88	82	79	77	69	79	54	70	70	54	54	46	51
19	185	162	130	106	107	66	91	76	76	70	68	68	86	77	76	48	68	54	60	55
20	196	153	98	99	89	82	85	75	84	74	76	70	69	79	67	51	64	56	48	45
21	163	131	133	91	96	84	91	95	89	70	65	66	66	69	73	61	76	51	48	71
22	189	156	120	101	90	104	81	93	91	76	58	67	61	57	59	44	45	52	62	43
23	147	162	116	116	91	103	85	123	121	83	84	65	67	72	56	65	65	75	57	61
24	202	141	132	97	87	89	78	136	109	94	76	66	76	62	57	46	60	60	57	54
25	167	145	123	130	99	94	98	150	125	82	69	77	73	80	66	43	53	61	54	58
26	168	157	107	117	92	103	90	182	116	93	97	69	75	62	74	54	49	59	66	63
27	166	179	98	121	79	78	105	143	100	80	87	78	68	71	54	54	54	55	66	63
28	195	179	124	119	110	93	101	106	83	78	91	77	66	74	67	60	51	63	70	65
29	173	222	124	119	122	83	92	70	80	60	86	85	73	80	53	59	51	35	75	56
30	187	254	124	131	116	89	85	84	79	66	61	72	81	67	72	59	70	48	70	47
31	167	353	145	137	101	93	91	64	97	73	83	58	65	53	57	51	59	63	80	53
32	188	336	132	137	112	83	97	91	96	60	61	59	58	69	53	47	51	64	63	49
33	198	321	133	123	101	105	89	85	107	67	82	59	92	59	67	67	38	53	48	50
34	210	261	114	106	97	82	75	83	109	90	84	71	62	61	65	68	57	53	61	60
35	145	207	150	113	112	99	81	77	109	77	84	58	78	59	75	55	52	60	65	57
36	162	168	168	126	107	88	97	80	101	82	73	74	83	60	62	59	55	64	46	46
37	140	166	174	123	97	99	95	84	97	61	65	75	67	51	69	68	52	51	67	70
38	159	142	150	83	88	94	118	77	88	74	67	73	63	51	58	57	66	51	51	58
39	146	140	145	109	80	98	98	86	90	75	72	88	54	62	55	64	74	53	69	55
40	144	146	125	113	98	98	89	66	100	73	91	76	65	63	65	54	58	56	74	56
41	150	129	102	110	83	73	80	81	90	68	62	87	67	65	61	71	57	56	44	48
42	159	144	123	102	94	90	82	73	86	80	100	60	70	72	63	44	65	36	53	56
43	162	143	106	81	92	99	82	81	92	89	78	73	62	61	64	59	58	57	53	51
44	166	169	141	119	115	103	90	74	77	64	74	76	58	65	62	62	61	48	42	48
45	147	161	103	86	96	106	101	89	84	74	66	67	54	76	68	55	48	64	55	67
46	162	161	111	90	104	91	85	94	74	78	62	70	78	64	54	62	69	51	61	66
47	149	136	120	88	100	113	89	72	75	55	84	66	53	65	57	63	63	48	48	46
48	151	133	125	105	102	88	93	91	76	76	82	61	67	74	60	55	58	58	60	51
49	139	144	112	95	86	89	90	100	80	74	63	62	77	54	57	54	56	54	48	45

RECOUNT FOR NB-93M ON 92-5070

SY:925070NB.A1;2 COUNTED 6/18/92 @ 14:44: 0 GAIN: 0.2 KEV/CHAN

	1000	1050	1100	1150	1200	1250	1300	1350	1400	1450	1500	1550	1600	1650	1700	1750	1800	1850	1900	1950
0	52	43	47	32	42	37	42	49	43	49	32	27	37	24	36	22	23	26	18	28
1	45	36	45	40	43	29	33	34	32	34	34	31	33	26	33	40	31	30	34	22
2	50	57	49	40	40	47	31	40	30	25	41	35	42	31	21	20	35	26	30	27
3	43	53	45	42	40	45	27	45	30	30	48	28	20	19	41	27	22	37	24	37
4	52	57	40	41	49	42	40	34	46	42	42	36	26	26	30	37	17	20	30	25
5	63	54	56	37	55	37	37	37	35	31	20	37	30	21	20	22	23	22	25	37
6	55	51	37	40	34	43	41	43	32	40	25	36	24	30	34	31	26	23	34	27
7	54	43	40	36	44	36	34	41	46	31	34	27	20	33	24	29	25	20	32	27
8	62	46	41	43	40	30	30	44	42	22	31	26	21	30	37	32	18	26	41	26
9	41	50	40	44	43	36	43	30	20	35	30	19	20	26	27	20	27	27	26	30
10	55	49	40	40	30	32	32	33	34	36	35	26	30	20	36	53	20	30	10	21
11	57	62	40	40	43	26	45	35	33	33	42	30	32	32	24	31	35	24	26	31
12	61	42	40	41	45	45	24	36	31	34	30	23	26	34	27	37	31	27	28	27
13	60	52	39	42	45	31	30	32	52	30	41	30	35	29	25	33	31	26	31	32
14	59	38	47	44	44	31	33	28	30	32	29	29	33	32	22	31	27	42	20	25
15	47	51	52	41	37	42	36	39	26	20	29	24	24	31	32	34	24	31	39	26
16	41	54	46	56	41	33	40	33	39	29	36	29	30	23	19	26	32	29	20	31
17	48	52	47	42	40	43	43	30	36	25	44	32	25	26	22	29	27	30	24	27
18	67	51	45	30	40	37	31	32	25	30	32	31	22	24	31	19	30	32	29	19
19	57	44	47	54	51	40	45	34	42	34	27	24	24	35	20	33	27	32	31	29
20	47	44	54	40	43	37	46	29	30	31	35	32	33	20	22	25	22	22	25	39
21	45	50	45	44	36	30	47	40	34	42	29	46	27	27	19	29	25	21	24	22
22	50	46	57	46	44	20	30	43	36	37	25	32	47	29	34	30	39	27	24	24
23	42	38	46	45	29	22	44	36	36	40	25	36	28	34	34	31	24	25	23	34
24	49	34	30	39	36	35	50	32	30	33	32	36	31	27	26	34	25	31	20	29
25	36	54	46	41	52	39	40	42	36	27	30	33	32	33	30	37	33	30	29	25
26	49	51	36	47	36	36	27	44	30	36	20	24	31	27	20	35	20	20	20	27
27	30	63	42	32	42	30	40	29	26	52	44	33	29	33	26	20	36	23	29	20
28	56	46	40	36	41	30	47	26	37	37	29	34	31	26	30	20	29	27	30	23
29	52	61	46	55	37	25	42	34	36	40	46	20	20	37	30	35	24	27	33	33
30	57	50	41	52	57	42	42	41	29	30	36	21	32	30	31	20	33	24	29	22
31	56	48	36	39	37	30	43	34	24	32	30	24	32	31	36	35	29	21	20	29
32	51	52	30	42	40	32	36	39	33	32	37	37	45	42	25	20	20	30	30	35
33	44	54	50	50	45	20	20	47	30	37	21	41	32	21	20	33	31	26	31	34
34	59	45	39	41	42	36	37	41	30	26	43	32	31	29	25	29	33	30	26	20
35	44	43	30	39	39	43	35	29	27	32	20	24	37	35	31	31	29	26	32	29
36	60	47	55	25	32	42	34	36	42	35	29	29	42	32	30	31	31	39	18	25
37	65	37	53	44	41	20	36	37	31	35	23	25	25	22	30	27	23	31	40	27
38	50	32	47	33	45	43	20	36	35	37	32	27	29	21	26	27	20	29	20	35
39	32	47	34	39	30	37	36	35	39	26	32	39	20	27	20	29	36	33	30	29
40	57	45	39	37	39	36	35	31	33	35	34	30	31	40	29	20	24	23	26	29
41	49	46	39	52	53	40	35	34	32	33	37	29	31	27	45	26	26	34	39	17
42	45	48	44	66	39	44	47	39	30	36	10	33	36	30	29	22	32	32	13	22
43	53	52	50	37	36	36	34	27	32	35	33	25	30	30	34	34	19	20	29	26
44	41	40	63	63	40	33	42	32	20	37	40	32	39	26	31	21	22	35	32	31
45	40	47	62	55	35	40	44	32	40	40	22	30	37	36	26	27	32	23	19	23
46	45	45	52	43	35	35	39	34	44	32	26	37	29	22	27	29	31	21	25	23
47	43	42	36	42	39	31	43	40	44	42	30	39	20	20	26	21	19	39	30	24
48	56	50	40	43	47	35	35	32	36	36	26	31	36	17	24	39	33	30	23	27
49	47	30	49	31	32	49	32	40	41	24	20	41	26	33	30	36	18	29	46	20

NIOBIUM ANALYSIS

Page 1 of 2

Spreadsheet filename: NBCALC

Revision 1: 6/1/92, NLW

Assumes tracer added to final aliquot

Sample ID: 92-5070

Date Calculated: 06/16/92

Data filename: NB5070

M&TE No.

Diode HH

Nb-94 & 95 Spectrum: 9205070.hh;1

Zr/Nb-95 Tracer: 54124-76-0

volume added, ml: 0.2503 0.0012 error *****Half-lives*****

Zr-95 dpm/ml: 4.415E+03 4.500E+01 error Zr-95= 64.02 days

Nb-95 dpm/ml: 9.892E+03 1.151E+02 error Nb-95= 34.97 days

On: Date: 05/13/92 01:00 Time

Nb Sep Date: 05/07/92 13:30 Time

total dpm Nb-95= 2629.44 34.53 error at Nb sep time

Sample Amount: 0.7690 0.0002 error

g, ml or sample? g

Reporting Units

Leach Volume, ml: 250 0.01 error

Activity: dpm

Vol to dilute, ml: 1 0.00001 error

per ? : g

Diluted to, ml: 1 0.00001 error

Final Aliquot, ml: 4.993 0.17 error

Nb-94 & 95 Counting Data from Prepared Sample

Sample dpm Nb-95= 1.128E+03 1.06 % error at Nb sep time

Sample dpm Nb-94= 1.082E+00 100.00 % error

*****RESULTS*****

Yield Nb-95= 0.429 0.007 error

Nb-94 dpm/g= 164.223 164.341 error = 100.07 %

MDA = < 164.223

GENERIC FORMULAS

$$\text{Nb-94 Activity} = \frac{\text{net dpm} \times \text{leach vol} \times \text{diln vol}}{\text{yield} \times \text{sample amt} \times \text{diln aliquot} \times \text{aliquot}}$$

$$\% \text{ recovery} = \frac{\text{dpm recovered}}{\text{dpm added}} \times 100$$

$$\text{Nb-93m Activity} = \frac{\text{net cpm} \times \text{d/c} \times \text{leach vol} \times \text{diln vol}}{\text{yield} \times \text{sample amt} \times \text{diln aliquot} \times \text{aliquot}}$$

NIOBIUM ANALYSIS

Page 2 of 2

Spreadsheet filename: NBCALC

Revision 1: 6/1/92, NLW

Sample ID: 92-5070

Date Calculated: 06/16/92

Data filename: NB5070

Nb-93m Spectrum: 925070nb.a1;1

Weight Nb ppt, mg: 160.2 0.2 error

Counted on: A

M&TE No.

Diode A

On: Date: 05/26/92 15:50 Time

Nb-93m d/c = 67.213 5.185 error

NB-93M COUNTING DATA:

Diode B or 325 LEPS

Enter data under correct diode.

If %error >= 50%, enter MDA. If not, MDA = NA

net cps: 1.00 1.00 % error

MDA, in cps: NA

Diode A

peak channel no.: 82

bkgd: 71 - 75 <-- first ROI

Count time, min.: 1069.73

171 <-- counts

Nb-93m counts--> 174

169

208

176

peak channel + 242

178

5 lower + 302

175

4 higher 364

100 - 104 <-- second ROI

421

163 <-- counts

412

171

359

151

279

168

223

144

gross counts: 2984.000

1666 :normalized ROI total

net cpm: 0.510

0.722 :cpm in bkgd spectrum

error, cpm: 0.069

avg BKG.A1;1&2:bkgd filename

% error 13.495

2438.3 :total bkgd counts

*****RESULTS*****

Nb-93m dpm/g= 5203.620 832.673 error = 16.002 %

MDA =

Entered by NJG/ML Date 6/17/92

Reviewed by S. K. Fadoff Date 6/18/92

NIOBIUM ANALYSIS

Page 1 of 2

Spreadsheet filename: NBOCALC

Revision 1: 6/1/92, NLW

Assumes tracer added to final aliquot

Sample ID: 92-5070

Date Calculated: 06/02/92

Data filename: NB5070

M&TE No.

Diode HH

Nb-94 & 95 Spectrum: 9205070.hh:1

Zr/Nb-95 Tracer: 54124-76-0

volume added, ml: 0.2503 0.0012 error

*****Half-lives*****

Zr-95 dpm/ml: 4.415E+03 4.500E+01 error

Zr-95= 64.02 days

Nb-95 dpm/ml: 9.892E+03 1.151E+02 error

Nb-95= 34.97 days

On: Date: 05/13/92 01:00 Time

Nb Sep Date: 05/07/92 13:30 Time

total dpm Nb-95= 2629.44 34.53 error at Nb sep time

Sample Amount: 0.7690 0.0002 error

g, ml or sample? g

Reporting Units

Leach Volume, ml: 250 0.01 error

Activity: dpm

Vol to dilute, ml: 1 0.00001 error

per ? : g

Diluted to, ml: 1 0.00001 error

Final Aliquot, ml: 4.993 0.17 error

Nb-94 & 95 Counting Data from Prepared Sample

Sample dpm Nb-95= 1.128E+03 1.06 % error at Nb sep time

Sample dpm Nb-94= 1.082E+00 100.00 % error

*****RESULTS*****

Yield Nb-95= 0.429 0.007 error

Nb-94 dpm/g= 164.223 164.341 error = 100.07 %

MDA = < 164.223

GENERIC FORMULAS

$$\text{Nb-94 Activity} = \frac{\text{net dpm} \times \text{leach vol} \times \text{dilu vol}}{\text{yield} \times \text{sample amt} \times \text{dilu aliquot} \times \text{aliquot}}$$

$$\% \text{ recovery} = \frac{\text{dpm recovered}}{\text{dpm added}} \times 100$$

$$\text{Nb-93m Activity} = \frac{\text{net cpm} \times \text{d/c} \times \text{leach vol} \times \text{dilu vol}}{\text{yield} \times \text{sample amt} \times \text{dilu aliquot} \times \text{aliquot}}$$

NIOBIUM ANALYSIS

Page 2 of 2

Spreadsheet filename: NBCALC

Revision 1: 6/1/92, NLW

Sample ID: 92-5070

Date Calculated: 06/02/92

Data filename: NB5070

Nb-93m Spectrum: 925070nb.a1;1

Weight Nb ppt, mg: 160.2 0.2 error

Counted on: A

M&TE No.

Diode A

On: Date: 05/26/92 15:50 Time

Nb-93m d/c = 67.213 5.185 error

NB-93M COUNTING DATA:

Diode B or 325 LEP6

Enter data under correct diode.

If %error >= 50%, enter MDA. If not, MDA = NA

net cps: 1.00 1.00 % error

MDA, in cps: NA

Diode A

peak channel no.: 82

bkgd: 71 - 75 <-- first ROI

Count time, min.: 1069.73

171 <-- counts

Nb-93m counts--> 174

169

208

176

peak channel + 242

178

5 lower + 302

175

4 higher 364

100 - 104 <-- second ROI

421

163 <-- counts

412

171

359

151

279

168

223

144

gross counts: 2984.000

1666 :normalized ROI total

net cpm: 1.049

0.183 :cpm in bkgd spectrum

error, cpm: 0.065

BKG.A1;1 :bkgd filename

% error 6.203

1861.7 :total bkgd counts

*preliminary +
incorrect, see
corrected copy
MJD 6/16/92*

*****RESULTS*****

Nb-93m dpm/g= 10702.199 1134.718 error = 10.603 %

MDA =

$$\frac{1.049 \text{ cpm} \times 67.213 \text{ d/c}}{.429 \text{ yr W}} = 164.4 \text{ dpm/sample}$$

NLW
Entered by *NLW* Date *6/2/92*

S. K. Fadoff
Reviewed by *S. K. Fadoff* Date *6/4/92*

NB-93M ON 52-5070

SAMPLE ID..... SY:925070NB.A1;1

OF CHANNELS..... 2048

DIODE I.D..... A

SHELF NUMBER..... 0

CALIBRATION..... 0.2 KEV/CH

TIME ZERO 5/26/92 AT 15:50: 0

COUNTED..... 5/26/92 AT 15:50: 0

(0.00 MINUTES DECAY TIME)

LIVE COUNT TIME.... 17 HOURS 49 MINUTES 44 SECONDS (1069.73 MIN.)

ELAPSED TIME..... 17 HOURS 49 MINUTES 44 SECONDS (1069.73 MIN.)
(DEAD TIME = 0.000)

FLOX CORRECTION.... 0.0000

GEOM CORRECTION.... 0.0000 0.0000 0.0000 0.0000 0.0000

WEIGHT..... 1.00000 GRAMS

ART1: 0 SLP: 0 AREA: 0 P-T: 0 ERR: 0 ZER: 0 OPR: 0 NOV: -1

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MJD rwh
5/26/92

s.k. fady 6/4/92

NB-93M ON 52-5070

SY:925070NB.A1;1 COUNTED 5/26/92 @ 15:50; 0 GAIN: 0.2 KEV/CHAN

	0	50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950
0	64184	203	163	150	121	107	119	109	126	96	106	99	87	86	87	73	75	75	65	77
1	0	213	171	144	130	135	118	106	87	106	97	106	85	79	82	80	71	77	65	64
2	0	202	151	131	145	120	112	102	121	101	90	106	79	93	87	79	89	68	73	82
3	0	213	160	167	138	115	124	108	110	101	91	99	94	05	90	79	67	52	78	86
4	0	205	144	163	114	120	136	124	106	103	107	85	81	80	85	76	53	77	67	77
5	0	124	135	192	140	110	101	103	100	84	112	101	93	89	101	70	77	73	62	65
6	0	176	163	146	119	112	115	119	105	88	105	90	84	79	78	83	64	66	78	66
7	0	101	140	191	111	115	113	106	99	102	113	91	100	94	77	86	73	81	80	69
8	10	101	131	239	121	116	116	106	131	96	83	96	84	90	92	80	76	69	61	95
9	502	163	150	250	123	111	134	109	85	107	82	109	94	83	83	83	61	70	59	61
10	035	100	142	207	122	143	124	107	101	114	78	85	89	77	82	75	67	63	65	74
11	700	174	156	272	126	103	102	113	100	132	99	95	83	80	71	61	84	76	67	71
12	499	130	164	250	147	124	112	135	107	163	96	86	75	79	77	83	67	67	70	66
13	406	243	150	186	138	135	109	125	110	166	99	83	100	71	81	81	75	74	73	78
14	423	261	146	165	120	115	124	131	94	155	111	112	114	82	93	89	76	77	66	91
15	241	290	161	162	145	98	167	167	100	135	92	93	109	76	70	54	80	83	71	80
16	226	278	151	146	130	117	154	142	94	140	83	85	103	82	81	89	79	80	67	73
17	212	256	177	130	125	120	174	119	113	111	88	90	103	83	82	67	82	81	76	76
18	170	219	141	129	137	121	151	118	116	123	85	105	100	82	82	74	70	87	74	62
19	197	179	160	136	125	120	153	115	101	107	83	84	94	84	79	78	63	74	77	66
20	230	172	155	131	140	100	134	123	99	105	107	114	88	87	96	68	91	50	52	79
21	207	171	152	133	130	107	103	129	118	112	94	84	88	92	114	81	76	75	66	69
22	186	169	150	137	112	117	128	122	142	109	103	98	84	79	91	92	70	71	63	77
23	183	176	169	120	128	107	125	156	127	99	109	92	93	83	70	74	77	69	71	74
24	209	170	115	115	97	111	110	163	148	97	120	94	91	86	78	79	64	56	79	69
25	215	175	125	144	120	129	102	190	150	111	111	81	80	80	74	63	89	60	64	80
26	200	172	129	137	107	131	110	180	128	109	106	97	90	86	86	80	71	73	59	80
27	216	174	141	153	115	122	122	169	112	106	106	75	91	81	85	74	78	72	95	66
28	176	200	160	134	112	118	105	140	100	85	103	100	87	82	90	75	93	72	78	84
29	215	242	145	142	120	111	106	110	97	87	115	81	79	80	84	79	65	60	94	70
30	225	302	202	132	112	112	112	106	89	91	105	94	80	93	81	74	72	84	98	73
31	200	364	160	167	130	110	116	96	96	80	95	89	81	73	93	67	70	76	67	71
32	243	421	164	176	146	127	101	105	126	86	92	81	90	95	72	87	68	91	81	67
33	221	412	175	167	131	125	117	115	116	92	99	67	77	95	76	78	75	60	77	70
34	230	359	165	165	127	115	120	120	127	100	74	112	93	85	83	70	80	71	72	67
35	175	279	189	153	143	101	131	102	127	105	106	91	94	74	63	80	60	83	68	69
36	212	223	185	139	108	113	106	105	119	86	96	96	84	79	80	69	67	80	67	77
37	204	161	224	128	110	146	82	112	116	87	95	86	84	86	70	96	61	73	73	82
38	202	167	205	123	110	116	106	94	111	95	102	100	99	91	60	75	82	69	61	63
39	204	181	176	133	111	100	101	99	122	97	96	85	100	80	76	66	66	69	60	70
40	216	166	149	110	133	112	113	86	102	91	89	84	69	92	70	77	83	50	66	50
41	160	166	140	139	115	122	140	105	102	99	94	93	75	102	93	71	67	72	79	63
42	228	136	142	131	119	127	118	104	113	97	103	87	82	72	75	89	63	63	70	71
43	105	177	157	130	117	114	130	121	95	102	95	73	85	79	86	81	76	81	64	77
44	107	206	130	120	110	115	117	100	99	100	90	90	84	87	70	87	83	81	62	78
45	102	214	136	113	124	123	119	118	102	92	104	89	80	91	80	70	87	66	60	61
46	105	191	137	111	112	114	124	95	88	97	100	90	93	86	86	84	62	85	81	60
47	167	190	152	125	112	125	106	110	89	100	82	90	75	80	85	69	63	63	60	59
48	192	105	152	120	105	123	92	102	96	99	103	82	86	97	77	73	71	53	70	60
49	165	140	125	151	97	106	125	92	96	97	100	90	76	94	80	61	77	60	74	76

HB-93M ON 52-5070

SY:925070NB.A1;1 COUNTED 5/26/92 @ 15:50: 0 GAIN: 0.2 KEV/CHAN

	1000	1050	1100	1150	1200	1250	1300	1350	1400	1450	1500	1550	1600	1650	1700	1750	1800	1850	1900	1950
0	75	67	65	58	61	54	45	36	45	51	47	40	54	37	45	29	45	30	41	42
1	65	60	72	64	57	57	57	49	54	49	57	61	44	30	41	45	40	45	27	41
2	74	72	77	66	55	51	42	51	43	51	43	50	44	39	46	42	47	40	36	40
3	78	69	76	49	50	54	46	57	77	52	50	45	33	45	47	48	41	44	44	32
4	50	67	52	60	59	62	42	51	52	47	46	48	50	40	41	44	36	26	38	28
5	56	55	56	64	64	51	51	42	57	50	33	50	36	44	45	38	47	37	36	37
6	61	65	70	47	54	52	47	44	44	53	51	52	39	41	53	55	40	36	40	40
7	63	54	60	65	62	57	55	65	50	42	50	46	40	43	35	46	55	30	40	37
8	60	66	65	46	54	54	60	51	40	48	46	44	42	42	52	45	37	41	37	30
9	69	67	47	54	40	69	51	53	44	45	38	47	45	40	36	50	39	42	30	44
10	74	59	66	72	57	46	55	60	50	40	54	44	37	45	40	45	49	43	37	53
11	63	64	62	55	46	44	50	59	38	44	40	45	40	51	49	44	45	41	41	35
12	81	44	57	60	55	53	52	41	46	47	45	47	48	41	40	48	39	32	47	30
13	70	71	53	57	56	36	44	45	38	39	47	46	37	02	49	32	36	37	41	44
14	67	63	55	55	43	60	46	56	62	31	41	30	41	50	55	35	30	40	35	41
15	72	50	50	50	50	49	43	47	48	56	36	47	52	35	52	39	33	31	43	30
16	68	61	60	47	61	47	44	52	40	53	51	36	32	30	43	39	37	30	50	33
17	70	61	59	69	59	51	58	40	47	52	45	56	40	32	49	39	45	47	49	44
18	60	50	57	46	47	56	39	52	50	42	43	49	38	37	46	44	32	42	36	21
19	53	54	66	62	64	51	46	51	53	50	37	39	39	43	51	32	35	43	34	37
20	50	59	64	51	57	50	67	50	31	40	51	46	36	45	51	50	41	29	37	44
21	75	70	73	56	45	42	62	43	38	44	55	32	62	39	39	31	47	41	55	40
22	60	62	46	61	54	43	53	51	52	40	30	47	45	52	37	42	36	39	40	40
23	64	66	73	64	50	49	54	46	53	48	42	46	31	51	41	30	32	50	42	39
24	62	64	53	71	53	56	43	61	46	48	30	40	53	34	37	41	34	42	32	43
25	79	55	62	63	51	59	44	45	50	43	42	59	45	35	57	39	41	20	43	33
26	74	67	66	62	40	40	59	42	53	56	45	39	39	41	46	41	31	36	48	45
27	55	69	73	60	62	57	46	47	44	42	46	45	41	38	40	47	24	36	41	30
28	79	79	69	54	52	53	60	51	56	45	47	46	43	32	45	32	30	39	39	39
29	66	67	54	50	57	45	44	39	50	57	34	52	38	40	37	42	34	46	33	42
30	69	64	60	61	56	54	39	56	45	46	46	35	31	52	32	44	38	45	38	40
31	72	75	77	62	54	47	55	60	57	46	43	47	31	49	49	45	33	30	29	41
32	75	62	56	59	46	55	47	44	47	49	47	37	47	34	52	35	32	43	37	42
33	75	60	48	55	50	53	54	39	48	40	55	47	37	45	48	38	37	34	38	41
34	59	70	62	48	54	47	60	53	41	50	42	41	35	43	35	40	30	45	56	40
35	61	69	40	50	50	69	55	51	40	43	35	49	40	40	42	34	36	52	41	41
36	66	65	50	57	66	51	50	49	44	41	56	40	40	27	48	40	46	33	34	26
37	59	55	08	40	61	63	40	41	40	49	54	50	44	44	39	48	36	35	42	30
38	66	75	71	38	61	42	45	42	62	40	46	45	36	46	41	34	37	34	35	40
39	55	57	57	45	50	46	66	45	46	50	48	38	53	42	35	34	36	29	33	36
40	51	51	62	60	53	56	65	52	52	45	39	35	45	37	42	38	42	43	49	40
41	67	55	56	62	53	56	56	33	39	48	56	49	41	38	34	34	37	39	45	34
42	50	50	45	50	50	37	50	44	40	39	53	49	37	50	40	30	35	41	30	30
43	67	54	59	67	61	40	50	34	46	43	41	49	42	50	37	39	42	36	30	44
44	60	74	54	62	50	51	59	40	57	37	53	37	44	41	39	43	40	42	41	42
45	69	70	74	75	55	57	61	49	49	30	43	40	45	50	40	47	48	35	29	41
46	65	61	59	62	64	47	53	45	52	50	51	44	41	44	39	44	36	50	38	44
47	66	60	59	54	52	50	36	53	46	40	50	36	33	43	46	44	40	39	44	46
48	65	53	53	52	54	49	46	45	48	51	52	45	45	26	47	36	44	37	33	34
49	66	51	71	63	64	40	51	50	60	54	51	42	20	41	33	35	22	44	20	45

TITLE: 101SY NB SAMPLE 92-05070

FILE: 9205070.HH:1

* CHANNELS: 2048

SHELF: 0

DIODE: HH

TIME ZERO: 5 7 92 13 30 0

TIME OF COUNT: 5 15 92 15 20 0

(11630.0 MINUTES DECAY TIME)

LIVE TIME: 65 HOURS 18 MINUTES 54 SECONDS = 3918.90 MINUTES

ELAPSED TIME: 65 HOURS 18 MINUTES 54 SECONDS = 3918.90 MINUTES

(DEAD TIME = 0.000)

FLUX CORR. FACT.: 0.000000

GAIN: 1.00045 KEY/CHAN

WEIGHT: 1.00000

PLT INT: 0

PLT LAB: 0

ANTI FLG 0

SLP MLT: 0

AREA REJ: 0

PTR: 0

ERR REJ: 0

ZER LEV: 0

OVR PKR: 0

NOV: 0

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M. W. 16 5/29/92
A. K. Kelly 5/13/92

9205070.HH:1 101SY NB SAMPLE 92-05070

	0	50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950
0	235134	3757	2902	2574	2553	1706	1368	1199	1032	955	978	1197	673	445	329	284	146	133	110	94
1	5	3727	2893	2505	2442	1679	1725	1188	1070	1067	1043	1101	684	403	335	289	139	124	111	110
2	0	3646	2868	2465	2415	1625	1680	1203	1093	993	1021	1199	724	435	341	318	133	139	114	98
3	38	3528	2737	2411	2480	1600	1324	1315	1088	1072	1072	1088	681	417	324	276	149	110	103	86
4	295	3757	2788	2468	2385	1629	1298	1254	1063	1045	1047	1167	729	428	363	288	128	125	108	99
5	1117	3486	2797	2576	2444	1658	1307	1164	957	1038	1004	1163	668	425	340	292	167	121	99	113
6	2083	3522	3107	2452	2428	1683	1332	1128	1069	980	1047	1192	677	471	330	311	141	115	164	102
7	2418	3468	2917	2413	2382	1627	1306	1086	1057	1026	1052	1139	616	413	333	354	138	124	141	90
8	2698	3488	2783	2485	2357	1561	1388	1184	1011	1064	1113	1208	638	418	335	341	131	115	124	92
9	3224	3473	2762	2466	2317	1702	1339	1120	1062	1031	1058	1139	648	391	298	348	126	125	105	103
10	3825	3336	2684	2365	3128	1598	1381	1141	1104	1018	1198	1179	719	488	334	345	149	118	117	106
11	4525	3423	2631	2487	2814	1528	1278	1133	1203	1079	1343	1158	898	443	328	301	138	136	134	89
12	4685	3341	2688	2388	2248	1564	1388	1134	1188	1018	2887	1186	728	783	317	356	114	277	373	184
13	4787	3485	2781	2388	2332	1539	1385	1187	1088	1072	1955	1198	612	3518	311	365	145	316	1289	98
14	5098	3538	2729	2364	2188	1536	1389	1158	1065	1266	1399	1247	685	3379	292	484	126	151	983	88
15	5374	3437	2697	2488	2286	1663	1254	1092	988	1392	1149	1268	687	625	386	597	135	117	211	184
16	5817	3347	2748	2386	2239	1574	1293	1061	1076	1884	1834	1175	681	481	314	2862	149	125	182	179
17	5935	3529	2666	2365	2162	1565	1381	1123	1029	1859	1828	1167	558	369	325	26878	126	185	181	354
18	5898	3368	2645	2322	2261	1548	1269	1115	1056	1851	1882	1187	575	391	328	46386	126	118	98	228
19	5765	3312	2688	2316	2149	1515	1268	1186	1046	1882	1858	1144	577	341	297	9828	144	132	128	139
20	5771	3344	2686	2388	2138	1558	1223	1129	1837	1838	1874	1237	688	369	312	327	123	129	181	388
21	5922	3382	2657	2343	2144	1865	1258	1135	1839	1866	1888	1228	533	398	386	172	158	126	183	883
22	5727	3365	2697	2219	2867	1988	1273	1863	1885	1837	1864	1239	582	361	332	157	128	134	94	514
23	5598	3598	2782	2288	2827	1521	1293	1187	1885	1877	1857	1154	546	359	292	178	123	129	87	135
24	5562	3971	2898	2294	2148	1527	1279	1886	1871	1845	1898	1892	536	358	383	211	137	111	119	98
25	5628	4862	2594	2296	2898	1472	1219	1135	1831	1854	1882	1825	547	369	328	288	137	121	83	118
26	5465	5536	2628	2331	2898	1423	1241	1165	1831	1865	1117	968	587	353	322	166	154	111	119	182
27	5316	3486	2718	2318	2112	1459	1298	1887	1888	1817	1188	954	527	376	294	138	149	185	86	73
28	5258	5862	2632	2365	2842	1688	1237	1128	1826	998	1886	896	576	358	352	168	136	122	189	88
29	5174	3176	2733	2193	1999	1736	1663	1853	1828	1834	1121	843	498	361	686	144	135	125	188	182
30	5878	3827	3355	2213	1992	1397	1486	1133	1183	1897	1134	861	482	364	529	172	148	137	91	88
31	5879	2986	2687	2225	1938	1539	1267	1891	1815	991	1125	869	498	353	385	158	189	118	113	88
32	4956	3888	2678	2263	1945	1499	1146	1858	994	1836	1881	839	468	378	383	149	162	115	121	71
33	4724	3841	2618	2388	1934	1424	1276	1147	1185	1816	1187	816	512	365	292	158	152	126	185	93
34	4888	3169	2678	2257	1973	1478	1285	1132	1818	1885	1844	1477	525	347	294	176	126	125	94	186
35	4665	3784	2512	2197	2815	1453	1288	1898	1811	1839	1861	2857	521	331	311	158	148	117	123	181
36	4514	3788	2517	2372	1923	1366	1285	1856	1833	1813	1187	1299	485	346	278	155	143	124	117	83
37	4585	3196	2545	2812	1984	1397	1192	1878	1835	1888	1894	733	495	318	267	164	174	187	118	94
38	4588	4867	2561	2318	1922	1333	1258	1132	1832	1839	1125	759	482	326	267	191	288	189	115	94
39	4481	3232	2541	2188	4488	1432	2822	1869	1829	1834	1134	715	582	332	388	152	163	118	119	73
40	4282	3814	2548	2286	12267	1433	2883	1888	1865	1839	1114	727	587	346	279	168	148	114	122	81
41	4196	3566	2648	2252	2568	1365	1313	1885	994	1847	1898	758	473	359	317	141	123	186	185	88
42	4187	2767	2574	2278	2694	1482	1215	1111	1854	1848	1168	718	479	337	276	146	187	188	113	91
43	4187	3387	2554	2438	2874	1398	1896	1138	988	993	1169	678	453	328	281	149	176	143	91	128
44	4826	3774	2682	2514	1711	1478	1262	1896	1848	1886	1899	782	476	372	323	127	129	128	115	87
45	4875	3821	2678	2424	1816	1398	1154	1878	1842	975	1139	678	491	368	284	131	132	131	184	83
46	3825	2878	2573	2449	1738	1416	1284	1853	1817	1867	1174	637	435	327	294	238	144	148	98	85
47	3878	2798	2588	2583	1687	1437	1221	1111	1818	1823	1153	699	433	386	318	358	128	185	123	77
48	3856	2771	2435	2461	1767	1385	1242	1866	998	1873	1231	734	425	341	274	187	132	117	98	83
49	3812	2736	2446	2543	1719	1372	1137	1858	1817	1887	1176	695	421	363	383	139	126	94	186	77

9205070.HH:1 101SY NO SAMPLE 92-05070

	1000	1050	1100	1150	1200	1250	1300	1350	1400	1450	1500	1550	1600	1650	1700	1750	1800	1850	1900	1950
0	83	81	69	76	65	78	64	48	39	33	39	32	24	24	19	31	21	31	19	20
1	95	77	87	64	77	79	49	61	33	37	28	37	27	23	27	25	21	32	19	25
2	99	85	98	88	81	72	58	57	44	44	36	22	38	30	33	17	25	36	20	17
3	117	89	88	78	57	69	56	43	44	38	33	25	35	28	33	19	22	32	20	14
4	98	91	63	56	70	69	52	49	64	50	33	30	27	24	20	17	19	25	20	22
5	78	75	75	78	78	74	58	54	41	32	48	29	25	20	19	21	27	25	20	29
6	102	88	80	68	67	81	62	52	42	32	29	39	34	13	26	31	16	19	21	24
7	110	86	82	71	85	75	55	58	42	52	31	26	31	27	23	21	23	26	26	17
8	88	79	84	86	79	65	56	51	55	39	38	21	31	18	24	25	25	24	26	19
9	80	79	78	92	61	57	58	47	48	48	34	17	32	33	32	21	24	20	15	18
10	92	88	87	71	75	62	56	47	65	53	31	36	26	26	38	25	26	23	23	21
11	84	87	82	69	82	65	54	57	46	87	37	37	29	25	20	18	32	26	23	22
12	82	89	85	67	88	56	44	48	43	271	32	25	26	23	21	17	22	23	26	21
13	98	72	182	71	87	61	56	47	39	736	36	32	25	31	18	24	19	29	23	19
14	94	102	83	77	68	53	78	55	56	880	35	29	23	29	24	32	19	24	18	21
15	87	84	78	86	66	57	48	46	33	231	34	32	28	29	31	28	21	23	26	15
16	99	74	72	83	96	75	49	54	52	51	37	19	27	26	33	35	28	28	17	17
17	82	111	84	74	67	63	64	52	48	23	34	22	28	32	25	83	24	19	22	24
18	69	95	78	85	77	78	63	49	41	28	31	31	31	22	22	86	22	25	24	26
19	93	85	78	76	78	53	65	51	39	40	35	26	34	38	28	34	18	31	21	23
20	84	85	100	77	67	78	42	47	37	26	35	28	28	29	28	33	29	27	19	20
21	105	98	104	78	79	67	52	55	48	37	23	25	28	22	34	28	21	29	17	25
22	93	67	106	65	81	59	58	35	49	31	26	26	41	43	23	23	31	26	15	27
23	68	71	149	88	68	66	68	42	52	35	26	21	71	24	29	19	18	28	19	18
24	85	72	88	76	81	61	45	55	44	37	26	18	52	19	21	21	24	25	29	18
25	87	74	93	93	81	67	37	59	43	43	34	34	43	34	25	28	29	31	17	19
26	78	88	59	86	64	77	58	49	43	29	25	37	29	23	22	27	32	28	29	28
27	93	88	69	82	53	72	44	36	38	38	28	38	28	33	26	38	25	22	17	23
28	98	83	82	73	81	81	63	68	43	31	16	39	36	27	26	26	22	27	20	23
29	88	89	67	69	67	68	57	58	47	48	38	22	32	23	23	25	26	18	26	28
30	81	82	81	75	74	49	58	55	36	34	25	24	24	20	33	31	28	16	18	26
31	72	122	78	73	76	56	51	59	38	28	22	31	23	17	29	36	37	26	21	14
32	91	103	76	71	78	48	51	49	33	34	31	32	41	26	32	19	36	28	19	23
33	95	75	74	77	72	61	57	43	28	27	35	54	75	27	37	21	23	19	24	24
34	85	92	81	82	73	64	56	52	34	29	25	28	57	21	28	24	27	22	15	13
35	84	98	74	83	78	62	65	48	47	32	31	31	39	22	22	23	24	17	21	22
36	88	68	85	79	68	76	59	46	47	38	32	29	25	26	16	25	21	18	22	24
37	84	85	52	73	67	49	45	39	46	38	25	38	28	15	17	28	19	22	16	13
38	99	82	78	72	77	55	46	52	39	23	28	48	23	25	21	22	28	34	22	25
39	84	83	73	78	81	69	53	48	29	33	42	32	24	28	25	14	28	28	17	21
40	85	84	58	64	103	48	37	38	34	36	32	77	39	31	24	33	28	37	28	15
41	86	74	78	76	107	57	54	47	48	31	22	128	35	22	18	22	21	38	23	25
42	85	88	88	77	67	51	62	51	39	32	39	89	27	38	31	23	32	23	24	19
43	77	78	73	74	78	51	46	52	33	28	29	48	34	21	14	33	18	19	18	22
44	100	78	84	69	77	58	36	42	41	27	35	66	28	31	26	26	14	17	25	28
45	83	92	88	76	78	55	42	56	39	38	35	128	17	27	14	24	26	17	29	24
46	98	98	71	73	88	68	35	42	34	33	29	105	28	26	18	19	19	28	23	24
47	86	107	73	66	81	54	53	51	46	48	38	55	29	27	25	19	14	22	24	21
48	87	98	82	83	96	62	32	48	25	62	33	33	22	34	24	24	21	28	30	25
49	74	89	81	64	74	48	52	43	42	61	26	37	34	38	25	25	28	19	27	23

Raygun - RSX Version 10-Jan-90

(29-MAY-1992 08:51:17)

Analysis performed by: diana mcmullin

Sample: 101SY NB SAMPLE 92-05070

Weight: 1.00000 ML

Irradiation date: 7-May-1992 at 13:30:00

Count date: 15-May-1992 at 15:20:00

Decay: 8.1d (697800.00 seconds)

Count times: REAL TIME 2.72d (235134.00 seconds)
LIVE TIME 2.72d (235134.00 seconds)

Dead time: 0.00 percent

Detector: HH pos # 0 Geometry Factor: 1.000

Efficiencies and shape parameters from file: ve:[116,2]JEFFFILNB.HH

Spectrum from file : 9205070.hh:1

Background subtractions from file: VE:[116,1]BACKG.HH

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	Peak channel	Region start end	Gross counts	Net area +-	Energy (keV)	Gamma /sec	Err % SD	System bkgd
1	105.9	72. 80.	35203.	6552.*	74.33	1.565E-02	100.0	6807.
2	131.0	83. 90.	27203.	3556.*	83.92	8.562E-02	96.5	1663.
3	151.1	93. 96.	13052.	1578.*	92.24	1.040E-02	100.0	2201.
4	165.1	104. 107.	11609.	612.*	104.50	8.974E-03	100.0	471.
5	210.2	210. 211.	5942.	1258.*	208.52	1.102E-02	100.0	1210.
6	238.5	238. 243.	25926.	14985.*	238.20	1.149E-02	100.0	15320.
7	271.7	270. 274.	8443.	844.*	269.94	1.229E-02	100.0	731.
8	278.0	270. 279.	3345.	416.*	276.99	1.246E-02	100.0	520.
9	301.3	301. 302.	3405.	694.*	299.61	1.326E-02	100.0	692.
10	325.1	329. 331.	4336.	636.*	327.30	1.417E-02	100.0	632.
11	339.3	338. 342.	8691.	2764.*	338.02	1.449E-02	100.0	2047.
12	353.2	351. 356.	7244.	398.*	351.37	1.495E-02	100.0	311.
13	424.0	453. 455.	3730.	594.*	462.00	2.057E-02	100.0	657.
14	512.2	509. 515.	10101.	2854.*	510.36	2.346E-02	100.0	2970.
15	563.0	564. 566.	5633.	3227.*	582.92	2.459E-02	100.0	3301.
16	611.0	610. 612.	2329.	440.*	608.94	2.308E-02	100.0	419.
17	663.5	661. 666.	9149.	6790.*	661.32	1.024E+00	4.0	221.
18	723.2	720. 732.	2175.	651.*	726.99	2.856E-02	100.0	705.
19	755.6	755. 761.	2204.	273.	757.37	4.962E-02	24.0	0.
20	761.9	761. 770.	86616.	84116.	765.63	1.546E+01	0.4	0.
21	774.4	773. 776.	763.	152.	772.21	2.020E-02	24.4	0.
22	796.9	796. 798.	775.	340.*	794.66	1.592E-02	100.0	201.
23	841.3	842. 843.	363.	93.	840.00	1.094E-02	27.1	0.
24	861.7	861. 864.	880.	489.*	868.39	1.621E-02	100.0	374.

Diana L. McMullin
5-29-92
M. W. W. 6/2/92

25	906.2	906.	908.	429.	108.*	903.89	1.656E-02	100.0	84.
26	913.3	910.	915.	3107.	2480.*	910.89	1.655E-02	100.0	2410.
27	967.1	965.	969.	996.	494.*	964.66	1.759E-02	100.0	558.
28	971.1	969.	973.	1900.	1390.*	968.72	2.651E-02	100.0	1280.
29	1240.6	1238.	1241.	368.	69.*	1237.95	2.175E-02	100.0	71.
30	1453.6	1459.	1466.	2277.	1952.*	1460.75	2.049E-02	100.0	1909.
31	1493.4	1496.	1500.	235.	82.*	1495.56	1.045E-02	100.0	71.
32	1591.1	1587.	1594.	502.	268.*	1588.10	1.973E-02	100.0	238.
33	1695.3	1594.	1599.	416.	243.*	1592.32	2.988E-02	100.0	171.
34	1633.2	1632.	1635.	212.	102.*	1630.16	1.987E-02	100.0	87.
35	1767.5	1763.	1771.	383.	178.*	1764.42	2.040E-02	100.0	152.

 +- Net Peak Area above the Compton Continuum before correction for system background. Values flagged with a * are subsequently corrected for system background before calculation of absolute emission rate (gams/sec).

Gamma-ray and nuclide lookup from file: VE:[116.3]NBL10.DAT

*** Least-squares Results ***

(Interferences)

nuclide	energy KeV	dps at zero time	uCl /HL	peak frac	err (%)	dev (sig)	DPM /HL	error (%)
1 Nb 95	- - - -	1.880E+01	5.082E-04	- - - -	- - - -	- - - -	1.128E+03	1.06
	765.63	1.880E+01	5.082E-04	1.00	1.06	1.00		

The following are upper limit values:

Co 60	- - - -	2.091E-02	5.650E-07	- - - -	- - - -	- - - -	1.254E+00	100.00
Zr 95	- - - -	4.664E-02	1.260E-06	- - - -	- - - -	- - - -	2.798E+00	100.00
Nb 94	- - - -	1.803E-02	4.072E-07	- - - -	- - - -	- - - -	1.082E+00	100.00
Sn113	- - - -	3.413E-01	9.223E-06	- - - -	- - - -	- - - -	2.040E+01	100.00
Sn123	- - - -	0.000E+00	0.000E+00	- - - -	- - - -	- - - -	0.000E+00	100.00
Sn119m	- - - -	2.003E+00	7.576E-05	- - - -	- - - -	- - - -	1.682E+02	100.00
Sn121m	- - - -	7.696E-01	2.080E-05	- - - -	- - - -	- - - -	4.618E+01	100.00
Sn125	- - - -	2.423E-01	6.540E-06	- - - -	- - - -	- - - -	1.454E+01	100.00

The following peaks were not identified:

#	energy	gammals/sec	poterr	CI #
1	74.35	1.5646E-02	100.0	0.0000000
2	100.0	0.5555E-02	96.5	0.0000000

3	92.24	1.0396E-02	100.0	0.0000000
4	104.50	8.9739E-03	100.0	0.0000000
5	208.52	1.1019E-02	100.0	0.0000000
6	239.20	1.1487E-02	100.0	0.0000000
7	269.94	1.2287E-02	100.0	0.0000000
8	276.59	1.2463E-02	100.0	0.0000000
9	299.61	1.3258E-02	100.0	0.0000000
10	327.36	1.4172E-02	100.0	0.0000000
11	338.02	1.4487E-02	100.0	0.0000000
12	351.37	1.4955E-02	100.0	0.0000000
13	462.00	2.0568E-02	100.0	5.3006131E-02
14	510.36	2.3463E-02	100.0	0.0000000
15	522.52	2.4592E-02	100.0	0.0000000
16	600.54	2.3084E-02	100.0	0.0000000
17	661.32	1.0242E+00	4.1	0.0000000
18	723.00	2.0559E-02	100.0	0.0000000
19	757.37	4.9617E-02	24.0	0.5855254
21	772.21	2.0200E-02	24.4	0.0000000
22	794.66	1.5922E-02	100.0	0.0000000
23	840.00	1.8935E-02	27.1	0.0000000
24	860.39	1.6207E-02	100.0	0.0000000
25	903.89	1.6564E-02	100.0	0.0000000
26	910.09	1.6547E-02	100.0	0.0000000
27	961.66	1.7593E-02	100.0	0.0000000
28	968.72	2.6511E-02	100.0	0.0000000
29	1037.05	2.1750E-02	100.0	0.0000000
30	1469.75	2.0406E-02	100.0	0.0000000
31	1495.56	1.8448E-02	100.0	0.0000000
32	1560.16	1.9736E-02	100.0	0.0000000
33	1592.32	2.9881E-02	100.0	0.0000000
34	1630.16	1.9869E-02	100.0	0.0000000
35	1764.42	2.0401E-02	100.0	0.0000000

CS-137

If CI > 0 Confidence threshold was not exceeded
 CI = 0 Energy Window test failure
 CI = -1 Extreme Half Life test failure
 CI = -2 Extreme As. Gamma comparison test failure
 CI = -3 Unable to estimate area of Assoc. Gamma

NIOBIUM ANALYSIS

Page 1 of 2

Spreadsheet filename: NBOCALC

Revision 1: 6/1/92, NLW

Assumes tracer added to final aliquot

Sample ID: 92-5070Dup - LEPS recount

Date Calculated: 06/17/92

Data filename: NB5070DR

M&TE No.

Nb-94 & 95 Spectrum: F5726.cnf;1

Zr/Nb-95 Tracer: 54124-76-0

volume added, ml: 0.2503 0.0012 error *****Half-lives*****

Zr-95 dpm/ml: 4.415E+03 4.500E+01 error Zr-95= 64.02 days

Nb-95 dpm/ml: 9.892E+03 1.151E+02 error Nb-95= 34.97 days

On: Date: 05/13/92 01:00 Time

Nb Sep Date: 05/07/92 13:30 Time

total dpm Nb-95= 2629.44 34.53 error at Nb sep time

Sample Amount: 0.7690 0.0002 error

g, ml or sample? g **Reporting Units**

Leach Volume, ml: 250 0.01 error Activity: dpm

Vol to dilute, ml: 1 0.00001 error per ? g

Diluted to, ml: 1 0.00001 error

Final Aliquot, ml: 4.993 0.017 error

Nb-94 & 95 Counting Data from Prepared Sample

Sample dpm Nb-95= 1.501E+03 0.50 % error at Nb sep time

Sample dpm Nb-94= 2.764E+00 100.00 % error

*****RESULTS*****

Yield Nb-95= 0.571 0.008 error

Nb-94 dpm/g= 315.263 315.295 error = 100.01 %

MDA = < 315.263

GENERIC FORMULAS

Nb-94 Activity =
$$\frac{\text{net dpm} \times \text{leach vol} \times \text{diln vol}}{\text{yield} \times \text{sample amt} \times \text{diln aliquot} \times \text{aliquot}}$$

% recovery =
$$\frac{\text{dpm recovered}}{\text{dpm added}} \times 100$$

Nb-93m Activity =
$$\frac{\text{net cpm} \times \text{d/c} \times \text{leach vol} \times \text{diln vol}}{\text{yield} \times \text{sample amt} \times \text{diln aliquot} \times \text{aliquot}}$$

NIOBIUM ANALYSIS

Page 2 of 2

Spreadsheet filename: NBCALC

Revision 1: 6/1/92. NLW

Sample ID:

92-5070Dup - LEPS recount

Date Calculated:

06/17/92

Data filename:

NBS070DR

Nb-93m Spectrum:

Weight Nb ppt, mg: 258.1 0.2 error

Counted on: A

M&TE No.

Diode A

On: Date: 06/16/92 17:45 Time

Nb-93m d/c = 72.467 5.928 error

NB-93M COUNTING DATA:

Diode B or 325 LEPS

Enter data under correct diode.

If %error >= 50%, enter MDA. If not, MDA = NA

net cps: 1.00E+00 1.00 % error

MDA, in cps:NA

Diode A

peak channel no.: 83 bkgd: 71 - 75 <-- first ROI

Count time, min.: 1257.03 205 <-- counts

Nb-93m counts--> 256 189

289 176

peak channel + 391 210

5 lower + 475 225

4 higher 515 101 - 105 <-- second ROI

539 183 <-- counts

438 186

324 164

258 186

220 160

gross counts: 3705.000 1884 :normalized ROI total

net cpm: 0.727 0.722 :cpm in bkgd spectrum

error, cpm: 0.064 avg BKG.A1;1&2:bkgd filename

% error 8.824 2791.5 :total bkgd counts

*****RESULTS*****

Nb-93m dpm/g# 5006.253 727.902 error = 12.119 %

MDA =

N. W. Kelly 6/17/92
Entered by Date

J. L. Foddy 6/18/92
Reviewed by Date

RECOUNT FOR MB-93M ON 92-5070 DUPLICATE

SAMPLE ID..... SY:925070DNB.A1;2

OF CHANNELS..... 2048

DIODE I.D..... A

SHELF NUMBER..... 0

CALIBRATION..... 0.2 KEV/CH

TIME ZERO 6/16/92 AT 17:45: 0

COUNTED..... 6/16/92 AT 17:45: 0

(0.00 MINUTES DECAY TIME)

LIVE COUNT TIME.... 20 HOURS 57 MINUTES 2 SECONDS (1257.03 MIN.)

ELAPSED TIME..... 20 HOURS 57 MINUTES 2 SECONDS (1257.03 MIN.)
(DEAD TIME = 0.000)

FLUX CORRECTION.... 0.0000

GEOM CORRECTION.... 0.0000 0.0000 0.0000 0.0000 0.0000

WEIGHT..... 1.00000 GRAMS

ANTI: 0 SLP: 0 AREA: 0 P-T: 0 ERR: 0 ZER: 0 OPR: 0 NOV: 1

M. J. Dwyer
6/17/92

Reviewed S. K. Fady 6/18/92

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RECOUNT FOR NB-93M ON 92-5070 DUPLICATE

SY:925070DNB.A1;2 COUNTED 6/16/92 @ 17:45: B GAIN: 0.2 KEV/CHAN

	0	50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950
0	75422	246	159	165	137	120	132	130	118	110	90	97	96	103	82	100	105	90	82	99
1	0	247	183	179	139	133	121	120	128	115	104	89	98	100	92	94	91	69	88	83
2	0	262	186	180	120	139	118	124	116	114	111	107	97	111	83	96	96	84	89	75
3	0	251	164	184	135	128	140	127	109	107	129	100	97	92	96	101	81	89	78	78
4	0	218	186	214	142	141	147	122	109	120	92	96	100	82	96	86	76	79	86	95
5	0	204	160	199	145	138	120	120	145	100	102	124	93	89	91	100	88	80	68	82
6	0	219	165	214	136	120	131	128	132	100	112	87	94	120	92	76	101	70	81	80
7	0	218	143	224	138	123	127	126	125	112	101	92	101	95	83	91	86	70	83	83
8	10	199	159	297	136	130	114	126	104	105	104	121	116	106	100	100	82	101	94	92
9	574	197	181	337	135	127	143	136	120	119	109	97	116	79	100	96	86	91	93	77
10	1100	198	173	437	143	150	133	124	114	100	107	110	85	110	93	80	91	72	71	85
11	883	191	160	432	141	123	129	142	119	173	118	109	105	107	87	97	76	113	88	86
12	584	219	180	359	157	151	126	143	142	174	111	116	88	95	111	85	88	71	92	75
13	618	264	172	244	128	124	129	169	121	180	103	100	100	100	84	93	05	104	79	97
14	425	311	150	182	160	142	171	178	98	159	115	109	114	105	87	97	83	70	83	105
15	313	359	160	146	166	151	184	185	129	173	104	108	111	100	90	88	104	06	70	80
16	300	300	163	174	156	136	190	155	105	120	109	99	106	95	91	70	89	81	86	105
17	237	267	160	150	140	123	180	138	117	119	96	113	93	94	117	92	83	90	77	90
18	237	222	160	141	143	126	160	130	120	112	103	112	104	96	115	84	84	96	86	79
19	231	191	173	142	129	140	145	138	106	107	113	112	81	97	84	83	90	80	62	85
20	219	199	155	165	159	157	130	102	129	112	115	82	90	109	96	93	104	79	70	80
21	242	205	170	159	124	118	116	120	142	98	101	92	110	97	118	99	76	76	73	88
22	274	189	140	138	161	123	117	152	146	97	97	100	83	70	83	90	92	77	73	78
23	224	176	170	150	124	152	136	166	159	111	97	102	96	84	93	96	92	94	99	81
24	230	210	172	133	116	139	139	209	155	116	104	95	105	101	113	69	86	72	98	83
25	223	225	164	157	145	132	118	199	147	83	96	117	105	106	83	73	88	85	74	86
26	255	193	177	140	143	134	135	213	153	105	104	94	103	104	90	82	94	85	88	86
27	223	227	164	160	174	153	132	171	137	100	104	101	90	94	95	75	88	69	99	106
28	232	256	180	135	159	135	116	146	142	94	110	77	110	105	94	86	88	92	104	90
29	249	289	184	192	125	142	142	118	112	88	98	105	89	92	85	99	85	92	108	84
30	249	391	193	190	160	124	117	102	135	120	110	95	103	107	89	85	87	82	107	96
31	242	475	196	197	162	127	119	106	132	104	129	100	99	83	85	93	90	79	105	75
32	285	515	218	234	180	117	135	137	115	117	114	103	93	121	69	90	91	89	80	96
33	245	539	196	186	148	105	133	111	120	107	116	104	109	81	90	97	76	102	79	88
34	247	438	170	207	132	145	126	125	129	135	99	104	117	94	87	77	86	79	85	77
35	229	324	227	173	125	120	121	126	132	107	112	110	105	107	100	87	85	91	79	83
36	243	258	236	184	157	132	123	123	130	111	102	103	82	94	79	91	76	85	69	65
37	211	220	241	177	138	143	143	127	135	100	96	100	116	94	97	89	85	87	63	98
38	202	227	231	153	134	133	115	123	146	99	94	102	105	94	115	95	75	79	81	87
39	241	200	188	151	154	156	133	116	153	99	109	100	104	103	80	89	81	86	91	83
40	217	192	169	154	121	133	127	120	105	100	117	94	90	92	85	77	64	74	85	85
41	219	218	173	144	153	140	143	106	119	101	117	113	103	96	86	85	105	79	81	86
42	203	222	140	142	134	139	106	106	122	120	100	90	101	82	90	87	84	82	79	79
43	224	242	136	143	126	101	117	110	101	112	89	96	88	93	94	101	65	83	96	91
44	205	268	156	152	151	163	134	130	112	103	83	84	105	87	101	84	69	65	62	79
45	243	234	158	163	153	125	138	130	100	104	109	88	96	112	102	93	93	74	80	83
46	199	232	165	135	152	136	117	120	116	90	103	96	94	107	88	93	02	80	80	79
47	219	220	172	149	131	120	110	122	112	106	89	82	100	97	96	84	90	80	93	73
48	217	210	174	157	144	152	117	136	131	101	114	125	90	107	97	97	73	86	66	82
49	222	181	183	146	141	129	123	113	126	108	117	80	117	83	110	93	68	82	76	67

RECOUNT FOR NB-93M ON 92-507# DUPLICATE

SY:92507#DNB.A1:2 COUNTED 6/16/92 @ 17:45:00 GAIN: 0.2 KEV/CHAN

	1000	1050	1100	1150	1200	1250	1300	1350	1400	1450	1500	1550	1600	1650	1700	1750	1800	1850	1900	1950
0	81	84	64	63	63	71	51	62	58	48	48	57	47	52	37	68	58	47	43	48
1	86	84	65	55	68	52	52	61	54	54	57	58	47	46	54	56	49	39	56	37
2	98	69	78	68	71	58	59	54	48	52	52	56	48	42	65	39	39	46	58	42
3	78	82	84	83	66	65	65	46	53	46	58	45	45	52	47	48	46	48	37	45
4	81	87	68	69	58	67	51	57	48	54	52	45	49	48	47	64	41	47	71	56
5	89	76	65	66	36	62	45	55	55	61	44	59	52	52	47	52	45	45	49	42
6	99	95	72	58	71	55	61	66	61	44	52	51	52	48	39	54	45	56	47	55
7	83	61	69	73	78	57	68	68	45	49	46	55	59	43	52	58	68	43	49	48
8	97	84	72	65	61	51	51	55	49	46	49	58	41	51	45	51	47	51	51	58
9	88	65	77	71	88	52	62	49	58	58	48	41	58	43	47	63	51	27	31	57
10	84	84	64	64	83	47	58	53	45	51	48	58	58	41	57	52	38	43	44	46
11	65	78	55	55	63	56	63	68	66	52	67	49	47	58	48	49	46	51	47	45
12	79	65	75	54	57	55	56	52	51	62	58	57	68	45	48	62	48	56	78	48
13	78	78	64	69	65	53	53	62	68	58	51	58	43	42	37	39	42	47	44	55
14	79	74	78	77	63	71	54	55	54	38	41	53	44	42	51	45	45	58	45	42
15	89	77	65	57	53	58	53	58	54	51	55	51	62	45	45	47	48	45	54	48
16	88	57	61	66	46	56	49	51	44	57	43	39	51	36	52	49	47	35	47	39
17	82	73	71	77	62	55	52	54	58	45	37	68	57	54	34	58	51	45	49	35
18	75	63	56	75	57	58	52	56	57	53	58	33	54	52	39	43	55	44	48	54
19	67	88	72	72	57	66	55	63	54	52	68	51	58	51	57	52	53	42	49	48
20	82	32	72	83	58	61	52	45	51	51	68	56	37	56	47	57	33	38	39	41
21	84	31	81	58	68	63	64	55	57	48	52	47	51	43	58	49	46	55	33	55
22	77	61	75	73	78	78	53	56	54	59	58	53	61	39	54	65	48	38	32	37
23	76	62	74	67	61	73	44	54	44	43	52	48	55	53	37	59	39	58	51	43
24	81	73	75	65	76	68	68	51	57	57	51	59	48	47	47	43	48	54	53	35
25	94	66	64	88	52	52	58	61	68	56	43	45	52	48	42	64	31	51	51	41
26	101	89	68	59	67	45	59	46	58	55	52	49	39	54	68	56	52	43	41	41
27	98	61	98	68	53	48	51	64	68	42	46	48	59	49	44	49	48	45	47	46
28	86	68	63	58	61	63	64	47	61	52	54	51	57	51	46	57	55	38	32	54
29	97	66	58	68	69	68	55	59	68	64	52	37	51	52	49	49	45	57	49	49
30	78	73	61	77	73	55	68	56	49	71	68	52	39	58	58	54	52	57	37	59
31	84	64	71	78	68	63	55	57	58	55	55	45	51	48	64	54	47	55	48	49
32	75	68	72	72	46	69	58	52	53	58	47	41	68	52	54	48	52	47	42	44
33	65	81	62	59	64	64	61	54	53	32	61	48	48	47	54	39	43	39	38	48
34	87	74	58	58	67	61	77	78	54	47	62	51	48	56	49	41	38	54	52	33
35	78	61	69	65	59	63	61	65	62	58	61	58	48	51	55	36	47	56	47	58
36	78	68	57	66	72	62	64	38	58	55	59	54	61	29	45	62	36	39	51	44
37	77	68	78	59	64	67	57	55	68	48	48	44	64	57	39	52	77	43	39	44
38	67	71	54	78	68	62	54	62	68	62	66	46	48	48	58	53	38	48	36	49
39	68	72	71	63	55	62	48	42	55	52	52	68	47	44	43	32	45	55	29	56
40	73	68	83	71	59	63	66	57	58	71	62	54	48	43	45	46	48	49	44	33
41	85	67	64	61	66	53	58	59	61	54	39	58	47	52	58	48	34	43	32	32
42	85	53	61	52	69	57	58	62	58	57	51	58	46	45	58	54	49	47	43	46
43	85	75	61	69	68	54	55	49	65	61	51	49	48	56	48	54	36	48	49	39
44	88	72	53	67	65	57	58	65	52	53	56	58	54	41	58	48	53	58	47	51
45	72	87	73	73	59	55	64	64	68	58	52	59	54	46	47	58	56	47	38	48
46	82	71	68	78	68	59	58	66	52	47	41	44	55	55	43	51	58	44	53	54
47	67	72	64	62	57	64	69	62	56	56	63	45	46	53	45	45	45	37	43	43
48	88	72	79	54	57	48	49	58	45	58	47	62	53	49	58	49	38	47	45	43
49	74	78	71	57	61	63	58	45	57	51	65	55	54	53	48	48	53	44	42	48

NIOSBIUM ANALYSIS

Page 1 of 2

Spreadsheet filename: NBOALD

Revision 1: 8/1/92, NLW

Assumes tracer added to final aliquot

Sample ID: 92-5070Dup

Date Calculated: 06/03/92

Data filename: NBS070d

M&TE No.

Nb-94 & 95 Spectrum: F5726.cnf;1

Zr/Nb-95 Tracer: S4124-76-0

volume added, ml: 0.2503 0.0012 error

*****Half-lives*****

Zr-95 dpm/ml: 4.415E+03 4.500E+01 error

Zr-95= 64.02 days

Nb-95 dpm/ml: 9.892E+03 1.151E+02 error

Nb-95= 34.97 days

On: Date: 05/13/92 01:00 Time

Nb Sep Date: 05/07/92 13:30 Time

total dpm Nb-95= 2629.44 34.53 error at Nb sep time

Sample Amount: 0.7690 0.0002 error

g, ml or sample? g

Reporting Units

Leach Volume, ml: 250 0.01 error

Activity: dpm

Vol to dilute, ml: 1 0.00001 error

per ? : g

Diluted to, ml: 1 0.00001 error

Final Aliquot, ml: 4.993 0.017 error

Nb-94 & 95 Counting Data from Prepared Sample

Sample dpm Nb-95= 1.501E+03 0.50 % error at Nb sep time

Sample dpm Nb-94= 2.764E+00 100.00 % error

*****RESULTS*****

Yield Nb-95= 0.571 0.008 error

Nb-94 dpm/g= 315.263 315.295 error = 100.01 %

MDA = < 315.263

GENERIC FORMULAS

$$\text{Nb-94 Activity} = \frac{\text{net dpm} \times \text{leach vol} \times \text{diln vol}}{\text{yield} \times \text{sample amt} \times \text{diln aliquot} \times \text{aliquot}}$$

$$\% \text{ recovery} = \frac{\text{dpm recovered}}{\text{dpm added}} \times 100$$

$$\text{Nb-93m Activity} = \frac{\text{net cpm} \times \text{d/c} \times \text{leach vol} \times \text{diln vol}}{\text{yield} \times \text{sample amt} \times \text{diln aliquot} \times \text{aliquot}}$$

NIOBIUM ANALYSIS

Page 2 of 2

Spreadsheet filename: NBCALC

Revision 1: 6/1/92, NLW

Sample ID: 92-5070Dup

Date Calculated: 06/03/92

Data filename: NB5070d

Nb-93m Spectrum:

Weight Nb ppt, mg: 258.1 0.2 error

Counted on: 325 leps M&TE No. 325 leps

On: Date: 05/22/92 15:40 Time

Nb-93m d/c = 182.354 31.973 error

NB-93M COUNTING DATA:

Diode B or 325 LEPS

If %error >= 50%, enter MDA. If not, MDA = NA

net cps: 6.96E-03 10.20 % error

MDA, in cps: NA

Diode A Enter data under correct diode.

peak channel no.: 83 bkgd: 71 - 75 <-- first ROI

Count time, min.: 1000 0 <-- counts

Nb-93m counts--> 0 0

0 0

peak channel + 0 0

5 lower + 0 0

4 higher 0 100 - 104 <-- second ROI

0 <-- counts

0 0

0 0

0 0

0 0

gross counts: 0.000 0 :normalized ROI total

net cpm: 0.000 0 :cpm in bkgd spectrum

error, cpm: 0.000 BKG.A1:1 :bkgd filename

% error ERR 0 :total bkgd counts

*****RESULTS*****

Nb-93m dpm/g= 3685.818 1766.347 error = 20.33c %

MDA =

$$\frac{.00696 \text{ cps} \times 60 \text{ sec/min} \times 182.354 \text{ d/c}}{.571 \text{ g/c id}} = 133.4 \text{ dpm/sample}$$

11/2
6/3/92

Entered by NLW Date 6/2/92

Reviewed by A. K. Jodoff Date 6/4/92

 23-MAY-92 07:42:15

92-030700P HB POWDER IN FILTER M39913

SAMPLE DATE: 22-MAY-92 14:34:00
 SAMPLE IDENTIFICATION: NO STD STIPPLED
 TYPE OF SAMPLE: BATCH FILTER
 SAMPLE QUANTITY: 1.000000 UNITS: SPL
 SAMPLE GEOMETRY: SHELF 1
 EFFICIENCY FILE NAME: EFF.TAB1..

 ACQUIRE DATE: 22-MAY-92 15:40:03 * FLUHM(1332) 1.609
 PRESET TIME(LIVE): 57600. SEC * SENSITIVITY: 5.000
 ELAPSED SEAL TIME: 57722. SEC * SHAPE PARAMETER: 10.0 %
 ELAPSED LIVE TIME: 57690. SEC * HBR ITERATIONS: 10.
 *

 DETECTOR: TGP-S10 LEPS #1 * LIBRARY:N.LIB1
 CALIB DATE: 15-APR-91 09:00:00 * ENERGY TOLERANCE: 1.250KV
 KEV/OFF: 0.1800000 * HALF LIFE RATIO: 0.00
 OFFSET: 0.0000000 KEY * ABUNDANCE LIMIT: 85.00%
 *

		ENERGY WINDOW		5.00 TO		405.00				
PK	IT	ENERGY	AREA	BKGND	FWHM	CHANNEL	LEFT	PW	CTS/SEC XERR	FIT
1	0	16.10	401.	640.	0.52	161.76	153	16	6.96E-03	10.2
2	0	26.04	233.	943.	1.55	260.37	250	29	4.05E-03	19.7
3	0	31.07	401.	501.	0.69	310.75	310	10	6.97E-03	9.3

PEAK SEARCH COMPLETED (REV 11)

16h.

VAX/VMS Peak Search Report V1.8 Generated 28-MAY-1992 15:00:12

Configuration : DUBO:[USER]F5726.CNF;1
 Analyses by : PEAK V16.2
 Sample title : F5726 NB EXPERIMENTAL SPL 92-5070DUP
 Sample date : 20-MAY-1992 00:00:00 Acquisition date : 21-MAY-1992 14:54:28
 Sample ID : F5726 5070 DUP Sample quantity : 1.0000 SA
 Sample type : Sample geometry : FALF (W/O DISH)
 Elapsed live time: 0 15:00:00.00 Elapsed real time: 0 15:00:05.00 0.04
 Start energy : 40.25 keV End energy : 4098.26 keV
 Sensitivity : 5.00 Gaussian : 10.00
 Critical level : No

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	54.66	556	4412	4.88	54.41	50	9	1.03E-02	22.4	
2	0	62.59	445	4255	4.64	62.35	59	8	8.23E-03	26.2	
3	0	74.25	2193	5982	4.23	74.01	69	11	4.06E-02	7.2	
4	0	85.35	1057	4374	2.65	85.12	81	9	1.96E-02	12.0	
5	0	92.65	733	4067	2.39	92.41	90	9	1.36E-02	16.4	
6	0	201.01	2278	7398	3.67	200.78	195	13	4.22E-02	8.2	
7	0	511.14	913	4043	3.08	510.93	506	11	1.69E-02	13.8	
8	0	609.64	178	1423	2.72	609.43	606	7	3.31E-03	36.5	
9	0	661.86	3914	1342	2.53	661.66	656	12	7.25E-02	2.5	
10	0	765.97	45479	1044	2.77	765.76	758	16	8.42E-01	0.5	
11	0	1119.49	64	124	2.95	1119.23	1116	8	1.18E-03	34.7	
12	0	1172.89	98	100	3.67	1172.62	1169	9	1.81E-03	22.2	
13	0	1332.43	160	142	2.76	1332.12	1324	16	2.96E-03	20.4	
14	0	1461.16	72	115	2.99	1460.82	1456	12	1.34E-03	33.4	
15	0	2616.46	85	45	3.63	2615.55	2606	20	1.58E-03	20.5	

VAX/VMS Peak Search Report V1.8 Generated 28-MAY-1992 15:02:03

Configuration : DUBO:[USER]F5726.CNF;1
 Analyses by : PEAK V16.2,ENBACK V1.5
 Sample title : F5726 NB EXPERIMENTAL SPL 92-5070DUP
 Sample date : 20-MAY-1992 00:00:00 Acquisition date : 21-MAY-1992 14:54:28
 Sample ID : F5726 5070 DUP Sample quantity : 1.0000 SA
 Sample type : Sample geometry : FALF (W/O DISH)
 Elapsed live time: 0 15:00:00.00 Elapsed real time: 0 15:00:05.00 0.0%
 Start energy : 40.25 keV End energy : 4098.26 keV
 Sensitivity : 5.00 Gaussian : 10.00
 Critical level : No

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	54.66*	388	4412	4.88	54.41	50	9	7.19E-03	33.5	
2	0	85.35*	261	4374	2.65	85.12	81	9	4.84E-03	51.0	
3	0	92.65*	25	4067	2.39	92.41	90	9	4.64E-04	496.5	
4	0	201.01*	39	7398	3.67	200.78	195	13	7.24E-04	503.0	
5	0	609.64*	115	1423	2.72	609.43	606	7	2.12E-03	59.4	
6	0	661.86*	3867	1342	2.53	661.66	656	12	7.16E-02	2.5	
7	0	765.97	45479	1044	2.77	765.76	758	16	8.42E-01	0.5	
8	0	1119.49	64	124	2.95	1119.23	1116	8	1.18E-03	34.7	
9	0	1172.89*	12	100	3.67	1172.62	1169	9	2.19E-04	213.6	
10	0	1332.43*	12	142	2.76	1332.12	1324	16	2.21E-04	297.4	
11	0	1461.16*	11	115	2.99	1460.82	1456	12	2.05E-04	243.5	
12	0	2616.46	85	45	3.63	2615.55	2606	20	1.58E-03	20.5	

John H. 5/29/92

VAX/VMS Nuclide Identification Report V2.8 Generated 28-MAY-1992 15:30:23

Configuration : DUBO:[USER]F5726.CNF;1
 Analyses by : PEAK V16.2,PEAKEFF V2.2,ENBACK V1.5,NID V2.4,WTMEAN V1.5
 Sample title : F5726 NB EXPERIMENTAL SPL 92-5070DUP
 Sample date : 20-MAY-1992 00:00:00 Acquisition date : 21-MAY-1992 14:54:28
 Sample ID : F5726 5070 DUP Sample quantity : 1.0000 SA
 Sample type : Sample geometry : FALF (W/O DISH)
 Elapsed live time: 0 15:00:00.00 Elapsed real time: 0 15:00:05.00 0.0%
 Energy tolerance : 1.60 keV Half life ratio : 8.00
 Errors propagated: No Systematic Error : 0.00 %
 Efficiency type : Empirical Efficiencies at : Peak Energy
 Abundance limit : 75.00 WTM error limit : 3.00

Nuclide Line Activity Report

Nuclide Type: natural

Nuclide	Energy	%Abn	%Eff	Uncorrected Decay Corr 1-Sigma			Status
				uCi/SA	uCi/SA	%Error	
K-40	1460.83	10.67*	1.776E+00	2.920E-06	2.920E-06	243.47	OK

Final Mean for 1 Valid Peaks = 2.920E-06+/- 7.110E-06 (243.47%)

Nuclide Type: activation

Nuclide	Energy	%Abn	%Eff	Uncorrected Decay Corr 1-Sigma			Status
				uCi/SA	uCi/SA	%Error	
CQ-60	1173.24	99.90	2.212E+00	2.673E-07	2.675E-07	213.56	OK
	1332.50	99.98*	1.939E+00	3.079E-07	3.081E-07	297.43	OK

Final Mean for 2 Valid Peaks = 2.789E-07+/- 4.848E-07 (173.84%)

Nuclide Type: fission

Nuclide	Energy	%Abn	%Eff	Uncorrected Decay Corr 1-Sigma			Status
				uCi/SA	uCi/SA	%Error	
NB-95	765.79	99.79*	3.506E+00	6.506E-04	6.760E-04	0.50	OK

Final Mean for 1 Valid Peaks = 6.760E-04+/- 3.348E-06 (0.50%)

CS-137	661.66	85.20*	4.080E+00	5.568E-05	5.568E-05	2.53	OK

Final Mean for 1 Valid Peaks = 5.568E-05+/- 1.406E-06 (2.53%)

Nuclide Type:

Nuclide	Energy	%Abn	%Eff	Uncorrected Decay Corr 1-Sigma			Status
				uCi/SA	uCi/SA	%Error	
TC-95	765.79	94.00*	3.506E+00	6.907E-04	3.411E-03	0.50	OK
	947.67	1.96	2.787E+00	0.000E+00	0.000E+00	0.00	Absent
	1073.71	3.75	2.432E+00	0.000E+00	0.000E+00	0.00	Absent

Final Mean for 1 Valid Peaks = 3.411E-03+/- 1.689E-05 (0.50%)

*= 1501
* 1.433
dpm*

Minimum Detectable Activity Report (continued)

Page : 2

Sample ID : F5726 5070 DUP

Acquisition date : 21-MAY-1992 14:54:28

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/SA)
PM-148M	3297.	550.27	3.7085E-06
EU-152	93.	1408.01	5.8547E-06
GD-153	3341.	97.43	3.1015E-06
EU-154	121.	1274.51	3.6769E-06
EU-155	3199.	105.31	3.7698E-06
TM-170	4531.	84.30	3.3141E-05
TA-182	209.	1121.30	4.1901E-06
W-188	3213.	155.00	6.3217E-06
OS-191	3219.	129.40	3.6352E-06
IR-192	2653.	316.50	1.8239E-06
HG-203	6024.	72.87	2.3738E-05
PB-210	3883.	46.52	1.1389E-04
BI-211	0.	350.10	Half-Life too short
BI-214	207.	1120.27	9.6121E-06
PB-214	2844.	351.87	4.5418E-06
PO-214(I	1905.	609.31	3.1561E-06
RA-224	3341.	240.76	4.8902E-05
RA-226	2844.	351.87	4.5406E-06
TH-228	3270.	215.75	4.3318E-04
TH-230	4232.	67.68	3.6719E-04
PA-231	2859.	300.07	6.1870E-05
TH-232	253.	911.16	4.3905E-06
PA-233	2775.	311.90	4.0828E-06
U-234	3984.	53.23	2.1831E-03
U-235	4083.	185.74	2.2506E-06
U-236	3816.	49.37	4.4255E-03
NP-237	2775.	311.90	3.8851E-06
PU-237	3193.	101.10	4.2305E-06
U-238	218.	1001.00	2.0153E-04
AM-241	3940.	59.54	5.0079E-06

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides
0	54.66*	388	4412	4.88	54.41	50	9	33.5		
0	85.35*	261	4374	2.65	85.12	81	9	51.0		
0	92.65*	25	4067	2.39	92.41	90	9	496.5		
0	201.01*	39	7398	3.67	200.78	195	13	503.0		
0	609.64*	115	1423	2.72	609.43	606	7	59.4		
0	661.86*	3867	1342	2.53	661.66	656	12	2.5		CS-137
0	765.97	45479	1044	2.77	765.76	758	16	0.5		TC-95
										NB-95
0	1119.49	64	124	2.95	1119.23	1116	8	34.7		
0	1172.89*	12	100	3.67	1172.62	1169	9	213.6		CO-60
0	1332.43*	12	142	2.76	1332.12	1324	16	297.4		CO-60
0	1461.16*	11	115	2.99	1460.82	1456	12	243.5		K-40
0	2616.46	85	45	3.63	2615.55	2606	20	20.5		

VAX/VMS Nuclide Identification Report V2.8 Generated 28-MAY-1992 15:36:10

Configuration : DUBO:[USER]F5726.CNF;1
 Analyses by : PEAK V16.2,PEAKEFF V2.2,ENBACK V1.5,NID V2.4,WTMEAN V1.5
 Analyses by : MINACT V2.2
 Sample title : F5726 NB EXPERIMENTAL SPL 92-5070DUP
 Sample date : 20-MAY-1992 00:00:00 Acquisition date : 21-MAY-1992 14:54:28
 Sample ID : F5726 5070 DUP Sample quantity : 1.0000 SA
 Sample type : Sample geometry : FALF (W/O DISH)
 Elapsed live time: 0 15:00:00.00 Elapsed real time: 0 15:00:05.00 0.0%
 Peak Width (FWHM): 3.00 Confidence level : 5.00 %
 Energy tolerance : 1.60 keV Half life ratio : 8.00
 Errors propagated: No Systematic Error : 0.00 %
 Efficiency type : Empirical Efficiencies at : Peak Energy
 Abundance limit : 75.00 WTM error limit : 3.00

Minimum Detectable Activity Report

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/SA)
NA-22	122.	1274.53	1.2680E-06
NA-24	114.	1368.60	1.1582E-05
SC-46	208.	1120.50	1.4672E-06
CR-51	2609.	320.08	1.5875E-05
MN-54	288.	834.83	1.2406E-06
CO-57	3306.	122.06	9.9552E-07
CO-58	243.	810.75	1.1261E-06
FE-59	146.	1099.25	2.1623E-06
ZN-65	201.	1115.55	2.8022E-06
SE-75	2935.	264.66	2.2953E-06
BR-82	297.	776.52	3.5261E-06
SR-85	3779.	514.00	2.8146E-06
Y-88	254.	898.04	1.3932E-06
NB-94	267.	871.09	1.2451E-06
NB-95M	3282.	235.68	7.4975E-06
TC-95M	5332.	204.11	2.2607E-06
ZR-95	893.	756.73	3.6699E-06
RU-103	2839.	497.05	2.6811E-06
RU-106	1435.	621.92	2.0786E-05
AG-108M	713.	722.90	1.8273E-06
CD-109	4287.	88.03	2.8020E-05
AG-110M	250.	884.68	1.6935E-06
SN-113	2499.	391.70	2.7445E-06
SB-124	1919.	602.71	3.1714E-06
SB-125	2590.	427.88	6.5146E-06
I-131	2522.	364.50	2.3818E-06
BA-133	2660.	356.00	2.6435E-06
CS-134	1920.	604.71	2.3431E-06
CE-139	3211.	165.80	1.2347E-06
BA-140	3019.	537.27	1.1616E-05
LA-140	2753.	487.03	4.6730E-06
CE-141	3321.	145.40	1.9762E-06
CE-144	3287.	133.54	7.9321E-06
PM-144	832.	696.54	1.2999E-04
SM-145	4115.	61.30	2.7823E-06
ND-147	4196.	91.10	3.9634E-06

= 2.764 dpm

NIOBIUM ANALYSIS

Page 1 of 2

Spreadsheet filename: NBOCALC

Revision 1: 6/1/92, NLW

Assumes tracer added to final aliquot

Sample ID: 92-5074 2nd recount

Date Calculated: 06/16/92

Data filename: NB5074R2

M&TE No.

Diode HH

Nb-94 & 95 Spectrum: nb5074.hh;1

Zr/Nb-95 Tracer: 54124-76-0

volume added, ml: 0.2503 0.0012 error *****Half-lives*****

Zr-95 dpm/ml: 4.415E+03 4.500E+01 error Zr-95= 64.02 days

Nb-95 dpm/ml: 9.892E+03 1.151E+02 error Nb-95= 34.97 days

On: Date: 05/13/92 01:00 Time

Nb Sep Date: 05/07/92 13:30 Time

total dpm Nb-95= 2629.44 34.53 error at Nb sep time

Sample Amount: 0.8379 0.0002 error

g, ml or sample? g

Reporting Units

Leach Volume, ml: 250 0.01 error Activity: dpm

Vol to dilute, ml: 1 0.00001 error per ? : g

Diluted to, ml: 1 0.00001 error

Final Aliquot, ml: 4.993 0.17 error

Nb-94 & 95 Counting Data from Prepared Sample

Sample dpm Nb-95= 2.324E+03 1.09 % error at Nb sep time

Sample dpm Nb-94= 1.943E+00 100.00 % error

*****RESULTS*****

Yield Nb-95= 0.984 0.015 error

Nb-94 dpm/g= 131.367 131.462 error = 100.07 %

MDA = < 131.367

GENERIC FORMULAS

$$\text{Nb-94 Activity} = \frac{\text{net dpm} \times \text{leach vol} \times \text{dilu vol}}{\text{yield} \times \text{sample amt} \times \text{dilu aliquot} \times \text{aliquot}}$$

$$\% \text{ recovery} = \frac{\text{dpm recovered}}{\text{dpm added}} \times 100$$

$$\text{Nb-93m Activity} = \frac{\text{net cpm} \times \text{d/c} \times \text{leach vol} \times \text{dilu vol}}{\text{yield} \times \text{sample amt} \times \text{dilu aliquot} \times \text{aliquot}}$$

NIOBIUM ANALYSIS

Page 2 of 2

Spreadsheet filename: NBCALC

Revision 1: 6/1/92, NLW

Sample ID:

92-5074 2nd recount

Date Calculated:

06/16/92

Data filename:

NB5074R2

Nb-93m Spectrum:

925074nb.ai;3

Weight Nb ppt, mg: 277.0

0.2 error

Counted on:

A

M&TE No.

Diode A

On: Date:

06/09/92

11:25 Time

Nb-93m d/c =

73.482

6.098 error

NB-93M COUNTING DATA:

Diode B or 325 LEPS

Enter data under correct diode.

If %error >= 50%, enter MDA.

If not, MDA = NA

net cps:

1.00

1.00 % error

MDA, in cps:NA

Diode A

peak channel no.:

83

bkgd:

71 - 75 <-- first ROI

Count time, min.:

1749.7

444

<-- counts

Nb-93m counts-->

556

457

617

436

peak channel +

828

434

5 lower +

966

459

4 higher

1240

101 - 105 <-- second ROI

1288

425

<-- counts

1087

423

830

436

661

457

551

403

gross counts: 8624.000

4373

:normalized ROI total

net cpm:

1.708

0.722

:cpm in bkgd spectrum

error, cpm:

0.068

avg BKG.A1:1x:2:bkgd filename

% error

3.997

5636.2

:total bkgd counts

*****RESULTS*****

Nb-93m dpm/g=

8483.356

845.537 error

=

9.767 %

MDA =

*avg of 2 recounts: 8483 + MDW
6/16/92*

MJ Dye 6/16/92
Entered by Date

A. K. Fachoff 6/18/92
Reviewed by Date

SECOND RECOUNT N8-93M 92-5874

SAMPLE ID..... 925874NB.A1;3

OF CHANNELS..... 2048

DIODE I.D..... A

SHIELD NUMBER..... 8

CALIBRATION..... 8.2 KEV/CH

TIME ZERO 6/ 9/92 AT 11:25: 8

COUNTED..... 6/ 9/92 AT 11:25: 8

(8.88 MINUTES DECAY TIME)

LIVE COUNT TIME.... 29 HOURS 9 MINUTES 42 SECONDS (1749.78 MIN.)

ELAPSED TIME..... 29 HOURS 9 MINUTES 42 SECONDS (1749.78 MIN.)

(DEAD TIME = 8.888)

FLUX CORRECTION.... 8.8888

GAIN CORRECTION.... 8.8888 8.8888 8.8888 8.8888 8.8888

WEIGHT..... 1.00000 GRAMS

DATE: 6/13/92 AREA: 8 P-T: 8 ERR: 8 ZER: 8 OPR: 8 NOV: 1

204

M. J. J. 6/13/92

St. J. J. 6/13/92

286

SECOND RECOUNT NB-93M 92-5074

925074NR.A1;3 COUNTED 6/ 9/92 @ 11:25: 0 GAIN: 0.2 KEV/CHAN

	0	50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950
0	101902	457	425	438	370	345	368	441	441	385	404	395	327	287	269	266	274	246	212	196
1	0	519	425	430	372	357	379	387	410	416	396	383	331	355	309	299	247	232	240	217
2	0	534	423	481	346	361	400	413	428	410	391	402	382	321	318	255	240	231	209	193
3	0	523	436	468	361	360	388	453	386	421	342	354	340	289	296	245	231	233	206	226
4	0	470	457	463	384	392	399	415	433	370	382	350	355	303	296	274	251	232	192	245
5	0	485	403	535	374	344	345	422	431	403	300	347	351	304	282	291	249	216	212	227
6	0	457	414	547	363	366	411	414	410	441	371	352	360	319	300	253	232	241	208	189
7	0	465	399	685	336	369	410	426	409	390	363	366	343	316	276	278	268	237	218	225
8	23	520	416	826	351	361	405	403	407	394	388	368	305	338	264	287	235	245	213	227
9	384	485	442	1063	345	368	379	138	437	439	375	365	305	299	267	251	233	230	233	214
10	1730	445	451	1342	362	368	397	395	421	426	424	300	351	299	269	305	223	224	199	198
11	1410	464	421	1338	365	360	377	435	407	402	371	325	328	294	281	276	238	230	185	213
12	1413	479	432	1093	379	340	413	499	420	526	396	347	302	379	273	272	246	234	223	223
13	493	548	358	770	388	373	410	572	392	502	330	360	339	313	276	249	282	226	251	207
14	674	606	403	537	395	402	433	604	421	454	387	365	338	299	292	256	254	246	214	222
15	114	632	425	434	402	340	409	610	417	509	353	355	351	300	294	247	256	224	220	237
16	530	635	381	396	354	390	499	536	434	409	386	344	310	329	305	263	246	232	206	221
17	501	580	419	409	353	351	495	460	394	454	377	347	335	317	276	256	250	224	236	225
18	479	501	417	354	361	355	502	445	421	405	396	352	334	295	275	269	252	256	190	224
19	472	510	303	380	355	380	454	423	444	464	372	344	307	299	299	264	233	211	183	211
20	504	441	410	393	379	368	426	431	450	433	375	357	324	286	309	265	253	214	209	232
21	500	444	417	375	385	345	407	471	470	378	343	359	316	298	281	273	247	241	213	229
22	480	457	405	398	358	398	417	546	470	400	405	374	320	289	278	266	235	243	214	214
23	430	435	407	382	387	371	452	640	539	369	385	351	335	285	273	265	261	242	216	200
24	508	434	377	379	381	383	414	728	554	439	372	350	335	302	299	247	239	216	238	232
25	465	459	412	377	369	368	429	830	520	409	405	370	365	295	248	263	232	212	220	194
26	531	507	430	409	390	398	300	733	497	395	370	348	317	289	303	237	223	233	240	224
27	477	487	411	393	365	397	424	620	454	404	357	355	340	293	287	253	240	209	211	200
28	497	556	471	439	386	357	391	546	458	436	374	330	314	302	304	257	248	210	251	212
29	539	617	503	480	377	351	417	430	392	391	386	358	340	317	263	271	244	229	262	245
30	530	628	577	491	339	394	401	399	429	374	359	336	294	288	279	248	276	209	209	226
31	529	966	676	544	483	374	402	425	382	381	361	339	335	316	278	254	234	226	274	218
32	590	1240	617	612	404	372	486	393	438	383	395	335	324	291	260	243	239	253	238	187
33	616	1280	620	565	401	396	390	421	398	358	399	360	339	301	292	230	215	249	212	209
34	627	1087	563	546	370	364	416	466	429	372	392	343	310	289	301	271	275	227	210	230
35	572	830	652	471	356	375	432	477	466	373	353	330	339	287	298	255	233	241	200	233
36	511	661	778	501	365	423	414	461	468	390	361	347	329	319	257	246	250	243	217	198
37	524	551	855	440	376	363	398	448	517	386	382	360	302	277	227	219	203	214	156	
38	532	510	848	420	342	380	425	446	483	381	383	347	299	303	245	219	214	223	200	
39	530	460	638	413	360	378	411	428	481	416	378	365	290	262	256	243	212	294	194	159
40	100	487	508	340	389	377	387	420	451	360	377	355	315	312	280	251	256	207	220	213
41	407	455	411	393	366	412	407	399	413	400	352	363	340	266	261	275	232	227	195	216
42	469	530	386	375	358	375	396	433	370	402	394	362	344	298	245	233	230	214	193	208
43	416	560	401	396	369	368	453	476	396	360	366	341	310	277	270	237	235	200	200	201
44	503	597	401	354	379	391	415	434	396	419	367	365	323	316	268	251	222	187	230	200
45	494	552	401	380	354	360	408	391	372	397	329	360	308	298	258	270	250	216	211	235
46	450	521	413	355	355	426	402	460	397	397	409	329	329	297	288	246	210	252	204	247
47	472	463	445	356	389	380	401	401	429	300	314	326	302	284	262	219	209	225	219	186
48	496	441	441	334	376	390	406	414	425	392	337	351	360	300	269	240	215	242	195	200
49	444	480	449	363	344	421	400	414	444	350	386	356	309	285	284	216	220	196	216	215

SECOND RECOUNT NB-93M 92-5074

925074NB.A1:3 COUNTED 6/ 9/92 @ 11:25: 0 GAIN: 0.2 KEV/CHAN

	1000	1050	1100	1150	1200	1250	1300	1350	1400	1450	1500	1550	1600	1650	1700	1750	1800	1850	1900	1950
0	224	176	164	161	134	138	143	122	132	100	117	105	109	110	103	91	91	82	113	103
1	192	178	164	157	161	147	114	132	117	141	122	114	119	117	108	124	95	104	110	91
2	219	186	198	150	157	147	123	132	120	115	112	115	120	81	109	109	111	83	104	111
3	181	167	175	159	157	135	122	127	113	119	106	128	99	85	103	94	87	113	99	111
4	166	201	179	141	133	136	120	135	133	100	100	109	96	108	103	115	114	107	101	101
5	216	203	170	152	143	140	125	133	139	120	113	101	104	114	98	135	115	99	120	101
6	201	178	183	169	163	125	123	141	129	102	117	119	126	106	112	124	104	82	90	88
7	204	180	194	160	154	142	114	119	111	124	116	133	111	105	125	141	99	106	108	105
8	213	190	164	152	160	130	133	138	118	125	102	103	89	123	97	163	114	117	94	85
9	180	187	165	158	139	138	119	131	137	127	133	112	115	92	106	115	102	104	114	95
10	223	171	175	157	144	129	127	118	112	117	124	108	106	110	90	118	112	92	99	104
11	218	179	177	150	145	141	109	130	115	118	102	117	90	116	100	139	95	91	93	101
12	212	188	170	162	141	125	141	112	142	135	99	121	100	97	92	105	95	90	104	98
13	201	159	173	162	137	144	128	119	129	131	121	103	116	111	85	107	117	87	88	109
14	191	192	145	161	138	142	138	107	108	110	113	109	108	103	96	104	102	92	93	94
15	200	170	184	148	134	167	142	123	119	114	117	98	105	131	116	115	114	101	111	100
16	210	186	178	182	138	141	135	121	145	120	96	107	100	96	100	92	95	100	92	81
17	199	181	195	145	118	125	130	130	123	102	112	111	107	108	106	95	88	93	92	101
18	216	201	175	176	156	144	111	120	134	112	108	93	95	106	103	102	124	99	99	118
19	199	174	183	149	146	138	152	146	134	130	97	109	116	109	96	114	105	97	93	99
20	181	176	153	174	142	137	153	116	125	114	113	84	104	101	95	90	105	96	102	99
21	172	175	152	168	133	140	132	141	125	125	123	109	102	98	115	94	104	99	92	89
22	210	180	170	159	133	134	125	112	127	121	116	115	108	104	109	88	96	105	102	87
23	202	178	160	149	140	122	130	111	113	122	120	118	100	98	100	97	94	90	88	95
24	179	188	195	158	127	133	140	144	108	112	121	107	108	106	105	96	94	101	104	98
25	201	203	152	149	129	144	112	134	135	151	99	107	100	119	106	115	93	110	84	92
26	200	197	140	137	127	143	130	101	120	144	104	110	102	78	91	89	93	93	79	107
27	192	152	155	156	147	134	132	125	112	160	106	132	128	106	87	108	108	70	82	97
28	209	177	179	139	141	124	146	127	121	130	110	100	91	116	102	104	91	93	101	97
29	192	158	182	177	131	134	120	129	113	96	117	107	121	103	100	84	106	94	95	106
30	195	164	159	163	139	121	147	135	124	104	120	126	113	119	111	95	100	105	99	88
31	174	198	183	136	160	123	139	132	123	123	130	101	107	106	117	89	113	97	104	105
32	157	186	171	156	134	121	133	124	107	111	105	125	93	110	98	112	108	71	112	109
33	212	183	175	160	143	130	126	111	103	131	115	105	108	105	100	114	98	110	96	108
34	148	180	165	162	136	156	130	92	120	133	115	106	113	109	90	97	100	111	91	72
35	187	177	166	135	148	135	128	124	137	102	106	116	111	103	81	97	104	95	113	87
36	186	173	160	157	124	136	135	132	129	107	108	127	108	125	105	111	104	103	97	106
37	176	150	168	182	143	114	124	114	122	100	122	120	137	94	90	86	107	109	96	91
38	184	164	160	168	121	115	122	107	123	108	113	122	107	102	93	95	127	100	106	90
39	187	181	151	151	130	147	122	132	142	128	96	112	116	102	105	114	100	90	90	90
40	191	189	182	174	124	134	134	131	108	105	99	124	109	115	102	115	97	92	89	100
41	194	169	168	215	126	142	117	138	115	102	128	102	115	109	107	114	99	94	98	106
42	188	193	157	225	133	155	110	133	114	135	114	122	100	120	102	97	105	96	97	89
43	197	191	151	243	128	124	114	121	139	102	117	122	120	111	96	109	94	128	92	90
44	18	169	13	238	152	127	114	123	117	112	98	112	115	105	97	109	95	100	89	102
45	18	195	175	197	146	142	135	141	121	99	99	99	103	112	113	118	85	101	115	102
46	185	175	154	172	134	120	138	125	130	119	91	108	112	114	105	92	116	89	93	86
47	200	203	162	173	111	124	149	129	111	124	109	108	102	98	96	99	119	103	91	85
48	18	175	159	153	141	134	123	116	99	98	103	107	117	104	99	100	115	93	87	104
49	172	191	132	147	143	131	128	138	139	117	115	119	119	124	167	108	96	78	91	92

NIOBIUM ANALYSIS

Page 1 of 2

Spreadsheet filename: NBCALC

Revision 1: 6/1/92, NLW

Assumes tracer added to final aliquot

Sample ID: 92-5074 LEPS recount

Date Calculated: 06/16/92

Data filename: NB5074R

M&TE No.

Diode HH

Nb-94 & 95 Spectrum: nb5074.hh;1

Zr/Nb-95 Tracer: 54124-76-0

volume added, ml: 0.2503 0.0012 error *****Half-lives*****

Zr-95 dpm/ml: 4.415E+03 4.300E+01 error Zr-95= 64.02 days

Nb-95 dpm/ml: 9.892E+03 1.151E+02 error Nb-95= 34.97 days

On: Date: 05/13/92 01:00 Time

Nb Sep Date: 05/07/92 13:30 Time

total dpm Nb-95= 2629.44 34.53 error at Nb sep time

Sample Amount: 0.6379 0.0002 error

g, ml or sample? g

Reporting Units

Leach Volume, ml: 250 0.01 error

Activity: dpm

Vol to dilute, ml: 1 0.00001 error

per ? : g

Diluted to, ml: 1 0.00001 error

Final Aliquot, ml: 4.993 0.17 error

Nb-94 & 95 Counting Data from Prepared Sample

Sample dpm Nb-95= 2.324E+03 1.09 % error at Nb sep time

Sample dpm Nb-94= 1.943E+00 100.00 % error

*****RESULTS*****

Yield Nb-95= 0.884 0.015 error

Nb-94 dpm/g= 131.367 131.462 error = 100.07 %

MDA = < 131.367

GENERIC FORMULAS

Nb-94 Activity =
$$\frac{\text{net dpm} \times \text{leach vol} \times \text{diln vol}}{\text{yield} \times \text{sample amt} \times \text{diln aliquot} \times \text{aliquot}}$$

% recovery =
$$\frac{\text{dpm recovered}}{\text{dpm added}} \times 100$$

Nb-93m Activity =
$$\frac{\text{net cpm} \times \text{d/c} \times \text{leach vol} \times \text{diln vol}}{\text{yield} \times \text{sample amt} \times \text{diln aliquot} \times \text{aliquot}}$$

NIOBIUM ANALYSIS

Page 2 of 2

Spreadsheet filename: NBCALC

Revision 1: 6/1/92, NLW

Sample ID:

92-5074 LEPS recount

Date Calculated:

06/16/92

Data filename:

NB5074R

Nb-93m Spectrum:

925074nb.ai;2

Weight Nb ppt, mg:

277.0

0.2 error

Counted on:

A

M&TE No.

Diode A

On:

Date:

05/31/92

10:48 Time

Nb-93m d/c =

73.482

6.098 error

NB-93M COUNTING DATA:

Diode B or 325 LEPS

Enter data under correct diode.

If %error >= 50%, enter MDA.

If not, MDA = NA

net cps:

1.00

1.00

% error

MDA, in cps:NA

Diode A

peak channel no.:

83

bkgd:

70

-

74

<-- first ROI

Count time, min.:

1294.02

279

<-- counts

Nb-93m counts-->

323

263

273

236

peak channel +

419

237

5 lower +

450

245

4 higher

640

100

-

104

<-- second ROI

860

242

<-- counts

822

240

741

223

545

231

382

231

gross counts: 5455.000

2427

:normalized ROI total

net cpm:

1.618

0.722

:cpm in bkgd spectrum

error, cpm:

0.073

avg BKG.A1;1&2;bkgd filename

% error

4.485

3361.2

:total bkgd counts

*****RESULTS*****

Nb-93m dpm/g=

8038.389

817.697 error

=

10.172 %

MDA =

Entered by NJO-ML Date 6/16/92

Reviewed by S. L. Indoff Date 6/18/92

NIOBIUM ANALYSIS

Page 1 of 2

Spreadsheet filename: NBCALC

Revision 1: 6/1/92, NLW

Assumes tracer added to final aliquot

Sample ID: 92-5074

Date Calculated: 06/16/92

Data filename: NBS074

M&TE No.

Diode HH

Nb-94 & 95 Spectrum: nb5074.hn;1

Zr/Nb-95 Tracer: 54124-76-0

volume added, ml: 0.2503 0.0012 error

*****Half-lives*****

Zr-95 dpm/ml: 4.415E+03 4.500E+01 error

Zr-95= 64.02 days

Nb-95 dpm/ml: 9.892E+03 1.151E+02 error

Nb-95= 34.97 days

On: Date: 05/13/92 01:00 Time

Nb Sep Date: 05/07/92 13:30 Time

total dpm Nb-95= 2629.44 34.53 error at Nb sep time

Sample Amount: 0.8379 0.0002 error

g, ml or sample? g

Reporting Units

Leach Volume, ml: 250 0.01 error

Activity: dpm

Vol to dilute, ml: 1 0.00001 error

per ? : g

Diluted to, ml: 1 0.00001 error

Final Aliquot, ml: 4.993 0.17 error

Nb-94 & 95 Counting Data from Prepared Sample

Sample dpm Nb-95= 2.324E+03 1.09 % error at Nb sep time

Sample dpm Nb-94= 1.943E+00 100.00 % error

*****RESULTS*****

Yield Nb-95= 0.884 0.015 error

Nb-94 dpm/g= 131.367 131.462 error = 100.07 %

MDA = < 131.367

GENERIC FORMULAS

Nb-94 Activity =
$$\frac{\text{net dpm} \times \text{leach vol} \times \text{diln vol}}{\text{yield} \times \text{sample amt} \times \text{diln aliquot} \times \text{aliquot}}$$

% recovery =
$$\frac{\text{dpm recovered}}{\text{dpm added}} \times 100$$

Nb-93m Activity =
$$\frac{\text{net cpm} \times \text{d/c} \times \text{leach vol} \times \text{diln vol}}{\text{yield} \times \text{sample amt} \times \text{diln aliquot} \times \text{aliquot}}$$

NIOBIUM ANALYSIS

Page 2 of 2

Spreadsheet filename: NBCALC

Revision 1: 6/1/92, NLW

Sample ID: 92-5074

Date Calculated: 06/16/92

Data filename: NB5074

Nb-93m Spectrum: 925074nb.al;1

Weight Nb ppt, mg: 277.0 0.2 error

Counted on: A M&TE No. Diode A

On: Date: 05/14/92 15:05 Time

Nb-93m d/c = 73.482 6.098 error

NB-93M COUNTING DATA:

Diode B or 325 LEPS Enter data under correct diode.

If %error >= 50%, enter MDA. If not, MDA = NA

net cps: 1.00 1.00 % error

MDA, in cps:NA

Diode A

peak channel no.: 83 bkgd: 71 - 75 <-- first ROI

Count time, min.: 1466.85 355 <-- counts

Nb-93m counts--> 414 342

515 367

peak channel + 600 353

5 lower + 913 345

4 higher 1155 101 - 105 <-- second ROI

1242 322 <-- counts

1115 306

748 333

570 343

485 326

gross counts: 7757.000 3392 :normalized ROI total

net cpm: 2.254 0.722 :cpm in bkgd spectrum

error, cpm: 0.075 avg BKG.AL;13;2:bkgd filename

% error 3.342 4451.0 :total bkgd counts

*****RESULTS*****

Nb-93m dpm/g= 11196.968 1088.677 error = 9.723 %

MDA =

Entered by NW Date 6/16/92

Reviewed by J. L. Jady Date 6/18/92

NIOBIUM ANALYSIS

Page 1 of 2

Spreadsheet filename: NBOCALC

Revision 1: 6/1/92, NLW

Assumes tracer added to final aliquot

Sample ID: 92-5074

Date Calculated: 06/02/92

Data filename: NB5074

M&TE No.

Diode HH

Nb-94 & 95 Spectrum: nb5074.hh;1

Zr/Nb-95 Tracer: 54124-76-0

Volume added, ml: 0.2503 0.0012 error

*****Half-lives*****

Zr-95 dpm/ml: 4.413E+03 4.500E+01 error

Zr-95= 64.02 days

Nb-95 dpm/ml: 9.892E+03 1.151E+02 error

Nb-95= 34.97 days

On: Date: 05/13/92 01:00 Time

Nb Sep Date: 05/07/92 13:30 Time

total dpm Nb-95= 2629.44 34.53 error at Nb sep time

Sample Amount: 0.8379 0.0002 error

g, ml or sample? g

Reporting Units

Leach Volume, ml: 250 0.01 error

Activity: dpm

Vol to dilute, ml: 1 0.00001 error

per ? : g

Diluted to, ml: 1 0.00001 error

Final Aliquot, ml: 4.993 0.17 error

Nb-94 & 95 Counting Data from Prepared Sample

Sample dpm Nb-95= 2.324E+03 1.09 % error at Nb sep time

Sample dpm Nb-94= 1.943E+00 100.00 % error

*****RESULTS*****

Yield Nb-95= 0.884 0.015 error

Nb-94 dpm/g= 131.367 131.462 error = 100.07 %

MDA = < 131.367

GENERIC FORMULAS

Nb-94 Activity =
$$\frac{\text{net dpm} \times \text{leach vol} \times \text{diln vol}}{\text{yield} \times \text{sample amt} \times \text{diln aliquot} \times \text{aliquot}}$$

% recovery =
$$\frac{\text{dpm recovered}}{\text{dpm added}} \times 100$$

Nb-93m Activity =
$$\frac{\text{net cpm} \times \text{d/c} \times \text{leach vol} \times \text{diln vol}}{\text{yield} \times \text{sample amt} \times \text{diln aliquot} \times \text{aliquot}}$$

NIOBIUM ANALYSIS

Page 2 of 2

Spreadsheet filename: NBCALC

Revision 1: 6/1/92, NLW

Sample ID: 92-5074

Date Calculated: 06/02/92

Data filename: NBS074

Nb-93m Spectrum: 925074nb.a1;1

Weight Nb ppt, mg: 277.0 0.2 error

Counted on: A

M&TE No.

Diode A

On: Date: 05/14/92

15:05 Time

Nb-93m d/c = 73.482

6.098 error

NB-93M COUNTING DATA:

Diode B or 325 LEPS

Enter data under correct diode.

If %error >= 50%, enter MDA. If not, MDA = NA

net cps: 1.00 1.00 % error

MDA, in cps:NA

Diode A

peak channel no.: 83

bkgd: 71 - 75 <-- first ROI

Count time, min.: 1466.85

355 <-- counts

Nb-93m counts--> 414

342

515

367

peak channel + 600

353

5 lower + 913

345

4 higher 1155

101 - 105 <-- second ROI

1242

322 <-- counts

1115

306

748

333

570

343

485

326

gross counts: 7757.000

3392 :normalized ROI total

net cpm: 2.793

0.183 :cpm in bkgd spectrum

error, cpm: 0.073

BKG.A1;1 :bkgd filename

% error 2.608

3660.4 :total bkgd counts

*****RESULTS*****

Nb-93m dpm/g= 13874.783 1317.515 error = 9.495 %

MDA =

Entered by NLW Date 6/2/92

Reviewed by A. K. Fady Date 6/4/92

NIOBIUM ANALYSIS

Page 1 of 2

Spreadsheet filename: NBCALC

Revision 1: 6/1/92, NLW

Assumes tracer added to final aliquot

Sample ID: 92-5074 LEPS recount

Date Calculated: 06/05/92

Data filename:

NB5074R

M&TE No.

Diode HH

Nb-94 & 95 Spectrum:

nb5074.hh;1

Zr/Nb-95 Tracer: 54124-76-0

volume added, ml: 0.2503 0.0012 error

*****Half-lives*****

Zr-95 dpm/ml: 4.415E+03 4.500E+01 error

Zr-95= 64.02 days

Nb-95 dpm/ml: 9.892E+03 1.151E+02 error

Nb-95= 34.97 days

On: Date: 05/13/92 01:00 Time

Nb Sep Date: 05/07/92 13:30 Time

total dpm Nb-95= 2629.44 34.53 error at Nb sep time

Sample Amount: 0.8379 0.0002 error

g, ml or sample? g

Reporting Units

Leach Volume, ml: 250 0.01 error

Activity: dpm

Vol to dilute, ml: 1 0.00001 error

per ? : g

Diluted to, ml: 1 0.00001 error

Final Aliquot, ml: 4.993 0.17 error

Nb-94 & 95 Counting Data from Prepared Sample

Sample dpm Nb-95= 2.324E+03 1.09 % error at Nb sep time

Sample dpm Nb-94= 1.943E+00 100.00 % error

*****RESULTS*****

Yield Nb-95= 0.884 0.015 error

Nb-94 dpm/g= 131.367 131.462 error = 100.07 %

MDA = < 131.367

GENERIC FORMULAS

Nb-94 Activity =
$$\frac{\text{net dpm} \times \text{leach vol} \times \text{diln vol}}{\text{yield} \times \text{sample amt} \times \text{diln aliquot} \times \text{aliquot}}$$

% recovery =
$$\frac{\text{dpm recovered}}{\text{dpm added}} \times 100$$

Nb-93m Activity =
$$\frac{\text{net cpm} \times \text{d/c} \times \text{leach vol} \times \text{diln vol}}{\text{yield} \times \text{sample amt} \times \text{diln aliquot} \times \text{aliquot}}$$

NIOBIUM ANALYSIS

Page 2 of 2

Spreadsheet filename: NBCALC

Revision 1: 6/1/92, NLW

Sample ID:

92-5074 LEPS recount

Date Calculated:

06/05/92

Data filename:

NB5074R

Nb-93m Spectrum:

925074nb.a1;2

Weight Nb ppt, mg:

277.0

0.2 error

Counted on:

A

M&TE No.

Diode A

On: Date:

05/31/92

10:48 Time

Nb-93m d/c =

73.482

5.098 error

NB-93M COUNTING DATA:

Diode B or 325 LEPS

Enter data under correct diode.

If %error >= 50%, enter MDA. If not, MDA = NA

net cps:

1.00

1.00 % error

MDA, in cps:NA

Diode A

peak channel no.:

83

bkgd:

70

-

74

<-- first ROI

Count time, min.:

1294.02

279

<-- counts

Nb-93m counts-->

323

263

273

236

peak channel +

419

237

5 lower +

450

245

4 higher

640

100

- 104 <-- second ROI

860

242

<-- counts

822

240

741

223

545

231

382

231

gross counts: 5455.000

2427

:normalized ROI total

net cpm:

2.157

0.183

:cpm in bkgd spectrum

error, cpm:

0.070

BKG.A1;1

:bkgd filename

% error

3.228

2663.8

:total bkgd counts

*****RESULTS*****

Nb-93m dpm/g=

10716.205

1037.797 error

=

9.684 %

MDA =

Entered by N. J. Wynn Date 6/5/92

Reviewed by A. L. Tudy Date 6/18/92

RECOUNT OF NB-93M ON 92-5074

SAMPLE ID..... SY:925074NB.A1;2

OF CHANNELS..... 2048

DIODE I.D..... A

SHELF NUMBER..... 0

CALIBRATION..... 0.2 KEV/CH

TIME ZERO 5/31/92 AT 10:48: 0

COUNTED..... 5/31/92 AT 10:48: 0

(0.00 MINUTES DECAY TIME)

LIVE COUNT TIME.... 21 HOURS 34 MINUTES 1 SECONDS (1294.02 MIN.)

ELAPSED TIME..... 21 HOURS 34 MINUTES 1 SECONDS (1294.02 MIN.)

(DEAD TIME = 0.000)

FLUX CORRECTION.... 0.0000

GEOM CORRECTION.... 0.0000 0.0000 0.0000 0.0000 0.0000

WEIGHT..... 1.00000 GRAMS

ANTI: 0 SLP: 0 AREA: 0 P-T: 0 ERR: 0 ZER: 0 OPR: 0 NOV: 1

$$\frac{5455 - 2427}{1294.02 \text{ min}} = \frac{3028 \text{ cts}^{\pm 89}}{1294.02} = 2.340 \text{ cpm} \pm 0.069$$

215

MJW
6/1/92

Reviewed J. L. Jachff. 6/4/92.

RECOUNT OF NB-93M ON 92-5874

SY:925874NB.A1:2 COUNTED 5/31/92 @ 18:48: 8 GAIN: 0.2 KEV/CHAN

	0	50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950
0	7/641	277	255	256	211	185	192	184	159	152	140	158	151	130	135	121	121	117	121	146
1	0	257	242	244	200	147	165	171	139	140	137	141	139	153	135	121	126	127	131	130
2	0	315	240	238	172	167	172	146	153	159	159	145	127	133	104	138	104	117	120	136
3	0	277	223	262	168	183	193	171	182	136	147	131	156	122	122	112	117	130	126	125
4	0	298	231	310	203	166	187	169	166	148	141	147	164	148	109	110	125	110	102	137
5	0	269	231	300	186	169	196	159	166	144	147	138	123	120	126	144	119	105	123	121
6	0	300	220	320	188	161	158	180	192	150	144	133	139	141	126	124	120	121	99	127
7	0	258	224	406	196	195	171	182	161	156	145	110	149	143	142	118	131	117	115	113
8	10	250	236	543	179	197	162	157	155	169	138	147	124	140	126	129	114	105	113	112
9	760	268	239	742	178	196	177	156	156	178	132	149	141	133	144	141	131	102	114	124
10	1132	254	225	856	201	190	179	140	144	194	141	136	151	139	144	131	126	109	132	129
11	1014	201	235	909	215	202	161	181	161	200	145	156	133	139	126	135	135	115	124	119
12	625	274	240	719	208	153	179	186	156	200	147	152	155	132	122	150	111	101	107	135
13	564	319	254	523	184	194	176	221	133	222	144	159	127	139	151	110	125	110	117	138
14	438	332	203	279	197	186	195	210	156	226	139	142	149	138	127	110	115	109	128	141
15	471	387	205	221	169	213	213	199	160	212	169	134	148	138	110	118	124	123	115	123
16	332	394	225	234	211	151	240	190	130	170	145	156	165	131	129	119	116	120	127	135
17	318	365	225	197	203	184	236	171	175	170	155	151	156	127	124	129	125	125	127	127
18	319	290	225	203	194	172	247	167	156	143	131	149	124	152	138	113	119	123	132	133
19	290	280	232	180	204	193	191	154	164	156	125	155	153	140	143	120	120	135	127	102
20	279	279	216	192	204	184	193	165	160	153	133	152	153	126	121	126	138	105	101	135
21	276	263	245	205	206	214	176	147	214	146	139	132	131	126	140	134	128	120	115	114
22	283	236	215	195	182	156	153	219	182	140	156	135	147	140	125	118	132	118	122	136
23	272	237	204	179	172	182	146	250	203	151	145	137	135	132	142	116	117	120	132	127
24	283	245	207	219	204	181	160	265	206	167	149	177	127	134	120	129	124	129	141	116
25	209	237	226	212	198	190	167	260	210	143	145	140	135	137	153	107	122	112	151	133
26	324	273	159	213	182	186	177	279	187	115	155	152	142	141	122	121	117	116	114	135
27	269	323	241	238	175	155	174	202	174	137	164	139	128	143	144	130	133	129	122	112
28	314	273	295	232	195	147	154	185	166	161	156	124	146	139	152	135	124	165	164	111
29	269	419	273	230	200	158	160	174	172	152	171	158	122	138	120	118	116	136	136	108
30	306	450	312	302	204	175	175	167	153	152	145	155	136	144	138	127	121	117	145	120
31	329	640	360	320	196	165	183	156	140	142	142	149	151	126	146	99	134	144	154	131
32	330	067	350	337	210	141	206	177	173	134	154	126	132	155	129	131	118	139	140	136
33	335	022	353	326	160	176	189	144	164	150	145	144	137	147	122	143	130	146	126	133
34	340	741	361	276	134	183	181	171	144	153	140	147	136	140	129	107	135	135	116	141
35	320	545	410	259	185	180	180	202	156	145	138	140	127	125	128	136	113	104	108	121
36	309	382	512	270	187	187	189	175	103	143	159	144	122	136	119	98	115	122	124	134
37	260	312	551	259	171	172	140	164	170	128	139	126	139	127	133	123	112	125	124	119
38	275	300	500	229	178	212	174	175	164	131	145	145	139	120	120	115	120	120	109	130
39	272	273	307	228	169	192	164	176	159	146	166	132	147	144	138	133	124	125	133	143
40	279	274	303	189	189	178	154	149	169	136	146	124	148	120	114	126	110	119	126	135
41	263	208	244	175	181	182	174	160	164	142	138	137	142	130	138	138	118	118	117	134
42	274	305	213	183	192	163	164	174	139	141	142	143	152	147	116	136	123	139	149	130
43	306	383	233	195	167	191	175	153	151	155	137	139	111	126	123	118	113	124	122	131
44	258	343	234	195	157	176	156	170	153	174	174	136	131	135	116	135	124	120	125	141
45	264	342	206	189	168	186	166	149	153	160	155	145	130	139	128	124	131	101	90	130
46	248	289	216	209	189	201	169	158	174	159	147	145	143	131	119	119	114	120	130	117
47	259	262	238	208	197	196	101	149	149	161	164	162	122	134	148	109	111	123	109	110
48	273	224	252	210	107	182	159	145	147	135	137	149	140	138	143	115	107	126	105	118
49	316	234	245	187	177	179	171	163	153	148	149	132	143	162	124	128	121	116	119	118

RECOUNT OF NB-93M ON 92-5074

SY:925074NB.A1:2 COUNTED 5/31/92 @ 10:48: 0 GAIN: 0.2 KEV/CHAN

	1000	1050	1100	1150	1200	1250	1300	1350	1400	1450	1500	1550	1600	1650	1700	1750	1800	1850	1900	1950
0	129	97	117	99	102	90	75	68	90	93	76	66	81	74	82	77	74	72	78	62
1	127	114	100	94	87	96	82	96	74	74	109	79	78	81	69	91	80	79	70	66
2	130	118	100	104	85	86	80	97	90	76	86	71	94	71	67	70	86	81	80	84
3	137	104	102	102	104	95	80	79	70	87	87	73	86	75	59	74	68	79	73	78
4	114	111	107	81	102	86	74	94	83	67	83	87	75	82	58	76	72	70	71	77
5	136	117	110	99	83	88	99	80	65	80	74	68	73	95	63	82	74	80	74	79
6	135	90	94	109	105	81	91	93	67	85	87	94	83	81	76	99	76	58	78	68
7	129	90	114	107	89	93	88	92	88	102	75	83	88	79	67	94	91	79	75	72
8	118	99	93	119	93	86	102	80	83	80	85	76	74	77	68	94	64	69	93	81
9	135	107	119	107	81	106	107	95	90	60	84	78	93	96	59	93	89	80	66	80
10	139	116	98	103	99	106	84	96	90	72	89	61	88	68	72	82	68	76	71	90
11	124	91	106	112	100	106	89	83	81	93	79	70	79	63	68	90	69	70	78	90
12	117	122	113	108	98	90	67	84	88	76	74	80	76	81	69	94	70	77	78	82
13	124	104	104	99	106	90	97	94	79	78	86	86	78	86	73	76	84	83	76	85
14	127	100	95	81	82	85	88	83	91	72	85	86	76	69	66	72	76	85	83	72
15	122	105	94	85	95	93	100	71	79	84	78	91	97	69	95	87	68	80	73	70
16	117	121	106	108	96	107	70	58	72	84	68	75	83	70	63	90	96	75	77	84
17	133	100	102	97	85	91	75	88	86	94	86	74	74	77	74	76	79	72	66	77
18	139	105	107	110	97	80	102	91	94	93	87	78	91	70	65	74	62	80	95	81
19	121	100	115	89	85	89	95	78	71	83	74	80	83	88	73	52	65	82	58	70
20	119	109	75	91	105	95	65	95	80	76	80	71	85	89	80	72	76	64	104	65
21	112	102	92	100	100	87	71	89	79	83	97	76	83	90	86	84	76	63	68	63
22	109	114	95	99	92	91	88	91	80	88	90	90	89	84	86	66	55	68	65	78
23	118	103	97	80	82	101	81	89	85	68	83	74	77	73	78	87	60	84	77	82
24	119	102	97	84	92	93	97	93	86	79	77	76	81	101	85	61	92	66	83	73
25	137	124	110	106	82	99	87	85	72	85	65	60	83	88	80	75	81	63	76	86
26	123	115	95	102	93	85	73	97	94	83	82	75	83	80	82	73	71	67	79	83
27	106	97	113	116	103	90	88	88	105	104	75	79	73	74	66	64	72	65	72	71
28	109	113	77	95	90	73	85	90	75	94	73	79	84	85	66	70	82	72	77	56
29	148	91	93	79	78	86	92	74	89	73	79	83	77	82	71	91	72	63	69	70
30	108	104	110	71	100	91	71	84	67	87	71	70	82	70	68	83	99	72	81	99
31	105	104	113	78	95	74	91	85	80	68	81	90	84	67	77	81	71	90	86	73
32	121	96	88	104	88	104	83	85	88	76	80	74	80	75	63	68	89	77	67	78
33	111	114	93	81	104	97	77	87	94	102	73	69	75	63	85	78	87	86	91	79
34	121	114	109	104	103	95	83	82	74	77	69	85	98	78	73	85	64	94	63	69
35	93	118	93	80	88	102	82	97	90	67	86	72	77	78	74	86	79	81	77	86
36	125	135	115	107	94	97	65	86	102	78	75	71	76	78	83	68	86	79	77	69
37	105	109	121	94	103	89	81	87	93	74	100	83	79	72	82	86	69	83	78	78
38	111	90	106	109	74	73	104	90	78	79	60	67	80	72	70	83	84	64	70	84
39	132	89	90	99	86	65	85	90	81	89	71	90	93	89	72	82	73	74	61	76
40	114	115	105	114	92	86	88	90	94	105	75	73	66	84	85	66	80	78	75	72
41	99	110	92	89	94	78	100	86	81	84	77	65	72	92	74	72	77	72	69	65
42	121	108	96	106	81	96	66	77	91	74	73	76	77	86	85	74	61	76	77	79
43	129	134	113	112	99	96	83	97	94	93	70	79	80	81	55	83	92	61	70	77
44	105	99	105	114	106	83	88	88	83	97	90	81	69	70	77	77	81	67	66	75
45	121	110	100	128	95	99	90	76	81	62	77	66	76	82	81	76	69	78	85	79
46	112	116	100	98	87	79	84	81	95	81	74	91	76	74	66	63	71	72	84	75
47	103	112	100	88	85	72	65	81	88	93	66	88	84	68	73	85	82	76	71	90
48	109	91	96	115	78	76	86	70	94	87	85	77	69	88	75	59	56	76	85	72
49	124	94	108	99	91	90	93	92	68	93	70	57	75	84	89	81	76	61	89	68

NB-93M ON 92-5074: 277.0 MG PPT

SAMPLE ID..... SY:925074NB.A1:1

OF CHANNELS..... 2048

DIODE I.D..... A

SHELF NUMBER..... 0

CALIBRATION..... 0.2 KEV/CH

TIME ZERO 5/14/92 AT 15: 5: 0

COUNTED..... 5/14/92 AT 15: 5: 0

(0.00 MINUTES DECAY TIME)

LIVE COUNT TIME.... 24 HOURS 26 MINUTES 51 SECONDS (1466.85 MIN.)

ELAPSED TIME..... 24 HOURS 26 MINUTES 51 SECONDS (1466.85 MIN.)

(DEAD TIME = 0.000)

FLUX CORRECTION.... 0.0000

GEOM CORRECTION.... 0.0000 0.0000 0.0000 0.0000 0.0000

WEIGHT..... 1.00000 GRAMS

ANTI: 0 SLP: 0 AREA: 0 P-T: 0 ERR: 0 ZER: 0 OPR: 0 NOV: 1

$$\frac{7757 - 3392}{1466.85 \text{ min}} = \frac{4365 \text{ cts} \pm 106}{1466.85} = 2.776 \text{ cpm} \pm 0.072$$

M. J. G. W.
5/15/92

S. K. Fackell 6/1/92

NB-93M ON 92-5074: 277.0 MG PPT

SY:925074NB.A1:1 COUNTED 6/14/92 @ 15: 5: 0 GAIN: 0.2 KEV/CHAN

		0	50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950
0	88011	371	332	378	269	233	242	260	240	216	191	216	186	212	201	196	202	151	149	177	
1	0	342	322	331	266	268	233	251	266	220	221	244	194	198	200	203	168	191	151	179	
2	0	370	306	350	251	260	259	226	224	231	209	227	216	229	210	176	177	176	159	169	
3	0	444	333	350	260	232	217	223	212	205	222	206	188	220	206	170	177	187	183	183	
4	0	383	343	418	278	251	247	216	270	179	201	214	212	202	183	201	160	181	163	166	
5	0	367	326	448	294	233	263	243	212	205	207	207	179	178	193	175	206	189	153	203	
6	0	367	325	466	247	235	225	234	240	222	213	216	222	198	191	170	186	177	164	169	
7	0	393	283	490	262	240	247	230	205	209	210	213	176	193	203	173	204	172	168	188	
8	22	373	305	610	282	237	227	262	233	218	191	213	211	180	192	186	168	180	186	189	
9	692	347	309	923	286	259	238	226	237	229	225	223	207	179	192	189	188	182	204	188	
10	1227	360	331	1020	265	278	238	249	241	266	229	212	216	208	211	177	163	166	197	179	
11	1169	357	347	1075	283	257	249	252	240	256	185	204	209	211	201	199	188	161	176	191	
12	712	361	353	864	264	296	244	282	260	289	209	202	184	190	185	194	208	181	186	191	
13	675	443	321	638	245	237	296	294	225	276	226	215	207	207	203	187	161	158	201	217	
14	546	483	307	412	260	255	266	289	218	290	211	221	231	179	175	163	194	169	189	174	
15	472	522	327	321	270	272	297	311	216	261	236	207	217	221	204	201	184	171	150	192	
16	439	436	295	291	287	244	322	277	210	285	216	202	209	234	200	161	190	171	192	209	
17	423	488	301	312	248	276	330	238	229	215	201	218	205	191	193	171	173	189	182	183	
18	409	455	303	293	279	248	333	286	213	214	223	228	211	183	209	208	189	194	184	210	
19	365	376	304	291	305	224	263	230	232	212	218	219	206	226	194	191	213	174	163	199	
20	393	355	323	306	273	264	231	236	258	225	200	201	197	177	231	168	189	192	187	188	
21	354	356	288	276	261	269	245	234	249	222	190	218	211	186	182	184	171	187	184	173	
22	394	342	334	346	271	289	256	283	270	210	221	224	213	193	249	193	167	203	178	198	
23	379	367	304	289	257	266	245	302	282	232	219	209	199	175	197	166	182	165	173	190	
24	392	353	321	259	273	263	269	369	287	232	231	212	206	186	188	181	162	175	169	198	
25	365	345	312	322	267	244	241	391	279	217	224	223	218	203	188	182	171	193	175	181	
26	393	393	298	311	263	257	258	348	273	201	215	216	178	173	204	191	172	182	197	207	
27	397	398	295	370	259	240	260	306	228	232	196	206	188	193	187	181	172	193	198	188	
28	391	414	349	315	271	251	239	278	242	219	212	229	221	191	193	182	187	170	182	199	
29	420	515	427	309	272	291	240	282	226	194	239	210	183	202	197	182	184	214	185	180	
30	422	600	443	382	284	260	228	265	221	200	230	217	205	187	201	183	174	192	182	187	
31	427	913	487	450	271	278	243	252	213	216	241	224	193	206	177	191	193	192	214	182	
32	471	1155	522	463	298	256	210	209	232	222	190	248	212	176	157	153	199	182	177	211	
33	480	1242	494	467	287	221	242	236	241	184	233	213	193	188	177	173	200	177	193		
34	477	1115	457	382	300	271	258	262	256	200	232	207	199	178	197	186	168	198	196	206	
35	442	748	546	367	253	247	262	253	236	217	220	232	189	179	205	157	180	169	168	187	
36	416	570	656	336	240	232	219	262	264	219	211	218	190	198	180	179	165	164	200	211	
37	368	485	743	346	228	248	256	239	244	214	230	181	185	186	200	194	203	185	192	179	
38	388	429	695	316	233	269	237	242	269	214	213	184	222	208	194	189	203	173	188	201	
39	370	389	500	298	247	253	237	245	236	225	198	237	201	185	158	180	199	182	171	183	
40	389	369	361	281	245	274	244	280	238	196	182	203	195	201	177	179	184	181	170	203	
41	321	417	332	309	225	254	217	205	227	254	225	193	212	171	187	168	164	179	183	180	
42	393	519	346	274	267	277	248	236	216	233	220	226	223	207	184	199	171	181	178	176	
43	334	523	287	276	269	252	232	242	225	216	216	204	179	185	165	171	184	174	185	181	
44	375	528	281	245	293	285	239	236	215	217	198	204	204	173	178	175	190	153	175	202	
45	407	434	309	290	265	270	234	237	204	203	211	201	196	216	194	167	167	145	177	171	
46	355	436	307	279	285	305	247	248	224	205	211	224	236	190	197	166	174	199	176	176	
47	351	391	345	262	281	266	232	217	246	212	220	171	199	190	182	166	180	177	166	185	
48	361	360	350	271	272	243	238	246	235	224	216	199	201	215	195	182	175	167	169	190	
49	339	351	356	261	248	229	224	216	218	256	213	177	203	202	193	156	174	170	181	170	

NB-93M ON 92-5074: 277.0 MG PPT

SY:925074NB.A1:1 COUNTED 5/14/92 @ 15: 5: 0 GAIN: 0.2 KEV/CHAN

	1000	1050	1100	1150	1200	1250	1300	1350	1400	1450	1500	1550	1600	1650	1700	1750	1800	1850	1900	1950
0	192	164	161	157	146	158	131	139	126	119	140	115	112	114	108	126	117	116	141	113
1	173	157	149	152	134	140	125	145	122	113	121	117	117	109	119	117	131	101	127	106
2	187	169	146	165	138	161	132	117	132	135	108	118	138	131	142	121	120	115	126	115
3	187	154	162	166	126	124	128	121	138	125	131	121	129	118	124	126	114	112	120	114
4	209	152	142	156	155	155	144	131	101	115	115	114	109	112	116	135	107	123	118	114
5	175	157	172	143	149	114	142	139	131	110	133	127	124	139	126	123	117	127	104	111
6	192	179	157	154	144	141	133	139	115	133	123	126	145	111	105	132	115	121	118	98
7	186	183	175	149	133	143	138	138	128	109	107	122	148	131	137	132	114	104	126	114
8	175	180	163	136	133	133	124	135	121	133	134	128	109	114	155	135	134	115	107	108
9	183	162	148	150	154	136	149	116	136	115	123	121	118	120	112	165	115	110	93	100
10	168	158	157	143	137	135	138	108	118	121	120	110	112	111	132	135	113	110	104	100
11	167	157	162	155	152	125	133	137	108	137	140	128	139	126	135	121	100	131	108	115
12	186	144	156	131	148	129	129	144	122	148	128	129	119	122	106	108	119	136	104	118
13	165	186	156	129	168	146	129	142	114	118	136	127	103	120	113	127	110	99	119	130
14	169	144	143	153	152	116	124	117	102	130	119	121	118	135	110	109	121	121	126	110
15	169	178	154	142	127	141	146	148	136	131	136	127	107	124	112	120	108	112	112	110
16	174	149	135	165	168	124	133	116	125	134	136	128	121	134	126	108	111	103	104	107
17	193	186	167	159	138	134	156	135	120	119	131	125	97	120	107	135	112	105	120	136
18	200	150	147	136	148	137	125	130	136	131	126	100	133	117	116	119	102	116	97	111
19	191	180	176	137	136	154	133	139	141	122	125	130	121	128	107	101	122	123	109	108
20	180	169	162	154	140	161	131	125	121	118	132	136	140	132	112	123	119	112	110	101
21	172	166	141	144	142	146	130	108	106	119	123	127	132	126	118	111	112	114	109	110
22	191	134	167	130	139	149	143	137	119	120	136	116	132	102	107	129	106	105	116	119
23	184	190	159	156	149	136	133	130	128	158	133	123	118	131	119	115	120	134	116	107
24	173	157	156	137	157	142	118	139	165	141	101	134	102	139	115	106	105	118	102	118
25	177	164	157	165	171	129	133	145	132	134	132	118	126	119	131	121	122	128	105	119
26	174	159	169	144	137	117	127	141	124	136	122	126	124	119	114	122	128	121	134	106
27	159	175	154	145	156	125	126	136	110	150	144	115	132	114	106	103	113	126	115	111
28	163	153	169	143	134	129	141	128	136	146	127	121	124	118	126	120	118	124	135	107
29	153	162	165	159	139	126	139	125	110	131	134	127	131	135	119	120	134	112	111	114
30	176	158	132	149	156	167	129	139	136	121	137	111	127	119	113	122	108	119	134	108
31	155	148	156	166	140	143	131	138	115	127	109	134	119	98	124	116	110	128	140	103
32	186	147	158	176	148	139	124	113	138	119	118	128	109	118	120	116	110	121	100	88
33	160	170	167	131	149	141	141	119	123	108	126	121	128	109	116	118	127	110	127	140
34	165	182	162	178	135	139	117	125	116	134	112	112	120	112	109	109	120	115	120	103
35	178	158	164	176	148	148	143	157	106	148	124	133	138	111	130	138	108	134	84	110
36	171	187	145	137	149	121	128	138	140	125	106	119	102	121	136	118	132	132	120	94
37	166	148	179	138	142	141	131	116	139	111	130	111	102	125	121	117	114	101	115	114
38	163	165	161	141	141	131	121	112	139	127	118	122	128	133	145	119	123	124	116	116
39	154	154	181	152	144	132	134	154	141	133	128	125	116	129	106	138	126	134	133	119
40	160	159	162	156	139	140	115	132	137	121	126	117	116	139	91	120	117	108	115	129
41	158	165	165	153	134	144	138	126	123	115	134	128	120	138	113	117	113	94	103	117
42	160	159	127	169	132	137	140	117	119	117	140	124	120	128	108	123	97	131	122	120
43	185	148	169	158	160	152	136	129	138	121	127	137	118	131	111	116	135	124	100	119
44	138	163	149	147	124	138	124	140	126	138	139	114	138	102	116	115	117	131	121	133
45	164	161	163	163	134	138	142	132	116	136	141	138	113	122	119	124	131	105	112	115
46	199	178	152	161	143	134	129	135	122	141	129	119	125	98	124	123	112	113	117	102
47	190	172	136	160	149	122	124	135	109	115	107	114	126	111	119	137	128	112	131	121
48	178	154	144	151	144	128	121	123	123	122	127	124	115	132	121	115	111	123	112	105

TITLE: 101SY NIOBIUM SAMPLE 92-05074

FILE: HB5074.HH:1

* CHANNELS: 2048

SHELF: 0

DIODE: HH

TIME ZERO: 5 7 92 13 30 0

TIME OF COUNT: 5 13 92 14 30 0

(0700.00 MINUTES DECAY TIME)

LIVE TIME: 19 HOURS 57 MINUTES 19 SECONDS = 1197.32 MINUTES

ELAPSED TIME: 19 HOURS 57 MINUTES 19 SECONDS = 1197.32 MINUTES

(DEAD TIME = 0.000)

FLUX CORR. FACT.: 0.000000

GAIN: 1.00045 KEV/CHAN

WEIGHT: 1.00000

PLT INT: 0
PLT LAB: 0
ANTI FLG 0
SLP MLT: 0
AREA REJ: 0
PTR: 0
ERR REJ: 0
ZER LEV: 0
OVR PKR: 0
NOV: 0

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M. W. G. 5/29/92
D. L. J. 5/28/92

NB5074.HH:1 101SY NIOBIUM SAMPLE 92-05074

	0	50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950
0	71839	1474	1081	972	1207	793	641	576	598	613	541	665	350	234	152	129	46	32	23	24
1	5	1338	1075	1045	1206	799	757	568	591	544	585	679	331	202	146	125	49	34	26	24
2	0	1330	1018	1049	1181	785	803	621	564	604	556	685	300	217	150	122	53	44	29	30
3	17	1428	1054	1055	1116	784	637	665	568	563	599	702	385	234	141	121	44	32	30	37
4	98	1423	1037	1019	1091	792	648	658	539	541	590	662	350	187	157	138	54	45	30	28
5	421	1423	1064	1094	1107	792	641	583	553	573	592	682	347	175	143	142	47	25	32	29
6	669	1322	1160	1018	1151	710	627	516	543	595	594	684	370	189	129	145	41	31	50	31
7	856	1335	1130	1050	1153	756	612	503	568	586	563	672	368	192	125	150	40	44	39	31
8	977	1342	1100	996	1147	701	632	549	585	570	583	621	350	186	134	159	47	42	26	25
9	1154	1335	1098	1027	1168	772	634	572	540	619	599	693	351	205	154	125	41	44	39	20
10	1307	1284	1062	1017	1230	753	633	593	568	587	633	696	367	207	153	140	36	43	39	28
11	1457	1240	1073	992	1329	734	618	584	633	596	649	657	429	236	141	139	43	35	40	40
12	1599	1338	1104	997	1074	777	645	553	601	584	882	710	337	434	140	167	53	64	72	42
13	1778	1268	1127	977	1006	733	656	568	550	599	908	712	319	3182	152	193	40	106	337	24
14	1775	1383	1086	977	1069	763	647	581	577	651	737	728	341	4411	141	203	46	68	375	24
15	1834	1283	1067	1024	1056	735	642	573	578	739	620	726	307	786	151	205	60	33	98	28
16	2053	1272	1085	1043	1071	758	622	535	578	568	622	683	331	186	151	1187	34	36	28	47
17	2064	1299	1136	1017	1126	745	658	592	552	566	594	672	308	184	127	12597	30	40	35	97
18	2012	1310	1049	969	1073	692	603	584	581	611	639	732	315	171	156	32508	41	29	40	66
19	2094	1285	1050	958	1014	700	626	564	537	607	616	714	306	180	149	9660	39	33	31	33
20	2023	1304	1083	949	1026	722	612	594	567	625	641	701	288	166	130	320	44	35	41	69
21	2144	1294	1071	968	981	817	607	556	585	592	592	675	296	149	134	53	35	34	36	228
22	1982	1270	1111	1038	1027	911	639	581	576	568	598	679	322	181	96	45	42	24	38	191
23	2108	1308	1089	1020	955	715	625	575	541	603	621	682	307	152	146	52	35	47	16	52
24	2048	1463	1054	1031	950	727	662	546	571	629	642	715	300	150	137	72	35	41	32	27
25	1941	1331	1034	945	980	744	630	561	572	650	611	634	274	175	152	69	30	37	19	31
26	1966	1935	1085	1009	936	707	598	598	558	594	568	595	269	159	132	54	35	27	20	32
27	1919	1353	1079	982	952	691	540	577	593	639	625	548	281	167	142	52	39	35	29	29
28	1953	1712	1124	971	959	762	634	603	551	602	660	527	270	184	152	49	50	37	42	30
29	1843	1314	1119	947	938	802	696	513	592	603	650	490	273	191	241	55	44	41	31	25
30	1845	1127	1272	1089	893	692	699	609	640	553	565	584	278	180	221	45	43	33	28	25
31	1845	1215	1105	1017	926	659	559	600	595	567	589	471	231	165	133	42	53	29	32	32
32	1802	1206	1082	967	877	696	588	564	567	599	650	465	285	170	131	40	47	36	35	24
33	1706	1209	1036	1026	903	699	595	599	585	588	610	469	294	149	137	41	49	43	42	30
34	1686	1223	1079	965	880	683	672	577	572	684	640	599	241	169	134	48	48	37	25	24
35	1784	1365	1033	1014	932	653	588	544	585	568	598	1034	277	155	125	50	44	27	26	33
36	1710	1545	1076	1009	912	699	598	536	579	591	694	678	263	141	149	47	52	36	43	27
37	1660	1286	1061	1058	928	683	611	564	578	578	612	483	244	152	122	51	55	37	36	36
38	1698	1528	1082	995	928	706	643	542	564	617	652	418	275	167	124	59	67	38	22	38
39	1647	1291	1054	943	1340	669	758	538	555	569	663	438	261	143	136	47	58	31	27	31
40	1560	1248	1086	1009	4261	653	1163	588	571	562	633	417	231	147	129	31	44	37	22	38
41	1559	1289	1034	983	1353	708	677	568	596	557	655	385	265	159	116	41	33	40	32	38
42	1658	1132	1048	1057	1074	667	688	581	626	570	673	363	216	143	143	43	51	35	38	27
43	1493	1161	1065	1094	1037	698	629	575	576	533	622	391	239	152	132	50	37	23	28	24
44	1598	1375	1026	1067	863	638	581	535	587	562	638	345	212	169	122	44	47	25	38	35
45	1586	1228	1107	1121	888	665	597	571	561	559	620	416	225	144	138	42	44	40	26	27
46	1440	1098	1083	1213	815	628	624	583	563	593	677	371	222	137	138	55	46	39	35	26
47	1416	1057	1035	1187	816	695	602	680	577	532	655	374	225	173	140	96	47	28	38	25
48	1532	1094	1047	1138	791	674	541	615	588	571	684	387	213	143	124	85	44	33	23	27
49	1482	1098	1064	1158	796	657	593	576	559	595	625	354	244	145	138	58	36	28	26	31

NB5074.HH:1 101SY NIOBIUM SAMPLE 92-05074

	1000	1050	1100	1150	1200	1250	1300	1350	1400	1450	1500	1550	1600	1650	1700	1750	1800	1850	1900	1950
0	24	16	21	20	23	21	12	12	7	16	9	6	12	9	10	4	4	6	5	14
1	33	25	25	16	27	19	12	21	17	15	11	12	9	7	7	7	14	8	8	4
2	30	31	25	25	17	13	23	14	11	9	6	9	9	7	14	7	4	7	16	11
3	32	25	16	22	18	11	14	11	6	10	9	4	8	11	9	4	5	7	4	13
4	35	27	24	18	21	18	18	8	15	18	9	9	11	6	8	7	6	8	10	6
5	31	23	37	31	27	16	12	9	13	6	16	7	5	5	14	9	8	5	13	2
6	29	24	23	31	24	24	16	10	14	11	12	12	7	11	7	9	9	4	8	11
7	22	38	20	33	23	30	17	9	13	11	11	10	5	12	17	7	9	2	8	2
8	29	21	28	25	25	27	17	14	9	10	7	8	7	7	6	7	8	6	15	7
9	35	24	31	18	23	13	19	9	11	20	14	8	11	6	10	8	8	5	7	10
10	19	19	24	26	24	20	26	12	20	20	13	10	3	7	8	11	3	5	7	9
11	25	30	24	25	18	23	19	15	22	25	13	5	13	6	15	11	9	11	7	5
12	27	15	18	20	24	10	11	20	16	68	16	13	9	7	13	2	6	10	7	10
13	27	22	31	21	22	14	16	18	14	196	11	11	11	12	6	8	7	2	10	7
14	16	22	32	29	26	23	14	15	15	208	8	8	8	14	4	8	8	6	7	6
15	30	31	27	27	23	24	29	14	15	92	15	7	9	6	13	9	6	3	4	4
16	31	33	22	15	27	22	13	24	13	18	8	16	10	7	14	11	8	9	5	8
17	26	33	30	23	23	24	19	11	16	8	9	7	3	7	7	21	6	8	6	8
18	32	31	28	15	29	23	19	13	14	12	6	11	12	12	8	24	7	6	8	7
19	26	31	21	22	22	21	19	13	7	9	1	5	9	8	8	22	4	10	4	5
20	24	19	16	26	29	27	20	18	16	8	3	3	11	10	7	8	4	3	10	9
21	25	23	19	17	26	17	22	11	15	13	5	8	16	7	6	6	8	6	6	5
22	23	30	41	21	16	18	17	12	14	12	4	9	9	11	9	7	7	9	9	4
23	35	30	50	18	17	19	13	21	19	9	9	9	15	10	3	9	3	6	4	5
24	29	31	44	23	27	17	9	6	9	15	10	10	19	9	9	17	3	6	5	3
25	32	33	32	24	22	21	21	15	10	12	12	8	13	4	5	5	4	9	11	9
26	25	32	22	32	21	20	23	18	6	13	9	13	9	10	7	9	6	6	1	3
27	27	21	22	27	27	18	15	10	19	8	3	8	11	10	5	5	11	3	7	9
28	28	32	22	16	24	24	20	12	19	11	8	9	7	12	9	11	4	7	4	9
29	28	33	27	25	22	24	17	11	14	12	7	12	10	4	9	9	3	3	9	7
30	30	21	25	20	18	17	9	14	10	8	6	8	6	5	4	9	9	9	6	9
31	26	23	22	18	24	22	22	15	16	6	11	12	11	14	9	6	11	13	7	9
32	28	32	21	25	16	26	16	17	11	10	11	16	15	7	11	4	4	8	11	7
33	32	28	26	27	21	20	25	17	14	9	9	7	15	8	13	9	6	5	6	3
34	25	35	21	22	22	31	11	7	8	6	10	9	21	4	8	7	5	8	10	8
35	29	18	22	25	24	18	21	11	10	10	10	6	18	6	10	12	10	7	4	6
36	22	21	25	32	22	23	21	14	13	13	17	6	7	5	8	8	5	11	9	5
37	25	19	17	24	25	12	20	13	5	7	10	7	11	10	6	6	5	7	6	7
38	26	25	23	24	19	19	8	20	19	12	12	10	8	5	8	6	13	8	8	8
39	28	28	24	18	30	20	6	11	16	10	7	10	9	6	7	8	3	8	7	2
40	26	21	17	22	22	13	14	18	9	11	5	15	6	5	4	8	10	10	7	9
41	35	21	31	15	28	15	18	7	10	16	12	40	9	5	9	4	6	4	9	16
42	25	21	23	16	22	17	21	11	9	15	12	34	20	9	10	8	9	4	5	3
43	29	19	31	20	18	23	11	17	11	9	8	19	13	4	7	7	11	4	3	6
44	21	26	27	33	26	12	10	16	10	6	4	14	7	7	8	4	5	18	4	3
45	25	26	17	19	13	16	18	12	11	8	13	26	8	5	5	7	5	7	7	4
46	28	25	20	29	10	18	18	14	10	9	8	33	8	4	9	6	3	8	9	8
47	37	27	34	18	26	23	9	15	18	12	12	24	12	12	6	7	4	13	7	6
48	24	42	24	31	21	14	17	15	18	12	4	13	6	4	5	9	4	4	5	6
49	27	19	14	40	25	14	11	18	7	18	5	8	12	5	7	9	12	8	6	2

Analysis performed by: diana mcnullin

Sample: 101SY NIOBIUM SAMPLE 92-05074

Height: 1.00000 ML

Irradiation date: 7-May-1992 at 13:30:00

Count date: 13-May-1992 at 14:30:00

Decay: 6.0d (522000.00 seconds)

Count times: REAL TIME 19.96h (71839.000 seconds)
LIVE TIME 19.96h (71839.000 seconds)

Dead time: 0.00 percent

Detector: HH pos 0 0 Geometry Factor: 1.000

Efficiencies and shape parameters from file: ve:[116,2]EFFFI1NB.HH

Spectrum from file : nb5074.hh:1

Background subtractions from file: VE:[116,1]BACKG.HH

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	Peak channel	Region start end	Gross counts	Net area +-	Energy (KeV)	Gammas /sec	Err x SD	System bkgd
1	76.0	73. 79.	10400.	1850.*	74.39	3.165E-02	100.0	2000.
2	85.0	82. 88.	9274.	919.*	84.20	6.053E-02	82.0	500.
3	210.0	206. 212.	8252.	510.*	209.04	2.485E-02	100.0	370.
4	243.0	236. 244.	12696.	4971.*	230.20	4.667E-02	100.0	4683. ←?
5	271.0	271. 272.	1720.	279.*	270.00	2.779E-02	100.0	223.
6	361.0	301. 302.	1560.	252.*	299.88	3.019E-02	100.0	211.
7	329.5	328. 330.	2029.	170.*	327.64	3.294E-02	100.0	193.
8	340.0	337. 341.	3852.	810.*	338.05	3.390E-02	100.0	870.
9	353.5	352. 355.	2527.	257.*	351.57	4.059E-02	55.6	95.
10	512.6	509. 516.	5650.	809.*	510.54	5.843E-02	100.0	907.
11	505.1	504. 506.	2311.	921.*	502.90	6.119E-02	100.0	1009.
12	663.0	659. 667.	9671.	8011.*	661.52	4.055E+00	1.4	60.
13	729.3	727. 730.	756.	200.*	727.02	4.540E-02	100.0	215.
14	768.0	761. 770.	57259.	56142.	765.62	3.377E+01	0.4	0.
15	797.5	796. 799.	286.	98.*	794.91	3.009E-02	100.0	86.
16	863.0	862. 864.	230.	113.*	860.53	3.071E-02	100.0	114.
17	913.6	909. 915.	1000.	748.*	911.12	3.194E-02	100.0	736.
18	967.1	966. 969.	243.	110.*	964.56	3.234E-02	100.0	171.
19	971.5	969. 973.	573.	416.*	968.75	3.256E-02	100.0	391.
20	1123.1	1122. 1125.	175.	79.*	1120.33	3.517E-02	100.0	53.
21	1463.0	1459. 1466.	727.	641.*	1460.75	4.133E-02	100.0	600.
22	1591.3	1500. 1594.	142.	81.*	1508.10	3.601E-02	100.0	73.
23	1595.9	1554. 1598.	110.	64.*	1592.73	3.701E-02	100.0	52.
24	1770.1	1770. 1770.	111.	40.*	1764.71	4.002E-02	100.0	46.

Diana L. McNullin
5-29-92
M/Dp W/ 6/2/92

++ Net Peak Area above the Compton Continuum before correction for system background. Values flagged with a * are subsequently corrected for system background before calculation of absolute emission rate (gms/sec).

Gamma-ray and nuclide lookup from file: VE:[116.3]NBLIB.DAT

%% Least-squares Results %%

(interferences)

nuclide	energy kev	dps at zero time	uCi /TL	peak frac	err (%)	dev (sig)	DPM /TL	error (%)
1 Hs 95	- - - -	3.874E+01	1.047E-03	- - - -	- - - -	- - - -	2.324E+03	1.09
	765.62	3.874E+01	1.047E-03	1.00	1.09	-1.00		

The following are upper limit values:

Co 60	- - - -	3.911E-02	1.057E-06	- - - -	- - - -	- - - -	2.347E+00	100.00
Zr 95	- - - -	1.020E-01	2.778E-06	- - - -	- - - -	- - - -	6.168E+00	100.00
Hs 94	- - - -	3.230E-02	8.752E-07	- - - -	- - - -	- - - -	1.943E+00	100.00
Sn113	- - - -	8.678E-01	2.345E-05	- - - -	- - - -	- - - -	5.207E+01	100.00
Sn123	- - - -	0.000E+00	0.000E+00	- - - -	- - - -	- - - -	0.000E+00	100.00
La115m	- - - -	5.459E+00	1.475E-04	- - - -	- - - -	- - - -	3.275E+02	100.00
La131m	- - - -	1.514E+00	4.093E-05	- - - -	- - - -	- - - -	9.086E+01	100.00
La126	- - - -	5.975E-01	1.615E-05	- - - -	- - - -	- - - -	3.585E+01	100.00

The following peaks were not identified:

#	energy	gms/sec	pcorr	CI %
1	11.37	3.1619E-02	100.0	0.0000000
2	21.20	6.0531E-02	82.0	0.0000000
3	24.34	2.4854E-02	100.0	0.0000000
4	27.20	4.6670E-02	100.0	0.0000000
5	32.16	2.7785E-02	100.0	0.0000000
6	37.00	3.0186E-02	100.0	0.0000000
7	42.00	3.2930E-02	100.0	0.0000000
8	47.00	3.3390E-02	100.0	0.0000000
9	51.57	4.0509E-02	55.6	0.0000000
10	56.54	5.6430E-02	100.0	0.0000000
11	60.11	6.1153E-02	100.0	0.0000000
12	61.13	4.0050E+00	1.7	0.0000000 ←
13	61.13	4.0050E+00	100.0	0.0000000

15	794.91	3.0087E-02	100.0	0.0000000
16	860.53	3.0708E-02	100.0	0.0000000
17	911.12	3.1939E-02	100.0	0.0000000
18	964.56	3.2343E-02	100.0	0.0000000
19	968.75	3.2558E-02	100.0	0.0000000
20	1120.33	3.5169E-02	100.0	0.0000000
21	1460.75	4.1326E-02	100.0	0.0000000
22	1503.10	3.6007E-02	100.0	0.0000000
23	1592.73	3.7015E-02	100.0	0.0000000
24	1764.71	4.0018E-02	100.0	0.0000000

If CI > 0 Confidence threshold was not exceeded
 CI = 0 Energy Window test failure
 CI = -1 Extreme Half Life test failure
 CI = -2 Extreme As. Gamma comparison test failure
 CI = -3 Unable to estimate area of Assoc. Gamma

NIOBIUM ANALYSIS

Page 1 of 2

Spreadsheet filenames: N8CALC

Revision 1: 6/1/92, NLW

Assumes tracer added to final aliquot

Sample ID: 92-5076 LEP9 recount

Date Calculated: 06/16/92

Data filename: N85076R

M&TE No.

Nb-94 & 95 Spectrum: T9638.cnf;2

Zr/Nb-95 Tracer: 54124-76-0

volume added, ml:	0.2503	0.0012 error	*****Half-lives*****
Zr-95 dpm/ml:	4.415E+03	4.500E+01 error	Zr-95= 64.02 days
Nb-95 dpm/ml:	9.892E+03	1.151E+02 error	Nb-95= 34.97 days

On: Date: 05/13/92 01:00 Time

Nb Sep Date: 05/07/92 13:30 Time

total dpm Nb-95= 2629.44 34.53 error at Nb sep time

Sample Amount: 0.6253 0.0002 error

g, ml or sample? g

Reporting Units

Leach Volume, ml: 250 0.01 error

Activity: dpm

Vol to dilute, ml: 1 0.00001 error

per ? : g

Diluted to, ml: 1 0.00001 error

Final Aliquot, ml: 4.993 0.017 error

Nb-94 & 95 Counting Data from Prepared Sample

Sample dpm Nb-95= 7.357E+02 1.54 % error at Nb sep time

Sample dpm Nb-94= 4.884E+00 100.00 % error

*****RESULTS*****

Yield Nb-95= 0.280 0.006 error

Nb-94 dpm/g= 1397.745 1398.039 error = 100.02 %

MDA = < 1397.745

GENERIC FORMULAS

Nb-94 Activity =
$$\frac{\text{net dpm} \times \text{leach vol} \times \text{diln vol}}{\text{yield} \times \text{sample amt} \times \text{diln aliquot} \times \text{aliquot}}$$

% recovery =
$$\frac{\text{dpm recovered}}{\text{dpm added}} \times 100$$

Nb-93m Activity =
$$\frac{\text{net cpm} \times \text{d/c} \times \text{leach vol} \times \text{diln vol}}{\text{yield} \times \text{sample amt} \times \text{diln aliquot} \times \text{aliquot}}$$

NIOBIUM ANALYSIS

Page 2 of 2

Spreadsheet filename: NBGALC

Revision 1: 6/1/92, NLW

Sample ID:

92-5076 LEPS recount

Date Calculated:

06/16/92

Data filename:

NB5076R

Nb-93m Spectrum:

925076NB.A1;2

Weight Nb ppt, mg: 118.9

0.2 error

Counted on: A

M&TE No.

Diode A

On: Date: 06/10/92

16:45 Time

Nb-93m d/c = 64.997

4.955 error

NB-93M COUNTING DATA:

Diode B or 325 LEPS

Enter data under correct diode.

If %error >= 50%, enter MDA. If not, MDA = NA

net cps: 1.00E+00

1.00 % error

MDA, in cps:NA

Diode A

peak channel no.: 83

bkgd: 71 - 75 <-- first ROI

Count time, min.: 1214.57

137 <-- counts

Nb-93m counts--> 218

134

247

163

peak channel + 313

156

5 lower + 352

159

4 higher 404

101 - 105 <-- second ROI

360

169 <-- counts

300

130

218

119

195

149

166

126

gross counts: 2773.000

1442 :normalized ROI total

net cpm: 0.374

0.722 :cpm in bkgd spectrum

error, cpm: 0.059

avg BKG.A1;1;2:bkgd filename

% error 15.715

2318.9 :total bkgd counts

*****RESULTS*****

Nb-93m apm/g= 6954.332 1223.030 error = 17.387 %

MDA =

NJW 6/16/92
Entered by Date

A. k. Jachy 6/18/92
Reviewed by Date

RECOUNT 92-5076 NB-93M

SAMPLE ID..... SY:925076NB.A1;2

OF CHANNELS..... 2048

DIODE I.D..... A

SHELF NUMBER..... 0

CALIBRATION..... 0.2 KEV/CH

TIME ZERO 6/10/92 AT 16:45: 0

COUNTED..... 6/10/92 AT 16:45: 0

(0.00 MINUTES DECAY TIME)

LIVE COUNT TIME.... 20 HOURS 14 MINUTES 34 SECONDS (1214.57 MIN.)

ELAPSED TIME..... 20 HOURS 14 MINUTES 34 SECONDS (1214.57 MIN.)

(DEAD TIME = 0.000)

FLUX CORRECTION.... 0.0000

GEOM CORRECTION.... 0.0000 0.0000 0.0000 0.0000 0.0000

WEIGHT..... 1.00000 GRAMS

ANAL: 0 SLP: 0 AREA: 0 P-T: 0 ERR: 0 ZER: 0 OPR: 0 NOV: 1

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Reviewed S. k. Jaff 6/10/92
S. J. K. Singh 6/11/92

RECOUNT 92-5076 NB-93H

SY:925076NB.A1;2 COUNTED 6/10/92 @ 16:45:00 GAIN: 0.2 KEV/CHAN

	0	50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950
0	72874	160	156	128	113	112	111	112	107	98	87	88	84	91	79	66	62	62	60	64
1	0	222	159	125	112	113	110	122	92	113	88	87	73	80	90	73	63	79	68	66
2	0	209	130	133	142	115	109	94	117	95	80	83	68	80	89	83	67	52	60	62
3	0	188	119	153	101	108	113	123	108	92	83	86	85	70	81	85	68	76	66	55
4	0	186	149	136	107	92	87	104	102	92	94	99	80	87	73	77	68	65	53	57
5	0	183	126	164	98	111	120	85	96	99	91	74	70	77	85	71	52	68	55	54
6	0	138	143	169	140	110	104	100	107	95	86	89	70	87	82	66	61	56	65	67
7	0	109	140	155	109	115	114	118	108	92	81	100	73	91	79	65	58	72	60	61
8	6	167	139	200	97	91	96	105	100	90	94	95	82	68	82	79	56	80	69	56
9	577	168	147	246	114	116	90	94	86	103	86	88	78	70	77	67	56	67	66	55
10	0	145	127	206	142	96	102	106	69	109	92	79	85	84	82	70	69	62	50	56
11	000	106	145	302	182	89	105	112	98	120	63	110	80	77	67	68	74	63	50	60
12	556	167	161	262	142	108	106	120	96	179	86	77	92	70	75	69	65	62	67	60
13	450	203	138	161	140	110	80	138	91	156	72	80	113	80	67	76	63	50	58	50
14	305	258	160	162	142	105	125	136	107	162	93	99	122	86	87	82	76	60	54	56
15	275	307	133	127	165	113	142	135	111	147	78	84	140	71	63	67	73	55	61	65
16	250	317	136	140	172	107	158	112	91	123	91	69	128	70	76	70	91	51	41	62
17	242	243	125	103	138	122	171	122	120	100	81	94	125	77	81	74	77	77	55	53
18	209	200	99	122	117	113	164	113	96	95	84	77	91	69	80	66	81	57	50	60
19	228	176	124	100	113	97	114	89	89	86	94	76	90	84	74	59	92	65	57	60
20	207	154	120	117	103	98	114	102	84	80	82	81	97	80	86	68	69	63	67	70
21	204	137	124	132	111	101	91	97	111	100	80	89	81	83	81	62	77	49	68	65
22	216	134	136	118	128	94	95	127	117	97	71	103	91	77	88	64	74	67	65	65
23	192	163	122	118	91	87	110	146	117	91	93	74	92	70	74	86	62	62	64	53
24	199	156	129	127	116	98	99	174	127	95	101	102	78	74	65	72	79	69	69	61
25	190	159	131	147	118	106	104	207	154	86	109	92	92	73	76	85	73	67	51	63
26	219	100	130	120	125	104	109	211	117	60	119	83	81	75	64	72	61	60	72	65
27	106	172	151	147	113	90	97	164	104	89	115	90	78	69	71	61	72	56	87	70
28	209	210	149	126	100	119	96	119	100	80	119	103	60	83	74	73	79	64	102	57
29	233	247	161	140	134	100	75	95	111	79	101	67	76	80	76	69	56	62	80	50
30	226	313	155	144	112	112	92	103	111	100	97	56	75	69	79	82	64	52	83	50
31	200	152	138	171	128	119	109	113	122	113	115	89	76	86	76	83	60	80	75	56
32	232	404	163	186	117	110	106	90	150	77	93	91	77	79	76	78	84	67	57	61
33	191	360	164	141	123	115	105	91	148	90	75	81	73	80	82	56	70	64	69	61
34	000	300	155	134	122	103	100	123	143	74	83	82	79	72	74	73	61	62	65	65
35	129	210	157	140	124	120	119	104	136	105	79	87	67	80	63	67	66	66	61	68
36	170	195	200	120	115	104	104	109	103	66	87	84	97	77	62	81	66	80	65	60
37	154	166	220	132	112	105	95	104	89	79	68	74	78	60	74	64	68	70	59	66
38	170	177	205	147	116	124	128	104	93	99	89	84	80	82	70	59	59	75	76	70
39	180	152	159	136	94	89	117	92	104	91	91	89	83	65	71	65	70	50	63	65
40	167	151	152	114	95	104	110	96	98	104	111	78	81	73	65	83	73	57	55	66
41	190	151	103	107	117	106	130	82	105	71	93	60	86	73	60	65	62	62	84	73
42	169	165	136	122	122	92	109	105	100	89	72	73	81	87	85	73	70	40	71	57
43	137	170	132	121	123	116	96	80	100	83	98	72	82	64	74	76	76	61	52	73
44	158	107	127	113	122	114	99	112	81	96	101	94	86	69	69	76	77	64	73	54
45	182	105	143	115	118	111	101	109	76	79	82	81	69	73	70	50	46	70	57	60
46	169	161	144	121	116	90	113	95	73	73	95	74	75	81	66	62	74	64	55	63
47	167	146	142	104	112	121	104	100	97	92	80	86	72	71	75	74	81	75	89	61
48	180	160	137	100	123	103	104	86	98	104	94	100	81	77	85	61	73	63	71	59
49	174	171	150	119	125	115	104	94	83	74	96	74	79	73	64	66	66	67	64	50

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036

RECOUNT 92-5075 NB-93M

SY:925076MB.A1:2 COUNTED 6/10/92 @ 16:45:00 GAIN: 0.2 KEV/CHAN

	1000	1050	1100	1150	1200	1250	1300	1350	1400	1450	1500	1550	1600	1650	1700	1750	1800	1850	1900	1950
1	50	53	53	51	39	44	43	44	46	34	37	41	36	41	20	34	41	29	25	32
2	53	51	54	56	51	33	42	60	43	46	38	30	44	30	30	32	27	34	27	34
3	52	50	53	50	55	48	36	43	39	44	40	32	26	31	28	27	31	33	31	24
4	56	50	39	57	41	49	44	50	42	41	33	36	31	22	43	32	42	39	26	20
5	52	55	52	39	39	39	32	30	34	27	30	41	32	42	35	34	37	38	38	32
6	54	63	51	51	46	48	46	51	44	45	33	37	34	31	28	20	28	24	40	37
7	56	60	52	60	63	57	53	33	54	40	32	31	32	33	37	34	27	25	35	30
8	69	39	66	58	44	38	42	39	42	38	30	36	31	28	30	49	29	26	29	29
9	50	51	58	55	54	40	30	27	47	36	40	35	35	31	36	44	29	23	27	34
10	56	54	51	50	41	39	38	51	27	34	39	37	41	18	29	47	39	43	24	29
11	56	43	65	51	54	41	40	32	40	56	30	36	27	36	39	56	29	32	36	38
12	60	39	58	53	53	50	48	39	37	28	36	37	21	33	36	31	32	41	27	34
13	52	50	63	35	53	44	39	33	50	43	38	43	34	38	27	43	35	35	33	27
14	54	43	52	36	43	50	31	52	49	34	42	33	27	23	26	46	25	31	40	26
15	54	62	49	51	52	42	40	27	42	46	30	27	40	36	30	45	24	51	32	25
16	54	46	56	50	64	54	42	29	45	43	41	38	44	47	31	36	26	31	35	34
17	60	40	43	50	39	40	43	42	38	32	33	31	26	31	22	26	37	34	23	33
18	65	46	51	39	46	40	37	43	46	29	38	39	37	29	33	35	24	25	30	31
19	63	52	57	30	39	44	40	30	32	37	40	44	41	37	37	37	27	30	27	21
20	46	46	49	45	36	54	46	43	30	36	35	36	26	36	45	25	27	23	27	30
21	56	52	46	31	49	50	45	42	46	35	39	26	36	32	38	33	21	23	38	31
22	70	47	44	39	38	44	43	40	37	51	40	36	36	23	35	23	30	31	45	24
23	60	49	69	50	35	32	35	20	53	38	36	37	39	31	36	33	21	31	32	32
24	55	49	50	55	42	41	47	37	37	37	46	39	27	32	40	28	23	25	26	30
25	53	67	54	31	46	40	47	33	30	49	49	31	30	23	32	34	42	26	24	26
26	67	53	51	53	52	37	45	50	41	37	39	29	35	36	40	39	35	21	31	28
27	60	44	49	51	47	36	38	41	45	35	30	31	47	31	32	23	36	26	33	29
28	54	44	54	45	41	49	30	30	36	40	40	36	35	29	34	34	23	36	28	32
29	57	52	47	45	32	30	32	41	39	40	27	28	43	34	30	36	22	23	37	30
30	54	52	39	32	44	36	41	42	38	44	20	37	39	36	41	31	37	31	33	20
31	59	47	43	33	46	41	43	43	47	41	34	41	31	45	33	31	35	41	35	30
32	53	67	44	59	52	47	37	41	34	41	33	37	29	33	41	37	28	19	31	26
33	53	43	61	43	50	50	41	32	35	37	41	25	36	27	25	30	21	29	29	25
34	45	51	60	42	44	42	37	31	35	33	25	35	32	26	25	30	27	31	26	26
35	61	59	52	44	50	38	36	52	34	40	35	35	40	47	34	29	27	28	29	31
36	62	59	54	33	51	58	40	43	30	39	36	24	38	45	35	40	36	33	30	24
37	39	55	49	54	52	36	42	40	37	33	35	35	38	43	34	30	32	38	36	30
38	55	45	46	49	55	39	35	49	38	39	34	45	33	29	30	41	27	33	29	41
39	43	36	42	51	37	30	49	30	39	45	37	32	36	23	40	32	30	36	23	21
40	65	55	48	49	42	38	38	48	49	37	25	29	31	43	25	25	36	24	24	33
41	50	57	45	56	53	41	36	31	34	41	32	38	34	43	35	28	34	32	41	31
42	51	48	44	54	46	42	46	32	38	37	35	46	26	26	17	34	26	37	21	35
43	52	72	51	62	56	36	32	31	27	34	24	27	36	41	32	32	43	34	21	21
44	69	57	41	56	49	32	44	40	31	36	41	34	40	37	30	34	27	33	34	21
45	52	45	56	57	45	39	31	42	32	36	25	33	34	25	32	28	36	27	33	30
46	56	42	60	62	48	44	40	32	48	31	38	30	28	32	41	45	20	40	26	27
47	58	44	42	42	46	42	41	37	33	36	32	33	36	35	41	24	31	32	23	20
48	50	54	47	39	47	46	48	41	31	33	48	41	30	29	32	35	25	28	35	32
49	55	56	56	55	47	36	51	47	32	35	38	28	32	32	31	43	29	35	29	31
50	54	49	51	50	34	40	32	36	46	31	42	38	24	38	33	29	21	40	24	36

NIOBIUM ANALYSIS

Page 1 of 2

Spreadsheet filename: NBCALC

Revision 1: 6/1/92, NLW

Assumes tracer added to final aliquot

Sample ID: 92-5076

Date Calculated: 06/03/92

Data filename: NB5076

M&TE No.

Nb-94 & 95 Spectrum: T9638.cnf;2

Zr/Nb-95 Tracer: 34124-76-0

volume added, ml: 0.2503 0.0012 error *****Half-lives*****

Zr-95 dpm/ml: 4.415E+03 4.500E+01 error Zr-95= 64.02 days

Nb-95 dpm/ml: 9.892E+03 1.151E+02 error Nb-95= 34.97 days

On: Date: 05/13/92 01:00 Time

Nb Sep Date: 05/07/92 13:30 Time

total dpm Nb-95= 2629.44 34.53 error at Nb sep time

Sample Amount: 0.6253 0.0002 error

g, ml or sample? g

Reporting Units

Leach Volume, ml: 250 0.01 error

Activity: dpm

Vol to dilute, ml: 1 0.00001 error

per ? : g

Diluted to, ml: 1 0.00001 error

Final Aliquot, ml: 4.993 0.017 error

Nb-94 & 95 Counting Data from Prepared Sample

Sample dpm Nb-95= 7.357E+02 1.54 % error at Nb sep time

Sample dpm Nb-94= 4.884E+00 100.00 % error

*****RESULTS*****

Yield Nb-95= 0.280 0.006 error

Nb-94 dpm/g= 1397.745 1398.039 error = 100.02 %

MDA = < 1397.745

GENERIC FORMULAS

$$\text{Nb-94 Activity} = \frac{\text{net dpm} \times \text{leach vol} \times \text{diln vol}}{\text{yield} \times \text{sample amt} \times \text{diln aliquot} \times \text{aliquot}}$$

$$\% \text{ recovery} = \frac{\text{dpm recovered}}{\text{dpm added}} \times 100$$

$$\text{Nb-93m Activity} = \frac{\text{net cpm} \times \text{d/c} \times \text{leach vol} \times \text{diln vol}}{\text{yield} \times \text{sample amt} \times \text{diln aliquot} \times \text{aliquot}}$$

NIOBIUM ANALYSIS

Page 2 of 2

Spreadsheet filename: NBCALC

Revision 1: 6/1/92. NLW

Sample ID: 92-5076

Date Calculated: 06/03/92

Data filename: NB5076

Nb-93m Spectrum:

Weight Nb ppt, mg: 118.9 0.2 error

Counted on: 325 leps M&TE No. 325 leps

On: Date: 05/21/92 15:11 Time

Nb-93m d/c = 147.911 26.726 error

NB-93M COUNTING DATA:

Diode B or 325 LEPS

If %error >= 50%, enter MDA. If not, MDA = NA

net cps: 2.44E-03 23.00 % error

MDA, in cps: NA

Diode A Enter data under correct diode.

peak channel no.: 83 bkgd: 71 - 75 <-- first ROI

Count time, min.: 1000 0 <-- counts

Nb-93m counts--> 0 0

0 0

peak channel + 0 0

5 lower + 0 0

4 higher 0 100 - 104 <-- second ROI

0 <-- counts

0 0

0 0

0 0

0 0

gross counts: 0.000 0 :normalized ROI total

net cpm: 0.000 0 :cpm in bkgd spectrum

error, cpm: 0.000 BKG.A1;1 :bkgd filename

% error ERR 0 :total bkgd counts

*****RESULTS*****

Nb-93m dpm/g= 6197.158 1831.671 error = 29.557 %

MDA =

Entered by

Date

Reviewed by

Date

Configuration : DUBO:[USER]T9638.CNF;2
 Analyses by : PEAK V16.2,PEAKEFF V2.2,ENBACK V1.5,NID V2.4,WTMEAN V1.5
 Sample title : T9638 92-05076 Nb Powder 'on' card in 'TLCARD SLOT' M99913
 Sample date : 22-MAY-1992 00:00:00 Acquisition date : 22-MAY-1992 07:30:21
 Sample ID : T9638 92-05076 Sample quantity : 1.0000 sa
 Sample type : FILTER AT T1 Sample geometry : T1 'CARD'
 Detector name : TRACK Detector geometry: T1CARD
 Elapsed live time: 0 05:30:00.00 Elapsed real time: 0 05:30:02.76 0.0%
 Energy tolerance : 1.20 Half life ratio : 8.00
 Errors propagated: No Systematic Error : 0.00 %
 Efficiency type : Empirical Efficiencies at : Peak Energy
 Abundance limit : 70.00 WTM error limit : 3.00

Nuclide Line Activity Report

Nuclide Type: natural

Nuclide	Energy	%Abn	%Eff	Uncorrected Decay Corr 1-Sigma			Status
				uCi/sa	uCi/sa	%Error	
K-40	1460.83	10.67*	9.583E-01	1.849E-05	1.849E-05	70.91	OK

Final Mean for 1 Valid Peaks - 1.849E-05+/- 1.312E-05 (70.91%)

Nuclide Type: fission

Nuclide	Energy	%Abn	%Eff	Uncorrected Decay Corr 1-Sigma			Status
				uCi/sa	uCi/sa	%Error	
NB-95	765.79	99.79*	1.966E+00	3.286E-04	3.314E-04	1.54	OK

Final Mean for 1 Valid Peaks - 3.314E-04+/- 5.095E-06 (1.54%)

CS-137	661.66	85.20*	2.322E+00	3.837E-05	3.837E-05	7.90	OK

Final Mean for 1 Valid Peaks - 3.837E-05+/- 3.033E-06 (7.90%)

Nuclide Type:

Nuclide	Energy	%Abn	%Eff	Uncorrected Decay Corr 1-Sigma			Status
				uCi/sa	uCi/sa	%Error	
TC-95	765.79	94.00*	1.966E+00	3.488E-04	4.970E-04	1.54	OK
	947.67	1.96	1.545E+00	0.000E+00	0.000E+00	0.00	Absent
	1073.71	3.75	1.343E+00	0.000E+00	0.000E+00	0.00	Absent

Final Mean for 1 Valid Peaks - 4.970E-04+/- 7.641E-06 (1.54%)

Flag: "*" - Keyline

Post-NID Peak Search Report
Sample ID : T9638 92-05076

Page : 2
Acquisition date : 22-MAY-1992 07:30:21

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides
0	74.79*	116	1107	3.00	100.41	95	11	59.9		
0	661.48*	556	115	1.76	882.70	878	11	7.9		CS-137
0	765.65	4723	136	1.73	1021.62	1015	12	1.5		TC-95 NB-95
0	1173.68*	27	32	2.57	1565.82	1560	13	57.9		
0	1330.80	42	23	5.87	1775.41	1768	13	26.9		
0	1461.04*	14	6	3.17	1949.14	1943	12	70.9		K-40

```

Configuration      : DUBO:[USER]T9638.CNF;2
Analyses by       : PEAK V16.2,PEAKEFF V2.2,ENBACK V1.5,NID V2.4,WTMEAN V1.5
Analyses by       : MINACT V2.2
Sample title      : T9638 92-05076 Nb Powder 'on' card in 'T1CARD SLOT' M99913
Sample date       : 22-MAY-1992 00:00:00 Acquisition date : 22-MAY-1992 07:30:21
Sample ID        : T9638 92-05076 Sample quantity : 1.0000 sa
Sample type       : FILTER AT T1 Sample geometry : T1 'CARD'
Detector name     : TRACK Detector geometry: T1CARD
Elapsed live time: 0 05:30:00.00 Elapsed real time: 0 05:30:02.76 0.0%
Peak Width (FWHM): 2.00 Confidence level : 5.00 %
Energy tolerance : 1.20 Half life ratio : 8.00
Errors propagated: No Systematic Error : 0.00 %
Efficiency type : Empirical Efficiencies at : Peak Energy
Abundance limit : 70.00 WTM error limit : 3.00

```

Minimum Detectable Activity Report

Nuclide	Bckgnd Sum	Energy ()	MDA (uCi/sa)
NA-22	29.	1274.53	3.0661E-06
NA-24	6.	1368.60	2.4488E-06
SC-46	32.	1120.50	2.8235E-06
CR-51	234.	320.08	1.9011E-05
MN-54	34.	834.83	2.0719E-06
CO-57	482.	122.06	1.2738E-06
CO-58	34.	810.75	2.0149E-06
FE-59	23.	1099.25	4.1646E-06
CO-60	39.	1332.50	3.7558E-06
ZN-65	26.	1115.55	4.9315E-06
SE-75	267.	264.66	2.7304E-06
BR-82	30.	776.52	2.6973E-06
SR-85	218.	514.00	3.0667E-06
Y-88	32.	898.04	2.4105E-06
NB-94	35.	871.09	2.2002E-06
NB-95M	334.	235.68	6.9696E-06
TC-95M	381.	204.11	2.2457E-06
ZR-95	53.	756.73	4.2560E-06
RU-103	174.	497.05	2.9580E-06
RU-106	109.	621.92	2.7150E-05
AG-108M	57.	722.90	2.4901E-06
CD-109	390.	88.03	2.3677E-05
AG-110M	25.	884.68	2.6121E-06
SN-113	198.	391.70	3.3277E-06
SB-124	143.	602.71	4.0232E-06
SB-125	166.	427.88	7.3104E-06
I-131	181.	364.50	2.3954E-06
BA-133	205.	356.00	3.1196E-06
CS-134	127.	604.71	2.8555E-06
CE-139	371.	165.80	1.5133E-06
BA-140	232.	537.27	1.3794E-05
LA-140	203.	487.03	5.3319E-06
CE-141	426.	145.40	2.4227E-06
CE-144	427.	133.54	9.8549E-06
PM-144	64.	696.54	1.7298E-04

= 4.884 dpm

Minimum Detectable Activity Report (continued)

Page : 2

Sample ID : T9638 92-05076

Acquisition date : 22-MAY-1992 07:30:21

Nuclide	Bckgnd Sum	Energy ()	MDA (uCi/sa)
SM-145	296.	61.30	1.2666E-06
ND-147	406.	91.10	3.2359E-06
PM-148M	236.	550.27	3.8118E-06
EU-152	10.	1408.01	9.6404E-06
GD-153	376.	97.43	3.1332E-06
EU-154	29.	1274.51	8.9096E-06
EU-155	397.	105.31	4.1962E-06
TM-170	424.	84.30	2.7190E-05
TA-182	32.	1121.30	8.0733E-06
W-188	424.	155.00	8.1137E-06
OS-191	409.	129.40	4.1526E-06
IR-192	214.	316.50	2.1154E-06
HG-203	408.	72.87	1.3818E-05
PB-210	363.	46.52	2.6786E-05
BI-211	0.	350.10	Half-Life too short
BI-214	32.	1120.27	1.8573E-05
PB-214	237.	351.87	5.5613E-06
PO-214(I	129.	609.31	3.9001E-06
RA-224	288.	240.76	4.2140E-05
RA-226	237.	351.87	5.5598E-06
TH-228	361.	215.75	5.4918E-04
TH-230	302.	67.68	2.0081E-04
PA-231	220.	300.07	7.0307E-05
TH-232	37.	911.16	8.2845E-06
PA-233	221.	311.90	4.5774E-06
U-234	324.	53.23	7.4807E-04
U-235	410.	185.74	2.6497E-06
U-236	289.	49.37	1.1598E-03
NP-237	221.	311.90	4.5274E-06
PU-237	364.	101.10	4.3184E-06
U-238	19.	1001.00	2.8931E-04
AM-241	321.	59.54	2.2824E-06

VAX/VMS Peak Search Report V1.8 Generated 28-MAY-1992 16:18:57

Configuration : DUBO:{USER}T9638.CNF;2
 Analyses by : PEAK V16.2,ENBACK V1.5
 Sample title : T9638 92-05076 Nb Powder 'on' card in 'T1CARD SLOT' M99913
 Sample date : 22-MAY-1992 00:00:00 Acquisition date : 22-MAY-1992 07:30:21
 Sample ID : T9638 92-05076 Sample quantity : 1.0000 sa
 Sample type : FILTER AT T1 Sample geometry : T1 'CARD'
 Detector name : TRACK Detector geometry: T1CARD
 Elapsed live time: 0 05:30:00.00 Elapsed real time: 0 05:30:02.76 0.00
 Start energy : 29.48 End energy : 3069.79
 Sensitivity : 5.00 Gaussian : 10.00
 Critical level : No

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	74.79*	116	1107	3.00	100.41	95	11	5.86E-03	59.9	
2	0	661.48*	556	115	1.76	882.70	878	11	2.81E-02	7.9	
3	0	765.65	4723	136	1.73	1021.62	1015	12	2.39E-01	1.5	
4	0	1173.68*	27	32	2.57	1565.82	1560	13	1.37E-03	57.9	
5	0	1330.80	42	23	5.87	1775.41	1768	13	2.13E-03	26.9	
6	0	1461.04*	14	6	3.17	1949.14	1943	12	7.00E-04	70.9	

VAX/VMS Peak Search Report V1.8 Generated 28-MAY-1992 16:18:16

Configuration : DUBO:[USER]T9638.CNF;2
 Analyses by : PEAK V16.2
 Sample title : T9638 92-05076 Nb Powder 'on' card in 'TICARD SLOT' M99913
 Sample date : 22-MAY-1992 00:00:00 Acquisition date : 22-MAY-1992 07:30:21
 Sample ID : T9638 92-05076 Sample quantity : 1.0000 sa
 Sample type : FILTER AT T1 Sample geometry : T1 'CARD'
 Detector name : TRACK Detector geometry: TICARD
 Elapsed live time: 0 05:30:00.00 Elapsed real time: 0 05:30:02.76 0.0%
 Start energy : 29.48 End energy : 3069.79
 Sensitivity : 5.00 Gaussian : 10.00
 Critical level : No

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	74.79	320	1107	3.00	100.41	95	11	1.62E-02	21.4	
2	0	91.80	112	820	1.34	123.08	120	7	5.68E-03	44.2	
3	0	510.60	191	546	2.50	681.50	675	12	9.64E-03	26.0	
4	0	661.48	1325	115	1.76	882.70	878	11	6.69E-02	3.2	
5	0	765.65	4723	136	1.73	1021.62	1015	12	2.39E-01	1.5	
6	0	1173.68	51	32	2.57	1565.82	1560	13	2.59E-03	29.6	
7	0	1330.80	42	23	5.87	1775.41	1768	13	2.13E-03	26.9	
8	0	1461.04	60	6	3.17	1949.14	1943	12	3.04E-03	15.2	

 22-MAY-92 06:13:54

92-05076 NB POWDER IN FILTER M99913

SAMPLE DATE: 21-MAY-92 15:10:00
 SAMPLE IDENTIFICATION: NB STD STIPPLED
 TYPE OF SAMPLE: BATCH FILTER
 SAMPLE QUANTITY: 1.000000 UNITS: SPL
 SAMPLE GEOMETRY: SHELF 1
 EFFICIENCY FILE NAME: EFF.TAB1..

 ACQUIRE DATE: 21-MAY-92 15:11:53 *
 PRESET TIME(LIVE): 54000. SEC *
 ELAPSED REAL TIME: 54113. SEC *
 ELAPSED LIVE TIME: 54000. SEC *

 DETECTOR: 1GP-STD LEPS *1 *
 ACQ IN DATE: 15-APR-91 00:00:00 *
 PVSCHNL: 0.1000000 *
 LFSCHN: 0.0000000 KEV *

ENERGY WINDOW 5.00 TO 405.00

PK	IT	ENERGY	AREA	BKGND	FMIM	CHANNEL	LEFT	PW	CTS/SEC	XERR	FIT
1	0	16.33	132.	400.	0.36	163.20	156	16	2.44E-03	23.3	
2	0	27.15	97.	346.	0.61	271.47	264	17	1.79E-03	29.0	
3	0	31.83	199.	400.	0.57	310.27	309	22	3.69E-03	15.8	
4	0	36.59	89.	300.	1.20	365.93	351	30	1.65E-03	32.7	

PEAK SEARCH COMPLETED (REV 11)

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NIOBIUM ANALYSIS

Page 1 of 2

Spreadsheet filename: NBOALC

Revision 1: 5/1/92, NLW

Assumes tracer added to final aliquot

Sample ID: 92-5080 recount

Date Calculated: 06/16/92

Data filename: NB5080R

M&TE No.

Diode HH

Nb-94 & 95 Spectrum: rr05080nb.hh;1

Zr/Nb-95 Tracer: 54124-76-0

Volume added, ml:	0.2503	0.0012 error	*****Half-lives*****
Zr-95 dpm/ml:	4.415E+03	4.500E+01 error	Zr-95= 64.02 days
Nb-95 dpm/ml:	9.892E+03	1.151E+02 error	Nb-95= 34.97 days

On: Date: 05/13/92 01:00 Time

Nb Sep Date: 05/07/92 13:30 Time

total dpm Nb-95= 2629.44 34.53 error at Nb sep time

Sample Amount: 0.7021 0.0002 error

g, ml or sample? g

Reporting Units

Leach Volume, ml: 250 0.01 error

Activity: dpm

Vol to dilute, ml: 1 0.00001 error

per ? : g

Diluted to, ml: 1 0.00001 error

Final Aliquot, ml: 4.993 0.17 error

Nb-94 & 95 Counting Data from Prepared Sample

Sample dpm Nb-95= 2.180E+03 1.01 % error at Nb sep time

Sample dpm Nb-94= 1.829E+00 100.00 % error

*****RESULTS*****

Yield Nb-95= 0.829 0.014 error

Nb-94 dpm/g= 157.326 157.438 error = 100.07 %

MDA = < 157.326

GENERIC FORMULAS

Nb-94 Activity =
$$\frac{\text{net dpm} \times \text{leach vol} \times \text{diln vol}}{\text{yield} \times \text{sample amt} \times \text{diln aliquot} \times \text{aliquot}}$$

% recovery =
$$\frac{\text{dpm recovered}}{\text{dpm added}} \times 100$$

Nb-93m Activity =
$$\frac{\text{net cpm} \times \text{d/c} \times \text{leach vol} \times \text{diln vol}}{\text{yield} \times \text{sample amt} \times \text{diln aliquot} \times \text{aliquot}}$$

NIOBIUM ANALYSIS

Page 2 of 2

Spreadsheet filename: NRCALC

Revision 1: 6/1/92, NLW

Sample ID: 92-5080 recount

Date Calculated: 06/16/92

Data filename: NBS080R

Nb-93m Spectrum: 925080nb.al;2

Weight Nb ppt, mg: 319.9 0.2 error

Counted on: A M&TE No. Diode A

On: Date: 06/05/92 12:31 Time

Nb-93m d/c = 75.784 6.508 error

NB-93M COUNTING DATA:

Diode B or 325 LEPS Enter data under correct diode.

If %error >= 50%, enter MDA. If not, MDA = NA

net cps: 1.00 1.00 % error

MDA, in cps: NA

Diode A

peak channel no.: 83 bkgd: 71 - 75 <-- first ROI

Count time, min.: 4424.82 980 <-- counts

Nb-93m counts--> 1237 992

1467 1044

peak channel + 1903 1021

5 lower + 2696 976

4 higher 3627 101 - 105 <-- second ROI

3751 855 <-- counts

3158 878

2241 888

1540 876

1261 879

gross counts: 22881.000 9389 :normalized ROI total

net cpm: 2.327 0.722 :cpm in bkgd spectrum

error, cpm: 0.043 avg BKG.A1;1&2:bkgd filename

% error 1.829 12583. :total bkgd counts

*****RESULTS*****

Nb-93m dpm/g = 15170.154 1450.453 error = 9.561 %

MDA =

NJW 6/16/92
Entered by Date

S. K. Tody 6/18/92
Reviewed by Date

RECOUNT OF NB-93M ON 92-5088

SAMPLE ID..... SY:925088NB.A1;2

OF CHANNELS..... 2048

DIODE I.D..... A

SHELF NUMBER..... 0

CALIBRATION..... 0.2 KEV/CH

TIME ZERO 6/ 5/92 AT 12:31: 0

COUNTED..... 6/ 5/92 AT 12:31: 0

(0.00 MINUTES DECAY TIME)

LIVE COUNT TIME.... 73 HOURS 44 MINUTES 49 SECONDS (4424.82 MIN.)

ELAPSED TIME..... 73 HOURS 44 MINUTES 49 SECONDS (4424.82 MIN.)

(DEAD TIME = 0.000)

FLUX CORRECTION.... 0.0000

GEOM CORRECTION.... 0.0000 0.0000 0.0000 0.0000 0.0000

WEIGHT..... 1.00000 GRAMS

ANLI: 0 SLP: 0 AREA: 0 P-T: 0 ERR: 0 ZER: 0 OPR: 0 NOV: 1

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M. J. W. H.
6/8/92

D. K. Fady 6/13/92

RECOUNT OF NB-93M ON 92-5000

SY:925000NB.A1;2 COUNTED 6/ 5/92 @ 12:31: 0 GAIN: 8.2 KEV/CHAN

	0	50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950
0	265400	1074	915	938	730	682	691	651	682	592	598	596	538	532	527	472	467	442	464	474
1	0	1100	855	923	744	712	676	613	634	538	549	561	508	493	507	509	492	472	453	457
2	0	1143	878	926	739	685	699	659	639	570	570	565	511	529	526	495	472	445	439	498
3	0	1159	888	954	806	717	678	649	607	613	568	581	482	529	488	407	458	438	462	481
4	0	1090	876	1054	762	722	635	603	559	580	615	589	542	498	502	469	430	463	467	484
5	0	1063	879	1289	729	695	658	620	612	581	526	590	528	531	495	483	456	446	455	492
6	0	1029	970	1436	736	704	639	627	615	552	563	545	533	511	537	471	468	478	477	482
7	0	1007	930	2077	751	729	678	655	655	565	600	518	535	530	516	466	461	431	482	500
8	55	1050	888	3342	719	676	699	634	595	601	551	529	579	508	530	502	457	432	450	513
9	2745	983	970	5104	747	724	668	582	593	602	527	569	553	498	463	472	486	444	424	495
10	4417	1006	1001	6234	790	675	646	619	638	564	526	508	499	513	471	478	456	450	467	
11	3737	1010	990	6414	913	684	674	707	662	781	533	593	529	545	504	475	468	437	468	485
12	2292	1043	1011	5060	875	722	670	715	620	797	572	554	596	531	546	496	462	466	514	490
13	2002	1206	946	3065	903	692	684	874	563	824	566	533	635	538	520	486	460	463	464	446
14	1540	1427	807	1667	1000	696	766	884	686	854	539	585	764	532	500	499	475	430	460	446
15	1366	1484	890	1034	1005	691	827	845	606	707	591	586	749	506	548	501	512	476	456	510
16	1292	1484	908	822	953	739	947	775	609	600	539	552	816	478	483	497	443	458	460	445
17	1141	1305	842	808	894	696	806	739	625	639	522	528	721	536	499	410	491	459	429	470
18	1113	1143	862	763	775	699	804	673	650	617	583	553	672	499	485	443	499	449	460	485
19	1107	974	850	774	742	680	760	661	597	592	567	511	587	492	499	496	470	459	463	509
20	1054	1027	879	773	716	697	724	624	667	616	552	567	555	518	536	504	471	442	492	462
21	1009	980	854	792	731	687	694	713	731	570	553	581	549	534	467	472	456	464	468	505
22	1010	592	829	805	696	690	662	761	714	631	576	535	553	548	515	485	438	410	446	471
23	1040	1044	800	829	751	690	668	868	764	563	550	550	512	493	409	480	467	454	460	471
24	1037	1021	828	777	748	714	616	974	762	540	620	548	536	511	510	496	453	467	504	508
25	1105	976	858	833	705	679	659	1011	728	582	667	545	525	495	486	403	496	510	455	460
26	1104	1066	890	863	730	667	670	989	726	586	750	509	516	519	475	493	462	453	502	463
27	1064	1129	925	905	736	723	651	800	678	599	727	575	543	559	488	405	447	470	529	501
28	1102	1237	890	948	740	691	677	70	623	676	681	485	515	531	483	504	472	465	554	464
29	1175	1167	911	1175	712	665	677	616	605	583	615	501	503	500	506	463	456	456	517	445
30	1153	1063	976	1582	710	675	723	605	600	642	546	519	528	517	477	462	451	477	545	446
31	1307	2690	1014	1936	761	711	677	677	677	576	567	560	546	494	496	452	459	482	506	446
32	1302	3627	1781	2850	720	656	677	677	677	576	567	560	546	494	496	452	459	482	506	446
33	1466	3751	1000	1756	720	701	677	677	677	576	567	560	546	494	496	452	459	482	506	446
34	1328	3158	1103	1451	720	677	677	677	677	576	567	560	546	494	496	452	459	482	506	446
35	1246	2741	1200	1241	71	677	677	677	677	576	567	560	546	494	496	452	459	482	506	446
36	1153	1940	1000	1076	71	677	677	677	677	576	567	560	546	494	496	452	459	482	506	446
37	1012	1067	1000	1076	71	677	677	677	677	576	567	560	546	494	496	452	459	482	506	446
38	1002	1007	1000	1076	71	677	677	677	677	576	567	560	546	494	496	452	459	482	506	446
39	1041	1075	1317	1076	71	677	677	677	677	576	567	560	546	494	496	452	459	482	506	446
40	1055	1052	1076	1076	71	677	677	677	677	576	567	560	546	494	496	452	459	482	506	446
41	1051	1122	1076	1076	71	677	677	677	677	576	567	560	546	494	496	452	459	482	506	446
42	1073	1250	1076	1076	71	677	677	677	677	576	567	560	546	494	496	452	459	482	506	446
43	1076	1585	1076	1076	71	677	677	677	677	576	567	560	546	494	496	452	459	482	506	446
44	1052	1535	1076	1076	71	677	677	677	677	576	567	560	546	494	496	452	459	482	506	446
45	1082	1301	1076	1076	71	677	677	677	677	576	567	560	546	494	496	452	459	482	506	446
46	1000	1100	1076	1076	71	677	677	677	677	576	567	560	546	494	496	452	459	482	506	446
47	1077	1021	1076	1076	71	677	677	677	677	576	567	560	546	494	496	452	459	482	506	446
48	107	1000	1076	1076	71	677	677	677	677	576	567	560	546	494	496	452	459	482	506	446
49	1001	1000	1076	1076	71	677	677	677	677	576	567	560	546	494	496	452	459	482	506	446

KEY	OF NB-93M ON 92-5080				SY:925080NB.A1:2				UNITED 6/ 5/92 0 12:31:00 GAIN: 0.2 KEY/CHAN											
	1000	1050	1100	1150	1200	1250	1300	1350	1400	1450	1500	1550	1600	1650	1700	1750	1800	1850	1900	1950
0	441	478	368	363	347	350	338	346	346	299	296	367	329	316	296	292	310	270	292	293
1	472	445	475	369	357	337	324	316	313	314	309	316	292	326	333	310	286	287	328	267
2	433	415	400	396	350	302	354	321	326	314	335	302	332	322	305	296	303	279	288	308
3	449	435	401	365	348	398	353	342	332	360	308	370	330	323	295	327	301	307	262	309
4	466	440	408	370	366	352	352	342	318	340	324	292	294	300	302	313	304	279	305	293
5	468	425	423	317	361	368	313	316	324	309	311	358	305	304	312	339	280	286	302	335
6	454	436	397	390	370	303	347	340	357	316	365	277	290	321	295	325	305	298	290	327
7	454	436	383	383	371	353	201	317	352	329	332	308	311	309	318	321	285	304	291	292
8	485	420	413	354	335	300	343	342	338	330	304	267	299	298	335	307	280	287	285	206
9	460	443	445	419	357	358	366	302	330	352	308	308	319	311	301	316	310	301	273	282
10	488	389	372	346	301	313	357	331	313	302	337	315	300	336	270	371	303	308	292	309
11	458	425	423	400	371	368	334	315	338	341	314	312	276	291	297	306	317	279	280	309
12	465	425	400	354	384	354	352	353	315	321	292	352	315	299	321	313	287	307	314	309
13	478	430	391	368	365	341	337	352	356	314	356	357	289	288	301	295	312	304	289	311
14	494	366	393	397	342	343	307	294	300	336	289	306	318	314	283	313	326	289	301	311
15	465	430	399	394	354	340	340	356	351	328	286	298	337	309	301	313	276	302	280	284
16	424	418	404	422	381	374	357	366	332	350	318	317	312	319	306	288	278	291	297	280
17	448	426	409	365	362	355	325	331	299	293	309	318	298	297	324	271	300	308	290	281
18	486	453	406	376	360	368	353	346	376	305	324	350	303	268	319	302	305	307	318	282
19	472	409	416	398	341	343	329	391	312	332	314	296	292	317	332	289	298	306	285	282
20	463	400	401	381	362	327	359	300	335	344	323	281	315	312	306	294	282	321	318	289
21	492	428	386	406	323	301	331	346	335	349	277	317	339	327	301	332	302	266	287	282
22	447	387	393	399	356	346	351	350	300	304	313	281	314	300	303	298	319	310	297	311
23	470	397	372	380	366	365	324	371	294	327	318	324	317	299	327	284	295	295	280	281
24	491	401	404	381	333	363	329	361	312	338	320	335	301	294	322	281	284	309	300	281
25	463	463	396	376	367	351	330	310	330	325	297	296	312	299	286	302	304	294	282	280
26	437	410	381	357	355	328	325	320	321	330	346	278	316	297	277	325	313	348	300	300
27	443	352	390	358	397	332	342	347	297	331	323	303	300	298	300	304	285	313	300	286
28	446	405	396	387	366	349	377	325	321	336	296	314	274	327	303	337	290	295	310	300
29	431	391	394	352	357	339	332	319	284	341	294	292	293	318	344	299	292	281	280	281
30	440	417	396	370	364	345	320	347	325	329	300	329	326	289	275	314	282	297	303	280
31	426	393	391	378	349	349	328	347	311	314	341	311	337	326	294	297	313	300	313	287
32	434	426	384	369	326	332	339	300	322	313	320	313	311	296	305	321	319	324	287	291
33	472	403	338	366	409	352	332	313	325	332	334	302	316	300	272	297	292	276	283	280
34	421	418	387	371	369	339	317	361	335	339	349	316	298	306	304	310	302	305	282	300
35	434	425	381	352	345	354	350	318	335	333	304	305	320	304	269	203	203	313	287	280
36	401	453	397	376	366	340	345	343	307	299	306	311	316	323	281	315	293	304	286	282
37	438	447	414	376	354	365	379	345	341	332	315	302	334	302	309	288	318	298	281	280
38	473	393	378	388	355	349	350	320	326	335	304	330	308	304	289	320	283	319	287	286
39	433	475	399	400	361	338	317	321	353	340	291	294	318	330	321	312	307	304	280	301
40	427	400	366	412	391	325	331	323	297	299	327	294	321	318	318	299	325	308	290	285
41	470	415	403	390	380	375	341	345	304	285	334	298	298	311	318	292	274	285	281	288
42	447	373	384	424	357	348	328	317	303	327	314	330	301	341	336	312	279	302	290	288
43	450	426	387	399	334	340	357	338	322	331	302	328	303	290	299	289	301	278	286	280
44	439	406	410	437	342	369	373	341	330	329	285	340	292	314	294	298	303	301	286	288
45	432	394	387	433	336	350	371	356	335	334	288	297	307	287	296	297	327	314	312	280
46	426	402	427	403	364	357	327	300	340	335	310	321	316	290	310	297	326	314	286	280
47	453	397	370	388	345	341	347	321	334	320	361	312	276	333	295	314	279	280	286	280
48	436	416	402	380	347	338	343	324	301	293	275	309	315	294	297	299	285	297	280	280
49	461	392	373	376	350	343	332	314	315	313	313	296	277	290	303	299	271	279	281	300

NIOBIUM ANALYSIS

Page 1 of 2

Spreadsheet filename: NBCALC

Revision 1: 6/1/92, NLW

Assumes tracer added to final aliquot

Sample ID: 92-5080

Date Calculated: 06/16/92

Data filename: NB5080

M&TE No.

Diode HH

Nb-94 & 95 Spectrum: rr05080nb.hh:1

Zr/Nb-95 Tracer: 54124-76-0

volume added, ml: 0.2503 0.0012 error

*****Half-lives*****

Zr-95 dpm/ml: 4.415E+03 4.500E+01 error

Zr-95= 64.02 days

Nb-95 dpm/ml: 9.892E+03 1.151E+02 error

Nb-95= 34.97 days

On: Date: 05/13/92 01:00 Time

Nb Sep Date: 05/07/92 13:30 Time

total dpm Nb-95= 2629.44 34.53 error at Nb sep time

Sample Amount: 0.7021 0.0002 error

g, ml or sample? g

Reporting Units

Leach Volume, ml: 250 0.01 error

Activity: dpm

Vol to dilute, ml: 1 0.00001 error

per ? : g

Diluted to, ml: 1 0.00001 error

Final Aliquot, ml: 4.993 0.17 error

Nb-94 & 95 Counting Data from Prepared Sample

Sample dpm Nb-95= 2.180E+03 1.01 % error at Nb sep time

Sample dpm Nb-94= 1.829E+00 100.00 % error

*****RESULTS*****

Yield Nb-95= 0.829 0.014 error

Nb-94 dpm/g= 157.326 157.438 error = 100.07 %

MDA = < 157.326

GENERIC FORMULAS

$$\text{Nb-94 Activity} = \frac{\text{net dpm} \times \text{leach vol} \times \text{diln vol}}{\text{yield} \times \text{sample amt} \times \text{diln aliquot} \times \text{aliquot}}$$

$$\% \text{ recovery} = \frac{\text{dpm recovered}}{\text{dpm added}} \times 100$$

$$\text{Nb-93m Activity} = \frac{\text{net cpm} \times \text{d/c} \times \text{leach vol} \times \text{diln vol}}{\text{yield} \times \text{sample amt} \times \text{diln aliquot} \times \text{aliquot}}$$

NIOBIUM ANALYSIS

Page 2 of 2

Spreadsheet filename: NBCALC

Revision 1: 6/1/92, NLW

Sample ID: 92-5080

Date Calculated: 06/16/92

Data filename: NBS080

Nb-93m Spectrum: 925080nb.a1;1

Weight Nb ppt, mg: 319.9 0.2 error

Counted on: A M&TE No. Diode A

On: Date: 05/18/92 15:30 Time

Nb-93m d/c = 75.784 6.508 error

NB-93M COUNTING DATA:

Diode B or 325 LEPS Enter data under correct diode.

If %error >= 30%, enter MDA. If not, MDA = NA

net cps: 1.00 1.00 % error

MDA, in cps: NA

Diode A

peak channel no.: 83 bkgd: 70 - 74 <-- first ROI

Count time, min.: 1177.05 324 <-- counts

Nb-93m counts--> 409 329

478 308

peak channel + 624 310

5 lower + 859 339

4 higher 1214 100 - 104 <-- second ROI

1409 359 <-- counts

1225 333

854 306

581 319

424 313

gross counts: 8077.000 3246 :normalized ROI total

net cpm: 3.382 0.722 :cpm in bkgd spectrum

error, cpm: 0.094 avg BKG.A1;1&2:bkgd filename

% error 2.771 4095.8 :total bkgd counts

*****RESULTS*****

Nb-93m dpm/g= 22048.491 2157.517 error = 9.785 %

MDA =

NSU/LH *6/16/92*
Entered by Date

C. L. Tady *6/18/92*
Reviewed by Date

NIOBIUM ANALYSIS

Page 1 of 2

Spreadsheet filename: NBCALC

Revision 1: 6/1/92, NLW

Assumes tracer added to final aliquot

Sample ID: 92-3080

Date Calculated: 06/05/92

Data filename: NB5080

M&TE No.

Diode HH

Nb-94 & 95 Spectrum: rr05080nb.hh;1

Zr/Nb-95 Tracer: 54124-76-0

volume added, ml: 0.2503 0.0012 error *****Half-lives*****

Zr-95 dpm/ml: 4.415E+03 4.500E+01 error Zr-95= 64.02 days

Nb-95 dpm/ml: 9.892E+03 1.151E+02 error Nb-95= 34.97 days

On: Date: 05/13/92 01:00 Time

Nb Sep Date: 05/07/92 13:30 Time

total dpm Nb-95= 2629.44 34.53 error at Nb sep time

Sample Amount: 0.7021 0.0002 error

g, ml or sample? g

Reporting Units

Leach Volume, ml: 250 0.01 error

Activity: dpm

Vol to dilute, ml: 1 0.00001 error

per ? : g

Diluted to, ml: 1 0.00001 error

Final Aliquot, ml: 4.993 0.17 error

Nb-94 & 95 Counting Data from Prepared Sample

Sample dpm Nb-95= 2.180E+03 1.01 % error at Nb sep time

Sample dpm Nb-94= 1.829E+00 100.00 % error

*****RESULTS*****

Yield Nb-95= 0.829 0.014 error

Nb-94 dpm/g= 157.326 157.438 error = 100.07 %

MDA = < 157.326

GENERIC FORMULAS

Nb-94 Activity =
$$\frac{\text{net dpm} \times \text{leach vol} \times \text{diln vol}}{\text{yield} \times \text{sample amt} \times \text{diln aliquot} \times \text{aliquot}}$$

% recovery =
$$\frac{\text{dpm recovered}}{\text{dpm added}} \times 100$$

Nb-93m Activity =
$$\frac{\text{net cpm} \times \text{d/c} \times \text{leach vol} \times \text{diln vol}}{\text{yield} \times \text{sample amt} \times \text{diln aliquot} \times \text{aliquot}}$$

NIOBIUM ANALYSIS

Page 2 of 2

Spreadsheet filename: NBCALC

Revision 1: 5/1/92, NLW

Sample ID: 92-5080

Date Calculated: 06/05/92

Data filename: NB5080

Nb-93m Spectrum: 925080nb.ai;1

Weight Nb ppt, mg: 319.9 0.2 error

Counted on: A M&TE No. Diode A

On: Date: 05/18/92 15:30 Time

Nb-93m d/c = 75.784 6.508 error

NB-93M COUNTING DATA:

Diode B or 325 LEPS Enter data under correct diode.

If %error >= 50%, enter MDA. If not, MDA = NA

net cps: 1.00 1.00 % error

MDA, in cps: NA

Diode A

peak channel no.: 83 bkgd: 70 - 74 <-- first ROI

Count time, min.: 1177.05 324 <-- counts

Nb-93m counts--> 409 329

478 308

peak channel + 624 316

5 lower + 859 339

4 higher 1214 100 - 104 <-- second ROI

1409 359 <-- counts

1225 333

854 306

581 319

424 313

gross counts: 8077.000 3246 :normalized ROI total

net cpm: 3.921 0.183 :cpm in bkgd spectrum

error, cpm: 0.091 BKG.A1;1 :bkgd filename

% error 2.327 3461.4 :total bkgd counts

preliminary & incorrect; see corrected copy 6/16/92

*****RESULTS*****

Nb-93m dpm/g= 25562.087 2471.586 error = 9.669 %

MDA =

NLW 6/5/92
Entered by Date

S.K. Gaddy 6/13/92
Reviewed by Date

NB-93M ON 92-5000: 319.9 MG PPT

SAMPLE ID..... SY:925000/NB.A1;1

OF CHANNELS..... 2048

DIODE I.D..... A

SHELF NUMBER..... 0

CALIBRATION..... 0.2 KEV/CH

TIME ZERO 5/18/92 AT 15:30: 0

COUNTED..... 5/18/92 AT 15:30: 0

(0.00 MINUTES DECAY TIME)

LIVE COUNT TIME.... 19 HOURS 37 MINUTES 3 SECONDS (1177.05 MIN.)

ELAPSED TIME..... 19 HOURS 37 MINUTES 3 SECONDS (1177.05 MIN.)
(DEAD TIME = 0.000)

FLUX CORRECTION.... 0.0000

GEOM CORRECTION.... 0.0000 0.0000 0.0000 0.0000 0.0000

WEIGHT..... 1.00000 GRAMS

ANTI: 0 SLP: 0 AREA: 0 P-T: 0 ERR: 0 ZER: 0 OPR: 0 NOV: 1

250

MJDy
5/19/92

J.L. Jack *6/1/92*

NO-93M ON 92-5080: 319.9 MG PPT

SY:925080NB.A1;1 COUNTED 5/18/92 @ 15:30: 0 GAIN: 0.2 KEV/CHAN

	0	50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950
0	70623	391	359	324	294	266	270	259	230	239	215	187	209	180	192	165	162	178	163	163
1	0	368	333	314	279	245	247	247	236	215	231	196	196	196	186	204	160	207	151	176
2	0	370	306	329	278	274	248	229	220	209	204	190	204	197	193	162	173	171	166	167
3	0	392	319	310	267	244	245	233	207	240	188	199	191	196	183	184	170	162	159	177
4	0	390	313	378	272	208	255	227	222	216	217	188	209	206	196	169	201	175	187	161
5	0	384	305	427	270	245	236	229	219	209	198	197	183	202	167	171	176	175	158	173
6	0	362	308	459	292	260	252	228	272	208	195	187	206	198	220	185	167	172	192	216
7	0	364	309	570	282	262	260	236	220	238	207	193	188	189	169	179	182	170	174	190
8	16	321	323	947	285	243	238	239	240	215	223	205	199	169	171	174	195	158	162	207
9	566	347	288	1361	266	221	234	233	205	227	221	208	189	218	162	178	172	166	173	165
10	1006	344	339	1728	283	230	232	240	243	256	187	185	202	217	181	174	165	176	203	164
11	976	349	336	1765	281	235	237	244	222	211	196	202	199	196	172	165	171	150	171	170
12	636	385	342	1410	298	239	254	263	203	303	203	212	203	195	180	165	192	156	178	181
13	623	396	335	956	331	246	225	268	204	302	204	200	207	208	202	184	175	163	176	204
14	469	410	320	557	327	251	270	289	208	259	198	193	262	163	174	184	174	158	190	181
15	410	456	302	370	319	276	285	263	229	253	185	196	244	190	188	179	211	166	168	178
16	376	503	326	292	337	272	311	252	222	236	194	189	258	211	211	188	177	133	161	191
17	356	427	271	290	297	247	329	245	211	231	203	203	265	208	200	185	163	184	159	168
18	381	411	326	253	294	258	297	247	232	215	207	207	240	183	204	198	183	188	192	176
19	360	347	314	234	261	242	252	231	234	206	205	166	209	178	193	183	165	152	173	165
20	350	324	343	277	263	232	258	253	230	218	206	234	206	227	173	144	172	160	157	173
21	361	329	270	279	264	274	265	249	252	222	207	171	189	187	187	207	149	158	185	205
22	362	308	312	279	281	234	254	250	268	201	206	196	187	193	195	166	170	168	176	166
23	334	316	306	267	257	263	231	294	261	211	220	204	193	202	188	166	213	153	173	172
24	379	339	340	258	233	255	248	320	267	213	188	199	202	173	187	172	170	170	163	170
25	374	322	298	297	267	249	222	324	239	204	248	199	183	194	177	189	161	175	176	196
26	367	358	281	279	251	244	225	324	232	209	263	222	201	191	173	174	184	194	204	161
27	361	337	314	299	256	253	208	295	246	202	248	196	183	200	177	179	170	181	204	176
28	394	409	326	328	255	273	217	265	236	209	247	203	181	214	179	193	196	177	185	169
29	358	478	286	372	253	235	245	227	259	200	238	206	210	197	197	170	162	181	187	174
30	372	624	339	449	242	228	213	222	256	202	214	225	185	207	175	192	179	168	181	170
31	430	059	340	585	255	236	228	203	274	201	202	222	181	176	170	168	177	187	186	166
32	450	1214	351	662	262	230	263	223	284	196	202	184	173	202	193	200	170	189	178	187
33	472	1409	335	595	257	235	256	234	287	185	187	215	229	169	165	196	188	165	196	209
34	476	1225	402	472	262	251	240	234	298	197	209	191	186	194	213	177	154	186	185	172
35	436	854	400	421	271	234	241	219	271	180	189	194	197	186	180	161	182	175	173	161
36	403	581	493	402	221	238	250	231	244	196	199	186	167	181	183	196	187	173	175	166
37	362	424	531	342	246	223	223	242	235	175	209	184	190	161	195	166	185	140	149	168
38	357	446	545	341	277	226	222	219	205	200	215	194	203	209	183	158	180	171	165	171
39	357	356	423	298	256	224	225	196	200	213	212	220	201	207	171	168	149	159	165	165
40	404	404	366	265	286	244	233	234	202	213	177	203	187	234	192	192	183	159	181	185
41	338	400	306	282	244	245	236	235	215	215	199	207	188	182	174	184	169	166	160	176
42	373	145	260	263	261	231	225	238	225	240	194	191	204	155	176	176	150	205	159	151
43	377	513	286	260	282	251	241	201	221	201	177	206	184	187	190	167	151	174	161	173
44	416	505	283	230	295	253	239	229	193	181	213	224	184	191	179	172	189	162	166	175
45	340	467	270	256	270	219	237	233	181	223	233	203	184	171	184	184	168	163	168	176
46	370	434	310	253	265	274	222	222	240	210	207	208	171	171	182	182	162	176	172	179
47	370	363	325	253	254	233	263	232	216	172	201	196	196	170	184	165	165	169	192	192
48	315	362	329	264	236	245	235	256	214	203	191	160	183	190	166	194	184	149	189	161
49	314	317	324	255	263	232	250	217	205	206	180	197	210	186	170	181	174	177	178	173

NB-93H GN 92-5230: 319.9 MG PPT

SY:925000NB.A1;1 COUNTED 5/18/92 @ 15:30: 0 GAIN: 0.2 KEV/CHAN

	1000	1050	1100	1150	1200	1250	1300	1350	1400	1450	1500	1550	1600	1650	1700	1750	1800	1850	1900	1950
0	180	172	149	128	159	136	151	137	130	195	112	146	124	111	110	122	104	132	117	100
1	179	162	146	155	128	115	130	130	134	122	141	126	116	124	107	125	145	134	110	115
2	171	156	153	136	158	160	149	142	132	126	120	132	109	129	127	123	121	103	110	115
3	191	174	159	150	136	135	131	155	115	122	105	122	141	110	116	116	118	110	107	107
4	169	147	139	143	153	144	125	120	154	122	145	111	121	109	106	126	103	111	108	100
5	183	156	160	143	134	152	120	127	145	122	141	112	136	126	115	103	113	110	121	103
6	170	177	153	151	156	126	141	137	122	120	111	124	117	103	129	123	136	112	123	100
7	159	175	153	144	163	141	145	115	126	139	117	113	126	116	103	129	120	113	141	100
8	176	169	164	138	135	157	143	134	137	113	140	142	137	127	121	142	118	110	99	100
9	163	171	160	160	155	136	140	136	126	130	126	104	122	122	126	117	123	139	110	100
10	180	155	150	172	143	148	135	144	131	135	119	123	126	129	142	107	123	120	116	100
11	195	172	144	133	155	140	145	137	125	105	119	112	112	107	116	103	110	122	124	100
12	184	168	168	134	156	130	148	109	116	122	121	131	122	122	120	120	130	142	129	100
13	159	165	162	132	133	141	146	136	140	142	142	151	119	120	112	115	118	121	105	100
14	152	144	149	142	123	135	145	118	120	110	125	121	143	111	107	119	107	129	103	100
15	208	163	129	140	120	131	142	134	135	124	135	131	141	117	125	128	110	110	109	100
16	100	134	155	124	129	144	125	141	139	116	100	116	116	129	119	132	122	117	134	100
17	166	164	142	155	130	127	128	116	120	121	109	116	105	133	106	109	119	124	111	100
18	160	160	164	145	140	148	143	124	133	120	125	117	131	109	113	104	121	102	119	100
19	186	143	140	140	132	125	126	133	145	124	112	122	101	117	109	131	125	93	115	100
20	177	154	143	149	148	139	116	127	119	131	127	146	131	127	125	120	112	121	129	100
21	174	160	130	130	132	139	116	131	109	119	125	130	133	119	124	109	129	121	113	100
22	163	166	162	150	118	151	131	140	114	125	122	127	130	118	145	113	100	123	127	100
23	152	161	172	169	127	136	134	120	122	126	131	119	142	117	117	126	118	132	100	100
24	164	162	164	148	132	127	125	131	143	109	132	119	111	120	144	140	96	140	120	100
25	179	150	136	148	147	123	124	152	100	133	149	120	129	113	118	114	110	111	122	100
26	175	145	154	145	140	143	158	144	120	134	121	100	123	120	124	115	124	113	121	100
27	174	136	155	139	129	126	120	146	125	146	134	145	110	120	114	133	126	95	120	100
28	183	157	151	161	129	146	142	114	113	132	112	110	93	114	124	109	126	113	107	100
29	159	151	153	152	121	143	151	133	130	116	120	111	99	120	137	126	124	124	130	100
30	157	145	132	155	140	130	132	132	123	133	130	114	113	103	121	140	113	117	117	100
31	159	140	166	132	127	137	120	126	131	141	123	150	122	115	101	140	103	112	116	100
32	170	149	115	160	135	137	137	131	100	130	109	125	143	139	133	120	121	113	110	100
33	172	172	152	135	134	127	110	123	125	105	120	122	116	111	108	120	131	119	107	100
34	182	161	152	149	134	145	114	120	143	136	122	123	134	125	115	100	112	110	132	100
35	146	140	140	153	152	121	132	141	115	142	107	114	150	123	115	132	113	120	124	100
36	187	157	163	131	154	119	137	117	144	134	107	117	117	134	124	111	120	129	130	100
37	150	175	155	147	139	136	132	123	130	124	115	124	110	127	121	113	120	110	135	100
38	167	173	144	145	136	132	145	119	117	130	139	129	121	130	133	119	111	96	122	100
39	168	151	149	120	140	131	131	109	131	135	131	111	94	114	124	110	117	116	96	100
40	180	176	155	152	144	132	121	136	130	143	101	121	115	106	107	132	144	112	116	100
41	168	152	143	134	148	147	137	153	133	128	126	120	146	117	107	124	127	115	107	100
42	170	150	150	160	170	153	147	125	133	125	118	130	114	122	112	144	113	109	94	100
43	199	142	155	165	135	149	157	121	120	118	113	104	122	122	129	114	109	136	111	100
44	157	153	153	156	147	151	122	130	140	124	129	99	130	111	126	111	131	110	133	100
45	160	159	145	157	137	132	120	123	126	115	120	122	125	124	123	109	115	112	117	100
46	199	155	150	133	143	150	115	134	116	139	140	144	113	125	110	124	104	110	111	100
47	161	152	149	139	144	110	126	139	123	130	147	123	113	112	114	119	112	129	116	100
48	130	150	115	153	133	156	117	155	125	150	126	117	131	115	116	99	109	99	124	100
49	151	146	117	167	139	149	123	130	104	121	117	115	114	114	137	122	115	105	131	100

TITLE: 1015Y NB 92-05000 RERUN-

Recount

FILE: RR05000NB.HH:1

M.W. 5/28/92

* CHANNELS: 2048

SHIFT: 0

DIODE: HH

TIME ZERO: 5 7 92 13 30 0

TIME OF COUNT: 5 26 92 10 15 0

(27165.0 MINUTES DECAY TIME)

LIVE TIME: 25 HOURS 21 MINUTES 10 SECONDS = 1521.17 MINUTES

ELAPSED TIME: 25 HOURS 22 MINUTES 24 SECONDS = 1522.40 MINUTES

(DEAD TIME = 0.001)

FLUX CORR. FACT.: 0.000000

GAIN: 1.00000 KEV/CHAN

WEIGHT: 1.00000

PLT INT: 0

PLT LAB: 0

ANTI FLG 0

SLP FLT: 0

AREA REJ: 0

PTR: 0

ERR REJ: 0

ZER LEV: 0

OVR PER: 0

NOV: -1

253

M.W. 5/28/92

S.K. Jodiff 5/21/93

RR05090NB.HH:1			1015Y NB 92-05080 RERUN																	
	0	50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950
0	91270	1754	1361	1244	1500	986	830	744	650	716	705	614	407	246	171	152	58	53	40	40
1	5	1776	1435	1217	1512	984	946	718	752	702	657	704	397	255	150	160	57	57	45	35
2	0	1721	1305	1260	1427	929	952	720	697	761	641	670	390	256	146	110	62	51	43	20
3	21	1671	1269	1270	1390	1023	795	775	721	753	634	601	373	248	133	160	56	59	39	30
4	40	1719	1300	1229	1341	1006	706	750	736	743	670	669	392	217	176	151	60	52	51	45
5	197	1652	1307	1333	1399	961	765	683	726	754	677	697	331	260	175	135	62	39	43	33
6	507	1664	1527	1263	1355	918	739	740	677	731	627	752	303	252	155	161	52	49	50	45
7	909	1620	1301	1210	1372	977	746	729	722	739	657	699	360	262	140	164	50	35	43	34
8	1093	1649	1316	1201	1346	949	739	737	695	756	640	739	348	251	134	102	65	40	42	37
9	1313	1540	1304	1197	1316	057	773	727	695	790	624	606	357	254	120	135	64	54	30	42
10	1605	1660	1360	1292	1560	916	759	739	716	750	693	692	370	243	147	150	46	50	45	30
11	1066	1603	1201	1217	1521	903	021	606	767	755	740	720	452	333	171	100	69	59	37	46
12	2162	1591	1369	1207	1230	923	793	777	699	755	1055	672	370	1730	146	165	50	90	144	39
13	2046	1550	1295	1219	1247	095	740	706	679	745	960	675	361	11709	139	100	50	111	500	35
14	2095	1652	1332	1224	1295	901	744	716	704	069	796	774	344	9900	141	224	49	47	369	31
15	2324	1646	1346	1224	1171	004	766	661	674	000	695	691	330	042	171	353	39	37	72	30
16	2524	1600	1302	1240	1210	077	772	748	698	767	606	792	315	195	153	2124	52	51	43	67
17	2575	1559	1301	1225	1244	929	742	699	727	779	637	714	342	100	153	17667	53	32	40	132
18	2529	1570	1261	1290	1260	901	771	648	727	790	650	756	355	192	153	27575	57	36	43	67
19	2510	1612	1363	1234	1257	066	735	730	710	773	643	606	354	167	157	4616	54	52	54	47
20	2599	1523	1290	1264	1210	094	746	712	676	749	630	714	314	175	120	136	53	56	40	131
21	2556	1507	1260	1260	1267	1049	750	609	690	737	627	600	201	171	159	60	46	56	51	313
22	2546	1670	1340	1100	1191	1059	760	720	720	702	630	697	320	161	140	63	54	55	42	199
23	2610	1603	1393	1109	1103	096	770	776	707	739	647	691	200	160	133	61	67	57	47	47
24	2537	1025	1593	1290	1100	007	734	741	714	701	672	670	312	100	140	01	56	50	50	30
25	2491	1022	1200	1213	1143	005	714	716	747	755	610	626	200	107	167	00	42	40	40	41
26	2574	2303	1343	1162	1224	090	736	720	715	750	671	614	324	174	163	60	53	47	45	45
27	2305	1629	1311	1223	1004	022	760	696	747	719	637	567	276	160	169	52	57	40	35	39
28	2392	2165	1366	1224	1100	912	747	715	709	734	669	516	295	194	176	60	55	47	37	39
29	2295	1490	1366	1160	1167	991	900	695	714	773	664	530	316	176	332	65	47	40	43	32
30	2266	1494	1500	1179	1103	095	816	740	772	735	667	546	264	160	219	63	44	45	30	32
31	2207	1446	1340	1240	1125	045	774	722	724	729	691	402	300	102	136	51	57	54	40	29
32	2166	1503	1356	1224	1093	070	737	720	690	692	669	477	253	163	135	54	67	56	30	34
33	2171	1440	1200	1225	1110	079	709	730	721	650	600	516	201	167	134	67	66	40	45	26
34	2095	1496	1301	1243	1144	059	766	726	673	694	704	710	276	145	129	72	43	50	45	43
35	2241	1714	1332	1210	1141	025	769	702	749	630	669	1293	314	190	141	61	50	46	44	36
36	2026	1694	1339	1305	1073	796	733	606	757	725	732	637	303	162	140	40	45	43	41	29
37	2005	1673	1293	1445	1051	000	741	700	679	693	603	457	279	179	150	65	70	45	36	40
38	2056	1923	1349	1332	1016	097	693	704	761	665	606	423	200	161	117	70	76	59	43	42
39	2020	1460	1341	1250	2159	029	1110	673	600	642	674	300	270	171	154	56	55	52	44	35
40	2011	1415	1209	1251	5139	065	1400	669	706	727	650	390	279	153	139	60	60	51	30	33
41	1924	1647	1207	1310	1336	000	743	677	772	624	606	449	244	135	147	65	50	30	36	45
42	1935	1411	1302	1361	1341	011	746	600	727	645	645	401	261	172	154	61	65	41	33	30
43	1774	1490	1402	1400	1114	056	730	730	773	640	705	412	247	150	116	52	60	40	36	30
44	1096	1775	1271	1457	990	070	723	740	745	672	670	441	276	159	139	46	57	41	40	22
45	1935	1420	1269	1450	967	004	725	709	742	669	650	403	247	163	151	55	30	47	35	33
46	1045	1330	1324	1475	1015	026	695	723	761	695	736	417	247	167	141	00	51	46	34	30
47	1773	1360	1220	1410	1039	029	717	664	719	595	692	307	249	150	125	154	40	51	30	35
48	1792	1332	1270	1309	900	031	695	705	715	632	704	391	227	172	132	71	49	43	46	32
49	1761	1406	1265	1396	1002	792	771	604	731	672	637	446	276	164	124	61	45	36	27	42

RR05000NB.HH:1			101SY NB 92-05000 RERUN																	
	1000	1050	1100	1150	1200	1250	1300	1350	1400	1450	1500	1550	1600	1650	1700	1750	1800	1850	1900	1950
0	38	29	36	34	21	33	22	19	19	19	18	19	16	11	8	2	12	9	14	6
1	49	31	42	22	20	22	30	24	18	14	15	9	10	10	10	4	6	14	6	10
2	45	43	25	29	29	37	16	20	18	12	8	11	8	12	12	7	6	13	5	6
3	35	27	36	26	35	11	30	16	18	16	14	9	13	12	7	8	10	9	11	8
4	32	27	31	32	21	18	22	25	23	13	17	11	8	7	13	8	7	10	3	5
5	35	33	33	34	27	27	12	29	19	10	13	7	21	8	5	8	8	7	3	6
6	50	42	30	29	32	23	20	18	18	13	12	15	11	9	8	9	15	4	10	15
7	44	26	31	32	29	28	21	21	12	20	14	10	10	9	12	12	7	6	9	8
8	49	29	23	25	26	31	29	20	20	16	17	8	10	7	5	6	7	10	9	7
9	29	20	31	30	27	30	20	22	14	19	15	11	6	10	9	10	9	3	12	7
10	33	36	24	39	23	20	22	18	9	19	13	14	12	8	16	11	7	9	5	11
11	29	32	39	27	22	21	15	12	18	45	14	8	12	10	11	8	7	10	7	8
12	31	31	41	27	28	29	30	10	14	117	19	17	12	8	10	9	7	11	14	7
13	26	36	38	37	22	26	27	18	19	268	22	12	8	10	7	5	8	7	8	9
14	53	44	39	30	39	23	17	32	16	272	6	8	14	11	7	8	13	9	11	6
15	29	36	40	40	21	21	19	16	18	70	14	13	11	9	19	13	11	9	11	10
16	30	37	27	34	23	22	19	23	20	9	16	8	11	14	20	18	7	3	12	4
17	41	40	34	29	30	26	20	31	21	12	19	6	13	7	5	27	13	8	9	5
18	37	29	28	33	29	24	15	15	16	21	15	9	14	7	8	29	5	12	9	6
19	41	20	27	30	30	21	28	13	15	16	9	13	9	10	14	13	8	6	7	4
20	29	27	25	39	25	26	19	11	15	13	10	11	12	12	8	7	6	12	8	7
21	29	27	35	23	28	24	16	22	19	11	9	9	16	11	9	6	11	5	6	6
22	25	27	42	31	30	24	24	14	16	7	15	5	18	7	13	8	13	2	11	9
23	40	20	55	27	18	21	19	18	22	13	4	13	23	12	7	8	8	6	9	6
24	32	34	38	30	27	19	21	26	20	10	13	4	20	4	12	8	7	13	11	5
25	28	32	33	30	27	24	21	22	19	16	9	14	11	10	11	10	9	8	6	9
26	27	27	36	24	27	33	25	27	23	12	13	11	5	10	12	5	7	8	6	7
27	32	33	29	37	16	42	16	10	13	9	8	10	14	24	7	6	14	11	5	12
28	25	38	30	20	24	31	19	21	14	15	7	11	17	15	5	6	8	19	9	12
29	31	33	32	23	33	20	13	29	30	15	8	13	12	5	21	5	15	8	6	14
30	35	36	30	25	29	18	24	21	15	18	17	11	13	11	8	11	13	6	6	5
31	31	47	28	34	21	17	23	20	18	10	5	10	6	6	7	9	6	7	8	12
32	39	29	47	33	25	31	15	13	12	11	16	16	17	14	11	13	6	5	6	6
33	27	31	37	22	33	23	20	16	16	9	15	20	31	9	8	10	8	9	12	7
34	29	37	31	24	28	29	22	14	19	9	11	8	33	10	13	8	10	3	2	8
35	32	26	25	25	29	16	28	14	21	6	8	10	18	8	14	9	13	12	6	5
36	37	33	25	24	24	22	12	18	20	9	12	11	15	6	17	7	12	5	11	9
37	20	37	26	32	21	16	16	20	19	13	9	17	15	7	8	14	12	12	9	9
38	30	27	17	33	23	19	20	27	16	18	8	14	7	10	9	6	9	6	8	0
39	32	20	30	30	21	29	18	12	22	8	14	14	9	15	7	9	13	10	8	10
40	32	31	30	30	42	20	18	18	22	11	8	30	4	10	8	5	8	13	4	3
41	30	25	25	24	32	26	21	25	21	12	17	38	17	8	9	7	6	9	6	9
42	40	24	26	20	28	31	29	24	14	12	13	24	14	14	9	7	11	7	5	8
43	34	27	18	23	24	18	19	16	15	7	14	9	10	9	5	6	13	14	9	3
44	31	27	33	25	19	19	18	17	23	7	7	25	6	8	13	11	6	8	13	9
45	20	27	32	29	26	22	27	15	14	12	16	63	11	10	10	12	8	12	9	9
46	40	35	30	22	28	25	28	22	13	18	11	44	8	12	10	7	11	4	4	7
47	21	35	32	16	23	25	21	18	14	9	9	17	15	8	6	11	15	9	6	8
48	34	40	25	32	24	25	21	14	20	27	7	14	12	8	14	12	8	11	11	11
49	21	42	26	19	36	24	19	15	5	23	12	12	9	12	13	11	5	5	7	13

Analysis performed by: diana mcnullin

Sample: 1015Y NB 92-05080 RERUN *Recount 11/26/92*
 Weight: 1.00000 ML

Irradiation date: 7-May-1992 at 13:30:00

Count date: 26-May-1992 at 10:15:00

Decay: 18.9d (1629900.0 seconds)

Count times: REAL TIME 25.37h (91344.000 seconds)
 LIVE TIME 25.35h (91270.000 seconds)

Dead time: 0.08 percent

Detector: HH pos # 0 Geometry Factor: 1.000

Efficiencies and shape parameters from file: ve:[116.2]IEFFFILNB. HH

Spectrum from file : rr05080nb.hh;1

Background subtractions from file: VE:[116.1]BACKG. HH

	Peak channel	Region start end	Gross counts	Net area ++	Energy (keV)	Gammas /sec	Err % SD	System bkgd
1	75.9	73. 80.	14419.	2263.	76.61	3.109E-01	7.6	0.
2	210.4	210. 211.	3089.	445.*	210.53	2.165E-02	100.0	470.
3	235.9	239. 244.	12007.	5951.*	239.98	2.244E-02	100.0	5950.
4	271.6	270. 275.	5670.	363.*	271.51	2.440E-02	100.0	204.
5	301.6	300. 304.	4317.	344.*	301.38	2.643E-02	100.0	269.
6	330.0	339. 340.	2518.	1025.*	339.45	2.987E-02	100.0	1105.
7	401.6	400. 405.	1757.	210.*	403.82	4.574E-02	100.0	255.
8	512.3	510. 516.	5633.	1126.*	511.27	4.767E-02	100.0	1153.
9	583.0	584. 586.	2648.	1158.*	583.68	5.010E-02	100.0	1201.
10	663.0	661. 665.	24690.	23552.*	661.75	9.433E+00	0.7	86.
11	725.1	725. 730.	1059.	309.*	727.23	3.730E-02	100.0	274.
12	767.8	765. 770.	52875.	51818.	765.00	2.454E+01	0.4	0.
13	862.7	858. 863.	420.	140.*	860.30	2.642E-02	100.0	145.
14	913.2	912. 915.	1093.	917.*	910.66	2.705E-02	100.0	936.
15	963.0	955. 969.	351.	162.*	964.23	2.790E-02	100.0	217.
16	961.1	960. 973.	737.	542.*	968.33	2.063E-02	100.0	497.
17	1037.1	1039. 1065.	810.	702.*	1050.83	3.282E-02	100.0	772.
18	1150.0	1080. 1592.	120.	61.*	1505.67	3.256E-02	100.0	92.
19	1150.2	1000. 1598.	163.	100.	1509.97	1.069E-01	15.1	0.
20	1650.0	1632. 1637.	129.	50.*	1620.30	3.400E-02	100.0	34.
21	1767.0	1761. 1769.	108.	60.	1761.74	7.292E-02	20.6	0.

 40. 1. High Peak above the Compton Continuum before correction for system

Diana L. McNullin
5-29-92
11/26/92

background. Values flagged with a * are subsequently corrected for system background before calculation of absolute emission rate (goms/sec).

Gamma-ray and nuclide lookup from file: VE:[116.3]NBL18.DAT

*** Least-squares Results ***

(interferences)

nuclide	energy keV	dps at zero time	UCI /TL	peak frac	err (%)	dev (sig)	DPM /TL	error (K)
115 93	- - - -	3.633E+01	9.819E-04	- - - -	- - - -	- - - -	2.180E+03	1.10
	765.00	3.633E+01	9.819E-04	1.00	1.10	1.00		

The following are upper limit values:

Co 60	- - - -	3.221E-02	8.706E-07	- - - -	- - - -	- - - -	1.933E+00	100.00
Co 95	- - - -	9.794E-02	2.647E-06	- - - -	- - - -	- - - -	5.877E+00	100.00
Ir 94	- - - -	3.049E-02	8.241E-07	- - - -	- - - -	- - - -	1.829E+00	100.00
Sr113	- - - -	8.691E-01	2.187E-05	- - - -	- - - -	- - - -	4.854E+01	100.00
Sr123	- - - -	8.000E+00	8.000E+00	- - - -	- - - -	- - - -	8.000E+00	100.00
Sr115m	- - - -	5.062E+00	1.368E-04	- - - -	- - - -	- - - -	3.837E+02	100.00
Sr121m	- - - -	1.361E+00	3.677E-05	- - - -	- - - -	- - - -	8.164E+01	100.00
Sr125	- - - -	5.154E-01	1.393E-05	- - - -	- - - -	- - - -	3.892E+01	100.00

The following peaks were not identified:

#	energy	gammas/sec	pcorr	CI
1	76.61	3.1093E-01	7.7	0.0000000
2	210.53	2.1650E-02	100.0	0.0000000
3	239.98	2.2439E-02	100.0	0.0000000
4	271.51	2.4402E-02	100.0	0.0000000
5	301.38	2.6431E-02	100.0	0.0000000
6	330.45	2.9870E-02	100.0	0.0000000
7	403.82	4.5735E-02	100.0	4.7718420E-02
8	511.27	4.7670E-02	100.0	0.0000000
9	583.68	5.0102E-02	100.0	0.0000000
10	661.75	9.4332E+00	1.2	0.0000000
11	727.23	3.7302E-02	100.0	0.0000000
13	860.30	2.6421E-02	100.0	0.0000000
14	916.66	2.7851E-02	100.0	0.0000000
15	964.23	2.7905E-02	100.0	0.0000000
16	1061.34	2.8631E-02	100.0	0.0000000
17	1120.00	3.0000E-02	100.0	0.0000000

18	1585.67	3.2562E-02	100.0	0.0000000
19	1589.97	1.0692E-01	15.2	0.0000000
20	1628.30	3.4000E-02	100.0	0.0000000
21	1761.74	7.2919E-02	20.6	0.0000000

If CI > 0 Confidence threshold was not exceeded
 CI = 0 Energy Window test failure
 CI = -1 Extreme Half Life test failure
 CI = -2 Extreme As. Gamma comparison test failure
 CI = -3 Unable to estimate area of Assoc. Gamma

NIOBIUM ANALYSIS

Page 1 of 2

Spreadsheet filename: NBCALC

Revision 1: 6/1/92, NLW

Assumes tracer added to final aliquot

Sample ID: 92-5688 LEPS recount

Date Calculated: 06/20/92

Data filename: NBS688R

M&TE No.

Nb-94 & 95 Spectrum: T9637.cnf;1

Zr/Nb-95 Tracer: 54124-76-0

volume added, ml: 0.2503 0.0012 error *****Half-lives*****

Zr-95 dpm/ml: 4.415E+03 4.500E+01 error Zr-95= 64.02 days

Nb-95 dpm/ml: 9.892E+03 1.151E+02 error Nb-95= 34.97 days

On: Date: 05/13/92 01:00 Time

Nb Sep Date: 05/07/92 13:30 Time

total dpm Nb-95= 2629.44 34.53 error at Nb sep time

Sample Amount: 0.5000 0.0002 error

g, ml or sample? g

Reporting Units

Leach Volume, ml: 250 0.01 error

Activity: dpm

Vol to dilute, ml: 1 0.00001 error

per ? : g

Diluted to, ml: 1 0.00001 error

Final Aliquot, ml: 4.993 0.017 error

Nb-94 & 95 Counting Data from Prepared Sample

Sample dpm Nb-95= 6.178E+02 1.01 % error at Nb sep time

Sample dpm Nb-94= 1.885E+00 100.00 % error

*****RESULTS*****

Yield Nb-95= 0.235 0.004 error

Nb-94 dpm/g= 803.405 803.520 error = 100.01 %

MDA = < 803.405

GENERIC FORMULAS

$$\text{Nb-94 Activity} = \frac{\text{net dpm} \times \text{leach vol} \times \text{diln vol}}{\text{yield} \times \text{sample amt} \times \text{diln aliquot} \times \text{aliquot}}$$

$$\% \text{ recovery} = \frac{\text{dpm recovered}}{\text{dpm added}} \times 100$$

$$\text{Nb-93m Activity} = \frac{\text{net cpm} \times \text{d/c} \times \text{leach vol} \times \text{diln vol}}{\text{yield} \times \text{sample amt} \times \text{diln aliquot} \times \text{aliquot}}$$

NIOBIUM ANALYSIS

Page 2 of 2

Spreadsheet filename: NBOCALC

Revision 1: 6/1/92, NLW

Sample ID:

92-5688 LEPS recount

Date Calculated:

06/20/92

Data filename:

NBS668R

Nb-93m Spectrum:

Weight Nb ppt, mg: 268.8

0.2 error

Counted on: A

M&TE No.

Diode A

On: Date: 06/19/92

08:12 Time

Nb-93m d/c = 73.042

6.023 error

NB-93M COUNTING DATA:

Diode B or 325 LEPS

Enter data under correct diode.

If %error >= 50%, enter MDA. If not, MDA = NA

net cps: 1.00E+00 100.00 % error

MDA, in cps: NA

Diode A

peak channel no.: 83

bkgd: 71 - 75 <-- first ROI

Count time, min.: 1662.83

229 <-- counts

Nb-93m counts--> 312

202

360

258

peak channel + 461

233

5 lower + 498

245

4 higher 497

101 - 105 <-- second ROI

464

200

<-- counts

375

236

367

219

248

231

280

191

gross counts: 3862.000

2244 :normalized ROI total

net cpm: 0.251

0.722 :cpm in bkgd spectrum

error, cpm: 0.051

avg BKG.A1;18;2;bkgd filename

% error 20.477

3444.5 :total bkgd counts

*****RESULTS*****

Nb-93m dpm/g= 7815.1 1730 error = 22.140 %

MDA =

Entered by N. W. G. H. Date 6/20/92

Reviewed by A. K. Joddy Date 6/23/92

RECOUNT FOR NB-93M ON 92-5688

SAMPLE ID..... SY:925688H8.A1;2

OF CHANNELS..... 2048

DIODE I.D..... A

SHELF NUMBER..... 0

CALIBRATION..... 0.2 KEV/CH

TIME ZERO 6/19/92 AT 8:12: 0

COUNTED..... 6/19/92 AT 8:12: 0

(0.00 MINUTES DECAY TIME)

LIVE COUNT TIME.... 27 HOURS 42 MINUTES 50 SECONDS (1662.83 MIN.)

ELAPSED TIME..... 27 HOURS 42 MINUTES 50 SECONDS (1662.83 MIN.)
(DEAD TIME = 0.000)

FLUX CORRECTION.... 0.0000

GEOM CORRECTION.... 0.0000 0.0000 0.0000 0.0000 0.0000

WEIGHT..... 1.00000 GRAMS

ANTI: 0 SLP: 0 AREA: 0 P-T: 0 ERR: 0 ZER: 0 OPR: 0 NOV: 1

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M. J. W.
6/20/92

W. L. King 6/23/92

RECOUNT FOR NB-93M ON 92-5688

SY:925688NB.A1;2 COUNTED 6/19/92 @ 8:12:00 GAIN: 0.2 KEV/CHAN

		50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950
0	99778	277	210	165	155	172	168	170	161	137	116	131	120	126	125	113	107	112	87	111
1	0	295	208	208	183	188	160	157	134	134	117	120	121	125	142	109	116	100	105	101
2	0	313	236	214	187	171	182	136	144	134	131	114	124	120	97	116	107	84	105	89
3	0	297	219	206	184	150	163	136	164	136	136	131	130	109	104	120	107	92	114	103
4	0	261	231	223	171	180	152	152	155	132	146	137	111	120	111	103	120	103	93	93
5	0	249	191	230	175	169	169	149	147	132	138	139	143	116	92	122	88	79	107	94
6	0	254	101	225	196	165	156	156	134	141	120	119	140	130	106	110	111	105	101	93
7	0	228	195	180	154	155	178	140	140	122	127	148	118	112	117	101	101	107	91	113
8	6	247	186	209	155	160	158	160	123	130	127	120	115	109	102	104	104	91	96	93
9	750	226	190	161	156	165	152	163	151	141	135	130	127	114	121	116	99	107	108	95
10	1570	253	226	207	158	152	146	153	152	103	133	122	130	121	127	103	115	93	88	100
11	1272	254	179	202	166	168	165	184	150	109	147	135	134	119	113	91	129	103	80	94
12	836	285	205	179	158	175	136	170	160	216	114	130	115	96	117	102	91	121	101	116
13	640	342	185	157	166	184	165	220	148	219	119	146	109	130	110	120	95	101	94	96
14	499	375	195	202	178	171	191	209	125	242	128	123	109	124	116	112	113	111	91	102
15	402	427	195	180	163	188	253	223	148	187	121	140	127	121	110	97	99	102	110	112
16	357	388	192	176	168	168	229	201	149	168	115	110	118	123	111	111	98	97	105	116
17	306	361	186	171	152	178	241	173	159	155	114	112	113	116	112	100	105	99	98	92
18	295	298	188	177	172	161	218	170	138	147	132	103	129	112	121	114	118	98	99	96
19	297	247	192	175	157	161	175	179	144	133	117	124	141	124	123	121	97	98	95	104
20	310	235	210	174	166	128	170	154	155	141	134	116	111	104	113	109	96	94	101	105
21	264	229	185	184	157	142	122	135	166	130	106	127	133	119	139	113	104	112	99	93
22	299	202	202	167	163	184	172	181	194	113	126	112	114	115	120	103	104	105	83	98
23	275	258	222	184	168	172	173	216	199	139	148	144	127	130	103	129	112	93	100	93
24	295	233	213	180	181	167	146	276	190	112	121	123	140	120	113	110	93	98	102	93
25	281	245	181	190	149	162	161	305	196	143	137	145	127	115	114	109	124	92	117	91
26	315	267	185	190	176	177	181	300	172	157	119	120	133	136	113	106	119	104	118	102
27	295	277	180	211	161	180	154	200	150	131	152	111	107	122	110	117	112	93	123	121
28	326	312	217	207	185	168	155	183	146	125	142	137	129	128	114	127	113	82	122	83
29	308	360	198	156	178	191	159	180	159	151	140	102	128	122	104	93	93	97	120	120
30	304	461	208	187	170	153	150	142	144	135	126	117	101	137	111	103	109	102	121	88
31	309	498	209	181	152	169	158	144	122	143	125	104	111	109	127	106	109	95	109	109
32	309	437	209	172	179	166	153	140	153	123	130	115	116	107	101	105	121	98	133	98
33	284	454	224	170	188	159	151	145	127	123	135	107	111	129	120	107	92	116	101	114
34	270	375	200	181	192	163	156	164	148	127	128	123	106	127	107	104	98	87	100	99
35	291	367	265	183	161	177	193	177	151	120	124	124	134	125	104	100	113	94	105	102
36	201	248	266	150	156	170	155	159	152	118	127	132	128	139	108	106	99	123	88	112
37	260	230	275	158	158	153	137	172	152	112	136	118	121	141	101	109	117	109	93	116
38	269	274	337	201	154	146	135	117	134	142	120	134	135	147	125	92	103	95	101	99
39	235	255	237	169	173	174	146	139	158	100	130	106	131	123	106	117	113	86	109	111
40	260	199	214	184	155	157	154	133	151	133	136	121	131	102	109	119	93	97	97	117
41	254	227	196	168	145	130	140	133	144	141	135	149	126	108	120	106	111	87	103	94
42	273	234	209	202	169	161	166	143	135	127	121	129	129	114	110	119	105	95	94	123
43	271	225	194	193	180	186	159	143	138	131	129	120	121	116	106	115	107	84	74	93
44	256	269	150	199	177	158	139	149	123	138	124	129	122	132	108	115	89	105	107	98
45	266	285	168	173	171	164	152	143	109	110	121	118	114	119	116	119	113	93	96	94
46	249	264	179	182	172	153	152	121	134	135	123	128	98	129	114	114	89	118	123	103
47	260	228	218	163	178	160	142	143	142	121	123	122	111	125	114	109	107	95	97	112
48	246	229	178	183	183	195	147	141	121	129	104	125	131	116	111	117	107	99	73	104
49	256	202	194	190	177	159	146	147	155	136	146	109	110	108	95	111	113	104	90	97

RECOUNT FOR NB-93M ON 92-5688

SY:925688NB.A1;2 COUNTED 6/19/92 @ 8:12: 0 GAIN: 0.2 KEV/CHAN

	1000	1050	1100	1150	1200	1250	1300	1350	1400	1450	1500	1550	1600	1650	1700	1750	1800	1850	1900	1950
0	92	96	86	89	59	59	73	57	71	60	61	75	55	60	61	52	57	52	55	42
1	96	98	97	76	73	63	81	64	69	65	58	63	50	57	55	50	46	48	59	41
2	106	97	81	83	82	80	53	65	69	63	72	54	59	63	43	54	56	56	70	61
3	106	79	87	75	74	88	59	62	45	65	70	56	64	57	65	51	53	50	47	48
4	89	96	80	81	68	77	62	67	62	56	56	63	70	59	64	70	67	54	50	71
5	82	94	98	73	81	78	69	72	61	67	62	52	44	68	62	73	66	58	56	64
6	98	102	77	74	83	76	68	72	61	52	60	59	65	60	56	59	52	60	53	50
7	85	83	74	83	86	69	65	54	54	57	61	55	53	52	46	67	47	58	36	60
8	100	96	85	98	83	76	72	56	68	71	62	69	60	69	62	63	62	51	63	50
9	92	85	75	91	81	73	78	56	51	68	58	62	64	76	44	61	46	53	65	48
10	100	79	89	80	92	82	76	68	49	57	52	60	58	48	44	54	45	60	67	47
11	76	81	82	86	77	67	82	71	63	58	63	65	62	60	49	51	61	51	61	48
12	102	74	80	74	73	76	83	68	75	70	66	54	52	55	62	54	46	53	33	55
13	96	79	86	71	70	58	89	59	55	70	71	68	57	54	53	63	54	50	49	66
14	95	82	85	90	69	71	70	89	59	65	73	54	58	61	51	62	57	47	57	63
15	94	79	86	88	77	70	66	73	58	81	50	57	42	58	55	45	49	50	50	53
16	105	85	111	80	74	77	78	57	67	66	53	81	73	52	64	60	59	56	57	51
17	108	90	78	87	66	81	73	73	61	77	65	69	53	73	55	50	55	50	59	61
18	106	90	87	85	73	65	63	56	62	70	55	58	56	62	62	53	56	56	41	50
19	99	92	75	78	62	70	70	69	56	65	48	53	43	69	51	50	56	54	50	53
20	103	85	90	86	81	78	70	53	70	84	61	63	40	59	42	52	45	61	64	53
21	96	91	92	81	69	85	76	51	57	60	65	61	66	55	66	59	60	58	45	50
22	80	89	96	70	55	68	57	76	55	67	66	62	47	69	55	54	46	50	48	43
23	111	104	76	86	55	62	69	70	76	71	60	64	56	60	63	63	42	48	51	39
24	95	95	87	59	63	68	62	88	68	63	70	58	50	60	54	47	41	39	48	57
25	96	88	83	84	87	79	77	65	69	64	63	68	50	53	48	54	47	58	43	66
26	95	101	71	70	72	70	69	54	69	79	79	50	50	66	57	51	60	47	40	56
27	103	87	84	77	66	52	68	70	72	69	62	54	56	56	51	60	61	60	70	48
28	98	83	77	81	76	76	60	76	71	62	90	55	49	56	58	69	50	53	50	45
29	85	100	87	62	62	78	63	63	58	62	43	50	67	61	51	62	48	45	53	48
30	95	89	72	74	70	77	74	66	70	70	62	51	56	55	64	62	56	63	39	45
31	106	94	68	70	73	63	75	64	72	72	50	50	60	67	56	50	54	56	45	52
32	77	79	85	69	77	74	66	61	62	55	56	68	59	63	74	58	55	45	48	51
33	99	76	96	90	86	71	68	74	55	70	64	65	56	48	63	66	46	46	60	41
34	96	78	88	87	64	56	66	60	55	72	55	47	52	71	46	57	47	62	51	42
35	107	81	90	71	77	50	66	62	55	59	61	55	53	59	63	50	50	54	46	49
36	96	106	94	78	64	70	64	61	66	58	47	74	72	51	62	54	52	53	45	54
37	79	75	78	70	78	73	63	60	55	62	72	64	42	54	69	65	56	56	30	40
38	89	76	78	85	73	65	74	82	56	64	40	58	67	57	58	60	70	57	60	45
39	103	80	88	91	69	76	83	60	71	63	69	58	66	56	51	50	46	52	66	54
40	97	94	93	99	88	87	77	73	69	63	51	59	62	57	64	57	45	61	49	64
41	70	93	83	79	72	61	65	59	61	64	70	60	58	52	56	57	63	62	51	45
42	109	80	84	86	60	71	65	53	61	55	78	75	59	55	47	57	55	50	59	56
43	95	81	84	99	79	65	72	70	60	72	45	68	45	58	60	59	49	54	48	52
44	97	93	90	101	73	82	68	66	69	57	61	59	58	66	52	61	46	60	43	42
45	89	73	84	85	61	66	66	58	72	64	53	68	62	59	59	69	48	57	54	51
46	101	83	87	84	60	61	73	71	54	61	69	65	63	47	49	51	54	61	55	63
47	98	73	94	73	73	71	66	66	79	60	64	55	60	70	67	43	59	58	50	43
48	90	88	76	70	66	80	62	67	61	59	62	66	56	57	53	52	66	60	45	59
49	110	79	87	68	72	73	93	70	77	62	58	62	55	69	53	53	44	56	73	50

NIOBIUM ANALYSIS

Page 1 of 2

Spreadsheet filename: NBOCALC

Revision 1: 6/1/92, NLW

Assumes tracer added to final aliquot

Sample ID: 92-5688

Date Calculated: 06/04/92

Data filename: N85688

M&TE No.

Nb-94 & 95 Spectrum: T9637.cnf;1

Zr/Nb-95 Tracer: 54124-76-0

volume added, ml:	0.2503	0.0012 error	*****Half-lives*****
Zr-95 dpm/ml:	4.415E+03	4.500E+01 error	Zr-95= 64.02 days
Nb-95 dpm/ml:	9.892E+03	1.151E+02 error	Nb-95= 34.97 days

On: Date: 05/13/92 01:00 Time

Nb Sep Date: 05/07/92 13:30 Time

total dpm Nb-95= 2629.44 34.53 error at Nb sep time

Sample Amount: 0.5000 0.0002 error

g, ml or sample? g

Reporting Units

Leach Volume, ml: 250 0.01 error

Activity: dpm

Vol to dilute, ml: 1 0.00001 error

per ? : g

Diluted to, ml: 1 0.00001 error

Final Aliquot, ml: 4.993 0.017 error

Nb-94 & 95 Counting Data from Prepared Sample

Sample dpm Nb-95= 6.178E+02 1.01 % error at Nb sep time

Sample dpm Nb-94= 1.885E+00 100.00 % error

*****RESULTS*****

Yield Nb-95=	0.235	0.004 error	
Nb-94 dpm/g=	803.405	803.520 error	= 100.01 %
MDA =	< 803.405		

GENERIC FORMULAS

net dpm x leach vol x diln vol
Nb-94 Activity = -----
yield x sample amt x diln aliquot x aliquot

dpm recovered
% recovery = ----- x 100
dpm added

net cpm x d/c x leach vol x diln vol
Nb-93m Activity = -----
yield x sample amt x diln aliquot x aliquot

NIOBium ANALYSIS

Page 2 of 2

Spreadsheet filename: NBCALC

Revision 1: 6/1/92, NLW

Sample ID: 92-5688

Date Calculated: 06/04/92

Data filename: NB5688

Nb-93m Spectrum:

Weight Nb ppt, mg: 268.0 0.2 error

Counted on: 325 leps M&TE No. 325 leps

On: Date: 05/20/92 10:32 Time

Nb-93m d/c = 105.002 32.486 error

NB-93M COUNTING DATA:

Diode B or 325 LEPs

If %error >= 50%, enter MDA. If not, MDA = NA

net cps: 1.00E+00 100.00 % error

MDA, in cps: 1.16E-03

Diode A Enter data under correct diode.

peak channel no.: 83 bkgd: 71 - 75 <-- first ROI

Count time, min.: 1000 0 <-- counts

Nb-93m counts-->

0

0

0

0

peak channel +

0

0

5 lower +

0

0

4 higher

0

100 - 104 <-- second ROI

0

<-- counts

0

0

0

0

0

0

0

0

gross counts:

0.000

0

:normalized ROI total

net cpm:

0.000

0

:cpm in bkgd spectrum

error, cpm:

0.000

BKG.A1;1 :bkgd filename

% error

ERR

0

:total bkgd counts

*****RESULTS*****

Nb-93m dpm/g= 473275.6 4804050 error = 101.544 %

MDA = < 5487.933

Entered by *NJL* Date *6/3/92*

Reviewed by *J. K. Fackoff* Date *6/4/92*

21-MAY-92 06:34:56

SC-65 IN NO FINDER IN FILTER M99913

ACQ DATE: 20-MAY-92 11:00:00
SC-65 IDENTIFICATION: M9 510 STIPPLED
SC-65 SAMPLE: BATCH FILTER
SC-65 SENSITIVITY: 1.000000 UNITS: SPL
SC-65 ENERGY: SHELF 1
SC-65 PRIMARY FILE NAME: EFF.TAB1..

ACQ DATE: 20-MAY-92 13:32:19 * FWHM(1332) 1.609
PULSE TIME (SEC): 72000. SEC * SENSITIVITY: 5.000
PULSE SEAL TIME: 72149. SEC * SHAPE PARAMETER : 10.0 %
PULSE SEAL TIME: 72000. SEC * NBR ITERATIONS: 10.

ACQ DATE: 16-510 LEPS #1 * LIBRARY:H.LIB1
CALIB DATE: 15-APR-91 00:00:00 * ENERGY TOLERANCE: 1.250KV
KEY CHAN: 0.1000000 * HALF LIFE RATIO: 0.00
OFFSET: 0.0000000 KEV * ABUNDANCE LIMIT: 85.00%

ENERGY WINDOW 5.00 TO 405.00

AREA DECID FWHM CHANNEL LEFT PW CTS/SEC XERR FIT

PEAK SEARCH COMPLETED (REV 11)

20h

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BEST COPY AVAILABLE

368

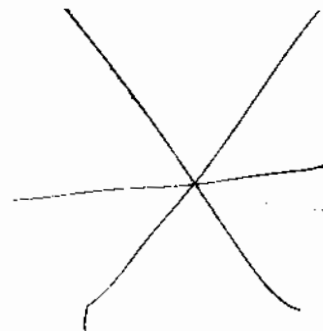
 ** 29-MAY-92 08:45:10 **

92 0509 NB POWDER IN FILTER M99911

START DATE: 29-MAY-92 11:00:00
 SAMPLE IDENTIFICATION: NB STD STIPPLED
 NAME OF SAMPLE: BATCH FILTER
 SAMPLE ID: 1100000 UNITS: SPL
 SAMPLE NAME: SHELF 1
 FILE NAME: REF. T001..

 * FWHM(1332) 1.609
 * SENSITIVITY: 5.000
 * SHAPE PARAMETER: 10.0 %
 * NBR ITERATIONS: 10.

 * LIBRARY: N.L.181
 * ENERGY TOLERANCE: 1.250KV
 * ABUNDANCE LIMIT: 85.00%



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$$\frac{3 \sqrt{291 \text{ cts}}}{72000 \text{ sec}} = 7.1 \times 10^{-4} \text{ cps}$$

ROI too small,
only 5 channels

ROI, symmetrical around peak
with hi E channel = 155 like
92-5092

$$\frac{3 \sqrt{772}}{72000 \text{ sec}} = 1.16 \times 10^{-3} \text{ cps}$$

MJW
6/3/92

MJW
6/3/92

Reviewed S. K. Fadoff 6/4/92

BEST COPY AVAILABLE

BEST COPY AVAILABLE

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100:	41.	44.	50.	49.	35.	45.	45.	42.
100:	33.	43.	47.	31.	42.	55.	38.	53.
116:	43.	41.	34.	30.	36.	37.	21.	40.
124:	33.	36.	29.	29.	45.	45.	42.	27.
132:	30.	32.	41.	38.	38.	40.	39.	34.
140:	26.	35.	45.	37.	49.	30.	42.	40.
148:	39.	45.	31.	41.	45.	36.	36.	40.
156:	44.	40.	31.	53.	47.	22.	44.	38.
164:	41.	37.	31.	44.	44.	41.	38.	38.
172:	40.	36.	34.	29.	34.	42.	32.	30.
180:	37.	40.	37.	40.	34.	46.	33.	28.
188:	27.	27.	35.	34.	28.	23.	36.	27.
196:	37.	24.	37.	24.	31.	37.	29.	32.
204:	33.	34.	40.	27.	40.	32.	30.	19.
212:	41.	29.	38.	28.	32.	32.	28.	33.
220:	28.	28.	29.	10.	21.	36.	31.	23.
228:	29.	32.	26.	35.	19.	27.	23.	26.
236:	15.	33.	34.	26.	33.	31.	27.	33.
244:	40.	21.	33.	34.	26.	22.	28.	

Shannon 5/29/92

VAX/VMS Nuclide Identification Report V2.8 Generated 28-MAY-1992 16:23:12

```

Configuration      : DUBO:[USER]T9637.CNF;1
Analyses by       : PEAK V16.2,PEAKEFF V2.2,ENBACK V1.5,NID V2.4,WMEAN V1.5
Sample title      : T9637 Nb POWDER 'ON' CARD IN 'T1CARD SLOT' 92-5688 M99913
Sample date       : 21-MAY-1992 00:00:00 Acquisition date : 21-MAY-1992 15:21:00
Sample ID        : T9637 92-5688      Sample quantity  : 1.0000 sa
Sample type      : FILTER AT T1       Sample geometry   : T1 'CARD'
Detector name    : TRACK              Detector geometry : T1CARD
Elapsed live time: 0 15:00:00.00      Elapsed real time: 0 15:00:06.26  0.0%
Energy tolerance : 1.20               Half life ratio   : 8.00
Errors propagated: No                 Systematic Error  : 0.00 %
Efficiency type  : Empirical           Efficiencies at   : Peak Energy
Abundance limit  : 70.00              WTM error limit   : 3.00
  
```

Nuclide Line Activity Report

Nuclide Type: activation

Nuclide	Energy	%Abn	%Eff	Uncorrected Decay Corr 1-Sigma			Status
				uCi/sa	uCi/sa	%Error	
CO-60	1173.24	99.90	1.217E+00	3.782E-07	3.783E-07	222.02	OK
	1332.50	99.98*	1.059E+00	4.477E-07	4.478E-07	198.32	OK

Final Mean for 2 Valid Peaks = $4.111E-07 \pm 6.103E-07$ (148.43%)

Nuclide Type: fission

Nuclide	Energy	%Abn	%Eff	Uncorrected Decay Corr 1-Sigma			Status
				uCi/sa	uCi/sa	%Error	
NB-95	765.79	99.79*	1.966E+00	2.731E-04	2.783E-04	1.01	OK

Final Mean for 1 Valid Peaks = $2.783E-04 \pm 2.820E-06$ (1.01%) = 617.8 ± 6.260 dpm

Nuclide Type:

Nuclide	Energy	%Abn	%Eff	Uncorrected Decay Corr 1-Sigma			Status
				uCi/sa	uCi/sa	%Error	
TC-95	765.79	94.00*	1.966E+00	2.899E-04	6.328E-04	1.01	OK
	947.67	1.96	1.545E+00	0.000E+00	0.000E+00	0.00	Absent
	1073.71	3.75	1.343E+00	0.000E+00	0.000E+00	0.00	Absent

Final Mean for 1 Valid Peaks = $6.328E-04 \pm 6.414E-06$ (1.01%)

Nuclide Type: dtr Pu, desc Th

Nuclide	Energy	%Abn	%Eff	Uncorrected Decay Corr 1-Sigma			Status
				uCi/sa	uCi/sa	%Error	
U-234	53.23	0.12*	1.291E+01	2.695E-05	2.695E-05	717.88	OK
	120.91	0.04	1.282E+01	0.000E+00	0.000E+00	0.00	Absent

Final Mean for 1 Valid Peaks = $2.695E-05 \pm 1.935E-04$ (717.88%)

Post-NID Peak Search Report
Sample ID : T9637 92-5688

Page : 3
Acquisition date : 21-MAY-1992 15:21:00

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides
0	39.84	333	641	1.58	53.81	51	7	14.9		
0	53.63*	8	1123	0.94	72.19	70	6717.9			U-234
10	72.68*	29	1579	1.73	97.60	94	17252.1	1.05E+00		
10	76.85*	32	846	0.97	103.15	94	17165.2			
0	92.62*	58	1652	1.63	124.17	121	8143.6			
0	510.91*	11	1166	2.69	681.91	676	13732.2			
0	765.54	10706	233	1.82	1021.47	1015	13	1.0		TC-95
										NB-95
0	1173.02*	9	74	1.24	1564.94	1561	10222.0			CO-60
0	1332.48*	9	37	2.54	1777.65	1774	10198.3			CO-60

VAX/VMS Nuclide Identification Report V2.8 Generated 28-MAY-1992 16:25:38

Configuration : DUB0:[USER]T9637.CNF;1
 Analyses by : PEAK V16.2,PEAKEFF V2.2,ENBACK V1.5,NID V2.4,WTMEAN V1.5
 Analyses by : MINACT V2.2
 Sample title : T9637 Nb POWDER 'ON' CARD IN 'TICARD SLOT' 92-5688 M99913
 Sample date : 21-MAY-1992 00:00:00 Acquisition date : 21-MAY-1992 15:21:00
 Sample ID : T9637 92-5688 Sample quantity : 1.0000 sa
 Sample type : FILTER AT T1 Sample geometry : T1 'CARD'
 Detector name : TRACK Detector geometry: TICARD
 Elapsed live time: 0 15:00:00.00 Elapsed real time: 0 15:00:06.26 0.0%
 Peak Width (FWHM): 2.00 Confidence level : 5.00 %
 Energy tolerance : 1.20 Half life ratio : 8.00
 Errors propagated: No Systematic Error : 0.00 %
 Efficiency type : Empirical Efficiencies at : Peak Energy
 Abundance limit : 70.00 WTM error limit : 3.00

Minimum Detectable Activity Report

Nuclide	Bckgnd Sum	Energy ()	MDA (uCi/sa)
NA-22	21.	1274.53	9.6958E-07
NA-24	29.	1368.60	3.5114E-06
K-40	95.	1460.83	2.2188E-05
SC-46	42.	1120.50	1.1800E-06
CR-51	434.	320.08	9.6234E-06
MN-54	41.	834.83	8.3493E-07
CO-57	745.	122.06	5.8167E-07
CO-58	57.	810.75	9.6923E-07
FE-59	39.	1099.25	2.0053E-06
ZN-65	49.	1115.55	2.5131E-06
SE-75	583.	264.66	1.4855E-06
BR-82	54.	776.52	1.6834E-06
SR-85	481.	514.00	1.6794E-06
Y-88	62.	898.04	1.2305E-06
→ NB-94	38.	871.09	8.4924E-07 = 1.885 dpm
NB-95M	666.	235.68	3.9850E-06
TC-95M	827.	204.11	1.2202E-06
ZR-95	83.	756.73	1.9722E-06
RU-103	403.	497.05	1.6668E-06
RU-106	212.	621.92	1.3921E-05
AG-108M	91.	722.90	1.1601E-06
CD-109	777.	88.03	1.2266E-05
AG-110M	47.	884.68	1.3244E-06
SN-113	408.	391.70	1.7590E-06
SB-124	263.	602.71	2.0164E-06
SB-125	438.	427.88	4.3589E-06
I-131	417.	364.50	1.3961E-06
BA-133	392.	356.00	1.5831E-06
CS-134	291.	604.71	1.5821E-06
CS-137	1984.	661.66	5.2425E-06
CE-139	775.	165.80	8.0427E-07
BA-140	468.	537.27	7.3855E-06
LA-140	409.	487.03	2.8568E-06
CE-141	832.	145.40	1.2554E-06
CE-144	838.	133.54	5.0679E-06

Minimum Detectable Activity Report (continued)

Page : 2

Sample ID : T9637 92-5688

Acquisition date : 21-MAY-1992 15:21:00

Nuclide	Bckgnd Sum	Energy ()	MDA (uCi/sa)
PM-144	132.	696.54	9.1482E-05
SM-145	629.	61.30	6.7752E-07
ND-147	806.	91.10	1.7285E-06
PM-148M	492.	550.27	2.1602E-06
EU-152	24.	1408.01	5.4782E-06
GD-153	737.	97.43	1.6114E-06
EU-154	21.	1274.51	2.8154E-06
EU-155	698.	105.31	2.0411E-06
TM-170	883.	84.30	1.4425E-05
TA-182	37.	1121.30	3.1780E-06
W-188	812.	155.00	4.1369E-06
OS-191	807.	129.40	2.1881E-06
IR-192	450.	316.50	1.1305E-06
HG-203	888.	72.87	7.5309E-06
PB-210	764.	46.52	1.4258E-05
BI-211	0.	350.10	Half-Life too short
BI-214	43.	1120.27	7.9557E-06
PB-214	449.	351.87	2.8105E-06
PO-214(I	280.	609.31	2.1035E-06
RA-224	677.	240.76	2.6165E-05
RA-226	449.	351.87	2.8097E-06
TH-228	713.	215.75	2.8308E-04
TH-230	629.	67.68	1.0622E-04
PA-231	539.	300.07	4.0294E-05
TH-232	70.	911.16	4.1715E-06
PA-233	462.	311.90	2.4586E-06
U-235	868.	185.74	1.4132E-06
U-236	556.	49.37	5.8926E-04
NP-237	462.	311.90	2.3992E-06
FU-237	739.	101.10	2.2731E-06
U-238	44.	1001.00	1.6293E-04
AM-241	629.	59.54	1.1723E-06

VAX/VMS Peak Search Report V1.8 Generated 28-MAY-1992 16:18:51

Configuration : DUBO:[USER]T9637.CNF;1
 Analyses by : PEAK V16.2,ENBACK V1.5
 Sample title : T9637 Nb POWDER 'ON' CARD IN 'T1CARD SLOT' 92-5688 M99913
 Sample date : 21-MAY-1992 00:00:00 Acquisition date : 21-MAY-1992 15:21:00
 Sample ID : T9637 92-5688 Sample quantity : 1.0000 sa
 Sample type : FILTER AT T1 Sample geometry : T1 'CARD'
 Detector name : TRACK Detector geometry: T1CARD
 Elapsed live time: 0 15:00:00.00 Elapsed real time: 0 15:00:06.26 0.0%
 Start energy : 29.48 End energy : 3069.79
 Sensitivity : 5.00 Gaussian : 10.00
 Critical level : No

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	39.84	333	641	1.58	53.81	51	7	6.17E-03	14.9	
2	0	53.63*	8	1123	0.94	72.19	70	6	1.53E-04	717.9	
3	10	72.68*	29	1579	1.73	97.60	94	17	5.34E-04	252.1	1.05E+00
4	10	76.85*	32	846	0.97	103.15	94	17	5.94E-04	165.2	
5	0	92.62*	58	1652	1.63	124.17	121	8	1.07E-03	143.6	
6	0	510.91*	11	1166	2.69	681.91	676	13	1.98E-04	732.2	
7	0	765.54	10706	233	1.82	1021.47	1015	13	1.98E-01	1.0	
8	0	1173.02*	9	74	1.24	1564.94	1561	10	1.70E-04	222.0	
9	0	1332.48*	9	37	2.54	1777.65	1774	10	1.75E-04	198.3	

VAX/VMS Peak Search Report V1.8 Generated 28-MAY-1992 16:18:10

Configuration : DUBO:[USER]T9637.CNF;1
 Analyses by : PEAK V16.2
 Sample title : T9637 Nb POWDER 'ON' CARD IN 'T1CARD SLOT' 92-5688 M99913
 Sample date : 21-MAY-1992 00:00:00 Acquisition date : 21-MAY-1992 15:21:00
 Sample ID : T9637 92-5688 Sample quantity : 1.0000 sa
 Sample type : FILTER AT T1 Sample geometry : T1 'CARD'
 Detector name : TRACK Detector geometry: T1CARD
 Elapsed live time: 0 15:00:00.00 Elapsed real time: 0 15:00:06.26 0.0%
 Start energy : 29.48 End energy : 3069.79
 Sensitivity : 5.00 Gaussian : 10.00
 Critical level : No

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	39.84	333	641	1.58	53.81	51	7	6.17E-03	14.9	
2	0	42.90	217	2902	3.67	57.89	57	14	4.01E-03	53.2	
3	0	53.63	114	1123	0.94	72.19	70	6	2.11E-03	47.4	
4	10	72.68	221	1579	1.73	97.60	94	17	4.10E-03	31.5	1.05E+00
5	10	74.74	379	877	1.12	100.34	94	17	7.03E-03	12.6	
6	10	76.85	106	846	0.97	103.15	94	17	1.97E-03	42.2	
7	0	84.30	251	1223	1.87	113.08	110	6	4.65E-03	23.5	
8	0	92.62	390	1652	1.63	124.17	121	8	7.22E-03	19.3	
9	0	510.91	623	1166	2.69	681.91	676	13	1.15E-02	11.8	
10	0	661.42	1912	330	1.70	882.62	877	13	3.54E-02	3.1	
11	0	765.54	10706	233	1.82	1021.47	1015	13	1.98E-01	1.0	
12	0	1173.02	75	74	1.24	1564.94	1561	10	1.39E-03	22.6	
13	0	1332.48	85	37	2.54	1777.65	1774	10	1.58E-03	17.8	
14	0	1460.45	78	45	1.64	1948.36	1942	12	1.45E-03	19.8	

NIOBIUM ANALYSIS

Page 1 of 2

Spreadsheet filename: NBCALC

Revision 1: 6/1/92, NLW

Assumes tracer added to final aliquot

Sample ID: 92-5086 LEPS recount

Date Calculated: 06/22/92

Data filename: NB5086R

M&TE No.

Diode HH

Nb-94 & 95 Spectrum: 9205086nb.hh;1

Zr/Nb-95 Tracer: 54124-76-0

volume added, ml:	0.2503	0.0012 error	*****Half-lives*****
Zr-95 dpm/ml:	4.415E+03	4.500E+01 error	Zr-95= 64.02 days
Nb-95 dpm/ml:	9.892E+03	1.151E+02 error	Nb-95= 34.97 days

On: Date: 05/13/92 01:00 Time

Nb Sep Date: 05/07/92 13:30 Time

total dpm Nb-95= 2629.44 34.53 error at Nb sep time

Sample Amount: 0.5623 0.0002 error

g, ml or sample? g

Reporting Units

Leach Volume, ml: 250 0.01 error

Activity: dpm

Vol to dilute, ml: 1 0.00001 error

per ? : g

Diluted to, ml: 1 0.00001 error

Final Aliquot, ml: 4.993 0.17 error

Nb-94 & 95 Counting Data from Prepared Sample

Sample dpm Nb-95= 2.263E+03 1.13 % error at Nb sep time

Sample dpm Nb-94= 2.199E+00 100.00 % error

*****RESULTS*****

Yield Nb-95= 0.861 0.015 error

Nb-94 dpm/g= 227.517 227.683 error = 100.07 %

MDA = < 227.517

GENERIC FORMULAS

Nb-94 Activity =
$$\frac{\text{net dpm} \times \text{leach vol} \times \text{dilu vol}}{\text{yield} \times \text{sample amt} \times \text{dilu aliquot} \times \text{aliquot}}$$

% recovery =
$$\frac{\text{dpm recovered}}{\text{dpm added}} \times 100$$

Nb-93m Activity =
$$\frac{\text{net cpm} \times \text{d/c} \times \text{leach vol} \times \text{dilu vol}}{\text{yield} \times \text{sample amt} \times \text{dilu aliquot} \times \text{aliquot}}$$

NIOBIUM ANALYSIS

Page 2 of 2

Spreadsheet filename: NBCALC

Revision 1: 6/1/92, NLW

Sample ID: 92-5086 LEPS recount

Date Calculated: 06/22/92

Data filename: NB5086R

Nb-93m Spectrum: 925086nb.a1;2

Weight Nb ppt, mg: 281.6 0.2 error

Counted on: A M&TE No. Diode A

On: Date: 06/21/92 17:04 Time

Nb-93m d/c = 73.729 6.140 error

NB-93M COUNTING DATA:

Diode B or 325 LEPS Enter data under correct diode.

If %error >= 50%, enter MDA. If not, MDA = NA

net cps: 1.00 1.00 % error

MDA, in cps: NA

Diode A

peak channel no.: 83 bkgd: 71 - 75 <-- first ROI

Count time, min.: 972.32 110 <-- counts

Nb-93m counts--> 221 167

233 158

peak channel + 316 160

5 lower + 401 165

4 higher 528 101 - 105 <-- second ROI

527 122 <-- counts

447 130

395 147

220 139

185 136

gross counts: 3373.000 1434 :normalized ROI total

net cpm: 1.272 0.722 :cpm in bkgd spectrum

error, cpm: 0.076 avg BKG.A1;1&2 :bkgd filename

% error 6.000 2136.0 :total bkgd counts

*****RESULTS*****

Nb-93m dpm/g= 9704.639 1062.875 error = 10.952 %

MDA =

Entered by NLW Date 6/22/92

Reviewed by N. K. Jolly Date 6/23/92

RECOUNT FOR NB-93M ON 92-5086

SAMPLE ID..... SY:925086NB.A1;2

OF CHANNELS..... 2048

DIODE I.D..... A

SHELF NUMBER..... 0

CALIBRATION..... 0.2 KEV/CH

TIME ZERO 6/21/92 AT 17: 4: 0

COUNTED..... 6/21/92 AT 17: 4: 0

(0.00 MINUTES DECAY TIME)

LIVE COUNT TIME.... 16 HOURS 12 MINUTES 19 SECONDS (972.32 MIN.)

ELAPSED TIME..... 16 HOURS 12 MINUTES 19 SECONDS (972.32 MIN.)

(DEAD TIME = 0.000)

FLUX CORRECTION.... 0.0000

GEOM CORRECTION.... 0.0000 0.0000 0.0000 0.0000 0.0000

WEIGHT..... 1.00000 GRAMS

ANTI: 0 SLP: 0 AREA: 0 P-T: 0 ERR: 0 ZER: 0 OPR: 0 NOY: -1

277

MJPW
6/22/92

Reviewed J. K. Fockoff
6/22/92

RECOUNT FOR NB-93M ON 92-5086

SY:925086NB.A1;2 COUNTED 6/21/92 @ 17: 4: 0 GAIN: 0.2 KEV/CHAN

	B	50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950
0	58339	157	124	134	111	112	115	104	112	77	87	85	96	80	61	74	65	62	66	63
1	0	176	122	121	114	112	99	92	100	93	67	81	86	91	73	69	88	72	57	62
2	0	210	130	149	110	114	103	101	98	103	77	84	99	68	84	83	75	65	55	80
3	0	185	147	155	115	94	107	86	91	80	83	74	70	76	83	69	67	59	65	59
4	0	104	139	170	130	117	105	97	96	67	83	83	97	70	81	60	62	59	69	86
5	0	145	136	161	130	94	109	96	106	70	74	91	64	64	66	66	73	67	78	71
6	0	150	130	174	127	112	102	100	90	97	82	89	79	73	56	65	57	62	70	54
7	0	151	129	166	111	132	99	111	95	81	96	97	76	94	69	69	74	65	68	57
8	5	150	127	175	130	115	120	88	89	83	74	76	76	80	68	79	66	59	50	64
9	436	155	129	188	120	121	110	104	80	97	67	88	89	81	78	50	61	84	65	69
10	831	145	132	226	140	112	113	90	96	112	82	89	88	85	62	70	64	72	55	73
11	738	164	154	211	164	120	93	104	94	126	88	80	71	70	58	70	76	83	79	58
12	471	171	103	217	161	97	102	119	84	143	85	85	87	77	74	74	63	65	76	67
13	342	210	120	155	182	111	120	131	72	155	97	78	104	70	80	60	62	63	54	71
14	209	227	114	128	191	96	116	125	91	141	75	106	168	60	81	54	62	69	56	55
15	249	262	99	116	223	130	140	132	74	120	70	82	164	51	60	56	59	72	45	83
16	222	237	120	110	192	139	147	109	80	99	89	79	177	79	61	62	71	63	69	63
17	186	223	134	127	133	109	151	122	84	93	85	93	146	76	74	63	81	57	64	87
18	217	203	120	112	125	100	129	110	105	80	73	64	125	69	73	74	65	62	57	76
19	102	173	134	119	129	101	116	103	104	80	85	85	86	80	72	58	61	73	68	77
20	190	141	120	134	113	115	102	96	116	89	92	74	76	63	89	73	72	48	55	57
21	150	110	129	117	103	103	86	94	89	80	76	84	70	73	90	66	75	53	74	71
22	177	167	110	131	100	112	103	130	110	76	71	83	74	62	76	63	65	63	75	68
23	174	150	132	90	117	109	87	141	93	75	95	79	78	71	62	66	70	73	66	70
24	168	160	134	117	101	108	106	173	109	96	107	84	71	82	72	70	63	79	81	72
25	199	165	136	131	121	105	109	173	130	81	131	81	80	77	77	60	66	66	74	77
26	175	152	137	131	91	102	99	153	112	96	144	90	65	71	79	79	80	67	53	75
27	180	170	127	152	123	101	110	150	102	83	166	58	81	80	87	49	76	73	90	78
28	194	221	134	141	100	102	110	123	97	79	149	87	76	06	79	72	74	66	72	57
29	217	233	159	142	106	99	93	95	108	96	109	86	85	73	69	74	62	66	83	72
30	221	316	139	132	103	119	102	103	109	87	90	91	79	73	81	62	67	68	99	75
31	196	401	136	148	136	115	121	87	120	95	71	82	92	62	74	67	62	70	69	63
32	204	520	130	144	100	111	113	100	103	94	84	74	81	84	80	84	75	75	69	68
33	225	527	135	133	100	87	85	86	106	69	78	70	79	79	72	61	72	67	71	71
34	206	447	171	128	120	90	112	99	199	93	75	82	85	60	66	81	64	64	66	63
35	187	295	215	99	113	99	92	90	138	84	61	75	84	85	79	76	68	60	75	61
36	202	220	298	112	87	107	89	101	117	68	81	95	58	70	92	72	60	83	68	69
37	176	185	303	132	83	109	99	89	106	92	74	94	64	77	69	68	86	60	60	64
38	170	160	267	143	114	113	100	102	94	70	67	83	70	63	86	72	71	67	56	60
39	151	143	228	113	113	97	79	91	83	94	92	84	81	65	71	69	52	62	68	44
40	187	169	153	110	93	97	88	96	76	101	85	80	70	77	60	69	55	51	64	73
41	173	175	135	98	121	122	95	97	102	89	84	76	74	77	82	70	65	62	58	78
42	100	171	114	102	129	100	124	110	79	103	73	77	90	74	73	79	58	65	66	64
43	150	211	125	102	100	102	95	102	73	93	92	89	66	75	63	69	67	73	60	63
44	173	211	112	152	136	105	111	94	101	80	101	61	87	75	70	77	64	76	67	65
45	152	136	120	106	114	91	82	85	70	90	87	60	70	65	75	60	66	56	66	59
46	163	208	146	122	89	110	102	90	97	86	101	67	86	83	69	61	68	75	63	65
47	138	150	123	112	112	112	92	106	85	73	95	85	78	70	92	67	83	58	74	58
48	153	146	135	127	100	119	94	100	94	84	78	74	77	58	61	67	66	68	54	73
49	146	157	103	126	123	94	103	60	102	81	86	82	74	75	92	56	65	78	71	56

RECOUNT FOR NB-93M ON 92-5086

SY:925086NB.A1;2 COUNTED 6/21/92 @ 17: 4: 0 GAIN: 0.2 KEV/CHAN

	1000	1050	1100	1150	1200	1250	1300	1350	1400	1450	1500	1550	1600	1650	1700	1750	1800	1850	1900	1950
0	57	71	52	58	45	46	40	37	33	54	40	43	39	39	47	41	40	48	35	46
1	78	51	59	56	63	40	42	41	46	37	44	32	39	48	36	44	27	38	36	38
2	53	72	63	65	37	61	60	59	55	44	36	39	38	41	40	36	44	40	37	33
3	68	53	63	63	41	50	48	46	50	45	46	39	44	35	42	39	34	39	48	36
4	67	63	47	54	57	58	48	53	47	49	47	32	39	35	43	34	36	34	34	33
5	68	58	52	51	62	41	47	42	42	51	33	45	38	39	37	42	39	42	44	39
6	45	51	60	47	49	56	43	58	47	50	44	38	36	35	36	43	28	48	36	35
7	66	51	51	56	35	51	47	44	60	48	50	40	29	39	31	47	35	38	30	48
8	68	61	60	45	50	45	47	43	47	48	33	36	44	40	31	46	31	28	30	36
9	55	50	52	42	50	52	52	45	45	40	45	46	48	42	38	40	34	27	31	26
10	68	47	60	52	54	51	39	50	46	34	35	38	35	40	32	50	40	36	40	36
11	65	66	49	59	53	55	48	49	53	48	54	35	51	36	41	37	27	37	37	37
12	57	52	64	58	63	40	37	34	46	42	47	30	35	32	30	44	49	45	35	43
13	66	72	56	42	63	49	47	31	41	32	52	47	41	39	35	40	30	35	37	38
14	73	62	53	52	59	51	48	37	47	39	50	44	43	52	36	32	24	32	30	31
15	77	69	63	51	60	47	48	39	37	35	39	43	36	44	45	33	35	36	41	33
16	52	60	56	51	44	42	58	45	48	40	40	50	25	41	33	36	39	33	49	48
17	66	70	55	53	51	57	50	53	42	50	44	27	44	27	43	22	44	36	34	34
18	69	58	58	56	50	46	31	49	36	34	41	41	35	38	41	47	37	40	28	24
19	78	64	39	38	45	44	49	42	37	48	35	42	37	36	49	33	37	40	33	28
20	60	75	51	66	50	49	38	41	22	40	36	45	38	34	30	46	38	25	39	37
21	61	54	63	50	59	52	39	47	54	36	42	38	52	51	37	42	42	44	36	36
22	63	62	54	65	55	42	52	37	52	48	30	42	35	36	48	46	37	44	36	39
23	64	54	65	52	56	56	42	42	42	43	54	42	37	34	41	38	31	34	35	36
24	63	54	46	52	56	50	32	39	47	40	42	38	46	40	30	37	37	32	34	39
25	69	46	50	57	53	45	48	42	43	43	41	37	40	30	36	38	31	37	27	35
26	55	59	47	54	64	45	35	59	51	48	41	35	35	40	38	33	30	37	37	38
27	49	58	43	52	47	56	47	38	41	42	34	43	42	36	50	39	40	47	36	38
28	54	56	48	61	44	46	43	55	35	39	44	42	45	29	32	34	35	34	34	30
29	64	58	50	47	43	48	48	46	51	56	39	38	37	25	31	29	42	34	29	27
30	58	52	47	51	51	41	46	52	49	40	48	40	36	41	38	29	38	32	38	30
31	67	54	50	43	44	53	43	42	46	45	55	33	49	36	41	43	33	30	35	34
32	70	45	52	49	44	48	39	31	42	36	36	35	32	41	38	41	35	44	32	28
33	58	68	58	58	48	41	42	47	44	43	31	39	30	39	45	45	35	29	38	39
34	63	68	54	55	48	48	39	44	51	30	34	38	37	45	55	41	41	37	29	29
35	53	51	56	44	54	61	50	49	40	44	35	28	30	42	36	40	32	31	39	32
36	60	44	62	50	45	49	52	48	40	46	47	36	43	42	47	38	29	32	30	24
37	58	66	44	53	63	46	39	45	41	44	42	49	27	42	53	40	38	41	27	37
38	55	60	53	59	58	46	48	42	41	54	35	45	36	30	40	45	37	40	50	52
39	61	64	49	60	53	42	45	32	37	42	39	33	45	39	31	33	27	35	45	25
40	54	37	52	54	52	49	48	44	61	37	56	47	43	32	36	36	32	30	25	50
41	70	56	55	57	54	65	41	37	42	23	33	40	32	38	31	49	36	28	36	28
42	64	51	53	73	54	42	60	41	38	36	39	31	50	41	41	41	31	31	31	34
43	59	57	35	62	42	46	46	35	36	45	51	40	45	36	47	29	32	38	51	43
44	60	44	53	85	48	47	43	41	43	44	39	52	47	43	36	39	42	41	32	34
45	62	50	60	51	43	56	47	44	50	44	44	38	40	31	36	31	26	37	42	42
46	60	60	46	51	37	54	42	37	29	30	55	42	39	28	37	36	25	28	42	39
47	51	43	65	41	49	56	41	35	48	41	34	37	37	39	42	27	35	37	44	41
48	59	56	41	43	49	51	47	52	39	40	40	40	39	34	33	46	38	30	41	34
49	63	63	47	51	41	45	43	42	47	52	46	51	41	38	42	37	32	42	38	39

NIOBIUM ANALYSIS

Page 1 of 2

Spreadsheet filename: NBCALC

Revision 1: 6/1/92, NLW

Assumes tracer added to final aliquot

Sample ID: 92-5086

Date Calculated: 06/16/92

Data filename: NB5086

M&TE No.

Diode HH

Nb-94 & 95 Spectrum: 9205086nb.hh;1

Zr/Nb-95 Tracer: 54124-76-0

volume added, ml: 0.2503 0.0012 error

*****Half-lives*****

Zr-95 dpm/ml: 4.415E+03 4.500E+01 error

Zr-95= 64.02 days

Nb-95 dpm/ml: 9.892E+03 1.151E+02 error

Nb-95= 34.97 days

On: Date: 05/13/92 01:00 Time

Nb Sep Date: 05/07/92 13:30 Time

total dpm Nb-95= 2629.44 34.53 error at Nb sep time

Sample Amount: 0.5623 0.0002 error

g, ml or sample? g

Reporting Units

Leach Volume, ml: 250 0.01 error

Activity: dpm

Vol to dilute, ml: 1 0.00001 error

per ? g

Diluted to, ml: 1 0.00001 error

Final Aliquot, ml: 4.993 0.17 error

Nb-94 & 95 Counting Data from Prepared Sample

Sample dpm Nb-95= 2.263E+03 1.13 % error at Nb sep time

Sample dpm Nb-94= 2.199E+00 100.00 % error

*****RESULTS*****

Yield Nb-95= 0.861 0.015 error

Nb-94 dpm/g= 227.517 227.683 error = 100.07 %

MDA = < 227.517

GENERIC FORMULAS

$$\text{Nb-94 Activity} = \frac{\text{net dpm} \times \text{leach vol} \times \text{diln vol}}{\text{yield} \times \text{sample amt} \times \text{diln aliquot} \times \text{aliquot}}$$

$$\% \text{ recovery} = \frac{\text{dpm recovered}}{\text{dpm added}} \times 100$$

$$\text{Nb-93m Activity} = \frac{\text{net cpm} \times \text{d/c} \times \text{leach vol} \times \text{diln vol}}{\text{yield} \times \text{sample amt} \times \text{diln aliquot} \times \text{aliquot}}$$

NIOBIMUM ANALYSIS

Page 2 of 2

Spreadsheet filename: NBCALC

Revision 1: 6/1/92, NLW

Sample ID: 92-5086

Date Calculated: 06/16/92

Data filename: NB5086

Nb-93m Spectrum: 925086nb.ai;1

Weight Nb ppt, mg: 281.6 0.2 error

Counted on: A M&TE No. Diode A

On: Date: 05/29/92 15:48 Time

Nb-93m d/c = 73.729 6.140 error

NB-93M COUNTING DATA:

Diode B or 325 LEPS Enter data under correct diode.

If %error >= 50%, enter MDA. If not, MDA = NA

net cps: 1.00 1.00 % error

MDA, in cps: NA

Diode A

peak channel no.: 83 bkgd: 70 - 74 <-- first ROI

Count time, min.: 993.55 180 <-- counts

Nb-93m counts--> 222 181

283 196

peak channel + 403 189

5 lower + 476 201

4 higher 614 100 - 104 <-- second ROI

640 179 <-- counts

550 170

361 169

270 152

251 166

gross counts: 4070.000 1783 :normalized ROI total

net cpm: 1.580 0.722 :cpm in bkgd spectrum

error, cpm: 0.082 avg BKG.A1;1&2 :bkgd filename

% error 5.164 2500.3 :total bkgd counts

*****RESULTS*****

Nb-93m dpm/g= 12051.447 1267.496 error = 10.517 %

MDA =

N. J. G. 6/16/92
Entered by Date

J. K. Faddy 6/18/92
Reviewed by Date

NIOBIUM ANALYSIS

Page 1 of 2

Spreadsheet filename: NBOALC

Revision 1: 6/1/92, NLW

Assumes tracer added to final aliquot

Sample ID: 92-5086

Date Calculated: 06/02/92

Data filename: NBS086

M&TE No.

Diode HH

Nb-94 & 95 Spectrum: 9205086nb.hh;1

Zr/Nb-95 Tracer: 54124-76-0

volume added, ml:	0.2503	0.0012 error	*****Half-lives*****
Zr-95 dpm/ml:	4.415E+03	4.500E+01 error	Zr-95= 64.02 days
Nb-95 dpm/ml:	9.892E+03	1.151E+02 error	Nb-95= 34.97 days

On: Date: 05/13/92 01:00 Time

Nb Sep Date: 05/07/92 13:30 Time

total dpm Nb-95= 2629.44 34.53 error at Nb sep time

Sample Amount: 0.5623 0.0002 error

g, ml or sample? g

Reporting Units

Leach Volume, ml: 250 0.01 error

Activity: dpm

Vol to dilute, ml: 1 0.00001 error

per ? : g

Diluted to, ml: 1 0.00001 error

Final Aliquot, ml: 4.993 0.17 error

Nb-94 & 95 Counting Data from Prepared Sample

Sample dpm Nb-95= 2.263E+03 1.13 % error at Nb sep time

Sample dpm Nb-94= 2.199E+00 100.00 % error

*****RESULTS*****

Yield Nb-95= 0.861 0.015 error

Nb-94 dpm/g= 227.517 227.683 error = 100.07 %

MDA = < 227.517

GENERIC FORMULAS

Nb-94 Activity =
$$\frac{\text{net dpm} \times \text{leach vol} \times \text{diln vol}}{\text{yield} \times \text{sample amt} \times \text{diln aliquot} \times \text{aliquot}}$$

% recovery =
$$\frac{\text{dpm recovered}}{\text{dpm added}} \times 100$$

Nb-93m Activity =
$$\frac{\text{net cpm} \times \text{d/c} \times \text{leach vol} \times \text{diln vol}}{\text{yield} \times \text{sample amt} \times \text{diln aliquot} \times \text{aliquot}}$$

NIOBIUM ANALYSIS

Page 2 of 2

Spreadsheet filename: NBCALC

Revision 1: 6/1/92, NLW

Sample ID: 92-5086

Date Calculated: 06/02/92

Data filename: NB5086

Nb-93m Spectrum: 925086nb.ai;1

Weight Nb ppt, mg: 281.6 0.2 error

Counted on: A

M&TE No.

Diode A

On: Date: 05/29/92

15:48 Time

Nb-93m d/c = 73.729

6.140 error

NB-93M COUNTING DATA:

Diode B or 325 LEPS

Enter data under correct diode.

If %error >= 50%, enter MDA. If not, MDA = NA

net cps: 1.00 1.00 % error

MDA, in cps: NA

Diode A

peak channel no.: 83

bkgd: 70 - 74 <-- first ROI

Count time, min.: 993.55

180 <-- counts

Nb-93m counts--> 222

181

283

196

peak channel + 403

189

5 lower + 476

201

4 higher 614

100 - 104 <-- second ROI

640

179 <-- counts

550

170

361

169

270

152

251

166

gross counts: 4070.000

1783 :normalized ROI total

net cpm: 2.119

0.183 :cpm in bkgd spectrum

error, cpm: 0.078

BKG.A1;1 :bkgd filename

% error 3.690

1964.8 :total bkgd counts

*****RESULTS*****

Nb-93m dpm/g= 15163.065 1596.508 error = 9.876 %

MDA =

Entered by NJL/gm Date 6/2/92

Reviewed by J. L. Fadysz Date 6/4/92

NB-93M ON 92-5086

SAMPLE ID..... SY:925086NB.A1;1

OF CHANNELS..... 2048

DIODE I.D..... A

SHELF NUMBER..... 0

CALIBRATION..... 0.2 KEV/CH

TIME ZERO 5/29/92 AT 15:48: 0

COUNTED..... 5/29/92 AT 15:48: 0

(0.00 MINUTES DECAY TIME)

LIVE COUNT TIME.... 16 HOURS 33 MINUTES 33 SECONDS (993.55 MIN.)

ELAPSED TIME..... 16 HOURS 33 MINUTES 33 SECONDS (993.55 MIN.)

(DEAD TIME = 0.000)

FLUX CORRECTION.... 0.0000

GEOM CORRECTION.... 0.0000 0.0000 0.0000 0.0000 0.0000

WEIGHT..... 1.00000 GRAMS

ANTI: 0 SLP: 0 AREA: 0 P-T: 0 ERR: 0 ZER: 0 OPR: 0 NOV: -1

284

M-JW
5/30/92

J.K. Jack 6/4/92

NB-93M ON 92-5086

SY:925086NB.A1;1 COUNTED 5/29/92 @ 15:48: 0 GAIN: 0.2 KEV/CHAN

	0	50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950
0	59613	227	179	165	135	157	134	127	133	115	117	110	80	110	116	103	109	96	81	95
1	0	225	170	161	138	141	136	110	130	115	128	133	101	100	99	99	79	59	87	72
2	0	235	169	165	132	134	144	134	123	86	103	104	94	108	104	95	82	101	84	80
3	0	207	152	187	157	132	134	104	101	114	103	106	97	86	101	94	126	98	101	91
4	0	213	165	182	148	122	134	136	131	94	101	113	95	94	90	104	99	81	94	99
5	0	180	161	223	140	141	114	120	135	93	107	106	114	93	85	109	95	80	103	81
6	0	177	171	219	152	137	145	126	127	112	107	112	95	104	100	89	87	111	75	97
7	0	200	136	204	137	111	145	120	111	138	111	114	105	112	109	103	88	104	84	88
8	5	189	164	206	140	129	135	112	126	129	104	100	114	102	92	97	78	80	82	91
9	478	185	152	251	150	137	129	124	143	127	104	110	103	105	88	95	96	97	91	80
10	869	184	155	301	169	128	123	133	135	151	117	89	116	101	90	84	88	93	82	79
11	733	205	174	315	211	133	129	140	105	146	113	102	104	92	89	93	87	94	85	92
12	452	206	170	249	224	141	109	124	111	150	113	107	115	82	100	101	103	76	67	103
13	385	264	162	197	225	135	143	166	109	148	90	110	142	86	110	98	91	89	93	81
14	287	310	176	149	253	131	129	167	142	181	103	126	189	90	92	107	97	92	89	107
15	254	304	152	149	257	137	149	153	121	150	131	127	215	91	102	86	88	90	96	104
16	243	299	183	150	234	120	105	161	98	146	114	103	193	102	97	100	75	83	80	80
17	235	264	163	159	160	135	176	149	111	118	112	112	163	93	95	76	111	78	85	87
18	228	200	174	144	175	153	150	104	127	118	100	106	143	98	110	97	114	94	92	114
19	231	215	160	154	124	123	140	124	121	100	106	96	121	103	103	98	84	82	79	100
20	194	180	144	150	144	150	142	134	110	100	111	126	99	99	99	97	88	78	65	87
21	227	181	153	170	137	139	108	140	134	121	103	90	103	106	88	107	95	83	80	102
22	194	196	159	135	152	131	145	134	139	127	110	115	109	101	81	99	108	79	96	99
23	190	189	146	144	132	125	119	176	151	106	104	107	97	98	110	87	105	100	117	100
24	221	201	105	143	145	131	108	193	156	119	111	95	113	98	90	111	98	80	89	74
25	220	170	153	142	137	131	113	186	161	93	143	96	110	110	88	95	96	99	85	75
26	226	212	138	164	146	139	124	200	170	102	106	105	84	93	106	113	75	70	84	87
27	210	227	163	145	132	127	140	185	133	103	192	98	118	103	83	68	86	104	103	100
28	196	222	183	177	139	135	114	140	122	104	173	100	102	90	95	98	91	83	93	94
29	217	203	153	181	145	147	134	120	122	105	135	101	117	101	95	98	96	82	113	90
30	266	403	170	158	147	123	112	115	139	123	134	99	108	91	88	84	104	98	100	87
31	255	476	166	164	156	134	137	115	165	103	107	114	108	103	99	94	90	88	121	90
32	272	614	174	180	141	130	160	131	202	110	97	110	104	90	76	97	110	110	102	111
33	277	640	193	161	155	131	124	116	226	126	110	112	110	86	81	92	80	79	91	93
34	291	550	249	149	151	147	130	127	195	90	108	109	102	95	87	82	72	84	99	96
35	231	361	260	141	135	118	136	120	109	103	89	116	94	107	104	95	90	85	90	88
36	216	270	337	144	137	119	135	113	149	120	102	107	111	101	86	86	97	78	87	82
37	223	251	411	147	138	147	140	146	145	106	106	122	92	88	79	84	81	69	94	96
38	217	220	344	155	133	121	106	123	129	105	109	93	110	105	98	88	85	87	101	93
39	200	240	313	153	130	133	113	99	131	113	116	115	100	99	92	83	83	76	97	84
40	209	243	227	125	130	139	106	127	127	102	102	95	104	103	91	92	78	85	80	89
41	183	190	198	162	160	127	126	131	101	121	106	110	93	97	80	80	84	89	96	80
42	207	225	169	143	135	145	109	105	112	110	100	91	103	102	95	90	83	90	91	97
43	208	260	142	150	189	132	120	141	100	119	101	103	106	116	91	79	91	81	71	92
44	180	250	150	151	166	138	124	119	114	105	113	87	105	99	85	97	74	104	90	84
45	217	255	167	154	149	134	119	132	111	106	97	100	106	90	102	79	86	93	87	84
46	231	211	141	162	138	153	123	124	106	114	108	120	103	90	114	97	87	85	100	69
47	190	184	150	132	153	138	136	112	105	97	119	105	113	102	92	77	98	74	78	103
48	203	211	172	153	139	147	114	123	107	101	127	100	121	107	109	94	76	94	87	96
49	209	183	143	141	147	142	124	127	109	114	118	115	94	91	80	85	99	86	82	93

NB-93M OM 92-5886

SY:925886NB.A1:1 COUNTED 5/29/92 @ 15:48: 8 GAIN: 8.2 KEV/CHAN

	1000	1050	1100	1150	1200	1250	1300	1350	1400	1450	1500	1550	1600	1650	1700	1750	1800	1850	1900	1950
0	93	60	73	70	65	61	83	68	47	48	50	50	67	47	61	59	56	58	58	65
1	95	81	60	60	60	64	67	74	58	58	62	48	49	60	56	53	66	52	43	41
2	83	85	86	67	71	67	68	55	48	67	54	54	54	48	47	55	54	53	60	55
3	77	91	70	77	69	53	65	55	76	69	67	57	52	73	74	49	57	56	51	48
4	80	75	75	93	63	60	72	73	78	61	53	80	47	50	53	62	60	67	63	52
5	105	83	60	73	69	63	58	67	69	60	64	47	61	41	60	64	53	57	48	44
6	88	80	85	70	71	69	64	79	75	64	59	66	57	64	68	67	59	69	52	48
7	68	90	66	68	84	68	70	69	58	62	55	57	48	60	52	56	52	55	64	61
8	94	69	78	77	67	67	56	61	64	73	69	62	69	52	52	52	55	57	51	60
9	98	75	71	60	76	67	65	55	56	63	55	54	51	56	52	62	60	59	54	77
10	91	80	70	74	81	58	64	65	73	61	53	50	62	53	57	74	68	56	54	50
11	90	76	65	81	74	55	59	66	59	60	59	59	54	65	43	51	43	51	41	47
12	96	102	81	84	70	69	64	65	59	51	57	61	57	52	62	60	53	63	58	50
13	88	72	53	69	62	63	69	67	58	49	55	51	49	61	58	49	48	60	62	55
14	88	83	71	70	68	56	70	86	53	78	57	45	51	57	54	49	53	56	45	61
15	75	78	84	61	60	70	70	59	52	66	63	60	58	53	60	50	54	55	56	49
16	80	76	60	74	63	70	61	60	61	44	61	67	51	56	54	58	63	56	50	59
17	110	76	88	82	69	60	62	58	64	55	49	70	49	60	57	51	50	48	51	66
18	85	97	76	64	78	58	66	61	62	52	69	56	54	44	58	60	56	54	48	55
19	83	75	67	64	86	77	76	80	53	62	53	64	64	51	52	48	60	61	60	56
20	89	94	72	89	67	77	71	73	72	60	65	58	64	55	55	38	53	66	56	49
21	83	84	65	57	78	60	58	56	68	63	59	71	63	55	67	53	49	56	56	45
22	89	75	87	65	65	49	64	66	72	66	56	63	66	60	59	48	46	53	53	64
23	81	75	75	60	59	62	59	57	72	65	65	65	62	58	48	61	55	54	61	53
24	104	68	66	68	59	69	62	61	63	70	64	62	55	49	51	49	53	52	67	34
25	83	78	72	73	77	61	76	76	62	64	72	58	54	62	47	61	51	50	41	46
26	82	79	85	69	81	64	49	62	65	64	76	66	61	65	60	49	55	47	43	45
27	73	77	72	72	59	71	67	56	75	77	54	55	57	57	65	67	60	38	67	40
28	88	73	73	59	68	67	78	58	64	58	64	83	57	53	50	45	45	47	50	42
29	77	78	61	74	75	60	82	65	49	59	60	53	61	64	57	61	54	49	52	44
30	78	77	64	65	65	68	69	62	61	66	63	50	53	71	56	57	44	58	53	67
31	90	93	63	64	78	60	69	56	55	72	61	60	57	63	53	61	61	57	51	60
32	02	77	62	57	82	69	54	51	54	69	65	52	62	79	53	48	48	50	51	53
33	93	79	94	65	66	60	75	50	60	62	45	66	50	59	47	47	63	62	58	58
34	93	79	77	72	61	75	67	47	63	60	52	65	59	55	59	38	52	52	54	40
35	84	61	69	83	59	83	71	66	66	62	59	56	57	52	47	58	62	46	57	60
36	95	72	74	84	61	60	55	77	57	65	58	57	46	55	48	47	49	46	45	54
37	97	89	80	64	66	69	62	61	69	54	56	62	58	58	47	70	49	47	38	64
38	96	65	63	66	71	68	72	85	56	57	61	50	63	60	60	56	61	41	56	51
39	80	82	70	74	65	63	68	61	59	61	65	59	61	60	62	57	49	49	48	60
40	94	79	94	68	75	57	58	57	55	67	75	46	50	51	56	60	51	60	56	52
41	78	72	70	78	75	67	51	58	57	61	66	69	52	53	64	57	51	53	43	61
42	88	72	65	62	77	66	61	53	60	51	55	55	51	38	53	53	57	51	51	43
43	75	60	63	104	64	83	74	53	56	67	47	69	57	60	46	50	59	59	49	49
44	80	72	70	80	74	65	50	52	50	63	48	56	52	69	61	51	57	51	63	60
45	77	74	59	73	65	53	58	77	58	46	67	62	52	63	63	48	51	52	53	45
46	84	81	67	72	85	69	68	50	61	50	59	72	58	58	55	58	57	49	54	51
47	92	77	66	72	70	49	67	48	54	59	62	65	59	64	57	48	57	36	67	61
48	84	82	69	60	60	59	56	52	62	62	69	41	53	49	46	56	48	63	36	47
49	79	90	77	80	73	74	61	64	70	55	63	46	51	57	68	55	61	43	53	59

TITLE: 101SY NB 92-05006

FILE: 9205006N9.HH:1

* CHANNELS: 2048

SHELF: 0

DIODE: III

TIME ZERO: 5 7 92 13 30 0

TIME OF COUNT: 5 21 92 16 23 0

(28333.0 MINUTES DECAY TIME)

LIVE TIME: 16 HOURS 24 MINUTES 38 SECONDS = 984.500 MINUTES

ELAPSED TIME: 16 HOURS 25 MINUTES 19 SECONDS = 985.317 MINUTES

(DEAD TIME = 0.001)

FLUX CORR. FACT.: 0.000000

GAIN: 1.00000 KEY/CHAN

WEIGHT: 1.00000

PLT INT: 0
PLT LAB: 0
ANTI FLG 0
SLP ALT: 0
ORIG REJ: 0
PTR: 0
ERR REJ: 0
ZER LEV: 0
OVR PKR: 0
HDS: -1

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M. D. G. 6/1/5/29/92

S. K. Jackoff 5/22/92

10
15
19

9205086MB.HH:1

101SY NB 92-05086

	0	50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950
0	59070	1005	854	787	810	575	444	402	373	368	407	466	254	126	120	95	40	35	24	28
1	5	1050	804	719	816	564	584	371	362	362	380	468	247	164	99	93	47	23	35	33
2	0	1077	805	773	822	521	584	387	397	349	385	468	271	138	107	83	37	33	23	10
3	14	1042	741	765	802	546	432	478	365	374	409	451	258	147	114	98	44	31	30	26
4	65	1072	783	745	748	577	421	424	364	394	379	447	226	125	117	95	43	23	26	33
5	236	989	826	798	799	551	447	436	350	386	410	480	267	141	109	95	26	36	41	23
6	524	955	1029	773	809	521	458	368	366	368	408	459	199	129	110	90	46	31	38	35
7	609	909	811	729	791	528	446	370	408	358	412	463	221	146	118	107	29	31	38	25
8	726	902	834	653	756	546	458	374	389	365	412	486	253	126	96	116	40	28	26	15
9	844	1058	835	745	749	588	437	365	336	347	399	440	227	149	100	121	40	36	32	29
10	1029	983	839	768	950	588	501	378	377	392	441	477	242	128	99	113	38	28	25	32
11	1198	987	786	751	833	582	449	412	388	373	482	466	336	132	117	105	32	39	31	26
12	1277	1023	787	702	718	476	443	381	400	368	672	488	278	207	94	122	31	66	83	21
13	1254	994	786	725	761	514	463	358	361	372	612	495	186	866	117	99	32	81	335	27
14	1369	1004	816	773	783	582	487	383	365	414	528	462	243	845	112	142	26	39	295	23
15	1442	978	817	782	782	497	471	344	358	498	425	523	239	198	107	228	37	48	46	30
16	1554	968	795	726	672	474	437	373	372	381	398	583	222	134	111	1134	34	27	38	46
17	1686	949	776	758	686	586	432	375	382	392	421	499	248	127	83	11209	38	27	25	86
18	1564	957	779	699	733	585	398	484	358	388	489	485	282	139	106	21673	29	29	32	55
19	1643	946	794	679	713	536	443	374	369	358	431	491	283	136	101	4468	37	33	23	30
20	1551	942	772	733	699	484	461	395	377	371	432	483	284	127	111	182	40	25	26	71
21	1644	992	777	658	667	593	414	483	351	387	396	498	284	121	182	41	32	27	29	217
22	1596	956	777	766	699	626	484	487	396	485	428	458	195	134	184	52	31	34	29	158
23	1636	1050	831	676	699	472	418	373	371	384	415	439	186	115	86	46	22	38	27	21
24	1643	1044	1867	698	668	528	416	399	391	397	454	459	283	127	96	68	38	38	25	28
25	1548	1152	828	679	645	469	444	383	335	372	431	451	288	127	123	47	32	38	29	17
26	1559	1498	793	737	638	487	419	394	363	388	483	487	197	121	187	42	36	29	24	24
27	1454	1828	738	713	661	457	486	387	353	373	437	389	186	122	89	41	26	23	26	19
28	1417	1388	763	672	662	535	451	382	489	377	444	361	193	138	115	49	28	35	29	22
29	1449	922	786	687	661	598	525	357	388	355	416	358	162	119	199	49	31	19	36	18
30	1463	888	968	687	642	457	446	364	395	381	418	348	188	143	168	42	29	33	17	28
31	1436	889	818	693	653	467	434	388	393	391	426	318	198	119	83	42	35	28	33	27
32	1265	829	798	659	668	449	421	489	488	379	452	339	284	186	89	44	42	33	16	15
33	1394	863	793	661	631	485	432	377	358	366	425	318	179	114	112	34	47	25	23	22
34	1355	831	833	785	656	584	418	387	378	399	423	461	197	116	88	47	28	38	26	26
35	1326	1035	778	649	617	584	418	372	352	375	423	781	188	109	98	48	44	28	38	27
36	1293	1139	752	738	615	498	381	385	384	369	481	392	216	115	113	41	28	27	22	28
37	1276	1083	726	811	649	443	415	387	344	358	483	296	188	126	118	47	47	34	25	23
38	1254	1193	887	784	619	462	412	347	338	483	478	286	286	188	98	43	42	26	24	21
39	1157	929	767	693	1345	481	619	365	371	358	454	277	182	189	97	42	38	32	25	19
40	1225	855	854	785	3218	498	862	374	391	379	467	281	189	187	94	37	38	27	27	21
41	1167	992	778	677	765	483	434	488	361	365	449	265	155	111	84	42	39	33	27	23
42	1175	841	813	748	797	491	489	386	483	351	498	273	157	115	188	43	35	33	18	21
43	1892	950	751	719	648	487	359	339	366	388	449	288	168	124	114	34	42	33	28	28
44	1152	1879	798	789	574	434	392	417	347	481	446	275	157	119	94	47	34	33	25	19
45	1175	863	755	777	544	461	436	388	343	481	475	265	168	185	98	38	31	29	25	19
46	1124	874	744	834	548	478	399	484	361	387	459	288	172	183	84	65	25	31	29	31
47	1882	786	786	832	519	588	483	355	392	378	469	228	149	111	98	84	26	38	29	32
48	1112	888	746	836	579	436	391	382	486	395	449	272	154	185	99	53	41	29	25	26
49	1897	855	738	846	593	443	392	369	394	488	481	239	152	182	188	36	41	32	22	17

9205086NB.HH:1			1015Y NB 92-05006																	
	1000	1050	1100	1150	1200	1250	1300	1350	1400	1450	1500	1550	1600	1650	1700	1750	1800	1850	1900	1950
0	14	26	22	14	18	14	15	13	11	9	10	6	6	10	5	3	8	5	2	4
1	20	20	16	21	17	19	20	9	11	11	10	10	9	8	8	2	6	6	1	6
2	27	15	17	17	11	11	12	10	9	14	9	10	10	10	7	3	4	5	10	6
3	25	16	14	16	19	18	14	16	12	13	7	6	14	2	3	5	3	4	2	5
4	36	28	21	18	23	22	18	11	16	10	9	8	6	11	6	7	3	7	8	5
5	28	19	17	15	16	21	10	9	13	9	5	10	6	3	4	5	6	4	6	1
6	33	22	20	21	20	17	13	14	16	9	12	12	4	3	5	6	4	6	4	5
7	38	17	20	16	19	12	12	12	13	9	10	6	11	12	8	4	5	2	6	3
8	27	11	25	19	22	11	11	9	14	17	11	9	5	4	11	9	6	8	4	4
9	30	17	23	13	18	11	19	10	10	6	6	7	4	8	9	6	4	4	6	3
10	25	30	13	14	26	12	10	10	15	13	8	3	7	7	6	2	7	7	1	7
11	19	22	18	20	16	13	14	11	13	23	14	5	9	6	0	4	3	8	4	4
12	19	21	24	18	23	13	16	13	12	60	7	5	9	7	5	7	5	4	6	11
13	17	21	24	16	16	18	10	9	7	178	9	8	6	3	1	8	9	6	4	10
14	24	23	22	16	27	20	18	15	6	178	7	5	4	8	9	7	3	7	7	4
15	25	30	20	10	18	19	13	11	7	63	6	4	10	6	7	6	3	3	7	5
16	19	15	12	16	16	17	14	9	16	11	9	10	6	6	9	12	9	5	8	4
17	25	13	24	13	4	15	12	11	11	5	4	8	9	4	6	22	8	7	9	6
18	24	25	18	20	16	19	14	11	9	4	4	11	4	7	7	24	5	8	3	4
19	23	20	17	19	13	28	13	13	11	7	7	5	12	12	6	13	6	6	14	8
20	10	21	25	18	22	20	9	10	8	5	6	7	5	10	7	5	10	5	5	8
21	21	21	23	22	19	14	7	14	10	8	8	7	6	9	10	8	6	4	7	10
22	26	33	27	18	21	18	18	11	8	8	10	8	6	8	4	6	9	3	9	7
23	20	24	35	29	18	14	18	16	12	9	6	9	18	7	5	1	2	5	7	3
24	22	18	24	16	16	18	17	10	12	6	9	5	12	9	7	2	5	7	3	5
25	24	24	19	21	16	12	16	9	12	14	10	4	9	10	5	6	4	9	2	3
26	21	16	18	24	13	21	14	13	11	14	9	4	14	5	7	8	9	3	9	4
27	15	18	20	12	19	30	12	15	13	14	10	8	4	8	7	4	7	3	10	3
28	20	20	23	15	11	26	12	7	9	5	5	10	6	8	8	8	6	3	4	4
29	22	13	21	23	19	16	15	21	8	11	8	9	5	5	5	6	9	6	5	6
30	24	23	21	21	19	19	12	8	13	8	8	9	3	6	6	6	6	5	6	4
31	19	19	14	24	22	14	16	14	9	12	7	5	5	4	9	7	7	4	3	5
32	26	20	29	22	18	18	13	7	21	5	7	7	14	6	4	10	5	13	6	5
33	26	12	22	16	23	15	20	4	7	10	7	12	17	9	5	8	5	5	5	6
34	24	17	26	16	22	24	17	11	10	8	8	14	15	4	8	4	3	4	3	3
35	18	21	18	23	15	10	13	12	11	11	7	7	9	6	3	10	5	6	7	3
36	21	10	15	16	11	14	12	12	7	9	9	11	6	4	7	4	6	8	4	6
37	24	18	18	18	27	18	10	9	16	9	4	3	5	5	12	8	2	4	4	6
38	23	15	18	20	17	8	15	11	10	7	11	7	8	9	7	11	11	7	8	7
39	20	21	6	22	13	10	17	16	9	6	9	7	9	5	3	7	13	6	7	5
40	19	22	22	21	22	26	13	11	15	6	10	20	3	6	11	6	5	6	7	6
41	25	22	18	15	16	21	18	6	4	6	5	28	10	10	3	6	13	4	8	7
42	19	22	17	16	22	12	9	15	10	5	5	16	7	6	6	10	8	6	6	2
43	21	18	19	17	18	18	14	7	9	16	12	10	8	6	8	2	7	4	7	3
44	21	19	20	14	15	15	6	8	18	5	7	23	2	4	7	6	4	7	4	8
45	14	19	19	18	12	11	12	9	8	9	8	24	7	5	6	10	9	5	2	7
46	15	22	15	17	21	19	14	9	10	6	7	31	8	5	8	4	4	5	18	8
47	27	26	23	18	17	16	14	14	18	6	4	19	7	2	2	7	7	5	3	8
48	18	16	28	15	12	18	15	18	18	19	9	8	7	2	6	3	8	7	7	4
49	26	19	13	17	16	11	13	6	18	17	5	6	4	8	8	8	5	5	6	4

Raygun - RSX Version 18-Jan-90

(29-MAY-1992 08:51:50)

Analysis performed by: diana mcmullin

Sample: 101SY NB 92-05086

Weight: 1.00000 ML

Irradiation date: 7-May-1992 at 13:30:00

Count date: 21-May-1992 at 16:23:00

Decay: 14.1d (1219900.0 seconds)

Count times: REAL TIME 16.42h (59119.000 seconds)
LIVE TIME 16.41h (59078.000 seconds)

Dead time: 0.08 percent

Detector: HH pos 0 Geometry Factor: 1.000

Efficiencies and shape parameters from file: ve:[116.2]EFFFILNB. HH

Spectrum from file : 9205086nb.hh:1

Background subtractions from file: VE:[116.1]BACKG. HH

280

	Peak channel	Region start end	Gross counts	Net area ++	Energy (keV)	Commas /sec	Err % SD	System bkgd
1	75.9	74. 81.	8793.	1521.	77.79	3.130E-01	8.9	0.
2	239.9	238. 244.	7958.	3945.	240.86	7.800E-01	2.9	0.
3	271.7	271. 272.	1219.	227.	272.42	5.220E-02	20.7	0.
4	301.5	301. 302.	1168.	250.	302.11	6.436E-02	10.3	0.
5	339.9	338. 341.	2327.	681.	340.21	2.005E-01	10.2	0.
6	512.3	510. 515.	3160.	722.*	511.64	5.869E-02	100.0	746.
7	585.8	584. 586.	1634.	702.*	583.92	6.141E-02	100.0	829.
8	663.5	662. 666.	2242.	1570.*	661.99	9.411E-01	4.1	56.
9	729.2	728. 730.	474.	171.*	727.33	4.744E-02	100.0	177.
10	767.9	764. 770.	38940.	38376.	765.00	2.800E+01	0.5	0.
11	796.9	796. 799.	202.	80.*	794.64	3.412E-02	100.0	70.
12	862.0	861. 865.	265.	115.*	860.14	3.285E-02	100.0	94.
13	913.4	911. 916.	820.	643.*	910.46	3.535E-02	100.0	605.
14	967.1	965. 969.	247.	129.*	963.86	3.431E-02	100.0	140.
15	971.2	969. 973.	489.	381.*	967.93	5.637E-02	100.0	321.
16	1463.5	1460. 1466.	526.	469.	1457.47	7.050E-01	5.2	0.
17	1583.9	1580. 1593.	88.	53.	1584.15	8.712E-02	21.1	0.
18	1605.5	1593. 1599.	115.	76.*	1589.08	3.844E-02	100.0	60.
19	1763.6	1766. 1769.	71.	46.	1759.88	8.602E-02	21.2	0.

Diana J McMullin
5-29-92
M. J. W.
6/2/92

++ If a peak area above the Compton Continuum before correction for system background. Values flagged with a * are subsequently corrected for background before calculation of absolute emission rate (qpm/sec).

Gamma-ray and nuclide lookup from file: VE:116.33NBL18.DAT

*** Least-squares Results ***

(interferences)

nuclide	energy keV	dps at zero time	uCi /ML	peak frac	err (%)	dev (sig)	DPM /ML	error (%)
I 135 95	- - - -	3.772E+01	1.019E-03	- - - -	- - - -	- - - -	2.263E+03	1.13
	765.00	3.772E+01	1.019E-03	1.00	1.13	-1.00		

The following are upper limit values:

Co 60	- - - -	4.195E-02	1.134E-06	- - - -	- - - -	- - - -	2.517E+00	100.00
Zn 95	- - - -	1.171E-01	3.165E-06	- - - -	- - - -	- - - -	7.027E+00	100.00
Br 94	- - - -	3.666E-02	9.907E-07	- - - -	- - - -	- - - -	2.199E+00	100.00
Sa 113	- - - -	4.143E-02	1.120E-06	- - - -	- - - -	- - - -	2.406E+00	100.00
Sa 125	- - - -	0.000E+00	0.000E+00	- - - -	- - - -	- - - -	0.000E+00	100.00
Sa 119m	- - - -	1.967E+00	5.310E-05	- - - -	- - - -	- - - -	1.100E+02	100.00
Sa 121m	- - - -	1.682E+00	4.545E-05	- - - -	- - - -	- - - -	1.009E+02	100.00
Sa 125	- - - -	6.001E-01	1.622E-05	- - - -	- - - -	- - - -	3.601E+01	100.00

The following peaks were not identified:

#	energy	gammas/sec	poterr	CI %
1	77.79	3.1300E-01	0.9	0.0000000
2	245.86	7.0876E-01	3.1	0.0000000
3	272.42	5.2204E-02	20.7	0.0000000
4	302.11	6.4360E-02	18.3	0.0000000
5	345.21	2.0050E-01	10.2	0.0000000
6	511.04	5.0695E-02	100.0	0.0000000
7	583.92	6.1405E-02	100.0	0.0000000
8	661.99	9.4110E-01	4.2	0.0000000
9	727.33	4.7438E-02	100.0	0.0000000
11	794.64	3.4124E-02	100.0	0.0000000
12	860.14	3.2049E-02	100.0	0.0000000
13	910.46	3.5355E-02	100.0	0.0000000
14	963.66	3.4300E-02	100.0	0.0000000
15	967.95	5.6372E-02	100.0	0.0000000
16	1057.47	7.0577E-01	5.2	0.0000000
17	1384.15	0.7110E-02	21.1	0.0000000
18	1589.08	3.8435E-02	100.0	0.0000000
19	1764.01	0.0010E-02	21.2	0.0000000

If CI > 0 Confidence threshold was not exceeded
CI = 0 Energy Window test failure
CI = -1 Extreme Half Life test failure
CI = -2 Extreme As. Gamma comparison test failure
CI = -3 Unable to estimate area of Assoc. Gamma

NIObIUM ANALYSIS

Page 1 of 2

Spreadsheet filename: NBCALC

Revision 1: 6/1/92, NLW

Assumes tracer added to final aliquot

Sample ID: 92-5087 LEPS recount

Date Calculated: 06/22/92

Data filename: NBS087R

M&TE No.

Nb-94 & 95 Spectrum: T9644.cnf;1

Zr/Nb-95 Tracer: 54124-76-0

volume added, ml: 0.2503 0.0012 error

*****Half-lives*****

Zr-95 dpm/ml: 4.415E+03 4.500E+01 error

Zr-95= 64.02 days

Nb-95 dpm/ml: 9.892E+03 1.151E+02 error

Nb-95= 34.97 days

On: Date: 05/13/92 01:00 Time

Nb Sep Date: 05/07/92 13:30 Time

total dpm Nb-95= 2629.44 34.53 error at Nb sep time

Sample Amount: 0.5733 0.0002 error

g, ml or sample? g

Reporting Units

Leach Volume, ml: 250 0.01 error

Activity: dpm

Vol to dilute, ml: 1 0.00001 error

per ? : g

Diluted to, ml: 1 0.00001 error

Final Aliquot, ml: 4.993 0.017 error

Nb-94 & 95 Counting Data from Prepared Sample

Sample dpm Nb-95= 1.736E+03 0.58 % error at Nb sep time

Sample dpm Nb-94= 2.297E+00 100.00 % error

*****RESULTS*****

Yield Nb-95= 0.660 0.009 error

Nb-94 dpm/g= 303.858 303.891 error = 100.01 %

MDA = < 303.858

GENERIC FORMULAS

$$\text{Nb-94 Activity} = \frac{\text{net dpm} \times \text{leach vol} \times \text{dilin vol}}{\text{yield} \times \text{sample amt} \times \text{dilin aliquot} \times \text{aliquot}}$$

$$\% \text{ recovery} = \frac{\text{dpm recovered}}{\text{dpm added}} \times 100$$

$$\text{Nb-93m Activity} = \frac{\text{net cpm} \times \text{d/c} \times \text{leach vol} \times \text{dilin vol}}{\text{yield} \times \text{sample amt} \times \text{dilin aliquot} \times \text{aliquot}}$$

NIOBIUM ANALYSIS

Page 2 of 2

Spreadsheet filename: NBCALC

Revision 1: 6/1/92, NLW

Sample ID:

92-5087 LEPS recount

Date Calculated:

06/22/92

Data filename:

NB5087R

Nb-93m Spectrum:

Weight Nb ppt, mg: 251.5

0.2 error

Counted on: A

M&TE No.

Diode A

On: Date: 06/20/92

12:06 Time

Nb-93m d/c = 72.113

5.871 error

NB-93M COUNTING DATA:

Diode B or 325 LEPS

Enter data under correct diode.

If %error >= 50%, enter MDA. If not, MDA = NA

net cps: 1.00E+00

1.00 % error

MDA, in cps: NA

Diode A

peak channel no.: 83

bkgd: 71 - 75 <-- first ROI

Count time, min.: 1720.28

267 <-- counts

Nb-93m counts--> 349

275

469

259

peak channel + 597

260

5 lower + 739

280

4 higher 948

101 - 105 <-- second ROI

911

252

<-- counts

802

246

524

244

417

249

343

199

gross counts: 6099.000

2531 :normalized ROI total

net cpm: 1.352

0.722 :cpm in bkgd spectrum

error, cpm: 0.058

avg BKG.A1;1&2:bkgd filename

% error 4.272

3773.0 :total bkgd counts

*****RESULTS*****

Nb-93m dpm/g= 12898.132 1200.950 error = 9.311 %

MDA =

Entered by MLW Date 6/22/92

Reviewed by J. L. Jolly Date 6/23/92

RECOUNT FOR NB-93M ON 92-5087

SAMPLE ID..... SY:925087NB.A1;2

OF CHANNELS..... 2048

DIODE I.D..... A

SHELF NUMBER..... 8

CALIBRATION..... 0.2 KEV/CH

TIME ZERO 6/20/92 AT 12: 6: 0

COUNTED..... 6/20/92 AT 12: 6: 0

(0.00 MINUTES DECAY TIME)

LIVE COUNT TIME.... 20 HOURS 40 MINUTES 17 SECONDS (1720.28 MIN.)

ELAPSED TIME..... 20 HOURS 40 MINUTES 17 SECONDS (1720.28 MIN.)
(DEAD TIME = 0.000)

FLUX CORRECTION.... 0.0000

GEOM CORRECTION.... 0.0000 0.0000 0.0000 0.0000 0.0000

WEIGHT..... 1.00000 GRAMS

ANTI: 0 SLP: 0 AREA: 0 P-T: 0 ERR: 0 ZER: 0 OPR: 0 NOV: 1

295

J. H. D'Age
6/21/92

Reviewed by
M. W. L. L.
6/22/92

SI file 6/25/92

RECOUNT FOR NB-93M ON 92-5087

SY:925087NB.A1:2 COUNTED 6/20/92 @ 12: 6: 8 GAIN: 0.2 KEV/CHAN

	#	50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950
0	103217	321	241	243	198	184	154	162	173	146	142	143	156	132	133	117	129	104	117	123
1	0	316	252	213	219	183	168	173	149	180	148	159	140	125	112	126	122	114	114	122
2	0	354	246	258	220	189	172	154	127	151	144	156	135	121	131	143	144	114	104	113
3	0	356	244	300	206	153	175	148	150	175	137	145	144	160	136	107	116	115	105	120
4	0	287	243	343	208	194	181	174	158	150	143	151	146	140	117	123	126	100	144	120
5	0	301	193	366	231	154	187	178	173	141	163	126	139	152	116	137	115	108	116	114
6	0	275	245	331	181	185	182	162	154	151	152	135	140	118	118	135	110	116	132	100
7	0	319	246	349	230	217	187	148	177	141	161	149	126	142	112	140	117	127	130	120
8	0	297	210	442	188	154	155	159	147	150	145	136	131	123	155	114	121	109	111	116
9	734	247	236	555	207	184	182	195	161	174	140	145	139	124	132	143	111	126	121	129
10	1576	302	233	506	202	173	176	187	142	169	141	132	146	128	116	151	111	116	95	125
11	1301	309	215	624	199	189	161	196	160	204	129	159	158	125	115	124	113	103	117	116
12	826	318	202	460	178	197	174	215	144	262	127	134	138	128	129	121	100	110	114	116
13	683	332	258	328	195	180	210	220	131	227	133	134	170	148	121	138	114	102	102	113
14	576	449	200	250	202	185	214	225	164	229	142	141	149	134	129	121	147	111	96	113
15	393	460	209	199	232	150	250	231	171	212	155	141	166	130	134	119	124	91	122	132
16	407	434	210	202	206	196	257	204	157	203	164	137	141	144	128	128	136	116	111	126
17	358	356	231	220	198	195	260	179	159	173	144	137	130	103	143	122	109	130	100	125
18	323	324	196	203	193	191	259	176	160	150	145	121	130	140	125	112	99	116	109	115
19	322	254	223	218	179	179	204	164	155	130	156	150	142	126	132	116	123	90	124	110
20	291	265	207	215	232	180	100	175	185	151	152	133	150	121	140	111	134	109	117	131
21	347	267	253	200	198	203	193	167	197	180	154	117	136	148	143	109	121	116	111	104
22	328	275	206	183	207	204	150	215	230	142	128	144	121	124	144	114	118	104	141	128
23	324	259	255	209	160	215	168	216	211	141	155	120	135	135	126	129	125	124	125	109
24	329	260	197	214	194	178	171	285	211	172	149	161	142	156	122	111	109	120	117	110
25	322	280	224	212	183	160	159	295	235	160	186	142	120	131	122	127	115	111	133	125
26	339	305	215	268	201	180	171	283	221	154	167	122	123	127	130	127	128	112	146	117
27	319	235	259	265	174	184	195	237	191	139	140	120	144	119	127	116	105	100	127	107
28	326	349	232	259	185	173	183	191	175	178	142	114	140	101	131	100	112	136	166	109
29	344	469	248	251	183	173	172	172	182	151	154	129	140	128	118	121	143	115	153	125
30	324	537	258	278	197	181	176	160	151	147	139	136	145	132	141	140	110	136	147	113
31	362	739	277	300	222	167	185	160	173	178	141	150	155	116	124	124	112	113	116	111
32	388	940	302	278	224	186	197	170	165	156	134	135	152	103	114	120	122	124	124	102
33	377	911	287	300	211	191	168	186	155	129	161	164	134	136	159	111	117	145	120	109
34	372	802	406	240	190	186	184	180	185	129	159	117	134	141	121	108	103	106	111	115
35	371	524	495	252	189	162	194	170	170	150	149	139	139	150	120	120	121	122	115	141
36	339	417	700	262	204	152	168	167	173	122	125	142	158	157	119	126	133	86	123	122
37	295	343	825	220	193	179	169	173	179	136	160	146	117	109	126	113	111	117	102	133
38	334	230	662	213	202	180	160	154	173	149	128	141	142	127	113	116	100	103	96	133
39	299	281	406	194	171	180	186	147	189	135	157	145	133	115	115	129	126	120	122	134
40	310	297	350	185	185	171	177	160	171	140	129	134	133	156	140	123	124	91	105	110
41	286	279	228	197	195	172	181	147	161	143	138	145	166	137	123	125	103	116	109	125
42	279	343	241	200	187	201	170	164	162	159	142	150	141	132	120	121	111	96	110	136
43	294	399	224	189	195	191	168	171	148	149	126	134	147	135	132	127	107	119	117	103
44	289	396	222	195	177	225	174	169	141	151	162	130	149	128	118	121	100	124	92	111
45	305	371	204	215	185	183	180	152	143	146	133	134	162	167	113	104	97	91	134	114
46	275	235	219	199	223	176	181	183	142	137	154	144	146	123	119	122	100	110	110	116
47	286	274	197	228	200	182	175	175	152	141	149	130	135	118	122	110	117	109	110	116
48	301	284	228	224	188	205	161	158	153	151	145	142	142	143	126	116	104	91	104	90
49	276	248	241	175	227	158	190	144	125	136	159	119	147	133	137	104	140	115	104	112

RECOUNT FOR NB-93M ON 92-5087

SY:925087NB.A1;2 COUNTED 6/20/92 @ 12: 6: 0 GAIN: 0.2 KEV/CHAN

	1000	1050	1100	1150	1200	1250	1300	1350	1400	1450	1500	1550	1600	1650	1700	1750	1800	1850	1900	1950
0	117	93	103	77	70	100	84	86	77	69	64	77	63	71	64	62	55	75	66	56
1	136	88	85	97	86	69	81	91	71	64	56	66	69	74	67	53	84	59	52	68
2	104	98	100	86	87	83	84	86	81	77	73	62	67	66	75	79	54	59	56	68
3	86	95	109	90	93	80	90	79	84	64	80	77	71	82	74	73	56	76	65	50
4	112	106	94	79	85	73	72	81	64	72	77	74	70	55	60	75	64	67	67	66
5	104	108	96	91	97	94	75	76	70	84	68	55	63	56	69	65	64	50	59	49
6	105	132	90	110	102	64	76	85	82	72	83	68	91	55	61	72	71	47	53	66
7	114	107	93	93	94	81	63	73	69	57	69	64	68	62	69	77	76	66	51	70
8	95	102	83	98	77	86	83	73	76	80	64	71	87	64	68	73	67	55	69	62
9	97	100	102	93	80	80	87	75	67	70	68	55	76	63	69	78	67	72	56	54
10	86	101	91	86	76	71	104	67	70	96	74	73	64	76	61	92	82	84	52	83
11	87	99	100	80	104	89	102	60	67	69	64	82	70	73	65	78	83	77	68	66
12	115	105	94	74	102	76	80	85	77	65	73	72	74	69	66	76	49	75	72	71
13	119	100	94	106	75	66	70	75	81	74	82	58	67	82	72	74	74	48	49	59
14	129	118	95	83	95	96	70	66	66	71	66	69	68	65	69	63	75	49	72	56
15	106	102	96	81	90	76	80	75	82	56	76	67	59	70	53	69	65	55	62	60
16	111	101	92	99	87	101	72	85	76	60	78	83	72	64	73	59	59	56	66	75
17	94	108	86	82	85	82	97	89	81	77	70	77	76	62	58	55	70	66	61	66
18	128	102	87	96	92	79	70	75	77	62	64	70	56	60	68	65	63	63	67	68
19	100	97	87	106	91	98	71	74	79	78	55	81	81	71	68	73	58	62	64	42
20	124	97	99	80	80	68	87	97	82	67	65	66	71	57	59	66	69	55	70	61
21	107	94	102	95	93	84	92	85	75	80	68	83	86	46	63	71	74	79	77	70
22	96	109	96	109	68	78	70	85	73	70	69	70	79	66	77	65	69	59	56	60
23	115	79	96	82	85	94	91	76	58	89	80	72	63	65	70	61	61	75	58	59
24	103	101	100	82	83	70	75	73	76	92	77	81	66	48	70	59	57	63	58	60
25	107	113	95	95	86	73	71	70	80	73	71	68	65	58	75	70	67	62	54	67
26	110	96	93	91	94	83	85	85	85	68	60	58	58	61	61	64	67	64	64	59
27	115	101	80	103	91	81	84	69	83	91	70	65	58	77	50	71	62	61	67	58
28	102	110	90	93	93	82	78	74	84	72	67	67	68	72	72	72	72	59	54	49
29	97	99	87	93	70	66	85	87	70	70	73	67	65	61	59	67	58	51	57	59
30	111	110	87	85	80	77	92	79	84	81	78	60	66	64	65	70	69	74	55	58
31	100	96	106	73	77	68	75	70	83	66	75	83	61	63	58	69	83	54	71	62
32	114	91	97	90	86	85	74	70	79	76	90	67	68	75	73	65	68	58	59	63
33	112	103	91	79	81	81	76	74	83	64	77	67	69	79	75	61	66	64	65	66
34	98	90	122	86	97	87	77	81	70	76	65	73	67	63	75	62	68	72	75	61
35	113	95	100	89	102	85	73	62	72	52	67	68	80	67	59	70	64	59	57	68
36	100	99	90	73	90	94	91	83	76	64	55	68	77	68	67	62	69	61	62	66
37	97	88	107	84	85	99	84	87	66	78	73	75	70	75	53	83	79	61	71	63
38	107	116	82	88	85	86	77	63	82	62	64	79	60	70	62	61	57	72	56	62
39	101	100	97	94	81	80	69	76	90	85	62	66	76	83	60	64	78	72	47	69
40	100	104	80	102	92	75	64	64	82	63	73	54	72	82	76	82	61	55	70	91
41	108	104	100	101	79	79	80	66	75	59	72	55	72	83	71	69	68	61	69	64
42	104	110	83	89	74	84	74	69	71	58	57	71	63	68	76	61	57	61	66	63
43	100	99	98	111	86	85	75	70	70	68	66	62	72	69	70	71	65	60	62	68
44	100	93	76	96	84	90	70	70	80	07	91	78	66	68	67	59	59	65	61	74
45	109	102	80	131	85	85	75	69	71	92	64	77	85	71	56	55	57	59	65	67
46	111	89	79	90	78	84	84	98	79	73	73	85	61	70	61	51	66	70	66	56
47	96	106	101	87	82	90	80	77	65	68	70	67	73	63	56	76	53	57	63	58
48	98	107	102	79	105	84	70	70	83	70	64	64	89	60	62	61	63	74	57	78
49	97	78	83	102	92	99	87	70	59	77	78	61	79	52	62	45	75	59	55	65

NIQBIUM ANALYSIS

Spreadsheet filename: NBCALC

Page 1 of 2

Revision 1: 6/1/92, NLW

Assumes tracer added to final aliquot

Sample ID: 92-5087

Date Calculated: 06/03/92

Data filename: NB5087

M&TE No.

Nb-94 & 95 Spectrum: T9644.cnf;1

Zr/Nb-95 Tracer: 54124-76-0

volume added, ml: 0.2503 0.0012 error *****Half-lives*****

Zr-95 dpm/ml: 4.415E+03 4.500E+01 error Zr-95= 64.02 days

Nb-95 dpm/ml: 9.892E+03 1.151E+02 error Nb-95= 34.97 days

On: Date: 05/13/92 01:00 Time

Nb Sep Date: 05/07/92 13:30 Time

total dpm Nb-95= 2629.44 34.53 error at Nb sep time

Sample Amount: 0.5733 0.0002 error

g, ml or sample? g

Reporting Units

Leach Volume, ml: 250 0.01 error

Activity: dpm

Vol to dilute, ml: 1 0.00001 error

per ? : g

Diluted to, ml: 1 0.00001 error

Final Aliquot, ml: 4.993 0.017 error

Nb-94 & 95 Counting Data from Prepared Sample

Sample dpm Nb-95= 1.736E+03 0.58 % error at Nb sep time

Sample dpm Nb-94= 2.297E+00 100.00 % error

*****RESULTS*****

Yield Nb-95= 0.660 0.009 error

Nb-94 dpm/g= 303.858 303.891 error = 100.01 %

MDA = < 303.858

GENERIC FORMULAS

$$\text{Nb-94 Activity} = \frac{\text{net dpm} \times \text{leach vol} \times \text{diln vol}}{\text{yield} \times \text{sample amt} \times \text{diln aliquot} \times \text{aliquot}}$$

$$\% \text{ recovery} = \frac{\text{dpm recovered}}{\text{dpm added}} \times 100$$

$$\text{Nb-93m Activity} = \frac{\text{net cpm} \times \text{d/c} \times \text{leach vol} \times \text{diln vol}}{\text{yield} \times \text{sample amt} \times \text{diln aliquot} \times \text{aliquot}}$$

NIOBIUM ANALYSIS

Page 2 of 2

Spreadsheet filename: NBCALC

Revision 1: 6/1/92, NLW

Sample ID: 92-5087

Date Calculated: 06/03/92

Data filename: NB5087

Nb-93m Spectrum:

Weight Nb ppt, mg: 251.5 0.2 error

Counted on: 325 leps M&TE No. 325 leps

On: Date: 05/22/92 07:18 Time

Nb-93m d/c = 180.721 31.863 error

NB-93M COUNTING DATA:

Diode B or 325 LEPS

If %error >= 50%, enter MDA. If not, MDA = NA

net cps: 5.91E-03 16.90 % error

MDA, in cps: NA

Diode A Enter data under correct diode.

peak channel no.: 83 bkgd: 71 - 75 <-- first ROI

Count time, min.: 1000 0 <-- counts

Nb-93m counts--> 0 0

0 0

peak channel + 0 0

5 lower + 0 0

4 higher 0 100 - 104 <-- second ROI

0 <-- counts

0 0

0 0

0 0

0 0

gross counts: 0.000 0 :normalized ROI total

net cpm: 0.000 0 :cpm in bkgd spectrum

error, cpm: 0.000 BKG.A1;1 :bkgd filename

% error ERR 0 :total bkgd counts

*****RESULTS*****

Nb-93m dpm/g= 8477.297 2067.394 error = 24.387 %

MDA =

7/26/92

Entered by NJWp/ll ³ 6/2/92 Date

Reviewed by J.L. Fadoff 6/4/92 Date

Shu Jia 8/29/92

VAX/VMS Nuclide Identification Report V2.8 Generated 28-MAY-1992 16:23:40

Configuration : DUBO:[USER]T9644.CNF;1
 Analyses by : PEAK V16.2,PEAKEFF V2.2,ENBACK V1.5,NID V2.4,WTMEAN V1.5
 Sample title : T9644 Nb "ON" FILTER 92-5087 M99913
 Sample date : 22-MAY-1992 00:00:00 Acquisition date : 22-MAY-1992 15:01:36
 Sample ID : T9644 92-5087 Sample quantity : 1.0000 sa
 Sample type : FILTER AT T1 Sample geometry : T1 'CARD'
 Detector name : TRACK Detector geometry: T1CARD
 Elapsed live time: 0 16:00:00.00 Elapsed real time: 0 16:00:10.47 0.0s
 Energy tolerance : 1.20 Half life ratio : 8.00
 Errors propagated: No Systematic Error : 0.00 %
 Efficiency type : Empirical Efficiencies at : Peak Energy
 Abundance limit : 70.00 WTM error limit : 3.00

Nuclide Line Activity Report

Nuclide Type: activation

Nuclide	Energy	%Abn	%Eff	Uncorrected Decay Corr 1-Sigma			Status
				uCi/sa	uCi/sa	%Error	
CO-60	1173.24	99.90	1.217E+00	2.050E-06	2.051E-06	45.99	OK
	1332.50	99.98*	1.059E+00	3.418E-06	3.419E-06	21.53	OK

Final Mean for 2 Valid Peaks - 2.901E-06+/- 5.804E-07 (20.00%)

Nuclide Type: fission

Nuclide	Energy	%Abn	%Eff	Uncorrected Decay Corr 1-Sigma			Status
				uCi/sa	uCi/sa	%Error	
NE-95	765.79	99.79*	1.966E+00	7.674E-04	7.822E-04	0.58	OK

Final Mean for 1 Valid Peaks - 7.822E-04+/- 4.508E-06 (0.58%)

1736 ± 10.01 dpm

CS-137	661.66	85.20*	2.321E+00	6.095E-05	6.095E-05	3.58	OK

Final Mean for 1 Valid Peaks - 6.095E-05+/- 2.181E-06 (3.58%)

Nuclide Type:

Nuclide	Energy	%Abn	%Eff	Uncorrected Decay Corr 1-Sigma			Status
				uCi/sa	uCi/sa	%Error	
TC-95	765.79	94.00*	1.966E+00	8.147E-04	1.787E-03	0.58	OK
	947.67	1.96	1.545E+00	0.000E+00	0.000E+00	0.00	Absent
	1073.71	3.75	1.343E+00	0.000E+00	0.000E+00	0.00	Absent

Final Mean for 1 Valid Peaks - 1.787E-03+/- 1.030E-05 (0.58%)

U-236	49.37	0.08*	1.185E+01	2.015E-03	2.015E-03	21.33	OK
	112.75	0.02	1.334E+01	0.000E+00	0.000E+00	0.00	Absent

Final Mean for 1 Valid Peaks - 2.015E-03+/- 4.298E-04 (21.33%)

Nuclide Line Activity Report (continued)

Page : 2

Sample ID : T9644 92-5087

Acquisition date : 22-MAY-1992 15:01:36

Nuclide Type: desc Ra-226

Nuclide	Energy	%Abn	%Eff	uCi/sa	uCi/sa	%Error	Status
PE-210	46.52	4.05*	1.104E+01	8.932E-05	8.932E-05	12.26	OK

Final Mean for 1 Valid Peaks - 8.932E-05 +/- 1.095E-05 (12.26%)

Flag: "*" - Keyline

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides
5	39.50	925	231	1.89	53.36	50	25	7.4	3.21E+01	
5	43.08*	1505	1233	3.82	58.13	50	25	9.5		
5	46.18*	851	1747	2.72	62.26	50	25	12.3		PB-210
5	49.03	397	2005	2.20	66.06	50	25	21.3		U-236
0	74.08*	78	3761	2.62	99.46	95	101	56.8		
0	197.62*	101	2047	1.64	264.18	262	5	74.8		
0	427.64	140	1452	2.56	570.88	567	7	46.3		
0	661.55*	2569	676	1.73	882.79	877	12	3.6		CS-137
0	765.69	32088	503	1.78	1021.67	1015	14	0.6		TC-95
										NB-95
0	1173.44*	53	56	1.92	1565.51	1561	12	46.0		CO-60
0	1332.27	77	62	1.63	1777.37	1774	9	21.5		CO-60
0	2614.10	36	7	2.75	3487.74	3483	10	27.3		

VAX/VMS Nuclide Identification Report V2.8 Generated 28-MAY-1992 16:26:12

Configuration : DUBO:[USER]T9644.CNF;1
 Analyses by : PEAK V16.2,PEAKEFF V2.2,ENBACK V1.5,NID V2.4,WTMEAN V1.5
 Analyses by : MINACT V2.2
 Sample title : T9644 Nb "ON" FILTER 92-5087 M99913
 Sample date : 22-MAY-1992 00:00:00 Acquisition date : 22-MAY-1992 15:01:36
 Sample ID : T9644 92-5087 Sample quantity : 1.0000 sa
 Sample type : FILTER AT T1 Sample geometry : T1 'CARD'
 Detector name : TRACK Detector geometry: T1CARD
 Elapsed live time: 0 16:00:00.00 Elapsed real time: 0 16:00:10.47 0.0%
 Peak Width (FWHM): 2.00 Confidence level : 5.00 %
 Energy tolerance : 1.20 Half life ratio : 8.00
 Errors propagated: No Systematic Error : 0.00 %
 Efficiency type : Empirical Efficiencies at : Peak Energy
 Abundance limit : 70.00 WTM error limit : 3.00

Minimum Detectable Activity Report

Nuclide	Bckgnd Sum	Energy ()	MDA (uCi/sa)
NA-22	41.	1274.53	1.2658E-06
NA-24	23.	1368.60	2.9218E-06
K-40	116.	1460.83	2.2988E-05
SC-46	55.	1120.50	1.2776E-06
CR-51	855.	320.08	1.2660E-05
MN-54	64.	834.83	9.7774E-07
CO-57	1253.	122.06	7.0703E-07
CO-58	55.	810.75	8.9140E-07
FE-59	48.	1099.25	2.0789E-06
ZN-65	41.	1115.55	2.1479E-06
SE-75	1065.	264.66	1.8815E-06
BR-82	69.	776.52	1.8030E-06
SR-85	1150.	514.00	2.4346E-06
Y-88	63.	898.04	1.1652E-06
NB-94	65.	871.09	1.0349E-06
NB-95M	1266.	235.68	5.1598E-06
TC-95M	1555.	204.11	1.5691E-06
ZR-95	202.	756.73	2.8868E-06
RU-103	996.	497.05	2.4579E-06
RU-106	481.	621.92	1.9652E-05
AG-108M	155.	722.90	1.4175E-06
CD-109	1226.	88.03	1.4449E-05
AG-110M	56.	884.68	1.3497E-06
SN-113	840.	391.70	2.3663E-06
SB-124	627.	602.71	2.9184E-06
SB-125	1044.	427.88	6.3061E-06
I-131	891.	364.50	1.9143E-06
BA-133	914.	356.00	2.2675E-06
CS-134	595.	604.71	2.1227E-06
CE-139	1300.	165.80	9.7647E-07
BA-140	1141.	537.27	1.0819E-05
LA-140	985.	487.03	4.1573E-06
CE-141	1323.	145.40	1.4839E-06
CE-144	1245.	133.54	5.7896E-06
PM-144	199.	696.54	1.0510E-04

= 2.297 dpm

Nuclide	Bckgnd Sum	Energy ()	MDA (uCi/sa)
SM-145	1086.	61.30	8.3416E-07
ND-147	1241.	91.10	2.0114E-06
PM-148M	1236.	550.27	3.2119E-06
EU-152	25.	1408.01	5.2364E-06
GD-153	1125.	97.43	1.8666E-06
EU-154	41.	1274.51	3.6766E-06
EU-155	1243.	105.31	2.5534E-06
TM-170	1315.	84.30	1.6507E-05
TA-182	55.	1121.30	3.6293E-06
W-188	1284.	155.00	4.8765E-06
OS-191	1263.	129.40	2.5675E-06
IR-192	866.	316.50	1.4702E-06
HG-203	1376.	72.87	8.7902E-06
BI-211	0.	350.10	Half-Life too short
BI-214	56.	1120.27	8.5338E-06
PB-214	897.	351.87	3.7213E-06
PO-214(I	574.	609.31	2.8246E-06
RA-224	1212.	240.76	3.2863E-05
RA-226	897.	351.87	3.7203E-06
TH-228	1422.	215.75	3.7473E-04
TH-230	1114.	67.68	1.3250E-04
PA-231	914.	300.07	4.9204E-05
TH-232	78.	911.16	4.1268E-06
PA-233	940.	311.90	3.2883E-06
U-234	998.	53.23	4.5165E-04
U-235	1465.	185.74	1.7213E-06
NP-237	940.	311.90	3.2083E-06
PU-237	1183.	101.10	2.6975E-06
U-238	57.	1001.00	1.7506E-04
AM-241	1044.	59.54	1.4152E-06

VAX/VMS Peak Search Report V1.8 Generated 28-MAY-1992 16:19:03

Configuration : DUBO:[USER]T9644.CNF;1
 Analyses by : PEAK V16.2,ENBACK V1.5
 Sample title : T9644 Nb "ON" FILTER 92-5087 M99913
 Sample date : 22-MAY-1992 00:00:00 Acquisition date : 22-MAY-1992 15:01:36
 Sample ID : T9644 92-5087 Sample quantity : 1.0000 sa
 Sample type : FILTER AT T1 Sample geometry : T1 'CARD'
 Detector name : TRACK Detector geometry: T1CARD
 Elapsed live time: 0 16:00:00.00 Elapsed real time: 0 16:00:10.47 0.0%
 Start energy : 29.48 End energy : 3069.79
 Sensitivity : 5.00 Gaussian : 10.00
 Critical level : No

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	5	39.50	925	231	1.89	53.36	50	25	1.61E-02	7.4	3.21E+01
2	5	43.08*	1505	1233	3.82	58.13	50	25	2.61E-02	9.5	
3	5	46.18*	851	1747	2.72	62.26	50	25	1.48E-02	12.3	
4	5	49.03	397	2005	2.20	66.06	50	25	6.89E-03	21.3	
5	0	74.08*	78	3761	2.62	99.46	95	10	1.36E-03	156.8	
6	0	197.62*	101	2047	1.64	264.18	262	5	1.75E-03	74.8	
7	0	427.64	140	1452	2.56	570.88	567	7	2.43E-03	46.3	
8	0	661.55*	2569	676	1.73	882.79	877	12	4.46E-02	3.6	
9	0	765.69	32088	503	1.78	1021.67	1015	14	5.57E-01	0.6	
10	0	1173.44*	53	56	1.92	1565.51	1561	12	9.22E-04	46.0	
11	0	1332.27	77	62	1.63	1777.37	1774	9	1.34E-03	21.5	
12	0	2614.10	36	7	2.75	3487.74	3483	10	6.33E-04	27.3	

VAX/VMS Peak Search Report V1.8 Generated 28-MAY-1992 16:18:22

Configuration : DUBO:[USER]T9644.CNF;1
 Analyses by : PEAK V16.2
 Sample title : T9644 Nb "ON" FILTER 92-5087 M99913
 Sample date : 22-MAY-1992 00:00:00 Acquisition date : 22-MAY-1992 15:01:36
 Sample ID : T9644 92-5087 Sample quantity : 1.0000 sa
 Sample type : FILTER AT T1 Sample geometry : T1 'CARD'
 Detector name : TRACK Detector geometry: T1CARD
 Elapsed live time: 0 16:00:00.00 Elapsed real time: 0 16:00:10.47 0.0%
 Start energy : 29.48 End energy : 3069.79
 Sensitivity : 5.00 Gaussian : 10.00
 Critical level : No

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Ftc
1	5	39.50	925	231	1.89	53.36	50	25	1.61E-02	7.4	3.21E+01
2	5	43.08	1807	1233	3.82	58.13	50	25	3.14E-02	6.9	
3	5	46.18	987	1747	2.72	62.26	50	25	1.71E-02	10.2	
4	5	49.03	397	2005	2.20	66.06	50	25	6.89E-03	21.3	
5	0	74.08	673	3761	2.62	99.46	95	10	1.17E-02	17.5	
6	0	92.35	204	2614	1.69	123.82	121	7	3.55E-03	42.1	
7	0	197.62	179	2047	1.64	264.18	262	5	3.11E-03	39.1	
8	0	427.64	140	1452	2.56	570.88	567	7	2.43E-03	46.3	
9	0	511.03	449	2718	2.59	682.07	677	11	7.79E-03	23.1	
10	0	661.55	4806	676	1.73	882.79	877	12	8.34E-02	1.8	
11	0	765.69	32088	503	1.78	1021.67	1015	14	5.57E-01	0.6	
12	0	1173.44	123	56	1.92	1565.51	1561	12	2.14E-03	17.2	
13	0	1332.27	77	62	1.63	1777.37	1774	9	1.34E-03	21.5	
14	0	1461.16	116	47	2.33	1949.30	1941	17	2.02E-03	15.9	
15	0	2614.10	36	7	2.75	3487.74	3483	10	6.33E-04	27.3	

 22-MAY-92 14:18:59

92-05987 NB POWDER IN FILTER M99913

SAMPLE DATE: 22-MAY-92 07:18:00
 SAMPLE IDENTIFICATION: NB STD STIPPLED
 TYPE OF SAMPLE: BATCH FILTER
 SAMPLE QUANTITY: 1.000000 UNITS: SPL
 SAMPLE GEOMETRY: SHELF 1
 EFFICIENCY FILE NAME: EFF.TAB1..

ACQUIRE DATE: 22-MAY-92 07:18:04 * FLHM(1332) 1.609
 PRESET TIME(LIVE): 25200. SEC * SENSITIVITY: 5.000
 ELAPSED REAL TIME: 25246. SEC * SHAPE PARAMETER 1 10.0 %
 ELAPSED LIVE TIME: 25200. SEC * NBR ITERATIONS: 10.

DETECTOR: IGP-510 LEPS #1 * LIBRARY:N.L101
 CALIB DATE: 15-APR-91 00:00:00 * ENERGY TOLERANCE: 1.250KV
 KEY/CHNL: 0.1000000 * HALF LIFE RATIO: 0.00
 OFFSET: 0.0000000 KEY * ABUNDANCE LIMIT: 05.00%

ENERGY WINDOW 5.00 TO 405.00

PK	IT	ENERGY	AREA	BKGND	FLHM	CHANNEL	LEFT	PW	CTS/SEC	XERR	FIT
1	0	16.27	149.	243.	0.36	162.74	150	12	5.91E-03	16.9	
2	0	27.11	260.	324.	0.41	271.13	261	24	1.03E-02	11.6	
3	0	31.05	69.	495.	0.56	310.55	310	27	2.73E-03	47.3	

PEAK SEARCH COMPLETED (REV 11)

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NIOBIUM ANALYSIS

Page 1 of 2

Spreadsheet filename: NBCALC

Revision 1: 6/1/92, NLW

Assumes tracer added to final aliquot

Sample ID: 92-5092 LEPS recount

Date Calculated: 06/16/92

Data filename: NBS092R

M&TE No.

Nb-94 & 95 Spectrum: F5733.cnf;1

Zr/Nb-95 Tracer: 54124-76-0

volume added, ml: 0.2503 0.0012 error *****Half-lives*****

Zr-95 dpm/ml: 4.415E+03 4.500E+01 error Zr-95= 64.02 days

Nb-95 dpm/ml: 9.892E+03 1.151E+02 error Nb-95= 34.97 days

On: Date: 05/13/92 01:00 Time

Nb Sep Date: 05/07/92 13:30 Time

total dpm Nb-95= 2629.44 34.53 error at Nb sep time

Sample Amount: 0.6161 0.0002 error

g, ml or sample? g

Reporting Units

Leach Volume, ml: 250 0.01 error

Activity: dpm

Vol to dilute, ml: 1 0.00001 error

per ? : g

Diluted to, ml: 1 0.00001 error

Final Aliquot, ml: 4.993 0.017 error

Nb-94 & 95 Counting Data from Prepared Sample

Sample dpm Nb-95= 1.859E+03 0.44 % error at Nb sep time

Sample dpm Nb-94= 3.242E+00 100.00 % error

*****RESULTS*****

Yield Nb-95= 0.707 0.010 error

Nb-94 dpm/g= 372.669 372.707 error = 100.01 %

MDA = < 372.669

GENERIC FORMULAS

net dpm x leach vol x diln vol
Nb-94 Activity = -----
yield x sample amt x diln aliquot x aliquot

dpm recovered
% recovery = ----- x 100
dpm added

net cpm x d/c x leach vol x diln vol
Nb-93m Activity = -----
yield x sample amt x diln aliquot x aliquot

NIOBIDIUM ANALYSIS

Page 2 of 2

Spreadsheet filename: NBCALC

Revision 1: 6/1/92, NLW

Sample ID:

92-5092 LEPS recount

Date Calculated:

06/16/92

Data filename:

NB5092R

Nb-93m Spectrum:

Weight Nb ppt, mg: 328.9

0.2 error

Counted on:

A

M&TE No.

Diode A

On: Date: 06/15/92

08:31 Time

Nb-93m d/c = 76.267

6.597 error

NB-93M COUNTING DATA:

Diode B or 325 LEPS

Enter data under correct diode.

If %error >= 50%, enter MDA. If not, MDA = NA

net cps: 1.00E+00 1.00 % error

MDA, in cps:NA

Diode A

peak channel no.: 83

bkgd: 71 - 75 <-- first ROI

Count time, min.: 569.4

122 <-- counts

Nb-93m counts--> 185

139

199

111

peak channel + 306

115

5 lower + 472

143

4 higher 639

101 - 105 <-- second ROI

642

120 <-- counts

473

101

314

127

211

110

187

130

gross counts: 3628.000

1218 :normalized ROI total

net cpm: 3.511

0.722 :cpm in bkgd spectrum

error, cpm: 0.127

avg BKG.A1;1&2:bkgd filename

% error 3.627

1629.1 :total bkgd counts

*****RESULTS*****

Nb-93m dpm/g= 30776.499 2920.057 error = 9.488 %

MDA =

Entered by NJW Date 6/16/92

Reviewed by L. K. Tudy Date 6/18/92

RECOUNT FOR NB-93M ON 92-5092

SAMPLE ID..... SY:925092NB.A1;2

OF CHANNELS..... 2048

DIODE I.D..... A

SHELF NUMBER..... 0

CALIBRATION..... 0.2 KEV/CH

TIME ZERO 6/16/92 AT 8:31: 0

COUNTED..... 6/15/92 AT 8:31: 0

(0.00 MINUTES DECAY TIME)

LIVE COUNT TIME.... 9 HOURS 29 MINUTES 24 SECONDS (569.40 MIN.)

ELAPSED TIME..... 9 HOURS 29 MINUTES 24 SECONDS (569.40 MIN.)

(DEAD TIME = 0.000)

FLUX CORRECTION.... 0.0000

GEOM CORRECTION.... 0.0000 0.0000 0.0000 0.0000 0.0000

WEIGHT..... 1.00000 GRAMS

ANTI: 0 SLP: 0 AREA: 0 P-T: 0 ERR: 0 ZER: 0 OPR: 0 NOV: -1

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MJDy LL
6/15/92

J. L. Fadoff 6/12/92

RECOUNT FOR NB-93M ON 92-5092

SY:925092NB.A1:2 COUNTED 6/15/92 @ 0:31:00 GAIN: 0.2 KEV/CHAN

	0	50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950
0	34164	129	133	118	94	114	116	100	82	65	86	78	65	66	59	74	48	63	57	50
1	0	147	120	115	93	117	112	87	88	74	68	82	69	61	55	62	46	42	57	70
2	0	136	101	164	93	88	70	73	88	69	73	69	66	64	68	57	55	56	70	58
3	0	145	127	163	103	90	92	95	81	82	62	64	61	58	61	63	57	51	61	51
4	0	153	110	204	76	71	83	92	98	65	73	60	66	65	70	71	60	61	58	60
5	0	135	130	215	80	80	91	72	68	69	62	68	70	69	65	70	53	55	55	54
6	0	153	123	203	99	83	83	90	78	87	71	73	65	66	61	57	69	47	68	62
7	0	141	127	279	106	84	93	88	92	66	68	62	74	67	68	58	59	59	52	55
8	6	122	123	303	118	79	82	96	77	78	70	61	67	66	54	56	57	50	60	66
9	270	138	144	530	152	84	93	89	86	74	79	68	66	77	62	65	54	56	60	53
10	520	122	105	600	100	93	95	109	99	73	71	78	72	69	63	64	67	57	56	69
11	487	136	151	601	242	82	71	101	89	91	83	71	82	67	42	62	57	58	65	74
12	310	148	148	489	272	89	100	103	100	109	82	83	117	54	62	55	82	64	73	59
13	264	152	127	275	324	100	105	91	72	97	77	64	106	59	55	57	51	55	70	78
14	222	197	106	202	372	93	96	101	63	117	71	79	273	69	68	57	57	76	57	58
15	175	105	107	116	301	80	118	110	74	100	77	68	331	65	63	55	55	55	79	57
16	136	175	133	104	303	80	120	100	89	95	64	70	317	68	59	63	64	60	46	66
17	131	168	120	127	210	100	134	83	72	73	67	69	244	52	71	58	62	55	54	57
18	129	173	126	96	133	86	102	80	92	94	60	50	169	55	74	74	55	64	51	76
19	125	120	111	96	113	81	104	64	90	67	67	77	98	63	70	49	63	45	69	68
20	149	122	123	101	97	89	93	88	103	82	79	59	80	69	70	53	64	52	56	44
21	140	122	108	118	106	105	92	80	102	84	86	76	64	66	65	61	61	55	63	68
22	140	139	116	109	103	83	83	86	114	62	80	81	71	60	77	63	60	62	59	57
23	137	111	121	109	71	90	85	104	110	68	112	86	49	54	71	58	58	45	55	63
24	135	115	113	114	91	93	81	134	114	60	141	76	61	66	68	51	54	48	54	48
25	140	143	102	107	102	79	85	129	06	74	190	50	66	55	50	68	51	52	55	58
26	134	143	124	127	96	74	92	128	91	61	231	71	60	44	70	44	70	51	70	59
27	146	155	104	158	99	82	73	102	86	73	265	70	73	63	55	47	55	61	79	50
28	144	185	130	154	96	81	89	87	85	74	201	75	61	62	56	62	43	65	64	50
29	157	199	124	167	99	92	70	102	139	78	152	83	73	66	54	62	58	66	77	50
30	167	306	140	200	90	81	77	88	181	81	111	74	69	75	58	66	59	66	56	70
31	176	472	168	175	99	95	76	87	208	71	78	74	78	59	68	58	54	60	48	48
32	177	639	132	217	111	76	93	79	967	73	66	73	80	61	63	55	55	79	68	51
33	192	642	190	188	99	90	79	68	378	89	64	78	56	59	63	60	57	66	50	64
34	191	473	220	158	84	85	89	96	332	74	66	80	67	66	79	54	62	61	60	75
35	146	314	335	150	116	74	89	76	227	66	74	64	68	67	52	46	58	60	53	70
36	158	211	430	141	100	89	77	82	149	79	58	55	69	64	68	63	70	47	57	54
37	144	187	501	135	88	97	77	89	109	67	55	79	71	58	58	63	44	47	57	56
38	141	188	433	104	100	76	71	82	87	85	58	61	66	50	53	64	53	44	62	68
39	142	136	207	118	112	103	82	83	79	78	77	73	65	61	42	72	53	53	61	55
40	115	139	183	122	105	92	91	88	86	56	65	71	61	55	55	65	65	59	55	65
41	154	175	127	111	125	91	95	91	73	81	68	65	79	62	58	55	70	58	45	64
42	133	173	105	96	135	103	96	78	80	68	56	67	67	65	67	54	54	44	64	50
43	134	211	93	97	176	86	92	66	84	72	69	73	53	49	47	68	78	52	67	50
44	134	203	106	81	164	104	94	86	76	66	85	64	77	63	63	61	71	53	61	56
45	134	172	103	95	116	97	71	91	79	61	67	70	67	75	59	55	52	53	53	63
46	119	154	107	96	109	90	101	74	70	72	98	71	68	68	70	57	56	49	58	64
47	139	132	118	106	89	109	86	77	75	75	72	63	64	57	58	62	61	68	53	51
48	144	125	129	84	102	119	88	86	71	84	75	70	57	62	61	51	49	52	62	56
49	159	120	121	114	113	128	77	75	83	70	64	76	67	62	76	68	74	53	54	70

RECOUNT FOR NB-93M ON 92-5092

SY:925092NB.A1;2 COUNTED 6/15/92 @ 8:31:00 GAIN: 0.2 KEV/CHAN

	1000	1050	1100	1150	1200	1250	1300	1350	1400	1450	1500	1550	1600	1650	1700	1750	1800	1850	1900	1950
0	52	41	40	40	41	50	40	47	41	47	37	42	39	37	39	29	43	46	50	37
1	69	55	50	54	44	49	43	39	44	37	53	43	43	38	30	38	31	37	37	41
2	49	46	50	48	51	38	39	45	46	29	41	46	39	38	37	31	33	32	35	46
3	69	52	42	48	41	44	49	48	46	35	37	40	42	41	27	33	41	45	45	40
4	52	53	51	54	30	42	34	37	42	34	44	41	39	49	27	39	42	36	39	32
5	52	64	44	48	46	50	35	35	40	39	43	48	39	35	37	28	35	32	42	31
6	51	58	61	45	42	46	41	47	42	43	43	37	26	40	40	39	39	37	35	37
7	55	44	40	48	39	39	43	40	43	30	29	44	37	34	39	30	30	39	42	34
8	43	47	49	44	55	38	35	27	44	50	37	36	39	47	34	46	32	33	34	28
9	51	59	52	34	56	46	38	31	33	38	46	36	36	33	38	40	41	37	32	33
10	63	46	61	46	44	48	43	44	50	48	43	38	27	32	36	35	43	47	42	39
11	56	53	56	56	55	40	42	34	39	26	35	37	35	35	36	40	45	43	34	33
12	54	41	45	46	45	46	35	33	44	37	25	32	43	33	39	34	35	38	27	34
13	51	50	57	53	41	37	38	46	41	41	53	40	38	43	36	31	35	37	37	20
14	48	50	44	48	56	32	47	42	36	38	44	45	37	27	46	34	37	26	31	38
15	61	52	48	51	45	36	41	41	30	34	37	43	35	35	43	35	35	29	47	41
16	65	54	65	45	51	41	48	35	30	43	40	37	38	38	35	34	40	29	40	37
17	43	56	43	40	43	49	36	38	47	40	48	31	34	26	49	29	30	24	27	42
18	59	33	44	49	44	32	49	46	37	27	39	33	31	46	33	42	23	45	47	35
19	68	48	46	43	34	40	37	35	38	37	34	40	32	48	36	40	39	42	36	37
20	65	54	48	43	53	48	34	43	45	40	35	42	47	37	30	38	31	49	38	33
21	73	40	47	56	41	59	34	47	39	37	51	33	34	46	30	40	44	41	36	44
22	48	63	55	43	42	50	44	41	51	37	31	38	43	35	31	43	33	38	31	32
23	65	49	52	41	49	40	42	42	42	40	43	39	41	34	33	28	37	40	46	33
24	59	59	47	63	43	49	44	42	39	45	35	39	37	34	26	35	35	53	34	39
25	48	50	56	44	50	37	30	37	33	37	43	35	34	40	30	29	36	36	38	39
26	58	42	46	40	41	52	24	36	62	39	45	48	40	35	35	36	30	39	32	40
27	59	50	41	43	47	50	45	33	44	37	37	40	38	34	48	28	37	37	34	36
28	53	45	43	59	59	50	42	37	46	44	38	32	42	36	26	36	35	28	28	41
29	46	48	34	46	48	46	45	33	36	34	31	34	36	36	45	40	37	29	29	20
30	55	43	49	55	50	31	43	51	52	42	35	41	43	39	34	35	42	31	42	32
31	37	46	45	45	34	41	41	49	50	44	43	37	50	36	35	38	39	30	35	34
32	57	59	62	60	43	35	44	40	44	39	40	46	41	39	28	44	37	45	36	36
33	58	50	66	47	35	47	46	40	41	31	45	33	48	42	29	47	25	36	26	34
34	72	46	55	62	41	37	53	43	43	35	39	36	49	41	43	42	31	40	46	41
35	53	46	51	52	51	41	31	27	45	46	32	29	51	35	41	35	44	26	29	20
36	53	51	46	48	58	48	34	46	36	36	39	38	37	29	31	39	42	30	27	36
37	51	45	37	60	47	38	38	35	42	35	44	38	31	32	35	29	34	40	47	37
38	53	51	57	40	47	46	42	52	47	39	50	37	37	31	28	31	38	35	40	42
39	65	42	55	41	67	34	46	36	50	39	39	30	30	40	36	35	39	43	31	43
40	55	57	47	41	53	40	52	41	35	31	41	42	35	30	35	39	29	39	26	35
41	59	58	35	48	54	39	52	34	36	46	32	34	32	33	31	38	36	42	32	43
42	45	59	59	55	50	45	41	43	41	39	47	49	34	53	49	37	47	34	38	29
43	55	51	61	51	57	33	54	38	39	43	28	35	40	42	34	34	34	38	36	34
44	49	47	57	53	43	39	43	35	34	44	36	35	33	36	35	31	38	35	29	36
45	59	51	49	47	38	35	55	34	45	40	38	29	42	38	33	34	44	37	36	35
46	53	47	50	59	37	43	46	35	40	35	31	40	38	35	44	38	43	25	42	44
47	52	54	57	54	43	49	47	31	40	45	29	37	42	41	39	38	37	30	29	30
48	47	47	42	43	36	36	54	34	27	48	39	50	32	49	36	45	42	40	32	37
49	46	59	37	38	41	53	37	44	32	47	27	35	50	35	31	31	36	39	31	30

NIOBIUM ANALYSIS

Page 1 of 2

Spreadsheet filename: NBCALC

Revision 1: 6/1/92, NLW

Assumes tracer added to final aliquot

Sample ID: 92-5092

Date Calculated: 06/03/92

Data filename: NB5092

M&TE No.

Nb-94 & 95 Spectrum: F5733.cnf;1

Zr/Nb-95 Tracer: 54124-76-0

volume added, ml:	0.2503	0.0012 error	*****Half-lives*****
Zr-95 dpm/ml:	4.415E+03	4.500E+01 error	Zr-95= 64.02 days
Nb-95 dpm/ml:	9.892E+03	1.151E+02 error	Nb-95= 34.97 days

On: Date: 05/13/92 01:00 Time

Nb Sep Date: 05/07/92 13:30 Time

total dpm Nb-95= 2629.44 34.53 error at Nb sep time

Sample Amount: 0.6161 0.0002 error

g, ml or sample? g

Reporting Units

Leach Volume, ml: 250 0.01 error Activity: dpm

Vol to dilute, ml: 1 0.00001 error per ? g

Diluted to, ml: 1 0.00001 error

Final Aliquot, ml: 4.793 0.017 error

Nb-94 & 95 Counting Data from Prepared Sample

Sample dpm Nb-95= 1.859E+03 0.44 % error at Nb sep time

Sample dpm Nb-94= 3.242E+00 100.00 % error

*****RESULTS*****

Yield Nb-95= 0.707 0.010 error

Nb-94 dpm/g= 372.669 372.707 error = 100.01 %

MDA = < 372.669

GENERIC FORMULAS

Nb-94 Activity =
$$\frac{\text{net dpm} \times \text{leach vol} \times \text{diln vol}}{\text{yield} \times \text{sample amt} \times \text{diln aliquot} \times \text{aliquot}}$$

% recovery =
$$\frac{\text{dpm recovered}}{\text{dpm added}} \times 100$$

Nb-93m Activity =
$$\frac{\text{net cpm} \times \text{d/c} \times \text{leach vol} \times \text{diln vol}}{\text{yield} \times \text{sample amt} \times \text{diln aliquot} \times \text{aliquot}}$$

NIOBIUM ANALYSIS

Page 2 of 2

Spreadsheet filename: NBCALC

Revision 1: 6/1/92, NLW

Sample ID: 92-5092

Date Calculated: 06/03/92

Data filename: NB5092

Nb-93m Spectrum:

Weight Nb ppt, mg: 328.9 0.2 error

Counted on: 325 leps M&TE No. 325 leps

On: Date: 05/21/92 09:03 Time

Nb-93m d/c = 199.873 35.583 error

NB-93M COUNTING DATA:

Diode B or 325 LEPS

If %error >= 50%, enter MDA. If not, MDA = NA

net cps: 1.51E-02 11.60 % error

MDA, in cps: NA

Diode A Enter data under correct diode.

peak channel no.: 83 bkqd: 71 - 75 <-- first ROI

Count time, min.: 1000 0 <-- counts

Nb-93m counts--> 0 0

0 0

peak channel + 0 0

5 lower + 0 0

4 higher 0 100 - 104 <-- second ROI

0 0 <-- counts

0 0

0 0

0 0

0 0

gross counts: 0.000 0 :normalized ROI total

net cpm: 0.000 0 :cpm in bkqd spectrum

error, cpm: 0.000 BKG.A1;1 :bkqd filename

% error ERR 0 :total bkqd counts

*****RESULTS*****

Nb-93m dpm/g= 20815.900 4430.040 error = 21.297 %

MDA =

NWyer 6/3/92
Entered by Date

S. L. Jodys 6/4/92
Reviewed by Date

 21-MAY-92 14:54:33 . *****

92-55002 NB POWDER IN FILTER M9913

START DATE: 21-MAY-92 09:03:00
 SAMPLE IDENTIFICATION: NB STD STIPPLED
 TYPE OF SAMPLE: BATCH FILTER
 SAMPLE QUANTITY: 1.000000 UNITS: SPL
 SAMPLE GEOMETRY: SHELF 1
 EFFICIENCY FILE NAME: EFF.TAB1..

 ACQUIRE DATE: 21-MAY-92 09:03:43 * FLUHM(1332) 1.609
 PRESET TIME(LIVE): 21000. SEC * SENSITIVITY: 5.000
 ELAPSED REAL TIME: 21043. SEC * SHAPE PARAMETER: 10.0 %
 ELAPSED LIVE TIME: 21000. SEC * NBR ITERATIONS: 10.

 DETECTOR: IGP-510 LEPS *1 * LIBRARY: N.LIB1
 CALIB DATE: 15-APR-91 00:00:00 * ENERGY TOLERANCE: 1.250KV
 KEV/CHNL: 0.1000000 * HALF LIFE RATIO: 8.00
 OFFSET: 0.0000000 KEV * ABUNDANCE LIMIT: 85.00%

5.834

ENERGY WINDOW 5.00 TO 405.00

PK	IT	ENERGY	AREA	BKGD	FLUHM	CHANNEL	LEFT	PW	CTS/SEC	XERR	FIT
1	0	16.32	317.	520.	0.46	163.17	155	20	1.51E-02	11.6	
2	0	27.11	399.	424.	0.52	271.06	256	24	1.90E-02	8.0	
3	0	31.82	460.	533.	0.73	318.23	310	25	2.19E-02	8.5	
4	0	36.06	147.	560.	1.87	360.60	347	32	7.02E-03	24.2	
5	0	42.57	371.	422.	1.06	425.71	414	23	1.77E-02	9.4	
6	0	48.51	91.	369.	0.31	485.05	476	27	4.36E-03	31.5	
7	0	66.36	395.	234.	0.51	663.65	653	19	1.80E-02	7.4	
8	0	105.10	281.	248.	0.44	1051.01	1039	24	1.34E-02	9.9	
9	0	122.94	377.	297.	0.66	1229.40	1216	35	1.80E-02	8.3	

PEAK SEARCH COMPLETED (REV 11)

315

***** 29-MAY-92 08:57:11 *****

92-05092 NB POWDER IN FILTER M99913

SAMPLE DATE: 21-MAY-92 09:03:00
SAMPLE IDENTIFICATION: NB STD STIPPLED
TYPE OF SAMPLE: BATCH FILTER
SAMPLE QUANTITY: 1.000000 UNITS: SPL
SAMPLE GEOMETRY: SHELF 1
EFFICIENCY FILE NAME: EFF.TAB1..

ACQUIRE DATE: 21-MAY-92 09:03:43 * FWHM(1332) 1.609
PRESET TIME(LIVE): 21000. SEC * SENSITIVITY: 5.000
ELAPSED REAL TIME: 21043. SEC * SHAPE PARAMETER : 10.0 *
ELAPSED LIVE TIME: 21000. SEC * NBR ITERATIONS: 10.
*

DETECTOR: IGP-510 LEPS *1 * LIBRARY:H.LIB1
CALIB DATE: 15-APR-91 00:00:00 * ENERGY TOLERANCE: 1.250KV
KEY/CHNL: 0.1000000 * HALF LIFE RATIO: 8.00
OFFSET: 0.0000000 KEV * ABUNDANCE LIMIT: 05.00%
*

00	22	19	19	38	24	26	11
08	22	22	20	21	25	26	22
16	22	22	17	17	38	26	22
24	22	22	16	17	21	24	22
32	22	22	16	21	12	18	22
40	22	22	11	11	13	19	22
48	22	22	08	08	19	34	22
56	22	22	07	07	37	04	22
64	22	22	05	05	25	22	22
72	22	22	05	04	38	17	22
80	22	22	05	04	23	19	22
88	22	22	16	14	14	21	22
96	22	22	16	16	31	17	22
204	22	22	19	29	22	20	22
212	22	22	19	14	20	15	22
220	22	22	17	15	16	17	22
228	22	22	06	15	16	17	22
236	22	22	04	19	15	15	22
244	22	22	04	19	15	15	22

Configuration : DUBO:[USER]F5733.CNF;1
 Analyses by : PEAK V16.2,PEAKEFF V2.2,ENBACK V1.5,NID V2.4,WTMEAN V1.5
 Sample title : F5733 NB EXPERIMENTAL SPL 92-5092
 Sample date : 20-MAY-1992 00:00:00 Acquisition date : 22-MAY-1992 13:50:57
 Sample ID : F5733 92-5092 Sample quantity : 1.0000 SA
 Sample type : Sample geometry : FALF (W/O DISH)
 Elapsed live time: 0 16:00:00.00 Elapsed real time: 0 16:00:07.00 0.0%
 Energy tolerance : 1.60 keV Half life ratio : 8.00
 Errors propagated: No Systematic Error : 0.00 %
 Efficiency type : Empirical Efficiencies at : Peak Energy
 Abundance limit : 75.00 WTM error limit : 3.00

Nuclide Line Activity Report

Nuclide Type: fission

Nuclide	Energy	%Abn	%Eff	uCi/SA	uCi/SA	%Error	Status
GO-57	122.06	85.95*	1.567E+01	7.198E-06	7.252E-06	5.73	OK
	136.47	10.33	1.508E+01	0.000E+00	0.000E+00	0.00	Absent

Final Mean for 1 Valid Peaks - 7.252E-06+/- 4.154E-07 (5.73%)

NB-95	765.79	99.79*	3.506E+00	7.903E-04	8.372E-04	0.44	OK

Final Mean for 1 Valid Peaks - 8.372E-04+/- 3.647E-06 (0.44%) = 1859 ± 8.076 dpm

CS-137	661.66	85.20*	4.081E+00	2.334E-04	2.334E-04	0.91	OK

Final Mean for 1 Valid Peaks - 2.334E-04+/- 2.130E-06 (0.91%)

EU-154	123.07	40.42	1.567E+01	1.531E-05	1.532E-05	5.73	<<WTM Reject
	247.93	6.84	9.924E+00	0.000E+00	0.000E+00	0.00	Absent
	582.06	0.84	4.638E+00	0.000E+00	0.000E+00	0.00	Absent
	591.76	4.92	4.564E+00	0.000E+00	0.000E+00	0.00	Absent
	692.42	1.78	3.896E+00	0.000E+00	0.000E+00	0.00	Absent
	723.36	19.98	3.725E+00	8.517E-06	8.522E-06	38.84	OK
	756.86	4.50	3.551E+00	0.000E+00	0.000E+00	0.00	Absent
	873.20	12.09	3.047E+00	1.631E-05	1.632E-05	28.88	OK
	904.05	0.85	2.934E+00	0.000E+00	0.000E+00	0.00	Absent
	996.30	10.34	2.639E+00	0.000E+00	0.000E+00	0.00	Absent
	1004.76	17.90	2.616E+00	1.999E-05	2.000E-05	16.66	OK
	1246.60	0.80	2.075E+00	0.000E+00	0.000E+00	0.00	Absent
	1274.51	34.40*	2.028E+00	2.065E-05	2.066E-05	11.40	OK
	1494.08	0.71	1.741E+00	0.000E+00	0.000E+00	0.00	Absent
	1593.00	1.03	1.649E+00	0.000E+00	0.000E+00	0.00	Absent
	1596.45	1.81	1.646E+00	0.000E+00	0.000E+00	0.00	Absent

Final Mean for 4 Valid Peaks - 1.731E-05+/- 1.568E-06 (9.06%)

EU-155	86.54	32.80	1.491E+01	2.182E-05	2.184E-05	7.00	OK
	105.31	21.84*	1.600E+01	1.501E-05	1.503E-05	11.46	OK

Final Mean for 2 Valid Peaks - 1.884E-05+/- 1.143E-06 (6.07%)

Nuclide Type:

Nuclide	Energy	%Abn	%Eff	Uncorrected Decay Corr 1-Sigma			Status
				uCi/SA	uCi/SA	%Error	
TC-95	765.79	94.00*	3.506E+00	8.390E-04	9.323E-03	0.44	OK
	947.67	1.96	2.787E+00	0.000E+00	0.000E+00	0.00	Absent
	1073.71	3.75	2.432E+00	0.000E+00	0.000E+00	0.00	Absent

Final Mean for 1 Valid Peaks = 9.323E-03 +/- 4.061E-05 (0.44%)

Flag: "*" - Keyline

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides
0	74.28*	220	8218	4.06	74.04	69	11	90.9		
0	86.29*	2274	6452	3.28	86.05	82	9	7.0		EU-155
0	105.44	1118	5139	2.48	105.21	102	8	11.5		EU-155
0	123.28	2066	4306	2.91	123.05	120	7	5.7		CO-57
4	186.10	813	2880	4.25	185.87	183	27	10.4	5.50E+00	
4	192.37	2615	10013	7.76	192.14	183	27	9.2		
4	201.13*	1549	10430	6.20	200.91	183	27	16.3		
0	428.52	370	3720	2.42	428.31	425	8	29.5		
0	661.78*	17292	1768	2.60	661.57	656	12	0.9		CS-137
0	722.95	135	851	2.31	722.74	720	8	38.8		EU-154
0	765.91	58933	1338	2.70	765.70	758	16	0.4		TC-95
										NB-95
0	873.20	128	314	2.29	872.98	869	10	28.9		EU-154
0	1004.28	199	232	3.89	1004.04	1000	9	16.7		EU-154
0	1274.93	307	199	2.67	1274.63	1268	15	11.4		EU-154
0	2616.14*	8	20	3.43	2615.23	2612		8178.0		

VAX/VMS Nuclide Identification Report V2.8 Generated 28-MAY-1992 15:37:14

Configuration : DUBO:[USER]F5733.CNF;1
 Analyses by : PEAK V16.2,PEAKEFF V2.2,ENBACK V1.5,NID V2.4,WTMEAN V1.5
 Analyses by : MINACT V2.2
 Sample title : F5733 NB EXPERIMENTAL SPL 92-5092
 Sample date : 20-MAY-1992 00:00:00 Acquisition date : 22-MAY-1992 13:50:57
 Sample ID : F5733 92-5092 Sample quantity : 1.0000 SA
 Sample type : Sample geometry : FALF (W/O DISH)
 Elapsed live time: 0 16:00:00.00 Elapsed real time: 0 16:00:07.00 0.0%
 Peak Width (FWHM): 3.00 Confidence level : 5.00 %
 Energy tolerance : 1.60 keV Half life ratio : 8.00
 Errors propagated: No Systematic Error : 0.00 %
 Efficiency type : Empirical Efficiencies at : Peak Energy
 Abundance limit : 75.00 WTM error limit : 3.00

Minimum Detectable Activity Report

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/SA)
NA-22	415.	1274.53	2.1976E-06
NA-24	110.	1368.60	3.2163E-05
K-40	146.	1460.83	1.3915E-05
SC-46	225.	1120.50	1.4426E-06
CR-51	4016.	320.08	1.8921E-05
MN-54	311.	834.83	1.2115E-06
CO-58	318.	810.75	1.2182E-06
FE-59	195.	1099.25	2.3777E-06
CO-60	220.	1332.50	1.6714E-06
ZN-65	202.	1115.55	2.6400E-06
SE-75	4181.	264.66	2.5830E-06
BR-82	338.	776.52	5.5878E-06
SR-85	5021.	514.00	3.0732E-06
Y-88	257.	898.04	1.3214E-06
→ NB-94	418.	871.09	1.4605E-06
NB-95M	4617.	235.68	1.0056E-05
TC-95M	7339.	204.11	2.5143E-06
ZR-95	1132.	756.73	3.9140E-06
RU-103	3926.	497.05	3.0073E-06
RU-106	1977.	621.92	2.2912E-05
AG-108M	1056.	722.90	2.0841E-06
CD-109	7385.	88.03	3.4527E-05
AG-110M	279.	884.68	1.6828E-06
SN-113	3711.	391.70	3.1537E-06
SB-124	2616.	602.71	3.5105E-06
SB-125	4150.	427.88	7.7360E-06
I-131	3711.	364.50	2.9470E-06
BA-133	3819.	356.00	2.9701E-06
CS-134	2592.	604.71	2.5546E-06
CE-139	4408.	165.80	1.3628E-06
BA-140	4149.	537.27	1.3461E-05
LA-140	4056.	487.03	5.6071E-06
CE-141	4505.	145.40	2.2032E-06
CE-144	4586.	133.54	8.8042E-06
PM-144	988.	696.54	1.3310E-04
SM-145	5724.	61.30	3.0827E-06

1.4605E-06 = 3.242 dpm

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/SA)
ND-147	5965.	91.10	4.7121E-06
PM-148M	4374.	550.27	4.5420E-06
EU-152	87.	1408.01	5.3128E-06
GD-153	4728.	97.43	3.4682E-06
TM-170	7504.	84.30	4.0196E-05
TA-182	223.	1121.30	4.0834E-06
W-188	4438.	155.00	7.0340E-06
OS-191	4530.	129.40	4.2242E-06
IR-192	3944.	316.50	2.1041E-06
HG-203	7829.	72.87	2.5739E-05
PB-210	5696.	46.52	1.2933E-04
BI-211	0.	350.10	Half-Life too short
BI-214	225.	1120.27	9.3952E-06
PB-214	3860.	351.87	4.9609E-06
PO-214(I	2379.	609.31	3.3065E-06
RA-224	4564.	240.76	6.4464E-05
RA-226	3860.	351.87	4.9596E-06
TH-228	4771.	215.75	4.9104E-04
TH-230	5856.	67.68	4.0495E-04
PA-231	3881.	300.07	6.7580E-05
TH-232	265.	911.16	4.2091E-06
PA-233	3815.	311.90	4.6019E-06
U-234	5611.	53.23	2.4289E-03
U-235	5188.	185.74	2.3784E-06
U-236	5580.	49.37	5.0170E-03
NP-237	3815.	311.90	4.2706E-06
PU-237	4958.	101.10	5.0170E-06
U-238	438.	1001.00	2.6743E-04
AM-241	5536.	59.54	5.5650E-06

VAX/VMS Peak Search Report V1.8 Generated 28-MAY-1992 15:02:24

Configuration : DUBO:[USER]F5733.CNF;1
 Analyses by : PEAK V16.2,ENBACK V1.5
 Sample title : F5733 NB EXPERIMENTAL SPL 92-5092
 Sample date : 20-MAY-1992 00:00:00 Acquisition date : 22-MAY-1992 13:50:57
 Sample ID : F5733 92-5092 Sample quantity : 1.0000 SA
 Sample type : Sample geometry : FALF (W/O DISH)
 Elapsed live time: 0 16:00:00.00 Elapsed real time: 0 16:00:07.00 0.0%
 Start energy : 40.25 keV End energy : 4098.26 keV
 Sensitivity : 5.00 Gaussian : 10.00
 Critical level : No

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	74.28*	220	8218	4.06	74.04	69	11	3.82E-03	90.9	
2	0	86.29*	2274	6452	3.28	86.05	82	9	3.95E-02	7.0	
3	0	105.44	1118	5139	2.48	105.21	102	8	1.94E-02	11.5	
4	0	123.28	2066	4306	2.91	123.05	120	7	3.59E-02	5.7	
5	4	186.10	813	2880	4.25	185.87	183	27	1.41E-02	10.4	5.50E+00
6	4	192.37	2615	10013	7.76	192.14	183	27	4.54E-02	9.2	
7	4	201.13*	1549	10430	6.20	200.91	183	27	2.69E-02	16.3	
8	0	428.52	370	3720	2.42	428.31	425	8	6.43E-03	29.5	
9	0	661.78*	17292	1768	2.60	661.57	656	12	3.00E-01	0.9	
10	0	722.95	135	851	2.31	722.74	720	8	2.35E-03	38.8	
11	0	765.91	58933	1338	2.70	765.70	758	16	1.02E+00	0.4	
12	0	873.20	128	314	2.29	872.98	869	10	2.22E-03	28.9	
13	0	1004.28	199	232	3.89	1004.04	1000	9	3.46E-03	16.7	
14	0	1274.93	307	199	2.67	1274.63	1268	15	5.33E-03	11.4	
15	0	2616.14*	8	20	3.43	2615.23	2612	8	1.46E-04	178.0	

VAX/VMS Peak Search Report V1.8 Generated 28-MAY-1992 15:00:18

Configuration : DUBO:[USER]F5733.CNF;1
 Analyses by : PEAK V16.2
 Sample title : F5733 NB EXPERIMENTAL SPL 92-5092
 Sample date : 20-MAY-1992 00:00:00 Acquisition date : 22-MAY-1992 13:50:57
 Sample ID : F5733 92-5092 Sample quantity : 1.0000 SA
 Sample type : Sample geometry : FALF (W/O DISH)
 Elapsed live time: 0 16:00:00.00 Elapsed real time: 0 16:00:07.00 0.0%
 Start energy : 40.25 keV End energy : 4098.26 keV
 Sensitivity : 5.00 Gaussian : 10.00
 Critical level : No

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	63.80	431	6188	2.66	63.56	60	8	7.48E-03	31.7	
2	0	74.28	2599	8218	4.06	74.04	69	11	4.51E-02	7.1	
3	0	86.29	2428	6452	3.28	86.05	82	9	4.21E-02	6.4	
4	0	92.86	593	4634	1.76	92.63	90	7	1.03E-02	20.2	
5	0	105.44	1118	5139	2.48	105.21	102	8	1.94E-02	11.5	
6	0	123.28	2066	4306	2.91	123.05	120	7	3.59E-02	5.7	
7	4	186.10	813	2880	4.25	185.87	183	27	1.41E-02	10.4	5.50E+00
8	4	192.37	2615	10013	7.76	192.14	183	27	4.54E-02	9.2	
9	4	201.13	3937	10430	6.20	200.91	183	27	6.84E-02	6.2	
10	0	428.52	370	3720	2.42	428.31	425	8	6.43E-03	29.5	
11	0	511.12	1072	3949	3.62	510.91	507	8	1.86E-02	10.7	
12	0	661.78	17342	1768	2.60	661.57	656	12	3.01E-01	0.9	
13	0	722.95	135	851	2.31	722.74	720	8	2.35E-03	38.8	
14	0	765.91	58933	1338	2.70	765.70	758	16	1.02E+00	0.4	
15	0	873.20	128	314	2.29	872.98	869	10	2.22E-03	28.9	
16	0	1004.28	199	232	3.89	1004.04	1000	9	3.46E-03	16.7	
17	0	1173.62	36	250	8.31	1173.35	1165	13	6.28E-04	93.4	
18	0	1274.93	307	199	2.67	1274.63	1268	15	5.33E-03	11.4	
19	0	1331.82	113	113	4.29	1331.51	1327	10	1.95E-03	21.7	
20	0	2616.14	64	20	3.43	2615.23	2612	8	1.11E-03	18.5	

NIOBIUM ANALYSIS

Page 1 of 2

Spreadsheet filename: NBCALC

Revision 1: 6/1/92. NLW

Assumes tracer added to final aliquot

Sample ID: 92-5093 recount

Date Calculated: 06/16/92

Data filename: NBS093R

M&TE No.

Diode HH

Nb-94 & 95 Spectrum: 9205093nb.hh;1

Zr/Nb-95 Tracer: 34124-76-0

volume added, ml: 0.2503 0.0012 error

*****Half-lives*****

Zr-95 dpm/ml: 4.415E+03 4.500E+01 error

Zr-95= 64.02 days

Nb-95 dpm/ml: 9.892E+03 1.151E+02 error

Nb-95= 34.97 days

On: Date: 05/13/92 01:00 Time

Nb Sep Date: 05/07/92 13:30 Time

total dpm Nb-95= 2629.44 34.53 error at Nb sep time

Sample Amount: 0.5648 0.0002 error

g, ml or sample? g

Reporting Units

Leach Volume, ml: 250 0.01 error

Activity: dpm

Vol to dilute, ml: 1 0.00001 error

per ? : g

Diluted to, ml: 1 0.00001 error

Final Aliquot, ml: 4.993 0.17 error

Nb-94 & 95 Counting Data from Prepared Sample

Sample dpm Nb-95= 2.222E+03 1.04 % error at Nb sep time

Sample dpm Nb-94= 1.152E+00 100.00 % error

*****RESULTS*****

Yield Nb-95= 0.845 0.014 error

Nb-94 dpm/g= 120.852 120.939 error = 100.07 %

MDA = < 120.852

GENERIC FORMULAS

$$\text{Nb-94 Activity} = \frac{\text{net dpm} \times \text{leach vol} \times \text{diln vol}}{\text{yield} \times \text{sample amt} \times \text{diln aliquot} \times \text{aliquot}}$$

$$\% \text{ recovery} = \frac{\text{dpm recovered}}{\text{dpm added}} \times 100$$

$$\text{Nb-93m Activity} = \frac{\text{net cpm} \times \text{d/c} \times \text{leach vol} \times \text{diln vol}}{\text{yield} \times \text{sample amt} \times \text{diln aliquot} \times \text{aliquot}}$$

NIOBIUM ANALYSIS

Page 2 of 2

Spreadsheet filename: NBOCALC

Revision 1: 6/1/92, NLW

Sample ID: 92-5093 recount

Date Calculated: 06/16/92

Data filename: NB5093R

Nb-93m Spectrum: 925093nb.ai;2

Weight Nb ppt, mg: 309.2 0.2 error

Counted on: A M&TE No. Diode A

On: Date: 06/08/92 14:27 Time

Nb-93m d/c = 75.210 6.402 error

NB-93M COUNTING DATA:

Diode B or 325 LEPS Enter data under correct diode.

If %error >= 50%, enter MDA. If not, MDA = NA

net cps: 1.00 1.00 % error

MDA, in cps: NA

Diode A

peak channel no.: 83 bkgd: 71 - 75 <-- first ROI

Count time, min.: 1203.17 202 <-- counts

Nb-93m counts--> 290 227

346 199

peak channel + 474 240

5 lower + 628 212

4 higher 802 101 - 105 <-- second ROI

786 199 <-- counts

637 195

464 198

349 194

291 196

gross counts: 5067.000 2062 :normalized ROI total

net cpm: 1.776 0.722 :cpm in bkgd spectrum

error, cpm: 0.074 avg BKG.A1;1&2:bkgd filename

% error 4.186 2930.6 :total bkgd counts

*****RESULTS*****

Nb-93m dpm/g= 14009.223 1431.326 error = 10.217 %

MDA =

N. J. W. H. 6/16/92
Entered by Date

S. K. Faddy 6/12/92
Reviewed by Date

RECOUNT 92-5093 NB-93M

SAMPLE ID..... SY:925093NB.A1;2

OF CHANNELS..... 2048

PIECE I.D..... A

CH 1# NUMBER..... H

CALIBRATION..... 0.2 KEV/CH

PRE ZERO 0/ 8/92 AT 14:27: 0

COUNTED..... 6/ 8/92 AT 14:27: 0

(0.00 MINUTES DECAY TIME)

LIVE COUNT TIME.... 20 HOURS 3 MINUTES 10 SECONDS (1203.17 MIN.)

PLA SED TIME..... 20 HOURS 3 MINUTES 10 SECONDS (1203.17 MIN.)

(DEAD TIME = 0.000)

FLUX CORRECTION.... 0.0000

GEOI CORRECTION.... 0.0000 0.0000 0.0000 0.0000 0.0000

WEIGHT..... 1.00000 GRAMS

ANLI: 0 SLP: 0 AREA: 0 P-T: 0 ERR: 0 ZER: 0 OPR: 0 NOV: 1

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925

S. K. Jolly 6/18/92
A. L. Goodenough 6/18/92

RECOUNT 92-5093 NB-93H

SY:925093NB.A1;2 COUNTED 6/ 8/92 @ 14:27; B GAIN: 0.2 KEV/CHAN

	0	50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950
0	72190	247	193	175	187	171	139	149	137	130	113	126	112	132	140	115	84	68	117	103
1	0	251	199	192	172	159	134	138	132	115	134	120	116	120	110	97	109	110	98	104
2	0	246	195	174	164	156	143	140	135	122	132	115	110	98	104	104	106	109	81	107
3	0	249	198	226	172	135	149	127	113	125	125	123	102	90	113	107	99	103	100	106
4	0	250	194	274	164	169	158	149	133	142	134	130	143	110	110	104	93	89	98	99
5	0	239	196	326	175	151	130	130	131	120	113	124	139	115	108	116	84	86	90	89
6	0	243	193	290	159	140	146	144	177	127	106	115	127	113	112	99	84	104	80	70
7	0	208	205	320	148	170	144	136	131	103	118	120	115	99	109	92	94	84	113	101
8	18	214	154	370	140	167	158	144	125	148	110	113	126	103	96	112	105	92	100	100
9	641	209	201	485	156	159	160	129	153	116	136	100	110	110	97	91	94	112	87	92
10	1083	200	212	600	171	161	165	151	128	166	132	134	118	101	117	106	85	105	123	112
11	944	200	192	507	160	143	137	162	110	140	117	129	119	94	116	104	109	96	102	107
12	524	277	203	492	222	139	159	162	151	200	111	113	149	103	125	97	90	102	114	120
13	570	307	200	346	201	161	147	102	97	221	100	123	133	90	93	102	93	91	125	113
14	371	323	201	247	214	118	168	100	134	216	124	127	160	112	116	94	97	88	93	89
15	339	309	175	189	218	171	209	180	122	157	109	125	105	123	102	107	111	57	86	95
16	285	343	193	187	197	133	200	157	173	176	146	142	105	126	126	122	102	102	85	102
17	241	320	175	195	179	160	213	106	154	137	91	127	169	95	112	111	126	93	80	97
18	247	254	191	148	201	141	215	113	137	121	129	133	154	110	98	103	117	91	87	112
19	216	223	189	175	169	165	171	149	106	125	123	121	137	97	119	97	112	101	100	131
20	248	219	191	170	176	139	179	120	130	131	116	107	113	101	116	110	104	98	94	93
21	224	202	187	186	172	153	139	161	159	125	112	120	123	121	100	101	95	99	95	97
22	267	227	176	190	143	164	141	162	131	130	120	110	86	113	115	106	88	65	112	109
23	259	199	183	157	164	154	142	107	159	149	136	136	129	120	101	109	103	102	113	110
24	272	240	174	166	153	177	159	116	159	103	115	125	116	101	96	93	98	82	84	10
25	231	212	183	192	152	161	147	143	137	131	149	119	121	121	107	110	85	93	97	90
26	254	232	177	214	145	133	139	241	100	132	160	121	125	132	115	100	69	92	117	100
27	266	210	183	232	151	150	145	217	127	120	161	111	121	122	99	110	89	101	113	89
28	242	200	197	197	156	171	111	154	134	125	178	122	114	122	112	112	79	111	118	85
29	257	246	200	219	161	149	148	151	126	131	143	139	121	167	107	111	90	91	137	108
30	204	474	214	235	145	170	156	130	151	115	129	116	114	99	108	98	105	115	120	97
31	102	620	213	250	169	138	146	143	149	121	127	110	88	114	92	109	105	100	122	112
32	272	100	209	295	118	140	150	125	100	114	119	114	99	121	106	105	117	94	114	96
33	203	700	251	225	175	133	155	110	201	107	143	133	99	116	100	103	76	112	105	107
34	100	637	270	222	194	147	150	145	151	141	130	140	111	100	114	123	83	110	105	96
35	251	464	309	191	169	141	154	159	122	117	123	109	111	121	101	108	87	105	94	110
36	254	321	511	191	136	121	135	150	155	122	117	136	125	90	120	115	103	100	99	92
37	269	291	579	167	130	152	141	150	146	125	96	111	109	120	114	112	100	105	102	82
38	214	240	550	152	165	157	140	142	149	119	132	113	125	111	120	97	109	83	105	120
39	236	231	431	173	151	145	130	120	141	124	140	114	133	103	119	83	82	92	92	89
40	212	261	215	170	142	128	142	111	119	131	124	131	118	100	100	109	97	100	93	95
41	221	257	130	159	170	176	140	146	126	130	104	106	116	125	111	100	103	95	94	113
42	211	200	182	191	102	160	106	130	144	130	127	110	108	142	118	106	91	100	97	102
43	205	273	170	172	166	139	131	133	107	117	125	121	118	103	93	91	111	121	117	90
44	217	231	140	158	165	149	144	140	129	127	118	114	107	110	99	99	94	55	100	127
45	200	317	160	160	176	157	160	130	130	104	109	105	115	116	134	166	110	50	94	10
46	251	171	169	163	152	131	113	135	121	114	123	113	110	113	90	91	104	103	104	104
47	215	220	190	176	149	161	152	111	127	131	112	100	113	90	108	90	100	110	96	106
48	210	240	197	155	107	169	124	143	122	129	133	103	119	107	102	106	79	119	92	90
49	212	218	191	155	149	162	149	108	132	122	125	135	107	105	105	101	94	87	104	103

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* 7/20/92

RECOUNT 92-5093 NB-93H

SY:925003RB.A1:2 COUNTED 6/ 8/92 @ 14:27: 0 GAIN: 0.2 KEV/CHAN

	1000	1050	1100	1150	1200	1250	1300	1350	1400	1450	1500	1550	1600	1650	1700	1750	1800	1850	1900	1950
1	112	113	108	62	62	71	80	60	79	70	63	54	66	62	49	47	48	50	61	60
2	117	83	63	77	91	75	68	75	62	70	47	60	60	60	62	55	53	12	63	47
3	119	100	82	81	78	71	67	65	86	70	60	61	63	64	69	60	52	53	53	47
4	119	71	78	83	80	79	70	61	60	67	62	54	55	53	53	71	48	52	71	59
5	117	81	77	86	65	79	96	76	67	59	70	63	55	52	54	70	45	58	40	19
6	119	81	56	75	79	71	71	61	68	74	59	56	55	73	60	66	61	50	74	50
7	119	100	77	84	90	85	63	61	71	63	70	70	74	63	51	69	61	55	61	57
8	118	80	66	82	80	67	62	69	54	67	48	54	65	54	50	66	60	40	50	63
9	117	81	102	85	83	76	73	87	67	63	73	68	46	65	60	76	52	55	56	45
10	119	80	84	85	89	70	71	63	73	77	57	63	62	64	52	61	65	63	55	68
11	110	82	79	64	74	77	65	69	58	76	60	60	66	68	64	66	62	54	63	61
12	112	104	89	71	78	63	66	53	70	57	72	71	68	60	47	73	55	16	73	55
13	115	94	85	81	96	76	64	80	71	77	66	70	55	65	53	52	66	42	62	73
14	113	82	83	79	90	72	59	76	74	61	62	65	63	58	70	64	50	53	71	65
15	102	65	85	50	77	71	67	77	62	75	63	60	65	66	66	52	55	75	55	47
16	116	81	85	78	80	83	69	60	80	66	62	70	68	65	64	52	59	70	53	51
17	111	81	89	92	79	83	79	71	74	60	73	54	70	60	69	67	44	74	72	64
18	110	90	83	79	78	71	72	60	56	76	59	53	62	61	55	74	66	63	53	49
19	110	100	90	72	81	78	82	53	76	73	84	52	82	46	64	52	43	47	66	56
20	111	88	97	92	87	73	60	71	71	66	59	63	69	62	60	58	63	54	52	59
21	115	100	84	70	67	70	68	66	76	62	68	57	60	63	67	59	51	49	53	72
22	111	84	70	85	60	85	74	69	64	73	62	54	45	53	59	53	57	46	51	46
23	111	99	73	50	68	70	60	79	62	76	79	64	59	37	64	53	62	53	54	55
24	110	97	75	87	72	72	80	49	66	71	71	60	65	61	54	69	40	48	67	52
25	116	84	71	71	92	66	73	63	43	67	62	71	58	52	65	58	61	50	45	71
26	114	86	82	86	91	77	87	76	72	67	58	61	68	76	58	58	60	57	38	61
27	110	84	71	80	75	76	75	80	43	73	50	67	64	76	71	46	52	62	56	67
28	117	83	114	75	78	80	58	63	65	67	63	71	56	53	52	62	48	71	66	46
29	103	99	84	77	72	77	71	76	60	64	76	72	61	50	65	59	54	57	49	60
30	116	84	75	75	70	62	73	76	55	57	71	50	63	57	60	42	62	62	51	40
31	105	88	76	73	71	76	73	77	56	75	74	63	60	54	54	68	70	40	55	53
32	109	84	76	98	87	70	79	73	62	70	63	50	69	53	59	60	55	56	63	67
33	113	92	81	73	75	75	66	67	66	73	65	64	66	46	64	61	57	64	53	60
34	114	86	82	78	70	72	64	66	62	59	74	70	60	61	67	64	58	59	56	61
35	111	97	67	90	78	60	67	59	69	60	81	57	65	50	74	50	48	60	69	51
36	105	90	70	81	78	67	59	82	68	63	71	75	54	40	46	62	45	60	57	54
37	108	96	76	65	72	74	77	86	63	66	59	62	67	50	58	58	56	62	49	51
38	106	80	86	83	98	67	76	80	66	61	61	63	65	61	66	62	50	52	65	50
39	108	83	94	80	90	62	68	64	58	60	40	76	65	73	48	65	47	53	52	61
40	106	80	77	81	61	77	63	76	76	90	66	60	62	62	47	61	76	64	50	59
41	104	87	80	92	78	69	77	66	74	53	68	62	63	53	48	52	54	63	62	57
42	102	73	92	75	81	58	69	80	62	89	72	56	64	62	72	56	52	54	50	73
43	104	86	77	94	68	70	67	77	69	80	53	55	56	53	59	62	58	52	53	53
44	104	95	83	95	82	75	60	69	71	71	63	67	67	69	62	62	67	48	60	65
45	106	79	70	76	77	62	74	66	75	47	72	59	65	50	69	64	58	54	56	59
46	102	80	78	102	77	70	76	63	86	55	47	66	53	67	61	54	53	69	48	63
47	106	84	77	93	74	74	78	57	76	58	61	60	61	59	74	60	63	65	55	62
48	107	87	85	84	81	74	79	67	68	59	63	81	76	50	64	64	52	63	62	54
49	107	100	66	80	89	66	85	70	65	76	69	64	60	61	53	76	61	64	60	62
50	89	97	89	70	76	67	64	63	64	64	74	58	63	58	68	60	64	74	65	59

NIOBIIUM ANALYSIS

Page 1 of 2

Spreadsheet filename: NBCALC

Revision 1: 6/1/92, NLW

Assumes tracer added to final aliquot

Sample ID: 92-5093

Date Calculated: 06/16/92

Data filename: NB5093

M&TE No.

Diode HH

Nb-94 & 95 Spectrum: 9205093nb.hh;1

Zr/Nb-95 Tracer: 54124-76-0

volume added, ml: 0.2503 0.0012 error

*****Half-lives*****

Zr-95 dpm/ml: 4.415E+03 4.500E+01 error

Zr-95= 64.02 days

Nb-95 dpm/ml: 9.892E+03 1.151E+02 error

Nb-95= 34.97 days

On: Date: 05/13/92 01:00 Time

Nb Sep Date: 05/07/92 13:30 Time

total dpm Nb-95= 2629.44 34.53 error at Nb sep time

Sample Amount: 0.5648 0.0002 error

g, ml or sample? g

Reporting Units

Leach Volume, ml: 250 0.01 error

Activity: dpm

Vol to dilute, ml: 1 0.00001 error

per ? : g

Diluted to, ml: 1 0.00001 error

Final Aliquot, ml: 4.993 0.17 error

Nb-94 & 95 Counting Data from Prepared Sample

Sample dpm Nb-95= 2.222E+03 1.04 % error at Nb sep time

Sample dpm Nb-94= 1.152E+00 100.00 % error

*****RESULTS*****

Yield Nb-95= 0.845 0.014 error

Nb-94 dpm/g= 120.952 120.939 error = 100.07 %

MDA = < 120.852

GENERIC FORMULAS

$$\text{Nb-94 Activity} = \frac{\text{net dpm} \times \text{leach vol} \times \text{diln vol}}{\text{yield} \times \text{sample amt} \times \text{diln aliquot} \times \text{aliquot}}$$

$$\% \text{ recovery} = \frac{\text{dpm recovered}}{\text{dpm added}} \times 100$$

$$\text{Nb-93m Activity} = \frac{\text{net cpm} \times \text{d/c} \times \text{leach vol} \times \text{diln vol}}{\text{yield} \times \text{sample amt} \times \text{diln aliquot} \times \text{aliquot}}$$

NIOBium ANALYSIS

Page 2 of 2

Spreadsheet filename: NBCALC

Revision 1: 6/1/92, NLW

Sample ID: 92-5093

Date Calculated: 06/16/92

Data filename: NB5093

Nb-93m Spectrum: 925093nb.a1;1

Weight Nb ppt, mg: 309.2 0.2 error

Counted on: A

M&TE No.

Diode A

On: Date: 05/15/92 16:40 Time

Nb-93m d/c = 75.210 6.402 error

NB-93M COUNTING DATA:

Diode B or 325 LEPS

Enter data under correct diode.

If %error >= 50%, enter MDA. If not, MDA = NA

net cps: 1.00 1.00 % error

MDA, in cps: NA

Diode A

peak channel no.: 83

bkgd: 70 - 74 <-- first ROI

Count time, min.: 3807.57

1063 <-- counts

Nb-93m counts--> 1292

1050

1559

1073

peak channel + 2045

1060

5 lower + 2822

1056

4 higher 3775

100 - 104 <-- second ROI

4201

958 <-- counts

3791

967

2575

980

1804

913

1539

952

gross counts: 25403.000

10072 : normalized ROI total

net cpm: 3.304

0.722 : cpm in bkgd spectrum

error, cpm: 0.051

avg BKG.A1;10;2:bkgd filename

% error 1.554

12821. : total bkgd counts

*****RESULTS*****

Nb-93m dpm/g= 26072.102 2463.476 error = 9.449 %

MDA =

M. J. L. L. 6/16/92
Entered by Date

C. E. L. L. 6/18/92
Reviewed by Date

NIOBIUM ANALYSIS

Page 1 of 2

Spreadsheet filename: NBCALC

Revision 1: 6/1/92. NLW

Assumes tracer added to final aliquot

Sample ID: 92-5093

Date Calculated: 06/02/92

Data filename: NBS093

M&TE No.

Diode HH

Nb-94 & 95 Spectrum: 9205093nb.hh;1

Zr/Nb-95 Tracer: 54124-76-0

volume added, ml: 0.2503 0.0012 error *****Half-lives*****

Zr-95 dpm/ml: 4.415E+03 4.500E+01 error Zr-95= 64.02 days

Nb-95 dpm/ml: 9.892E+03 1.151E+02 error Nb-95= 34.97 days

On: Date: 05/13/92 01:00 Time

Nb Sep Date: 05/07/92 13:30 Time

total dpm Nb-95= 2629.44 34.53 error at Nb sep time

Sample Amount: 0.5648 0.0002 error

g, ml or sample? g

Reporting Units

Leach Volume, ml: 250 0.01 error

Activity: dpm

Vol to dilute, ml: 1 0.00001 error

per ? : g

Diluted to, ml: 1 0.00001 error

Final Aliquot, ml: 4.993 0.17 error

Nb-94 & 95 Counting Data from Prepared Sample

Sample dpm Nb-95= 2.222E+03 1.04 % error at Nb sep time

Sample dpm Nb-94= 1.152E+00 100.00 % error

*****RESULTS*****

Yield Nb-95= 0.845 0.014 error

Nb-94 dpm/g= 120.852 120.939 error = 100.07 %

MDA = < 120.852

GENERIC FORMULAS

Nb-94 Activity =
$$\frac{\text{net dpm} \times \text{leach vol} \times \text{diln vol}}{\text{yield} \times \text{sample amt} \times \text{diln aliquot} \times \text{aliquot}}$$

% recovery =
$$\frac{\text{dpm recovered}}{\text{dpm added}} \times 100$$

Nb-93m Activity =
$$\frac{\text{net cpm} \times \text{d/c} \times \text{leach vol} \times \text{diln vol}}{\text{yield} \times \text{sample amt} \times \text{diln aliquot} \times \text{aliquot}}$$

NI0BIUM ANALYSIS

Page 2 of 2

Spreadsheet filename: NBCALC

Revision 1: 5/1/92, NLW

Sample ID: 92-5093

Date Calculated: 06/02/92

Data filename: NB5093

Nb-93m Spectrum: 925093nb.al;1

Weight Nb ppt, mg: 309.2 0.2 error

Counted on: A M&TE No. Diode A

On: Date: 05/15/92 16:40 Time

Nb-93m d/c = 75.210 6.402 error

NB-93M COUNTING DATA:

Diode B or 325 LEPS Enter data under correct diode.

If %error >= 50%, enter MDA. If not, MDA = NA

net cps: 1.00 1.00 % error

MDA, in cps:NA

Diode A

peak channel no.: 83

Count time, min.: 3807.57

Nb-93m counts--> 1292

1559

peak channel + 2045

5 lower + 2822

4 higher 3775

4201

3791

2575

1804

1539

gross counts:25403.000

net cpm: 3.843

error, cpm: 0.050

% error 1.300

bkgd: 70 - 74 <-- first ROI

1063 <-- counts

1050

1073

1060

1056

100 - 104 <-- second ROI

958 <-- counts

967

980

913

952

10072 :normalized ROI total

0.183 :cpm in bkgd spectrum

BKG.A1;1 :bkgd filename

10768. :total bkgd counts

preliminary
- incorrect
see corrected
copy 7/16/92

*****RESULTS*****

Nb-93m dpm/g= 30324.807 2853.635 error = 9.410 %

MDA =

N. J. W. 6/2/92
Entered by Date

S. L. Jodoff 6/4/92
Reviewed by Date

TITLE: 101SY NB 92-05093

FILE: 9205093NB.MH:1

* CHANNELS: 2040

SHELF: 0

DIODE: HN

TIME ZERO: 5 7 92 13 30 0

TIME OF COUNT: 5 23 92 15 37 0

(23167.0 MINUTES DECAY TIME)

LIVE TIME: 65 HOURS 7 MINUTES 26 SECONDS - 3907.43 MINUTES

ELAPSED TIME: 65 HOURS 10 MINUTES 37 SECONDS - 3910.62 MINUTES

(DEAD TIME - 0.001)

FLUX CORR. FACT.: 0.000000

GAIN: 1.00000 KEY/CHAN

WEIGHT: 1.00000

PLT INT: 0
PLT LAB: 0
ANTI FLG: 0
SLP MLT: 0
AREA REJ: 0
PTR: 0
ERR REJ: 0
ZER LEV: 0
OVR PKR: 0
NOV: -1

334

NWp 5/29/92
A. F. Sodoff 5/26/92

9205093NB.HH:1

181SY NB 92-05093

	0	50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950
0	234446	4840	3140	2981	3338	2103	1783	1600	1521	1541	1494	1745	1009	586	437	367	131	114	109	107
1	5	4233	3293	2883	3293	2135	2071	1547	1493	1510	1455	1706	964	558	427	357	144	133	129	111
2	0	3981	3109	3024	3165	2100	2264	1566	1561	1521	1541	1721	1014	597	404	392	135	112	129	102
3	32	3983	2976	2864	3085	2166	1789	1716	1512	1495	1558	1737	1001	576	452	360	133	125	122	109
4	45	4007	3074	2936	3115	2168	1765	1679	1604	1559	1588	1794	939	583	427	360	122	107	120	124
5	8	3985	3073	3122	3234	2202	1725	1647	1549	1547	1532	1734	934	550	425	426	176	121	111	121
6	993	3936	3486	3026	3209	2111	1720	1509	1485	1529	1560	1762	966	560	384	374	136	125	149	97
7	1990	3023	3540	2047	3175	2166	1720	1531	1483	1565	1495	1799	952	548	426	432	140	118	123	122
8	2482	3777	3007	2036	3060	2030	1776	1552	1541	1496	1511	1870	934	540	421	450	140	117	106	111
9	3209	3007	3145	2021	3049	2074	1661	1535	1457	1475	1562	1717	892	524	378	447	140	112	90	80
10	3800	3007	3200	2042	3412	2131	1741	1596	1519	1640	1599	1840	909	540	431	427	137	119	106	106
11	4568	3706	2959	2064	3681	2022	1695	1631	1749	1526	1789	1847	1042	576	373	433	154	129	135	108
12	5091	3777	3152	2025	2970	2044	1673	1530	1536	1517	2304	1863	1000	1037	439	460	124	232	200	94
13	5158	3756	3144	2075	2034	2067	1690	1487	1481	1535	2623	1000	051	6520	399	424	145	369	1141	92
14	5059	3911	3052	2792	2981	2096	1827	1554	1500	1732	1951	1926	832	9520	395	561	126	174	1215	95
15	5457	3848	3030	2910	2035	2035	1716	1549	1449	1990	1720	1826	852	1633	411	835	136	130	269	103
16	5968	3648	3220	2901	2043	2017	1729	1620	1475	1625	1579	1870	840	522	392	2971	152	101	125	146
17	6148	3704	3029	2069	2046	1974	1716	1593	1489	1545	1604	1915	869	493	416	32635	129	114	110	327
18	6145	3829	3076	2912	2032	2055	1715	1572	1462	1537	1616	1769	832	459	375	81750	142	119	100	230
19	6152	3606	3001	2794	2742	1937	1756	1535	1475	1572	1533	1830	806	449	415	23799	126	115	109	131
20	6132	3714	3052	2001	2722	1990	1729	1509	1547	1557	1626	1893	793	450	397	774	134	124	100	270
21	6009	3722	2950	2739	2022	2256	1672	1476	1543	1536	1562	1804	784	454	381	187	133	135	106	001
22	6080	3719	3147	2773	2729	2520	1673	1507	1500	1566	1627	1789	809	451	364	176	131	133	104	650
23	5979	3714	2935	2799	2662	2086	1604	1508	1480	1562	1601	1705	766	444	391	173	129	121	110	140
24	5968	4412	3515	2019	2649	1896	1672	1572	1548	1567	1583	1764	810	496	379	210	148	149	111	07
25	5879	3922	3178	2662	2642	1966	1595	1563	1477	1632	1649	1670	755	462	420	201	107	140	122	109
26	5707	5946	3071	2022	2597	1923	1660	1574	1513	1570	1565	1651	805	455	400	140	153	149	02	05
27	5677	3845	3060	2018	2606	2011	1651	1505	1539	1516	1540	1425	786	438	308	160	147	135	97	95
28	5647	5355	3097	2054	2647	2005	1709	1475	1561	1489	1576	1413	750	476	432	140	123	115	94	81
29	5622	3927	3018	2730	2542	2193	1935	1531	1663	1506	1657	1391	667	460	744	152	145	105	103	94
30	5510	3477	3554	2743	2660	1918	2109	1546	1609	1587	1607	1290	729	453	655	153	132	123	119	90
31	5384	3346	3150	2739	2560	1860	1707	1465	1525	1494	1570	1244	715	411	375	175	136	133	100	98
32	5277	3342	3119	2696	2526	1957	1613	1494	1538	1502	1671	1193	730	436	374	157	157	115	90	91
33	5130	3437	3132	2645	2467	1866	1606	1500	1440	1489	1713	1215	736	417	303	164	159	100	112	88
34	5173	3342	2934	2726	2479	1812	1770	1496	1489	1551	1672	1621	740	450	341	156	147	109	93	100
35	5083	3002	3015	2690	2476	1796	1597	1544	1519	1527	1610	3154	646	446	374	176	117	112	102	82
36	4879	4394	2907	2040	2517	1815	1663	1491	1502	1467	1650	1920	643	437	361	153	124	100	107	82
37	4783	3606	3037	3209	2561	1861	1582	1551	1437	1480	1649	1056	736	414	346	166	103	132	96	96
38	4800	4444	3015	2902	2551	1904	1636	1519	1468	1413	1615	1031	726	430	352	201	220	114	104	101
39	4724	3750	2950	2757	3540	1809	2160	1463	1514	1615	1636	1077	631	445	361	147	143	123	110	110
40	4666	3260	3043	2071	13256	1900	3695	1594	1466	1510	1653	1053	629	440	386	125	125	116	104	96
41	4610	3851	3007	2095	4436	1707	1869	1544	1549	1511	1711	1074	637	454	379	162	136	109	90	95
42	4532	3240	2995	3107	3045	1852	1741	1510	1561	1514	1749	1015	606	454	372	136	152	109	110	96
43	4410	3249	2929	3113	2701	1756	1655	1453	1542	1559	1745	994	609	420	340	161	192	125	110	84
44	4438	4114	3005	3239	2351	1842	1603	1527	1519	1535	1754	1051	677	440	369	166	137	110	101	81
45	4428	3560	3127	3155	2250	1770	1619	1510	1520	1533	1755	1004	597	436	301	152	120	115	97	90
46	4321	3112	2941	3215	2233	1837	1619	1519	1530	1544	1743	1009	637	423	406	199	139	146	100	03
47	4295	3040	2914	3213	2176	1857	1613	1492	1526	1545	1690	1016	632	390	350	344	115	140	104	95
48	4147	3042	3129	3249	2143	1811	1611	1491	1530	1605	1710	1001	624	412	329	230	159	106	105	103
49	4116	3100	3009	3234	2195	1830	1564	1533	1524	1530	1740	983	581	418	395	168	116	120	111	115

9205093NB, HH: 1

101SY NB 92-05093

	1000	1050	1100	1150	1200	1250	1300	1350	1400	1450	1500	1550	1600	1650	1700	1750	1800	1850	1900	1950
0	86	89	93	88	75	71	65	46	38	35	39	30	32	23	23	35	17	20	13	24
1	107	72	88	86	94	71	62	49	33	48	37	26	27	25	19	31	19	32	17	20
2	88	83	76	81	82	58	62	55	37	36	38	29	22	25	26	13	24	18	29	15
3	113	93	83	88	64	62	58	54	38	38	43	26	28	29	22	24	17	17	26	17
4	116	98	90	77	81	76	57	45	53	48	53	32	39	28	23	23	19	25	23	18
5	92	88	81	78	68	64	58	62	58	36	37	28	28	29	27	23	24	29	22	27
6	100	90	70	69	86	74	59	37	45	48	39	35	24	26	26	31	30	22	28	27
7	106	81	86	85	87	69	43	53	54	44	38	26	35	19	23	30	24	21	23	19
8	105	94	70	88	83	55	60	66	41	38	39	31	17	30	27	23	25	29	26	23
9	81	101	69	82	74	63	58	42	38	47	26	27	25	23	32	28	26	28	32	12
10	97	95	85	71	73	75	48	52	53	62	32	32	35	26	25	28	24	19	21	20
11	100	109	74	80	74	55	48	51	61	86	32	27	29	38	20	41	17	31	28	21
12	74	78	80	69	89	46	55	58	33	248	38	31	26	18	24	23	17	21	12	21
13	82	93	188	67	67	44	58	51	38	658	35	29	38	31	32	28	21	23	17	17
14	81	99	92	79	65	69	53	42	53	858	36	39	22	38	38	22	23	13	21	21
15	87	88	67	66	66	53	58	46	48	268	43	33	28	28	27	28	22	25	19	19
16	88	79	65	65	85	61	51	51	37	55	38	28	27	28	21	46	19	17	28	19
17	86	91	63	73	64	68	55	36	40	36	27	36	24	18	22	88	18	31	24	26
18	87	97	79	74	69	64	43	45	39	43	28	34	21	29	27	75	21	28	19	15
19	83	95	93	71	85	68	62	38	42	26	25	28	29	41	23	48	19	21	29	28
20	87	64	92	82	79	65	56	37	47	38	26	48	25	37	19	24	17	27	24	27
21	102	78	88	71	73	62	52	61	44	34	14	25	39	22	32	12	25	17	27	15
22	87	76	118	88	81	59	49	58	46	31	33	19	41	27	28	22	19	22	22	22
23	89	78	146	54	77	48	59	41	41	33	32	24	57	12	22	28	16	26	16	22
24	84	76	181	74	69	63	62	45	41	35	32	38	53	19	25	18	23	24	27	25
25	82	87	88	89	68	65	49	57	48	35	24	28	41	18	18	26	13	15	18	24
26	69	62	81	89	74	75	59	48	42	29	27	36	31	24	38	28	26	27	27	28
27	78	86	74	75	78	96	44	42	33	38	21	28	38	33	28	26	32	17	21	14
28	74	72	64	79	78	92	56	68	48	28	28	22	39	28	24	19	22	26	22	12
29	92	88	67	59	64	48	58	45	45	29	23	33	35	28	28	18	23	22	16	27
30	91	92	78	64	69	48	46	79	43	33	29	25	31	37	18	31	25	19	22	22
31	94	88	77	61	72	66	52	68	57	27	34	27	33	31	21	25	18	19	28	26
32	87	108	66	65	64	62	49	61	42	39	38	29	44	39	28	27	25	28	38	26
33	98	79	69	85	77	58	52	43	27	23	25	29	63	27	34	21	22	19	23	17
34	88	102	83	67	75	78	46	44	35	21	31	48	64	38	28	14	23	19	27	18
35	93	78	88	69	74	61	57	47	32	36	22	28	43	22	21	25	28	21	15	19
36	88	92	68	92	68	51	42	51	44	27	38	47	24	23	38	18	28	15	18	21
37	93	84	61	68	72	56	35	63	38	29	23	45	29	26	23	22	26	25	22	23
38	88	92	71	72	66	52	45	48	36	27	31	33	29	35	15	22	18	24	28	28
39	78	84	64	85	79	59	65	58	37	38	25	27	18	31	19	36	28	27	25	25
40	75	64	86	72	82	63	58	45	48	32	34	86	32	27	29	32	28	24	23	25
41	86	71	73	79	95	63	51	48	42	28	38	106	33	25	29	17	26	21	22	27
42	98	89	81	65	85	65	58	43	45	38	34	72	37	15	37	34	28	23	33	24
43	91	81	85	75	82	54	68	38	45	28	34	48	31	22	28	25	22	25	37	14
44	96	84	76	68	77	47	47	32	39	26	35	63	19	24	19	14	28	28	24	21
45	93	74	72	75	88	58	48	44	43	26	31	188	27	23	22	21	33	16	18	19
46	83	103	74	74	82	62	36	47	27	24	38	119	41	19	38	25	23	19	14	17
47	85	108	66	84	88	53	45	48	39	34	37	52	26	27	18	23	23	23	28	15
48	81	86	88	75	71	51	48	42	44	57	35	22	22	21	22	22	22	34	29	23
49	97	83	69	67	93	71	43	38	36	58	24	26	22	27	31	38	22	21	18	19

NB-93M ON 92-5093: 309.2 MG PPT

SAMPLE ID..... SY:925093NB.A1;1

OF CHANNELS..... 2048

DIODE I.D..... A

SHELF NUMBER..... 0

CALIBRATION..... 0.2 KEV/CH

TIME ZERO 5/15/92 AT 16:40: 0

COUNTED..... 5/15/92 AT 16:40: 0
(0.00 MINUTES DECAY TIME)

LIVE COUNT TIME.... 63 HOURS 27 MINUTES 34 SECONDS (3807.57 MIN.)

ELAPSED TIME..... 63 HOURS 27 MINUTES 34 SECONDS (3807.57 MIN.)
(DEAD TIME = 0.000)

FLUX CORRECTION.... 0.0000

GEOM CORRECTION.... 0.0000 0.0000 0.0000 0.0000 0.0000

WEIGHT..... 1.00000 GRAMS

ANT1: 0 SLP: 0 AREA: 0 P-T: 0 ERR: 0 ZER: 0 OPR: 0 NOV: 1

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MJL
5/18/92
M

NB-93H ON 92-5893: 389.2 MG PPT

SY:925893NB.A1;1 COUNTED 5/15/92 @ 16:48: 8 GAIN: 8.2 KEV/CHAN

	0	50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950
0	228454	1133	958	867	890	799	798	712	723	718	626	626	669	648	582	545	550	526	523	534
1	0	1194	967	947	859	874	771	719	781	675	623	621	598	572	598	633	538	567	541	581
2	0	1214	988	988	793	759	778	685	788	672	638	678	618	618	676	545	586	548	482	589
3	0	1289	913	1025	854	746	832	737	695	784	656	624	682	618	571	598	536	512	584	582
4	0	1185	952	1214	858	848	764	753	696	648	681	649	613	581	565	593	539	551	553	589
5	0	1187	919	1244	858	776	769	716	694	684	613	673	618	569	548	639	543	557	528	587
6	0	1139	998	1241	827	757	883	735	715	686	665	688	635	584	579	558	546	518	514	584
7	0	1092	998	1307	832	787	743	758	682	664	661	588	628	684	571	677	578	533	568	588
8	48	1038	974	1516	823	773	731	691	629	639	656	633	781	594	552	671	551	562	518	544
9	1075	1075	921	1894	873	882	748	715	788	683	654	633	619	584	581	584	523	565	556	588
10	3189	1099	992	2899	911	789	772	736	699	735	662	631	688	683	598	568	517	589	546	585
11	3235	1042	934	2134	878	755	684	761	695	855	689	635	613	682	593	547	553	511	581	529
12	2883	1127	999	1866	946	835	741	786	747	878	667	618	638	582	547	565	473	534	522	587
13	1848	1175	931	1421	982	717	796	854	686	896	691	629	685	565	582	549	554	557	583	542
14	1436	1425	958	1867	989	752	787	819	685	889	684	635	817	588	579	547	517	498	586	581
15	1312	1496	967	927	969	822	853	885	719	793	631	658	797	623	572	552	553	555	539	571
16	1133	1532	925	989	1823	771	949	851	781	775	644	577	772	585	555	537	593	546	511	582
17	1166	1327	932	868	915	773	959	755	694	688	697	611	737	569	685	555	516	573	499	573
18	1158	1246	923	891	853	769	986	748	788	638	624	594	671	684	598	577	544	553	499	589
19	1181	1888	948	845	869	788	822	748	689	696	642	624	648	543	578	533	591	543	497	588
20	1144	1853	921	859	832	773	715	732	691	656	619	588	686	593	588	518	523	512	514	583
21	1876	1858	898	886	825	768	718	812	754	632	654	613	689	612	583	539	515	515	522	582
22	1188	1873	981	982	811	858	797	847	758	788	636	645	618	588	512	578	539	544	528	587
23	1137	1868	952	858	785	853	758	915	832	638	662	592	614	588	558	544	556	535	578	583
24	1879	1856	953	885	858	813	743	953	828	694	718	625	638	582	574	572	574	535	587	581
25	1164	1881	927	898	836	838	683	999	787	789	728	591	684	598	568	549	537	519	583	585
26	1158	1119	924	974	785	768	726	1832	798	626	748	689	648	683	582	538	587	499	523	589
27	1162	1235	986	998	792	754	728	986	788	638	743	611	618	566	564	527	546	495	594	587
28	1191	1292	987	982	832	778	729	748	725	642	756	636	582	687	572	552	535	589	632	587
29	1239	1559	979	1888	828	767	751	783	731	636	787	657	617	586	533	561	558	538	686	543
30	1224	2845	1852	1837	885	778	696	714	737	646	696	655	626	687	555	528	515	554	581	589
31	1386	2822	1867	1138	861	786	882	718	818	674	689	596	591	586	532	582	538	588	555	587
32	1449	3775	1869	1156	812	886	762	787	854	697	588	614	572	548	577	572	522	532	554	581
33	1494	4281	1186	1189	874	817	728	683	847	615	619	591	566	622	513	547	538	543	519	588
34	1456	3791	1388	984	811	797	762	776	945	674	658	636	634	555	578	688	528	528	521	588
35	1384	2575	1735	975	887	765	788	755	793	659	648	653	684	645	524	561	557	586	518	584
36	1228	1884	2188	977	784	729	717	756	769	631	667	584	592	575	576	551	555	548	543	591
37	1243	1532	2426	951	848	819	785	733	774	636	596	644	576	586	532	559	524	513	546	589
38	1134	1381	2222	938	783	728	741	687	723	645	631	586	659	588	551	524	527	536	535	586
39	1138	1288	1727	832	791	711	698	692	663	646	624	618	598	562	581	548	546	494	588	588
40	1152	1195	1385	816	797	741	738	694	688	693	575	611	594	572	562	584	518	495	581	678
41	1187	1283	1812	816	833	778	755	736	699	648	652	618	586	559	596	543	567	544	533	587
42	1115	1444	925	841	811	756	778	721	656	666	612	658	653	557	576	579	523	588	523	584
43	1146	1584	889	832	829	788	778	669	691	668	618	621	594	555	574	555	542	494	549	581
44	1151	1557	916	874	856	746	738	688	669	669	649	685	635	578	592	573	538	568	552	581
45	1157	1437	881	852	853	756	737	785	653	648	638	593	563	569	587	546	528	537	529	583
46	1897	1221	973	875	787	788	767	748	603	678	612	599	549	612	618	542	544	525	553	589
47	1895	1878	973	835	824	759	748	699	671	638	676	628	622	548	558	564	538	587	524	587
48	1148	1838	984	828	848	738	699	737	685	649	647	584	638	592	597	613	532	499	467	589
49	1224	1888	932	838	821	774	736	665	654	633	668	565	585	581	549	548	548	588	547	584

Raygun - RSX Version 18-Jan-90

(29-MAY-1992 08:51:58)

Analysis performed by: diana mcmullin

Sample: 101SY NB 92-05093

Weight: 1.00000 ML

Irradiation date: 7-May-1992 at 13:30:00

Count date: 23-May-1992 at 15:37:00

Decay: 16.1d (1390020.0 seconds)

Count times: REAL TIME 2.72d (234637.00 seconds)

LIVE TIME 2.71d (234445.98 seconds)

Dead time: 0.08 percent

Detector: HH pos 0 Geometry Factor: 1.000

Efficiencies and shape parameters from file: ve:0116.23EFFFI1LNB. HH

Spectrum from file : 9205093nb.hh:1

Background subtractions from file: VE:0116.13BACKG. HH

Peak channel	Region start	Region end	Gross counts	Net area +-	Energy (keV)	Gamma /sec	Err % SD	System bkgd
1	85.0	85. 87.	11882.	1400.*	88.97	1.208E-02	100.0	2165.
2	88.1	87. 90.	15068.	1712.	91.10	6.845E-02	9.8	0.
3	93.1	90. 95.	21290.	2015.	97.09	7.461E-02	10.0	0.
4	103.5	106. 107.	7026.	755.	109.41	2.502E-02	15.3	0.
5	155.2	154. 156.	9084.	420.	157.74	1.369E-02	31.7	0.
6	210.8	210. 211.	7093.	1036.	212.88	4.545E-02	11.1	0.
7	240.0	236. 246.	41529.	15446.	241.88	7.818E-01	1.7	0.
8	271.5	270. 273.	8860.	972.	273.50	5.648E-02	13.3	0.
9	301.0	301. 304.	7689.	776.	303.19	5.059E-02	15.8	0.
10	329.8	327. 331.	9111.	954.	330.98	6.862E-02	15.1	0.
11	340.0	338. 343.	12756.	3066.	341.05	2.282E-01	4.9	0.
12	353.3	353. 355.	5042.	365.	354.34	2.839E-02	27.0	0.
13	429.7	426. 432.	11028.	586.	430.18	4.884E-02	29.0	0.
14	434.0	434. 436.	5347.	710.	465.05	7.567E-02	13.9	0.
15	513.0	509. 515.	13556.	2573.*	512.59	2.917E-02	100.0	2961.
16	585.1	584. 586.	6655.	2170.*	584.31	3.416E-02	100.0	3292.
17	611.4	611. 612.	2050.	260.*	610.41	2.787E-02	100.0	418.
18	663.8	661. 668.	20760.	16796.*	662.41	2.597E+00	1.7	221.
19	720.5	720. 730.	1031.	667.*	727.43	2.344E-02	100.0	703.
20	768.0	764. 770.	143325.	141016.	765.80	2.600E+01	0.3	0.
21	774.5	773. 775.	584.	112.	772.11	2.084E-02	33.5	0.
22	797.1	793. 799.	1420.	416.*	794.70	2.617E-02	100.0	280.
23	837.0	837. 839.	554.	154.*	835.16	1.669E-02	100.0	166.
24	850.0	850. 850.	1111.	450.*	850.03	1.787E-02	100.0	373.

Diana A. McMullin
6-27-92
M2DyW
6/2/92

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25	913.6	911.	917.	3291.	2468.*	910.31	1.770E-02	100.0	2403.
26	967.1	965.	969.	937.	446.*	963.48	1.754E-02	100.0	557.
27	971.3	969.	973.	2000.	1507.*	967.57	5.549E-02	100.0	1276.
28	1123.0	1118.	1127.	944.	221.	1118.09	6.224E-02	18.5	0.
29	1277.5	1274.	1279.	391.	88.	1271.31	2.875E-02	29.8	0.
30	1453.0	1459.	1458.	2353.	1998.	1456.31	7.573E-01	2.6	0.
31	1498.5	1497.	1502.	263.	77.	1498.02	3.007E-02	27.4	0.
32	1590.9	1590.	1594.	375.	238.	1582.46	9.560E-02	9.9	0.
33	1595.7	1594.	1597.	334.	219.*	1587.27	1.970E-02	100.0	237.
34	1623.3	1621.	1626.	262.	85.	1614.63	3.635E-02	24.5	0.
35	1635.5	1631.	1635.	247.	83.	1624.80	3.554E-02	24.5	0.
36	1767.4	1765.	1770.	301.	154.	1757.63	7.229E-02	13.7	0.

 ** Net Peak Area above the Compton Continuum before correction for system background. Values flagged with a * are subsequently corrected for system background before calculation of absolute emission rate (gams/sec).

Gamma-ray and nuclide lookup from file: VE:[116,3]NBLIB.DAT

*** Least-squares Results ***

(interferences)

nuclide	energy kev	dps at zero time	uCi /ML	peak frac	err (%)	dev (sig)	DPM /ML	error (%)
1 Hb 95	- - - -	3.704E+01	1.001E-03	- - - -	- - - -	- - - -	2.222E+03	1.04
	765.80	3.704E+01	1.001E-03	1.00	1.04	-1.00		

The following are upper limit values:

Co 60	- - - -	2.041E-02	5.515E-07	- - - -	- - - -	- - - -	1.224E+00	100.00
Zn 95	- - - -	6.055E-02	1.637E-06	- - - -	- - - -	- - - -	3.633E+00	100.00
Hb 94	- - - -	1.919E-02	5.187E-07	- - - -	- - - -	- - - -	1.152E+00	100.00
Sb113	- - - -	2.401E-02	6.489E-07	- - - -	- - - -	- - - -	1.441E+00	100.00
Sb123	- - - -	0.000E+00	0.000E+00	- - - -	- - - -	- - - -	0.000E+00	100.00
Sb115m	- - - -	1.560E-01	4.215E-06	- - - -	- - - -	- - - -	9.358E+00	100.00
Sb121a	- - - -	8.256E-01	2.231E-05	- - - -	- - - -	- - - -	4.953E+01	100.00
Sb125	- - - -	3.011E-01	8.130E-06	- - - -	- - - -	- - - -	1.887E+01	100.00

The following peaks were not identified:

0 energy gams/sec poterr CI *
 1 1.0000000000000000 0.00000000

2	91.18	6.8447E-02	9.9	0.0000000
3	97.09	7.4612E-02	10.0	0.0000000
4	109.41	2.5021E-02	15.3	0.0000000
5	157.74	1.3689E-02	31.7	0.0000000
6	212.68	4.5445E-02	11.1	0.0000000
7	241.09	7.0182E-01	2.0	0.0000000
8	273.50	5.6483E-02	13.3	0.0000000
9	383.19	5.0596E-02	15.0	0.0000000
10	330.90	6.0623E-02	15.1	0.0000000
11	341.05	2.2816E-01	5.0	0.0000000
12	354.34	2.8389E-02	27.0	0.0000000
13	430.10	4.8844E-02	29.0	0.0000000
14	475.05	7.5669E-02	13.9	2.5502070E-10
15	512.59	2.9173E-02	100.0	0.0000000
16	564.31	3.4156E-02	100.0	0.0000000
17	610.41	2.7871E-02	100.0	0.0000000
18	662.41	2.5968E+00	2.0	0.0000000
19	727.43	2.3436E-02	100.0	0.0000000
21	772.11	2.0837E-02	33.5	0.0000000
27	794.70	2.6166E-02	100.0	0.0000000
28	838.16	1.6685E-02	100.0	0.0000000
29	875.05	1.7069E-02	100.0	0.0000000
29	896.34	1.7609E-02	100.0	0.0000000
29	901.05	1.7535E-02	100.0	0.0000000
29	947.87	0.5494E-02	100.0	0.0000000
29	1114.00	6.2237E-02	18.5	0.0000000
29	1211.01	2.8751E-02	29.0	0.0000000
31	1305.31	7.5735E-01	2.8	0.0000000
31	1328.62	3.0072E-02	27.4	0.0000000
31	1333.48	9.5802E-02	10.0	0.0000000
33	1587.27	1.5696E-02	100.0	0.0000000
33	1614.03	3.6349E-02	24.5	0.0000000
34	1621.00	3.5538E-02	24.5	0.0000000
34	1637.05	7.2207E-02	13.7	0.0000000

If CI > 0 Confidence threshold was not exceeded
 CI = 0 Energy Window test failure
 CI = -1 Extreme Half Life test failure
 CI = -2 Extreme As. Gamma comparison test failure
 CI = -3 Unable to estimate area of Assoc. Gamma

NIOBIUM ANALYSIS

Page 1 of 2

Spreadsheet filename: NBOCALC

Revision 1: 6/1/92, NLW

Assumes tracer added to final aliquot

Sample ID: 92-5689 LEPS recount

Date Calculated: 06/16/92

Data filename: N85689R

M&TE No.

Diode HH

Nb-94 & 95 Spectrum: 925689.hh;1

Zr/Nb-95 Tracer: 54124-76-0

volume added, ml: 0.2503 0.0012 error

*****Half-lives*****

Zr-95 dpm/ml: 4.415E+03 4.500E+01 error

Zr-95= 64.02 days

Nb-95 dpm/ml: 9.892E+03 1.151E+02 error

Nb-95= 34.97 days

On: Date: 05/13/92 01:00 Time

Nb Sep Date: 05/07/92 13:30 Time

total dpm Nb-95= 2629.44 34.53 error at Nb sep time

Sample Amount: 0.5000 0.0001 error

g, ml or sample? g

Reporting Units

Leach Volume, ml: 250 0.01 error

Activity: dpm

Vol to dilute, ml: 1 0.00001 error

per ? : g

Diluted to, ml: 1 0.00001 error

Final Aliquot, ml: 4.993 0.17 error

Nb-94 & 95 Counting Data from Prepared Sample

Sample dpm Nb-95= 2.132E+03 1.14 % error at Nb sep time

Sample dpm Nb-94= 2.187E+00 100.00 % error

*****RESULTS*****

Yield Nb-95= 0.811 0.014 error

Nb-94 dpm/g= 270.105 270.303 error = 100.07 %

MDA = < 270.105

GENERIC FORMULAS

$$\text{Nb-94 Activity} = \frac{\text{net dpm} \times \text{leach vol} \times \text{diln vol}}{\text{yield} \times \text{sample amt} \times \text{diln aliquot} \times \text{aliquot}}$$

$$\% \text{ recovery} = \frac{\text{dpm recovered}}{\text{dpm added}} \times 100$$

$$\text{Nb-93m Activity} = \frac{\text{net cpm} \times \text{d/c} \times \text{leach vol} \times \text{diln vol}}{\text{yield} \times \text{sample amt} \times \text{diln aliquot} \times \text{aliquot}}$$

NIOBIUM ANALYSIS

Page 2 of 2

Spreadsheet filename: NBCALC

Revision 1: 6/1/92, NLW

Sample ID: 92-5689 LEPS recount

Date Calculated: 06/16/92

Data filename: NB5689R

Nb-93m Spectrum: 925689nb.a1;2

Weight Nb ppt, mg: 300.5 0.2 error

Counted on: A M&TE No. Diode A

On: Date: 06/14/92 13:05 Time

Nb-93m d/c = 74.743 6.318 error

NB-93M COUNTING DATA:

Diode B or 325 LEPS Enter data under correct diode.

If %error >= 50%, enter MDA. If not, MDA = NA

net cps: 1.00 1.00 % error

MDA, in cps: NA

Diode A

peak channel no.: 83 bkgd: 71 - 75 <-- first ROI

Count time, min.: 1161.63 149 <-- counts

Nb-93m counts--> 210 167

267 166

peak channel + 308 172

5 lower + 331 195

4 higher 380 101 - 105 <-- second ROI

347 150 <-- counts

289 161

257 131

267 172

207 156

gross counts: 2863.000 1619 :normalized ROI total

net cpm: 0.349 0.722 :cpm in bkgd spectrum

error, cpm: 0.063 avg BKG.A1;1;2:bkgd filename

% error 17.997 2457.6 :total bkgd counts

*****RESULTS*****

Nb-93m dom/g= 3220.815 652.143 error = 20.246 %

MDA =

N. J. W. 6/16/92
Entered by Date

L. K. J. 6/18/92
Reviewed by Date

RECOUNT FOR NB-93M ON 92-5689

SAMPLE ID..... SY:925689NB.A1;2

OF CHANNELS..... 2040

DIODE I.D..... A

SHELF NUMBER..... 0

CALIBRATION..... 0.2 KEV/CH

TIME ZERO 6/14/92 AT 13: 5: 0

COUNTED..... 6/14/92 AT 13: 5: 0

(0.00 MINUTES DECAY TIME)

LIVE COUNT TIME.... 19 HOURS 21 MINUTES 30 SECONDS (1161.63 MIN.)

ELAPSED TIME..... 19 HOURS 21 MINUTES 30 SECONDS (1161.63 MIN.)

(DEAD TIME = 0.000)

FLUX CORRECTION.... 0.0000

GEOM CORRECTION.... 0.0000 0.0000 0.0000 0.0000 0.0000

WEIGHT..... 1.00000 GRAMS

ANTI: 0 SLP: 0 AREA: 0 P-T: 0 ERR: 0 ZER: 0 OPR: 0 NOV: 1

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M J W
6/15/92

S. K. Fackoff 6/13/92

RECOUNT FOR NB-93M ON 92-5689

SY:925689NB.A1;2 COUNTED 6/14/92 @ 13: 5: # GAIN: 0.2 KEV/CHAN

	#	50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950
0	69698	206	160	127	135	128	138	108	100	119	104	101	93	86	76	83	87	69	85	82
1	0	220	150	134	108	126	99	110	113	106	96	102	93	85	64	80	73	78	85	74
2	0	239	161	149	137	117	133	116	123	100	81	95	100	92	91	77	93	57	89	73
3	0	211	131	177	131	121	113	106	105	115	90	95	96	87	69	103	100	84	72	71
4	0	197	172	154	133	115	128	112	109	88	102	95	89	105	88	79	67	89	75	79
5	0	210	156	145	143	119	126	113	115	98	99	83	71	103	77	87	70	78	76	72
6	0	183	173	149	124	104	129	124	110	86	86	105	102	102	90	88	87	84	80	63
7	0	152	158	145	127	96	150	129	103	113	107	83	110	83	78	83	94	66	77	84
8	0	173	165	170	134	141	97	117	112	102	89	102	105	92	90	73	94	76	66	83
9	679	179	148	141	109	126	126	104	124	103	100	112	94	88	88	100	87	88	81	86
10	2147	203	153	128	124	104	125	104	126	128	84	94	99	99	76	78	86	65	78	75
11	2391	200	144	142	152	116	109	109	111	150	102	83	103	88	91	90	78	95	92	80
12	1730	196	137	119	110	116	119	139	120	158	86	111	78	103	81	78	85	82	78	71
13	1805	236	149	134	114	99	124	155	97	161	92	95	89	105	94	85	57	67	95	73
14	775	269	158	134	119	122	157	164	100	152	81	100	99	92	91	96	87	63	79	93
15	639	296	149	123	116	127	146	166	105	135	111	90	99	84	93	87	90	90	68	87
16	479	308	144	131	119	142	165	136	120	135	109	89	85	94	88	70	85	69	73	70
17	439	239	142	134	103	125	185	119	92	137	98	108	101	79	89	89	68	62	74	81
18	383	226	157	147	141	112	160	112	112	92	99	112	103	92	82	93	97	73	80	65
19	284	216	133	137	138	132	129	139	94	100	103	91	98	94	99	100	95	77	83	84
20	295	205	163	127	144	127	122	120	104	107	102	95	88	92	82	74	95	82	71	70
21	246	149	152	156	146	127	117	118	127	99	102	115	87	87	91	96	79	67	86	64
22	204	167	157	150	117	137	116	117	135	96	96	109	88	94	92	96	81	76	76	100
23	229	166	169	137	124	120	108	161	141	87	86	95	84	109	83	87	70	83	82	63
24	245	172	151	141	116	101	127	106	130	106	90	106	113	85	94	93	83	82	77	58
25	225	195	127	123	139	119	111	197	118	101	108	101	90	93	104	85	77	75	85	75
26	255	194	156	130	134	129	107	191	145	102	102	93	98	92	79	81	80	75	74	69
27	214	139	145	153	111	116	130	154	121	104	91	95	95	87	94	97	94	88	83	75
28	250	210	153	143	118	107	108	121	111	105	99	95	76	90	86	74	83	70	103	96
29	224	267	162	142	110	127	123	135	125	104	92	96	91	84	75	88	79	72	101	73
30	233	308	142	136	119	103	110	106	108	88	106	87	103	93	73	83	76	103	85	77
31	240	331	120	141	133	104	122	105	102	89	95	89	84	90	81	81	94	76	88	90
32	225	300	119	141	139	113	128	122	107	102	76	85	96	92	88	64	85	86	99	74
33	232	347	168	153	134	118	124	110	109	89	111	105	102	92	103	79	57	70	86	96
34	186	209	157	149	144	111	125	129	106	104	81	75	70	85	94	83	85	74	70	75
35	208	257	173	121	137	129	124	94	118	114	96	96	87	85	92	90	83	85	80	71
36	189	267	209	132	121	127	117	127	107	112	100	91	104	91	77	77	70	75	67	80
37	200	207	221	120	133	130	123	113	145	109	90	87	101	93	99	87	79	71	74	
38	204	220	190	148	135	112	111	107	103	100	98	98	82	100	80	79	90	79	61	83
39	222	106	176	131	125	131	114	110	100	101	85	106	107	97	88	81	81	80	79	71
40	202	182	161	124	108	119	112	121	115	102	103	107	91	63	82	75	73	74	74	82
41	185	175	124	138	130	127	110	126	102	96	97	101	80	99	96	79	96	73	74	89
42	163	179	126	133	103	131	146	124	91	107	82	90	83	88	89	86	90	68	68	86
43	188	134	129	122	125	133	116	106	91	108	99	100	87	74	89	76	82	94	66	93
44	178	189	147	135	119	111	118	107	93	100	99	94	96	85	73	72	63	75	67	
45	191	136	141	160	127	130	126	109	82	114	109	100	79	101	77	81	85	81	58	74
46	206	176	151	131	116	112	120	102	123	94	121	100	77	91	87	70	68	61	67	72
47	174	188	140	129	103	120	117	106	96	100	106	115	103	80	94	76	81	69	66	76
48	156	176	142	125	108	143	108	121	111	91	127	108	66	87	84	93	90	85	88	73
49	194	173	129	148	119	133	112	111	103	91	93	98	101	84	92	83	80	88	82	81

RECOUNT FOR NB-93M ON 92-5689

SY:925689NB.A1;2 COUNTED 6/14/92 @ 13: 5: # GAIN: 0.2 KEV/CHAN

	1000	1050	1100	1150	1200	1250	1300	1350	1400	1450	1500	1550	1600	1650	1700	1750	1800	1850	1900	1950
0	03	68	65	53	62	55	45	58	49	45	44	46	53	51	47	41	44	36	58	43
1	74	62	70	57	69	57	61	53	48	53	54	32	44	28	50	50	39	43	49	42
2	81	66	64	75	60	61	52	68	52	52	53	41	45	37	42	34	37	38	34	35
3	65	69	72	69	60	60	44	46	46	43	54	54	36	44	63	42	37	35	32	32
4	78	67	74	51	56	50	49	60	40	52	48	46	38	40	35	38	40	48	46	43
5	83	72	60	63	58	47	55	60	46	43	51	48	50	42	44	46	50	48	46	42
6	67	48	65	63	55	55	53	45	50	48	41	33	51	47	42	55	33	33	39	33
7	62	74	76	71	83	58	53	53	47	46	57	48	44	32	41	55	39	29	49	37
8	70	82	69	65	77	53	53	51	53	61	49	52	40	52	50	40	40	41	50	37
9	76	81	61	60	57	54	54	46	33	41	51	51	46	37	47	69	28	50	41	35
10	71	64	68	66	39	64	56	50	48	52	54	44	48	52	47	56	41	38	38	42
11	77	65	63	63	61	54	41	36	51	43	57	45	37	42	44	48	40	52	32	37
12	73	62	61	71	70	64	50	48	45	52	53	50	42	53	45	54	33	39	47	45
13	66	78	70	51	67	64	53	54	52	51	53	42	45	49	36	46	45	37	45	35
14	75	61	63	66	54	55	51	39	52	51	42	54	56	42	42	45	54	40	47	39
15	64	75	67	61	47	66	55	43	57	47	50	54	48	56	34	33	44	44	38	35
16	66	64	63	62	56	52	56	60	43	57	51	44	53	42	51	45	47	50	50	23
17	68	80	59	76	46	51	58	49	43	52	52	38	60	39	50	36	35	41	38	32
18	57	70	62	59	65	55	45	49	44	36	53	53	38	50	34	44	36	35	43	41
19	70	56	81	66	53	52	63	48	45	55	47	38	62	54	48	33	48	34	53	49
20	72	65	73	75	59	61	57	54	60	42	58	39	44	38	38	38	34	40	37	43
21	65	64	76	65	50	49	60	48	54	44	44	51	51	43	31	37	48	32	38	47
22	85	78	68	56	44	45	61	48	59	38	41	49	49	36	57	44	27	46	42	41
23	70	62	49	67	53	49	47	40	56	42	43	47	43	43	42	53	51	45	52	41
24	68	78	66	61	42	66	55	48	44	43	59	42	40	41	44	51	46	51	50	43
25	75	55	64	61	52	53	51	51	55	42	42	45	44	42	35	38	45	41	46	46
26	77	53	70	51	64	56	43	49	48	47	54	51	47	41	59	53	53	35	33	40
27	102	56	55	44	59	53	61	57	41	59	40	52	38	42	39	33	40	42	38	40
28	60	60	66	72	60	56	51	44	47	40	47	44	45	51	42	49	35	51	39	41
29	73	49	60	42	54	61	45	52	57	46	42	54	38	37	49	54	44	32	38	36
30	62	66	70	58	56	64	60	38	45	53	61	53	51	40	43	36	47	52	46	41
31	63	71	60	63	64	52	65	47	53	50	42	40	34	38	44	39	40	38	45	43
32	74	67	59	63	54	59	51	52	42	44	47	43	38	38	35	58	48	41	46	43
33	70	61	66	60	50	36	66	42	46	54	35	54	51	45	37	33	41	37	44	44
34	82	59	60	69	51	56	53	36	54	58	44	50	36	51	48	43	31	39	41	40
35	73	73	57	51	49	47	63	48	61	50	45	45	45	51	41	43	61	33	38	32
36	76	62	56	64	60	67	56	61	43	46	52	46	49	48	38	43	48	34	47	35
37	82	59	72	53	67	50	59	50	42	49	38	65	33	45	43	37	37	40	48	39
38	74	76	59	70	58	52	56	44	55	41	49	31	42	39	41	37	43	32	47	40
39	73	70	68	58	44	53	52	44	54	63	49	47	44	53	34	46	34	35	47	27
40	70	68	60	76	60	60	54	51	36	48	41	40	34	64	30	52	41	40	37	40
41	70	67	66	59	53	58	50	53	47	43	44	48	45	48	42	47	20	40	36	45
42	71	54	67	75	63	38	64	50	51	50	46	49	50	46	44	58	41	32	52	31
43	70	60	70	66	55	57	52	47	39	43	60	55	57	49	35	45	49	34	46	49
44	69	60	53	54	60	54	55	53	51	55	30	46	49	55	51	49	42	47	30	34
45	57	67	67	57	60	62	70	56	47	57	44	45	51	46	39	50	38	47	52	41
46	73	84	68	57	71	43	48	48	50	43	45	44	41	47	42	39	38	49	38	49
47	70	63	55	55	50	60	58	40	49	43	39	48	45	37	48	44	46	43	52	44
48	75	73	61	54	59	46	53	57	49	34	40	49	53	33	47	41	38	39	51	37
49	62	75	60	62	74	51	45	52	48	50	56	42	54	41	53	37	44	44	46	37

NIOBIUM ANALYSIS

Page 1 of 2

Spreadsheet filename: NBCALC

Revision 1: 6/1/92, NLW

Assumes tracer added to final aliquot

Sample ID: 92-5689

Date Calculated: 06/16/92

Data filename: NB5689

M&TE No.

Diode HH

Nb-94 & 95 Spectrum: 925689.hh;1

Zr/Nb-95 Tracer: 54124-76-0

Volume added, ml: 0.2503 0.0012 error

*****Half-lives*****

Zr-95 dpm/ml: 4.415E+03 4.500E+01 error

Zr-95= 64.02 days

Nb-95 dpm/ml: 9.892E+03 1.151E+02 error

Nb-95= 34.97 days

On: Date: 05/13/92 01:00 Time

Nb Sep Date: 05/07/92 13:30 Time

total dpm Nb-95= 2629.44 34.53 error at Nb sep time

Sample Amount: 0.5000 0.0001 error

g, ml or sample? g

Reporting Units

Leach Volume, ml: 250 0.01 error

Activity: dpm

Vol to dilute, ml: 1 0.00001 error

per ? : g

Diluted to, ml: 1 0.00001 error

Final Aliquot, ml: 4.993 0.17 error

Nb-94 & 95 Counting Data from Prepared Sample

Sample dpm Nb-95= 2.132E+03 1.14 % error at Nb sep time

Sample dpm Nb-94= 2.187E+00 100.00 % error

*****RESULTS*****

Yield Nb-95= 0.811 0.014 error

Nb-94 dpm/g= 270.105 270.303 error = 100.07 %

MDA = < 270.105

GENERIC FORMULAS

$$\text{Nb-94 Activity} = \frac{\text{net dpm} \times \text{leach vol} \times \text{diln vol}}{\text{yield} \times \text{sample amt} \times \text{diln aliquot} \times \text{aliquot}}$$

$$\% \text{ recovery} = \frac{\text{dpm recovered}}{\text{dpm added}} \times 100$$

$$\text{Nb-93m Activity} = \frac{\text{net cpm} \times \text{d/c} \times \text{leach vol} \times \text{diln vol}}{\text{yield} \times \text{sample amt} \times \text{diln aliquot} \times \text{aliquot}}$$

NIOBIUM ANALYSIS

Page 2 of 2

Spreadsheet filename: NBCALC

Revision 1: 6/1/92, NLW

Sample ID: 92-5689

Date Calculated: 06/16/92

Data filename: NB5689

Nb-93m Spectrum: 925689nb.a1;1

Weight Nb ppt, mg: 300.5 0.2 error

Counted on: A M&TE No. Diode A

On: Date: 05/29/92 08:55 Time

Nb-93m d/c = 74.743 6.318 error

NB-93M COUNTING DATA:

Diode B or 325 LEPS Enter data under correct diode.

If %error >= 50%, enter MDA. If not, MDA = NA

net cps: 1.00 1.00 % error

MDA, in cps: NA

Diode A

peak channel no.: 83 bkgd: 70 - 74 <-- first ROI

Count time, min.: 398.22 58 <-- counts

Nb-93m counts--> 71 57

112 60

peak channel + 107 61

5 lower + 146 60

4 higher 131 100 - 104 <-- second ROI

136 67 <-- counts

122 62

92 72

76 58

81 59

gross counts: 1074.000 614 :normalized ROI total

net cpm: 0.433 0.722 :cpm in bkgd spectrum

error, cpm: 0.112 avg BKG.A1;1&2 :bkgd filename

% error 25.768 901.51 :total bkgd counts

*****RESULTS*****

Nb-93m dpm/g= 3998.363 1095.061 error = 27.368 %

MDA =

Entered by NALP/H Date 6/16/92

Reviewed by S. L. Indoff Date 6/18/92

NIOBium ANALYSIS

Page 1 of 2

Spreadsheet filename: NBOCALC

Revision 1: 6/1/92, NLW

Assumes tracer added to final aliquot

Sample ID: 92-5689

Date Calculated: 06/02/92

Data filename: NB5689 *nbj6/5/92*

M&TE No.

Diode HH

Nb-94 & 95 Spectrum: 925689~~nb~~.hh;1

Zr/Nb-95 Tracer: 54124-76-0

volume added, ml: 0.2503 0.0012 error

*****Half-lives*****

Zr-95 dpm/ml: 4.415E+03 4.500E+01 error

Zr-95= 64.02 days

Nb-95 dpm/ml: 9.892E+03 1.151E+02 error

Nb-95= 34.97 days

On: Date: 05/13/92 01:00 Time

Nb Sep Date: 05/07/92 13:30 Time

total dpm Nb-95= 2629.44 34.53 error at Nb sep time

Sample Amount: 0.5000 0.0001 error

g, ml or sample? g

Reporting Units

Leach Volume, ml: 250 0.01 error

Activity: dpm

Vol to dilute, ml: 1 0.00001 error

per ? : g

Diluted to, ml: 1 0.00001 error

Final Aliquot, ml: 4.993 0.17 error

Nb-94 & 95 Counting Data from Prepared Sample

Sample dpm Nb-95= 2.132E+03 1.14 % error at Nb sep time

Sample dpm Nb-94= 2.197E+00 100.00 % error

*****RESULTS*****

Yield Nb-95= 0.811 0.014 error

Nb-94 dpm/g= 270.105 270.303 error = 100.07 %

MDA = < 270.105

GENERIC FORMULAS

$$\text{Nb-94 Activity} = \frac{\text{net dpm} \times \text{leach vol} \times \text{diln vol}}{\text{yield} \times \text{sample amt} \times \text{diln aliquot} \times \text{aliquot}}$$

$$\% \text{ recovery} = \frac{\text{dpm recovered}}{\text{dpm added}} \times 100$$

$$\text{Nb-93m Activity} = \frac{\text{net cpm} \times \text{d/c} \times \text{leach vol} \times \text{diln vol}}{\text{yield} \times \text{sample amt} \times \text{diln aliquot} \times \text{aliquot}}$$

NI0BIUM ANALYSIS

Page 2 of 2

Spreadsheet filename: NBCALC

Revision 1: 6/1/92, NLW

Sample ID: 92-5689

Date Calculated: 06/02/92

Data filename: NB5689

Nb-93m Spectrum: 925689nb.a1;1

Weight Nb ppt, mg: 300.5 0.2 error

Counted on: A M&TE No. Diode A

On: Date: 05/29/92 08:55 Time

Nb-93m d/c = 74.743 6.318 error

NB-93M COUNTING DATA:

Diode B or 325 LEPS Enter data under correct diode.

If %error >= 50%, enter MDA. If not, MDA = NA

net cps: 1.00 1.00 % error

MDA, in cps: NA

Diode A

peak channel no.: 83 bkgd: 70 - 74 <-- first ROI

Count time, min.: 398.22 58 <-- counts

Nb-93m counts--> 71 57

112 60

peak channel + 107 61

5 lower + 146 60

4 higher 131 100 - 104 <-- second ROI

136 67 <-- counts

122 62

92 72

76 58

81 59

gross counts: 1074.000 614 :normalized ROI total

net cpm: 0.972 0.183 :cpm in bkgd spectrum

error, cpm: 0.105 BKG.A1;1 :bkgd filename

% error 10.840 586.87 :total bkgd counts

*****RESULTS*****

Nb-93m dpm/g= 8973.927 1290.383 error = 14.268 %

MDA =

NJL 6/2/92
Entered by Date

A. E. Fady 6/4/92
Reviewed by Date

NB 93M 92-05689

SAMPLE ID..... SY:925689NB.A1;1

OF CHANNELS..... 2548

DIODE I.D..... A

SHELF NUMBER..... 0

CALIBRATION..... 0.2 KEV/CH

TIME ZERO 5/29/92 AT 0:55: 0

COUNTED..... 5/29/92 AT 0:55: 0

(0.00 MINUTES DECAY TIME)

LIVE COUNT TIME.... 6 HOURS 38 MINUTES 13 SECONDS (398.22 MIN.)

ELAPSED TIME..... 6 HOURS 38 MINUTES 13 SECONDS (398.22 MIN.)

(DEAD TIME = 0.000)

FLUX CORRECTION.... 0.0000

GEOM CORRECTION.... 0.0000 0.0000 0.0000 0.0000 0.0000

WEIGHT..... 1.00000 GRAMS

ANTI: 0 SLP: 0 AREA: 0 P-T: 0 ERR: 0 ZER: 0 OPR: 0 NOV: -1

Reviewed S.L. Fiedler 6/4/92

Guen B Brodeur 5-29-92

351

NB 93M 92-05689

SY:925689NB.A1;1 COUNTED 5/29/92 @ 8:55: 0 GAIN: 0.2 KEY/CHAN

	B	50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950
0	23893	60	67	70	57	54	50	40	49	37	30	31	47	43	34	30	32	32	25	31
1	0	75	62	56	59	34	37	53	53	40	34	37	39	43	49	33	40	33	34	35
2	0	82	72	50	46	50	52	36	49	43	40	43	36	24	40	46	30	26	29	42
3	0	60	58	65	61	53	34	53	43	36	42	36	43	56	44	29	20	37	27	26
4	0	75	59	74	61	43	37	46	51	36	30	46	40	35	37	42	34	15	33	30
5	0	72	57	64	52	43	42	43	43	37	46	46	44	33	33	32	23	29	37	36
6	0	72	65	61	41	45	50	52	37	40	30	30	41	20	32	33	29	37	31	25
7	0	61	47	61	54	54	50	43	40	33	41	29	36	27	33	35	24	31	37	47
8	3	61	53	53	50	53	59	40	47	40	47	33	43	44	20	24	31	24	32	39
9	229	61	53	57	49	41	54	46	39	30	43	44	39	40	31	29	32	25	33	36
10	327	62	63	44	55	48	49	47	49	62	36	33	35	40	31	31	24	23	33	32
11	297	81	52	57	46	40	45	44	40	57	45	33	31	30	23	35	31	21	21	32
12	148	57	51	54	43	52	54	48	29	59	29	37	29	32	41	31	21	33	36	29
13	167	86	50	59	44	37	40	72	46	75	36	31	36	30	32	20	26	36	39	21
14	129	94	66	52	51	47	53	66	41	55	43	35	33	30	26	31	25	39	27	36
15	107	125	57	53	69	49	55	63	30	60	37	31	30	33	36	50	32	36	20	33
16	07	100	52	39	61	61	63	40	33	44	32	47	33	35	29	27	32	32	29	20
17	03	04	62	42	51	50	70	53	43	46	36	43	34	29	35	30	32	30	30	32
18	00	72	57	47	51	39	67	36	45	35	35	39	46	28	37	35	30	29	29	35
19	79	77	64	52	60	43	51	30	44	29	40	33	33	40	45	32	34	27	36	40
20	69	58	43	45	47	46	49	40	49	37	45	40	43	20	42	30	35	30	27	20
21	82	57	47	44	54	44	43	40	39	36	34	41	44	40	36	35	37	32	31	39
22	02	60	81	60	54	50	30	42	60	45	43	36	33	34	42	39	20	35	29	30
23	60	61	50	55	52	50	53	61	46	42	46	41	40	42	40	35	29	31	43	40
24	07	60	52	42	60	51	50	82	51	40	40	33	20	41	29	32	32	20	34	31
25	75	77	51	55	55	45	42	05	55	39	40	36	39	29	36	31	26	31	32	35
26	92	70	55	60	36	49	42	73	37	30	41	44	42	26	41	31	36	35	29	27
27	01	77	62	40	57	57	35	56	40	41	45	30	40	40	42	31	31	23	37	35
28	07	71	61	45	44	52	30	56	47	33	36	24	40	34	37	35	40	36	41	37
29	09	112	47	60	61	34	43	60	53	41	43	45	30	26	47	41	36	29	32	37
30	03	107	50	50	53	45	41	43	44	35	42	40	47	37	32	39	37	30	39	40
31	70	146	61	47	52	39	39	35	50	39	40	40	42	42	22	33	20	29	30	37
32	90	131	53	47	50	34	43	42	39	37	35	37	44	35	35	30	31	20	32	34
33	62	136	60	45	61	41	46	47	45	39	41	36	32	39	47	21	20	47	32	36
34	73	122	59	40	44	54	50	47	62	30	23	37	31	33	33	30	31	20	27	30
35	07	92	67	40	40	39	49	50	44	44	37	41	34	37	35	26	23	26	21	34
36	79	76	03	55	40	65	45	44	45	42	30	35	31	35	23	32	32	29	25	37
37	00	81	100	45	34	40	46	54	37	52	46	43	30	41	37	37	40	30	25	29
38	67	03	61	51	43	52	46	41	35	36	43	41	31	25	14	24	33	43	20	46
39	76	69	61	60	39	41	40	42	43	55	32	32	29	33	43	30	28	36	25	30
40	02	60	51	43	50	55	35	30	33	42	31	44	44	37	40	41	40	22	40	40
41	60	60	64	49	40	41	40	46	36	31	27	36	43	33	32	33	20	37	29	29
42	63	76	65	47	42	43	51	45	40	49	39	36	30	41	42	32	24	27	26	30
43	60	70	52	53	44	37	40	49	43	30	52	20	50	42	30	20	33	20	31	29
44	74	63	53	51	33	30	53	27	35	43	36	30	34	42	21	37	29	31	30	39
45	69	69	63	54	44	40	46	50	47	26	37	39	31	34	39	34	31	30	34	35
46	70	85	51	51	40	56	41	34	41	35	41	39	30	27	36	35	31	32	33	37
47	06	50	45	49	40	40	44	53	32	36	41	35	44	25	26	34	30	17	23	34
48	56	69	52	55	46	44	43	40	29	40	34	34	31	45	28	29	30	40	26	29
49	76	01	59	50	52	54	50	42	46	40	45	30	23	33	26	35	37	30	35	41

NB 93M 92-85689

SY:925689NB.A1;1 COUNTED 6/29/92 @ 8:55:00 GAIN: 0.2 KEY/CHAN

	1000	1050	1100	1150	1200	1250	1300	1350	1400	1450	1500	1550	1600	1650	1700	1750	1800	1850	1900	1950
0	35	33	23	28	28	21	23	16	23	16	16	11	23	18	19	25	14	11	28	28
1	31	30	30	28	22	23	23	25	23	21	17	19	15	23	19	28	16	12	19	14
2	35	27	28	30	25	21	24	17	25	25	25	21	27	15	16	18	18	25	12	21
3	32	30	31	24	28	27	28	22	16	25	21	20	19	23	22	18	21	18	19	19
4	33	23	28	34	29	19	35	19	30	32	17	25	14	19	16	19	14	24	21	18
5	37	27	22	29	30	22	26	21	25	13	14	23	17	20	18	17	23	18	14	17
6	34	28	41	26	28	17	16	17	18	25	16	15	9	23	18	17	17	11	15	19
7	29	25	28	27	28	17	18	17	25	28	13	28	28	12	23	21	21	14	15	18
8	35	33	21	18	25	22	31	16	29	16	15	23	11	16	28	17	16	17	16	15
9	31	32	27	22	31	31	25	19	21	16	12	21	21	18	19	28	19	15	13	14
10	31	31	25	29	26	30	18	23	24	17	12	22	30	22	23	21	21	28	24	15
11	29	14	27	28	28	28	28	28	17	15	21	25	15	16	12	24	22	19	21	12
12	38	33	28	22	22	24	26	21	22	15	16	25	27	22	24	23	17	21	12	18
13	29	30	30	25	24	15	13	28	16	22	16	22	21	15	15	17	23	22	14	14
14	26	31	28	28	33	26	19	21	21	29	28	14	21	13	13	18	24	19	13	25
15	42	16	22	33	21	22	19	26	27	21	12	22	28	15	21	21	28	18	18	14
16	44	22	23	30	16	16	26	28	21	28	13	23	15	15	14	14	18	24	28	18
17	28	29	31	28	13	27	26	26	17	18	21	17	14	18	16	26	22	16	19	11
18	30	24	33	25	28	21	16	25	23	18	27	13	19	23	13	13	14	15	23	13
19	35	32	31	34	27	27	28	18	19	22	15	21	18	19	24	16	16	13	19	11
20	33	27	24	31	29	26	35	22	29	28	19	22	15	23	16	28	28	21	25	21
21	31	21	36	25	23	25	26	24	24	28	27	23	26	18	28	19	19	16	28	18
22	31	38	26	32	27	23	28	15	23	14	14	21	30	25	12	24	18	18	14	17
23	29	28	27	27	26	17	18	23	18	19	28	26	23	17	27	28	22	8	15	14
24	29	35	28	31	19	23	28	28	21	11	15	18	19	13	19	12	18	16	15	17
25	29	17	31	28	15	22	21	26	18	22	16	18	28	17	21	21	14	22	18	19
26	32	30	21	27	23	34	19	30	21	31	24	28	21	26	16	18	22	28	18	16
27	31	23	37	26	29	28	24	21	19	12	18	22	17	16	21	18	16	12	19	
28	34	26	32	24	37	21	18	21	22	13	23	24	17	18	19	22	28	6	16	16
29	21	29	23	28	27	19	19	26	17	28	28	16	16	23	17	8	14	12	13	21
30	34	48	24	13	28	27	12	29	18	23	17	23	23	27	18	21	13	24	15	16
31	33	28	31	27	32	23	24	17	22	28	21	24	27	23	22	21	18	21	9	28
32	28	30	32	19	33	18	23	15	15	23	18	25	26	21	28	19	28	14	12	16
33	35	25	24	28	17	30	24	16	19	28	11	14	19	23	22	14	21	18	14	17
34	30	30	21	23	24	26	35	16	21	18	28	19	23	22	24	13	17	15	17	13
35	24	24	26	24	23	30	17	21	19	28	14	29	25	19	23	15	17	17	28	17
36	31	37	28	23	28	22	27	19	21	16	19	23	22	15	13	21	23	11	24	15
37	36	23	29	27	27	25	22	21	21	15	18	18	22	19	14	22	15	17	16	17
38	27	23	24	28	33	28	28	18	22	16	21	13	18	14	28	24	15	22	18	
39	32	25	22	28	13	27	24	28	15	21	16	19	23	18	16	19	13	19	19	13
40	30	24	37	29	21	19	27	25	17	30	21	16	23	21	28	19	22	18	23	16
41	34	35	32	29	29	18	24	15	23	13	23	25	13	21	13	24	14	23	25	21
42	29	29	32	33	23	24	18	25	18	14	15	12	22	16	15	24	22	21	12	23
43	31	23	18	24	21	23	28	23	24	18	16	12	25	28	25	19	21	19	19	14
44	28	32	28	37	25	14	26	27	15	18	22	26	12	15	28	16	21	9	15	17
45	27	18	26	32	22	13	18	18	13	17	16	17	23	19	19	14	22	17	27	21
46	23	28	25	31	22	28	22	23	27	21	17	21	17	28	28	26	26	16	14	18
47	34	24	24	26	21	23	27	23	22	25	16	18	23	32	19	16	17	15	16	17
48	35	18	24	21	14	23	17	27	11	14	22	16	28	28	22	28	13	28	8	15
49	27	27	30	26	18	21	22	16	26	18	28	24	23	23	15	12	9	13	19	17

TITLE: 101-SY NB 92-5689

FILE: 925689.HH:1

* CHANNELS: 2048

SHLUF: 0

DIODE: HH

TIME ZERO: 5 7 92 13 30 0

TIME OF COUNT: 5 20 92 16 25 0

(18895.0 MINUTES DECAY TIME)

LIVE TIME: 16 HOURS 6 MINUTES 48 SECONDS = 966.800 MINUTES

ELAPSED TIME: 16 HOURS 7 MINUTES 36 SECONDS = 967.600 MINUTES

(DEAD TIME = 0.001)

FLUX CORR. FACT.: 0.000000

GAIN: 1.00000 KEY/CHAN

WEIGHT: 1.00000

PLT INT: 0

PLT LAD: 0

ANTI FLG 0

SLP FLT: 0

ARLO REJ: 0

PTR: 0

ERR REJ: 0

ZER LEV: 0

OWN PER: 0

NOV: -1

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M. W. G. W. 5/29/92
S. L. Jacoby 5/31/92

925689.HH:1		101-SY NB 92-5689																		
	0	50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950
0	50000	925	786	740	761	493	455	383	336	317	354	466	253	143	106	99	26	36	30	26
1	5	910	744	677	742	498	530	376	329	358	357	444	252	150	118	75	43	29	30	25
2	0	892	712	696	782	489	525	368	326	363	341	423	235	146	107	97	34	28	24	29
3	5	966	738	691	733	483	414	401	342	371	355	422	239	133	103	105	44	35	36	25
4	18	951	688	722	759	511	407	373	339	343	359	456	212	159	105	85	28	26	29	22
5	111	913	653	707	756	513	381	345	330	322	333	443	204	139	121	114	51	21	32	23
6	381	957	761	715	788	488	413	394	363	313	367	454	227	138	104	111	40	21	39	23
7	519	878	665	688	740	493	414	387	354	330	373	417	199	136	86	95	29	33	22	19
8	569	891	718	653	718	506	409	380	365	350	367	463	213	133	120	94	43	25	30	30
9	721	899	753	639	718	487	404	363	346	339	377	493	217	109	98	113	33	29	26	20
10	918	868	715	686	847	508	441	343	374	315	361	469	233	128	116	99	37	33	23	30
11	1102	823	724	657	845	467	428	360	436	374	429	479	268	118	107	120	29	26	24	33
12	1284	855	688	662	707	463	361	354	343	349	657	450	232	106	106	130	36	67	85	27
13	1140	841	678	623	645	496	443	386	362	356	568	427	222	158	89	119	31	75	306	23
14	1199	925	753	637	668	508	418	362	336	436	420	463	218	150	95	132	32	34	273	21
15	1214	854	724	663	654	456	480	378	352	455	374	487	216	105	99	223	32	24	45	21
16	1448	839	724	665	646	434	383	350	356	347	373	439	207	127	102	1147	24	35	21	45
17	1483	878	762	701	784	422	407	322	379	378	377	483	186	133	83	10912	26	26	23	85
18	1452	892	716	667	662	491	416	375	327	357	399	472	203	122	92	20164	35	27	24	58
19	1429	818	713	649	644	507	411	351	315	393	391	448	194	104	102	3991	38	27	26	37
20	1381	890	735	615	633	448	404	361	371	352	384	478	195	111	93	136	39	31	15	56
21	1379	868	690	634	633	535	393	368	347	343	377	446	212	103	105	43	33	20	25	247
22	1396	827	741	667	633	575	418	352	356	372	419	439	199	126	108	45	30	31	20	142
23	1465	936	743	615	617	457	429	388	341	332	440	377	178	89	92	43	31	31	24	25
24	1429	1018	712	666	627	410	387	352	384	372	400	419	185	138	106	57	44	32	27	21
25	1369	1053	718	617	624	484	419	371	326	358	419	428	201	184	78	58	29	33	22	13
26	1332	1374	765	678	618	434	385	358	353	372	425	414	196	182	76	39	41	24	29	24
27	1377	873	713	696	617	482	415	368	336	357	374	398	190	113	107	37	32	26	31	18
28	1281	1310	691	675	608	497	396	362	387	372	399	323	179	119	117	28	29	26	34	26
29	1217	838	709	647	639	492	496	358	356	332	430	318	165	107	165	33	27	20	28	29
30	1331	762	878	621	611	469	425	348	325	375	428	314	173	185	187	33	28	37	27	16
31	1177	793	728	686	615	458	388	362	344	368	405	266	178	128	118	36	41	26	32	16
32	1387	804	674	613	591	489	393	357	324	364	409	389	198	98	99	31	36	18	26	34
33	1228	888	705	621	558	459	371	352	368	368	428	381	165	123	64	42	33	34	27	17
34	1188	854	741	621	574	483	381	348	353	354	481	477	149	184	185	56	27	27	36	19
35	1181	989	678	597	595	429	484	338	334	326	438	883	167	116	84	48	35	18	26	28
36	1158	876	735	698	598	437	395	355	331	378	419	485	171	189	84	46	33	27	28	19
37	1187	841	718	741	608	427	376	359	342	337	436	277	177	132	99	41	48	29	21	21
38	1138	1025	729	715	603	457	372	352	328	382	396	273	187	95	94	43	48	32	19	21
39	1137	744	679	671	1277	452	595	348	318	343	422	241	189	99	92	35	38	29	26	22
40	1113	833	714	638	3833	448	778	348	335	368	483	268	149	187	181	34	28	28	24	21
41	1842	914	715	675	718	429	487	331	358	367	437	275	159	89	96	28	29	29	36	17
42	1091	734	738	688	731	413	363	347	335	358	481	253	157	98	99	27	41	27	21	32
43	1824	854	667	692	688	417	413	345	353	356	416	268	151	112	183	38	40	26	28	21
44	1845	1883	782	723	548	415	394	336	336	371	482	278	158	182	112	29	45	26	26	25
45	975	796	691	753	519	451	337	358	362	383	411	224	147	123	96	31	26	32	22	19
46	998	785	718	766	517	487	418	358	342	379	417	235	168	182	78	62	28	35	35	16
47	1847	738	781	734	587	447	361	373	357	334	487	289	173	188	188	78	26	33	27	24
48	943	738	657	767	494	485	369	345	316	358	441	265	162	188	84	68	26	28	18	17
49	1817	757	664	757	561	486	395	335	318	389	412	233	157	188	98	38	23	38	26	29

925689.HH:1			101-SY NB 92-5689																	
	1000	1050	1100	1150	1200	1250	1300	1350	1400	1450	1500	1550	1600	1650	1700	1750	1800	1850	1900	1950
0	10	18	18	16	6	12	11	8	11	7	8	7	4	7	5	5	7	6	6	6
1	17	17	15	23	18	14	15	11	9	6	8	7	5	7	5	6	3	7	5	4
2	20	21	18	19	20	14	4	18	13	5	6	8	12	7	4	3	5	6	5	5
3	32	21	19	17	15	15	14	8	9	9	4	2	7	4	5	2	5	8	4	8
4	22	22	29	16	24	16	5	11	8	13	6	7	9	8	3	5	3	9	5	5
5	19	19	23	20	12	14	8	9	8	11	7	9	7	8	6	8	4	9	7	3
6	15	14	14	19	13	17	9	13	7	7	7	5	10	4	11	5	4	5	5	8
7	22	23	24	15	16	18	7	14	14	11	6	4	4	11	6	9	4	3	5	3
8	14	13	17	21	23	11	9	13	9	7	7	6	5	4	6	5	7	6	2	7
9	23	24	19	11	19	18	13	12	6	5	2	6	6	8	5	4	2	2	7	4
10	23	17	16	15	15	18	16	8	13	7	5	7	9	5	5	4	2	9	5	1
11	22	26	18	17	20	7	11	12	14	24	7	7	10	7	9	7	9	9	4	3
12	17	23	22	13	14	11	14	12	8	68	10	8	6	5	11	5	7	10	6	1
13	17	21	25	17	23	13	11	13	15	152	8	12	5	7	4	2	1	6	6	3
14	15	22	16	24	12	18	9	16	8	178	7	4	4	6	5	4	5	4	3	3
15	27	15	16	23	12	12	9	10	11	47	10	11	6	8	11	7	4	9	2	7
16	28	27	21	20	17	12	8	10	11	16	10	8	4	3	10	8	6	3	4	2
17	24	27	24	17	18	13	10	9	12	8	7	6	7	9	3	14	6	6	4	1
18	26	32	26	14	16	13	17	13	8	11	1	7	7	7	9	14	2	3	0	5
19	22	28	16	14	17	16	11	21	5	6	13	3	8	4	4	16	6	4	2	8
20	24	21	24	13	15	9	17	12	12	9	2	9	9	6	11	7	5	4	4	4
21	14	19	21	24	21	22	10	6	8	4	7	8	8	6	5	4	9	4	4	5
22	26	13	28	13	29	10	8	19	9	4	6	8	8	6	9	8	6	5	10	1
23	21	20	30	12	21	12	16	15	10	10	7	7	15	6	7	8	6	6	3	4
24	16	17	27	15	16	14	8	16	8	10	13	3	10	5	2	6	6	4	2	2
25	19	16	29	18	11	12	13	13	7	12	5	9	13	8	13	2	6	6	6	3
26	21	19	23	16	12	10	10	14	7	7	7	4	7	6	10	8	10	4	2	5
27	18	15	11	15	19	18	14	15	13	7	4	8	8	2	7	5	4	2	5	6
28	14	16	17	27	13	14	12	13	7	3	3	7	10	2	7	4	4	5	5	4
29	23	15	13	19	26	16	8	14	6	6	9	5	9	8	5	5	6	6	7	7
30	12	23	19	20	17	15	17	7	12	10	10	6	7	3	4	10	3	7	4	3
31	18	20	21	18	16	16	15	12	11	4	5	10	5	4	6	4	3	6	7	3
32	19	24	14	18	25	18	12	11	12	4	8	5	1	12	2	11	11	6	6	2
33	12	25	13	18	20	19	12	12	17	7	6	10	13	6	10	5	3	6	7	3
34	19	19	23	17	20	12	14	7	13	6	6	7	13	2	4	7	9	6	6	1
35	14	20	22	20	35	12	11	8	10	4	10	11	13	7	4	5	7	9	4	7
36	27	23	21	18	21	15	11	14	7	11	6	7	3	8	4	8	2	2	3	3
37	26	16	20	18	19	16	10	8	15	5	6	18	1	5	7	3	7	11	4	7
38	20	21	19	8	22	11	13	20	15	11	5	11	8	5	10	6	5	4	7	1
39	18	18	15	20	13	10	14	12	5	7	9	8	7	5	13	9	4	2	6	7
40	23	27	20	22	14	12	10	6	9	10	8	12	7	3	7	5	2	7	6	8
41	24	25	18	16	19	14	7	10	13	12	9	27	8	7	3	4	9	6	4	6
42	22	26	18	22	20	16	14	13	9	10	9	23	16	8	5	4	10	4	6	2
43	18	29	16	18	15	17	13	7	13	6	5	8	8	4	4	7	4	8	7	5
44	12	19	26	17	23	9	13	11	10	5	4	10	8	7	8	9	3	4	5	7
45	17	30	17	20	17	12	9	17	12	6	5	31	8	8	6	2	6	7	3	2
46	15	25	19	12	18	18	13	8	17	11	11	20	7	4	12	8	8	2	8	2
47	18	27	25	17	20	18	12	10	4	5	6	18	8	4	6	3	9	5	2	4
48	25	25	11	6	22	21	16	15	4	8	4	11	7	8	6	3	7	3	5	7
49	21	20	23	20	27	16	9	11	12	22	4	13	7	3	5	10	6	7	4	4

Raygun - RSX Version 10-Jan-90

(29-MAY-1992 08:52:00)

Analysis performed by: diana mcmullin

Sample: 101-SY NB 92-5689

Weight: 1.00000 ML

Irradiation date: 7-May-1992 at 13:30:00

Count date: 20-May-1992 at 16:25:00

Decay: 13.1d (1133700.0 seconds)

Count times: REAL TIME 16.13h (58056.000 seconds)

LIVE TIME 16.11h (58008.000 seconds)

Dead time: 0.08 percent

Detector: HH pos 0 Geometry Factor: 1.000

Efficiencies and shape parameters from file: ve:[116,2]EFFFILNB. HH

Spectrum from file : 925689.hh:1

Background subtractions from file: VE:[116,1]BACKG. HH

	Peak channel	Region start end	Gross counts	Net area +-	Energy (KeV)	Gommas /sec	Err % SD	System bkgd
1	75.9	73. 79.	7386.	1676.	77.54	3.536E-01	6.8	0.
2	210.5	209. 212.	3117.	320.	211.43	5.775E-02	23.4	0.
3	239.9	236. 246.	9736.	3745.	240.69	7.618E-01	3.5	0.
4	301.5	300. 303.	1924.	268.	301.90	7.036E-02	22.3	0.
5	339.8	339. 341.	1772.	614.	340.05	1.840E-01	8.8	0.
6	404.6	463. 465.	1247.	190.*	464.18	4.884E-02	100.0	162.
7	512.2	511. 514.	2066.	578.*	511.50	5.715E-02	100.0	733.
8	585.0	584. 586.	1685.	645.*	583.89	6.600E-02	100.0	814.
9	729.7	727. 732.	785.	215.*	727.86	4.688E-02	100.0	174.
10	767.9	761. 770.	37074.	36216.	765.80	2.698E+01	0.5	0.
11	797.0	796. 799.	238.	102.*	794.77	3.190E-02	100.0	69.
12	862.7	862. 864.	176.	89.*	860.10	3.204E-02	100.0	92.
13	913.4	912. 915.	709.	686.*	910.53	3.373E-02	100.0	595.
14	967.0	966. 969.	217.	133.*	963.91	3.311E-02	100.0	138.
15	971.1	969. 974.	520.	410.*	967.99	9.113E-02	100.0	316.
16	1463.7	1461. 1466.	477.	423.	1457.88	6.495E-01	5.4	0.
17	1591.3	1590. 1592.	62.	35.	1584.81	5.881E-02	27.0	0.

 * Net Peak Area above the Compton Continuum before correction for system background. Values flagged with a * are subsequently corrected for applied background before calculation of absolute emission rate (gms/sec).

Diana L. McMullin
5-27-92
M20 gm W
6/2/92

13
 0
 0

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Gamma-ray and nuclide lookup from file: VE:C116.3\MBLIB.DAT

Least-squares Results

(interferences)

nuclide	energy keV	dps at zero time	uCi /ML	peak frac	err (%)	dev (sig)	DPM /ML	error (%)
1 Nb 95	- - - -	3.554E+01	9.605E-04	- - - -	- - - -	- - - -	2.132E+03	1.14
	765.00	3.554E+01	9.605E-04	1.00	1.14	-1.00		

The following are upper limit values:

Co 60	- - - -	4.061E-02	1.097E-06	- - - -	- - - -	- - - -	2.436E+00	100.00
Zr 95	- - - -	1.160E-01	3.135E-06	- - - -	- - - -	- - - -	6.960E+00	100.00
Nb 94	- - - -	3.645E-02	9.052E-07	- - - -	- - - -	- - - -	2.107E+00	100.00
Sr113	- - - -	4.203E-02	1.136E-06	- - - -	- - - -	- - - -	2.522E+00	100.00
Sr125	- - - -	0.000E+00	0.000E+00	- - - -	- - - -	- - - -	0.000E+00	100.00
Sr115m	- - - -	1.936E+00	5.204E-05	- - - -	- - - -	- - - -	1.155E+02	100.00
Sr121a	- - - -	1.000E+00	4.325E-05	- - - -	- - - -	- - - -	9.601E+01	100.00
Sr125	- - - -	5.794E-01	1.566E-05	- - - -	- - - -	- - - -	3.476E+01	100.00

The following peaks were not identified:

#	energy	gammas/sec	pcterr	CI #
1	77.54	3.5332E-01	6.9	0.0000000
2	211.40	5.7753E-02	23.4	0.0000000
3	245.60	7.6181E-01	3.6	0.0000000
4	301.00	7.0363E-02	22.3	0.0000000
5	331.05	1.0494E-01	0.9	0.0000000
6	331.10	4.6042E-02	100.0	4.5452554E-02
7	311.50	5.7152E-02	100.0	0.0000000
8	303.00	6.5090E-02	100.0	0.0000000
9	325.10	4.6000E-02	100.0	0.0000000
11	331.77	3.1055E-02	100.0	0.0000000
12	300.10	3.2636E-02	100.0	0.0000000
13	310.53	3.3726E-02	100.0	0.0000000
14	303.51	3.3114E-02	100.0	0.0000000
15	307.50	2.1133E-02	100.0	0.0000000
16	107.60	6.4953E-01	5.5	0.0000000
17	100.01	5.0014E-02	27.0	0.0000000

If CI > 0 Confidence threshold was not exceeded

1) - E Energy Window test failure

2) - E Lifetime Data Life test failure

CI = -2 Extreme As. Gamma comparison test failure
CI = -3 Unable to estimate area of Assoc. Gamma

NIOBIUM ANALYSIS

Page 1 of 2

Spreadsheet filename: NBCALC

Revision 1: 6/1/92, NLW

Assumes tracer added to final aliquot

Sample ID: BL-5070 LEPS recount

Date Calculated: 06/16/92

Data filename: NB5070BR

M&TE No.

Diode HH

Nb-94 & 95 Spectrum: bl5070nb.hh;1

Zr/Nb-95 Tracer: 54124-74-0

volume added, ml: 0.2503 0.0012 error

*****Half-lives*****

Zr-95 dpm/ml: 4.415E+03 4.500E+01 error

Zr-95= 64.02 days

Nb-95 dpm/ml: 9.892E+03 1.151E+02 error

Nb-95= 34.97 days

On: Date: 05/13/92 01:00 Time

Nb Sep Date: 05/07/92 13:30 Time

total dpm Nb-95= 2629.44 34.53 error at Nb sep time

Sample Amount: 0.5000 0.0001 error

g, ml or sample? g

Reporting Units

Leach Volume, ml: 250 0.01 error

Activity: dpm

Vol to dilute, ml: 1 0.00001 error

per ? : g

Diluted to, ml: 1 0.00001 error

Final Aliquot, ml: 4.993 0.17 error

Nb-94 & 95 Counting Data from Prepared Sample

Sample dpm Nb-95= 2.135E+03 1.13 % error at Nb sep time

Sample dpm Nb-94= 2.178E+00 100.00 % error

*****RESULTS*****

Yield Nb-95= 0.812 0.014 error

Nb-94 dpm/g= 268.616 268.812 error = 100.07 %

MDA = < 268.616

GENERIC FORMULAS

$$\text{Nb-94 Activity} = \frac{\text{net dpm} \times \text{leach vol} \times \text{diln vol}}{\text{yield} \times \text{sample amt} \times \text{diln aliquot} \times \text{aliquot}}$$

$$\% \text{ recovery} = \frac{\text{dpm recovered}}{\text{dpm added}} \times 100$$

$$\text{Nb-93m Activity} = \frac{\text{net cpm} \times \text{d/c} \times \text{leach vol} \times \text{diln vol}}{\text{yield} \times \text{sample amt} \times \text{diln aliquot} \times \text{aliquot}}$$

NIOBIMUM ANALYSIS

Page 2 of 2

Spreadsheet filename: NBOCALC

Revision 1: 6/1/92, NLW

Sample ID:

BL-5070 LEPS recount

Date Calculated:

06/16/92

Data filename:

NB5070BR

Nb-93m Spectrum:

BL5070nb.ai;2

Weight Nb ppt, mg: 265.4

0.2 error

Counted on: A

M&TE No.

Diode A

On: Date: 06/11/92

13:10 Time

Nb-93m d/c = 72.859

5.993 error

NB-93M COUNTING DATA:

Diode B or 325 LEPS

Enter data under correct diode.

If %error >= 50%, enter MDA. If not, MDA = NA

net cps: 1.00 1.00 % error

MDA, in cps:NA

Diode A

peak channel no.: 83

bkgd: 71 - 75 <-- first ROI

Count time, min.: 1431.15

226 <-- counts

Nb-93m counts--> 256

218

314

223

peak channel + 401

220

5 lower + 455

208

4 higher 492

101 - 105 <-- second ROI

476

212

<-- counts

398

198

288

166

287

201

237

151

gross counts: 3604.000

2023 :normalized ROI total

net cpm: 0.383

0.722 :cpm in bkgd spectrum

error, cpm: 0.057

avg BKG.A1;1&2:bkgd filename

% error 14.900

3056.2 :total bkgd counts

*****RESULTS*****

Nb-93m dpm/g= 3438.924 599.859 error = 17.443 %

MDA =

7/16/92
Entered by Date

6/18/92
Reviewed by Date

RECOUNT NB-93M ON BL-5070

SAMPLE ID..... SY:BL5070NB.A1;2

OF CHANNELS..... 2048

DIODE I.D..... A

SHELF NUMBER..... 0

CALIBRATION..... 0.2 KEV/CH

TIME ZERO 6/11/92 AT 13:10: 0

COUNTED..... 6/11/92 AT 13:10: 0

(0.00 MINUTES DECAY TIME)

LIVE COUNT TIME.... 23 HOURS 51 MINUTES 9 SECONDS (1431.15 MIN.)

ELAPSED TIME..... 23 HOURS 51 MINUTES 9 SECONDS (1431.15 MIN.)

(DEAD TIME = 0.000)

FLUX CORRECTION.... 0.0000

GEOM CORRECTION.... 0.0000 0.0000 0.0000 0.0000 0.0000 ← unused portion of printout

WEIGHT..... 1.00000 GRAMS

ANTI: 0 SLP: 0 AREA: 0 P-T: 0 ERR: 0 ZER: 0 OPR: 0 NOV: 1

W. J. W.
6/12/92

S.L. Fodoff 6/12/92

Reviewed S.L. Fodoff
6/12/92

977

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RECOUNT MB-93M ON BL-5070

SY:BL5070NB.A1;2 COUNTED 6/11/92 @ 13:10:00 GAIN: 0.2 KEV/CHAN

	0	50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950
0	85369	253	204	175	189	161	143	145	151	121	100	130	127	112	121	109	104	110	93	90
1	0	261	212	197	154	164	135	151	130	131	127	122	100	109	93	96	96	97	89	97
2	0	242	190	167	158	140	156	147	123	134	133	126	130	135	124	113	94	97	76	98
3	0	238	166	107	159	135	136	121	157	111	115	130	100	114	98	104	103	104	109	97
4	0	246	201	104	150	145	165	161	130	112	124	100	120	125	116	104	102	80	97	87
5	0	209	151	205	145	152	137	140	146	131	129	122	125	116	136	97	93	100	96	96
6	0	228	176	205	153	150	133	160	141	137	116	107	134	85	101	116	87	98	99	84
7	0	221	104	197	157	176	151	167	130	130	115	121	129	124	103	90	93	90	85	93
8	17	240	174	102	144	151	140	143	133	131	121	135	117	116	119	93	93	96	82	81
9	699	212	181	164	168	127	159	143	122	157	132	123	121	110	116	102	120	87	85	93
10	1224	206	176	170	104	162	170	135	140	159	116	133	113	104	106	95	112	93	93	101
11	1004	247	140	158	163	174	170	150	127	100	100	124	121	105	111	104	80	100	82	92
12	604	203	160	167	151	151	139	143	125	205	139	130	132	105	103	114	107	85	95	92
13	540	207	195	170	147	156	146	101	107	225	125	115	133	100	111	110	103	107	86	94
14	426	359	150	152	170	139	102	197	134	211	110	117	123	102	131	93	92	102	95	117
15	331	394	100	177	144	140	203	193	115	100	113	131	104	101	105	123	87	100	74	101
16	297	340	170	173	147	126	232	179	133	177	105	149	110	110	107	114	110	106	77	107
17	297	304	196	150	103	132	219	177	132	125	134	117	115	109	122	120	99	89	88	103
18	282	205	100	149	160	144	217	141	139	123	103	107	109	134	104	102	93	95	99	99
19	245	227	207	169	172	160	158	133	145	116	120	116	120	125	117	109	100	60	71	86
20	261	225	201	171	165	137	140	154	161	141	119	135	111	111	122	93	95	103	93	112
21	247	226	179	176	156	149	131	149	163	117	115	110	109	126	127	95	100	87	102	101
22	259	218	157	160	164	149	135	164	107	130	107	129	112	102	114	129	86	100	96	91
23	241	223	172	153	167	113	135	211	171	135	123	114	107	115	121	97	89	92	77	111
24	249	220	161	104	161	130	145	230	165	145	124	120	123	113	125	127	110	94	94	100
25	258	200	169	106	149	140	137	259	160	107	116	127	130	102	94	82	96	94	87	98
26	292	246	166	176	137	145	128	255	170	131	135	134	135	114	110	90	117	110	110	107
27	249	241	100	174	150	174	137	205	146	132	113	147	118	100	110	80	96	94	113	87
28	263	256	174	103	152	159	157	191	142	129	130	135	132	114	119	102	87	109	134	93
29	275	314	100	165	169	134	144	174	152	127	127	123	110	105	99	117	99	90	134	115
30	274	401	179	157	167	176	140	173	152	124	111	114	123	95	104	100	86	120	116	106
31	201	455	153	152	165	156	163	131	132	135	123	100	120	90	100	102	111	94	107	91
32	294	492	165	172	171	145	154	159	125	136	129	123	101	100	102	90	100	116	110	05
33	252	476	175	159	179	137	147	104	127	123	126	101	111	116	112	90	117	74	101	103
34	290	390	194	151	109	134	177	150	140	126	125	115	111	106	106	85	96	114	94	100
35	271	200	217	162	157	157	143	156	140	127	117	130	100	99	120	124	91	91	90	83
36	263	207	231	193	159	145	119	133	150	117	119	107	121	127	131	132	103	102	90	91
37	223	237	234	153	155	160	150	136	122	113	124	134	110	105	90	102	79	76	75	100
38	255	236	217	176	154	142	145	142	120	133	97	99	107	122	96	99	87	86	103	90
39	219	234	177	102	151	156	136	130	120	134	103	122	112	111	122	97	93	97	100	99
40	241	223	195	167	139	164	120	130	140	122	112	117	125	110	93	79	109	111	93	86
41	200	195	161	102	155	134	179	156	113	129	131	121	134	121	114	103	96	91	77	101
42	246	207	101	133	151	156	150	134	115	133	136	125	101	110	100	90	105	111	102	103
43	243	254	109	177	153	151	157	114	107	110	143	110	111	112	102	103	92	116	97	91
44	238	265	150	191	156	130	166	134	131	110	124	99	110	105	121	96	100	101	93	101
45	272	245	177	150	147	142	143	116	107	133	126	125	116	105	100	100	105	100	100	100
46	270	267	175	169	146	166	162	118	137	126	125	119	102	90	100	99	110	101	91	90
47	225	222	194	162	160	159	146	126	118	126	131	97	129	106	125	123	98	96	85	91
48	220	213	159	107	152	161	130	135	130	104	141	123	112	114	107	106	78	100	98	93
49	250	216	160	156	167	162	163	119	130	133	133	100	100	137	105	91	81	92	85	91

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RECOUNT NB-93M ON BL-5070

SY:BL5070NB.A1:2 COUNTED 6/11/92 @ 13:10: 0 GAIN: 0.2 KEV/CHAN

	1000	1050	1100	1150	1200	1250	1300	1350	1400	1450	1500	1550	1600	1650	1700	1750	1800	1850	1900	1950
0	111	93	80	69	77	84	73	67	72	66	61	62	50	55	45	70	67	57	43	50
1	72	89	60	70	79	68	67	68	67	64	50	59	62	55	66	47	47	50	60	53
2	84	92	77	76	77	83	71	74	73	70	64	55	56	56	65	55	43	51	57	50
3	86	98	62	89	79	72	53	69	81	65	65	61	62	63	50	50	65	49	59	50
4	94	80	85	76	72	48	57	80	57	62	52	54	57	62	57	69	56	52	60	45
5	91	81	73	74	72	66	67	66	57	67	50	49	44	56	55	54	57	55	57	45
6	107	92	80	79	74	80	76	73	65	47	67	49	50	55	44	61	60	45	51	65
7	91	89	83	73	66	68	92	61	54	56	61	60	50	52	54	64	48	44	49	51
8	95	93	87	73	66	69	81	56	60	58	82	59	59	45	57	62	53	59	54	55
9	85	77	85	59	79	70	69	56	66	57	62	56	62	60	60	75	45	57	59	44
10	74	84	82	80	80	69	76	76	66	52	61	65	51	48	57	46	59	50	58	47
11	92	86	90	83	59	51	72	77	55	56	64	63	63	50	57	68	44	53	56	46
12	112	87	80	70	66	63	72	70	53	66	56	63	67	52	53	64	51	52	46	45
13	85	80	80	72	69	73	66	74	68	51	68	62	60	52	60	54	57	47	56	64
14	95	81	73	71	71	69	71	62	55	61	64	55	57	54	61	49	65	54	38	48
15	81	100	81	89	76	65	55	58	61	70	50	50	64	54	63	44	67	37	61	40
16	106	92	62	61	85	70	79	55	78	69	60	52	50	44	48	53	47	60	35	43
17	92	74	66	79	60	45	65	65	51	60	73	69	56	54	66	58	45	60	40	40
18	95	85	76	63	73	59	73	65	63	80	66	60	56	62	48	53	49	47	50	60
19	95	93	78	65	54	70	81	74	47	63	53	60	55	54	50	51	64	52	53	49
20	114	73	73	70	74	70	82	60	66	65	61	69	60	64	64	57	44	55	49	57
21	97	74	97	75	76	75	65	54	58	71	57	51	50	52	61	53	43	54	60	42
22	95	89	84	67	65	64	64	72	55	69	67	53	54	50	55	47	37	49	53	50
23	96	87	73	74	75	87	59	54	62	62	60	57	59	41	55	63	46	54	50	45
24	94	81	70	79	71	53	69	69	70	67	50	71	64	56	61	51	50	50	48	50
25	110	79	77	77	73	70	63	66	69	67	64	55	57	57	51	51	47	51	50	56
26	117	78	74	86	73	80	61	56	57	62	47	62	51	60	58	60	55	44	54	44
27	89	83	86	79	83	77	63	82	68	70	67	70	67	43	52	46	51	38	59	54
28	84	78	84	66	61	64	82	57	54	72	63	49	42	62	44	60	49	53	54	40
29	110	84	69	50	53	91	58	67	63	63	50	69	49	42	49	52	59	50	43	50
30	87	85	68	90	77	57	72	58	52	62	50	55	47	50	54	76	39	44	45	43
31	106	77	86	69	64	66	64	69	54	62	50	43	57	44	71	53	55	44	43	31
32	97	72	78	72	67	67	64	51	61	50	69	56	69	73	52	44	47	46	56	49
33	89	79	72	81	81	70	48	56	68	70	70	52	47	65	56	54	61	59	56	47
34	83	80	90	84	70	75	69	53	60	65	65	60	67	56	61	42	49	43	65	56
35	81	82	83	75	55	57	70	54	52	54	65	49	59	50	50	56	67	52	51	46
36	70	84	66	75	50	77	54	60	69	60	61	61	57	62	50	50	55	49	59	65
37	82	76	94	69	66	61	63	72	72	57	60	56	63	55	47	41	68	57	57	44
38	75	69	84	80	79	69	62	55	72	51	55	67	53	54	66	64	51	65	54	50
39	91	70	98	72	70	65	65	82	68	60	60	62	59	50	54	46	51	47	59	51
40	85	86	94	93	79	69	67	74	66	50	59	45	57	54	48	54	64	63	50	53
41	93	90	89	81	69	71	56	60	60	69	55	49	65	63	55	50	42	49	55	51
42	100	72	80	87	71	73	69	69	55	60	64	55	74	59	64	51	57	71	59	50
43	90	83	69	87	67	63	62	65	57	70	64	57	47	69	55	61	53	47	55	52
44	96	91	74	90	76	73	62	67	56	61	50	44	52	51	50	45	50	52	36	50
45	99	86	62	99	77	50	64	59	67	69	65	71	56	47	33	77	50	56	40	41
46	104	86	83	83	61	77	64	53	60	61	70	44	44	53	50	62	46	55	58	53
47	95	81	72	68	67	55	81	66	71	61	54	50	53	48	61	63	47	50	62	49
48	103	69	71	86	73	67	62	63	46	67	50	66	48	70	53	60	45	38	59	44
49	114	80	83	63	68	60	54	79	59	72	68	67	61	52	49	47	49	39	35	46

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NIQBIUM ANALYSIS

Page 1 of 2

Spreadsheet filename: NBCALC

Revision 1: 6/1/92. NLW

Assumes tracer added to final aliquot

Sample ID: BL-5070

Date Calculated: 06/16/92

Data filename: NBS070BL

M&TE No.

Diode HH

Nb-94 & 95 Spectrum: bl5070nb.hh;1

Zr/Nb-95 Tracer: 54124-76-0

volume added, ml: 0.2503 0.0012 error

*****Half-lives*****

Zr-95 dpm/ml: 4.415E+03 4.500E+01 error

Zr-95= 64.02 days

Nb-95 dpm/ml: 9.892E+03 1.151E+02 error

Nb-95= 34.97 days

On: Date: 05/13/92 01:00 Time

Nb Sep Date: 05/07/92 13:30 Time

total dpm Nb-95= 2629.44 34.53 error at Nb sep time

Sample Amount: 0.5000 0.0001 error

g, ml or sample? g

Reporting Units

Leach Volume, ml: 250 0.01 error

Activity: dpm

Vol to dilute, ml: 1 0.00001 error

per ? : g

Diluted to, ml: 1 0.00001 error

Final Aliquot, ml: 4.993 0.17 error

Nb-94 & 95 Counting Data from Prepared Sample

Sample dpm Nb-95= 2.135E+03 1.13 % error at Nb sep time

Sample dpm Nb-94= 2.178E+00 100.00 % error

*****RESULTS*****

Yield Nb-95= 0.812 0.014 error

Nb-94 dpm/g= 268.616 269.812 error = 100.07 %

MDA = < 268.616

GENERIC FORMULAS

$$\text{Nb-94 Activity} = \frac{\text{net dpm} \times \text{leach vol} \times \text{diln vol}}{\text{yield} \times \text{sample amt} \times \text{diln aliquot} \times \text{aliquot}}$$

$$\% \text{ recovery} = \frac{\text{dpm recovered}}{\text{dpm added}} \times 100$$

$$\text{Nb-93m Activity} = \frac{\text{net cpm} \times \text{d/c} \times \text{leach vol} \times \text{diln vol}}{\text{yield} \times \text{sample amt} \times \text{diln aliquot} \times \text{aliquot}}$$

NIOBIUM ANALYSIS

Page 2 of 2

Spreadsneet filename: NBCALC

Revision 1: 5/1/92, NLW

Sample ID: BL-5070

Date Calculated: 06/16/92

Data filename: NB5070BL

Nb-93m Spectrum: BL5070nb.ai;1

Weight Nb ppt, mg: 265.4 0.2 error

Counted on: A M&TE No. Diode A

On: Date: 05/28/92 15:11 Time

Nb-93m d/c = 72.859 5.993 error

NB-93M COUNTING DATA:

Diode B or 325 LEPS Enter data under correct diode.

If %error >= 50%, enter MDA. If not, MDA = NA

net cps: 1.00 1.00 % error

MDA, in cps:NA

Diode A

peak channel no.:	83	bkgd:	70 - 74 <-- first ROI
Count time, min.:	1051.8		171 <-- counts
Nb-93m counts-->	214		155
	247		179
peak channel +	320		180
5 lower +	350		167
4 higher	386	100 - 104 <-- second ROI	
	309	169 <-- counts	
	296	144	
	227	167	
	238	144	
	205	135	
gross counts:	2792.000	1611	:normalized ROI total
net cpm:	0.401	0.722	:cpm in bkgd spectrum
error, cpm:	0.068	avg BKG.A1;1;2:bkgd filename	
% error	17.042	2370.3	:total bkgd counts

*****RESULTS*****

Nb-93m dpm/g= 3601.846 695.334 error = 19.305 %

MDA =

NLW 6/16/92
Entered by Date

J. L. Tedoff 6/13/92
Reviewed by Date

NI0BIUM ANALYSIS

Page 1 of 2

Spreadsheet filename: NBCALC

Revision 1: 6/1/92, NLW

Assumes tracer added to final aliquot

Sample ID: BL-5070

Date Calculated: 06/02/92

Data filename: NB5070BL

M&TE No.

Diode HH

Nb-94 & 95 Spectrum: bl5070nb.hh;l

Zr/Nb-95 Tracer: 54124-76-0

Volume added, ml: 0.2503 0.0012 error

*****Half-lives*****

Zr-95 dpm/ml: 4.415E+03 4.500E+01 error

Zr-95= 64.02 days

Nb-95 dpm/ml: 9.892E+03 1.151E+02 error

Nb-95= 34.97 days

On: Date: 05/13/92 01:00 Time

Nb Sep Date: 05/07/92 13:30 Time

total dpm Nb-95= 2629.44 34.53 error at Nb sep time

Sample Amount: 0.5000 0.0001 error

g, ml or sample? g

Reporting Units

Leach Volume, ml: 250 0.01 error

Activity: dpm

Vol to dilute, ml: 1 0.00001 error

per ? : g

Diluted to, ml: 1 0.00001 error

Final Aliquot, ml: 4.993 0.17 error

Nb-94 & 95 Counting Data from Prepared Sample

Sample dpm Nb-95= 2.135E+03 1.13 % error at Nb sep time

Sample dpm Nb-94= 2.178E+00 100.00 % error

*****RESULTS*****

Yield Nb-95= 0.812 0.014 error

Nb-94 dpm/g= 268.616 268.812 error = 100.07 %

MDA = < 268.616

GENERIC FORMULAS

Nb-94 Activity =
$$\frac{\text{net dpm} \times \text{leach vol} \times \text{diln vol}}{\text{yield} \times \text{sample amt} \times \text{diln aliquot} \times \text{aliquot}}$$

% recovery =
$$\frac{\text{dpm recovered}}{\text{dpm added}} \times 100$$

Nb-93m Activity =
$$\frac{\text{net cpm} \times \text{d/c} \times \text{leach vol} \times \text{diln vol}}{\text{yield} \times \text{sample amt} \times \text{diln aliquot} \times \text{aliquot}}$$

NIOBIUM ANALYSIS

Page 2 of 2

Spreadsheet filename: NBCALC

Revision 1: 6/1/92, NLW

Sample ID: SL-5070

Date Calculated: 06/02/92

Data filename: NB5070BL

Nb-93m Spectrum: BL5070nb.a1;1

Weight Nb ppt, mg: 265.4 0.2 error

Counted on: A M&TE No. Diode A

On: Date: 05/29/92 15:11 Time

Nb-93m d/c = 72.859 5.993 error

NB-93M COUNTING DATA:

Diode B or 325 LEPS Enter data under correct diode.

If %error >= 50%, enter MDA. If not, MDA = NA

net cps: 1.00 1.00 % error

MDA, in cps: NA

Diode A

peak channel no.: 83 bkgd: 70 - 74 <-- first ROI

Count time, min.: 1051.8 171 <-- counts

Nb-93m counts--> 214 155

247 179

peak channel + 320 180

5 lower + 350 167

4 higher 386 100 - 104 <-- second ROI

309 169 <-- counts

296 144

227 167

238 144

205 135

gross counts: 2792.000 1611 :normalized ROI total

net cpm: 0.940 0.183 :cpm in bkgd spectrum

error, cpm: 0.064 BKG.A1;1 :bkgd filename

% error 6.858 1803.4 :total bkgd counts

*preliminary
incorrect see
collected copy*

*****RESULTS*****

Nb-93m dpm/g= 8445.199 960.207 error = 11.370 %

MDA =

N. D. G. H. 6/2/92
Entered by Date

A. K. G. H. 6/4/92
Reviewed by Date

NB 95M BLANK 5070

SAMPLE ID..... SY:BL5070HB.B1;2

OF CHANNELS..... 2048

DIODE I.D..... A

SHELF NUMBER..... 0

CALIBRATION..... 0.2 KEV/CH

TIME ZERO 5/28/92 AT 15:11: 0

COUNTED..... 5/28/92 AT 15:11: 0

(0.00 MINUTES DECAY TIME)

LIVE COUNT TIME.... 17 HOURS 31 MINUTES 48 SECONDS (1051.00 MIN.)

ELAPSED TIME..... 17 HOURS 31 MINUTES 48 SECONDS (1051.00 MIN.)
(DEAD TIME = 0.000)

FLUX CORRECTION.... 0.0000

GEOM CORRECTION.... 0.0000 0.0000 0.0000 0.0000 0.0000

WEIGHT..... 1.00000 GRAMS

AHT1: 0 SLP: 0 AREA: 0 P-T: 0 ERR: 0 ZER: 0 OPR: 0 NOV: -1

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McDermott 6/2/92
Steven J. McDermott 5294

NB 95M BLANK 5070

SY:8L5070NB.B1;2 COUNTED 5/28/92 @ 15:11: 0 GAIN: 0.2 KEV/CHAN

	0	50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950
0	63108	203	169	138	123	119	118	109	120	91	100	101	105	81	88	86	70	81	94	75
1	0	221	144	153	121	126	106	120	116	107	105	92	104	104	97	76	97	82	83	96
2	0	218	167	149	147	118	99	114	111	98	99	119	90	109	86	09	83	72	88	03
3	0	221	144	153	137	99	113	110	134	109	103	105	110	104	70	73	75	80	68	77
4	0	191	135	150	133	120	102	106	96	114	86	103	84	106	97	73	87	88	69	78
5	0	190	160	167	116	114	127	103	117	99	109	94	94	100	94	83	93	74	65	82
6	0	184	140	148	133	123	114	130	106	106	108	90	87	98	126	79	86	72	76	77
7	0	171	126	139	103	122	116	112	105	111	99	113	84	103	83	75	78	93	83	89
8	13	182	152	152	124	118	110	133	123	106	102	94	102	85	90	97	82	94	76	94
9	461	161	146	134	130	119	100	121	116	103	101	96	07	81	103	80	74	78	79	101
10	775	184	143	142	130	121	111	110	102	127	97	93	92	101	96	71	71	72	75	71
11	733	185	136	134	133	120	124	130	121	147	84	102	94	85	98	85	91	81	82	63
12	462	184	139	147	123	116	105	114	100	166	96	98	93	104	90	104	85	82	63	82
13	395	231	141	164	148	130	134	141	95	165	94	116	94	00	96	86	78	89	87	77
14	323	206	142	145	125	119	139	140	110	184	104	108	92	88	75	83	80	98	65	76
15	294	239	135	130	113	111	165	150	110	161	101	90	102	83	81	94	94	83	64	84
16	242	287	123	137	119	100	160	131	78	120	100	94	96	115	98	79	62	80	86	78
17	245	238	140	148	123	120	179	124	113	110	94	102	94	93	87	82	79	86	80	93
18	196	234	126	137	125	136	105	93	114	107	80	105	92	95	97	71	76	86	79	92
19	194	190	138	146	127	106	137	101	101	102	105	78	94	90	95	73	70	73	87	97
20	190	171	155	147	120	122	120	97	115	96	80	90	105	99	91	90	82	80	80	86
21	196	155	140	118	130	125	136	133	140	85	82	77	101	90	102	79	82	79	82	83
22	210	179	164	126	129	130	118	125	138	102	89	110	101	89	102	89	77	83	76	105
23	198	100	113	125	127	123	115	164	151	105	115	110	95	94	100	82	83	92	91	90
24	223	162	151	155	108	138	108	161	121	108	100	113	89	102	80	75	91	83	71	77
25	190	186	109	131	117	109	108	206	142	111	106	91	99	97	96	97	80	94	72	83
26	197	132	141	130	132	112	120	193	161	111	116	95	89	89	77	77	75	76	89	82
27	203	197	154	138	141	130	113	167	121	111	115	91	102	94	74	103	80	66	85	69
28	211	214	144	147	134	119	106	136	96	100	104	104	100	81	86	99	87	74	96	88
29	203	247	151	122	147	129	109	140	105	101	90	86	102	95	82	88	63	98	93	88
30	215	320	150	138	130	132	117	124	113	119	100	103	84	87	87	96	83	79	80	68
31	210	350	130	134	139	126	139	120	107	104	113	106	93	110	90	79	83	76	97	87
32	242	306	135	141	136	119	110	96	91	82	87	91	116	75	75	96	81	81	83	85
33	221	309	144	168	129	116	122	106	117	91	104	122	114	79	80	74	90	81	77	76
34	194	235	137	139	124	140	126	113	134	84	91	90	97	108	88	87	81	74	94	80
35	186	227	157	135	127	125	134	116	114	116	95	97	93	87	75	74	90	85	79	87
36	225	238	186	135	147	98	105	130	112	97	97	93	91	94	70	74	72	77	66	76
37	100	205	208	113	115	122	95	106	107	111	95	118	98	102	100	70	95	81	92	91
38	173	210	181	115	125	125	101	128	104	88	97	100	106	98	75	81	81	88	76	85
39	180	186	165	132	129	120	100	90	123	105	101	99	90	90	92	84	80	88	90	87
40	182	175	141	142	126	122	108	117	110	104	102	93	107	90	85	74	92	69	79	92
41	182	169	160	151	120	114	114	111	120	100	109	90	88	83	86	89	72	89	73	86
42	182	185	131	122	146	120	113	108	117	95	96	97	83	95	81	79	85	91	86	87
43	165	179	138	129	120	123	109	120	92	103	99	111	91	104	86	72	64	84	91	84
44	200	221	153	137	145	133	120	89	117	99	91	100	92	91	95	76	60	72	68	70
45	192	209	140	140	127	109	111	108	125	118	93	112	97	98	88	87	80	90	75	84
46	156	189	139	122	111	120	123	108	118	123	91	103	90	105	86	90	73	80	73	77
47	184	169	152	131	127	129	140	119	119	113	103	106	80	78	85	78	87	81	75	93
48	183	170	151	131	133	133	112	106	109	96	122	121	100	86	92	84	83	69	79	89
49	192	186	142	154	112	130	127	121	103	98	92	104	95	87	79	79	75	78	70	85

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HB 95M BLANK 5070

SY:BL5070HB.B1:2 COUNTED 5/28/92 @ 15:11:00 GAIN: 0.2 KEV/CHAN

	1000	1050	1100	1150	1200	1250	1300	1350	1400	1450	1500	1550	1600	1650	1700	1750	1800	1850	1900	1950
0	88	60	82	66	67	58	63	55	52	59	56	46	53	40	57	49	45	49	46	44
1	85	71	75	65	67	60	63	45	56	47	53	56	55	49	45	52	52	50	54	43
2	79	76	76	69	69	60	46	56	51	50	62	47	52	41	45	42	52	54	53	42
3	82	72	60	74	59	71	59	55	47	55	53	56	54	60	48	50	43	56	43	53
4	76	66	83	73	64	68	64	51	67	49	54	43	43	49	57	44	53	42	48	46
5	96	69	79	77	56	56	45	46	50	47	57	56	46	40	48	57	49	58	50	44
6	73	73	65	75	68	53	58	51	52	56	57	50	40	53	36	49	40	39	46	45
7	75	77	77	51	60	64	62	55	48	67	52	53	54	38	42	56	34	40	34	35
8	82	76	77	65	77	41	56	51	75	48	49	54	46	55	47	56	50	47	39	45
9	70	72	72	52	70	65	59	54	53	50	55	55	50	57	47	49	37	50	47	45
10	71	79	72	50	63	63	63	53	61	45	63	50	49	45	48	58	42	44	44	36
11	92	86	71	59	69	50	52	45	51	40	43	54	51	53	44	48	45	36	50	48
12	79	80	62	70	50	46	73	50	73	51	68	59	46	39	57	48	55	43	40	37
13	83	69	69	62	56	58	60	54	41	54	65	53	44	45	34	51	45	61	50	45
14	90	70	79	63	78	69	54	50	44	51	46	53	58	41	35	43	38	50	50	49
15	77	70	80	65	47	54	52	65	52	75	44	35	58	47	47	47	51	47	43	43
16	87	81	59	73	71	64	68	63	60	56	58	51	58	47	59	51	43	52	60	50
17	69	73	66	71	65	64	62	55	62	58	44	43	64	59	47	49	52	52	37	49
18	94	63	56	67	67	80	58	60	63	56	50	61	54	57	51	36	44	47	47	47
19	81	65	77	62	57	61	62	51	62	47	47	46	50	47	46	42	45	63	44	44
20	76	69	73	64	70	53	59	42	44	53	40	58	67	52	65	43	45	48	42	31
21	90	72	66	72	62	67	56	49	66	42	51	56	66	51	44	47	38	48	51	41
22	75	78	50	64	57	64	66	56	52	45	53	43	52	53	60	55	50	51	44	45
23	78	67	63	75	58	53	55	60	59	57	57	62	60	55	45	51	41	31	49	48
24	88	76	59	68	66	53	42	56	49	50	41	47	41	47	39	45	43	48	41	36
25	68	70	67	73	70	64	46	59	55	66	59	51	41	51	42	45	48	48	45	39
26	72	85	71	52	75	65	50	54	50	57	54	51	53	54	50	49	40	51	60	46
27	73	77	65	55	64	55	56	42	45	51	57	52	39	47	38	52	50	46	45	47
28	88	74	62	56	76	63	48	64	47	55	52	54	58	58	55	53	49	45	51	37
29	71	67	63	66	52	59	57	49	59	49	42	59	47	58	50	45	53	66	48	62
30	92	70	71	73	65	58	70	54	59	57	63	40	53	51	53	52	53	41	50	62
31	84	69	80	51	62	56	60	49	62	59	52	50	50	53	53	46	49	47	40	40
32	83	63	64	72	60	75	59	52	55	62	55	47	51	55	47	47	50	59	35	34
33	92	90	66	66	62	60	51	57	47	43	44	54	54	56	43	33	43	49	33	39
34	86	72	62	79	66	64	51	59	53	59	53	52	57	39	43	40	38	43	37	45
35	76	95	59	73	65	65	48	52	47	58	43	52	53	51	45	64	46	45	60	40
36	71	81	69	65	63	45	49	46	46	59	64	56	41	56	41	44	54	50	45	48
37	73	77	68	67	42	61	67	58	42	38	53	50	57	47	47	38	51	40	55	34
38	75	93	79	65	58	58	67	50	54	55	55	49	53	40	43	34	47	57	59	50
39	88	71	64	77	65	56	57	54	56	42	42	39	54	50	34	56	51	43	47	57
40	73	76	55	69	76	58	60	64	54	54	56	50	44	42	35	47	36	45	63	37
41	79	72	75	60	48	56	66	63	54	59	46	49	47	52	38	48	48	47	58	50
42	59	71	75	65	65	66	47	55	48	46	57	55	46	58	50	49	42	48	39	52
43	78	65	65	76	66	66	53	50	62	51	63	47	72	55	53	47	52	49	36	48
44	82	69	68	66	54	57	64	52	54	51	57	45	52	45	45	55	38	45	45	52
45	74	77	62	62	56	52	63	66	58	51	48	49	50	43	47	58	51	47	52	55
46	83	65	69	49	72	51	51	57	56	37	43	41	59	45	46	46	55	48	39	45
47	85	69	73	61	65	55	61	59	53	52	55	55	52	34	54	35	44	43	47	49
48	91	62	70	72	61	48	62	62	55	55	43	51	49	48	55	45	49	48	44	55
49	66	74	60	75	75	53	68	63	45	47	46	44	64	59	39	46	47	57	46	46

Analysis performed by: diana mcmullin

Sample: 101SY ELANK NB94/95

Weight: 1.00000 ML

Irradiation date: 7-May-1992 at 13:30:00

Count date: 19-May-1992 at 16:06:00

Decay: 12.1d (1046160.0 seconds)

Count times: REAL TIME 16.32h (58744.000 seconds)

LIVE TIME 16.30h (58696.000 seconds)

Dead time: 0.00 percent

Detector: HH pos 0 Geometry Factor: 1.000

Efficiencies and shape parameters from file: ve:[116.2]JEFFFILNB.HH

Spectrum from file: b105070nb.hh:1

Background subtractions from file: VE:[116.1]BACKG.HH

	Peak channel	Region start end	Gross counts	Net area **	Energy (KeV)	Gammas /sec	Err x SD	System bkgd
1	75.9	72. 79.	8474.	1569.*	74.30	3.261E-02	100.0	1699.
2	210.2	210. 213.	3134.	350.*	200.53	2.406E-02	100.0	302.
3	339.9	238. 244.	7662.	4254.*	230.20	8.507E-02	100.0	3026.
4	271.7	271. 275.	1050.	226.*	269.94	2.750E-02	100.0	102.
5	329.3	329. 330.	944.	152.*	327.49	3.221E-02	100.0	150.
6	339.0	330. 342.	2509.	740.*	330.01	3.235E-02	100.0	711.
7	512.5	510. 515.	2974.	608.*	510.63	5.675E-02	100.0	741.
8	504.9	504. 506.	1696.	752.*	503.00	6.175E-02	100.0	824.
9	729.1	726. 731.	785.	206.*	727.08	4.641E-02	100.0	176.
10	767.0	761. 770.	39268.	37430.	765.71	2.756E+01	0.5	0.
11	862.0	861. 865.	265.	117.*	860.69	3.273E-02	100.0	93.
12	913.2	912. 916.	739.	600.*	911.02	3.446E-02	100.0	602.
13	968.9	964. 969.	259.	108.*	964.73	3.554E-02	100.0	139.
14	971.1	969. 973.	490.	367.*	968.89	4.543E-02	100.0	319.
15	1122.7	1122. 1127.	169.	47.*	1120.38	3.972E-02	100.0	44.
16	1471.2	1461. 1485.	520.	471.*	1460.75	4.095E-02	100.0	497.
17	1500.7	1509. 1505.	84.	50.*	1500.15	3.936E-02	100.0	59.
18	1500.7	1509. 1508.	106.	60.*	1502.71	4.140E-02	100.0	43.

48 Net Peak Area above the Compton Continuum before correction for system background. Values flagged with a * are subsequently corrected for up-scattered background before calculation of absolute emission rate (gams/sec).

Diana L McMullin
5-29-92
MJL yw
6/2/92

Gamma-ray and nuclide lookup from file: VE:[116,3]NBLIB.DAT

%% Least-squares Results %%

		(interferences)						
nuclide	energy KeV	dps at zero time	uCi /HL	peak frac	err (%)	dev (sig)	DPM /HL	error (%)
135 95	- - - -	3.558E+01	9.616E-04	- - - -	- - - -	- - - -	2.135E+03	1.13
	765.71	3.558E+01	9.616E-04	1.00	1.13	1.00		

The following are upper limit values:

Co 60	- - - -	4.124E-02	1.115E-06	- - - -	- - - -	- - - -	2.475E+00	100.00
Po 95	- - - -	1.135E-01	3.067E-06	- - - -	- - - -	- - - -	6.810E+00	100.00
Pb 94	- - - -	3.631E-02	9.813E-07	- - - -	- - - -	- - - -	2.178E+00	100.00
Pa 113	- - - -	8.591E-01	2.319E-05	- - - -	- - - -	- - - -	5.149E+01	100.00
Pa 123	- - - -	0.008E+00	0.000E+00	- - - -	- - - -	- - - -	0.000E+00	100.00
Pa 119m	- - - -	5.661E+00	1.530E-04	- - - -	- - - -	- - - -	3.397E+02	100.00
Pa 121m	- - - -	1.552E+00	4.195E-05	- - - -	- - - -	- - - -	9.314E+01	100.00
Pa 125	- - - -	5.749E-01	1.554E-05	- - - -	- - - -	- - - -	3.449E+01	100.00

The following peaks were not identified:

#	energy	gammas/sec	poterr	CI %
1	74.30	3.2612E-02	100.0	0.0000000
2	250.55	2.4054E-02	100.0	0.0000000
3	260.20	8.5067E-02	100.0	0.0000000
4	269.94	2.7584E-02	100.0	0.0000000
5	317.49	3.2206E-02	100.0	0.0000000
6	320.01	3.2350E-02	100.0	0.0000000
7	510.63	5.6753E-02	100.0	0.0000000
8	583.00	6.1746E-02	100.0	0.0000000
9	727.60	4.6407E-02	100.0	0.0000000
11	860.09	3.2727E-02	100.0	0.0000000
12	911.00	3.4356E-02	100.0	0.0000000
13	964.73	3.5541E-02	100.0	0.0000000
14	968.09	4.5427E-02	100.0	0.0000000
15	1120.30	3.9716E-02	100.0	0.0000000
16	1400.75	4.0954E-02	100.0	0.0000000
17	1500.15	3.9363E-02	100.0	0.0000000
18	1592.71	4.1404E-02	100.0	0.0000000

If CI > 0, Confidence threshold was not exceeded

CI = 0 Energy Window test failure
CI = -1 Extreme Half Life test failure
CI = -2 Extreme As. Gamma comparison test failure
CI = -3 Unable to estimate area of Assoc. Gamma

TITLE: 101SY BLANK NB94/95

FILE: BL05070NB.HH:1

* CHANNELS: 2048

SHELF: 0

DIODE: HN

TIME ZERO: 5 7 92 13 30 0

TIME OF COUNT: 5 19 92 16 6 0

(17436.0 MINUTES DECAY TIME)

LIVE TIME: 16 HOURS 10 MINUTES 16 SECONDS = 978.267 MINUTES

ELAPSED TIME: 16 HOURS 19 MINUTES 4 SECONDS = 979.067 MINUTES

(DEAD TIME = 0.001)

FLUX CORR. FACT.: 0.000000

GAIN: 1.00045 KEV/CHAN

WEIGHT: 1.00000

PLT INT: 0
PLT LAB: 0
ANTI FLG 0
SLP FLT: 0
AREA REJ: 0
PTR: 0
ERR REJ: 0
ZER LEV: 0
OVR PKR: 0
NOV: 0

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M. W. H. 5/29/92
S. L. Jackson 5/20/92

BL05070NB.HH:1 101SY BLANK N094/95

	0	50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950
0	58696	944	765	692	797	497	433	388	379	345	376	422	251	126	112	100	36	29	31	29
1	5	973	736	704	784	500	514	376	363	355	370	448	246	136	113	99	40	30	28	28
2	0	954	724	684	789	486	489	368	357	341	388	452	240	142	88	80	47	31	22	31
3	6	921	701	642	728	525	425	398	348	374	395	467	239	129	111	100	42	28	28	23
4	32	947	742	672	711	497	404	366	370	364	364	413	221	112	124	113	32	39	29	19
5	159	927	758	701	728	486	438	349	342	354	382	426	227	139	129	96	40	27	35	23
6	404	872	786	710	745	469	434	383	358	362	377	482	211	139	92	115	33	33	29	29
7	534	917	751	682	746	504	383	327	327	387	405	449	264	137	105	127	50	28	42	25
8	605	870	719	661	721	501	398	355	342	332	412	472	235	139	114	99	34	34	29	27
9	738	917	881	722	781	512	425	398	352	348	362	441	258	124	102	102	53	45	21	26
10	924	932	733	669	921	542	418	347	352	365	386	495	238	137	109	92	22	22	19	36
11	1047	846	726	671	824	511	437	359	438	332	447	449	287	133	106	102	33	47	31	21
12	1160	898	748	667	691	494	428	375	373	347	650	477	205	131	105	109	33	65	117	28
13	1153	866	712	681	698	463	399	378	353	387	653	512	193	173	92	112	35	81	325	18
14	1204	846	741	780	656	510	355	355	338	489	445	525	215	153	118	151	38	42	218	28
15	1229	887	783	652	645	502	392	357	382	401	393	473	191	122	99	262	21	38	45	28
16	1378	880	750	669	644	479	401	376	335	359	378	529	227	125	91	1625	25	27	34	54
17	1387	882	674	678	649	580	396	354	355	350	379	488	204	122	107	13588	37	32	24	78
18	1439	865	785	696	668	475	398	336	382	339	371	505	198	132	87	19316	44	24	26	43
19	1427	848	662	673	646	476	388	371	351	342	426	452	210	117	89	2998	34	24	21	28
20	1438	846	684	644	654	468	482	361	362	358	346	473	202	121	107	85	38	26	32	87
21	1359	891	724	617	669	574	415	358	371	335	362	466	200	115	99	44	41	34	24	227
22	1462	929	735	678	639	591	432	343	358	368	383	503	195	127	83	44	39	32	38	121
23	1415	991	726	642	651	493	412	357	326	336	393	449	208	128	109	46	32	32	22	27
24	1489	1043	713	682	628	423	487	348	326	342	383	381	210	184	94	59	44	33	31	22
25	1315	1084	759	655	629	459	393	373	326	378	381	488	287	118	73	51	38	27	29	24
26	1381	1351	753	682	669	478	426	352	327	368	412	399	289	128	110	45	36	38	27	26
27	1373	936	691	642	682	459	428	361	373	365	399	332	186	99	111	31	36	36	23	34
28	1353	1298	705	688	591	479	397	375	313	387	379	339	184	182	121	46	32	28	38	21
29	1315	842	734	664	592	589	487	353	373	333	391	362	173	112	188	26	33	28	21	24
30	1348	772	868	688	595	486	457	361	347	377	394	314	178	183	142	37	46	22	25	28
31	1238	796	739	634	616	484	398	329	331	343	488	312	186	187	113	29	45	47	29	22
32	1213	796	757	613	689	429	358	487	325	378	423	313	175	88	84	29	26	35	26	13
33	1237	889	722	619	589	429	489	399	359	366	418	274	161	96	95	48	31	34	29	22
34	1245	789	678	599	584	583	382	375	354	356	487	510	198	114	98	37	27	38	32	24
35	1286	885	658	672	577	475	381	327	338	346	417	795	176	127	183	43	38	41	18	26
36	1169	949	688	666	538	435	381	364	353	360	450	391	166	113	89	36	34	27	28	23
37	1188	837	789	785	625	429	362	343	336	362	412	267	178	99	96	44	42	31	36	28
38	1092	1086	757	627	577	446	481	392	344	366	432	291	186	123	87	42	56	36	27	26
39	1157	839	748	621	1421	381	616	327	356	387	412	259	164	99	88	38	31	29	21	28
40	1088	887	788	626	3131	489	744	347	358	366	458	244	144	84	89	32	37	34	23	18
41	1128	988	787	664	789	458	416	351	336	349	441	264	152	187	89	34	32	28	25	17
42	1101	757	739	674	856	383	412	372	376	382	436	265	179	189	94	43	38	23	27	23
43	1145	837	658	681	622	427	356	329	352	371	385	266	148	123	89	42	44	24	24	28
44	1810	999	787	752	546	447	358	488	357	378	426	244	146	121	99	33	35	28	16	23
45	1843	817	725	735	485	421	363	374	364	358	457	246	159	187	119	38	32	38	28	25
46	1833	756	711	771	499	467	358	343	358	373	451	242	148	188	182	47	37	34	22	32
47	1815	717	785	775	543	455	369	372	311	357	388	246	148	118	187	78	38	29	35	18
48	981	734	689	744	578	438	382	337	338	372	441	265	172	116	181	57	22	23	23	21
49	951	754	719	734	513	458	385	375	383	383	424	264	137	182	185	33	43	32	28	18

BL05070NB.HH:1 101SY BLANK NB94/95

	1000	1050	1100	1150	1200	1250	1300	1350	1400	1450	1500	1550	1600	1650	1700	1750	1800	1850	1900	1950
0	19	22	30	25	15	17	7	13	12	7	8	5	8	8	8	2	4	9	7	4
1	27	27	26	22	10	12	13	15	7	8	14	8	11	8	4	3	7	4	3	5
2	38	15	20	15	16	8	14	13	9	7	9	9	6	7	6	9	6	3	1	1
3	31	25	16	13	17	19	11	18	13	7	4	8	8	8	3	8	6	7	5	5
4	20	21	16	16	25	19	20	11	14	8	12	6	2	6	8	9	5	4	3	5
5	12	23	16	18	12	17	13	11	9	10	10	5	6	3	8	3	2	5	7	9
6	17	24	20	16	27	9	11	9	9	10	6	3	10	7	5	6	5	9	6	3
7	19	23	21	20	21	14	7	17	10	12	7	14	4	6	11	6	6	8	3	9
8	15	23	14	20	19	14	15	16	15	13	10	7	6	3	3	2	6	5	1	4
9	21	23	20	23	25	21	17	13	7	8	5	9	6	11	3	7	7	3	7	10
10	18	17	19	22	21	19	10	12	10	8	7	4	7	8	5	6	10	8	7	6
11	20	17	20	18	15	25	13	14	9	33	8	4	4	6	7	6	7	4	6	6
12	21	23	22	24	27	13	17	12	10	61	14	6	7	4	5	6	7	7	9	9
13	22	24	23	10	14	18	8	5	7	213	8	3	7	10	8	5	3	4	6	5
14	27	17	20	10	10	10	12	9	10	158	10	8	4	6	5	10	7	1	4	8
15	25	21	26	16	25	11	12	14	7	55	7	7	9	10	8	7	5	4	6	5
16	24	23	17	15	22	20	17	9	12	4	8	8	8	10	7	5	5	6	1	4
17	20	25	19	18	14	14	9	8	15	9	15	14	5	4	9	15	3	6	3	8
18	23	28	38	25	21	10	12	10	8	9	12	9	6	8	8	10	7	7	4	5
19	24	21	18	23	27	17	12	18	6	8	8	4	5	9	3	10	5	8	3	7
20	18	18	16	24	12	22	15	12	21	6	8	5	9	4	6	7	7	4	4	8
21	26	19	18	21	20	16	15	8	6	10	4	12	10	3	5	7	5	4	2	9
22	22	24	36	16	17	10	17	10	13	9	6	7	10	13	8	7	4	6	1	5
23	25	16	38	16	10	13	11	9	6	8	2	8	11	6	12	6	4	10	6	2
24	27	17	27	19	17	17	13	7	11	12	6	4	15	7	7	1	10	2	3	7
25	23	21	23	23	21	12	9	15	7	8	2	6	5	5	8	9	3	7	10	4
26	14	31	23	15	23	10	18	12	14	7	4	4	3	3	8	2	6	5	4	5
27	32	22	22	21	17	21	17	15	10	13	5	7	11	2	4	10	11	5	3	4
28	22	16	19	19	10	14	11	12	12	5	9	13	9	7	6	10	8	4	4	6
29	22	17	20	19	27	18	9	12	9	7	4	7	9	8	6	4	4	9	6	7
30	25	16	12	13	18	14	11	13	6	7	9	4	4	9	5	6	6	3	9	7
31	16	23	16	17	16	13	12	12	10	4	15	5	5	4	8	10	6	7	9	5
32	24	24	19	17	20	10	19	10	14	9	7	10	12	11	7	4	5	3	7	4
33	22	24	22	20	19	24	10	10	11	11	11	15	10	6	7	6	5	5	7	4
34	23	24	16	15	13	20	10	14	11	8	8	6	13	13	4	4	3	6	8	4
35	28	18	24	17	19	16	12	11	7	12	8	5	7	1	4	7	4	3	6	9
36	25	17	22	15	21	15	14	12	10	7	5	7	3	6	6	7	10	5	4	5
37	17	27	16	14	19	6	16	12	17	7	9	7	5	8	9	2	1	1	4	8
38	16	21	29	13	16	14	14	9	10	5	10	6	8	2	7	7	8	7	6	1
39	20	13	20	13	22	13	6	12	11	8	11	10	7	5	12	4	4	8	7	3
40	21	26	11	20	28	20	10	7	10	9	4	24	7	5	11	4	4	4	5	4
41	24	17	23	23	30	13	7	6	8	6	6	29	8	10	5	4	1	5	5	4
42	23	16	29	13	23	8	13	15	15	8	12	11	6	15	10	3	9	5	9	11
43	22	23	18	21	14	15	11	13	8	8	6	10	8	8	9	6	7	5	4	1
44	24	18	15	16	17	11	12	10	12	5	9	12	4	6	8	7	3	6	3	6
45	22	26	15	14	14	16	10	9	8	7	5	31	9	3	6	5	6	7	6	8
46	27	24	24	18	16	15	12	7	9	13	2	26	4	3	6	5	3	6	5	10
47	18	18	14	22	27	13	14	13	10	15	7	14	5	6	7	8	12	5	3	2
48	25	16	20	20	13	8	11	20	13	11	7	13	5	4	8	4	5	5	4	2
49	17	19	19	14	10	16	8	12	15	16	13	8	2	8	4	6	8	7	5	4

REFERENCES

Project #:

Work Package #: M99913

ALO #: 92-5070, 5074, 5076, 5080, 5086, 5087, 5092, 5093, 5688 and 5689

NB-94 AND NB-93M ANALYSIS

Reference calibration records:

Diode A - see control and background files for Diode A

⁹³Nb d/c calibration - LRB #53293, p. 36, in 329 Bldg, Rm. 8

⁹⁵Nb yield std #54124-77-3 - LRB #54124, p. 77, in 329 Bldg, Rm. 10A

⁹⁴Nb spike #54124-33-1 - LRB #54124, p. 33, in 329 Bldg, Rm. 10A

⁹⁴Nb std #54124-99-1 - LRB #54124, p. 99, in 329 Bldg, Rm. 10A

⁹³Nb spike #54124-84-100 - LRB #54124, p. 84, in 329 Bldg, Rm. 10A

⁹⁵Zr-⁹⁵Nb tracer #54124-76-0 - LRB #54124, p. 76, in 329 Bldg, Rm. 10A

⁹⁵Nb std #53124-95-1000 - LRB #54124, p. 95, in 329 Bldg, Rm. 10A

⁹⁵Nb std #54124-96-1 - LRB #54124, p. 96, in 329 Bldg, Rm. 10A

mixed gamma std #54124-71-4 - LRB #54124, p. 71, in 329 Bldg, Rm. 10A

pipet and balance performance checks - LRB #54371, p. 33&34, in 329

Bldg., Rm. 5A + LRB #54372, p. 18, Rm. 10A.

NB101SY.REF

1016: Nb Data: Calculation of Blank Correction

filename: NBDATA

Sample ID	Nb-93m dpm/g	dpm/g % error	Nb-93m net cpm	net cpm error	d/c	d/c error	yield	yield error	Nb-93m dpm*	dpm error	% error
92-5070	3384	21.38	0.332	0.065	67.213	5.185	0.429	0.007	52.82	10.98	21.11
92-50700	6006	12.12	0.727	0.064	72.467	5.928	0.571	0.008	92.27	11.16	12.10
92-5074	8483	9.967	1.700	0.068	73.482	6.098	0.884	0.015	141.98	13.29	9.36
92-5076	6954	17.59	0.374	0.059	64.997	4.955	0.28	0.006	86.82	15.32	17.65
92-5080	15170	9.561	2.327	0.043	75.784	6.588	0.829	0.014	212.73	19.83	8.94
92-5688	7815	22.14	0.251	0.051	73.042	6.823	0.235	0.004	78.82	17.16	21.99
92-5086	9704	10.95	1.272	0.076	73.729	6.14	0.861	0.015	108.92	11.32	10.40
92-5087	12898	9.311	1.352	0.058	72.113	5.871	0.66	0.009	147.72	13.74	9.30
92-5092	30776	9.488	3.511	0.127	76.267	6.597	0.707	0.01	378.75	35.91	9.48
92-5093	14089	10.22	1.776	0.074	75.21	6.482	0.845	0.014	158.07	15.21	9.62
92-5689	3221	20.25	0.349	0.063	74.743	6.318	0.811	0.014	32.16	6.44	20.01
BL-5070	3439	17.44	0.383	0.057	72.859	5.993	0.912	0.014	34.37	5.87	17.89

Sample ID	corrected Nb-93m dpm**	error	% error	corrected Nb-93m dpm/g***	error	% error
92-5070	17.65	12.45	70.55	1148.3	888.4	76.68
92-50700	57.90	12.61	21.79	3769.0	1044.4	27.71
92-5074	107.61	14.53	13.50	6429.7	1235.4	19.21
92-5076	52.45	16.41	31.29	4201.3	1688.5	40.00
92-5080	178.36	19.91	11.17	12719.3	2188.6	17.21
92-5688	43.65	18.14	41.55	4372.5	2272.1	51.96
92-5086	74.56	12.76	17.11	6642.4	1515.8	22.82
92-5087	113.36	14.95	13.18	9897.4	1843.9	18.63
92-5092	344.38	36.39	10.57	27983.5	4778.4	17.08
92-5093	123.71	16.30	13.18	10963.4	2110.8	19.25
92-5689	-2.20	8.71	-395.78	-228.5	-974.8	396.81
BL-5070	0.00			0.0		

- * measured 16.6keV Nb K alpha x-ray in aliquot expressed as dpm Nb-93m, that is, yield-corrected dpm/aliquot
- ** yield-corrected dpm/aliquot after subtracting value of reagent blank, BL-5070, that is blank-corrected dpm/aliquot
- *** blank-corrected dpm/g

Errors are estimated by the propagation of individual measurement uncertainty estimates.

Handwritten:
MJD
6/25/92
J. C. J. J.
6/25/92

Nb sep time 5-7-72 1330

Work Sheet for Evaluation of Data

* only columns not previously calculated on a spreadsheet.

	where counted	d/c	75m Nb spaly	% error	yield	date of LEPS count	95m Nb net cpm	% error	cpm with 95m Nb dpm	cpm with 75m Nb dpm	estimate Nb-75m cpm	% loss Nb-75 since first count	* from 75m Nb dpm	1st count %	
5070	329	61.213	16200	16%	429	5/26	0.510	15%	34.3	81.5	015				
5070	329	↓	3380	21%	571	6/10	0.332	20%	22.3	52.0	<.001	37%	12	35%	same
5070	329	182.354	8630	20%	571	5/22	0.418	10%	76.2	133.5	016				
5070	329	72.467	6010	12%	571	6/16	0.727	9%	52.7	92.3	<.001	39%	41	31%	same
5074	329	72.483	12,000	10%	584	5/14	2.254	3%	165.6	187.4	015				
5074	329	↓	8,040	10%	584	5/31	1.618	4%	118.9	134.5	012	28%			
5074	329	↓	18,480	10%	584	6/9	1.728	5%	125.5	172.0	002	40%	140	24%	low
5076	329	147.711	6200	30%	280	5/21	0.146	23%	21.7	77.1	012				
5076	329	64.337	6350	18%	280	6/10	0.374	16%	24.3	96.8	001	33%	-3	-12%	increased
5080	329	75.784	44,000	10%	529	5/10	3.382	2%	256.3	303.2	024				
5080	329	↓	15,200	10%	529	6/5	2.327	2%	176.3	212.7	001	30%	89	31%	same
5082	329	115.082	55500		285	5/20	2.070		<12.7	<55	010				
5082	329	73.042	7815	22%	285	6/17	0.261	20%	18.3	78.0	<.001	45%	=5.4	>42%	increased
5086	329	73.727	4,000	48%	261	5/29	1.580	8%	116.5	135.3	016		8		
5086	329	73.727	9,700	11%	261	6/21	1.722	6%	93.8	108.9	<.001	37%	23	19%	low
5087	329	180.721	8480	24%	660	5/22	0.355	17%	64.1	97.2	020				
5087	329	72.113	12,000	9%	660	6/20	1.352	4%	97.5	171.7	<.001	44%	-33	-34%	increased
5092	329	157.873	20,800	21%	707	5/21	0.906	12%	181.1	256.1	024				
5092	329	76.267	30,800	9%	707	6/15	0.510	4%	267.8	376.7	001	39%	-87	-48%	increased
5093	329	75.210	26,100	9%	845	5/15	3.304	2%	248.5	294.1	025				
5093	329	↓	14,000	10%	845	6/8	1.776	4%	133.6	158.1	002	38%	115	46%	high
5099	329	74.743	4000	27%	811	5/29	0.433	16%	32.4	37.9	016				
5099	329	↓	3220	20%	811	6/14	0.343	18%	26.1	32.2	001	27%	6	19%	low
BL-5070	329	72.859	3600	19%	812	5/28	0.401	17%	29.2	36.0	018				
BL-5070	329	↓	3440	17%	812	6/11	0.383	15%	27.9	34.4	001	29%	1.3	4%	very low

To Provide Comparison of 181SY Nb-93m Data to Nb-95m and Nb-95 activities
 filename: NB95MBKG

Ir-95 = 4685 +/- 47.75 dpm/ml @ Nb sep time
 added: 0.2583 +/- 0.0012 ml
 Nb separation time: 05/07/92 13:30

Half-Lives
 Nb-95m = 3.6 d
 Nb-95 = 34.97 d

MJ2 rwh
6/23/92

Sample No.	d/c	yield	LEPS Count Date	Time	days since 1st count	Estimated Nb-95m gam/min	Nb-95m cpm	Nb-95 dpm @ sep time	Nb-95 dpm @ cnt time	% less since 1st count
5070	67.213	0.429	05/26/92	15:50		0.093	0.015	1128.0	772.5	
5070R	67.213	0.429	06/18/92	14:44	23.0	0.001	0.000	1128.0	490.1	37
50700	102.354	0.571	05/22/92	15:40		0.269	0.016	1501.0	1113.0	
50700R	72.467	0.571	06/16/92	17:45	25.1	0.002	0.000	1501.0	676.9	39
5074	73.402	0.084	05/14/92	15:05		1.952	0.295	2324.0	2020.3	
5074R	73.402	0.084	05/31/92	10:40	16.0	0.077	0.012	2324.0	1447.5	28
5074R2	73.402	0.084	06/09/92	11:25	25.0	0.013	0.002	2324.0	1210.4	40
5076	147.911	0.28	05/21/92	15:11		0.161	0.012	735.7	556.6	
5076R	64.997	0.28	06/10/92	16:45	20.1	0.003	0.001	735.7	374.0	33
5080	75.784	0.029	05/18/92	15:30		0.945	0.124	2100.0	1750.0	
5080R	75.784	0.029	06/05/92	12:31	17.9	0.027	0.004	2100.0	1227.9	30
5080	105.002	0.235	05/20/92	10:32		0.170	0.010	617.0	478.6	
5080R	73.042	0.235	06/19/92	08:12	29.9	0.001	0.000	617.0	264.6	45
5086	73.729	0.061	05/29/92	15:40		0.105	0.016	2263.0	1460.4	
5086R	73.729	0.061	06/21/92	17:04	23.1	0.001	0.000	2263.0	924.0	37
5087	100.721	0.66	05/22/92	07:10		0.332	0.020	1736.0	1296.1	
5087R	72.113	0.66	06/20/92	12:06	29.2	0.001	0.000	1736.0	726.6	44
5092	199.073	0.707	05/21/92	09:03		0.426	0.024	105.9	141.4	
5092R	76.267	0.707	06/15/92	00:31	25.0	0.003	0.001	105.9	06.2	39
5093	75.21	0.045	05/15/92	16:40		1.520	0.225	2222.0	1091.2	
5093R	75.21	0.045	06/00/92	14:27	23.9	0.015	0.002	2222.0	1177.4	30
5089	74.743	0.011	05/29/92	00:55		0.105	0.016	2132.0	1303.7	
5089R	74.743	0.011	06/14/92	13:05	16.2	0.005	0.001	2132.0	1004.2	27
BL-5070	72.059	0.012	05/20/92	15:11		0.121	0.010	2135.0	1406.1	
BL-5070R	72.059	0.012	06/11/92	13:10	13.9	0.000	0.001	2135.0	1067.2	24

S.E. Faddey 6/23/92

Nb-95m on each prepared sample (on filter) is estimated by:

$$\begin{array}{l} \text{Zr-95 added} \times \text{yield} \times 2\% \times .367 \text{ gamma/d} \xrightarrow{\text{decayed to}} = \text{gammas/min} \\ \text{(at sep time)} \qquad \qquad \text{Nb-95m} \quad \text{count time} \quad \text{Nb-95m} \end{array}$$

$$\begin{array}{l} \text{Nb-95m gammas/min} \\ \hline = \text{cpm Nb-95m} \\ 0.89 \text{ Nb-93m gamma/d} \times \text{Nb-93m d/c} \end{array}$$

RPD 92-5070 + 92-5070

Blank-corrected

$$\frac{3800 - 1100}{(3800 + 1100)^{1/2}} \times 100 = 110\%$$

← not unexpected
since the
individual, 10
uncertainties
are 28% + 77%.

No blank correction

$$\frac{6000 - 3400}{(6000 + 3400)^{1/2}} \times 100 = 55\%$$

MJW:W 6/24/92

W.K. Jodg 6/24/92

* 7/26/24/92

NB STD B:100UL NB-95 #54124-95-10000,153.1MG PPT

SAMPLE ID..... SY:NBFLUORB.A1;2

OF CHANNELS..... 2048

DIODE I.D..... A

SHELF NUMBER..... B

CALIBRATION..... 0.2 KEV/CH

TIME ZERO 6/22/92 AT 9:23: B

COUNTED..... 6/22/92 AT 9:23: B

(0.00 MINUTES DECAY TIME)

LIVE COUNT TIME.... 22 HOURS 52 MINUTES 6 SECONDS (1372.10 MIN.)

ELAPSED TIME..... 22 HOURS 52 MINUTES 6 SECONDS (1372.10 MIN.)
(DEAD TIME = 0.000)

FLUX CORRECTION.... 0.0000

GEOM CORRECTION.... 0.0000 0.0000 0.0000 0.0000 0.0000

WEIGHT..... 1.00000 GRAMS

ANTI: 0 SLP: 0 AREA: 0 P-T: 0 ERR: 0 ZER: 0 OPR: 0 NOV: 1

93mNb region

1500 ± 79 cts

3901
3552 - 2401

± 77 *

145 cts ±

1.093 ± 0.058 cpm

~~0.839 cpm~~ *

~~± 0.058 *~~

1372.10 min

1372.10

avg bkg = 0.722 ± 0.129 cpm

Δ = 0.371 ± 0.141 (38%)
cpm

~~No detectable~~ wrong 7/26/24/92
~~Nb K_α x-ray~~ (16.1 keV)
~~fluorescence~~
Possible Nb K_α x-ray
present above bkg.

MJD 7/26/24/92

J. I. Fadoff 6/24/92

384

NB STD B:100UL NB-95 #54124-95-10000,153.1MG PPTSY:NBFUORB.A1:2 COUNTED 6/22/92 @ 9:23: @ GAIN: 0.2 KEV/CHAN

	0	50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950
0	82326	307	240	203	193	178	167	177	182	164	145	147	129	136	150	133	143	119	104	100
1	0	278	234	204	218	185	178	166	173	172	149	162	130	144	140	129	117	114	114	120
2	0	311	224	204	191	194	173	167	128	149	149	154	144	90	142	126	96	126	129	133
3	0	302	233	214	201	189	165	160	180	150	128	146	157	150	154	119	123	132	115	142
4	0	279	234	182	201	192	145	157	176	180	137	139	164	140	129	136	131	129	127	101
5	0	270	211	196	200	168	150	165	155	128	165	126	145	141	119	118	119	116	109	151
6	0	269	212	200	201	150	167	167	165	159	145	153	155	142	140	128	141	117	122	129
7	0	261	227	225	180	167	180	138	197	120	148	144	150	139	130	139	127	134	133	121
8	12	236	219	184	178	168	164	186	156	155	122	164	149	130	109	122	112	101	122	126
9	584	265	194	200	165	162	152	146	169	180	157	163	141	136	143	120	119	113	93	103
10	1332	266	224	189	171	177	173	185	154	197	135	130	142	142	134	136	121	113	131	121
11	1134	246	197	200	181	186	176	170	134	235	145	176	149	148	119	134	113	95	95	137
12	742	259	195	206	198	180	169	216	144	247	162	141	154	147	135	134	125	137	120	122
13	623	321	187	221	181	169	177	233	169	228	139	148	140	162	122	132	119	117	108	125
14	460	373	233	196	186	204	177	228	169	273	151	144	150	125	104	133	117	112	114	145
15	369	414	231	184	192	174	224	227	167	204	151	160	149	129	144	128	121	91	117	121
16	324	384	220	202	200	205	253	181	147	201	168	142	123	131	137	119	113	127	129	150
17	315	376	213	166	204	172	262	186	158	175	151	159	130	131	160	125	127	103	125	135
18	304	290	180	200	184	169	229	178	167	164	147	154	174	131	156	102	104	113	107	133
19	308	268	192	171	182	167	205	157	170	160	169	152	149	135	124	107	124	137	109	135
20	294	233	203	187	200	167	171	197	152	129	136	155	132	143	100	136	111	125	96	105
21	295	225	217	180	190	164	182	169	162	166	173	138	163	124	123	113	147	109	108	144
22	278	268	192	167	174	178	168	206	211	135	153	138	143	144	132	135	119	113	112	132
23	303	252	201	218	216	167	174	242	204	168	151	164	141	133	140	134	108	113	99	124
24	283	257	203	192	184	176	164	270	212	152	144	146	123	137	146	128	127	121	122	126
25	305	263	210	225	160	188	182	206	199	143	142	141	158	130	125	109	121	119	109	124
26	260	266	199	206	196	161	189	265	190	150	144	140	155	116	126	128	130	119	114	115
27	317	281	212	193	173	140	179	233	183	163	141	152	122	128	134	129	134	120	127	125
28	293	323	205	191	179	194	147	220	173	155	137	130	143	135	122	123	95	115	149	125
29	316	376	218	190	165	182	160	173	146	142	145	141	124	147	130	136	111	122	149	136
30	317	405	212	176	180	169	159	153	148	130	160	133	140	133	127	132	111	124	145	127
31	285	471	201	180	176	161	155	183	172	148	137	151	142	146	147	106	110	117	128	136
32	308	474	212	196	203	164	178	177	150	143	129	156	160	134	132	122	124	129	157	122
33	301	449	217	187	191	158	175	175	174	165	147	136	131	141	136	127	125	107	115	127
34	319	401	210	194	218	149	164	170	147	149	133	118	150	126	138	130	120	132	114	116
35	282	349	215	185	175	175	163	184	171	148	137	163	125	107	133	123	112	123	122	131
36	305	349	212	175	172	196	172	175	159	156	162	137	130	141	122	114	104	111	114	121
37	287	304	207	206	157	164	168	160	197	151	134	171	142	123	136	129	113	116	106	136
38	290	311	194	187	160	190	174	161	159	144	139	163	144	139	136	119	116	102	108	134
39	286	307	207	204	169	179	186	144	150	136	150	156	156	135	134	120	116	107	110	110
40	249	253	199	187	175	164	184	160	158	180	126	147	158	149	135	113	112	120	115	122
41	287	226	201	203	160	166	170	146	151	159	165	164	143	132	127	119	131	92	123	129
42	278	255	216	183	173	186	168	176	142	134	143	135	148	138	123	109	108	116	131	132
43	309	242	203	180	186	182	176	141	149	172	148	155	142	144	97	129	124	120	111	135
44	295	274	202	198	165	173	172	159	150	120	146	117	161	145	105	125	119	135	114	144
45	245	269	191	175	199	172	166	149	150	162	142	158	131	112	122	111	123	96	124	113
46	272	246	204	182	176	176	182	163	142	135	151	127	146	151	135	128	137	120	118	126
47	251	251	193	193	164	185	183	159	148	165	157	137	155	146	128	137	142	128	133	132
48	277	273	209	193	186	187	193	156	154	161	145	147	149	133	141	117	115	120	130	138
49	260	241	203	168	176	187	151	164	162	149	146	127	133	125	141	128	116	127	110	134

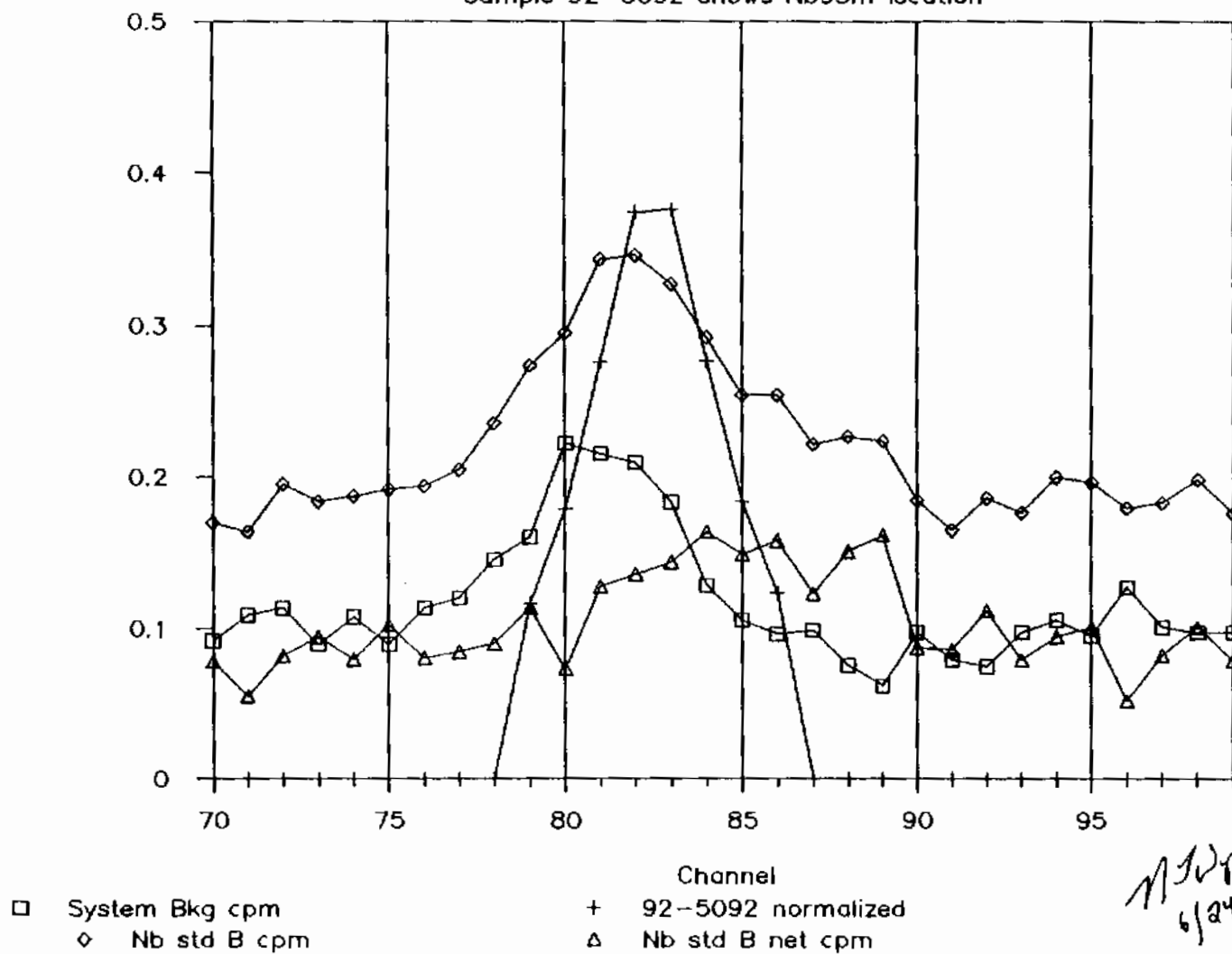
NB STD B:100UL NB-95 #54124-95-10000,153.IMG PPTSY:NBFUORB.A1:2 COUNTED 6/22/92 0 9:23: 0 GAIN: 0.2 KEV/CHAN

	1000	1050	1100	1150	1200	1250	1300	1350	1400	1450	1500	1550	1600	1650	1700	1750	1800	1850	1900	1950
0	102	127	94	80	101	86	91	87	71	95	98	74	71	70	67	68	76	66	65	65
1	143	142	121	86	101	109	97	82	78	78	70	74	79	81	67	73	81	76	67	67
2	143	136	114	99	107	95	75	74	67	80	87	87	81	84	76	60	61	74	91	71
3	123	110	100	100	97	83	109	91	81	85	81	84	88	77	68	81	58	64	69	50
4	131	115	125	107	91	89	92	87	97	78	81	81	71	76	59	87	70	80	64	73
5	116	100	110	93	102	111	77	93	74	73	82	80	76	61	68	72	73	66	76	72
6	106	104	101	93	87	95	88	99	83	100	82	64	76	81	102	86	72	59	74	55
7	108	102	119	95	97	86	77	99	94	71	70	70	74	95	62	99	71	87	76	72
8	125	120	92	110	102	97	92	94	108	86	68	93	91	79	86	103	75	75	67	70
9	116	103	101	116	94	89	81	89	80	79	94	96	72	98	80	78	70	68	68	64
10	141	120	112	99	110	101	79	85	93	85	62	82	84	70	76	91	73	53	62	63
11	118	96	108	89	107	76	103	85	73	87	77	51	70	71	61	65	68	79	68	77
12	118	110	105	101	107	95	82	100	71	83	74	72	83	74	58	86	89	67	72	81
13	120	108	124	109	98	91	103	93	66	78	81	81	85	73	67	83	73	80	74	77
14	117	139	116	85	87	82	96	66	88	80	68	95	73	76	76	65	69	70	74	66
15	128	100	99	85	94	87	85	81	81	99	78	67	73	92	62	53	78	60	69	65
16	105	96	110	103	93	96	86	68	76	72	90	83	79	73	69	70	69	64	61	78
17	102	117	109	98	104	88	87	77	91	64	62	80	72	80	72	72	63	66	83	76
18	130	94	106	106	89	87	86	88	69	83	82	90	80	68	71	59	70	70	62	77
19	106	105	87	92	113	95	90	95	79	77	59	90	92	75	67	82	76	80	91	87
20	125	108	103	96	90	97	83	97	64	77	77	70	68	60	64	74	79	93	74	50
21	116	120	110	84	78	80	95	89	93	86	75	80	76	81	69	76	85	77	66	65
22	136	96	91	95	90	81	84	94	67	79	73	62	85	69	81	55	83	70	78	85
23	114	104	102	106	111	83	92	72	87	93	85	69	75	70	66	75	74	62	75	71
24	130	99	101	105	88	90	93	86	86	95	82	73	58	71	73	88	71	76	60	62
25	129	125	110	120	86	92	77	94	93	70	76	81	74	90	84	70	70	89	74	63
26	121	111	94	95	98	100	82	95	72	76	64	79	66	85	56	85	75	71	62	64
27	123	112	122	88	102	91	80	102	65	88	71	74	89	71	78	66	66	80	78	83
28	105	125	121	84	109	71	82	97	100	83	80	90	85	65	93	62	67	64	72	62
29	129	114	93	112	98	88	100	111	92	91	83	79	86	76	74	78	64	63	71	94
30	101	134	92	100	99	92	74	87	76	86	72	82	65	67	61	86	66	68	74	89
31	104	104	90	97	100	81	112	85	90	77	80	75	75	64	84	74	65	70	58	71
32	105	107	99	98	97	101	79	66	75	93	86	66	85	83	71	77	77	62	61	60
33	120	99	97	107	108	87	87	82	81	79	74	98	59	84	68	71	70	69	78	68
34	113	112	94	99	90	94	76	101	79	97	79	86	59	79	82	79	81	75	84	73
35	137	98	107	91	90	75	105	92	81	85	81	77	98	73	72	86	53	60	66	63
36	129	92	93	100	95	88	73	78	88	91	80	66	85	70	61	73	70	64	70	77
37	114	106	107	93	99	81	82	78	81	98	74	79	82	65	63	75	82	62	60	72
38	106	83	104	79	102	77	95	76	78	85	75	59	84	79	77	79	61	77	76	70
39	136	113	106	93	118	79	93	83	82	94	86	87	85	89	76	78	73	73	77	72
40	87	112	101	107	90	87	72	80	94	78	91	89	77	62	82	65	63	79	78	77
41	105	108	100	96	86	79	85	79	89	75	69	78	80	77	75	78	80	70	71	61
42	125	107	101	98	87	96	91	97	83	83	74	81	91	81	80	78	74	82	67	62
43	126	110	90	114	88	93	78	86	87	75	82	76	80	72	52	74	82	79	68	59
44	89	116	95	100	87	83	68	72	86	74	58	100	80	68	65	67	75	64	74	83
45	98	95	93	90	92	93	83	65	83	79	75	70	62	84	63	75	69	68	81	76
46	110	91	133	110	92	94	83	80	68	76	64	68	68	67	73	72	82	68	75	70
47	117	111	110	102	84	100	97	101	79	80	84	64	71	76	63	79	77	71	62	61
48	114	116	100	109	95	86	95	89	71	94	105	67	76	70	74	81	74	68	67	74
49	124	107	91	100	93	97	90	80	93	90	81	63	81	67	62	84	80	64	70	68

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Comparison of Nb Std #B to System Bkg

Sample 92-5092 shows Nb93m location

MJP
6/24/92

NB95 STD #54124-96-1 FACE DOWN

SAMPLE ID..... SY:54124961.A1;1

OF CHANNELS..... 2048

DIODE I.D..... A

SHELF NUMBER..... 0

CALIBRATION..... 0.2 KEV/CH

TIME ZERO 6/13/92 AT 11:48: 0

COUNTED..... 6/13/92 AT 11:48: 0

(0.00 MINUTES DECAY TIME)

LIVE COUNT TIME.... 25 HOURS 16 MINUTES 9 SECONDS (1516.15 MIN.)

ELAPSED TIME..... 25 HOURS 16 MINUTES 9 SECONDS (1516.15 MIN.)
(DEAD TIME = 0.000)

FLUX CORRECTION.... 0.0000

GEOM CORRECTION.... 0.0000 0.0000 0.0000 0.0000 0.0000

WEIGHT..... 1.00000 GRAMS

AUT: 0 SLP: 0 AREA: 0 P-T: 0 ERR: 0 ZER: 0 OPR: 0 NOV: 1

$$\frac{(4417 - 3140) \pm 87}{1516.15 \text{ min}} = 0.842 \text{ cpm} \pm 0.057$$

$$\text{bkg} = 0.183 \text{ cpm} \quad \text{7/20/92}$$

$$\text{new avg bkg} = 0.722 \text{ cpm} \pm 0.129$$

(avg of BKG A1;1 + ;2)

in 93m Nb region

$$\Delta = 0.120 \pm 0.141 \text{ cpm}$$

No detectable
6.6 keV x-rays.

7/13/92
6/14/92 - 6/17/92

J. K. Jackoff 6/24/92

303

NB95 STD #54124-96-1 FACE DOWN

SY:54124961.A1;1 COUNTED 6/13/92 @ 11:40: 0 GAIN: 0.2 KEV/CHAN

	0	50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950
0	90969	340	316	257	254	259	226	234	220	206	198	197	194	199	199	156	177	145	198	179
1	0	392	296	304	280	266	245	228	216	237	213	220	214	186	202	185	182	176	153	174
2	0	357	319	266	245	234	219	221	197	221	180	203	197	181	179	171	163	162	153	181
3	0	376	311	272	239	249	244	242	245	212	211	228	183	190	211	181	190	177	184	202
4	0	353	303	280	222	249	243	226	212	206	185	188	218	180	197	196	153	191	194	188
5	0	345	263	270	250	252	247	251	209	192	246	211	189	184	172	170	180	167	170	186
6	0	366	259	266	271	260	232	240	208	202	216	191	187	194	200	176	178	180	157	173
7	0	331	279	278	244	212	212	237	217	211	214	211	186	203	200	171	166	157	162	185
8	23	357	266	267	223	210	265	227	214	215	193	221	201	167	173	171	164	167	143	189
9	816	329	285	278	257	231	249	234	219	216	230	211	199	149	172	158	173	161	171	170
10	1478	346	266	269	238	240	263	240	225	217	202	204	224	185	193	173	190	169	143	204
11	1368	341	284	254	263	216	238	230	237	282	213	207	178	208	198	149	158	187	166	175
12	826	363	284	264	232	257	272	242	198	209	199	207	184	189	188	170	166	170	224	202
13	600	429	291	263	248	252	251	258	220	293	225	203	217	192	180	170	166	161	172	201
14	541	453	261	263	234	238	273	281	233	275	194	182	208	185	183	194	172	148	156	183
15	435	507	314	250	244	224	311	250	230	270	230	200	197	179	182	160	175	170	167	196
16	378	493	283	298	277	264	332	263	209	248	197	183	180	170	170	173	159	171	158	193
17	365	428	245	265	269	223	316	255	236	225	197	180	200	191	197	181	172	176	180	208
18	373	379	278	261	261	247	284	229	229	201	203	168	189	183	182	172	165	166	159	186
19	353	349	290	313	271	214	261	219	216	206	202	153	206	198	209	177	165	195	155	206
20	352	310	275	260	266	255	274	224	244	184	217	209	189	183	213	168	196	169	156	170
21	350	308	293	279	226	236	237	237	211	210	178	196	214	199	178	195	176	157	175	186
22	364	333	290	257	262	249	249	267	260	205	201	214	214	166	204	208	155	193	160	209
23	360	342	246	214	254	233	259	293	244	199	170	224	175	173	187	181	148	165	166	174
24	362	312	262	286	265	218	230	344	224	230	200	224	192	193	171	184	165	173	159	189
25	355	347	278	245	222	236	225	363	270	219	218	183	208	191	179	169	154	148	177	193
26	391	329	284	216	236	225	212	321	237	210	179	189	190	203	173	166	172	170	185	187
27	390	349	273	259	216	235	193	330	244	211	207	191	216	214	180	157	180	181	197	200
28	361	391	297	248	268	253	249	242	213	208	190	102	166	182	198	174	157	159	214	171
29	378	425	276	282	251	221	238	245	219	213	208	194	168	199	167	183	173	153	169	182
30	392	490	266	246	268	244	234	223	211	192	198	184	210	196	166	171	177	172	204	185
31	411	520	287	255	245	197	266	220	215	183	220	204	168	201	180	167	195	160	190	183
32	398	452	257	239	264	230	239	215	192	201	182	200	215	207	182	171	163	176	167	187
33	384	426	235	246	276	204	244	232	230	200	205	186	207	188	192	178	166	169	182	169
34	380	385	284	267	259	237	230	231	215	202	216	195	196	178	182	193	180	184	152	209
35	368	434	260	245	254	226	222	253	223	205	173	214	183	176	172	177	148	167	169	209
36	375	457	291	259	248	230	239	220	234	195	190	215	201	182	169	173	154	163	161	234
37	365	437	276	240	223	252	249	221	260	204	204	225	195	170	153	186	186	143	160	195
38	355	385	277	262	234	236	210	209	247	209	206	228	186	193	197	171	180	152	172	197
39	396	405	285	246	272	228	235	237	215	172	169	203	165	164	188	165	191	160	177	
40	335	348	273	262	224	252	233	194	197	209	173	199	188	206	154	105	160	152	156	174
41	379	294	247	263	231	228	236	240	214	204	223	193	185	185	160	177	184	155	171	179
42	362	279	302	239	230	246	227	219	235	219	204	191	189	180	170	174	183	165	176	170
43	386	314	239	254	235	248	261	205	235	205	216	209	203	180	165	166	162	161	173	194
44	339	328	272	248	218	213	246	206	176	204	183	207	199	175	163	173	166	145	177	179
45	353	323	283	242	234	232	213	234	212	211	201	206	177	180	162	173	187	164	166	207
46	332	341	264	248	251	210	231	200	197	221	187	195	201	191	183	187	176	147	157	204
47	335	338	293	256	230	238	248	207	206	203	220	211	223	156	177	181	142	175	168	189
48	356	349	260	253	246	267	221	205	203	179	230	189	187	169	195	176	157	193	176	233
49	349	352	276	241	260	235	229	226	199	189	186	198	191	190	189	166	137	176	181	206

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N895 STD #54124-96-1 FACE DOWN

SY:54124961.A1;1 COUNTED 6/13/92 @ 11:40: # GAIN: 0.2 KEV/CHAN

	1000	1050	1100	1150	1200	1250	1300	1350	1400	1450	1500	1550	1600	1650	1700	1750	1800	1850	1900	1950
0	235	191	153	150	137	125	130	160	116	109	131	119	115	121	122	121	104	100	100	99
1	166	157	157	140	157	127	133	130	97	101	122	107	102	113	104	126	86	100	95	76
2	172	158	182	133	129	136	133	123	92	121	119	115	133	103	122	105	100	100	96	98
3	191	178	171	156	139	125	134	131	129	110	131	103	118	88	99	119	95	120	102	100
4	188	191	169	146	146	118	100	129	116	107	121	117	105	105	121	111	103	110	114	91
5	197	192	136	166	147	146	139	129	99	130	112	104	109	123	102	124	94	107	94	113
6	178	158	164	138	148	134	116	104	123	95	94	106	113	90	115	107	116	106	101	130
7	182	143	177	143	131	146	135	110	142	119	139	136	118	111	110	106	109	112	106	118
8	158	192	148	141	144	120	108	116	112	125	105	124	126	113	104	107	107	89	109	111
9	184	174	161	125	144	136	121	127	116	116	114	111	119	122	115	131	79	115	85	88
10	156	163	144	156	141	138	103	132	128	132	104	117	110	100	101	102	101	96	98	117
11	147	151	139	150	127	139	131	120	118	117	123	130	106	90	100	117	116	99	100	100
12	180	158	156	152	136	136	137	108	128	145	125	113	125	104	112	117	112	113	95	106
13	166	175	152	140	143	132	130	110	109	89	144	110	103	110	101	115	101	100	119	101
14	205	145	145	150	120	137	118	139	128	118	107	110	140	103	106	100	102	104	99	96
15	181	143	130	138	122	126	135	139	125	120	118	120	126	102	85	104	102	100	117	103
16	185	163	157	153	124	129	141	115	138	125	135	131	123	112	103	131	104	102	118	81
17	174	142	159	149	144	130	125	113	109	119	108	112	130	121	109	101	94	110	126	112
18	180	162	165	156	144	139	135	132	129	122	124	101	127	98	102	101	100	121	108	124
19	172	161	158	150	133	133	108	136	117	136	133	113	114	105	112	112	95	120	125	114
20	185	145	146	141	143	136	128	127	129	105	124	131	111	105	117	109	117	115	107	91
21	205	152	140	155	121	139	126	128	139	110	119	116	94	114	104	107	122	103	101	108
22	193	173	162	177	142	137	123	131	104	143	117	97	118	117	112	99	121	106	94	113
23	190	152	165	157	136	135	114	116	119	123	113	118	112	104	100	114	103	90	102	109
24	189	200	137	151	118	134	133	106	108	133	121	128	113	96	121	110	103	106	103	125
25	168	160	139	166	134	129	148	128	133	120	100	133	118	114	117	111	83	115	89	95
26	179	159	142	135	150	145	138	118	109	150	115	127	107	109	106	111	112	108	105	97
27	171	145	136	130	141	132	135	121	117	123	129	114	121	96	97	114	100	110	103	111
28	153	167	144	151	125	126	108	105	99	100	131	107	111	100	135	93	103	104	99	99
29	173	173	159	117	149	119	139	122	100	126	128	106	100	120	96	115	109	96	94	104
30	179	161	140	116	112	140	137	121	146	109	121	117	114	101	95	124	92	115	102	112
31	147	172	153	151	167	135	123	143	129	106	124	91	119	111	102	110	100	123	104	112
32	162	149	133	145	133	131	132	137	108	135	110	123	103	100	126	97	100	104	99	83
33	186	157	140	141	146	144	128	110	114	116	110	109	116	91	108	122	103	114	100	94
34	172	148	161	162	151	127	120	120	116	119	110	111	104	106	103	116	106	112	107	95
35	162	173	141	130	146	107	126	121	124	117	127	105	115	101	116	95	105	101	97	99
36	183	183	147	167	142	146	139	133	115	118	118	113	100	116	120	99	102	95	96	89
37	170	173	141	144	140	129	119	131	118	126	98	109	113	112	110	114	102	124	104	121
38	152	151	158	137	130	139	126	141	128	116	106	125	109	109	125	93	90	95	114	105
39	165	154	137	136	142	135	111	114	123	116	114	120	110	116	109	89	100	103	129	90
40	194	126	149	134	127	136	111	112	113	137	108	115	113	104	86	109	90	99	92	97
41	190	159	159	150	111	133	116	111	113	120	102	113	131	119	123	95	121	94	109	103
42	189	156	147	156	144	134	108	115	118	112	126	95	109	122	105	100	96	104	116	105
43	174	168	142	157	134	103	123	121	131	117	107	142	118	116	107	102	104	110	100	103
44	156	143	141	160	134	141	132	112	116	135	118	112	100	119	103	98	107	112	106	100
45	176	162	144	140	142	113	103	112	107	124	111	106	115	90	110	112	113	110	99	108
46	165	157	139	136	120	131	113	116	122	110	107	110	105	104	103	92	109	110	115	113
47	166	163	152	150	125	106	124	113	123	117	118	118	104	110	115	102	117	94	116	107
48	165	155	151	151	142	120	139	120	122	118	117	103	109	126	107	119	99	113	111	103
49	180	162	147	143	113	129	109	145	107	120	125	108	113	110	95	107	112	99	96	81

350

Niobium -95 Fluorescence Check Standards

1. Prepare the following standards by adding the Nb carrier and ^{95}Nb spike to conc HNO_3 in a beaker and precipitating, mount and count according to PNL-ALO-472³, beginning at step 4.1.7. Only precipitate each std once. Don't repeat steps 4.1.6 through 4.1.10.

No need to record a separation time, of course. Also, calibrated pipets are not needed as this is just to check for the possibility of ^{95}Nb -induced Nb x-ray fluorescence in Nb oxide ppt.

<u>Std. No.</u>	<u>mg Nb carrier</u>	<u>Nb-95 spike</u>
A	100	20 λ ^{95}Nb #54124-95-10000
B	100	100 λ ^{95}Nb #54124-95-10000
C	100	500 λ ^{95}Nb #54124-95-10000

2. Label the stds "Nb Std A", etc.

NBSTD2.INS

Nb-95 Fluorescence Check Standards Data Sheet

Date Prepared 6-12-92

Nb-95 Spike

Spike ID 54124-95-10,000 Spike Activity 1002 $\pm$ 95 Nb added to 1015K
Nb samples as of their Nb sep
time of 5-7-92 1330.

Balance Number 509-06-03-003 LRB No. 54372 Page No. 18

Std. No.	Nb Carrier, mg	Volume Nb-GS spike	Filter Tare Wt	Filter + Ppt Wt.	Net Ppt, Wt

[illegible]

Analyst G.G. Brodaczynski Date 6-19-92 Reviewer MTWg/ff Date 6/24/92

NBSTD2.LOG

TITLE: 54124-96-1 95NB

FILE: 54124961.HH:1

* CHANNELS: 2040

DATE: 6/18/92

DIRECT: 101

TIME ZERO: 6 16 92 0 30 0

TIME OF COUNT: 6 16 92 0 30 0

(0.000000 MINUTES DECAY TIME)

LIVE TIME: 4 HOURS 15 MINUTES 54 SECONDS = 255.900 MINUTES

ELC. CUP TIME: 4 HOURS 15 MINUTES 54 SECONDS = 255.900 MINUTES

(DEAD TIME = 0.000)

FLUX CORR. FACT.: 0.000000

GATE: 0.000000 KEY/CHAN

WEIGHT: 1.00000

PLY TIME: 0
PLY CORR: 0
CORR CORR: 0
SUB CORR: 0
SUB CORR: 0
PLY CORR: 0
PLY CORR: 0
PLY CORR: 0
PLY CORR: 0
PLY CORR: -1

$$\frac{13458 - (114 + 46) \text{ cts}}{255.90 \text{ min}} = 51.97 \text{ cpm} \pm 0.46$$

$$\frac{52 \text{ cpm} \times 4.328 \text{ }^{95}\text{Nb}}{.99 \text{ }^{95}\text{Nb}} = 2270 \text{ dpm}$$

$$\frac{2270 \text{ dpm}}{.100 \text{ ml}} = 22,700 \text{ dpm/ml}$$

*calculated from a Raygun printout that used EFFFFILNB.HH:1 to calculate Nb 95 dps.

This calculation is just to confirm an appropriate amt. to add to Nb fluorescence check stds #A-C

M. J. P. M.

6/18/92

1.4 1.1 or 6/25/92

393

54124961.HH:1

54124-96-1 95NB

	0	50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950
0	18354	295	236	216	236	172	140	92	120	125	143	159	86	59	32	32	3	6	8	5
1	5	310	216	230	247	154	140	127	136	102	119	159	78	54	31	29	9	6	8	9
2	0	763	236	226	230	164	177	126	137	110	97	155	92	43	35	32	13	12	1	11
3	15	207	256	217	241	140	140	134	124	111	111	149	66	32	35	29	5	8	8	5
4	0	207	213	245	256	140	133	133	117	97	132	152	75	45	33	33	5	7	7	5
5	15	157	213	211	260	154	129	128	107	116	129	139	85	49	30	31	15	8	1	9
6	0	157	245	196	249	157	144	116	120	118	122	131	75	42	35	35	4	6	9	1
7	0	157	217	202	227	137	127	132	111	118	114	157	73	49	34	31	12	2	11	8
8	0	157	216	198	209	143	134	112	113	123	130	159	62	40	27	45	3	3	5	7
9	0	157	195	205	224	152	132	116	101	121	114	136	62	43	33	29	6	2	9	10
10	0	157	227	217	202	156	131	106	114	127	143	147	80	37	38	32	11	5	7	6
11	0	157	220	217	232	144	130	120	133	110	157	160	91	34	32	30	6	14	8	6
12	0	157	210	226	231	161	153	127	119	121	215	170	67	29	14	20	5	17	27	2
13	0	157	220	193	233	158	128	105	120	97	183	146	68	44	24	50	7	22	94	4
14	0	157	210	193	221	153	97	116	126	136	137	170	71	41	35	44	7	6	49	7
15	0	157	157	212	190	167	142	119	130	142	130	175	64	36	36	73	7	12	12	4
16	0	157	201	205	229	151	123	184	105	130	137	179	66	44	42	523	10	14	9	17
17	0	157	207	199	225	159	132	110	114	113	126	181	67	38	38	4820	6	9	9	19
18	0	157	217	197	237	131	139	180	110	131	139	160	56	38	33	6894	8	6	6	10
19	0	157	214	189	205	145	127	115	113	116	141	152	88	43	48	1874	5	5	7	7
20	0	157	220	209	109	143	141	101	111	127	116	105	69	41	38	30	11	15	6	21
21	0	157	201	197	226	159	113	129	123	116	93	145	56	37	25	15	6	6	3	62
22	0	157	162	190	204	167	126	124	120	119	157	146	57	39	26	9	10	8	8	32
23	0	157	160	181	196	170	118	121	106	120	122	154	76	36	34	12	13	10	7	8
24	0	157	221	173	191	160	111	113	184	129	147	153	62	41	28	10	10	8	9	3
25	0	157	256	200	213	133	134	115	114	108	141	145	73	34	25	10	5	7	6	8
26	0	157	240	185	192	135	147	110	125	108	119	126	72	31	26	8	7	8	8	2
27	0	157	202	184	206	139	137	118	110	119	128	128	67	40	23	4	15	4	4	7
28	0	157	210	220	206	146	123	134	111	112	144	130	53	42	24	9	15	12	9	7
29	0	157	191	189	154	155	126	130	99	141	111	111	45	29	54	11	7	6	2	9
30	0	157	202	224	198	144	132	115	114	123	123	117	57	48	38	13	11	11	8	12
31	0	157	225	227	223	144	118	91	98	99	145	112	49	31	28	14	12	10	3	6
32	0	157	212	188	178	137	121	126	116	119	146	77	49	33	25	9	13	8	9	3
33	0	157	254	201	215	144	135	117	121	116	141	95	68	33	36	8	21	13	10	7
34	0	157	200	181	203	151	119	117	119	123	142	135	65	31	15	14	7	6	6	5
35	0	157	153	153	183	139	120	107	98	97	131	230	56	30	33	7	2	3	9	5
36	0	157	161	148	187	147	134	107	119	115	131	120	57	42	28	2	3	7	5	5
37	0	157	148	148	141	136	131	124	93	130	145	101	55	38	21	6	12	7	7	5
38	0	157	133	133	147	133	134	126	111	109	146	80	51	38	22	11	17	8	9	8
39	0	157	225	189	259	135	165	128	103	126	142	97	38	46	28	11	12	5	6	3
40	0	157	247	188	255	147	155	120	106	119	160	79	52	27	28	9	12	14	5	6
41	0	157	219	224	217	143	129	112	94	118	141	96	38	47	46	9	10	6	9	5
42	0	157	210	208	226	139	113	105	107	133	137	86	55	38	35	14	7	5	5	3
43	0	157	253	210	191	138	126	121	116	130	152	91	52	38	26	9	5	5	7	7
44	0	157	214	200	164	125	128	105	129	120	137	99	61	41	22	12	5	6	7	5
45	0	157	213	247	177	145	129	117	107	166	162	78	32	41	29	8	11	11	9	7
46	0	157	194	207	154	133	118	120	108	138	147	83	53	36	34	7	5	4	7	2
47	0	157	217	232	173	137	127	113	128	167	145	84	61	26	26	23	10	10	5	7
48	0	157	217	262	159	118	141	101	99	120	153	95	46	26	26	18	8	4	13	5
49	0	157	159	262	166	125	112	113	74	134	146	81	44	47	32	12	10	11	9	3

$92 \times \frac{35}{3} = 114$
 $92 \times \frac{35}{3} = 114$
 13458
 $39 \times \frac{35}{3} = 46$

54124961.HH:1	54124-96-1 95MB																			
	1000	1050	1100	1150	1200	1250	1300	1350	1400	1450	1500	1550	1600	1650	1700	1750	1800	1850	1900	1950
0	0	0	0	5	5	7	5	4	6	2	5	2	0	0	0	3	1	2	0	0
1	0	0	6	1	3	1	5	4	0	2	1	3	1	0	2	2	3	3	5	1
2	0	0	0	15	6	5	5	5	4	2	1	3	1	2	2	2	0	1	2	1
3	0	0	4	5	7	5	2	1	3	3	5	1	2	1	3	2	3	0	1	2
4	10	10	7	2	0	2	4	3	4	2	2	1	3	2	0	1	0	0	1	1
5	0	0	3	5	1	4	9	3	5	4	1	1	3	1	1	1	2	0	0	1
6	0	0	6	7	2	0	4	0	1	2	1	0	2	2	4	2	0	0	2	3
7	0	0	7	4	7	3	2	5	3	3	1	3	2	1	1	3	1	2	3	4
8	0	0	5	5	5	2	0	6	2	1	2	2	2	4	2	2	1	1	1	1
9	0	0	4	4	2	6	4	5	4	3	4	2	0	0	2	0	4	1	3	2
10	0	0	4	9	3	6	0	3	3	3	2	2	2	0	1	3	1	2	1	1
11	0	0	3	4	6	3	7	1	6	7	3	4	2	1	2	4	2	1	2	2
12	0	0	6	3	5	4	3	3	4	31	0	4	1	2	3	2	3	3	0	2
13	0	0	9	4	4	6	5	5	2	40	4	0	2	1	0	0	4	0	1	0
14	0	0	6	10	7	4	2	3	3	47	1	1	0	1	0	2	2	1	0	0
15	0	0	7	7	5	4	1	2	1	12	2	5	2	5	0	1	1	1	0	3
16	0	11	4	7	5	5	2	4	4	4	1	0	4	2	1	1	1	1	1	2
17	0	0	4	4	2	3	5	4	5	4	1	4	2	2	0	6	1	1	2	3
18	10	0	5	9	3	5	9	5	7	0	3	1	2	5	1	5	1	0	1	2
19	0	0	5	6	7	2	4	4	2	1	4	2	0	3	0	1	0	0	1	1
20	0	0	4	7	1	4	4	4	4	1	4	2	0	6	3	1	1	2	2	2
21	0	0	5	10	0	3	1	3	4	3	3	2	2	2	2	1	3	1	0	2
22	0	0	9	3	7	3	3	4	3	4	3	1	3	1	0	2	2	2	1	2
23	0	0	7	4	0	6	4	3	1	2	1	1	6	1	0	2	2	1	1	1
24	0	0	0	1	7	6	7	3	3	2	0	1	3	3	2	1	2	3	1	1
25	0	0	6	7	5	1	5	1	2	2	4	1	2	2	0	1	0	1	3	0
26	0	0	6	5	6	6	5	4	1	1	3	0	1	1	1	0	1	4	2	2
27	0	0	6	5	2	3	3	1	0	1	3	5	3	0	0	1	2	0	4	0
28	0	0	7	1	6	3	4	2	3	1	2	4	4	1	1	1	2	2	2	2
29	0	0	5	2	4	2	4	2	4	2	3	2	0	0	1	1	1	1	4	0
30	0	0	5	6	3	7	6	6	5	4	0	3	3	2	0	1	2	2	1	1
31	0	0	6	7	4	6	3	7	1	3	4	1	2	2	2	0	3	2	1	1
32	1	6	4	1	3	7	4	5	3	3	0	0	3	1	3	2	1	5	2	0
33	3	4	4	5	3	3	2	4	2	0	2	2	4	5	3	2	2	0	1	1
34	10	7	3	5	5	3	4	3	4	4	2	5	6	1	1	0	3	2	0	1
35	4	4	4	5	3	7	6	1	2	0	2	6	2	3	2	3	1	0	3	2
36	6	0	3	0	5	2	2	3	1	1	3	2	2	4	1	1	1	3	2	2
37	0	0	7	5	12	4	3	3	3	2	0	3	1	4	3	2	3	1	3	0
38	0	0	3	6	0	4	2	7	6	2	1	0	0	2	1	0	0	1	2	0
39	6	5	0	6	5	3	6	2	2	3	2	6	3	1	2	0	3	2	2	0
40	2	5	6	4	3	5	3	2	2	1	0	7	2	1	0	3	2	1	0	4
41	2	7	3	3	4	5	4	5	0	2	3	14	1	2	1	0	3	0	0	2
42	0	0	6	7	1	0	3	1	2	3	1	4	2	2	1	2	1	0	1	1
43	0	4	6	3	2	3	3	2	2	2	0	2	3	1	0	1	0	2	1	2
44	2	7	10	9	1	2	4	1	1	0	1	3	2	1	1	3	0	3	3	1
45	5	0	5	10	6	4	3	2	3	2	2	11	5	1	4	2	1	3	0	3
46	0	0	0	0	0	4	2	1	4	2	2	4	1	4	2	0	1	1	3	1
47	0	0	5	7	3	7	5	3	1	3	2	2	1	3	2	2	0	2	1	0
48	0	0	4	5	6	3	7	2	1	2	2	6	2	2	1	0	0	3	0	1
49	0	0	0	5	0	3	2	4	1	0	0	0	5	2	1	2	2	3	5	0

I reviewed the spike recovery data for 10154 Nicotium
analyses on 6/24/92.

J. L. Fadoff

Why is % recov $\geq 500\%$ for BS + MS?

→ To BS + MS added:

$49.4 \pm 0.1\lambda$ ^{94}Nb # 54124-33-1
 $250.3 \pm 1.2\lambda$ $^{93\text{m}}\text{Nb}$ # 54124-84-100
 $250.3 \pm 1.2\lambda$ $^{95}\text{Zr}/^{95}\text{Nb}$ # 54124-76-0

→ Samples also had $^{95}\text{Zr}/^{95}\text{Nb}$ so only ^{94}Nb + $^{93\text{m}}\text{Nb}$ stds are unique to BS + MS

→ ^{94}Nb std # 54124-33-1

Prepared by dissolving and calibrating NBS
SRM # 4201-B-88

Stated activity of SRM was 5.338×10^3 dps 4-70

$^{93\text{m}}\text{Nb}$ impurity was 71% of 5.338×10^3 dpm on 6-11-70

Decay $^{93\text{m}}\text{Nb}$ to 5-15-92, $\Delta t = 21.93$ yr

$$0.71 \times 5338 \text{ dps} \times e^{-\frac{\ln 2 \times 21.93 \text{ yr}}{16.13 \text{ yr}}} = 1477 \text{ dps } ^{93\text{m}}\text{Nb} \text{ on 5-15-92}$$

$$\frac{1477 \text{ } ^{93\text{m}}\text{Nb}}{5338 \text{ } ^{94}\text{Nb}} \times 100 = 27.7\% \text{ on 5-15-92}$$

^{94}Nb std soln: If orig. contaminant is $^{93\text{m}}\text{Nb}$ (nil ^{93}Mo or ^{93}Zr):

$$27.7 \times 2.584 \times 10^4 \text{ dpm/ml} \times 0.0494 \text{ ml} = 353.6 \text{ dpm } ^{93\text{m}}\text{Nb} \text{ on 5-15-92}$$

So Count ^{94}Nb std to evaluate

N.J. J. 6/3/92

J.L. J. 6/4/92

Not anal to account for 500% recovery

Count ^{94}Nb std for $^{93\text{m}}\text{Nb}$ impurity

^{94}Nb std # 54124-33-1 - st'pple $249.8 \pm 0.5 \lambda$ on filter
→ = std # 54124-99-1

NB94STD. Al:1 } → $= 1.889 \times 10^4 \text{ dpm} \left(\begin{array}{l} 249.8 \lambda \\ \pm 9.625 \times 10^1 \end{array} \right) \pm 0.5$
16.6 keV $^{93\text{m}}\text{Nb}$ ROI

$\approx 7.562 \times 10^4 \text{ dpm/ml } ^{93\text{m}}\text{Nb}$
 $\pm 4.140 \times 10^3 \text{ (16.6 keV)}$

added $.0494 \pm .0001 \text{ ml}$ to BS + MS

→ $3736 \pm 21.80 \text{ dpm } ^{93\text{m}}\text{Nb added}$ - assume ns of
Nb sep time
5-7-92 1330

→ decay w/ $t_{1/2} = 16.13 \text{ yr}$ to count date ($^{93\text{m}}\text{Nb}$)

BS $\Delta t = 12 \text{ d}$ → $3731 \pm 21.77 \text{ dpm added}$

MS $\Delta t = 23 \text{ d}$ → $3726 \pm 21.74 \text{ dpm added}$

$^{93\text{m}}\text{Nb}$ in ^{94}Nb std

MDW/LH 6/8/92

250 UL HD-94 S10 #54124-33-1} = 54124-99-1
 stippled on back of box

START ID..... SYR894ST0.A1:1
 OF CHANNELS..... 2048
 MODE I.D..... A
 GELF NUMBER..... B
 CALIBRATION..... 0.2 KEV/CH

$$\frac{41659 - 1009}{109.58 \text{ min}} = \frac{40650 \text{ cts}}{109.58} = 370.96 \text{ cpm} \pm 1.89$$

Wtless $d/c = 50.928 \rightarrow 1.889 \times 10^4 \text{ dpm} \pm 9.625 \times 10^1$

TIME ZERO 6/ 3/92 AT 10:55: 0
 COUNTED..... 6/ 3/92 AT 10:55: 0
 (0.00 MINUTES DECAY TIME)
 LIVE COUNT TIME.... 1 HOURS 49 MINUTES 35 SECONDS (109.58 MIN.)
 ELAPSED TIME..... 1 HOURS 49 MINUTES 35 SECONDS (109.58 MIN.)
 (DEAD TIME = 0.000)

FLUX CORRECTION.... 0.0000
 GRAM CORRECTION.... 0.0000 0.0000 0.0000 0.0000
 W CORRECTION..... 1.00000 GRAMS
 COUNT & SEP: 0 AREA: 0 P.T: 0 ERR: 0 ZIR: 0 OPR: 0 NO2: -1

A. Dye
 6/3/92

250 UL ND-94 STD #54124-33-1

SYN854STD.A1:1 COUNTID 67 3/92 @ 10:55:00 GAIN: 0.2 KEV/CHAN

	0	50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950
0	6575	110	81	66	58	64	61	59	47	66	57	57	58	58	39	47	55	42	39	55
1	0	110	70	67	77	53	60	62	50	51	49	46	50	52	65	45	54	50	35	59
2	0	108	72	67	62	54	65	51	48	49	59	46	51	44	51	56	53	45	31	76
3	0	101	72	63	60	59	64	58	44	54	57	59	48	48	49	47	54	56	40	46
4	0	109	71	61	60	57	72	56	72	57	58	45	50	50	48	47	49	44	39	56
5	0	110	57	64	70	59	55	60	51	58	37	35	53	49	46	51	55	48	62	43
6	0	101	56	59	74	49	65	52	57	56	43	54	51	53	64	50	47	42	37	57
7	0	99	65	58	68	50	50	71	49	59	45	50	48	57	47	38	50	46	57	55
8	0	109	65	62	72	59	59	66	55	54	61	37	47	50	54	52	49	34	50	47
9	64	89	76	61	55	66	72	50	44	53	59	70	45	46	53	60	50	52	47	54
10	135	93	68	66	50	59	69	67	59	58	58	59	62	44	54	57	51	55	39	55
11	170	98	76	62	54	56	63	58	45	58	39	48	35	56	50	45	45	47	33	53
12	172	106	60	67	72	59	72	53	45	52	66	50	40	65	53	50	48	51	42	51
13	117	105	71	81	53	59	82	76	65	64	64	54	64	54	52	43	41	44	42	51
14	100	137	79	67	55	54	62	52	52	63	61	69	51	48	52	46	47	42	35	51
15	04	137	73	79	65	62	68	46	59	66	53	52	41	42	54	62	44	50	30	51
16	64	134	65	58	66	45	80	66	49	54	51	54	59	47	66	50	49	40	42	51
17	85	141	71	56	69	65	66	60	47	50	50	52	58	57	56	48	48	44	50	51
18	74	132	65	65	55	58	71	47	59	64	57	60	45	51	49	41	53	50	49	51
19	100	132	72	58	55	54	56	65	52	55	40	60	49	62	49	55	54	49	60	51
20	63	87	69	71	62	48	54	63	60	55	53	58	50	46	52	57	46	47	54	51
21	67	124	74	53	73	69	60	56	53	59	50	54	47	55	54	56	48	48	59	51
22	91	150	54	70	51	50	66	60	51	51	39	36	66	52	51	47	66	43	48	51
23	65	138	70	60	58	70	59	54	73	45	60	54	60	44	53	37	59	49	52	51
24	124	110	67	54	57	64	66	70	65	50	50	41	45	41	45	50	57	58	40	51
25	153	181	71	64	57	61	74	62	57	56	68	50	55	45	49	45	50	48	40	51
26	220	206	73	77	62	58	58	86	59	50	56	68	47	52	47	55	39	57	44	51
27	319	230	70	69	68	55	79	65	42	43	60	50	55	43	53	56	38	76	44	51
28	290	252	74	57	61	66	58	57	55	44	55	67	60	56	55	54	47	36	46	51
29	300	300	72	73	66	64	71	60	60	48	57	61	56	43	50	55	76	42	55	51
30	305	2013	72	57	75	74	67	60	62	45	62	54	50	45	51	49	46	55	43	51
31	614	400	81	65	71	65	69	56	52	52	62	46	50	53	51	59	30	41	49	51
32	900	8000	60	61	61	59	59	46	62	46	59	55	64	59	62	44	54	53	50	51
33	1200	10000	72	57	69	57	51	62	51	63	58	51	55	51	48	43	40	49	57	51
34	1161	8000	65	61	47	66	66	66	67	53	52	44	58	44	47	53	29	39	48	51
35	740	4000	65	47	57	51	56	53	57	59	62	51	58	55	44	44	40	37	43	51
36	371	1600	82	61	61	71	75	62	65	49	51	59	43	54	49	50	48	43	59	51
37	201	500	67	64	57	55	60	52	55	61	54	55	42	46	43	50	52	53	56	53
38	100	500	77	67	69	71	58	60	65	69	66	55	54	51	50	63	30	30	40	51
39	107	500	57	61	51	53	50	81	66	56	46	63	51	71	53	41	35	36	57	59
40	106	501	73	49	49	55	58	60	52	53	50	59	46	46	46	47	41	52	50	50
41	104	500	53	70	64	54	56	57	49	60	40	57	56	57	49	49	62	65	54	74
42	216	1000	75	61	65	51	64	45	53	46	57	55	52	67	55	62	49	40	60	55
43	267	1000	68	57	60	50	61	67	46	61	51	51	41	52	46	39	57	42	62	64
44	306	1000	79	43	76	54	67	50	51	51	51	50	64	51	55	44	48	52	51	63
45	305	1000	63	59	52	63	62	51	65	55	55	62	50	62	40	44	46	39	57	72
46	306	1000	58	57	56	63	69	52	62	50	57	48	38	50	58	45	46	49	54	50
47	306	1000	7	76	64	69	64	57	46	50	40	45	46	55	51	47	40	56	56	50
48	306	1000	29	50	56	64	59	54	59	60	45	51	41	47	48	51	47	54	45	50
49	306	1000	5	60	51	45	56	50	46	54	60	60	53	50	42	51	50	40	40	45

400

200 UL HB-94 STD #54124-33-1

SY:RB94STD.A1;1 COUNTED 6/ 3/92 @ 10:55: # GAIN: 0.2 KEV/CHAN

	1050	1060	1100	1150	1200	1250	1300	1350	1400	1450	1500	1550	1600	1650	1700	1750	1800	1850	1900	1950
1	55	56	40	51	36	33	43	52	31	37	45	38	37	38	36	33	38	33	40	35
2	51	49	41	47	37	44	35	49	52	31	35	45	28	42	34	39	37	31	31	36
3	43	57	40	43	41	35	43	41	37	26	38	34	10	25	43	27	35	43	30	30
4	54	50	17	47	45	43	41	34	42	31	48	39	34	28	33	33	30	43	35	31
5	60	51	42	34	47	37	44	39	41	34	48	34	38	30	36	37	31	32	27	30
6	53	43	54	33	32	45	31	23	40	37	48	20	43	47	43	35	30	37	50	39
7	53	65	48	46	41	47	25	35	48	35	39	28	36	48	44	36	40	43	25	38
8	44	44	49	41	37	31	47	39	45	38	53	41	42	33	43	41	35	38	42	42
9	61	40	42	33	25	39	41	32	38	31	40	38	48	44	39	48	38	36	26	28
10	55	62	43	46	43	46	32	31	37	38	51	32	45	38	47	37	29	34	32	32
11	51	46	37	49	35	29	37	34	48	40	34	26	36	47	32	41	35	24	26	30
12	53	41	51	40	36	34	36	33	41	49	28	39	37	35	31	36	34	35	37	26
13	50	46	48	40	39	46	32	39	35	40	41	30	31	34	31	24	42	42	45	30
14	51	48	44	60	46	39	31	29	44	48	34	31	51	42	45	37	48	34	34	44
15	73	51	47	33	41	39	43	35	33	41	31	48	43	35	39	35	49	30	35	46
16	58	47	39	42	37	36	35	48	47	39	33	37	25	41	36	36	32	48	48	30
17	54	56	52	33	49	38	37	35	38	34	49	42	41	35	34	39	38	38	33	32
18	53	57	36	31	35	43	34	37	46	34	33	38	39	39	37	33	43	32	37	37
19	54	48	45	44	43	46	42	43	37	49	28	34	29	41	43	36	36	28	41	32
20	54	61	47	47	33	49	30	44	29	33	27	41	32	37	29	37	29	48	31	35
21	61	53	34	42	45	48	26	47	35	43	54	34	33	27	33	41	48	33	28	30
22	48	52	61	37	34	39	29	44	35	36	31	29	28	25	44	14	41	38	42	31
23	43	51	46	36	37	33	48	35	48	38	52	48	41	33	32	34	39	35	43	34
24	48	47	52	48	28	48	46	48	32	36	40	41	32	27	29	45	41	27	36	32
25	46	46	32	45	31	34	48	44	34	44	49	33	29	38	31	39	31	39	45	31
26	61	45	58	33	33	37	38	36	39	38	42	41	37	24	34	34	33	34	37	30
27	51	60	39	44	45	43	41	31	51	34	35	36	38	29	37	49	35	48	43	35
28	42	51	46	38	42	46	48	39	38	31	37	31	29	34	29	34	29	29	35	32
29	58	41	39	31	44	34	48	36	34	37	35	31	28	24	32	34	42	35	38	31
30	53	45	45	51	39	38	39	36	34	31	44	42	35	38	34	42	35	38	34	31
31	55	43	42	41	46	38	45	37	37	41	37	34	34	39	49	47	34	38	37	31
32	52	37	49	52	47	35	43	32	49	42	33	41	44	27	45	39	36	42	30	31
33	62	43	58	45	47	41	42	39	36	35	38	44	38	43	39	39	35	41	29	32
34	42	34	54	29	37	38	38	38	37	48	26	43	38	43	38	38	38	34	43	30
35	46	49	53	37	35	31	35	42	45	29	37	48	37	41	31	37	31	36	31	30
36	44	51	41	46	45	28	32	31	34	39	35	58	26	38	34	48	38	38	37	31
37	57	62	59	36	29	35	42	41	34	42	33	36	38	38	34	36	32	34	36	31
38	49	53	52	43	44	38	38	38	38	36	45	32	37	37	45	35	38	32	37	33
39	46	55	58	41	46	43	35	29	31	36	49	44	25	42	31	45	37	35	43	30
40	61	35	47	37	51	41	32	49	34	48	34	34	35	32	41	31	38	34	32	37
41	59	61	31	49	37	44	42	33	40	45	34	27	32	36	52	32	39	47	38	30
42	56	46	34	39	33	43	31	43	33	32	37	39	28	48	38	42	48	41	50	31
43	59	62	35	37	43	29	37	44	43	47	39	53	24	35	38	37	38	37	35	35
44	56	68	37	38	47	43	45	44	44	27	34	33	43	45	29	42	36	37	37	35
45	55	54	36	36	43	38	38	28	31	51	33	41	27	31	31	33	35	33	40	34
46	57	57	57	43	42	46	39	31	34	34	32	40	41	36	48	32	37	37	37	37
47	49	45	35	43	46	39	38	35	41	41	35	35	38	47	32	31	35	35	35	36
48	46	35	38	58	48	38	34	36	27	39	35	38	36	31	43	35	37	37	37	36
49	42	33	38	44	48	36	37	37	41	51	48	39	38	43	48	38	37	35	37	35
50	41	33	35	39	51	37	38	34	38	38	37	31	39	35	31	43	42	35	37	37

- Count is done w/ $t_{1/2}$ & it is std for approx
activity (it was counted & then discarded)

N893MSTD. A111 250X # 54134-84-100 on blue paper

counted 6-2-92 @ 1551 wt = 0mg

$$18.68 \text{ cpm} \times 58.616 \text{ d/c} = 1094 \text{ dpm recovered}^*$$

$$\times 50.788 \text{ d/c} = 951 \text{ dpm recovered}^*$$

$$.250 \text{ ml} \times 3435 \text{ dpm/ml} \times e = \frac{\ln 2 \times 186}{16.13 \text{ hr}} = 856.9 \text{ dpm added}$$

* curvd-fit d/c ** empirical (measured) d/c

128% recovered 111% recovery

This std is OK

85415 problem not due to ^{137}Nb std.

MJ 29.64
Use this for all

6/3/92

APPROX. 2500L HB-93M STD #54124 14-100 on blue paper circle

SAMPLE ID..... SYRBB93HSD.A1;1

OF CHANNELS..... 2048

$$\frac{19557 - 1095}{988.45 \text{ min}} = \frac{18462}{988.45} = 18.68 \text{ cpm}$$

DIGRE I.D..... A

SHELF NUMBER..... 6

CALIBRATION..... 0.2 KEV/CH

TIME ZERO 07 2792 AT 15:51: 0

COUNTED..... 07 2792 AT 15:51: 0

(0.0 MINUTES DECAY TIME)

LIVE COUNT TIME.... 16 HOURS 28 MINUTES 27 SECONDS (598.45 MIN.)

ELAPSED TIME..... 16 HOURS 28 MINUTES 27 SECONDS (598.45 MIN.)

(DEAD TIME = 0.000)

FLUX CORRECTION.... 0.0000

GEOMETRIC CORRECTION.... 0.0000 0.0000 0.0000 0.0000 0.0000

WEIGHT..... 1.00000 GRAMS

ALPHA SUPP: 0 AREA: 0 P E: 0 ERR: 0 ZIR: 0 GER: 0 HCV: -1

403

M. J. W. W.
6/3/92

APPROX. 2500H. NB-93H SID #54124-84-100

SY:NB93HSID.A1:1 COUNTED 6/ 2/92 @ 15:51: 0 GAIN: 0.2 KEV/CHAN

	0	10	150	150	250	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950
0	120	104	73	77	74	68	69	53	50	51	43	41	29	42	35	30	24	42	26	
1	120	83	70	70	66	59	50	52	39	50	39	42	30	30	36	31	23	41	34	
2	110	101	60	66	63	53	48	42	69	47	39	38	39	41	33	48	27	10	23	
3	120	75	77	60	68	57	50	55	63	47	34	46	43	32	49	25	26	28	37	
4	131	66	77	59	51	69	59	33	42	57	50	44	17	33	29	29	20	30	39	
5	141	69	67	70	57	54	60	76	32	42	49	40	16	39	39	10	1	21	27	
6	117	77	60	63	60	48	61	63	39	49	50	51	27	40	43	28	10	25	15	
7	123	65	71	54	79	61	50	43	18	52	42	30	12	42	44	26	30	43	20	
8	91	69	61	62	65	63	51	63	37	31	48	26	45	40	33	3	26	27	27	
9	111	65	61	70	60	77	67	33	52	42	40	39	33	35	36	24	25	19	20	
10	132	72	65	76	52	61	60	56	58	46	42	53	37	43	39	33	51	37	22	
11	117	67	68	57	50	50	68	50	72	52	40	50	44	44	36	30	29	32	27	
12	147	69	73	79	60	65	64	47	100	45	44	46	43	46	47	35	3	19	10	
13	173	70	54	48	48	71	110	54	95	44	42	45	41	30	44	14	19	25	20	
14	195	81	66	54	55	64	111	49	110	30	40	54	20	46	32	37	30	19	31	
15	212	70	71	61	67	101	90	43	100	57	40	39	47	43	35	17	31	27	32	
16	231	70	72	76	50	114	70	62	64	53	40	34	51	37	29	33	10	25	26	
17	184	12	54	75	62	116	5	35	57	46	40	37	20	45	30	36	33	36	35	
18	151	64	67	60	54	105	55	60	55	41	47	51	41	45	35	34	12	26	24	
19	137	74	51	54	62	71	63	54	54	36	47	40	46	45	34	42	25	35	22	
20	136	15	101	47	59	56	57	73	55	42	62	12	42	46	34	19	31	16		
21	131	79	61	50	50	57	67	57	44	49	34	41	42	20	35	43	17	20	10	
22	110	73	66	65	40	50	90	70	40	30	33	13	51	36	34	37	13	26	20	
23	110	66	73	59	50	66	65	64	50	57	51	50	51	32	36	36	16	26	22	
24	131	73	65	65	69	130	74	53	51	31	47	33	45	36	17	15	17	32		
25	157	73	50	76	60	121	69	50	46	36	13	15	29	46	16	1	1	31		
26	1	66	65	70	49	133	66	20	40	47	38	40	39	30	30	31	1	20	20	
27	112	66	66	58	56	51	63	40	45	45	56	57	43	47	36	36	13	20	20	
28	117	67	50	61	15	70	67	31	47	50	40	30	30	41	28	1	1	16		
29	115	67	55	55	63	5	54	44	44	37	44	39	35	30	39	34	1	1	10	
30	110	66	63	60	56	63	46	43	40	49	41	42	43	31	36	36	1	1	22	
31	206	72	67	91	60	54	47	57	50	55	39	44	42	36	23	32	1	1	27	
32	315	65	75	65	71	50	55	47	47	48	43	46	39	30	32	30	1	1	16	
33	420	66	67	68	67	59	55	46	50	46	49	60	33	46	24	44	12	25	10	
34	3721	68	62	67	41	66	60	63	47	53	42	36	29	27	43	26	1	1	37	
35	2097	76	70	63	52	57	61	54	42	40	42	39	43	40	32	31	1	1	16	
36	370	81	65	61	58	61	63	51	30	50	51	51	41	36	30	34	1	1	33	
37	154	69	55	52	63	55	62	47	53	40	40	20	20	25	14	43	1	1	32	
38	130	70	75	57	40	65	57	67	30	43	42	31	1	30	17	1	1	1	20	
39	112	74	60	63	54	46	59	50	39	51	40	15	1	1	1	1	1	1	18	
40	130	69	70	51	57	52	57	43	44	41	44	20	27	32	1	1	1	1	16	
41	119	72	61	55	65	51	45	41	42	39	44	17	1	35	34	43	1	1	17	
42	116	67	69	72	49	53	41	41	2	44	41	34	11	20	34	7	1	1	26	
43	117	63	73	55	60	77	50	40	45	49	34	30	17	31	28	35	1	1	16	
44	115	61	70	56	70	55	50	8	41	55	41	17	1	33	27	1	1	1	1	
45	117	60	71	68	50	63	61	20	41	46	42	12	1	34	10	31	1	1	11	
46	11	60	50	72	59	4	2	45	34	45	39	17	1	37	30	14	1	1	6	
47	110	50	51	62	64	60	60	7	47	44	46	14	1	34	27	1	1	1	12	
48	114	60	68	70	46	50	50	10	43	42	40	1	1	40	33	10	1	1	12	
49	116	65	50	53	56	63	47	2	53	47	15	1	1	42	32	15	1	1	10	

404

BEST COPY AVAILABLE

APPROX. 2500L 00-93H LTD #54124-84-100

SY:RB93HSID.A1;1 COUNTED 6/ 2/92 @ 15:51: 8 GAIN: 8.2 KEV/CH

	1000	1050	1100	1150	1200	1250	1300	1350	1400	1450	1500	1550	1600	1650	1700	1750	1800	1850	1900	1950
0	23	23	27	27	17	17	18	15	11	16	16	15	18	13	14	16	12	7	7	7
1	14	18	29	24	18	18	21	22	13	21	8	14	12	9	9	17	7	1	12	8
2	14	22	26	16	16	27	17	15	14	5	13	10	14	11	9	15	10	1	1	11
3	30	25	16	20	10	11	18	21	8	14	20	12	14	15	13	11	9	1	1	6
4	20	24	15	20	21	20	13	17	13	21	16	8	11	9	14	8	6	12	11	9
5	2	21	32	24	19	17	22	22	19	12	8	12	18	17	12	13	13	11	12	10
6	19	25	13	17	20	11	17	25	12	13	18	16	11	12	14	14	11	10	11	6
7	1	25	18	20	24	21	18	21	19	12	18	8	17	12	12	22	7	1	1	14
8	10	19	14	17	16	9	24	10	17	15	8	23	13	9	9	16	13	14	12	14
9	18	24	15	25	31	13	19	14	17	13	14	10	14	14	12	22	9	12	12	9
10	26	22	26	32	22	27	14	18	14	11	7	13	17	14	10	20	17	1	1	7
11	5	32	30	19	20	14	24	28	16	18	17	9	8	12	6	23	11	12	12	1
12	31	25	21	23	20	20	23	19	18	13	8	12	8	17	7	5	5	1	1	6
13	12	21	24	17	28	16	14	16	20	13	15	13	13	15	9	7	15	1	1	1
14	13	21	25	19	18	21	13	16	17	13	17	9	11	13	12	12	13	1	1	1
15	20	21	25	26	21	14	23	17	23	10	14	15	12	10	12	10	9	14	1	12
16	10	24	28	19	27	12	11	25	7	16	10	8	7	14	10	17	12	11	10	12
17	14	35	11	22	24	16	26	17	17	21	15	12	8	10	11	7	9	1	1	1
18	29	24	25	15	14	19	19	8	15	21	18	12	7	13	10	8	16	1	1	7
19	25	21	23	21	20	12	11	21	13	23	17	15	15	16	14	13	7	10	1	1
20	10	35	18	17	13	16	21	16	11	21	13	13	19	19	11	19	9	1	1	1
21	18	35	20	15	16	16	15	7	13	13	12	13	12	14	8	9	7	12	1	1
22	5	29	20	18	23	19	17	19	14	16	15	14	17	11	13	10	13	11	1	1
23	14	17	19	25	13	19	20	17	20	19	21	5	15	13	11	8	15	1	1	1
24	27	27	21	15	24	10	16	16	5	16	11	10	10	13	7	12	10	1	1	1
25	23	23	27	26	10	21	17	18	13	10	12	10	15	9	10	16	11	12	7	1
26	14	24	18	23	27	14	22	14	11	25	12	14	8	10	20	12	12	1	7	1
27	10	19	9	15	26	16	22	17	12	19	11	19	10	6	15	12	8	1	1	1
28	15	26	20	15	17	22	20	12	20	9	18	17	19	16	9	12	11	10	6	1
29	20	27	23	27	16	16	18	15	11	17	17	13	12	26	10	14	10	21	10	13
30	10	30	24	20	18	13	16	21	11	14	16	12	12	8	13	12	12	11	4	5
31	10	26	27	24	16	17	17	20	25	9	16	12	18	21	7	15	14	7	12	8
32	11	28	26	24	13	16	19	17	16	15	16	19	16	9	11	13	10	16	13	12
33	11	21	26	23	9	18	18	10	23	10	16	15	10	9	16	6	8	1	6	9
34	25	20	21	16	16	36	13	20	13	13	17	14	16	10	8	6	16	8	20	3
35	24	30	23	25	25	19	16	9	12	14	12	10	14	9	6	20	10	6	4	12
36	34	29	23	29	27	18	16	16	16	14	21	12	14	12	10	10	12	14	9	11
37	31	16	25	25	19	22	16	15	8	13	14	15	14	12	11	9	8	10	10	11
38	27	26	25	22	19	10	15	16	11	13	18	13	13	13	19	14	11	12	10	8
39	2	23	10	17	20	13	19	21	8	14	12	17	16	15	15	13	14	5	5	7
40	25	15	31	20	20	23	18	21	22	15	16	11	16	15	15	13	10	14	3	6
41	24	25	20	15	21	12	17	15	16	12	10	12	12	12	12	6	10	12	4	7
42	33	21	16	21	17	10	20	10	13	17	10	12	11	15	12	11	9	9	9	9
43	28	27	22	15	15	15	15	15	15	17	12	14	15	15	11	5	5	7	7	12
44	18	27	15	31	19	13	22	15	16	18	17	15	10	12	16	7	6	11	7	5
45	30	15	25	21	22	21	21	22	20	17	9	16	8	14	12	9	15	11	10	6
46	5	7	17	21	22	24	15	17	16	10	18	11	12	13	9	11	15	5	6	6
47	34	31	17	17	11	16	17	20	10	8	17	20	8	13	10	10	7	12	11	6
48	10	15	14	3	10	19	16	21	6	17	16	12	12	12	13	9	11	10	8	8
49	7	1	25	15	16	11	11	16	11	16	17	14	14	6	8	10	11	13	10	8

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BEST COPY AVAILABLE

BS-5070

^{93m}Nb

added from ^{93m}Nb std → 859 dpm
in ⁹⁴Nb std → + 3731 dpm
4590 dpm total ^{93m}Nb added

recovered:

$$\frac{45.216 \text{ cpm} \times 72.929 \text{ d/c}}{0.769 \text{ yield}} = 4288 \text{ dpm recovered}$$

$$\frac{4288 \text{ dpm} \times 100}{4590 \text{ dpm}} = \underline{\underline{93.4\% \text{ recovery}}}$$

Equiv. amt. added:

$$\frac{4590 \text{ dpm added} \times 250 \text{ ml}}{0.5 \text{ g sample} \times 4.993 \text{ ml}} = 460,000 \text{ dpm/g equiv. added}$$

⁹⁴Nb

Equiv. added:

$$\frac{1276.5 \text{ dpm added} \times 250 \text{ ml}}{0.5 \text{ g} \times 4.993 \text{ ml}} = 128,000 \text{ dpm/g equiv. added}$$

M. J. W. L.
6/19/92

OK today 6/23/92

NIOBIUM ANALYSIS

Page 1 of 2

Spreadsheet filename: NBCALC

Revision 1: 6/1/92, NLW

Assumes tracer added to final aliquot

Sample ID: BS-5070

Date Calculated: 06/19/92

Data filename: NB5070bs

M&TE No.

Diode HH

Nb-94 & 95 Spectrum: bs5070.hh;1

Zr/Nb-95 Tracer: 54124-76-0

volume added, ml: 0.2503 0.0012 error

*****Half-lives*****

Zr-95 dpm/ml: 4.415E+03 4.500E+01 error

Zr-95= 64.02 days

Nb-95 dpm/ml: 9.892E+03 1.151E+02 error

Nb-95= 34.97 days

On: Date: 05/13/92 01:00 Time

Nb Sep Date: 05/07/92 13:30 Time

total dpm Nb-95= 2629.44 34.53 error at Nb sep time

Sample Amount: 0.5000 0.0002 error

g, ml or sample? g

Reporting Units

Leach Volume, ml: 250 0.01 error

Activity: dpm

Vol to dilute, ml: 1 0.00001 error

per ? : g

Diluted to, ml: 1 0.00001 error

Final Aliquot, ml: 4.993 0.17 error

Nb-94 & 95 Counting Data from Prepared Sample

Sample dpm Nb-95= 2.022E+03 1.10 % error at Nb sep time

Sample dpm Nb-94= 8.781E+02 2.13 % error

*****RESULTS*****

Yield Nb-95= 0.769 0.013 error

Nb-94 dpm/g= 114349.5 4992.894 error = 4.37 %

MDA =

A Nb-94 blank spike? yes If no, ignore Nb-94 spike and

Nb-94 Spike I.D.: 54124-33-1 recovery data.

volume added, ml: 0.0494 0.0001 error

to initial sample amt (i)

or final aliquot (f)? f

Nb-94 dpm/ml: 2.584E+04 6.920E+02 error

Half-life of Nb-94

On: Date: 08/16/91 12:00 Time

=2.0E4 yrs. therefore

added dpm Nb-94: 1276.50 34.26 error

not decay corrected.

Nb-94 % recovery = 89.455 3.428 error

3.832 % error

GENERIC FORMULAS

Nb-94 Activity =
$$\frac{\text{net dpm} \times \text{leach vol} \times \text{diln vol}}{\text{yield} \times \text{sample amt} \times \text{diln aliquot} \times \text{aliquot}}$$

% recovery =
$$\frac{\text{dpm recovered}}{\text{dpm added}} \times 100$$

Nb-93m Activity =
$$\frac{\text{net cpm} \times \text{d/c} \times \text{leach vol} \times \text{diln vol}}{\text{yield} \times \text{sample amt} \times \text{diln aliquot} \times \text{aliquot}}$$

NIOBIUM ANALYSIS

Page 2 of 2

Spreadsheet filename: NBCALC

Revision 1: 6/1/92, NLW

Sample ID: BS-5070

Date Calculated: 06/19/92

Data filename: NB5070bs

Nb-93m Spectrum: bs5070nb.al;1

Weight Nb ppt, mg: 266.7 0.2 error

Counted on: A M&TE No. Diode A

On: Date: 05/19/92 15:37 Time

Nb-93m d/c = 72.929 6.004 error

NB-93M COUNTING DATA:

Diode B or 325 LEPS Enter data under correct diode.

If %error >= 50%, enter MDA. If not, MDA = NA

net cps: 1.00 1.00 % error

MDA, in cps: NA

Diode A

peak channel no.: 83 bkgd: 70 - 74 <-- first ROI

Count time, min.: 1050.98 372 <-- counts

Nb-93m counts--> 677 373

1125 379

peak channel + 2354 328

5 lower + 5427 385

4 higher 9782 100 - 104 <-- second ROI

12219 279 <-- counts

10223 259

6096 270

2512 271

1022 241

gross counts: 51437.000 3157 :normalized ROI total

net cpm: 45.216 0.722 :cpm in bkgd spectrum

error, cpm: 0.224 avg BKG.A1;1&2:bkgd filename

% error 0.495 3915.2 :total bkgd counts

*****RESULTS*****

Nb-93m dpm/g= 429420.3 39017.406 error = 9.066 %

MDA =

A Nb-93m blank spike? yes If no, ignore Nb-93m spike and

Nb-93m Spike I.D.: 54124-84-100 recovery data.

volume added, ml: 0.2503 0.0012 error

to initial sample amt (i)

or final aliquot (f)? f

*****Half-life*****

Nb-93m dpm/ml: 3.435E+03 1.647E+01 error Nb-93m= 16.13 yr

On: Date: 05/15/92 12:00 Time

added dpm Nb-93m: 859.36 5.83 error

On: Date: 05/19/92 15:37 Time (Date Counted)

Nb-93m % recovery 498.999 42.172 error

0.451 % error

NBW 6/19/92 - see attached
sheet for hand calculation
with total amount added.

Entered by NLW Date 6/19/92

Reviewed by J. L. Taylor Date 06/22/92

BS-5070

^{93m}Nb

added: from ^{93m}Nb std $\rightarrow$ 859 dpm
in ^{94}Nb std $\rightarrow$ +3731 dpm
4590 dpm total ^{93m}Nb added

recovered:

$$\frac{45.755 \text{ cpm} \times 72.927 \text{ d/c}}{.769 \text{ yield}} = 4339 \text{ dpm} \quad \leftarrow \text{incorrect}^*$$

$$\frac{4339 \text{ dpm}}{4590 \text{ dpm}} \times 100 = 94.5\% \text{ recovery} \quad \leftarrow *$$

Equiv. amt added:

$$\frac{4590 \text{ dpm added} \times 250 \text{ ml}}{0.5 \text{ g sample} \times 4.993 \text{ ml}} = 460,000 \text{ dpm/g equiv. added}$$

^{94}Nb

Equiv. added:

$$\frac{1276.5 \text{ dpm added} \times 250 \text{ ml}}{0.5 \text{ g} \times 4.993 \text{ ml}} = 128,000 \text{ dpm/g equiv. added}$$

MJW
6/8/92

* ^{93m}Nb is preliminary & incorrect. dpm recovered calculation in spreadsheet used incorrect system bkgd: see corrected copy - 6/19/92 MJW 6/19/92

NIOBBIUM ANALYSIS

Page 1 of 2

Spreadsheet filename: NRCALC

Revision 1: 6/1/92, NLW

Assumes tracer added to final aliquot

Sample ID: BS-5070

Date Calculated: 06/08/92

Data filename: NBS070bs

M&TE No.

Diode HH

Nb-94 & 95 Spectrum: bs5070.hh;1

Zr/Nb-95 Tracer: 54124-76-0

volume added, ml:	0.2503	0.0012 error	*****Half-lives*****
Zr-95 dpm/ml:	4.415E+03	4.500E+01 error	Zr-95= 64.02 days
Nb-95 dpm/ml:	9.892E+03	1.151E+02 error	Nb-95= 34.97 days

On: Date: 05/13/92 01:00 Time

Nb Sep Date: 05/07/92 13:30 Time

total dpm Nb-95= 2629.44 34.53 error at Nb sep time

Sample Amount: 0.5000 0.0002 error

g, ml or sample? g

Reporting Units

Leach Volume, ml: 250 0.01 error

Activity: dpm

Vol to dilute, ml: 1 0.00001 error

per ? : g

Diluted to, ml: 1 0.00001 error

Final Aliquot, ml: 4.993 0.17 error

Nb-94 & 95 Counting Data from Prepared Sample

Sample dpm Nb-95= 2.022E+03 1.10 % error at Nb sep time

Sample dpm Nb-94= 8.781E+02 2.13 % error

*****RESULTS*****

Yield Nb-95= 0.769 0.013 error

Nb-94 dpm/g= 114349.5 4992.894 error = 4.37 %

MDA =

A Nb-94 blank spike? yes If no, ignore Nb-94 spike and
Nb-94 Spike I.D.: 54124-33-1 recovery data.

volume added, ml: 0.0494 0.0001 error

to initial sample amt (i)

or final aliquot (f)? f

Nb-94 dpm/ml: 2.584E+04 6.920E+02 error

Half-life of Nb-94

On: Date: 08/16/91 12:00 Time

=2.0E4 yrs, therefore

added dpm Nb-94: 1276.50 34.28 error

not decay corrected.

Nb-94 % recovery = 89.455 3.428 error

3.832 % error

GENERIC FORMULAS

Nb-94 Activity =
$$\frac{\text{net dpm} \times \text{leach vol} \times \text{diln vol}}{\text{yield} \times \text{sample amt} \times \text{diln aliquot} \times \text{aliquot}}$$

% recovery =
$$\frac{\text{dpm recovered}}{\text{dpm added}} \times 100$$

Nb-93m Activity =
$$\frac{\text{net dpm} \times \text{d/c} \times \text{leach vol} \times \text{diln vol}}{\text{yield} \times \text{sample amt} \times \text{diln aliquot} \times \text{aliquot}}$$

NIOBIUM ANALYSIS

Page 2 of 2

Spreadsheet filename: NSCALC

Revision 1: 6/1/92, NLW

Sample ID: BS-5070

Date Calculated: 06/08/92

Data filename: NS5070bs

Nb-93m Spectrum: bs5070nb.a1;1

Weight Nb ppt, mg: 266.7 0.2 error

Counted on: A

M&TE No.

Diode A

On: Date: 05/19/92

15:37 Time

Nb-93m d/c = 72.929

6.004 error

NB-93M COUNTING DATA:

Diode B or 325 LEPS

Enter data under correct diode.

If %error >= 50%, enter MDA. If not, MDA = NA

net cps: 1.00 1.00 % error

MDA, in cps: NA

Diode A

peak channel no.: 83

bkqd: 70 - 74 <-- first ROI

Count time, min.: 1050.98

372 <-- counts

Nb-93m counts--> 677

373

1125

379

peak channel + 2354

328

5 lower + 5427

385

4 higher 9782

100 - 104 <-- second ROI

12219

279 <-- counts

10223

259

6096

270

2512

271

1022

241

gross counts: 51437.000

3157 : normalized ROI total

net cpm: 45.755

0.183 : cpm in bkqd spectrum

error, cpm: 0.223

BK6.A1;1 : bkqd filename

% error 0.487

3349.3 : total bkqd counts

*****RESULTS*****

Nb-93m dpm/g = 434539.3 39480.556 error = 9.086 %

MDA =

A Nb-93m blank spike?

yes

If no, ignore Nb-93m spike and recovery data.

Nb-93m Spike I.D.:

54124-84-100

volume added, ml: 0.2503

0.0012 error

to initial sample amt (i)

or final aliquot (f)?

f

*****Half-life*****

Nb-93m dpm/ml: 3.435E+03

1.647E+01 error

Nb-93m = 16.13 yr

On: Date: 05/15/92

12:00 Time

added dpm Nb-93m: 859.36

5.83 error

On: Date: 05/19/92

15:37 Time (Date Counted)

Nb-93m % recovery 504.940

42.872 error

2.451 % error

7/12/92 - see attached sheet
for calculation with
total amount added.

Entered by

Date

Reviewed by

Date

Analysis performed by: diana mcmullin

Sample: 1015Y NIOBIUM BLANK SPIKE BS-5070

Height: 1.00000 ML

Irradiation date: 7-May-1992 at 13:30:00

Count date: 14-May-1992 at 11:00:00

Decay: 6.9d (595800.00 seconds)

Count times: REAL TIME 22.53h (81094.000 seconds)
LIVE TIME 22.51h (81020.000 seconds)

Dead time: 0.09 percent

Detector: HH pos 0 Geometry Factor: 1.000

Efficiencies and shape parameters from file: ve:[116.2]EFFFILMB.HH

Spectrum from file : bs5070.hh:1

Background subtractions from file: VE:[116.1]BACKG.HH

	Peak channel	Region start end	Gross counts	Net area ++	Energy (KeV)	Gamma /sec	Err x SD	System bkgd
1	75.0	73. 79.	14499.	2344.*	74.34	3.348E-02	100.0	2346.
2	85.5	85. 87.	5602.	542.*	83.85	2.652E-02	100.0	573.
3	210.4	210. 212.	5395.	415.*	200.66	2.694E-02	100.0	417.
4	239.9	239. 244.	14369.	5365.*	230.20	2.797E-02	100.0	5282.
5	271.6	270. 272.	3606.	297.*	269.87	3.037E-02	100.0	252.
6	301.6	300. 302.	3310.	296.*	299.82	3.316E-02	100.0	230.
7	330.8	330. 341.	4718.	986.*	330.01	3.730E-02	100.0	981.
8	512.5	507. 515.	10446.	1168.*	510.51	6.760E-02	100.0	1023.
9	504.9	504. 506.	3109.	936.*	502.88	6.905E-02	100.0	1130.
10	704.5	699. 706.	32018.	29622.	702.32	1.434E+01	0.6	0.
11	767.8	759. 770.	50460.	54090.	765.62	2.085E+01	0.4	0.
12	862.7	861. 866.	742.	153.*	860.41	4.296E-02	100.0	129.
13	873.1	868. 878.	25255.	24209.	870.81	1.497E+01	0.7	0.
14	913.2	910. 916.	1305.	059.*	910.93	3.755E-02	100.0	030.
15	968.9	965. 969.	429.	152.*	964.50	3.801E-02	100.0	192.
16	971.1	969. 973.	785.	514.*	960.74	5.050E-02	100.0	441.
17	1463.5	1459. 1466.	729.	605.*	1460.75	3.710E-02	100.0	685.
18	1576.2	1571. 1579.	675.	566.	1573.20	6.760E-01	4.9	0.
19	1596.9	1594. 1594.	141.	74.*	1588.04	3.573E-02	100.0	02.
20	1595.2	1594. 1596.	05.	40.*	1592.28	3.789E-02	100.0	59.
21	1622.9	1622. 1627.	109.	55.*	1619.98	3.710E-02	60.0	25.
22	1633.4	1633. 1636.	70.	40.*	1630.51	3.097E-02	100.0	30.
23	1707.0	1706. 1709.	100.	69.*	1764.71	3.525E-02	100.0	52.

Diana L. McMullin
5-29-92
M. J. Dymally
6/2/92

++ Not Peak Area above the Compton Continuum before correction for system background. Values flagged with a * are subsequently corrected for system background before calculation of absolute emission rate (gams/sec).

Gamma-ray and nuclide lookup from file: VE:[116,3]NBLIB.DAT

*** Least-squares Results ***

(interferences)

nuclide	energy kev	dps at zero time	uCi /1L	peak frac	err (%)	dev (sig)	DPM /1L	error (%)
1 Nb 94	- - - -	1.464E+01	3.956E-04	- - - -	- - - -	- - - -	8.781E+02	2.13
	702.32	1.434E+01	3.876E-04	1.02	1.19	-1.19		
	870.61	1.497E+01	4.045E-04	0.98	1.20	1.26		
2 Nb 95	- - - -	3.370E+01	9.107E-04	- - - -	- - - -	- - - -	2.022E+03	1.10
	765.62	3.370E+01	9.107E-04	1.00	1.10	0.00		

The following are upper limit values:

Co 60	- - - -	4.329E-02	1.170E-06	- - - -	- - - -	- - - -	2.597E+00	100.00
Zn 95	- - - -	1.223E-01	3.304E-06	- - - -	- - - -	- - - -	7.335E+00	100.00
Sn113	- - - -	9.907E-01	2.678E-05	- - - -	- - - -	- - - -	5.944E+01	100.00
Sn123	- - - -	0.000E+00	0.000E+00	- - - -	- - - -	- - - -	0.000E+00	100.00
Sn119m	- - - -	5.623E+00	1.520E-04	- - - -	- - - -	- - - -	3.374E+02	100.00
Sn121m	- - - -	1.561E+00	4.219E-05	- - - -	- - - -	- - - -	9.365E+01	100.00
Sn125	- - - -	6.785E-01	1.834E-05	- - - -	- - - -	- - - -	4.071E+01	100.00

The following peaks were not identified:

#	energy	gams/sec	pcerr	CI *
1	70.34	3.3401E-02	100.0	0.0000000
2	67.05	2.6523E-02	100.0	0.0000000
3	70.10	2.6544E-02	100.0	0.0000000
4	70.20	2.7960E-02	100.0	0.0000000
5	72.16	3.0509E-02	100.0	0.0000000
6	73.47	3.3056E-02	100.0	0.0000000
7	80.10	3.7285E-02	100.0	0.0000000
8	100.11	6.7603E-02	100.0	0.0000000
9	101.33	6.9001E-02	100.0	0.0000000
10	120.11	1.0756E-02	100.0	0.0000000
11	120.11	1.0756E-02	100.0	0.0000000

15	964.53	3.8014E-02	100.0	0.0000000
16	968.74	5.0503E-02	100.0	0.0000000
17	1460.75	3.7099E-02	100.0	0.0000000
18	1078.20	6.7677E-01	5.0	0.0000000
19	1005.64	3.5726E-02	100.0	0.0000000
20	1002.38	3.7893E-02	100.0	0.0000000
21	1019.50	3.7100E-02	68.9	0.0000000
22	1076.51	3.0974E-02	100.0	0.0000000
23	1104.71	3.5248E-02	100.0	0.0000000

If CI > 0 Confidence threshold was not exceeded
 CI = 0 Energy Window test failure
 CI = -1 Extreme Half Life test failure
 CI = -2 Extreme As. Gamma comparison test failure
 CI = -3 Unable to estimate area of Assoc. Gamma

Options - in - Effect

CALIBRATE	RAY.OUT
PRINT	
LICOPY	ALL116,30NOLIB.DAT
INJECT	injection
USE	
RE	0.00000000
AL	
BL	0.00000000
CS	

NB-93M ON BS-5070:266.7 HG PPT

SAMPLE ID..... SY:BS507000.A1:1

OF CHANNELS..... 2048

DIODE I.D..... A

SHELF NUMBER..... 0

CALIBRATION..... 0.2 KEV/CH

TIME ZERO 5/19/92 AT 15:37: 0

COUNTED..... 5/19/92 AT 15:37: 0

(0.00 MINUTES DECAY TIME)

LIVE COUNT TIME.... 17 HOURS 30 MINUTES 59 SECONDS (1050.98 MIN.)

ELAPSED TIME..... 17 HOURS 30 MINUTES 59 SECONDS (1050.98 MIN.)
(DEAD TIME = 0.000)

FLUX CORRECTION.... 0.0000

GEOM CORRECTION.... 0.0000 0.0000 0.0000 0.0000 0.0000

WEIGHT..... 1.00000 GRAMS

AD11: 0 SLP: 0 AREA: 0 P-Γ: 0 ERR: 0 ZER: 0 OPR: 0 NOV: -1

415

MSW
5/20/92

HB-93H ON BS-5870:266.7 MG PPT

SY:BS5870NB.A1:1 COUNTED 5/19/92 @ 15:37: @ GAIN: 0.2 KEV/CHAN

	0	50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950
0	6.019	352	279	225	231	170	207	206	212	197	213	209	171	173	142	135	165	165	139	150
1	0	346	259	240	224	202	212	183	211	209	184	170	176	171	168	161	152	133	150	142
2	0	345	270	250	216	194	220	181	194	169	182	176	155	153	179	150	173	168	152	142
3	0	340	271	225	213	216	192	184	184	181	185	182	140	182	183	169	163	143	161	142
4	0	370	241	254	239	203	190	196	208	189	157	162	171	177	159	174	165	154	157	142
5	0	349	258	267	219	203	186	193	205	188	191	200	178	150	168	141	148	173	154	142
6	0	333	248	245	215	185	182	202	187	173	190	157	144	170	174	172	155	138	143	142
7	0	343	243	239	222	206	204	212	185	195	181	188	172	166	172	151	167	133	151	142
8	9	355	229	260	191	217	215	200	178	198	165	163	169	177	199	161	136	151	164	142
9	597	309	249	211	216	234	191	199	186	163	168	172	171	180	176	190	167	141	141	142
10	950	344	252	245	206	212	225	180	194	195	171	177	164	156	156	149	170	150	155	142
11	914	349	260	260	222	219	206	203	200	221	193	173	154	151	180	174	143	160	159	142
12	516	327	276	254	236	200	193	196	206	219	166	194	202	176	158	158	161	159	162	142
13	496	362	259	233	211	227	209	247	192	230	167	183	179	161	204	156	154	130	136	142
14	310	345	245	228	214	242	235	232	195	241	191	172	169	179	202	181	149	159	156	142
15	413	448	256	259	227	207	257	229	183	213	189	193	178	152	142	178	150	132	134	142
16	374	450	218	193	202	221	208	240	200	231	172	174	181	169	146	154	162	150	156	142
17	375	424	227	243	219	210	276	215	182	212	173	185	184	167	149	152	154	137	157	142
18	311	419	205	242	237	235	227	179	169	198	207	169	183	170	174	146	146	172	158	142
19	337	392	250	213	214	227	225	196	195	175	183	188	173	171	179	152	154	167	163	142
20	312	372	256	241	183	229	215	206	213	177	173	162	179	150	181	166	147	163	160	142
21	346	373	259	266	216	208	210	196	198	192	176	174	176	161	163	169	157	139	150	142
22	316	379	267	251	196	193	207	246	205	196	200	173	173	144	161	151	153	171	145	142
23	324	328	243	249	235	199	212	210	207	172	167	180	163	172	155	151	170	173	167	142
24	353	385	238	225	214	217	217	265	227	180	172	191	180	159	125	144	177	164	158	142
25	421	386	244	273	206	206	187	295	226	186	177	193	177	161	161	137	151	136	173	142
26	504	417	236	234	232	185	220	273	228	185	197	199	194	144	141	155	148	152	152	142
27	577	436	279	240	244	212	179	280	216	192	186	161	179	166	165	144	134	146	185	142
28	601	677	276	225	226	205	218	236	197	179	188	173	155	200	138	152	163	147	176	142
29	569	1125	290	250	216	206	195	204	162	188	176	146	177	155	166	183	162	136	195	142
30	643	2454	251	233	223	199	181	211	193	206	205	170	185	161	167	182	140	126	185	142
31	809	5427	261	235	209	211	205	179	184	189	167	192	192	154	136	147	146	145	170	142
32	1205	9782	232	209	230	209	225	207	204	174	152	169	193	150	173	166	143	142	155	142
33	1739	12219	261	225	219	213	181	190	179	189	182	188	159	156	145	156	140	152	159	142
34	1630	10223	237	225	221	212	194	218	206	153	163	180	167	154	153	162	150	147	147	142
35	1175	6096	262	208	224	194	220	190	201	173	149	173	178	163	149	144	129	147	145	142
36	737	2512	263	236	200	204	199	225	205	174	181	161	189	170	160	149	159	153	160	142
37	459	1022	247	222	205	201	221	214	214	180	186	166	169	162	154	166	160	163	164	142
38	398	567	249	237	207	218	209	187	198	207	190	165	186	173	146	155	163	161	167	142
39	379	461	269	242	212	195	212	175	191	186	176	199	183	169	172	176	137	154	166	142
40	313	657	249	238	205	200	244	197	180	173	155	191	181	173	166	162	152	153	150	142
41	389	1076	243	224	211	202	197	196	171	183	172	165	183	182	159	165	157	158	156	142
42	448	1994	223	224	204	203	211	186	163	184	189	168	183	151	143	164	146	139	153	142
43	501	2644	266	223	227	215	219	207	189	186	175	174	178	139	167	148	145	159	150	142
44	559	2729	236	241	236	207	202	198	167	146	161	190	142	182	155	148	130	145	153	142
45	510	1104	250	224	195	217	204	202	186	176	199	163	178	152	169	133	145	143	160	142
46	411	1559	244	190	203	203	210	199	184	172	173	158	174	177	163	167	157	150	158	142
47	387	573	232	231	250	199	203	182	212	163	156	175	171	154	162	180	145	150	170	142
48	379	391	240	240	231	200	200	176	182	221	175	175	175	171	154	162	134	151	162	142
49	310	266	211	201	220	212	200	194	172	164	184	182	160	156	144	167	145	153	160	142

HB-93M ON BS-5070:266.7 MG PPT

SY:BS5070NB.A1:1 COUNTED 5/19/92 @ 15:37: 0 GAIN: 0.2 KEV/CHAN

	1000	1050	1100	1150	1200	1250	1300	1350	1400	1450	1500	1550	1600	1650	1700	1750	1800	1850	1900	1950
0	100	160	149	118	135	123	117	119	119	119	109	135	104	111	97	107	92	99	95	100
1	105	153	142	136	136	127	125	102	123	123	107	102	96	87	100	110	96	104	75	100
2	103	146	143	124	150	124	126	125	125	97	131	99	101	97	106	90	112	95	102	100
3	105	173	139	135	120	113	103	113	110	102	104	98	114	95	108	100	102	116	79	100
4	105	146	145	134	127	100	102	103	108	109	106	99	106	101	111	109	111	114	113	100
5	161	136	136	137	114	112	110	101	119	116	95	120	99	116	100	103	96	86	97	100
6	178	167	136	115	134	113	104	130	122	116	97	102	114	85	88	103	91	93	84	100
7	161	170	149	120	133	131	115	108	103	115	112	99	97	92	114	95	110	97	103	100
8	163	133	129	90	126	145	110	104	110	110	123	100	89	102	120	131	112	104	91	100
9	168	150	140	132	131	115	120	106	104	130	83	96	101	110	105	108	120	95	116	100
10	168	143	159	147	121	134	113	119	105	93	93	101	100	93	110	120	91	91	105	100
11	144	162	122	113	112	104	137	124	102	90	94	107	117	103	102	94	92	110	107	100
12	152	141	154	135	138	120	110	131	115	111	97	118	95	80	100	97	103	111	78	100
13	100	192	139	160	114	95	105	114	104	92	115	112	90	107	100	115	95	100	97	100
14	167	172	126	135	126	115	119	112	116	96	84	90	102	100	99	87	113	97	103	100
15	174	153	154	124	129	113	126	115	103	125	93	114	112	116	95	95	93	104	80	100
16	161	151	137	121	137	109	124	119	89	80	103	110	92	109	113	106	80	106	92	100
17	103	167	125	131	120	106	112	110	110	109	84	93	92	110	90	110	95	90	93	100
18	144	156	129	121	139	141	121	106	144	103	110	105	122	119	92	110	101	99	112	100
19	156	145	140	133	147	118	99	113	137	124	100	115	107	111	92	123	100	97	92	100
20	169	140	131	130	122	104	126	120	120	109	109	91	104	125	90	115	89	86	103	100
21	165	156	137	133	122	109	125	115	113	121	122	104	106	103	124	100	104	96	86	100
22	160	143	123	125	100	114	125	93	102	100	110	116	96	121	105	114	90	83	115	100
23	163	156	130	139	120	124	130	110	93	115	101	120	110	94	95	116	103	100	91	100
24	146	163	142	149	125	120	109	126	110	107	111	96	101	97	107	93	109	102	96	100
25	179	139	126	126	96	109	102	104	106	110	125	102	100	100	102	117	105	107	96	100
26	151	131	156	136	125	114	110	105	103	119	91	110	113	106	114	94	97	99	105	100
27	176	138	144	131	139	123	121	99	125	100	123	100	89	96	106	120	90	103	98	100
28	144	140	147	138	124	122	134	114	103	100	98	110	98	112	94	100	104	104	105	100
29	146	120	147	132	126	115	114	121	113	121	89	113	105	94	106	99	98	99	102	100
30	142	136	126	143	122	113	110	105	110	101	109	123	100	97	93	111	95	105	88	100
31	153	151	130	127	123	113	110	120	107	100	100	103	105	110	94	85	99	90	102	100
32	140	129	152	140	119	105	141	81	99	95	113	84	99	124	90	93	84	103	91	97
33	150	136	141	109	124	116	113	100	106	109	120	105	114	90	86	85	82	100	109	100
34	150	142	128	140	136	114	122	100	113	119	92	115	100	93	105	105	86	99	99	100
35	139	138	143	143	120	99	100	100	114	111	105	106	95	100	102	114	98	95	74	100
36	145	143	150	148	111	142	112	110	118	127	92	95	104	110	99	94	102	51	70	100
37	134	138	147	116	113	134	108	113	125	113	110	127	116	92	112	123	105	109	100	100
38	103	153	144	139	137	130	122	105	124	116	91	125	94	90	123	101	86	54	94	100
39	170	124	144	117	127	125	136	115	109	109	107	106	113	104	96	104	111	99	123	100
40	119	130	124	125	119	123	109	107	94	99	109	114	97	115	105	100	85	105	95	100
41	149	139	135	129	139	94	121	106	102	99	123	100	101	98	101	92	101	109	124	100
42	140	161	154	139	135	129	111	111	93	109	92	112	80	106	120	93	90	93	101	100
43	145	135	110	126	111	103	103	121	103	119	112	103	103	104	103	95	101	94	109	100
44	147	137	130	107	119	128	119	97	119	106	116	116	116	102	100	101	115	107	88	100
45	147	130	131	122	100	109	90	119	135	101	104	110	97	103	112	95	91	53	100	100
46	161	136	116	131	124	107	119	115	100	114	109	94	91	100	97	110	105	114	110	100
47	141	156	140	140	124	122	111	124	99	116	87	107	86	110	102	100	116	101	102	100
48	144	146	135	135	115	141	109	106	109	110	117	102	100	96	91	94	111	104	113	100
49	142	140	114	125	107	123	113	90	104	117	110	92	109	124	107	97	81	89	83	100

TITLE: 1015Y NIOBIUM BLANK SPIKE BS-5070

FILE: BS5070.HH:1

* CHANNELS: 2048

SHELF: 0

DIODE: HH

TIME ZERO: 5 7 92 13 30 0

TIME OF COUNT: 5 14 92 11 0 0

(9930.00 MINUTES DECAY TIME)

LIVE TIME: 22 HOURS 30 MINUTES 20 SECONDS = 1350.33 MINUTES

ELAPSED TIME: 22 HOURS 31 MINUTES 34 SECONDS = 1351.57 MINUTES

(DEAD TIME = 0.001)

FLUX CORR. FACT.: 0.000000

GAIN: 1.00045 KEY/CHAN

WEIGHT: 1.00000

PLT INT: 0
PLT LAB: 0
ANTI FLG 0
SLP MLT: 0
AREA REJ: 0
PTR: 0
ERR REJ: 0
ZER LEV: 0
OVR PKR: 0
NOV: 0

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M. J. W. Jr. 6/15/92

S. K. Jolly 5/15/92

BS5070.HH:1		101SY	NIOMIUM	BLANK	SPIKE	BS-5070														
0		58	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950
0	81020	1914	1615	1466	1729	1227	1045	872	867	914	994	951	646	530	379	221	98	92	61	64
1	5	1949	1639	1461	1806	1261	1114	912	875	909	997	945	643	520	410	224	106	106	64	52
2	0	1893	1560	1451	1761	1173	1151	894	888	875	1077	937	615	549	510	203	111	97	79	60
3	21	1957	1537	1500	1782	1126	940	978	899	875	1060	939	600	477	2029	222	99	107	65	56
4	127	1956	1569	1545	1673	1175	975	940	866	964	1030	1014	634	517	13049	194	92	101	89	64
5	538	1870	1513	1567	1704	1211	1038	906	917	1019	992	950	647	475	13355	211	105	100	56	62
6	960	1949	1519	1417	1812	1129	965	880	917	913	1007	955	629	511	1523	237	97	83	74	58
7	1023	1882	1593	1533	1658	1160	1011	864	902	874	1058	957	624	502	306	266	111	104	83	60
8	1247	1847	1595	1497	1623	1103	907	885	886	931	1053	1009	585	491	300	222	104	93	69	52
9	1494	1843	1544	1422	1629	1158	964	854	882	939	1000	965	639	506	304	234	96	100	50	61
10	1769	1797	1515	1461	1896	1126	1010	881	961	897	1122	995	601	506	303	239	100	86	69	56
11	1962	1803	1471	1360	1830	1162	969	932	924	997	1210	988	696	510	304	277	117	105	71	52
12	2102	1878	1541	1452	1669	1163	972	884	887	920	1360	938	645	503	263	261	87	151	167	62
13	2089	1863	1486	1440	1565	1211	1000	886	864	941	1357	1055	639	554	294	250	117	159	464	55
14	2294	1810	1501	1400	1570	1128	1010	842	922	1054	1159	987	587	571	291	298	91	122	362	53
15	2474	1785	1560	1505	1507	1124	945	925	910	1037	1031	980	589	540	267	455	86	104	95	57
16	2692	1823	1566	1439	1649	1136	937	851	905	946	954	979	584	492	250	2060	97	101	77	91
17	2589	1789	1502	1413	1529	1127	979	910	890	959	1043	990	590	525	206	17900	97	90	47	132
18	2694	1827	1599	1480	1544	1131	960	877	912	1001	904	971	577	529	209	29052	105	108	60	80
19	2699	1821	1516	1379	1576	1099	948	884	900	957	931	972	546	497	272	5227	107	153	63	69
20	2747	1793	1646	1469	1536	1126	1011	909	845	967	961	983	575	516	260	191	89	165	57	120
21	2761	1797	1544	1369	1452	1230	933	870	876	948	944	983	566	487	285	140	116	421	61	321
22	2737	1720	1533	1445	1532	1250	940	904	866	909	931	976	579	495	307	124	80	3917	61	194
23	2705	1939	1482	1439	1454	1087	963	924	866	1002	956	991	533	494	250	132	100	12992	66	73
24	2660	2001	1609	1489	1437	1075	969	892	927	995	948	899	532	484	200	138	87	6790	56	46
25	2645	2042	1534	1342	1472	1103	922	874	899	960	883	872	569	443	269	130	107	428	67	47
26	2699	2575	1580	1461	1455	1023	916	839	887	963	944	885	558	444	283	133	90	104	69	76
27	2609	1853	1489	1369	1429	1144	935	869	870	1000	983	792	551	426	254	119	114	98	64	47
28	2588	2380	1511	1470	1439	1187	952	897	888	945	889	768	598	421	289	141	94	79	55	50
29	2559	1709	1531	1440	1411	1159	1029	911	917	1004	932	824	548	392	391	106	105	63	53	65
30	2581	1664	1701	1400	1369	1150	1046	893	903	960	940	734	576	404	277	130	119	82	59	50
31	2519	1669	1581	1486	1383	1014	992	896	903	951	914	707	549	373	233	111	84	87	41	49
32	2414	1658	1560	1389	1422	1077	965	885	874	1020	974	763	570	396	260	114	104	67	60	55
33	2511	1670	1585	1447	1394	1013	842	892	878	1010	896	775	570	369	294	117	107	77	60	40
34	2426	1673	1571	1437	1394	1053	931	876	897	975	934	1011	536	377	264	129	96	71	65	40
35	2345	1931	1553	1416	1382	1030	860	881	884	1016	920	1336	536	368	269	114	93	74	55	59
36	2321	1929	1549	1485	1324	1093	971	883	894	956	942	842	589	343	241	137	89	93	71	47
37	2366	1742	1547	1551	1432	986	907	860	886	989	949	709	551	370	233	125	113	87	53	49
38	2305	1955	1522	1401	1370	1069	981	904	894	1034	911	710	526	370	231	120	154	74	48	59
39	2327	1707	1492	1433	2275	1040	1243	864	898	1025	929	649	538	335	225	124	117	73	63	48
40	2193	1655	1496	1596	4828	1002	1554	881	924	940	969	692	527	360	241	109	103	76	61	58
41	2131	1771	1600	1521	1554	1010	940	891	888	1013	983	633	516	379	214	106	111	66	64	58
42	2087	1570	1542	1586	1705	963	874	843	887	929	954	664	517	350	242	100	107	58	54	58
43	2197	1722	1511	1687	1364	970	893	850	918	1040	952	574	554	342	258	110	113	73	54	40
44	2121	1886	1518	1659	1273	1009	954	908	890	997	1023	724	538	355	225	92	94	59	62	63
45	2020	1672	1521	1626	1229	1036	957	910	956	1040	878	603	528	355	222	120	103	75	66	58
46	2041	1627	1586	1729	1239	1019	941	915	872	1042	982	583	581	360	242	122	107	60	52	47
47	2047	1408	1519	1696	1247	1061	922	893	940	1064	945	669	492	353	242	106	79	80	59	40
48	2045	1571	1500	1764	1212	959	876	872	900	1044	986	657	546	377	225	138	95	74	54	53
49	2003	1647	1473	1753	1261	1000	924	895	885	1053	998	645	541	370	241	107	80	68	50	62

	BS5070.HH:1	101SY	NITONIUM	BLANK	SPIKE	BS-5070														
	1000	1050	1100	1150	1200	1250	1300	1350	1400	1450	1500	1550	1600	1650	1700	1750	1800	1850	1900	1950
0	57	37	47	40	42	33	25	33	20	15	17	10	14	9	12	4	5	12	5	7
1	40	53	41	44	46	43	25	19	20	17	15	14	16	9	8	4	8	12	4	8
2	61	51	35	53	40	42	33	26	22	20	21	10	9	8	2	7	8	10	3	5
3	59	46	48	36	44	32	22	26	24	19	11	11	6	12	15	7	5	4	6	6
4	54	47	40	41	43	30	16	37	24	15	17	19	5	7	6	11	5	8	8	10
5	45	30	46	43	43	35	27	29	17	16	13	10	12	11	9	8	12	3	9	10
6	67	54	60	40	43	44	33	20	31	13	14	10	10	5	9	8	5	6	7	10
7	52	40	50	54	45	35	33	33	29	11	12	8	10	8	5	8	6	7	3	10
8	40	40	49	45	44	37	33	36	26	22	15	13	14	12	9	11	8	2	5	5
9	49	38	39	43	36	31	25	31	28	10	13	13	4	15	8	6	5	10	6	7
10	41	40	55	35	45	30	35	37	32	19	14	10	12	13	8	11	6	6	3	6
11	42	50	40	45	35	21	27	27	22	40	12	14	13	9	7	9	12	5	8	9
12	53	54	49	30	33	20	22	32	30	96	19	11	9	12	10	6	6	3	12	12
13	53	56	55	49	31	31	30	32	20	233	16	14	12	12	10	11	4	11	10	11
14	35	52	47	59	29	37	32	29	17	240	11	6	7	10	8	14	4	5	7	8
15	47	53	44	40	35	27	29	35	23	64	13	16	10	7	8	6	11	8	8	6
16	45	50	39	36	30	27	42	31	17	19	10	10	14	7	9	20	3	3	6	7
17	52	53	43	39	30	31	32	27	25	10	14	7	9	9	8	29	5	13	8	6
18	61	54	55	39	36	19	41	25	25	20	11	14	7	12	9	37	7	9	6	8
19	49	50	45	54	34	41	27	31	13	23	10	15	17	4	9	14	13	7	8	9
20	40	55	47	59	43	30	24	32	20	19	13	9	6	13	12	4	10	10	7	11
21	60	40	55	41	29	40	20	30	23	14	9	14	7	8	7	9	5	6	6	7
22	54	50	50	43	42	27	22	20	20	12	19	22	22	6	8	10	10	10	10	8
23	50	49	56	39	50	22	32	31	20	21	13	15	30	12	13	4	6	8	6	9
24	57	33	50	32	50	27	23	17	22	10	9	36	10	8	7	3	11	6	10	3
25	46	40	47	42	26	41	40	25	15	10	9	119	14	9	11	10	14	4	4	3
26	45	52	53	43	30	31	29	29	13	13	11	240	12	3	7	11	8	7	9	2
27	52	47	51	32	41	31	35	30	10	13	8	101	13	9	5	9	3	8	6	10
28	62	54	52	39	30	36	30	29	14	9	10	35	6	8	8	5	8	11	9	7
29	57	45	42	29	30	20	27	20	24	10	11	13	9	5	8	10	4	13	10	7
30	53	51	40	36	35	30	44	32	25	13	11	5	13	10	15	5	4	5	12	3
31	45	65	37	31	44	32	27	36	11	10	11	9	14	10	15	10	6	9	4	5
32	49	52	44	50	27	30	31	20	22	11	9	13	6	8	9	11	4	10	5	6
33	49	59	47	32	43	27	32	32	10	14	10	10	23	9	8	8	9	3	10	3
34	43	47	43	30	41	35	22	25	24	12	14	12	22	4	9	5	7	8	5	12
35	54	46	37	35	33	43	31	36	11	10	13	6	13	6	8	7	6	4	5	7
36	46	40	30	43	34	27	29	34	13	12	13	7	12	5	11	10	7	6	8	8
37	49	46	41	37	37	27	30	24	17	22	13	7	5	11	12	6	14	7	8	9
38	51	41	40	30	46	30	25	20	13	10	11	9	8	4	5	7	8	5	8	8
39	54	41	45	53	35	29	35	30	10	9	9	15	8	6	12	8	10	12	9	7
40	57	43	48	44	50	26	30	27	19	16	12	27	9	10	9	6	2	2	11	6
41	52	42	51	44	44	36	27	31	27	15	16	51	16	9	7	10	9	6	5	4
42	62	46	36	38	40	30	21	27	26	7	17	21	13	9	10	6	8	5	3	10
43	43	45	44	44	30	29	33	23	26	14	21	14	4	4	8	13	3	3	9	8
44	54	39	56	43	31	27	26	34	10	16	11	13	5	8	7	8	6	8	8	9
45	60	51	48	36	33	35	36	26	14	11	9	43	14	6	7	9	9	9	3	6
46	30	40	41	35	20	26	35	24	25	11	19	29	16	10	6	8	7	10	13	6
47	51	53	28	37	20	32	36	23	20	13	12	12	9	7	9	5	5	8	5	8
48	49	43	48	37	39	23	20	25	16	22	9	15	13	9	13	6	10	7	6	8
49	40	42	40	43	40	20	33	19	15	20	15	14	8	5	15	5	10	9	7	6

MS- 5070

^{93m}Nbadded in ^{93m}Nb std, decayed to count date, 5-30-92

$$0.2503 \text{ ml} \times 3435 \text{ dpm/ml} \times e^{-\frac{483 \times 156}{16.13 \text{ yr}}} = 858.3 \text{ dpm}$$

total added:

$$\text{impurity in } ^{94}\text{Nb std} = 3726 \text{ dpm} + 858 \text{ dpm} = 4584 \text{ dpm}$$

recovered:

$$53.439 \text{ cpm} \times 73.945 \text{ d/c} = 4839 \text{ dpm}$$

.825 yield

Since 92-5070 + 92-5070 Dup are $\geq 50\%$ and one is near the OL for at least or blank values) so the worst case value (from 92-5070 Dup) will be used

$$0.727 \text{ cpm} \times 12.467 \text{ d/c} = 92.4 \text{ dpm}$$

0.57 yield

$$4839 \text{ dpm} - 92 \text{ dpm} \times 100 = 104\% \text{ recovery}$$

4584 dpm

Equival amount added:

$$\frac{4584 \text{ dpm added} \times 0.2503 \text{ ml}}{0.769 \text{ sample} \times 4.993 \text{ ml}} = 298,000 \text{ dpm/g equiv added}$$

7563 cpm 6/19/92
J.K. Kelly 6/23/92

NIOBIUM ANALYSIS

Page 1 of 2

Spreadsheet filename: NBOCALC

Revision 1: 6/1/92. NLW

Assumes tracer added to final aliquot

Sample ID: MS-5070

Date Calculated: 06/19/92

Data filename: NB5070ms

M&TE No.

Nb-94 & 95 Spectrum: ms05070nb.hh1;

Zr/Nb-95 Tracer: 54124-76-0

volume added, ml: 0.2503 0.0012 error

*****Half-lives*****

Zr-95 dpm/ml: 4.415E+03 4.500E+01 error

Zr-95= 64.02 days

Nb-95 dpm/ml: 9.892E+03 1.151E+02 error

Nb-95= 34.97 days

On: Date: 05/13/92 01:00 Time

Nb Sep Date: 05/07/92 13:30 Time

total dpm Nb-95= 2629.44 34.53 error at Nb sep time

Sample Amount: 0.7690 0.0002 error

g, ml or sample? g

Reporting Units

Leach Volume, ml: 250 0.01 error

Activity: dpm

Vol to dilute, ml: 1 0.00001 error

per ? : g

Diluted to, ml: 1 0.00001 error

Final Aliquot, ml: 4.993 0.17 error

Nb-94 & 95 Counting Data from Prepared Sample

Sample dpm Nb-95= 2.168E+03 1.29 % error at Nb sep time

Sample dpm Nb-94= 9.515E+02 1.58 % error

*****RESULTS*****

Yield Nb-95= 0.825 0.015 error

Nb-94 dpm/g= 75138.844 3138.966 error = 4.18 %

MDA =

GENERIC FORMULAS

Nb-94 Activity =
$$\frac{\text{net dpm} \times \text{leach vol} \times \text{diln vol}}{\text{yield} \times \text{sample amt} \times \text{diln aliquot} \times \text{aliquot}}$$

% recovery =
$$\frac{\text{dpm recovered}}{\text{dpm added}} \times 100$$

Nb-93m Activity =
$$\frac{\text{net cpm} \times \text{d/c} \times \text{leach vol} \times \text{diln vol}}{\text{yield} \times \text{sample amt} \times \text{diln aliquot} \times \text{aliquot}}$$

NIOBIUM ANALYSIS

Page 2 of 2

Spreadsheet filename: NBOCALC

Revision 1: 6/1/92, NLW

Sample ID: MS-5070

Date Calculated: 06/19/92

Data filename: NB5070ms

Nb-93m Spectrum: MSS070nb.ai;1

Weight Nb ppt, mg: 286.0 0.2 error

Counted on: A M&TE No. Diode A

On: Date: 05/30/92 15:11 Time

Nb-93m d/c = 73.965 6.181 error

NB-93M COUNTING DATA:

Diode B or 325 LEPS Enter data under correct diode.

If %error >= 50%, enter MDA. If not, MDA = NA

net cps: 1.00 1.00 % error

MDA, in cps:NA

Diode A

peak channel no.: 83 bkgd: 70 - 74 <-- first ROI

Count time, min.: 1160.17 426 <-- counts

Nb-93m counts--> 765 440

1445 386

peak channel + 3405 413

5 lower + 7879 425

4 higher 13310 100 - 104 <-- second ROI

15729 297 <-- counts

12988 295

6987 276

2802 307

1085 294

gross counts:66395.000 3559 :normalized ROI total

net cpm: 53.439 0.722 :cpm in bkgd spectrum

error, cpm: 0.229 avg BKG.A1:1&2:bkgd filename

% error 0.429 4396.6 :total bkgd counts

*****RESULTS*****

Nb-93m dpm/g= 312132.1 28772.503 error = 9.219 %

MDA =

Entered by NLWjsh Date 6/19/92

Reviewed by J. K. Joch Date 6/23/92

MS-5070

 ^{93}Nb added in ^{93}Nb std, decayed to count date, 5-30-92

$$0.2503\text{ml} \times 3435\text{dpm/ml} \times e^{-\frac{.693 \times 15\text{d}}{16.13\text{yr}}} = 858.3\text{dpm}$$

total added:

$$\begin{aligned} \text{impurity in } ^{94}\text{Nb std} &= 3726\text{dpm} \\ &+ 858\text{dpm} \\ &= 4584\text{dpm} \end{aligned}$$

Recovered:

$$53.978\text{cpm} \times 73.965\text{d/c} = 4839\text{dpm}$$

.825 yield

$$\text{avg of } 92-5070 + 92-5070 \text{ Dap} = 149\text{dpm}$$

$$\frac{4839\text{dpm} - 149\text{dpm}}{4584\text{dpm}} \times 100 = 102\% \text{ recovery}$$

Equiv. anti. added:

$$\frac{4584\text{dpm added} \times 250\text{ml}}{767\text{g sample} \times 4.993\text{ml}} = 298,000\text{dpm/g equiv added}$$

^{93}Nb recovery is preliminary + incorrect.
dpm recovered calculation is incorrect
because wrong bkg dpm was used
in spreadsheet. See corrected
copy of 6/19/92. MAM 6/19/92

MAM 6/19/92

NIOBIUM ANALYSIS

Page 1 of 2

Spreadsheet filename: NBCALC

Revision 1: 6/1/92, NLW

Assumes tracer added to final aliquot

Sample ID: MS-5070

Date Calculated: 06/08/92

Data filename: NB5070ms

M&TE No.

Nb-94 & 95 Spectrum: ms05070nb.hhi;

Zr/Nb-95 Tracer: 54124-76-0

Volume added, ml: 0.2503 0.0012 error

*****Half-lives*****

Zr-95 dpm/ml: 4.415E+03 4.500E+01 error

Zr-95= 64.02 days

Nb-95 dpm/ml: 9.892E+03 1.151E+02 error

Nb-95= 34.97 days

On: Date: 05/13/92 01:00 Time

Nb Sep Date: 05/07/92 13:30 Time

total dpm Nb-95= 2629.44 34.53 error at Nb sep time

Sample Amount: 0.7690 0.0002 error

q, ml or sample? g

Reporting Units

Leach Volume, ml: 250 0.01 error

Activity: dpm

Vol to dilute, ml: 1 0.00001 error

per ? : g

Diluted to, ml: 1 0.00001 error

Final Aliquot, ml: 4.993 0.17 error

Nb-94 & 95 Counting Data from Prepared Sample

Sample dpm Nb-95= 2.168E+03 1.28 % error at Nb sep time

Sample dpm Nb-94= 9.515E+02 1.58 % error

*****RESULTS*****

Yield Nb-95= 0.825 0.015 error

Nb-94 dpm/g= 75138.844 3138.966 error = 4.18 %

MDA =

GENERIC FORMULAS

$$\text{Nb-94 Activity} = \frac{\text{net dpm} \times \text{leach vol} \times \text{diln vol}}{\text{yield} \times \text{sample amt} \times \text{diln aliquot} \times \text{aliquot}}$$

$$\% \text{ recovery} = \frac{\text{dpm recovered}}{\text{dpm added}} \times 100$$

$$\text{Nb-93m Activity} = \frac{\text{net cpm} \times \text{d/c} \times \text{leach vol} \times \text{diln vol}}{\text{yield} \times \text{sample amt} \times \text{diln aliquot} \times \text{aliquot}}$$

NIOBIUM ANALYSIS

Page 2 of 2

Spreadsheet filename: NBCALC

Revision 1: 5/1/92, NLM

Sample ID: MS-5070

Date Calculated: 06/08/92

Data filename: NB5070ms

Nb-93m Spectrum: MS5070nb.ai;1

Weight Nb pot, mg: 286.0 0.2 error

Counted on: A M&TE No. Diode A

On: Date: 05/30/92 15:11 Time

Nb-93m d/c = 73.965 6.181 error

NB-93M COUNTING DATA:

Diode B or 325 LEPS Enter data under correct diode.

If %error >= 50%, enter MDA. If not, MDA = NA

net cps: 1.00 1.00 % error

MDA, in cps: NA

Diode A

peak channel no.: 83

bkgd: 70 - 74 <-- first ROI

Count time, min.: 1160.17

426 <-- counts

Nb-93m counts--> 765

440

1445

386

peak channel + 3405

413

5 lower + 7879

425

4 higher 13310

100 - 104 <-- second ROI

15729

297 <-- counts

12988

295

6987

276

2802

307

1085

294

gross counts: 66395.000

3559 :normalized ROI total

net cpm: 53.978

0.183 :cpm in bkgd spectrum

error, cpm: 0.228

BKG.AI;1 :bkgd filename

% error 0.423

3771.3 :total bkgd counts

*preliminary + incorrect!
see corrected copy
6/14/92*

*****RESULTS*****

Nb-93m dpm/g= 315260.4 29061.811 error = 9.218 %

MDA =

N.W. Giff 6/8/92
Entered by Date

A.K. Jodry 6/9/92
Reviewed by Date

MS - 5070

94 NB

$$\text{added: } 0.0494 \text{ ml} \times 25840 \text{ dpm/ml} = 1276.5 \text{ dpm}$$

$$\text{recovered: } \frac{951.5 \text{ dpm}}{.825 \text{ yield}} = 1153.3 \text{ dpm}$$

$$92-5070 \text{ found } \frac{1.082 \text{ dpm}}{.429 \text{ yield}} = 2.5 \text{ dpm so ignored}$$

$$\frac{1153.3 \text{ dpm}}{1276.5 \text{ dpm}} \times 100 = 90.3\% \text{ recovery}$$

Equiv. amt. added:

$$\frac{1276.5 \text{ dpm added} \times 250 \text{ ml}}{0.769 \text{ g sample} \times 4.993 \text{ ml}} = 83,000 \text{ dpm/g equiv. added}$$

MS-5070 6/8/92

Raygun - RSX Version 10-Jan-90

(29-MAY-1992 08:52:17)

Analysis performed by: diana mcmullin

Sample: 101SY NB MATRIX SPIKE MS-85070

Weight: 1.00000 ML

Irradiation date: 7-May-1992 at 13:30:00

Count date: 22-May-1992 at 8:55:00

Decay: 14.8d (1279500.0 seconds)

Count times: REAL TIME 7.35h (26457.000 seconds)
LIVE TIME 7.34h (26435.000 seconds)

Dead time: 0.00 percent

Detector: HM pos 0 Geometry Factor: 1.000

Efficiencies and shape parameters from file: ve:[116.2]EFFFILNB. HM

Spectrum from file : ms85070nb.hh:1

Background subtractions from file: VE:[116.1]BACKG. HM

423

	Peak channel	Region start end	Gross counts	Net area ++	Energy (KeV)	Gamma /sec	Err x SD	System bKgd
1	239.9	239. 242.	3339.	1625.	240.68	7.254E-01	4.4	0.
2	339.8	339. 340.	920.	300.*	339.98	6.673E-02	100.0	320.
3	512.5	508. 514.	2730.	457.*	511.82	1.280E-01	100.0	334.
4	584.9	584. 586.	1068.	386.*	583.81	1.173E-01	100.0	371.
5	704.6	699. 706.	11481.	10521.	702.85	1.562E+01	1.1	0.
6	767.9	764. 771.	16773.	16292.	765.80	2.664E+01	0.6	0.
7	873.1	868. 875.	8811.	8542.	870.52	1.612E+01	1.1	0.
8	913.5	911. 915.	394.	286.*	910.62	6.792E-02	100.0	271.
9	971.1	970. 972.	225.	163.*	967.95	7.227E-02	100.0	144.
10	1453.5	1450. 1458.	254.	210.	1457.69	7.347E-01	7.8	0.
11	1573.6	1573. 1581.	289.	250.	1570.25	9.450E-01	6.9	0.

++ Net Peak Area above the Compton Continuum before correction for system background. Values flagged with a * are subsequently corrected for system background before calculation of absolute emission rate (gams/sec).

Geometry and nuclide lookup from file: VE:[116.3]NOLIB.DAT

41 Interferences Results **

(interferences)

Diana McMullin
3-29-92
MJW
6/2/92

nuclide	energy kev	dps at zero time	uCi /TL	peak frac	err (%)	dev (sig)	DPM /TL	error (x)
1 Nb 94	- - - -	1.586E+01	4.286E-04	- - - -	- - - -	- - - -	9.515E+02	1.58
	702.85	1.562E+01	4.222E-04	1.02	1.46	-1.19		
	870.52	1.612E+01	4.358E-04	0.98	1.50	1.26		
2 Nb 95	- - - -	3.614E+01	9.767E-04	- - - -	- - - -	- - - -	2.168E+03	1.28
	765.80	3.614E+01	9.767E-04	1.00	1.28	0.00		

The following are upper limit values:

Ce 88	- - - -	8.731E-02	2.368E-06	- - - -	- - - -	- - - -	5.233E+00	100.00
Ce 95	- - - -	2.323E-01	6.278E-06	- - - -	- - - -	- - - -	1.394E+01	100.00
Eu 113	- - - -	2.531E-01	6.840E-06	- - - -	- - - -	- - - -	1.519E+01	100.00
Eu 123	- - - -	0.000E+00	0.000E+00	- - - -	- - - -	- - - -	0.000E+00	100.00
Eu 124m	- - - -	4.067E+00	1.099E-04	- - - -	- - - -	- - - -	2.448E+02	100.00
Eu 124m	- - - -	2.792E+00	7.546E-05	- - - -	- - - -	- - - -	1.675E+02	100.00
Gd 125	- - - -	1.191E+00	3.219E-05	- - - -	- - - -	- - - -	7.145E+01	100.00

The following peaks were not identified:

#	energy	gammas/sec	poterr	CI %
1	249.60	7.2537E-01	4.5	0.0000000
2	385.98	6.6733E-02	100.0	0.0000000
3	511.02	1.2797E-01	100.0	0.0000000
4	865.81	1.1732E-01	100.0	0.0000000
5	916.62	6.7918E-02	100.0	0.0000000
6	1077.95	7.2266E-02	100.0	0.0000000
10	1437.69	7.3466E-01	7.9	0.0000000
11	1872.25	9.4497E-01	7.0	0.0000000

If CI > 0 Confidence threshold was not exceeded
 CI = 0 Energy Window test failure
 CI = -1 Extreme Half Life test failure
 CI = -2 Extreme As. Gamma comparison test failure
 CI = -3 Unable to estimate area of Assoc. Gamma

NB-93M ON MS-5070

SAMPLE ID..... SYMS5070NB.A1;1

OF CHANNELS..... 2048

DIODE I.D..... A

SHELF NUMBER..... 0

CALIBRATION..... 0.2 KEV/CH

TIME ZERO 5/30/92 AT 15:22: 0

COUNTED..... 5/30/92 AT 15:22: 0

(0.00 MINUTES DECAY TIME)

LIVE COUNT TIME.... 19 HOURS 20 MINUTES 10 SECONDS (1160.17 MIN.)

ELAPSED TIME..... 19 HOURS 20 MINUTES 10 SECONDS (1160.17 MIN.)
(DEAD TIME = 0.000)

FLUX CORRECTION.... 0.0000

GEOM CORRECTION.... 0.0000 0.0000 0.0000 0.0000 0.0000

WEIGHT..... 1.00000 GRAHS

ANTI: 0 SLP: 0 AREA: 0 P-T: 0 ERR: 0 ZER: 0 OPR: 0 NOV: 1

MJD LM
5/31/92

430

NB-93M ON MS-5070

SY:MS5070NB.A1:1 COUNTED 5/30/92 @ 16:22:00 GAIN: 0.2 KEV/CHAN

	0	50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950
0	69510	422	297	265	234	234	231	209	207	225	204	198	183	205	186	170	171	176	163	183
1	0	300	295	250	253	230	230	207	202	198	171	186	166	172	187	167	157	155	146	165
2	0	400	276	266	263	225	210	215	205	203	193	183	169	188	179	157	197	189	151	179
3	0	405	307	250	275	205	236	211	204	202	197	201	179	161	197	168	169	148	152	173
4	0	367	294	272	244	200	213	234	217	170	109	186	196	195	186	173	181	161	145	108
5	0	330	283	262	265	253	194	210	213	211	195	211	165	206	166	167	171	156	150	186
6	0	360	257	279	221	220	219	223	213	189	209	170	181	171	173	186	156	165	172	175
7	0	300	285	252	237	243	218	225	200	198	212	211	190	188	175	183	160	175	157	192
8	9	371	237	220	229	261	227	251	207	197	173	188	179	175	163	155	159	173	180	190
9	601	368	239	284	252	257	222	203	197	205	202	178	176	183	166	172	181	172	149	161
10	1451	305	205	253	259	229	264	245	190	213	175	206	194	203	195	182	179	152	155	192
11	1827	382	265	268	233	230	251	251	230	237	192	179	177	156	180	192	173	165	157	171
12	501	382	295	259	239	230	232	240	203	246	189	202	183	190	187	177	152	180	165	176
13	530	457	257	246	240	221	217	274	225	295	199	203	178	186	189	179	152	155	143	177
14	462	456	274	220	251	243	249	257	220	245	192	199	189	178	181	161	187	186	147	171
15	406	510	266	262	245	239	268	242	208	267	199	217	166	175	182	166	170	175	161	176
16	377	481	274	274	202	221	299	229	196	225	200	195	199	171	186	209	172	162	172	178
17	400	400	250	266	221	241	302	227	195	191	200	209	191	177	156	176	157	160	164	179
18	362	423	295	252	259	242	259	224	211	207	206	174	169	224	181	173	160	178	163	177
19	374	416	268	268	243	192	219	227	232	183	190	187	191	200	171	169	170	176	167	185
20	363	426	260	241	259	238	240	211	210	205	229	192	182	173	167	164	155	164	153	163
21	366	440	262	248	238	211	211	232	223	212	203	181	169	190	174	190	188	178	149	182
22	316	386	257	250	247	218	231	250	252	235	210	215	198	189	182	169	173	164	147	166
23	314	413	248	265	237	224	218	281	235	175	180	174	193	171	175	162	171	155	183	170
24	402	425	273	245	225	261	213	271	246	210	204	194	196	193	167	172	176	164	149	181
25	495	499	239	259	217	220	231	307	251	214	190	187	183	206	163	158	179	148	156	184
26	505	526	239	273	255	215	192	299	222	202	185	164	174	196	188	168	162	194	196	170
27	678	582	292	268	230	219	210	269	205	183	198	177	170	198	176	170	160	163	205	159
28	509	765	265	242	228	217	209	237	220	214	197	205	183	176	173	179	159	171	205	180
29	698	1445	276	246	233	200	220	207	209	196	190	189	200	183	152	168	159	153	178	186
30	752	3495	242	263	231	244	265	193	188	183	174	188	214	174	166	172	166	167	194	197
31	1101	7079	282	273	252	245	212	223	230	185	174	180	196	174	196	156	170	178	197	175
32	1698	13310	259	247	234	216	222	187	206	174	190	172	198	186	174	173	164	156	193	155
33	2809	15729	262	266	230	256	193	226	210	180	182	173	173	192	156	173	166	171	157	212
34	1060	12988	282	265	257	231	239	237	206	204	171	159	190	160	159	156	170	162	162	185
35	1345	6987	307	255	236	255	219	242	216	163	162	188	155	185	154	174	167	167	177	202
36	705	2002	310	253	248	244	202	193	230	211	200	192	200	178	176	150	154	161	175	201
37	516	1085	263	238	232	234	233	216	217	193	211	196	187	186	181	179	155	139	162	186
38	459	600	303	269	221	228	224	223	202	192	175	185	169	162	191	155	163	169	165	201
39	440	572	282	245	248	192	208	210	224	189	184	200	165	169	154	186	168	164	176	181
40	406	016	244	240	231	228	231	193	211	219	200	196	188	187	173	182	165	164	183	183
41	471	1583	262	244	222	212	205	188	193	191	213	180	181	185	181	180	169	158	158	183
42	536	2710	245	256	191	219	226	188	190	214	194	183	159	182	170	183	173	150	173	216
43	636	3205	244	252	245	248	232	212	193	185	182	191	171	172	170	159	174	162	191	182
44	624	3254	262	239	210	220	213	199	177	212	185	178	176	182	176	158	192	159	150	183
45	597	2171	300	223	229	220	232	251	177	204	185	180	158	187	160	160	181	171	174	150
46	400	1219	264	249	228	245	228	215	199	182	190	195	192	177	182	177	154	157	179	179
47	449	642	265	247	224	212	226	231	193	183	196	180	169	186	194	151	146	156	174	182
48	356	441	243	248	230	230	224	212	191	202	202	187	200	176	152	188	152	164	189	151
49	353	260	254	229	243	237	217	213	209	180	181	176	170	188	162	180	151	150	176	151

NB-93H ON MS-5070

SY:MSS0/0NB.A1;1 COUNTED 5/30/92 @ 15:22; 0 GAIN; 0.2 KEV/CHAN

	1000	1050	1100	1150	1200	1250	1300	1350	1400	1450	1500	1550	1600	1650	1700	1750	1800	1850	1900	1950
0	197	152	164	144	142	147	114	131	108	116	113	115	131	107	99	106	92	109	119	96
1	189	162	170	136	136	132	135	136	115	105	105	108	94	115	129	93	106	104	109	103
2	177	156	152	151	148	128	138	137	117	108	125	114	115	121	100	115	105	92	103	115
3	179	154	173	127	132	117	113	123	110	132	130	118	112	124	117	117	83	112	114	115
4	173	172	160	127	136	125	114	120	123	111	121	125	120	116	131	104	102	108	94	121
5	163	152	150	154	120	141	123	113	125	114	121	104	97	115	132	108	91	114	123	125
6	186	174	126	148	135	127	118	116	155	140	122	126	112	113	117	112	115	124	129	116
7	156	126	164	143	129	143	146	127	130	128	123	110	107	122	98	116	103	09	95	123
8	171	157	148	163	133	126	117	135	127	123	126	124	122	124	97	123	106	124	104	105
9	170	155	169	132	135	125	117	109	121	128	111	113	140	105	116	104	125	97	120	97
10	161	174	161	156	146	137	104	119	129	126	104	112	111	121	100	120	124	108	120	109
11	175	150	143	147	132	126	132	122	121	122	120	130	103	102	117	107	114	102	104	99
12	180	175	146	143	121	135	115	129	115	100	120	130	95	110	110	116	126	115	115	115
13	161	159	160	134	144	126	116	110	119	131	110	116	98	91	115	115	100	111	107	111
14	186	163	171	123	148	130	129	113	122	110	115	130	111	116	112	119	113	122	100	113
15	149	173	145	167	155	140	133	129	128	121	101	114	102	102	106	119	112	105	95	90
16	176	175	132	130	125	118	123	134	125	121	109	99	124	120	109	106	113	103	119	113
17	159	166	154	141	140	130	139	122	116	121	115	111	116	116	111	120	117	122	136	115
18	168	133	172	127	139	116	127	140	120	109	124	129	117	96	126	116	107	94	110	94
19	155	169	150	148	126	115	98	141	109	105	129	120	112	127	95	99	121	96	109	116
20	165	149	157	134	128	155	130	131	117	106	129	133	116	81	07	108	129	127	119	99
21	167	159	170	130	145	153	135	132	122	122	99	126	107	123	110	116	107	114	100	116
22	173	187	133	136	137	152	122	105	120	135	110	122	120	114	101	130	111	106	114	102
23	156	160	141	130	143	137	125	126	133	130	109	110	117	110	120	131	124	133	100	101
24	142	179	124	153	139	139	129	127	127	130	129	102	117	102	120	100	116	109	117	100
25	171	175	141	144	148	130	117	130	116	110	114	116	113	108	121	112	117	96	111	119
26	166	145	152	129	140	137	125	124	117	127	105	110	114	122	105	118	109	78	115	116
27	187	147	158	133	128	109	109	110	131	138	127	124	93	105	105	117	107	98	103	104
28	191	176	187	138	138	133	118	118	134	125	121	89	132	105	112	109	123	107	113	107
29	179	150	134	132	134	144	123	126	116	113	114	127	111	98	102	114	114	129	104	114
30	174	150	167	125	138	127	135	114	127	106	120	119	106	126	114	100	97	103	122	102
31	155	157	162	138	123	108	129	145	116	118	111	132	111	101	120	116	89	115	97	92
32	164	159	157	157	146	136	146	100	153	139	109	127	107	110	103	112	105	106	102	106
33	156	161	159	153	126	149	100	120	118	111	98	112	131	131	113	112	122	92	105	97
34	159	157	142	128	163	100	112	121	134	108	121	110	119	107	110	114	116	99	118	111
35	168	169	153	125	143	124	135	125	119	122	114	127	117	109	109	101	112	122	119	119
36	170	145	146	160	98	146	126	138	112	123	115	114	131	118	95	112	118	104	107	103
37	183	159	154	150	152	115	135	125	127	116	117	121	125	116	106	106	128	91	110	101
38	178	163	144	146	134	143	146	116	117	100	131	124	120	121	123	106	112	131	115	110
39	161	143	156	123	121	123	87	117	99	111	105	104	106	102	94	106	91	106	111	102
40	169	158	139	144	137	131	126	85	114	123	111	120	110	124	114	123	110	105	106	109
41	173	147	169	135	119	142	133	109	122	130	109	113	105	103	113	106	105	112	116	97
42	152	132	137	167	133	131	125	120	122	119	127	97	133	124	121	107	117	94	112	96
43	172	148	135	132	131	116	127	120	93	136	116	117	117	109	110	126	134	107	113	115
44	169	156	151	137	136	139	139	105	108	120	113	114	106	119	115	101	116	103	106	110
45	145	145	135	128	143	129	104	123	110	135	131	122	110	119	113	99	115	106	118	110
46	146	163	161	130	122	134	114	125	135	132	107	134	107	101	117	110	85	120	108	115
47	135	165	141	135	119	131	134	111	121	117	121	111	85	112	116	121	117	118	129	114
48	164	146	139	122	128	120	108	130	125	105	108	105	118	133	107	127	115	108	119	110
49	150	153	144	140	150	124	139	128	127	110	112	109	113	130	108	116	99	93	132	110

TITLE: 1015Y NB MATRIX SPIKE MS-05070

FILE: MS05070NB.HH:1

* CHANNELS: 2040

SHELF: 0

DIODE: HH

TIME ZERO: 5 7 92 13 30 0

TIME OF COUNT: 5 22 92 8 55 0

(21325.0 MINUTES DECAY TIME)

LIVE TIME: 7 HOURS 20 MINUTES 35 SECONDS = 440.583 MINUTES

ELAPSED TIME: 7 HOURS 20 MINUTES 57 SECONDS = 440.950 MINUTES

(DEAD TIME = 0.001)

FLUX CORR. FACT.: 0.000000

GAIN: 1.00000 KEY/CHAN

WEIGHT: 1.00000

433

PLY INT: 0
PLT LAB: 0
RMT FLG 0
SLP FLT: 0
ARJ REJ: 0
PTR: 0
ERR REJ: 0
ZER LEV: 0
OVR PWR: 0
NOV: -1

NTJ m 5/29/92
J. L. Foddy 5/22/92

MS05070NB.HH:1			101SY NB MATRIX SPIKE MS-05070																	
	0	50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950
0	26435	636	507	440	602	407	311	336	310	282	334	315	210	107	133	71	36	31	24	23
1	5	600	496	477	574	379	340	289	271	292	351	295	226	103	123	77	47	49	21	26
2	0	630	487	470	563	409	394	288	289	276	340	287	201	158	137	65	40	31	21	24
3	2	650	509	467	510	395	317	333	303	278	316	319	195	160	623	63	36	32	37	24
4	10	621	462	495	573	395	302	310	300	312	306	294	185	181	4695	65	47	32	15	21
5	55	626	492	464	530	404	321	266	292	305	346	313	195	199	5043	79	43	23	26	22
6	211	625	512	485	543	366	310	291	293	281	321	304	203	162	597	62	42	33	32	22
7	313	504	487	469	521	367	200	292	273	291	336	323	216	101	101	82	45	32	26	10
8	357	612	476	443	594	370	309	300	279	292	334	332	206	166	116	65	26	34	22	19
9	417	564	512	497	562	376	310	302	296	321	366	297	185	185	110	79	31	27	25	20
10	559	505	527	507	632	370	297	287	294	314	300	317	201	100	100	79	48	34	22	24
11	633	540	460	459	560	374	322	290	274	251	370	316	225	197	90	86	25	20	31	25
12	693	621	497	462	555	300	302	271	293	303	452	340	247	155	82	75	37	44	45	18
13	722	610	513	439	526	370	202	274	313	309	453	322	106	173	90	70	36	50	146	17
14	759	611	530	476	522	372	309	300	300	340	303	307	176	205	91	83	23	47	141	10
15	792	535	505	441	470	333	314	274	299	320	299	320	205	169	82	111	32	41	31	22
16	843	582	526	403	492	366	335	291	340	300	325	304	196	179	102	577	25	30	15	23
17	901	563	465	472	510	364	307	304	299	296	333	200	194	157	89	4948	35	34	21	53
18	805	566	500	474	515	336	306	203	299	324	269	290	235	106	73	9166	35	37	10	35
19	915	523	474	502	535	355	353	270	202	329	303	323	213	150	100	1767	37	47	15	18
20	950	604	524	441	495	372	290	272	264	335	310	316	189	192	109	72	30	82	17	50
21	900	633	470	403	495	414	290	323	300	324	325	325	190	103	92	49	33	130	16	107
22	007	560	400	436	497	300	320	270	291	291	209	305	106	156	110	37	39	1193	10	60
23	052	625	474	439	400	329	206	265	272	363	330	305	204	135	90	42	51	4435	24	10
24	052	639	465	460	431	325	294	200	321	321	304	292	102	153	00	49	31	2651	33	20
25	057	645	546	446	461	360	277	262	203	301	306	206	179	141	09	46	40	220	17	21
26	056	046	401	437	519	336	300	206	260	350	293	306	100	146	90	45	39	10	21	14
27	077	604	402	457	404	361	309	273	291	295	294	250	220	147	94	40	24	30	26	20
28	055	706	503	430	493	390	315	295	204	303	305	233	107	145	97	49	47	29	25	19
29	794	597	541	443	437	367	331	300	296	306	276	201	206	116	133	46	30	30	23	14
30	700	559	537	459	456	339	546	279	309	320	324	225	192	129	93	47	34	24	17	15
31	000	540	517	445	437	346	310	307	296	307	300	243	179	123	102	39	34	29	19	13
32	705	546	551	446	407	355	317	206	304	322	300	224	161	129	74	37	30	21	15	16
33	054	543	520	460	429	346	320	294	263	200	300	233	101	144	76	36	32	24	19	15
34	706	522	494	461	436	336	314	303	260	315	290	339	100	132	79	43	32	30	19	23
35	734	629	404	466	471	335	301	205	314	316	295	473	191	129	01	43	37	26	29	11
36	707	666	447	479	419	329	313	200	300	320	315	256	177	119	71	42	33	22	17	17
37	691	561	527	537	411	355	313	201	313	322	300	211	194	127	75	40	35	23	17	23
38	735	605	494	402	429	353	274	314	267	296	206	221	105	120	70	40	30	27	19	17
39	709	543	511	490	746	373	426	290	293	330	310	212	157	137	90	37	34	20	17	17
40	721	572	490	406	1622	353	494	295	314	314	305	220	106	122	00	34	30	23	14	19
41	737	617	467	500	445	346	301	256	300	304	201	201	104	105	71	30	27	21	17	13
42	700	561	476	512	526	311	294	303	260	329	293	210	160	131	67	41	40	17	27	23
43	711	543	494	490	455	310	326	204	294	340	320	214	109	137	03	45	45	10	14	12
44	663	622	406	531	409	333	292	240	270	334	313	205	207	127	72	27	54	30	14	11
45	717	517	453	540	412	340	313	269	200	324	315	244	144	122	06	32	27	23	21	23
46	644	515	492	507	404	340	291	313	321	316	322	216	177	111	01	45	29	21	20	15
47	647	492	479	546	419	365	296	313	209	350	200	192	153	119	79	66	36	22	19	17
48	659	467	474	576	300	344	314	264	294	333	296	207	140	112	74	50	24	24	19	19
49	628	527	541	546	399	335	305	307	295	323	320	211	172	130	71	39	25	30	13	20

MS05070NB.HH:1			1015Y NB MATRIX SPIKE MS-05070																	
	1000	1050	1100	1150	1200	1250	1300	1350	1400	1450	1500	1550	1600	1650	1700	1750	1800	1850	1900	1950
0	15	13	16	13	11	14	9	10	13	4	2	8	4	3	2	1	5	6	2	3
1	19	10	17	15	12	10	12	10	7	6	5	3	1	2	1	2	8	4	3	2
2	12	10	16	14	13	9	14	11	16	9	4	5	2	3	3	4	3	4	2	4
3	24	10	12	6	14	14	10	10	5	9	4	3	1	1	1	0	0	1	3	0
4	19	15	13	12	12	11	7	8	8	4	4	2	5	2	0	2	4	3	1	4
5	19	15	13	9	13	5	10	9	7	1	3	10	4	5	2	3	4	3	3	2
6	18	17	20	14	14	10	0	11	7	0	5	5	3	2	2	3	5	2	2	3
7	20	17	14	14	9	14	9	11	6	3	5	4	3	2	4	2	3	4	3	0
8	16	14	12	0	9	17	10	12	9	7	6	6	3	1	2	0	4	2	4	3
9	14	8	19	17	11	11	11	12	6	4	5	3	5	5	6	2	2	1	2	2
10	15	14	15	14	9	10	7	6	6	5	5	2	2	5	3	3	0	2	2	5
11	24	19	16	10	11	6	11	9	13	12	8	3	5	4	1	1	3	3	1	3
12	17	10	22	8	12	11	15	5	7	22	4	5	3	2	2	4	5	0	5	4
13	20	20	17	13	10	11	5	13	7	00	5	3	3	3	4	3	3	3	2	1
14	24	12	16	13	10	15	12	19	5	05	2	2	6	7	4	3	3	4	0	1
15	12	14	11	9	11	15	11	13	6	23	9	7	6	2	3	4	2	2	3	2
16	19	17	12	19	10	12	14	12	5	7	10	4	5	2	4	6	1	1	5	1
17	12	17	16	17	17	14	13	15	14	5	5	5	6	1	2	15	3	3	2	4
18	14	27	15	10	14	9	14	8	5	7	4	7	1	5	3	0	3	3	1	3
19	18	20	13	16	12	7	14	11	9	0	1	4	4	6	3	2	2	2	1	2
20	15	10	14	10	9	14	10	5	5	3	3	4	6	5	7	3	5	4	3	2
21	27	10	19	14	13	17	12	7	0	3	5	2	1	1	2	2	2	3	3	1
22	12	17	9	11	15	17	9	8	3	0	3	3	4	4	2	2	5	3	2	1
23	19	19	27	8	13	9	10	7	5	5	7	0	6	3	3	1	5	1	4	1
24	15	16	17	13	13	14	10	15	6	3	3	15	0	2	3	3	4	1	0	0
25	16	25	13	13	13	11	11	16	10	5	2	44	4	5	3	5	2	3	3	5
26	10	16	8	14	12	14	9	12	3	5	3	90	5	3	1	1	2	0	3	1
27	17	14	12	10	17	12	10	12	9	5	4	102	5	3	3	2	4	0	3	0
28	22	11	14	16	11	11	12	11	10	5	8	17	3	3	2	3	7	5	1	1
29	12	21	20	17	19	9	11	8	5	0	2	5	5	2	2	1	5	3	2	3
30	17	17	11	14	13	9	0	16	5	3	5	5	1	2	4	3	3	4	2	3
31	16	22	13	11	13	11	16	11	7	7	2	3	2	2	2	2	2	1	3	4
32	16	11	16	19	15	16	6	7	5	3	3	2	4	1	2	4	1	5	3	3
33	12	13	15	12	17	10	12	14	3	6	1	3	12	2	5	2	0	0	2	0
34	10	9	12	14	13	11	13	6	13	5	3	6	7	3	4	4	4	1	3	0
35	11	17	12	14	10	5	16	0	6	6	3	2	3	5	1	2	1	2	3	2
36	30	14	11	7	10	12	12	9	4	6	3	1	2	2	3	2	1	1	6	3
37	11	11	11	10	11	7	12	5	5	3	3	4	2	4	5	2	6	2	3	3
38	23	13	13	12	15	13	10	6	6	7	4	3	2	7	2	4	5	5	4	3
39	13	19	16	15	14	14	12	8	2	4	1	6	1	6	3	4	3	5	3	2
40	16	13	16	13	10	9	14	6	7	5	6	0	5	4	3	1	4	1	2	1
41	19	20	22	13	0	10	10	6	9	4	5	15	4	2	1	0	2	1	0	4
42	10	13	15	13	16	11	6	9	4	4	5	3	5	6	2	4	2	3	2	3
43	16	12	12	11	14	10	9	5	4	5	4	1	1	0	2	5	3	3	2	2
44	25	11	9	6	19	12	9	5	5	4	2	6	3	2	4	2	0	0	3	1
45	14	13	15	11	13	10	0	16	4	3	1	12	3	2	3	2	1	2	5	5
46	21	20	14	13	15	12	10	7	7	2	3	6	2	2	5	2	1	1	0	5
47	10	10	20	10	7	11	0	9	3	4	3	5	3	2	1	5	3	3	2	4
48	11	20	10	0	10	10	9	0	3	6	3	3	5	3	2	7	3	1	1	2
49	15	16	10	11	10	13	10	11	2	6	2	1	2	5	3	2	5	1	1	1

filename: NB95MBKG

*Evaluation of estimated contribution
of Nb-95m to 16.6 keV region.*

Zr-95 = 4685 +/-47.75 dpm/ml on 5-7-92 13:30 (at Nb sep time)
added: 0.2503 +/-0.001 ml

Sample No.	mg ppt	where?	yield	Counted Date	Time	Nb-95m gam/min	Nb-95m cpm
5070	160.2	329	0.429	05/26/92	15:50	0.093	0.015
5070D	258.1	325	0.571	05/22/92	15:40	0.269	0.016
5074	277.0	329	0.884	05/14/92	15:05	1.952	0.295
5074R	277.0	329	0.984	05/31/92	10:48	0.077	0.012
5076	118.9	325	0.28	05/21/92	15:11	0.161	0.012
5080	319.9	329	0.829	05/18/92	15:30	0.845	0.124
5688	268.8	325	0.235	05/20/92	10:32	0.170	0.010
5086	281.6	329	0.861	05/29/92	15:48	0.105	0.016
5087	251.5	325	0.66	05/22/92	07:18	0.332	0.020
5092	328.9	325	0.707	05/21/92	09:03	0.426	0.024
5093	309.2	329	0.845	05/15/92	16:40	1.520	0.225
5689	300.5	329	0.811	05/29/92	08:55	0.105	0.016
BL-5070	265.4	329	0.812	05/28/92	15:11	0.121	0.018

Zr-95 added

at sep time x yield x 2% x .367 --> decayed to count time = gammas/min

gammas/min / d/c = cpm

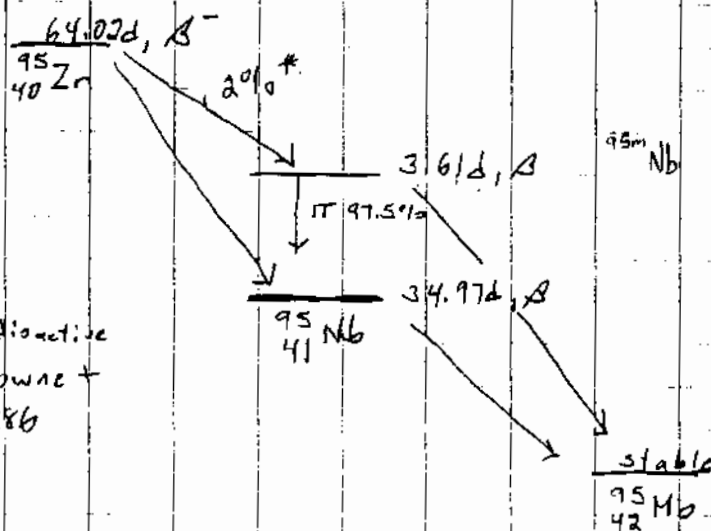
*MSD yr hll
6/4/92*

* per Larry Greenwood

^{93m}Nb

16.52 3.08
16.61 5.9

^{95m}Nb Interference



Ref:
Table of Radioactive
Isotopes, Browne +
Firestone, 1986

^{95m}Nb $t_{1/2} = 3.61\text{d}$
IT 97.5%, β^- 2.5%

Nb $K_{\alpha 2}$	16.521	12.65	} 36.7% = 36.7%/d
Nb $K_{\alpha 1}$	16.615	24.010	
γ_{IT}	235.68	24.9	

$\leftarrow ^{95}\text{Zr}$ has this γ when in
equilibrium with ^{95m}Nb

^{95m}Nb activity = $2\% \times ^{95}\text{Zr}$ at sep time, then decays with
3.61d half-life

^{95}Zr dpm = dpm added $\times$ yield, both at sep time

NJ Wyrw 6/1/92

J. K. Goff 6/13/92

Expected ^{95m}Nb in 92-5074 prepared sample

92 - 5074 (mid point) count date	cpm	2 σ range (30-)
5/14/92 (5/5/92 0320)	2.776 $\pm .072$	2.632 - 2.920 (2.550 - 2.982)
5/31/92 (2130)	2.340 $\pm .069$	2.202 - 2.478 (2.133 - 2.547)

Sep time 5-7-92 1330

^{132}Zr 4415 $\pm$ 45.0 dpm/ml 5-13-92 0100

$\Delta t = 5 \text{ days, } 11 \text{ hr, } 30 \text{ min} = 5.48 \text{ days}$

$t_{1/2} = 64.00 \text{ days}$

$e^{-\lambda t} \rightarrow 4685 \text{ dpm/ml @ sep time}$

4685 dpm/ml $\times$ 2503 ml $\times$ 0.89 yield = 10.44

2% of ^{132}Zr decays to ^{95m}Nb 16.6 keV for ^{95m}Nb
 $.02 \times 1044 \text{ dpm} \times .367 \text{ } \lambda/d = 7.66 \text{ } \lambda/\text{min on } 5-7-92$
 1330

1.8 λ/min on 5-14 $\xrightarrow{6.3\%}$.28 cpm $\Delta t = 7.576 \text{ d}$
 .08 5-31 .013 cpm

(^{95m}Nb $\lambda/c \sim 70$, $\lambda/d = .09 \rightarrow \lambda/c = 6.3 \text{ for } 16.6 \text{ keV}$)

M. J. Wynn 6/1/92
 J. K. Sadegh 6/18/92

NIOBIUM ANALYSIS

Spreadsheet filename: NBOCALC

Revision 1: 6/1/92, NLW

Assumes tracer added to final aliquot

Sample ID: *sample 104* } 92-5074 - *to calc Nb-95m*

Date Calculated: 06/01/92

Data filename: 5074test

M&TE No.

Diode HH

Nb-94 & 95 Spectrum: nb5074.hh;1

Zr/Nb-95 Tracer: 54124-76-0

volume added, ml: 0.25030 0.00120 error *****Half-lives*****

Zr-95 dpm/ml: 4.415E+03 4.500E+01 error Zr-95= 64.02 days

Nb-95 dpm/ml: 9.892E+03 1.151E+03 error Nb-95= 34.97 days

On: Date: 05/13/92 01:00 Time

Nb Sep Date: 05/07/92 13:30 Time

total dpm Nb-95= 2629.47 321.39 error at Nb sep time

Sample Amount: 1 0.00001 error

g, ml or sample?

sample

Reporting Units

Leach Volume, ml: 1 0.00001 error

Activity: dpm

Vol to dilute, ml: 1 0.00001 error

per ? : sample

Diluted to, ml: 1 0.00001 error

Final Aliquot, ml: 1 0.00001 error

Nb-94 & 95 Counting Data from Prepared Sample

Sample dpm Nb-95= 2.340E+03 1.09 % error at Nb sep time

Sample dpm Nb-94= 0.000E+00 1.00 % error

*****RESULTS*****

Yield Nb-95= 0.890 0.109 error

Nb-94 dpm/sample= 0.000 0.000 error = ERR %

MDA = ERR

GENERIC FORMULAS

Nb-94 Activity = $\frac{\text{net dpm} \times \text{leach vol} \times \text{diln vol}}{\text{yield} \times \text{sample amt} \times \text{diln aliquot} \times \text{aliquot}}$

% recovery = $\frac{\text{dpm recovered}}{\text{dpm added}} \times 100$

N. J. W. V. M. 6/1/92
Entered by Date

A. K. F. J. J. 6/16/92
Reviewed by Date

$$SID \# 54124-77-3 = 250.3 \pm 1.2 \quad SID \# 54124-76-0$$

$$\underline{54124-76-0} \quad ^{95}\text{Zr} / ^{95}\text{Nb} \quad std \quad 250.3 \pm 1.2 \lambda$$

→ 95NB STD. H.H.; 1 @ 5-13-92 @ 100 (mid-point of count)

$$^{95}\text{Zr} = \frac{1105 \text{ dpm} \pm 0.98\%}{.2503 \pm .0012 \text{ ml}} = 4414.7 \text{ dpm/ml} \pm 45.0$$

$$^{95}\text{Nb} = \frac{2476 \text{ dpm} \pm 1.06\%}{.2503 \pm .0012 \text{ ml}} = 9892.1 \text{ dpm/ml} \pm 115.1$$

(decay of 54124-77-1 27 hr cnt, mid-point 4-23-92 3:19,
filename 54124771.L; 1, g auc 5052 dpm/ml ^{95}Zr +
9892 dpm/ml ^{95}Nb @ 5-13-92 100)

M. J. Wynn 5/29/92
J. L. Fiddell 6/4/92

Analysis performed by: diana mcMullin

Sample: 95HB YIELD STANDARD AS SAMPLES
Weight: 1.00000 ML

54124-77-3

Irradiation date: 12-May-1992 at 12:48:00

Count date: 12-May-1992 at 12:48:00

Count times: REAL TIME 25.16h (90578.000 seconds)
LIVE TIME 25.16h (90578.000 seconds)

Dead time: 0.00 percent

Detector: HH pos 0 0 Geometry Factor: 1.000

Efficiencies and shape parameters from file: ve:[116.2]EFFFILNB. HH

Spectrum from file : 95nbstd.hh:1

Background subtractions from file: VE:[116.1]BACKG. HH

	Peak channel	Region start end	Gross counts	Net area ++	Energy (KeV)	Gamma /sec	Err % SD	System bkgd
1	75.9	72. 78.	16395.	2540.	77.09	3.473E-01	6.0	0.
2	85.3	84. 87.	8368.	790.	86.42	8.848E-02	16.0	0.
3	93.9	93. 95.	6106.	578.	94.95	5.690E-02	18.7	0.
4	131.2	131. 135.	9284.	911.	135.08	7.309E-02	16.2	0.
5	177.2	175. 180.	10206.	652.	177.91	6.061E-02	21.7	0.
6	210.3	209. 213.	9715.	553.*	210.82	2.575E-02	100.0	466.
7	239.9	239. 246.	17371.	6012.	240.34	7.020E-01	2.0	0.
8	339.0	337. 340.	5274.	1073.*	339.71	3.576E-02	100.0	1097.
9	429.2	426. 433.	8955.	945.	428.70	2.353E-01	13.0	0.
10	454.0	454. 467.	4500.	341.*	464.20	5.423E-02	100.0	253.
11	512.0	511. 516.	8403.	1189.*	511.95	6.616E-02	100.0	1144.
12	504.9	504. 506.	3501.	1149.*	503.75	6.455E-02	100.0	1272.
13	602.3	601. 603.	2350.	371.	601.00	1.347E-01	17.0	0.
14	610.8	607. 613.	4520.	381.*	609.50	5.904E-02	100.0	161.
15	637.0	637. 638.	1090.	233.	636.35	9.022E-02	19.0	0.
16	663.3	663. 664.	846.	203.*	661.70	4.820E-02	100.0	85.
17	726.0	721. 730.	20513.	10154.	724.20	8.136E+00	0.0	0.
18	753.7	755. 760.	22634.	21214.	756.75	9.980E+00	0.7	0.
19	767.0	763. 770.	86255.	84740.	765.80	4.043E+01	0.3	0.
20	797.2	794. 799.	483.	139.*	794.98	2.640E-02	100.0	100.
21	862.0	860. 864.	415.	174.*	860.29	2.709E-02	100.0	144.
22	913.3	910. 915.	1200.	963.*	910.61	2.659E-02	100.0	928.
23	937.0	966. 969.	295.	145.*	964.07	2.808E-02	100.0	215.
24	971.3	969. 974.	748.	503.*	968.32	2.951E-02	100.0	493.
25	1453.7	1460. 1466.	019.	710.	1458.49	7.057E-01	4.2	0.
26	1590.9	1580. 1594.	175.	07.	1585.07	9.430E-02	18.5	0.

Diana McMullin
5-29-92
M J Wyp W 5/29/92

27	1595.8	1594.	1599.	158.	87.	1589.94	9.372E-02	17.5	0.
28	1633.2	1632.	1634.	76.	42.	1627.18	4.676E-02	24.9	0.
29	1767.6	1767.	1770.	91.	54.	1760.90	6.532E-02	21.0	0.

++ Hst Peak Area above the Compton Continuum before correction for system background. Values flagged with a * are subsequently corrected for system background before calculation of absolute emission rate (gams/sec).

Gamma-ray and nuclide lookup from file: VE:[116.3]NBLIB.DAT

*** Least-squares Results ***

(interferences)

nuclide	energy KeV	dps at zero time	uCi /TL	peak frac	err (%)	dev (sig)	DPM /TL	error (%)
1 Zn 95	- - - -	1.842E+01	4.977E-04	- - - -	- - - -	- - - -	1.105E+03	0.90
	724.20	1.851E+01	5.003E-04	0.99	1.30	1.30		
	756.75	1.833E+01	4.954E-04	1.00	1.24	-1.22		
2 Hb 95	- - - -	4.127E+01	1.115E-03	- - - -	- - - -	- - - -	2.476E+03	1.06
	765.00	4.127E+01	1.115E-03	1.00	1.06	0.00		
3 Sb125	- - - -	7.733E-01	2.090E-05	- - - -	- - - -	- - - -	4.640E+01	9.43
	429.70	7.951E-01	2.149E-05	0.97	13.02	0.64		
	464.20	5.425E-01	1.466E-05	1.43	100.00	-1.30		
	601.00	7.324E-01	1.980E-05	1.06	17.79	-1.02		
	636.35	0.059E-01	2.170E-05	0.96	18.99	0.69		

@ 100 5-13-92
(mid-point of count time)

The following are upper limit values:

Co 60	- - - -	3.420E-02	9.243E-07	- - - -	- - - -	- - - -	2.052E+00	100.00
Hb 94	- - - -	2.884E-02	7.793E-07	- - - -	- - - -	- - - -	1.730E+00	100.00
Sa113	- - - -	0.935E-01	2.415E-05	- - - -	- - - -	- - - -	5.361E+01	100.00
Sa125	- - - -	0.000E+00	0.000E+00	- - - -	- - - -	- - - -	0.000E+00	100.00
Sa113m	- - - -	5.343E+00	1.444E-04	- - - -	- - - -	- - - -	3.206E+02	100.00
Sa113m	- - - -	1.511E+00	4.085E-05	- - - -	- - - -	- - - -	9.060E+01	100.00

The following peaks were not identified:

#	energy (gams/sec)	poterr	CI #
1	75.10	3.4730E-01	6.9
2	100.00	0.000000	0.000000

Reviewed
M. J. W. M.
5/29/92

442

3	94.95	5.6901E-02	18.7	0.0000000
4	135.00	7.3007E-02	16.3	0.0000000
5	177.91	6.0613E-02	21.7	0.0000000
6	210.02	2.5745E-02	100.0	0.0000000
7	242.34	7.0196E-01	3.0	0.0000000
8	285.71	3.5762E-02	100.0	0.0000000
11	311.90	6.6159E-02	100.0	0.0000000
12	303.15	6.4547E-02	100.0	0.0000000
13	302.50	5.9042E-02	100.0	0.0000000
16	351.74	4.8276E-02	100.0	0.0000000
20	751.50	2.6396E-02	100.0	0.0000000
21	809.29	2.7067E-02	100.0	0.0000000
22	917.61	2.6595E-02	100.0	0.0000000
23	101.07	2.0004E-02	100.0	0.0000000
24	100.72	2.9507E-02	100.0	0.0000000
25	100.49	7.0565E-01	4.3	0.0000000
26	1009.07	9.4306E-02	18.6	0.0000000
27	1009.04	9.3722E-02	17.5	0.0000000
28	1627.10	4.6750E-02	24.9	0.0000000
29	1762.10	6.5317E-02	21.1	0.0000000

If CI > 0 Confidence threshold was not exceeded
 CI = 0 Energy Window test failure
 CI = -1 Extreme Half Life test failure
 CI = -2 Extreme As. Gamma comparison test failure
 CI = -3 Unable to estimate area of Assoc. Gamma

TITLE: 95NB YIELD STANDARD AS SAMPLES

FILE: 95NBSTD.HH:1

* CHANNELS: 2048

SHELF: 0

DIOB#: 181

TIME ZERO: 5 12 92 12 48 0

TIME OF COUNT: 5 12 92 12 48 0

(0.000000 MINUTES DECAY TIME)

LIVE TIME: 25 HOURS 9 MINUTES 38 SECONDS = 1509.63 MINUTES

ELAPSED TIME: 25 HOURS 9 MINUTES 38 SECONDS = 1509.63 MINUTES

(DEAD TIME = 0.000)

FLUX CORR. FACT.: 0.000000

GAIN: 1.00000 KEY/CHAN

WEIGHT: 1.00000

PLY INT: 0

PLY LSS: 0

ANTI PLO: 0

SLP LSS: 0

ANAL LSS: 0

PIR: 0

ERR CORR: 0

ZEN LSS: 0

QVR LSS: 0

NOV: 1

$250.3 \pm 1.2 \lambda$ #54124-36-0

Pipetted on 5-6-92 with pipet #13A-6

= #54124-77-3

Guennel Brodsky, 5/13/92
Reviewed
ATD
5/29/92

444

425

95NSTD.HH:1		95NB YIELD STANDARD AS SAMPLES																		
0		50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950
0	20570	2297	1920	1666	2002	1377	1048	1051	959	1060	1150	1299	663	397	280	243	42	54	46	31
1	0	2224	1864	1727	2052	1342	1305	995	927	1020	1149	1317	712	364	267	221	57	49	55	35
2	0	2176	1752	1673	2006	1354	1218	1003	977	1037	1189	1263	841	340	301	226	50	46	51	40
3	50	2097	1709	1705	1949	1370	1157	1136	982	1021	1141	1296	797	359	253	223	49	47	31	45
4	372	2177	1700	1729	1961	1337	1126	1097	1003	1067	1180	1339	624	340	247	227	58	46	43	36
5	576	2164	1738	1751	1967	1306	1097	1056	1002	1003	1141	1330	629	344	240	238	61	53	39	36
6	1150	2137	1823	1669	2046	1336	1094	1051	1011	1020	1185	1208	624	342	263	299	51	48	53	37
7	1150	2076	1829	1637	1847	1302	1128	1029	1060	1024	1185	1325	638	344	250	1055	51	42	52	42
8	1473	2223	1725	1624	1095	1321	1102	1026	979	1070	1180	1254	666	334	249	8131	39	53	41	44
9	1473	2160	1779	1554	1908	1374	1132	1010	1027	1070	1170	1257	608	333	266	11161	61	45	40	29
10	1473	2130	1869	1635	2132	1264	1093	1001	1016	1063	1136	1292	675	324	252	1750	62	54	42	46
11	2150	2120	1661	1723	2035	1270	1055	1006	1104	1083	1309	1300	715	339	276	232	56	64	48	40
12	2070	2053	1776	1661	1027	1168	1100	1004	999	1072	1562	1324	683	317	289	243	45	105	120	44
13	2114	2077	1719	1622	1013	1287	1119	1031	993	1024	1644	1387	615	446	264	258	46	129	496	42
14	2071	2072	1835	1605	1773	1250	1134	1001	1004	1174	1471	1356	549	400	262	269	64	63	412	33
15	2066	2067	1738	1665	1734	1276	1131	916	965	1270	1245	1356	546	312	233	533	51	40	62	38
16	2030	2046	1801	1665	1727	1264	1065	997	973	1068	1252	1409	578	302	250	2865	59	49	31	57
17	2110	2041	1790	1658	1777	1181	1109	1015	1005	1068	1221	1250	528	316	257	27360	54	46	31	129
18	2125	2063	1820	1650	1736	1266	1039	987	1023	1087	1205	1282	564	296	267	46234	41	51	41	64
19	2035	2081	1706	1631	1771	1282	1010	1006	988	1046	1259	1250	561	308	236	8543	62	59	32	45
20	2101	1965	1748	1550	1643	1246	1080	1007	1054	1021	1263	1242	541	305	241	193	54	45	27	95
21	2105	2082	1716	1605	1651	1398	1109	987	1044	1057	1102	1218	588	283	252	45	48	42	26	307
22	2115	2069	1782	1609	1606	1303	1098	1002	927	1082	1208	1227	517	296	276	74	35	47	44	217
23	2097	2160	1677	1617	1732	1175	1116	1034	968	1025	1247	1210	500	308	262	60	57	36	43	44
24	2104	2244	1709	1597	1635	1203	1072	1039	966	1106	1268	1218	560	276	478	86	51	38	41	40
25	2104	2039	1776	1635	1605	1186	1118	965	974	1047	1208	1090	515	281	3162	84	57	49	38	34
26	2080	2806	1790	1637	1686	1161	1103	1034	991	1065	1239	1065	524	275	10787	58	55	39	46	26
27	2180	2104	1831	1947	1537	1147	1122	1015	997	1071	1229	998	441	291	4299	61	61	46	32	50
28	2067	2703	1751	1818	1636	1251	1049	1032	1066	1040	1182	904	585	257	363	64	57	51	52	45
29	2112	1687	1760	1638	1622	1246	1147	976	1532	1042	1271	926	467	298	358	63	47	44	45	26
30	2030	1876	2087	1611	1525	1194	1081	947	1310	1126	1312	895	464	299	276	49	39	47	39	35
31	2003	1920	1762	1509	1582	1197	1012	954	1020	1198	1255	849	485	384	287	56	41	52	40	49
32	2065	1864	1748	1570	1528	1158	1051	1058	1020	1112	1305	851	438	288	198	59	52	50	41	31
33	2077	1847	1750	1651	1542	1157	1042	992	1019	1058	1302	886	441	293	235	55	56	45	28	41
34	2070	1937	2034	1645	1611	1168	1062	1050	1002	1099	1329	1092	461	277	205	75	46	50	48	25
35	2030	2070	1950	1888	1885	1092	1020	992	998	1097	1240	1550	443	258	226	50	45	43	41	34
36	2065	2066	1895	1701	1561	1093	1097	1080	981	1066	1311	939	425	276	199	55	48	43	43	26
37	2070	1802	1734	1720	1770	1148	1074	957	1010	1058	1284	732	515	253	218	75	55	47	34	36
38	2070	2011	1730	1685	1495	1129	1036	980	989	1137	1351	759	575	295	195	58	84	36	37	32
39	2070	1807	1688	1639	2602	1131	1450	982	1049	1111	1261	782	405	256	225	63	62	38	46	40
40	2070	1811	1680	1655	5416	1131	1664	969	997	1083	1272	761	421	263	201	63	56	39	33	26
41	2077	2080	1705	1673	1671	1049	1033	983	1054	1089	1249	723	421	252	284	58	58	41	40	34
42	2070	1730	1733	1775	1791	1116	1082	948	1055	1129	1289	674	367	256	283	53	60	43	52	40
43	2070	1803	1840	1907	1563	1129	1015	1014	971	1089	1240	726	388	241	189	61	64	56	34	21
44	2070	2149	1725	1984	1460	1079	1056	1030	1034	1136	1251	751	438	237	211	59	62	42	31	40
45	2070	1805	1762	1981	1398	1158	1025	969	1078	1085	1250	669	398	225	241	66	47	56	33	41
46	2070	1782	1673	2021	1390	1241	981	995	945	1122	1314	664	376	263	185	72	45	38	35	38
47	2070	1707	1710	2034	1378	1151	997	1032	961	1156	1349	718	393	247	288	125	34	42	42	46
48	2070	1705	1706	1982	1355	1117	1089	1046	1046	1180	1367	673	379	295	213	96	59	60	34	32
49	2070	1705	1702	2002	1303	1122	984	1035	980	1115	1260	685	381	261	289	65	43	42	48	29

95NBSTD.HH:1	95NB YIELD STANDARD AS SAMPLES																			
	1000	1050	1100	1150	1200	1250	1300	1350	1400	1450	1500	1550	1600	1650	1700	1750	1800	1850	1900	1950
0	45	31	33	19	32	29	15	33	20	18	11	5	10	5	11	9	7	10	6	13
1	30	20	29	31	31	32	18	15	28	15	9	10	10	7	8	7	9	8	7	8
2	20	34	30	38	18	21	16	20	17	19	11	15	11	11	10	12	11	6	7	6
3	11	32	28	30	35	23	23	19	23	11	23	12	10	6	12	7	4	13	7	6
4	30	20	40	27	24	25	22	20	19	10	10	8	10	12	15	7	7	7	12	12
5	10	36	32	32	39	20	30	14	27	15	16	8	11	8	7	9	7	7	11	7
6	14	30	26	27	33	13	17	20	21	13	12	9	13	14	9	6	11	10	11	12
7	10	19	38	30	22	23	21	20	12	8	21	12	14	11	6	10	11	6	19	8
8	34	22	29	30	33	28	20	14	14	16	12	10	12	8	5	12	10	6	7	5
9	12	32	27	27	35	19	21	23	21	13	15	14	10	6	9	6	9	7	6	13
10	10	30	37	23	32	24	23	19	13	16	12	14	8	6	6	9	11	7	6	4
11	11	33	33	25	26	14	15	19	17	33	9	13	11	11	9	9	6	7	11	7
12	40	28	28	29	36	23	18	10	14	86	17	17	9	15	9	9	9	11	9	9
13	11	21	40	32	36	25	23	14	15	247	8	5	15	12	8	8	10	7	9	7
14	11	30	20	20	19	26	20	20	17	316	9	16	12	14	15	11	4	8	9	6
15	11	37	20	33	28	25	22	20	10	102	12	13	6	13	14	11	7	2	4	8
16	11	11	21	30	32	31	14	18	9	19	12	15	17	11	12	8	8	8	3	8
17	11	40	20	30	28	16	10	21	16	9	7	10	6	11	11	31	7	9	6	6
18	11	32	20	22	30	13	24	15	18	7	7	14	11	11	11	34	10	10	10	7
19	11	30	35	27	28	20	14	20	17	8	13	7	12	8	10	16	8	8	11	9
20	11	37	24	27	22	27	13	18	9	20	13	5	15	11	16	10	11	8	7	12
21	11	41	26	20	19	14	19	25	14	11	6	7	12	10	7	8	7	11	11	7
22	11	30	45	32	33	30	26	13	11	15	7	6	16	11	8	6	15	9	9	6
23	11	36	46	28	31	21	14	20	12	13	10	11	20	12	8	8	11	14	11	10
24	11	30	37	33	24	21	20	19	17	11	9	6	20	9	9	11	7	8	5	18
25	11	20	42	39	32	13	22	15	20	16	6	6	16	4	6	11	9	7	9	5
26	11	30	24	20	25	22	19	33	16	6	19	11	6	7	4	12	12	9	11	6
27	11	31	37	32	23	18	23	17	12	14	16	16	7	12	6	8	7	7	10	10
28	11	30	30	29	22	21	12	20	15	7	9	10	12	12	8	11	8	4	7	10
29	11	20	26	13	27	23	19	13	18	12	9	12	13	8	15	15	10	4	6	6
30	11	30	25	26	33	22	20	21	14	12	15	8	12	8	13	12	7	7	7	3
31	11	30	24	32	37	23	21	18	16	12	8	6	11	9	10	7	9	9	10	4
32	11	30	26	23	37	19	19	13	20	13	10	12	14	14	14	9	10	8	6	5
33	11	26	30	24	32	18	27	8	12	9	10	18	35	5	8	8	14	11	8	6
34	11	30	24	20	32	23	22	15	18	15	7	15	27	14	15	14	6	7	10	11
35	11	40	33	26	29	18	24	17	11	13	11	8	8	8	12	9	9	10	5	8
36	11	27	27	35	26	18	22	21	20	9	17	20	15	11	9	8	9	6	12	9
37	11	25	42	27	30	19	24	18	10	8	9	12	10	7	10	10	9	13	4	12
38	11	27	25	20	24	18	26	20	16	15	13	15	13	3	8	13	12	10	6	6
39	11	24	39	32	28	24	16	23	18	12	9	15	3	12	8	10	12	9	8	6
40	11	22	26	32	31	17	22	13	12	12	14	32	9	4	11	10	7	5	4	5
41	11	26	26	23	38	19	22	14	12	13	12	42	13	11	13	10	11	5	6	13
42	11	37	35	35	38	18	21	20	14	16	9	28	9	8	11	7	13	11	13	18
43	11	29	25	30	18	23	15	19	18	9	7	25	11	7	10	7	8	13	8	17
44	11	23	27	33	30	33	19	19	19	6	14	18	9	11	10	10	4	10	6	4
45	11	48	19	25	18	21	12	11	14	18	13	39	8	8	19	9	9	10	12	7
46	11	20	20	20	21	20	20	22	19	13	9	51	8	16	11	11	9	8	16	8
47	11	11	20	20	20	20	19	12	14	7	9	23	8	8	6	5	8	6	13	9
48	11	11	20	20	20	20	20	16	16	20	9	14	10	11	6	3	6	8	7	13
49	11	11	20	20	35	18	16	15	15	22	8	13	12	13	6	10	11	7	8	7

Print Time : 28-MAY-1992 16:16:08.65
 Certificate file name : DUBO:[USER]AMERS-NBFILTER.CER;1
 Certificate title : Amersham QCY.48 mixed gamma-ray std #54124-70-0 stippled onb
 Certificate date : 1-FEB-1992 04:00:00.00
 Certificate quantity : 1.06850E-01

Rcd	Nuclide	Half-life	CAL/ INIT	Energy	Rate	%Abun	Activity (uCi)
1	AM-241	432.20Y	Yes	59.54	1.1340E+03	35.90	8.5372E-02
2	Cd-109	462.00D	No	88.03	6.4500E+02	3.61	4.8289E-01
3	Co-57	271.77D	No	122.06	5.8800E+02	85.95	1.8490E-02
4	Cs-139	137.50D	No	165.80	7.1300E+02	79.90	2.4118E-02
5	Hg-203	46.61D	No	279.19	1.9990E+03	81.46	6.6323E-02
6	Sn-113	115.09D	No	391.70	2.2810E+03	64.00	9.6326E-02
7	Sr-85	64.80D	No	514.00	3.9130E+03	99.20	1.0661E-01
8	Cs-137	30.00Y	No	661.66	2.5090E+03	85.21	7.9581E-02
9	Y-88	106.61D	No	898.04	6.2950E+03	93.68	1.8161E-01
10	Co-60	5.27Y	No	1173.24	3.4130E+03	99.90	9.2336E-02
11	Co-60	5.27Y	No	1332.52	3.4160E+03	99.98	9.2341E-02
12	Y-88	106.61D	Yes	1836.06	6.6710E+03	99.24	1.8168E-01

Calculation for Filter Std from Amersham Mixed Std #54124-70-0
 filename: MIXEDSTD

Stippled from pipet #5A-28
 Reference Date: 2000 PST on 1-Feb-1992

*****Std #54124-70-0*****				***Filter Std***	
isotope	keV	gammas /sec/g	% overall uncertainty	gammas /sec	% error
Am-241	59.54	1134	2.3	121.16	2.3
Cd-109	88.03	645	3.2	68.92	3.2
Co-57	122.1	588	1.9	62.83	1.9
Ce-139	165.9	713	1.5	76.18	1.5
Hg-203	279.2	1999	2.3	213.59	2.3
Sn-113	391.7	2281	4.6	243.72	4.6
Sr-85	514.0	3913	1.7	418.09	1.7
Cs-137	661.7	2509	2.2	268.08	2.2
Y-88	898.0	6295	3.7	672.60	3.7
Co-60	1173	3413	0.7	364.67	0.8
Co-60	1333	3416	0.7	364.99	0.8
Y-88	1836	6671	3.6	712.78	3.6

gammas/sec = gammas/sec/g X 1.076 g/ml X 0.0993 +/- 0.0003 ml

= 0.10675g

MSW
 5/27/92

Configuration : MCA0:[USER]ADC3\$1
 Analyses by : CALIBRATE V1.5, PEAK V16.2
 Detector Name : Energy Calib Time: 28-MAY-1992 16:14:48
 Efficiency type : Spline Effncy Calib Time: 28-MAY-1992 16:14:48
 Detector Geometry: T1CARD Shelf : 6

Energy Calibration Report

$$\text{Energy} = -0.5209 + 0.7501 * \text{Channel} + -1.1976\text{E-}07 * (\text{Channel} ** 2)$$

Nbr	Centroid Channel	True Energy	Computed Energy	Difference
1	80.05	59.54	59.52	0.021
2	118.14	88.03	88.09	-0.058
3	163.40	122.06	122.04	0.018
4	221.81	165.80	165.85	-0.050
5	372.82	279.19	279.11	0.082
6	522.95	391.70	391.70	-0.002
7	686.02	514.00	513.99	0.011
8	882.95	661.66	661.67	-0.007
9	1198.18	898.04	898.04	0.001
10	1565.23	1173.24	1173.23	0.010
11	1777.76	1332.52	1332.56	-0.042
12	2449.45	1836.06	1836.04	0.016

FWHM Calibration Report

$$\text{FWHM} = 0.8029 + 3.8853\text{E-}02 * (\text{Energy} ** 1/2)$$

Nbr	Energy	True FWHM	Computed FWHM	Difference
1	59.54	1.20	1.10	0.096
2	88.03	1.19	1.17	0.025
3	122.06	1.50	1.23	0.265
4	165.80	1.31	1.30	0.012
5	279.19	1.30	1.45	-0.148
6	391.70	1.40	1.57	-0.176
7	514.00	1.55	1.68	-0.131
8	661.66	1.71	1.80	-0.092
9	898.04	1.89	1.97	-0.075
10	1173.24	2.13	2.13	-0.002
11	1332.52	2.24	2.22	0.019
12	1836.06	2.67	2.47	0.207

Efficiency Calibration Report

Nbr	Energy ()	Measured Efficiency	Efficiency Error
1	59.54	1.3889E-01	3.2134E-03
2	88.03	1.4336E-01	4.9210E-03

Nbr	Energy ()	Measured Efficiency	Efficiency Error
3	122.06	1.3305E-01	3.6612E-03
4	165.80	9.5438E-02	3.2513E-03
5	279.19	6.2279E-02	2.1841E-03
6	391.70	4.0804E-02	1.8577E-03
7	514.00	3.1451E-02	9.2248E-04
8	661.66	2.3435E-02	7.3647E-04
9	898.04	1.5977E-02	5.0996E-04
10	1173.24	1.2069E-02	1.8014E-04
11	1332.52	1.0703E-02	1.5131E-04
12	1836.06	7.4981E-03	1.8705E-04

Approved by:

NA

Approval Date:

_ / _ / _

VAX/VMS Calibration Report V1.4 Generated 28-MAY-1992 16:15:07

Configuration : MCA0:[USER]ADC3\$1
 Analyses by : CALIBRATE V1.5, PEAK V16.2
 Detector Name : Energy Calib Time: 28-MAY-1992 16:15:05
 Efficiency type : Empirical Effncy Calib Time: 28-MAY-1992 16:15:05
 Detector Geometry: TlCARD Shelf : 6

Energy Calibration Report

$$\text{Energy} = -0.5226 + 0.7501 \cdot \text{Channel} + -1.2053\text{E-}07 \cdot (\text{Channel}^2)$$

Nbr	Centroid Channel	True Energy	Computed Energy	Difference
1	80.05	59.54	59.52	0.023
2	118.14	88.03	88.09	-0.057
3	163.41	122.06	122.05	0.013
4	221.81	165.80	165.85	-0.049
5	372.82	279.19	279.11	0.083
6	522.95	391.70	391.70	-0.001
7	686.02	514.00	513.99	0.011
8	882.95	661.66	661.67	-0.007
9	1198.18	898.04	898.04	0.001
10	1565.23	1173.24	1173.23	0.010
11	1777.76	1332.52	1332.56	-0.042
12	2449.45	1836.06	1836.04	0.016

FWHM Calibration Report

$$\text{FWHM} = 0.8027 + 3.8902\text{E-}02 \cdot (\text{Energy}^{1/2})$$

Nbr	Energy	True FWHM	Computed FWHM	Difference
1	59.54	1.20	1.10	0.097
2	88.03	1.19	1.17	0.025
3	122.06	1.50	1.23	0.265
4	165.80	1.32	1.30	0.012
5	279.19	1.30	1.45	-0.148
6	391.70	1.40	1.57	-0.176
7	514.00	1.55	1.68	-0.131
8	661.66	1.71	1.80	-0.092
9	898.04	1.89	1.97	-0.075
10	1173.24	2.13	2.14	-0.003
11	1332.52	2.24	2.22	0.021
12	1836.06	2.68	2.47	0.206

Efficiency Calibration Report

$$\text{Eff} = \exp(a2 + a3 \cdot x + a4 \cdot x^2 + a5 \cdot x^3 + a6 \cdot x^4 + a7 \cdot x^5), \quad x = \ln(a1/\text{energy})$$

a1 a2 a3 a4 a5 a6 a7
 947.8 -4.170 1.125 3.3165E-02 -3.3551E-02 1.2347E-02 -7.3011E-03

Average Deviation = 2.14 * Reduced Chi-Square = 1.44

Nbr	Energy ()	Measured Efficiency	Efficiency Error	Computed Efficiency	Diff/ /Error	% Diff
1	59.54	1.39E-01	3.21E-03	1.39E-01	0.05	0.11

Nbr	Energy ()	Measured Efficiency	Efficiency Error	Computed Efficiency	Diff/ /Error	% Diff
2	88.03	1.43E-01	4.92E-03	1.47E-01	-0.68	-2.32
3	122.06	1.33E-01	3.60E-03	1.27E-01	1.43	3.87
4	165.80	9.54E-02	3.25E-03	1.01E-01	-1.80	-6.15
5	279.19	6.23E-02	2.18E-03	6.08E-02	0.66	2.30
6	391.70	4.08E-02	1.86E-03	4.20E-02	-0.65	-2.94
7	514.00	3.15E-02	9.22E-04	3.09E-02	0.57	1.67
8	661.66	2.34E-02	7.36E-04	2.32E-02	0.31	0.96
9	898.04	1.60E-02	5.10E-04	1.64E-02	-0.86	-2.73
10	1173.24	1.21E-02	1.80E-04	1.22E-02	-0.57	-0.85
11	1332.52	1.07E-02	1.51E-04	1.06E-02	0.78	1.11
12	1836.06	7.50E-03	1.87E-04	7.55E-03	-0.25	-0.63

Approved by: NH Approval Date: / /

Library Title : WASTE NLB, the single composite most comprehensive gamma
 Library file name : DUBO:[USER]WASTE.NLB;1
 Date printed : 27-MAY-1992 12:21:53.80
 Number of nuclides : 82
 Number of lines : 365

```

-----
NAME          nuclide name          NB-94
HALFLIFE      halflife              20300.00 Years
TYPE          nuclide type (subheader)  activation
1 ENERGY     line energy            702.62
ABUNDANCE     percent abundance       97.90000
2 ENERGY     Nuclide KEY Line Energy ----> 871.09
ABUNDANCE     percent abundance       99.98200
  
```

```

-----
NAME          nuclide name          NB-95
HALFLIFE      halflife              34.97 Days
TYPE          nuclide type (subheader)  fission
1 ENERGY     Nuclide KEY Line Energy ----> 765.79
ABUNDANCE     percent abundance       99.79000
  
```

```

-----
NAME          nuclide name          NB-95M
HALFLIFE      halflife              3.61 Days
TYPE          nuclide type (subheader)  ZR-95 DTR
1 ENERGY     Nuclide KEY Line Energy ----> 235.68
ABUNDANCE     percent abundance       24.90000
  
```

Library Title : WASTE NLB, the single composite most comprehensive gamma
 Library file name : DUBO:[USER]WASTE.NLB;1
 Date printed : 27-MAY-1992 12:21:53.80
 Number of nuclides : 82
 Number of lines : 365

```

-----
NAME          nuclide name          NB-94
HALFLIFE      halflife              20300.00 Years
TYPE          nuclide type (subheader)  activation
1 ENERGY     line energy            702.62
ABUNDANCE      percent abundance      97.90000
2 ENERGY     Nuclide KEY Line Energy ----> 871.09
ABUNDANCE      percent abundance      99.98200
  
```

```

-----
NAME          nuclide name          NB-95
HALFLIFE      halflife              34.97 Days
TYPE          nuclide type (subheader)  fission
1 ENERGY     Nuclide KEY Line Energy ----> 765.79
ABUNDANCE      percent abundance      99.79000
  
```

```

-----
NAME          nuclide name          NB-95M
HALFLIFE      halflife              3.61 Days
TYPE          nuclide type (subheader)  ZR-95 DTR
1 ENERGY     Nuclide KEY Line Energy ----> 235.68
ABUNDANCE      percent abundance      24.90000
  
```

Date April 15, 1992

To Tom Jones

From Sandy Fadeff *SF*

Subject QC Requirements for 101-SY Sample Analysis for
Nb-94, -93m and Ni-59, -63

J. Daniel
J. Latkovich
J. Kaye
L. Greenwood
✓ N. Wynhoff
File/LB

This memorandum summarizes our conversation of 4/15/92 regarding QC samples needing to be run with 101-SY samples for ⁹⁴Nb and ^{59.63}Ni analysis.

It was agreed that the following QC samples be run with each analytical batch:

- 1 methods blank
- 1 matrix spike at about 10 to 20 times the detection limit
- 1 duplicate
- 1 blank spike

DONT'T SAY IT - Write It!

To: Shannon

Date: May 19, 1992

From: Nancy

I have sent you the prepared Nb samples for the following 101SY samples:

92-05688 ✓
92-05092 ✓
92-05076 ✓
92-05087 ✓
92-05070Dup ✓

We need a LEPS count on each for Nb-93m. The reference date for these can be the start of the count. We need the net cpm at 16.6 keV (Nb-93m) and at 27.5 keV (an Sb-125 peak). We also need a print out of the counts in each channel of the spectrum.

We also need a gamma count for ^{94}Nb , ^{95}Nb and ^{95}Zr . The reference date for these is 5-7-92 13:30. In each case we need the total dpm in the prepared sample.

I've also included a filter standard prepared from an Amersham standard to use for calibrating is this geometry if you need it. I don't have the data on it at this moment but I will have soon.

I will also be sending you a set of 7 or 8 Nb-93m standards soon.

Please call me (6-8706) or Sandy (6-7015) if we can help in any way.

325COUNT.DSI

DONT'T SAY IT - Write It!

To: Shannan

Date: May 22, 1992

From: Nancy

Nancy

I have sent you 8 Nb-93m standards. They include 7 precipitate standards (#1-7) and one stippled standard (#0). Please handle these carefully and keep them upright.

I need a LEPS count of each for Nb-93m. We need the net cpm of the 16.6keV Nb-93m peak. They probably only need about an hour count to give 10,000 counts in the peak.

In order to get these to you as soon as I can, I did not take time to prepare another Amersham stippled standard for the higher energies. Please use the standard sent previously.

Thanks.

Please call me (6-8706) or Sandy (6-7015) if you need more information.

325CNT1.DSI

NUCLIDE IDENTIFICATION REPORT
PNL Analytical Chemistry Lab
Radioanalytical group, 325 bldg.

Shannon W. Thompson
P7-22 376-6529
May 28, 1992

Gamma Energy (LEPS) Analysis for: Nb Samples of 101-SY, Nancy Wynnhoff

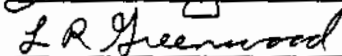
WP #: M99913

Cognizant Scientist:



Date: 5/29/92

Secondary Reviewer:



Date: 5-29-92

Sample	Count Times (H)	Total Peak Areas		Notes
		16.3	18.4	
92-05070 Dup	16	401	ND	
92-05076	15	132	ND	
92-05087	7	149	ND	
92-05092	5.83	317	ND	
92-05688	20	ND	ND	No Peaks Found
Nb Std. 0	0.5	4869	960	Note count time
" 1	1	7859	1711	
" 2	1	6343	1308	
" 3	1	3561	775	
" 4	1	5196	1167	
" 5	1	4256	931	
" 6	1	5214	1224	
" 7	1	3308	779	

Please Note the Following:

Errors are listed on the actual raw data peak reports, included in this data package. No Nuclide Identification algorithms have been employed. The spectra were simply analyzed by the "MIDAS" peak analysis.

Note: This provides the signatures & review for all detector 1GP-510
LEPS#1 data.

LR Greenwood
File/LB

Date June 10, 1992

To Tom Jones

From Nancy Wynhoff *NWynhoff*

Subject ^{94}Nb and $^{93\text{m}}\text{Nb}$ Analysis Results for 101-SY
Composite Samples

Aliquots of the eight fused samples and their associated fusion methods blanks submitted from the Tank 101-SY 24 Window "E" core composite samples were prepared for analysis according to procedure PNL-ALO-472, Determination of $^{93\text{m}}\text{Nb}$ and ^{94}Nb . Also prepared were the following QC samples: one sample duplicate, one methods blank, one methods blank spike and one matrix spike. A known activity of ^{95}Zr - ^{95}Nb tracer standard was added to each sample to serve as a yield monitor, a niobium separation was performed and the samples were prepared for counting. The ^{95}Nb yield and ^{94}Nb activity were determined by conventional gamma spectroscopy and the $^{93\text{m}}\text{Nb}$ activity was determined by low energy photon gamma spectroscopy (LEPS). All gamma counting was performed according to procedure PNL-ALO-464, Procedure for Gamma Counting and Data Reduction in the Low-Level Counting Room, 329 Building. All work was performed in buildings 329 and 329T5 in the 300 Area.

The ^{94}Nb results for all of the samples and blanks showed no detectable activity, so a minimum detectable activity (MDA) has been reported. The blank spike and matrix spike had good recoveries of 89% and 90% respectively. Since the duplicate sample results were both below the MDA, precision could not be estimated from their results.

The $^{93\text{m}}\text{Nb}$ results showed detectable activity for all of the samples and for two of the three blanks. However in evaluating the data we determined that there were at least one and possibly two sources of positive interference to our $^{93\text{m}}\text{Nb}$ measurements at the low levels being measured in these sample aliquots. The first is the presence of ^{95}Nb , the daughter (half-life = 3.6 days) of the ^{95}Zr tracer, which also produces the Nb K x-rays used to determine the $^{93\text{m}}\text{Nb}$ activity. More time is needed between the Nb-Zr separation and the LEPS counting to allow this interference to decay. The second possible source of interference is Nb x-ray fluorescence induced by the interaction of ^{95}Nb beta particles with the stable Nb (added as carrier) in the prepared sample. This is a possible additional cause of the consistently low but positive $^{93\text{m}}\text{Nb}$ activity of the order of 70 dpm per sample found in several samples and two of the blanks. (This corresponds to about 9000 dpm/g of original sample.)

Based on this evaluation of the $^{93\text{m}}\text{Nb}$ data it has been determined that the samples should be recounted on the LEPS detector after sufficient time has elapsed for the ^{95}Nb to decay to levels that will not interfere with our measurement. At such time the blanks (and possible additional blanks, if necessary) will be evaluated for their $^{93\text{m}}\text{Nb}$ activity to try to determine the

Tom Jones
June 10, 1992
Page 2

contribution of the Nb x-ray fluorescence. If this interference is present, new effective MDA will be estimated.

As a result of the on-going investigation of these interferences, preliminary results for the ^{92m}Nb analyses are being reported. All results below the apparent interference level of 9000 dpm/g are being reported as MDA's and all positive results are to be considered suspect at this time. The results for the blank spike and matrix spike are valid since the spike level was ten to thirty times the levels of the possible interferences. The spike recoveries were excellent at 95% for the blank spike and 102% for the matrix spike.

If you have any questions, please contact me at 6-8706 or by cc:mail.

NB101SYP.RES

Analyst M. J. Kelly Date 6/10/92 Reviewer A. L. Jachy Date 6/10/92

Preliminary Results for Nb-94 and Nb-93m Analyses for Tank 181-SY

These results are preliminary until an evaluation of interferences has been completed.

ACL I.D.	Nb-94 dpm/g	+/- 1 sigma	Nb-94 Spike Conc. dpm/g	Nb-94 Spike Recovery	Nb-93m dpm/g	+/- 1 sigma	Nb-93m Spike Conc. dpm/g	Nb-93m Spike Recovery
92-5878	< 168				11,888 **	11%		
92-5878 Duplicate	< 328				< 9888			
92-5874	< 138				18,888 **	18%		
92-5876	< 1488				< 9888			
92-5888	< 168				25,888 **	18%		
92-5888 Hot Cell Blank*	< 888				< 9888			
92-5886	< 238				16,888 **	18%		
92-5887	< 388				< 9888			
92-5892	< 378				21,888 **	21%		
92-5893	< 128				38,888 **	9%		
92-5889 Hot Cell Blank*	< 278				< 9888			
8L-5878 Blank*	< 278				< 9888			
8S-5878 Blank Spike*	114,888	4%	128,888	89%	435,888	9%	468,888	95%
MS-5878 Matrix Spike	75,888	4%	83,888	98%	315,888	9%	298,888	182%

* Based on nominal 8.5 gram sample size followed by the same dilutions and aliquots as the samples.

** All positive Nb-93m sample results are currently suspect. We are evaluating the magnitude of two interferences: Nb-95m interference (a 3.6 day daughter of the yield tracer), and Nb x-ray fluorescence induced by Nb-95 beta decay.

NB181SYF

DONT'T SAY IT - Write It!

To: Tom Jones

Date: June 3, 1992

From: Nancy Wynhoff *Nancy*

CC: Larry Greenwood

Subject: Preliminary 101SY Nb Results

Attached is a table containing preliminary results for radio-niobium in 101SY samples. These results are preliminary since the required review of the data has not yet been completed. I expect to have these results reviewed and reported to you by tomorrow or Friday.

In addition, please notice that all positive ^{93}Nb results have been flagged as suspect. These results may not really be positive due to contributions from ^{95}Nb , a 3.6 day daughter of the $^{96}\text{Zr}/^{96}\text{Nb}$ yield tracer, and possibly from Nb x-ray fluorescence in the prepared niobium oxide samples due to ^{96}Nb beta decay. The first interference will be evaluated by recounting the samples now that over seven half-lives have elapsed. The magnitude of the second potential interference will be evaluated by an experiment in which a simple tracer blank is prepared and counted.

If you have any questions, please call me at 6-8706 or contact me by cc:mail.

101SYNB.DSI

PRELIMINARY Radio-Niobium Results for 101-SY

These results are preliminary until a review of the data has been completed.

ACL I.D.	Nb-94		Nb-94	Nb-94	Nb-94		Nb-94	Nb-94
	dpm/g	+/- 1 sigma	Spike Conc. dpm/g	Spike Recovery	dpm/g	+/- 1 sigma	Spike Conc. dpm/g	Spike Recovery
92-5070	< 160				11,000 ± 11%			
92-5070 Duplicate	< 320				< 9000			
92-5074	< (190) < 150				10,000 ± 10%			
92-5076	< 1400				< 9000			
92-5080	< 160			25%	20,000 ± 10%			
92-5088 Hot Cell Blank**	< 800				< 9000			
92-5086	< 230				16,000 ± 10%			
92-5087	< 300				< 9000			
92-5092	< 370				21,000 ± 21%			
92-5093	< 120				30,000 ± 9%			
92-5089 Hot Cell Blank**	< 270				< 9000			
01-5070 Blank**	< 270				< 9000			
05-5070 Blank Spike	114,000	4%	120,000	89%	435,000	9%	460,000	95%
MS-5070 Matrix Spike	75,000	4%	83,000	90%	315,000	9%	290,000	102%

* All positive Nb-93m sample results are currently suspect. We are evaluating the magnitude of two interferences: Nb-95m interference (a 3.6 day daughter of the yield tracer, and Nb x-ray fluorescence induced by Nb-95 beta decay.

* Based on nominal 0.5g sample size followed by same dilutions + aliquots as the samples

NB:01SY

Nb sep time = 5-7-72 1330

* Blanks used amount 0.5g sample diluted to 250ml 4.993 ml aliquot.
 Samples were 0.56-0.84g, all diluted to 250ml 4.993 ml aliquot.

*** see channel dump for correct ROI
 + cps

X	where counted	yield	X 94 Nb 4.993g	X 73-Nb 4.993g	date of LEPS count	93m Nb net cpm	estimated 93m Nb cpm correct date	(cpm in d/c) 93m Nb dpm	(dpm in d/c) 93m Nb dpm/3600	years				
5070	329	.429	<160	10700 ± 10.6%	5/26	1.049	.015	70.506	164.4	.77				
50700	325	.571	<320	8670 ± 20.3%	5/23	0.418	.016	76.151	133.4	.77				
5074	329	.884	<130	X 13,100 ± 9.5% 9600 ± 7.8%	5/14 5/31	2.793 2.157	0.295 0.012	205.2 158.5	132.3 179.3	.84				
5076	325	.280	<1400	X 6200 ± 21.6%	5/21	0.146	.012	21.65	77.3	.63				
5080	329	.829	<160	X → 25,600 ± 7.7%	5/18	4.315	.124	297.15	358.4	.70				
Blank 5688*	325	.235	<800	<6500	5/20	<0.070	.010	<12.88	<54.8	.5				
5086	329	.861	<230	16,200 ± 9.1%	5/29	2.119	.016	156.33	181.5	.56				
5087	325	.660	<300	8480 ± 24.9%	5/22	0.355	.020	64.08	97.1	.57				
5092	325	.707	<370	20,800 ± 21.3%	5/21	0.906	.024	181.08	256.1	.62				
5093	329	.845	<120	X → 30,300 ± 9.4%	5/15	3.843	.025	289.03	342.0	.56				
Blank 5689*	329	.811	<270	8970 ± 14.3%	5/29	0.972	.016	72.65	87.6	.5				
BL-5070	329	.812	<270	8440 ± 11.4%	5/28	0.940	.018	68.49	84.3	.5				

Discussion w/ Larry 6/3/72

10 use < 9K MDA

(2) 12 use of 93m Nb cpm vs results
 .01 6K
 .02 9K

(3) We probably have a Nb x-ray
 fluorescence produced by 93Nb at
 what order of magnitude?

(4) Flag all results above 0L
 as suspect due to 93Nb
 + recalculate + monitor ckg in
 count rate

Reliability 6/3/72

Preliminary report + correction was
 based on this data.
 Nb-93m has since been corrected
 for the true system, which was
 previously mis-calculated. 6/12/72

Shielded Analytical Laboratory
Bench Sheet

Page 1 of 1

use wet wets
CAG

Project Id.: 101 57

Project No. 17667

Window E

Radchem Samples

KOH Fusion

BATCH #2

~~92-05086~~	92-05086	~~92-05087~~	92-05087
1204 (wet) #6	1204 (Dry)	1206 (wet) #7	1206 (Dry)
49.3888	49.2185	47.4127	47.2436
48.8265	48.8265	46.8394	46.8394
<u>0.5623g</u>	0.3920	<u>0.5733g</u>	0.4042

92-05092	92-05092	~~92-05093~~	92-05093
1309 (wet)	1309 (Dry)	1310 (wet) #9	1310 (Dry)
47.4816 #8		47.5711	
46.8655	47.3516	47.0063	47.3950
	46.8655		47.0063
<u>0.6161g</u>	0.4841	<u>0.5648g</u>	0.3887

92-05689

TOTAL Vol. = 250 ml.

BLANK #10

35 ml. of each was given to Radchem & a separate
35 ml. of each was given to 329 for Ni & Nb analyses

Analyst:

Date:

Reviewer:

Date:

A. Hui

4-3-92

Thompson

4/6/92

use wet wts
coll

Shielded Analytical Laboratory
Bench Sheet

Page 1 of 1

Project Id.: 10157

Project No. 7667

WINDOW E

RADchem Samples

KOH Fusion

BATCH #1

92-05070	92-05070	92-05074	92-05074
1200 (wet)	1200 (Dry)	1212 (wet)	1212 (Dry)

Ni #1

Ni #2

47.5474	47.2745	47.6441	47.4808
46.7286	46.7286	46.8062	46.8062
0.7690g	0.4959	0.9379g	0.6746

92-05076	92-05076	92-05080	92-05080
1213 (Wet)	1213 (Dry)	1299 (wet)	1298 (Dry)

Ni #3

Ni #4

48.1382	46.9783	47.4401	47.2252
46.5129	46.5129	46.7380	46.7380
0.6253g	0.4654g	0.7021g	0.4872

92-05688 Ni #5 TOTAL Wt. = 250.41

BLANK

35 mg of each was given to Radchem + a separate
35 mg of each was given to 329 for Ni & Pb analyses.

Analyst:

Date:

Reviewer:

Date:

A. Hoi

4-3-92

Shanghae

4/6/92

Procedures Used:

- ☒ PNL-ALO-101, Acid Digestion for Metals Analysis
- ☐ PNL-ALO-102, Fusion of Hanford Tank Waste Solids
- ☐ PNL-ALO-103, Water Leach of Sludges, Soils, and Other Solid Samples
- ☐ PNL-ALO-104, Extraction Procedure Toxicity
- ☐ PNL-ALO-106, Acid Digestion for Preparation of Samples for Radiochemical Analysis
- ☐ PNL-ALO-107, Leach Procedure for Preparing Sludges, Soils and Other Solid Samples for Free Cyanide Analysis
- ☐ PNL-ALO-108, Aqueous Leach of Sludges, Soils and Other Solid Samples for Anion Analysis
- ☐ PNL-ALO-330 Hexadecane Extracts for Volatile Organic Compounds
- ☐ PNL-ALO-504, Percent Solids Determination of Soils/Sludges/Solids
- ☐ PNL-ALO-120, Procedure for Extraction of Single Shell Tank Samples for the Analysis of Semivolatile Organic Compounds
- ☐ PNL-ALO-130, Procedure for the Receipt and Inspection of Single Shell Tank (SST) Samples
- ☐ WHC-053-1, Laboratory Procedure for Measurement of Physical and Rheological Properties of Solutions, Slurries and Sludges
- ☐ 7.40.9 Laboratory Procedure for the Physical Characterization of Fluids
- ☐ 7.40.16 Separation of Carbon from Soil/Sediment/Sludge Samples
- ☐ 7.40.24 Measurement of Carbon-14 in Zircaloy Cladding Crud Layer
- ☐ 7.40.25 Distillation of Caustic Trap Solutions for C-14 Separation
- ☐ 7.40.29 Specific Gravity of Highly Radioactive Solutions
- ☐ 7.40.30 Bulk Density of Highly Radioactive Free-Flowing Granular Solids
- ☐ 7.40.34 Tritium in Irradiated Cladding Materials
- ☐ 7.40.36 Analysis of Solid Samples for Carbonate by Use of Coulometrics Model 5011 Coulometer.
- ☐ 7.40.37 Determination of Carbon in Solids Using the Coulometrics Carbon Dioxide Coulometer
- ☐ 7.40.42 Determination of Carbon-14 in Radioactive Liquids, Soils, and Sludges
- ☐ 7.40.47 Determination of TC, TOC and TIC in Radioactive Liquids, Soils, and Sludges by Hot Persulfate Method
- ☒ Other TI-HSP-WINDOW E-001

M&TE Used:

- ☒ Cell 2 Balance 360-06-01-016 Mettler AE 160
- ☐ Cell 6 Balance 362-06-01-038 Mettler AE 200
- ☐ Counter Balance 360-06-01-024 Sartorius R 2000
- ☐ Corning pH meter Model 240 S/N 6629

Documentation List

- Efficiency file EFFFILNB.HH;1:
 - with summary of its preparation
 - modified line 2 to prevent Raygun problems
- Raw efficiency file, EFFFIL.EFF, produced by the program EFF from Raygun output
- Plot of EFFFIL.EFF
- Efficiency data file, EFFFIL.EFF, as produced by Raygun
- Raygun output (2 pages)
- Spectrum 54124700.HH;1 from original count of prepared standard
- Plot of spectrum 54124700.HH;1
- Raygun library containing nuclides in standard and the correct gammas/sec for aliquot used
- LRB record of standard used, 54124-71-4, which was prepared from Amersham standard 54124-70-0
- Calculation of gammas/sec in std 54124-71-4
- LRB record of Amersham standard, 54124-70-0, copy of "Traceability to NIST", and of Product Specification
- Gamma control and background records

HH.LIS

MSW
5/28/92

J. H. Kage
6/23/92

1.500E+00	2.400E-03	-2.400E+00	7.500E-04	6.157E-01
-8.337E-01	9.988E-01	0.000E+00	0.000E+00	0.000E+00 0.
-1.920E+01	2.300E+00	-1.800E-02		
-1.920E+01	2.300E+00	0.000E+00		

15	1.0
60.00000	, 4.4716191E-02
70.00000	, 6.6299617E-02
80.00000	, 8.7108143E-02
90.00000	, 0.1051481
100.0000	, 0.1193425
110.0000	, 0.1293588
120.0000	, 0.1353683
130.0000	, 0.1378315
140.0000	, 0.1373381
150.0000	, 0.1345020
160.0000	, 0.1298992
170.0000	, 0.1240368
180.0000	, 0.1173412
182.5118	, 0.1155710
1835.800	, 8.6789019E-03

EFFFIL. EFF

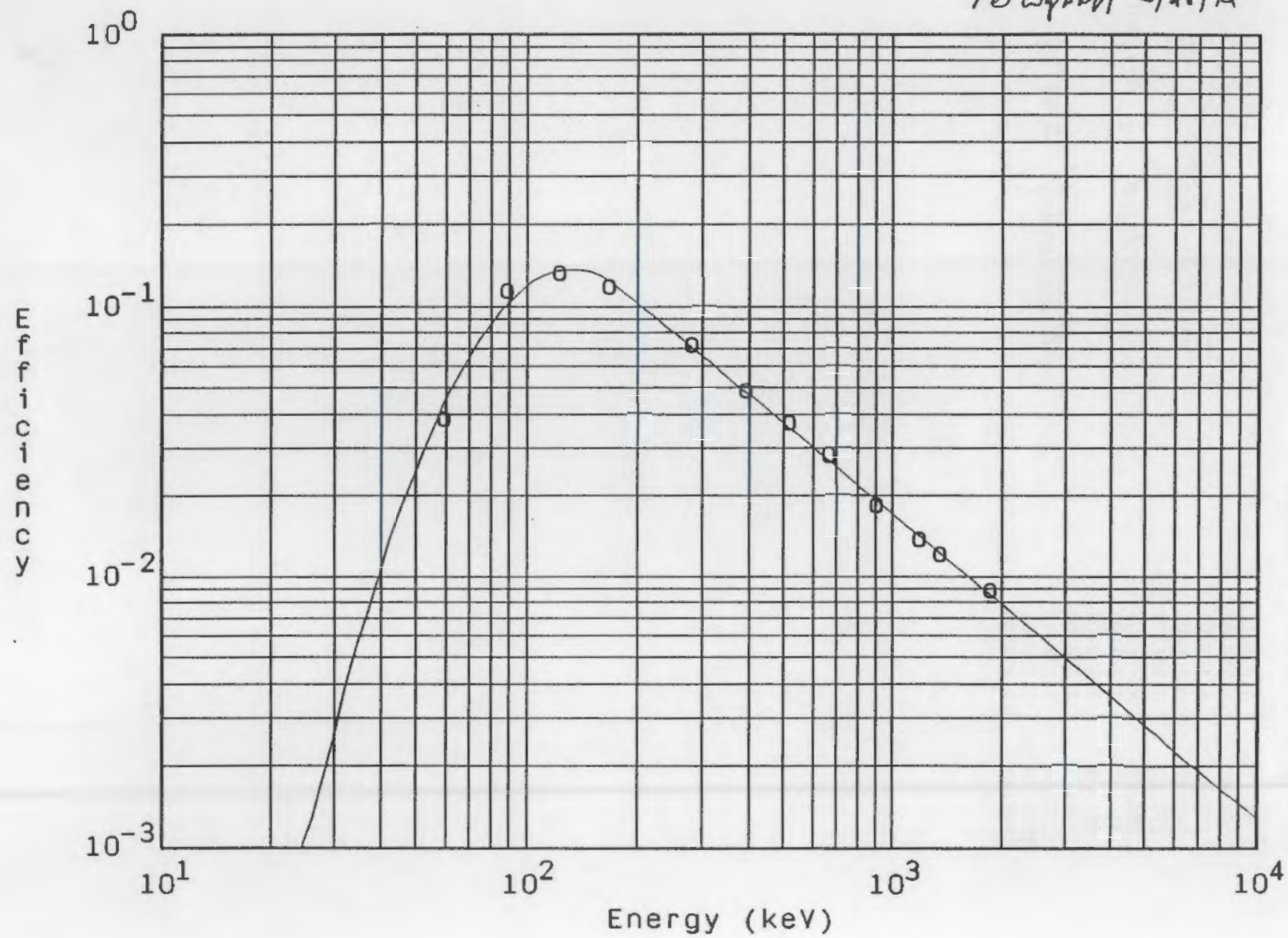
as produced by EFF

MJ Syn
5/28/92

471

efffil.eff

NTL 2/28/92 5/28/92



1.500E+00	2.400E-03	-2.400E+00	7.500E-04	6.157E-01
-3.337E-01	9.988E-01	0.000E+00	0.000E+00	0.000E+00
-1.920E+01	2.300E+00	-1.800E-02		
-1.920E+01	2.300E+00	0.000E+00		

-1 1.0

59.19	3.89E-02
87.86	1.15E-01
122.00	1.34E-01
165.92	1.20E-01
279.13	7.26E-02
391.73	4.92E-02
514.22	3.74E-02
661.70	2.82E-02
898.12	1.85E-02
1173.34	1.39E-02
1332.50	1.23E-02
1835.80	8.99E-03

EFFE/L. EFF

as produced by Raygun

MJW/V 5/28/92

Analysis performed by: NLW

Sample: 99.3+-0.2ULAMERSHAM STD #54124-70-0, FILTER GEO
Weight: 1.00000 grams

1/2 *NLW*
5/28/92

Irradiation date: 0-Feb-1992 at 4:00:00

Count date: 15-May-1992 at 10:15:00

Decay: 104.3d (9008100.0 seconds)

Count times: REAL TIME 4.34h (15636.000 seconds)
LIVE TIME 4.15h (14930.000 seconds)

Dead time: 4.52 percent

Detector: HH pos # 0 Geometry Factor: 1.000

Efficiencies and shape parameters from file: efffil.HH

Spectrum from file : 54124700.hh

	Peak channel	Region start end	Gross counts	Net area ++	Energy (keV)	Gammas /sec	Err % SD	System bkgd
1	60.1	56. 61.	130470.	70304.	59.19	4.709E+00	0.6	0.
2	73.9	71. 74.	37265.	5233.	72.94	3.505E-01	5.0	0.
3	83.3	80. 85.	50105.	2037.	82.39	1.364E-01	7.6	0.
4	88.8	85. 90.	143469.	101044.	87.86	6.768E+00	0.7	0.
5	123.0	120. 124.	128513.	96413.	122.00	6.458E+00	0.4	0.
6	137.3	135. 138.	35683.	12050.	136.32	8.071E-01	2.0	0.
7	167.0	164. 168.	110277.	80964.	165.92	5.423E+00	0.5	0.
8	256.2	253. 257.	18015.	4882.	255.02	3.270E-01	3.6	0.
9	280.3	278. 282.	68141.	48924.	279.13	3.277E+00	0.6	0.
10	393.0	389. 396.	118265.	95629.	391.73	6.405E+00	0.4	0.
11	515.7	510. 517.	93429.	76463.	514.22	5.121E+00	0.4	0.
12	663.3	660. 666.	126013.	112297.	661.70	7.522E+00	0.3	0.
13	816.1	814. 819.	9724.	2164.	814.24	1.449E-01	6.1	0.
14	900.1	895. 902.	105364.	94268.	898.12	6.314E+00	0.4	0.
15	1175.6	1172. 1178.	77939.	73047.	1173.34	4.893E+00	0.4	0.
16	1327.4	1325. 1331.	5056.	1917.	1324.95	1.284E-01	4.7	0.
17	1335.0	1331. 1340.	68648.	64329.	1332.50	4.309E+00	0.4	0.
18	1838.9	1831. 1842.	50097.	48559.	1835.80	3.252E+00	0.5	0.

++ Net Peak Area above the Compton Continuum before correction for system background. Values flagged with a * are subsequently corrected for system background before calculation of absolute emission rate (gams/sec).

Gamma-ray and nuclide lookup from file: 470_100x.std
which is assumed to be a properly constructed Calibration Certificate.

Delta T = 104.2604 Days
The following Energy - Efficiency pairs have been calculated.

1.500E+00	2.400E-03	-2.400E+00	7.500E-04	6.157E-01	
-8.337E-01	9.988E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00
-1.920E+01	2.300E+00	-1.800E-02			
-1.920E+01	2.300E+00	0.000E+00			
-1	1.0				

59.19	3.89E-02
87.86	1.15E-01
122.00	1.34E-01
165.92	1.20E-01
279.13	7.26E-02
391.73	4.92E-02
514.22	3.74E-02
661.70	2.82E-02
898.12	1.85E-02
1173.34	1.39E-02
1332.50	1.23E-02
1835.80	8.99E-03

Raygun 28-May-1992 8:56:18

2/2

Options - in - Effect

Master file	master.std
CALIBRATE	
PRINT	std.out
USER NAME	NLW
OPTION LIST	
CALC_EFFICIENCY	470_100x.std

TITLE: 99.3+-0.2ULAMERSHAM STD #54124-70-0. FILTER GEO

FILE: 54124700.HH:1

* CHANNELS: 2048

SHELF: 0

DIODE: HH

TIME ZERO: 2 1 92 4 0 0

TIME OF COUNT: 5 15 92 10 15 0

(150135. MINUTES DECAY TIME)

LIVE TIME: 4 HOURS 8 MINUTES 50 SECONDS = 248.833 MINUTES

ELAPSED TIME: 4 HOURS 20 MINUTES 36 SECONDS = 260.600 MINUTES

(DEAD TIME = 0.045)

FLUX CORR. FACT.: 0.000000

GAIN: 1.00045 KEY/CHAN

WEIGHT: 1.00000

PLT INT: 0
PLT LAB: 0
ANTI FLG 0
SLF MLT: 0
AREA REJ: 0
PTR: 0
ERR REJ: 0
ZER LEV: 0
OVR PKR: 0
NOV: 0

M. J. W.
5/28/92

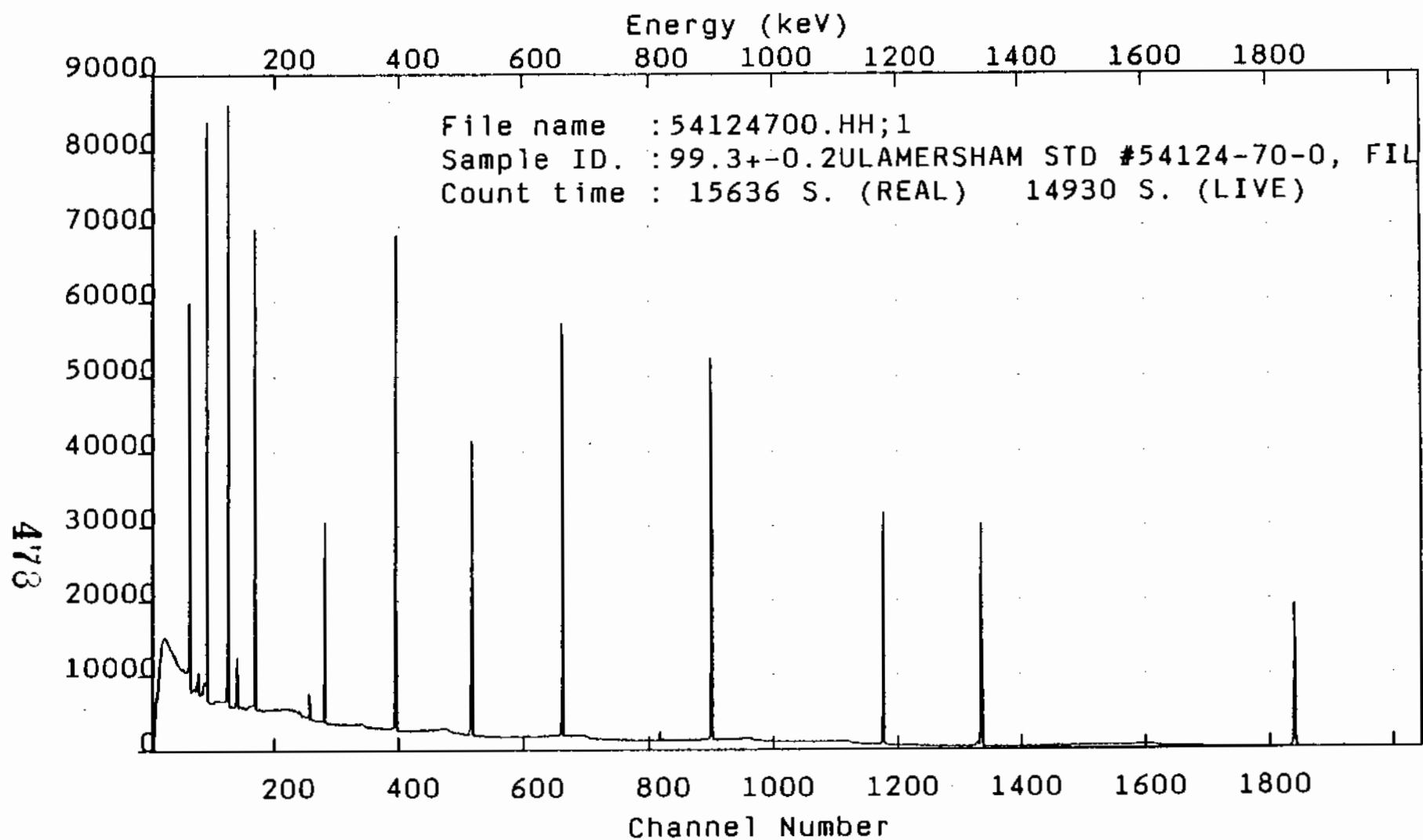
54124700.HH:1 99.3+-0.2ULAMERSHAM STD #54124-70-0. FILTER GEO

	0	50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950
0	14930	11024	6470	5594	5501	4449	3513	3090	2631	2779	2164	1032	1919	2039	1013	1344	1197	1279	52335	1562
1	5	10600	6426	5667	5356	4424	3633	3043	2649	2694	2203	1910	1015	2016	1704	1316	1101	1200	24906	1503
2	0	10615	6632	5604	5692	4470	3493	3131	2634	2779	2240	1703	1016	1947	1010	1420	1206	1270	2694	1543
3	93	10493	6791	5651	5575	4410	3425	3050	2699	2760	2143	1005	1014	1946	1729	1350	1257	1319	1323	1595
4	1400	10449	6770	5795	5467	4300	3506	3066	2677	2743	2139	1010	1934	1974	1651	1394	1245	1267	1303	1504
5	5067	10440	6635	5750	5510	4410	3542	3130	2591	2034	2146	1747	1795	1987	1509	1370	1221	1301	1362	1502
6	6435	10501	6752	5906	5536	7570	3412	3052	2660	2744	2120	1055	1067	1901	1664	1332	1245	1250	1350	1534
7	6975	10641	6603	5059	5470	6019	3470	3070	2672	2020	2194	1005	1900	2011	1546	1362	1215	1317	1404	1503
8	7510	11031	6709	6002	5303	4103	3411	3117	2694	2005	2154	1067	1094	2034	1626	1323	1264	1332	1323	1590
9	8202	12027	6501	5902	5525	4224	3450	3142	2501	2746	2114	1020	1754	1931	1501	1396	1255	1310	1339	1510
10	9307	59004	6534	6066	5539	4341	3560	3007	2676	2750	2210	1746	1709	2247	1566	1399	1201	1251	1331	1526
11	10301	26306	6646	6054	5644	4107	3530	2902	2629	2756	2414	1020	1062	2530	1555	1349	1230	1200	1352	1619
12	11265	7765	6591	6027	5446	4007	3609	3000	2603	2094	2643	1010	1702	9143	1501	1303	1245	1252	1301	1490
13	12010	7774	6500	6001	5460	4035	3463	3006	2507	2791	2005	1020	1799	57011	1544	1300	1174	1356	1507	1470
14	12053	7927	6610	6175	5470	4092	3410	2902	2610	2046	4326	1002	1055	40210	1473	1367	1305	1349	1442	1426
15	13051	7919	6647	6244	5595	3959	3460	2911	2597	2054	33016	1706	1040	4906	1512	1321	1576	1295	1375	1531
16	14569	0090	6650	10290	5665	3993	3512	2964	2625	2057	41445	1051	1741	1950	1527	1350	2452	1314	1402	1366
17	14031	0342	6629	69622	5553	4005	3406	2959	2562	2951	4562	1012	1056	1003	1572	1302	1012	1306	1404	1369
18	15000	0209	6646	9946	5547	4060	3460	2907	2665	2011	1977	1749	1022	1925	1440	1369	1204	1329	1421	1249
19	15115	0095	6590	5532	5576	4027	3466	2997	2705	2904	2060	1707	1061	1940	1505	1322	1295	1291	1351	1313
20	15166	0100	6065	5502	5600	3052	3429	2061	2621	2002	2043	1706	1034	1092	1570	1330	1260	1315	1377	1263
21	15174	0554	7053	5432	5520	3927	3377	2040	2609	2763	1961	1017	1006	1913	1440	1344	1207	1200	1374	1272
22	15004	9127	16561	5510	5513	3905	3390	2001	2719	2017	2009	1033	1062	1057	1510	1426	1364	1351	1325	1244
23	14007	9071	06026	5553	5512	4021	3425	2990	2692	2002	2006	1763	1059	1097	1517	1342	1352	1300	1366	1239
24	14696	10513	12000	5635	5500	3969	3503	2974	2667	2949	1967	1020	1041	1931	1550	1207	1336	1360	1337	1226
25	14446	7701	5061	5459	5507	3954	3433	2924	2601	2099	1090	1036	1020	1090	1401	1277	1293	1310	1306	1231
26	14220	0145	5900	5352	3499	3950	3540	2925	2707	2014	2020	1755	1076	1950	1507	1327	1247	1390	1450	1239
27	14202	7206	5962	5400	5553	3923	3516	2060	2606	2764	1996	1774	1050	1027	1442	1210	1291	1299	1400	1216
28	13992	7652	5713	5355	5477	3976	3460	2007	2604	2716	1959	1706	1043	1962	1447	1257	1273	1270	1362	1200
29	13549	7570	5904	5369	5404	4093	3547	2959	2724	2505	1069	1053	1055	1917	1512	1300	1316	1266	1395	1193
30	13569	7590	5760	5470	5413	30713	3505	2905	2760	2550	1940	1743	1079	1926	1496	1307	1255	1297	1432	1224
31	13263	7622	5000	5403	5395	24552	3472	2946	2756	2539	1957	1739	1794	1970	1436	1275	1200	1336	1439	1214
32	13332	7004	5933	5416	5595	4007	3495	2067	2645	2541	1926	1752	1960	1901	1460	1202	1313	1304	1469	1164
33	13226	9293	5772	5352	5272	3642	3509	2035	2702	2419	1901	1025	1907	1919	1417	1254	1235	1433	1396	1139
34	12691	0910	5067	5352	5292	3650	3457	2910	2634	2441	1917	1051	1093	1915	1390	1200	1310	1349	1411	1113
35	12016	0006	6007	5497	5200	3697	3500	2094	2610	2371	1924	1966	1799	2075	1444	1303	1301	1351	1399	1101
36	12370	9120	6129	5367	5247	3567	3469	2969	2707	2293	1020	1013	1930	2006	1449	1224	1200	1340	1446	1100
37	12419	0932	12449	5575	5237	3595	3479	2951	2705	2352	1070	1044	1971	1977	1462	1239	1227	1417	1494	1130
38	12101	23741	11090	5503	5027	3502	3421	2001	2654	2412	1041	1772	1903	1962	1462	1277	1234	1360	1492	1156
39	11757	03750	5711	5360	5204	3706	3490	2950	2670	2295	1909	1000	1939	1907	1339	1227	1267	1450	1377	1109
40	12040	9120	5956	5540	5393	3566	3523	3000	2772	2250	1930	1075	1069	1900	1522	1240	1261	1366	1457	1122
41	11534	6526	5901	5505	4927	3591	3405	3150	2666	2242	1036	1775	1911	1920	1439	1262	1222	1431	1403	1125
42	11533	6501	5036	5519	4010	3593	3476	12027	2644	2266	1049	1039	1060	2070	1394	1204	1273	1435	1490	1226
43	11425	6429	5030	5470	4707	3501	3309	60706	2600	2264	1043	1790	1964	1997	1425	1203	1200	1407	1470	1111
44	11115	6441	5767	5520	4762	3503	3204	21903	2701	2256	1910	1017	1962	2027	1409	1253	1303	1514	1570	1159
45	11309	6332	5040	5451	4455	3531	3219	2931	2734	2243	1930	1022	1977	2044	1415	1259	1300	1501	1407	1193
46	11020	6363	5033	5306	4643	3497	3147	2710	2679	2329	1060	1764	1099	2005	1306	1200	1212	1474	1404	1160
47	10031	6370	5760	5543	4601	3497	3250	2607	2701	2232	1777	1066	1941	1996	1346	1192	1339	1696	1493	1127
48	10009	6464	5060	5477	4593	3436	3093	2625	2721	2262	1011	1020	1906	1090	1450	1252	1227	2934	1490	1110
49	10754	6356	5632	5443	4601	3537	3161	2717	2725	2161	1790	1759	2027	2037	1364	1234	1309	17024	1500	1162

54124700.MH:1 95.3+-0.2ULAMERSHAM STD #54124-70-0. FILTER GEO

	1000	1050	1100	1150	1200	1250	1300	1350	1400	1450	1500	1550	1600	1650	1700	1750	1800	1850	1900	1950
0	1136	1070	1020	799	590	425	424	405	432	416	471	505	625	354	226	136	131	87	83	59
1	1139	1005	1101	753	560	405	411	382	398	409	473	523	584	337	250	150	129	69	91	74
2	1155	1006	1142	732	537	431	407	411	400	422	477	568	619	349	233	163	130	95	84	67
3	1123	1093	1102	756	510	407	422	376	395	450	477	520	619	360	239	180	130	102	88	81
4	1100	1046	1099	721	564	427	402	395	371	451	439	539	610	351	274	160	154	86	93	84
5	1135	1106	1130	734	506	412	423	390	405	429	495	502	612	354	257	160	131	84	72	72
6	1106	1046	1133	735	531	422	440	373	397	300	531	496	627	353	259	126	141	92	74	78
7	1108	1104	1071	743	577	420	416	354	387	437	456	510	637	346	272	150	162	93	86	74
8	1126	1135	1100	775	500	404	430	384	415	412	444	550	645	320	215	133	112	98	69	78
9	1076	1032	1070	812	485	433	423	423	415	418	462	520	613	356	249	146	131	76	104	54
10	1140	1075	1153	770	494	423	410	388	389	449	491	530	617	346	250	135	130	94	86	60
11	1144	996	1123	750	532	427	434	358	355	463	483	526	598	365	236	137	122	51	72	82
12	1061	1124	1129	760	534	414	430	366	416	445	459	579	631	306	209	147	144	73	91	70
13	1116	1034	1172	714	544	422	432	396	407	474	452	512	550	340	218	144	140	71	79	70
14	1083	1001	1100	784	534	402	444	344	409	477	460	565	580	352	250	143	126	68	84	74
15	1095	950	1111	677	467	413	434	394	371	444	494	544	527	330	254	140	145	81	84	69
16	1147	1076	1075	731	490	407	440	367	411	400	484	553	531	310	216	140	151	92	74	73
17	1042	1044	1120	739	533	429	464	382	431	430	450	595	514	309	194	152	152	99	90	63
18	1094	1000	1121	779	486	385	444	360	423	449	492	569	462	311	204	152	147	101	83	92
19	1137	1060	1046	724	452	415	440	374	426	438	467	556	419	345	210	132	130	91	84	86
20	1067	1109	1011	741	482	414	430	379	375	400	477	500	445	297	187	145	125	82	90	62
21	1122	1040	984	732	493	431	441	403	399	462	479	606	437	300	204	142	131	94	76	84
22	1100	1020	964	946	485	453	457	400	404	440	500	530	409	200	205	146	133	93	90	75
23	1186	1031	977	1539	507	411	460	403	360	437	490	542	435	342	196	141	130	80	76	75
24	1124	1120	905	7191	494	405	445	376	421	400	505	502	449	316	210	146	165	76	66	68
25	1009	986	887	20467	463	405	561	393	419	426	491	579	439	205	100	134	154	88	62	88
26	1109	1131	872	31676	405	401	744	360	393	441	471	593	400	315	160	139	134	68	80	89
27	1124	1042	858	7211	453	443	940	386	400	426	500	505	377	307	100	139	136	80	57	85
28	1042	1069	673	909	472	432	920	393	390	440	487	553	406	206	190	141	150	70	81	71
29	1110	1120	791	641	457	399	750	380	441	424	446	600	332	310	100	132	144	73	84	63
30	1123	1095	874	651	432	423	519	394	403	441	524	570	375	302	199	137	130	89	77	87
31	1101	1023	806	646	493	433	606	386	390	415	485	574	429	200	146	132	154	89	91	79
32	1119	1000	815	653	470	397	896	423	445	446	512	591	370	267	100	134	179	89	81	70
33	1070	1120	820	610	457	417	3209	300	446	466	474	596	399	292	177	136	191	102	71	66
34	1127	1096	815	603	479	400	16019	305	390	446	491	617	379	300	170	135	203	86	71	70
35	1010	1135	799	590	440	433	30204	372	396	406	474	568	367	296	140	146	337	90	76	71
36	1106	1076	806	635	479	415	14504	409	375	409	510	613	300	290	177	152	1011	84	60	86
37	1107	1075	708	577	456	412	1030	402	396	496	506	631	396	206	192	136	4095	73	66	83
38	1030	1130	795	603	429	414	432	382	384	475	525	627	400	290	150	134	13103	83	75	81
39	1071	1065	770	624	451	420	435	351	380	423	517	645	307	294	172	142	19220	102	87	75
40	1129	1160	817	500	443	404	425	300	300	440	474	576	306	274	173	121	9745	84	78	76
41	1072	1072	771	574	492	425	390	300	410	446	512	593	379	206	175	143	1506	70	71	82
42	1000	1001	771	610	452	414	379	305	400	494	517	501	302	257	140	151	193	69	60	70
43	1002	1125	756	573	459	439	367	301	432	429	464	602	353	239	155	125	100	70	83	87
44	1035	1039	700	511	455	430	300	372	426	431	530	635	303	259	161	144	103	81	73	83
45	1063	1109	790	543	430	413	300	374	424	420	520	650	307	265	161	134	116	71	82	70
46	1122	1094	709	590	439	462	356	433	442	461	562	650	392	246	160	147	92	65	61	63
47	1050	1092	797	569	457	415	390	413	431	450	501	505	356	235	137	156	102	104	72	75
48	1002	1097	764	530	450	405	362	410	410	457	557	610	370	259	153	131	106	90	95	85
49	1043	1004	770	501	422	419	309	359	424	457	511	631	393	240	151	129	107	67	70	73

477



M. J. W. M.
5/27/92

= #54124-71-4

RAYGUN Library: 470_100x.std;1 = $99.3 \pm 0.2\lambda$ std #54124-70-0 on filter
contains 10 nuclides and 12 gamma rays.

Nuclide	Parent	Daughter	Use	Half Life	Elem. Factor	Err(%)
Co 57	-	-	0	270.02 d	3.315E+04	2.30
Co 60	-	-	0	5.27 y	3.315E+04	0.60
Sr 85	-	-	0	64.73 d	3.315E+04	2.00
Y 88	-	-	0	106.60 d	3.315E+04	3.20
Cd 109	-	-	0	453.36 d	3.315E+04	3.30
Sn 113	-	-	0	115.10 d	3.315E+04	4.10
Cs 137	-	-	0	30.10 y	3.315E+04	3.00
Ce 139	-	-	0	137.50 d	3.315E+04	1.80
Hg 203	-	-	0	46.49 d	3.315E+04	2.10
Am 241	-	-	0	432.83 y	3.315E+04	2.00

Gamma Ray	Nuclide	Branch ratio	As. Gamma	As. Gamma
59.500	Am 241	1.212E+02	0.000	0.000
88.040	Cd 109	6.892E+01	0.000	0.000
122.070	Co 57	6.283E+01	0.000	0.000
165.850	Ce 139	7.618E+01	0.000	0.000
279.170	Hg 203	2.136E+02	0.000	0.000
391.710	Sn 113	2.437E+02	0.000	0.000
513.990	Sr 85	4.181E+02	0.000	0.000
661.620	Cs 137	2.681E+02	0.000	0.000
898.020	Y 88	6.726E+02	0.000	0.000
1173.230	Co 60	3.647E+02	0.000	0.000
1332.510	Co 60	3.650E+02	0.000	0.000
1836.010	Y 88	7.128E+02	0.000	0.000

* This is certificate or reference date but it is overridden
by time zero in spectrum (which has been set to
Amersham^{std.} reference time).

** Gammas/sec

M. W. H. H.
5/27/92

54124-71-1 500cc marinelli Beaker

2001 of mixed STD 54124-70-0

Pipette # 50690-40-1 500.0 gms of
0.1N HCl
Balance 510-06-01-005

54124-71-2 blue dot point source

2001 of mixed STD 54124-70-0
Pipette # 50690-40-1
2-25-92

54124-71-3 2001 of ^{137}Cs 1892-136-500

Pipette # 50690-40-1 Balance 510-06-01-005

Blue dot point source

54124-71-4 99.3 $\pm$ 0.21 54124-70-0 was
stippled on a blue paper circle
mounted on an a card. To
calibrate disk HH for Nb geometry.
Pipet SA-28, 1885437/p. 34 5-2-92

Steven A Broda, Jr.
Reviewed NISW-p/46 6-22-92

541247

PAGE

Project No. _____ Date of Work _____
Entered By Donna Edwards Date 2-19-92
Disclosed To and Understood By _____
Signed 1. _____ Date _____
2. _____ Date _____

5-5-92 pipette 5A-26 at 5 ml 24° temp

4.9776, 5.0044, 4.9740, 4.9585, 4.9859

$$\bar{X} = 4.98008 \times 1.00268 = 4.993$$

$$S = 0.01688 \times 1.00268 = 0.017 \quad \text{B. Braden 5-5-92}$$

5-6-92

510-06-01-011 performance check 200mg = 2.0000
 22° pipet 5A-28-1001
 .0993, .0988, .0992, .0990

$$\bar{X} = .09908 \times 1.00221 = .0993 \text{ ml}$$

$$S = .00022 \times 1.00221 = .0002 \text{ ml}$$

B. Braden 5-6-92

510-06-01-011 25° pipet 5A-5-501
 .0495, .0491, .0491, .0493

$$\bar{X} = .04925 \times 1.00294 = .0494 \text{ ml}$$

$$S = .00019 \times 1.00294 = .0001 \text{ ml}$$

B. Braden 5-6-92

reviewed by D. Ammerlin 6-3-92

5-7-92

Performance Check 510-06-01-011

2g: 2.0000g at

40° temp 25°C vol factor: 1.00294

pipet # 13A-3 801

0.0486; 0.0491; 0.0491; 0.0491;

$$\bar{X} = 0.0490 \times 1.00294 = 0.0491 \text{ ml} \quad S = 0.0003 \times 1.00294 = 0.0003 \text{ ml}$$

pipet # 13A-4 1001

0.0984; 0.0990; 0.0988; 0.0987

$$\bar{X} = 0.0987 \times 1.00294 = 0.0990 \text{ ml} \quad S = 0.0003 \times 1.00294 = 0.0003 \text{ ml}$$

continued on p. 35

LAB 5437

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Project No.

Date of Work

Entered By

Date

Disclosed To and Understood By

Signed 1.

B. K. Jaff

Date

6/1/92

2.

Date

Calculation for Filter Std from Amersham Mixed Std #54124-70-0

filename: MIXEDSTD

Filter std = #54124-71-4

Stippled from pipet #5A-28 = 99.3 +/- 0.3 ul

Reference Date: 400 PST on 1-Feb-1992

*****Std #54124-70-0*****				***Filter Std***	
isotope	keV	gammas /sec/g	% overall uncertainty	gammas /sec	% error
Am-241	59.54	1134	2.3	121.16	2.3
Cd-109	88.03	645	3.2	68.92	3.2
Co-57	122.1	588	1.9	62.83	1.9
Ce-139	165.9	713	1.5	76.18	1.5
Hg-203	279.2	1999	2.3	213.59	2.3
Sn-113	391.7	2281	4.6	243.72	4.6
Sr-85	514.0	3913	1.7	418.09	1.7
Cs-137	661.7	2509	2.2	268.08	2.2
Y-88	898.0	6295	3.7	672.60	3.7
Co-60	1173	3413	0.7	364.67	0.8
Co-60	1333	3416	0.7	364.99	0.8
Y-88	1836	6671	3.6	712.78	3.6

gammas/sec = gammas/sec/g X 1.076 g/ml X 0.0993 +/- 0.0003 ml

M. W. V. M.
5/27/92

revised S. L. Jodoff 6/9/92

70

(MIXED STD)

54124-70-0

STD ordered by

LEPEL

DO NOT DILUTE STD

Amersham International plc
Amersham, UK

54124-70-0



Description Product code: OCT, 48

Solution number: R7/15/54

This solvent radiochemical gamma ray reference standard consists of a solution in 48 HCl of the ten radiochemicals listed below.

Measurement
and Assay

Reference time: 1200 GMT on 1 February 1992

Mass of solution: 5.1184 grams Density: 1.076 g/ml at 20°C

Parent radiochemical	Chemical activity (Bq/g)	Radioactive mass per gram of solution	Random uncertainty	Systematic uncertainty	Overall uncertainty
Ar-40	50.50	1114	± 0.2 %	± 2.1 %	± 2.3 %
Co-60	80.03	645	± 0.2 %	± 3.0 %	± 3.2 %
Cr-51	129.1	570	± 0.1 %	± 1.8 %	± 1.9 %
Cr-51	105.8	713	± 0.1 %	± 1.2 %	± 1.5 %
Mn-54	270.2	1009	± 0.3 %	± 2.0 %	± 2.3 %
Fe-55	201.7	2301	± 0.1 %	± 4.5 %	± 4.6 %
Ti-44	314.0	711	± 0.2 %	± 1.4 %	± 1.7 %
Ca-45	481.7	2577	± 0.2 %	± 2.0 %	± 2.2 %
V-50	808.0	4205	± 0.2 %	± 3.5 %	± 3.7 %
Cr-51	1173	1411	± 0.3 %	± 0.4 %	± 0.7 %
Cr-51	1335	1414	± 0.3 %	± 0.4 %	± 0.7 %
V-50	1838	6671	± 0.2 %	± 3.4 %	± 3.6 %

Purity

At the reference time the solution also contained the following impurities:

Cadmium-115m less than 2.6 becquerels (0.070 nanocuries) per gram.

Chlorine-36 equal to 56.4 becquerels (0.44 nanocuries) per gram.

Cobalt-56 less than 0.24 becquerels (0.0065 nanocuries) per gram.

Indium-114m equal to 6.0 becquerels (0.16 nanocuries) per gram.

Remarks

Further details, including composition of the solution, methods of measurement, decay scheme uncertainties, decay tables and definitions of uncertainties, are given in the data sheet accompanying this certificate.

This product meets the quality assurance requirements of NRC Regulatory Guide 4.55 for producing certified NIST traceability as defined in NIST/DOE (1988).

Approved
Signature

G. B. H. Parker

Page 1 of 1

Amersham

This certificate is issued in accordance with the conditions of acceptance granted by the National Measurement Accreditation Scheme, which has assessed the measurement capability of the laboratory and its traceability to recognized national standards used by the units of measurement defined in the corresponding national standards. Changes to the certificate are permitted only by the British Council and the issuing laboratory and may not be reproduced other than in full copy with the present report of the issue of this certificate and the units of measurement.

Project No. _____ Date of Work _____
 Entered By James R. Edwards Date 2-19-92
 Disclosed To and Understood By _____
 Signed 1. M. J. J. J. Date 5-36-98
 2. _____ Date _____

54124-70-0

ACCEPTED QA DOCUMENT TRANSMITTAL FORM

MA- 70 IMPACT LEVEL I DOCUMENT # 166371-AKL DATE 4/18/92 ^{Vn}
~~4/7/92 G~~

VENDOR AMERSHAM CORPORATIONQA Submittal Identification QA CL 170A, 200PQ IS COMPLETENumber of Documents Transmitted 4

Distribution to:

Location:

DR EDWARDSP8-08KEVIN GHIRARDOQSB

From/Return to:

Location:

Vinh Nguyen *Vinh Nguyen*337/2233/300 P7-72Phone 372-0686

Attached are:

☐ QA Manual/Plan
☐ NDE Procedures
☐ NDE Reports
☐ Design Drawings
☐ As-Built Drawings
☐ Certification(s)
☐ Test Report(s)
☐ Analytical Report(s)
☐ Calibration Report(s)

☐ Certificates of Conformance
☒ Standard Material Reports
☐ Nonconformance Reports
☐ Inspection/Test Plan
☐ Inspection/Test Instructions (ITI)
☒ QC Review Plan and Record (RPR)
☐ Prelimin/Accep. Test Procedures
☐ WPS/PQRs
☐ Personnel Qualification Record(s)

These Documents are:

Please:

☒ Accepted
☐ Unaccepted
☐ Pending Approval

☒ Project Record Copy(s)
☐ Generic Record Copy(s)

☐ Comment
☐ Approve
☐ Return

NOTE: Accept tags are required to be placed on acceptable items by cognizant staff members. Refer to PAP-70-1401, para. 4.2 and 4.3.3.1.

COMMENTS:

NOTE: The Approval Signature block is considered N/A except when directed to be used in the comments block.

Approval Signature(s):

Date:

54124-70-0

QC REVIEW PLAN AND RECORD (RPR)

<u>166371-AKL</u> Procurement Document No.		COMMENTS: <u>This Standard Material Reports</u> <u>meet 170D QA clause requirement.</u>		Impact Level <u>1</u> Page <u>1</u> of <u>1</u>	
<u>Amersham Corporation</u> Supplier				Date Initiated <u>4/6/92</u>	
<u>Arlington Heights, IL</u> City/State				QC Representative <u>Vinh Nguyen</u>	
				Final accept date <u>4/8/92</u>	
				Date RPR Transmitted <u>4/8/92</u>	
		Other Referenced Documents			

Step No.	Submit Due/Rec'd Date	QA Requirements/ Acceptance Criteria	Responsible Individual	Transmit/Receive		Disapproved		Accepted		Remarks
				Out	In	Date	Init.	Date	Init.	
1	2/25/92 4/6/92	QA CL 170A	Vinh Nguyen					4/8/92	Vh	
2		QA CL 200	Vinh Nguyen					4/8/92	Vh	Verified the solution # by author per t/c on 4/8/92.



Description Product code: OCY.48

Solution number: R2/15/56

This mixed radionuclide gamma-ray reference standard consists of a solution in 4M HCl of the ten radionuclides listed below.

Measurement
and Accuracy

Reference time: 1200 GMT on 1 February 1992

Mass of solution: 5.3164 grams Density: 1.076 g/ml at 20°C

Parent radionuclide	Gamma-ray energy (keV)	Gamma-rays per second per gram of solution	Random uncertainty	Systematic uncertainty	Overall uncertainty
Americium-241	59.54	1134	± 0.2 %	± 2.1 %	± 2.3 %
Cadmium-109	88.03	645	± 0.2 %	± 3.0 %	± 3.2 %
Cobalt-57	122.1	588	± 0.1 %	± 1.8 %	± 1.9 %
Cerium-139	165.9	713	± 0.3 %	± 1.2 %	± 1.5 %
Mercury-203	279.2	1999	± 0.3 %	± 2.0 %	± 2.3 %
Tin-113	391.7	2281	± 0.1 %	± 4.5 %	± 4.6 %
Strontium-85	514.0	3913	± 0.3 %	± 1.4 %	± 1.7 %
Caesium-137	661.7	2509	± 0.2 %	± 2.0 %	± 2.2 %
Yttrium-88	898.0	6295	± 0.2 %	± 3.5 %	± 3.7 %
Cobalt-60	1173	3413	± 0.3 %	± 0.4 %	± 0.7 %
Cobalt-60	1333	3416	± 0.3 %	± 0.4 %	± 0.7 %
Yttrium-88	1836	6671	± 0.2 %	± 3.4 %	± 3.6 %

Purity

At the reference time the solution also contained the following impurities:

Cadmium-115m less than 2.6 becquerels (0.070 nanocuries) per gram.

Chlorine-36 equal to 16.4 becquerels (0.44 nanocuries) per gram.

Cobalt-56 less than 0.24 becquerels (0.0065 nanocuries) per gram.

Indium-114m equal to 6.0 becquerels (0.16 nanocuries) per gram.

Remarks

Further details, including composition of the solution, methods of measurement, decay scheme assumptions, decay tables and definitions of uncertainties, are given in the data sheet accompanying this certificate.

This product meets the quality assurance requirements of NRC Regulatory Guide 4.15 for achieving explicit NIST traceability as defined in NCRP58 (1985).

Approved
Signatory

[Signature]

*Accepted
VN 4-8-92*

G D M Parker

Page 1 of 1

Amersham

This certificate is issued in accordance with the conditions of accreditation granted by the National Measurement Accreditation Service, which has assessed the measurement capability of the laboratory and its traceability to recognised national standards and to the units of measurement realised at the corresponding national standards laboratory. Copyright of this certificate is owned jointly by the British Crown and the issuing laboratory and may not be reproduced other than in full except with the prior written approval of the Head of NAMAS and the issuing laboratory.

54124-70-0

Amersham Corporation
2636 South Clearbrook Drive
Arlington Heights, Illinois 60005-4692
(708) 593-6300

Amersham

TRACEABILITY TO NIST

(NOTE: NIST was formerly the National Bureau of Standards)

This product satisfies the quality assurance requirements of USNRC Regulatory Guide 4.15, Revision 1, February 19, 1979, for achieving NIST traceability, as defined in NCRP 58 (1985), through Amersham's participation in the USCEA/NIST Measurements Assurance Program of the Nuclear Power Industry.

*Accepted
4-8-92*

2780048
12/21/88

Amersham Corporation
2636 South Clearbrook Drive
Arlington Heights, Illinois 60005-4692
(708) 593-6300

54124-70-0

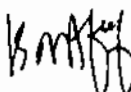
Amersham

CERTIFICATE OF CONFORMANCE

TO: Battelle Northwest Laboratory
For U.S.D.O.E.
c/o Westinghouse, 1163 Building
Richland, WA 99352

This is to certify that the item(s) listed below which were ordered on Purchase Order No. 166371AKL meet Amersham Corporation's catalog specifications and that it/they comply with the requirements specified in the purchase order.

<u>Item No.</u>	<u>Quantity</u>	<u>Product Code</u>	<u>Description</u>	<u>Batch No.</u>
1	1	QCY.48	Mixed Radionuclide Gamma Ray Reference Solution. Nominal Activity 5450 nCi, Nominal Volume 5 ml.	AB9660


K.N. Afeef
Quality Assurance Manager

Accept
wn 4-892

February 13, 1992

Detector Reliability System
Detector HH

18-JUN-92 14:12:38
Time Zero 6-DEC-84 9:36:45

Operator I.D.: *PHL*

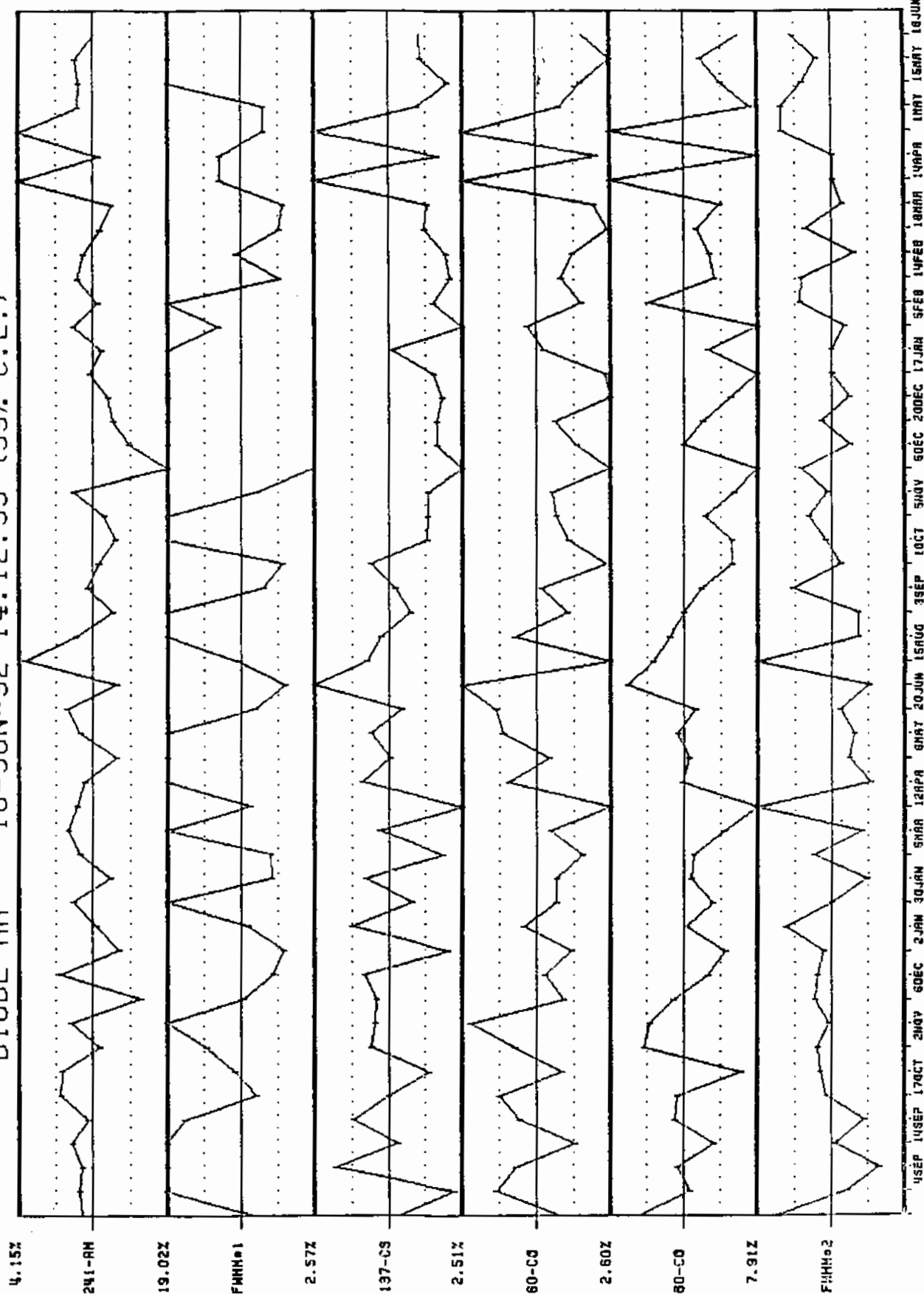
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17-OCT-90	1082.	1.039	2014.	3746.	3200.	1.899
2-NOV-90	1081.	1.100	1986.	3668.	3207.	1.911
2-NOV-90	1058.	1.170	2026.	3726.	3318.	1.918
13-NOV-90	1075.	1.519	2024.	3701.	3312.	1.893
6-DEC-90	1034.	1.073	2023.	3664.	3205.	1.923
13-DEC-90	1082.	0.9940	2030.	3689.	3244.	1.918
2-JAN-91	1047.	0.9630	1972.	3654.	3224.	1.903
18-JAN-91	1060.	1.063	2040.	3715.	3269.	1.901
30-JAN-91	1074.	1.512	1990.	3674.	3239.	1.808
15-FEB-91	1052.	0.9980	2030.	3673.	3264.	1.817
5-MAR-91	1070.	1.000	1975.	3640.	3260.	1.925
25-MAR-91	1079.	1.474	2020.	3681.	3226.	1.827
12-APR-91	1072.	1.057	1923.	3418.	3030.	2.081
16-APR-91	1067.	1.481	2032.	3734.	3274.	1.910
6-MAY-91	1040.	1.469	2013.	3604.	3267.	1.853
15-MAY-91	1070.	1.476	2026.	3740.	3280.	1.842
20-JUN-91	1070.	1.041	2005.	3751.	3260.	1.871
6-JUL-91	1040.	0.9570	2074.	3809.	3337.	1.813
15-AUG-91	1103.	1.094	2029.	3546.	3308.	2.121
29-AUG-91	1073.	1.500	2019.	3726.	3209.	1.836
3-SEP-91	1051.	1.500	1990.	3660.	3273.	1.834
25-SEP-91	1066.	1.021	2009.	3693.	3253.	1.967
1-OCT-91	1059.	0.9640	2026.	3610.	3210.	1.871
17-OCT-91	1049.	1.491	1907.	3657.	3217.	1.901
5-NOV-91	1056.	1.476	1906.	3673.	3240.	1.935
20-NOV-91	1074.	1.040	1906.	3678.	3214.	1.997
5-DEC-91	2.200	0.0000	-2.351	976.6	804.3	1.950
5-DEC-91	1041.	1.470	1980.	3640.	3272.	1.851
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2-JAN-92	1054.	1.470	1976.	3508.	3219.	1.854
17-JAN-92	1064.	1.480	1903.	3612.	3187.	1.889
20-JAN-92	1050.	1.474	2012.	3689.	3245.	1.808
5-FEB-92	1074.	1.144	1959.	3710.	3174.	1.862
5-FEB-92	1060.	1.501	1902.	3642.	3313.	1.952
14-FEB-92	1072.	0.9760	1971.	3668.	3238.	1.949
4-MAR-92	1060.	1.095	1974.	3654.	3244.	1.842
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2-JUN-92	1073.	1.485	1991.	3605.	3254.	1.920
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BEST COPY AVAILABLE

489

553

DIODE HH 18-JUN-92 14:12:39 (99% C.L.)



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* CHANNELS: 2048

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DIODE: HH

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TIME OF COUNT: 12 30 91 0 51 0

(0.000000 MINUTES DECAY TIME)

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ELAPSED TIME: 72 HOURS 50 MINUTES 27 SECONDS = 4370.45 MINUTES

(DEAD TIME = 0.001)

FLUX CORR. FACT.: 0.000000

GAIN: 1.00000 KEV/CHAN

WEIGHT: 0.000000

PLT INT: 0
PLT LAG: 0
ANTI FLG: 0
SLP HLT: 0
AREA REJ: 0
PTR: 0
ERR REJ: 0
ZER LEV: 0
OVR FLD: 0
NOV: 1

BEST COPY AVAILABLE

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13	0381	2081	1624	1519	1167	904	729	543	484	557	393	388	252	192	241	217	145	126	118	243		
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16	0553	2125	1732	1411	1252	951	685	542	463	365	335	278	288	243	193	183	173	159	99	170		
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19	0633	2136	1579	1580	1242	1491	680	530	458	378	335	312	266	232	201	185	150	127	119	459		
20	0657	2133	1577	1442	1126	1192	646	493	436	348	389	384	249	218	231	213	152	111	121	123		
21	0660	2089	1314	1435	1128	802	669	506	423	358	388	295	240	233	207	242	149	146	99	110		
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31	0853	1898	1631	1337	1123	787	733	544	438	373	319	556	232	232	185	218	151	189	123	124		
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37	0930	2139	1599	1347	5538	863	2358	586	488	376	388	275	285	218	191	147	135	141	188	115		
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41	0980	2089	1578	1324	1258	741	576	514	575	346	293	259	237	259	188	188	112	128	118	93		
42	0910	2045	1573	1314	975	788	572	455	381	328	322	279	216	239	281	146	146	153	122	113		
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BKG32DEC1.HH:1

BKG ON HH

BARE

Best copy available

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14	54	110	91	99	96	63	81	51	63	35	28	37	37	33	26	82	26	15	18	33
15	103	117	84	67	66	75	58	47	42	47	38	33	24	40	29	36	25	18	24	26
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18	100	84	95	95	87	70	52	51	47	44	41	28	51	32	33	24	22	20	27	25
19	105	85	145	72	87	51	72	47	55	38	34	38	65	24	31	14	29	23	25	27
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21	97	83	87	100	84	86	66	44	34	35	37	32	35	32	24	30	23	27	23	26
22	97	87	88	96	86	56	63	59	46	28	28	31	40	34	31	35	25	28	29	19
23	101	79	89	87	83	63	45	69	44	38	36	35	40	15	32	19	32	19	23	20
24	89	85	90	88	78	68	63	53	51	22	40	34	38	29	26	26	20	26	20	21
25	97	76	89	94	94	62	56	57	58	33	44	25	35	32	32	28	24	21	25	25
26	78	80	81	63	68	71	59	69	48	42	41	34	34	37	27	25	29	26	25	16
27	83	107	88	91	78	57	49	63	41	32	38	29	28	29	32	20	24	23	23	30
28	88	101	93	68	72	51	51	53	38	33	34	51	58	32	42	23	31	19	18	21
29	89	90	86	77	69	75	58	59	38	36	30	59	77	27	42	21	30	25	29	22
30	110	92	78	66	78	86	61	42	52	33	27	46	60	29	29	19	18	21	24	35
31	97	83	66	102	78	62	73	55	43	35	27	34	45	31	39	30	22	26	23	24
32	87	78	112	80	87	63	71	48	56	20	33	26	29	28	25	19	24	31	20	24
33	83	77	63	71	71	69	55	39	56	27	28	27	24	34	26	20	23	26	30	23
34	107	88	92	86	84	56	58	62	49	37	32	40	29	27	32	21	34	25	36	19
35	76	77	83	74	85	64	62	61	41	32	32	44	31	25	22	28	24	28	23	27
36	100	73	83	79	102	72	67	63	31	42	32	93	34	21	24	25	27	25	24	29
37	97	84	100	87	111	57	44	34	38	32	29	124	40	32	28	29	21	29	54	24
38	97	88	103	65	104	62	55	53	53	42	37	68	58	31	35	17	21	31	20	27
39	103	97	79	81	93	58	49	68	59	29	34	42	25	38	28	30	19	30	34	23
40	89	64	68	93	92	56	56	49	37	38	38	59	25	34	25	24	28	28	23	21
41	89	80	67	90	84	53	55	42	44	34	37	112	18	22	22	21	23	22	28	24
42	107	103	87	83	62	72	51	56	45	48	33	117	22	26	25	23	16	24	24	24
43	104	109	78	98	92	69	49	47	51	39	34	60	26	25	33	31	28	34	25	19
44	104	107	80	81	81	76	54	54	38	66	38	41	33	26	31	23	26	28	28	21
45	97	97	92	78	93	56	55	58	48	71	26	30	29	27	27	22	33	25	37	32
46	88	81	75	76	76	48	58	49	42	42	24	30	34	22	22	20	36	33	26	29
47	88	74	89	92	74	58	58	38	46	39	42	58	33	33	23	22	35	28	21	31
48	85	78	64	65	70	59	49	44	44	35	26	28	27	24	18	22	35	27	27	27
49	95	77	79	75	55	57	52	49	53	31	30	25	52	27	24	33	18	25	29	27

contains 9 nuclides and 30 gamma rays.

Nuclide	Parent Gamma Ray	Daughter Branch ratio	Use ratio	Half Life As. Gamma	Elem. Factor As. Gamma	Err(%)
Co 60	-	-	0	5.27 y	0.000E+00	0.00
	1173.230	9.986E-01		1332.510	0.000	
	1332.510	9.998E-01		1173.230	0.000	
Zr 95	-	-	0	64.40 d	0.000E+00	0.00
	724.180	4.420E-01		756.720	0.000	
	756.720	5.480E-01		724.180	0.000	
Nb 94	-	-	0	2.03E+04 y	0.000E+00	0.00
	702.500	1.000E+00		871.100	0.000	
	871.100	1.000E+00		702.500	0.000	
Nb 95	-	-	0	35.15 d	0.000E+00	0.00
	765.820	9.900E-01		0.000	0.000	
Sn 113	-	-	0	115.10 d	0.000E+00	0.00
	24.000	2.070E-01		391.710	24.210	
	24.210	3.900E-01		391.710	0.000	
	27.300	1.100E-01		391.710	0.000	
	27.900	2.100E-02		391.710	255.040	
	255.040	2.070E-02		391.710	0.000	
	391.710	6.417E-01		0.000	0.000	
Sn 123	-	-	0	129.17 d	0.000E+00	0.00
Sn 119m	-	-	0	245.02 d	0.000E+00	0.00
	23.870	1.600E-01		25.270	25.040	
	25.040	8.000E-02		25.270	28.500	
	25.270	1.540E-01		0.000	0.000	
	28.500	4.000E-02		0.000	0.000	
Sn 121m	-	-	0	50.00 y	0.000E+00	0.00
	26.300	5.500E-01		0.000	0.000	
	29.800	1.200E-01		37.150	0.000	
	37.150	8.000E-02		0.000	0.000	
Sb 125	-	-	0	2.77 y	0.000E+00	0.00
	35.460	5.800E-02		427.950	600.770	
	81.800	1.000E-02		427.950	600.770	
	176.290	6.300E-02		427.950	600.770	
	380.510	1.400E-02		427.950	600.770	
	427.950	2.960E-01		600.770	0.000	
	463.510	1.000E-01		427.950	600.770	
	600.770	1.840E-01		427.950	636.150	
	606.820	5.200E-02		427.950	600.770	
	636.150	1.120E-01		427.950	600.770	
	671.660	1.800E-02		427.950	600.770	

M J Wynall
9-11-91

RAYGUN Library: nbllib.dat;1

contains 9 nuclides and 30 gamma rays.

Nuclide	Parent	Daughter	Use	Half Life	Elem. Factor	Err(%)
Co 60	-	-	0	5.27 y	0.000E+00	0.00
Zr 95	-	-	0	64.40 d	0.000E+00	0.00
Nb 94	-	-	0	2.03E+04 y	0.000E+00	0.00
Nb 95	-	-	0	35.15 d	0.000E+00	0.00
Sn 113	-	-	0	115.10 d	0.000E+00	0.00
Sn 123	-	-	0	129.17 d	0.000E+00	0.00
Sn 119m	-	-	0	245.02 d	0.000E+00	0.00
Sn 121m	-	-	0	50.00 y	0.000E+00	0.00
Sb 125	-	-	0	2.77 y	0.000E+00	0.00

Gamma Ray	Nuclide	Branch ratio	As. Gamma	As. Gamma
23.870	Sn 119m	1.600E-01	25.270	25.040
24.000	Sn 113	2.070E-01	391.710	24.210
24.210	Sn 113	3.900E-01	391.710	0.000
25.040	Sn 119m	8.000E-02	25.270	28.500
25.270	Sn 119m	1.540E-01	0.000	0.000
26.300	Sn 121m	5.500E-01	0.000	0.000
27.300	Sn 113	1.100E-01	391.710	0.000
27.900	Sn 113	2.100E-02	391.710	255.040
28.500	Sn 119m	4.000E-02	0.000	0.000
29.800	Sn 121m	1.200E-01	37.150	0.000
35.460	Sb 125	5.800E-02	427.950	600.770
37.150	Sn 121m	8.000E-02	0.000	0.000
81.800	Sb 125	1.000E-02	427.950	600.770
176.290	Sb 125	6.300E-02	427.950	600.770
255.040	Sn 113	2.070E-02	391.710	0.000
380.510	Sb 125	1.400E-02	427.950	600.770
391.710	Sn 113	6.417E-01	0.000	0.000
427.950	Sb 125	2.960E-01	600.770	0.000
463.510	Sb 125	1.000E-01	427.950	600.770
600.770	Sb 125	1.840E-01	427.950	636.150
606.820	Sb 125	5.200E-02	427.950	600.770
636.150	Sb 125	1.120E-01	427.950	600.770
671.660	Sb 125	1.800E-02	427.950	600.770
702.500	Nb 94	1.000E+00	871.100	0.000
724.180	Zr 95	4.420E-01	756.720	0.000
756.720	Zr 95	5.480E-01	724.180	0.000
765.820	Nb 95	9.900E-01	0.000	0.000
871.100	Nb 94	1.000E+00	702.500	0.000
1173.230	Co 60	9.986E-01	1332.510	0.000
1332.510	Co 60	9.998E-01	1173.230	0.000

M. J. G. M.
9-11-91

D5 - NICKEL 59/63 ANALYSIS RESULTS

SK Fadeff
LR Greenwood
RS Strebin
File/LB

Date June 26, 1992

To Tom Jones

From J. H. Kaye *J. H. Kaye*Subject Final Analytical Results for Ni-63 and Ni-59
in 101-SY Composite Samples, Batch 2

Aliquots of seven 101-SY 24 Window "E" fused samples, a matrix spike and an associated fused hot cell blank were analyzed for ^{63}Ni and ^{59}Ni according to procedure PNL-ALO-473, Nickel Separation from Radioactive Solutions. Included with these samples were the following QC samples: one sample duplicate, one methods (reagent) blank, and one blank spiked with ^{63}Ni . Three of the eight samples were larger aliquots of samples which had been analyzed in Batch 1, and which were reported on June 16. The analysis for ^{59}Ni was determined by counting with Low-Energy Photon Spectrometers (LEPS) in 329 building. The analysis for ^{63}Ni was done with a Packard 2260XL Liquid Scintillation Spectrometer in Lab 54 of 325 building (note - procedure PNL-ALO-474, Determination of Alpha and Beta Activity by Liquid Scintillation Spectrometry is undergoing review).

A summary of the results obtained in Batch 2 is given in the attached table. When the first results (Batch 1) were reported, the possibility was considered that interfering fluorescent x-rays might be induced by beta decay of ^{63}Ni in the samples, but the magnitude of this effect was not known. These interfering x-rays cannot be readily resolved, and would result in high ^{59}Ni estimates. To eliminate part of this problem, the Batch 2 samples were plated onto platinum rather than stainless steel. This eliminates fluorescent x-rays from iron and nickel in the disk substrate. However, fluorescent x-rays can still be induced in the nickel carrier. By evaluation of the LEPS spectrum of the blank spike sample, it was determined that 1000 dpm of ^{63}Ni gives rise to approximately 0.2 cpm of x-ray interference, with an uncertainty of about 25 percent. The correction for this effect is up to 40 percent for some samples. The ^{59}Ni values in the attached table have been corrected accordingly.

Positive results for ^{63}Ni were obtained for all seven samples. The results for ^{59}Ni were positive for six of the samples. This sample also had the lowest ^{63}Ni activity. The relative uncertainty (one sigma) for sample 92-5087 for ^{59}Ni was high at 71%. (Only a 5 ml sample was taken for analysis which results in a net activity at the detection limit.) The hot cell blank, 92-5689, gave a positive ^{63}Ni result based on a slightly positive LSC result of 3.8 ± 0.4 counts per minute. Due to the low counting rate it could not be verified from the beta spectrum that the activity was due to ^{63}Ni . The recovery of ^{63}Ni was 92 percent in the spike blank, and 108 percent in the matrix spike, yielding an estimated batch bias for this batch of 0 percent. The chemical yield was estimated based on the weight of Ni carrier recovered after electrodeposition, rather than upon analysis of the plating solution by

Tom Jones
June 26, 1992
Page 2

ICP; the ICP data was not available. The precision is estimated to be ± 6 percent, based on results for the two aliquots of sample 92-5087 and for the duplicate analyses between batches 1 and 2. One duplicate analysis (92-5074) did not agree well. The relative percent difference was 21%. For reporting purposes, the average of the two results should be used.

Detection limit estimates of 18 and 17 pCi/g, respectively, for ^{63}Ni and ^{59}Ni were based on 1) fusion of 0.75 g, 2) dilution to 250 ml, 3) analysis of 15 ml 4) a chemical yield of 90 percent 5) a counting time of 100 minutes by LSC and 1000 minutes by LEPS and 6) LSC and LEPS backgrounds of 6.22 and 38 counts per minute, respectively (3 times the square root of the background).

JONES2NI.MEM

ENTERED BY

J. H. Kays

DATE

6/26/92

REVIEWER

J. K. Judd

DATE

6/26/92

Ni-63 and Ni-59 Results, 101-SY Samples, Batch 2

Parameters of Interest

Sample #	Sample Type	Ni-63 (pCi/g)	+/- 1 sigma*	Ni-59 (pCi/g)	+/- 1 sigma*	Recovery (Percent)
92-5074	Core Composite	25583	1228	157	28	
92-5076	Core Composite	10161	499	61	17	
92-5080	Core Composite	2180	109	6 (<25)**	15	
92-5086	Core Composite	13102	700	69	19	
92-5087	Core Composite	15126	707	56 (<51)**	40	
92-5087D	Core Composite	16002	764	88	24	
92-5092	Core Composite	61376	2807	270	54	
92-5093	Core Composite	34675	1646	255	41	
92-5689	Hot Cell Blank	72	8	-82 (<17)**	11	
MS-5080	Matrix Spike	37365	1906	-8 (<51)**	41	108
Blank	Reagent Blank	0.21 (<18)**	0.39	-0.98 (<17)**	0.85	

Detection Limit (15 ml)

18

17

		Added (dpm)	+/- 1 sigma*	Recovered (dpm)	+/- 1 sigma*	Recovery (Percent)
SB1	Spike Blank (Ni-63)	1007	26	926	43	92

*One sigma uncertainties are based on propagation of mass, volume, and counting uncertainties.

**Detection limit varies depending on volume analyzed.

ENTERED BY

J. H. Kage

DATE

6/26/92

REVIEWER

J. L. Fadoff

DATE

6/26/92

Ni-63 and Ni-59 Results, 101-SY Samples, Batch 1

Parameters of Interest

Sample #	Sample Type	Ni-63 (pCi/g)	+/- 1 sigma*	Ni-59 (pCi/g)	+/- 1 sigma*
92-5070	Core Composite	22099	1279	282	41
92-5070D	Core Composite	20235	1006	299	39
92-5074	Core Composite	31674	1859	131	47
92-5076	Core Composite	9727	582	-45 **	20
92-5080	Core Composite	2063	127	16 **	15
92-5688	Hot Cell Blank	-41 **	19	-61 **	11
	** Detection Limit	45		91	

		Added (dpm)	+/- 1 sigma*	Recovered (dpm)	+/- 1 sigma*	Recovery (Percent)
SB1	Spike Blank #1 (Ni-63)	1010	26	925	57	92
SB2	Spike Blank #2 (Ni-63)	1010	26	910	57	90

*One sigma uncertainties are based on propagation of mass, volume, and counting uncertainties.

500

Ni-63 and Ni-59 Results, 101-SY Samples, Summary Table

Parameters of Interest

Sample #	Sample Type	Ni-63 (pCi/g)	+/- 1 sigma*	Ni-59 (pCi/g)	+/- 1 sigma*
92-5070	Core Composite	21167	814	291	28
92-5074	Core Composite	28629	1114	144	27
92-5076	Core Composite	9944	383	61	17
92-5080	Core Composite	2122	84	< 25	
92-5688	Hot Cell Blank	< 45		< 50	
92-5086	Core Composite	13102	700	69	19
92-5087	Core Composite	15564	520	88	24
92-5092	Core Composite	61376	2807	270	54
92-5093	Core Composite	34675	1646	255	41
92-5689	Hot Cell Blank	72	8	< 20	

*One sigma uncertainties are based on propagation of mass, volume, and counting uncertainties.

The variation in detection limit is driven by the differing sample volume taken for analysis.

RADIOCHEMISTRY STANDARDS AND CONTROLS
Nickel-63 and Nickel-59
Supporting Documentation

This page indicates the location for supporting documentation for radiochemical analyses performed in support of ^{59&63}Ni determinations.

Detector Controls

- LEPS detector background, control counts, and efficiency determination, see control and background files for M&TE # Diode A, Diode B, and Diode D.
- LSC detector background and control counts, see instrument log, Packard 2260XL, Lab 54, Bldg 325.

Solution standards:

- ⁶³Ni standard #54124-16-0, LRB 54124, page 16, Bldg. 329, room 10.
- Nickel (stable) carrier solution for yield determination, see LRB 53293, page 30.

Performance checks of pipets and balances, see LRB 54371, pg 34, 36-37, and LRB 53647 pg. 79, 83, & 84.

support.ni

File/LB

Date August 12, 1992
To File
From Sandy Fadeff *S. K. Jackoff*
Subject Calibration of LEPS Detectors for Ni-59
Determination

The low energy photon spectroscopy detectors used in support of Ni-59 determination for 101SY were not calibrated with NIST traceable standards. Due to budget and time constraints, an approximation of the counter efficiency had to be made. This was done using a Ni-59 source available from on site. The history and activity of this source is not well documented by today's standards. The efficiency calculated from this source averages 13.24 ± 1.26 disintegrations per count (d/c) (one sigma error).

Subsequent to this analysis, the efficiency of the LEPS detectors was evaluated relative to a NIST traceable ^{55}Fe source. No NIST or other vendor calibrated source of ^{59}Ni is available. The K_{α} X-ray energy of ^{55}Fe (5.90 KeV) is close to that of ^{59}Ni (6.93 KeV) and it is assumed the counter efficiency is the same at these two energies. The efficiency derived from this source is 15.68 ± 3.14 disintegrations/count.

Additional NIST standards have been ordered for use in construction of an efficiency calibration curve.

The d/c value used in reporting the 101SY sample results differs from that determined by the ^{55}Fe source by about 16%. Yet the ^{59}Ni d/c based value is within the estimated error of the new d/c value. The propagated error identified with the ^{59}Ni sample values is equal to or exceeds 16%. Therefore, the analytical results, although biased low, should still be within the error limits identified in the final report.

lepsscali.mem

1013V blank spike

$$\frac{(400.14 \text{ dpm}) \left(\frac{100 + \text{dpm}}{509 \text{ cpm}} \right)}{0.950} \times \frac{1 \text{ ml}}{(1 \text{ ml} - 0.1005 \text{ ml})} = 926 \text{ dpm}$$

$$\frac{926}{1007} \times 100 = \underline{92\% \text{ recovered}}$$

MS-5080

$$\frac{(431.7 \text{ cpm}) (1.9738 \text{ \%})}{0.321} \times \frac{1 \text{ ml}}{0.39942 \text{ ml}} = 1154 \text{ dpm}$$

sampled 0.013929 g

$$\frac{(1154 \text{ dpm}) \text{ pCi}}{(0.013929 \text{ g}) 2.22 \text{ dpm}} = 37,316.7 \text{ pCi/g found}$$

$$\frac{(1007 \text{ dpm}) \frac{1}{2.22} \text{ pCi/dpm}}{0.013929 \text{ g}} = 32,565 \text{ pCi/g added}$$

92-5080 contains 2120 pCi/g

$$\frac{(37,316.7 - 2120) \text{ pCi/g}}{32,565 \text{ pCi/g}} \times 100 = \underline{108\% \text{ recovered}}$$

S. K. Joddy 6/25/92

Revised J. H. Hays 6/26/92

Ni Calculations for 101-BV Samples

04-Jun-92

24-Jun-92

Batch 2, 101-BV, S. K. Fadeff samples

File - N10210V.WR1

Ni concn	10.015 mg/ml	✓	error unknown
Ni carrier, ml =	0.0010	✓ +/-	0.0013
Ni added to samples (mg)	0.001027	✓ +/-	0.0010195
Ni-63 Spike Volume	0.00928	✓ +/-	0.00958
Date of LSC Counts	19-Jun-92	✓	
Ni-63, cps/ml	10348	✓ +/-	269
Date of above cps/ml	31-Jul-89		
Ni Std, cps at Tc =	1007.00	✓ +/-	26.18
LSC Background (100 ml)	6.04	✓ +/-	0.246
LSC Ni-63 net = average of 2 samples	509.365	✓ +/-	2.263
LSC factor =	1.111805	✓ +/-	0.002

Handwritten note: ...

$$(6.06 \text{ cps} \times 100) / 1000 = 0.246$$

$$(509.365 \text{ cps} / 1007.00 \text{ cps}) \times 100 = 50.58\%$$

$$\% = \frac{100 \times 1.111805}{1.111805 + 0.002} = 99.82\%$$

$$\text{LSC factor} = \frac{1.111805}{1.111805 + 0.00219} = 0.99942$$

505

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506

SAMPLE ID (ALQ)	SAMPLE ID (LAB)	DESCRIPTION OF SAMPLE	T	SAMPLE WT (g wet) (+/-)	TOTAL VOLDILUTION (ml) (+/-)	FACTOR (+/-)	VOL ROVD (ml)	VOL AXIAL (ml) (+/-)	NI YIELD DATA (g/g) (+/-)	CHRY YIELD (+/-)	GRAVIM YIELD (+/-)	POY DFF	LEO DFF (2-33) (g)	OPM NI-57	OPM NI-52 (for LEO factor)
92-5086	1	101-SY Sludge	S	0.5620	250	1	35	19.6484	0	2.200	2.767	100.0	150.75	1117	1290
				3.5	3			0.0072	2	ERR	3.0049		0.01	22	76
92-50870	2	101-SY Sludge	S	0.5733	250	1	35	9.5282	0	2.200	3.905	100.0	220.84	727	626
				0.5	3			0.2475	3	ERR	3.3058		1.03	13	52
92-5087	3	101-SY Sludge	S	0.5733	250	1	35	4.9601	0	2.200	3.950	100.2	135.35	244	382
				3.5	3			0.2218	2	ERR	3.3261		1.77	10	11
92-5092	4	101-SY Sludge	S	0.6161	250	1	35	19.6484	0	2.200	3.955	100.3	1897.22	5992	6662
				3.5	3			0.3872	1	ERR	3.3042		2.79	140	182
92-5074	5	101-SY Sludge	S	2.3375	250	1	35	14.8803	2	2.300	3.691	100.3	1147.44	2546	2852
				0.5	3			0.2635	0	ERR	3.3257		1.41	70	73
92-5080	6	101-SY Sludge	S	0.7801	250	1	35	9.9280	0	2.200	3.695	100.3	91.87	101	135
				3.5	3			0.2176	0	ERR	3.3358		3.82	4	4
92-5076	7	101-SY Sludge	S	0.6257	250	1	35	14.8803	0	2.200	2.262	100.0	103.87	785	642
				0.5	3			0.2654	0	ERR	3.2056		1.03	31	23
92-5093	8	101-SY Sludge	S	0.6348	250	1	35	14.8803	0	2.300	2.935	100.0	1245.87	2728	2599
				0.5	3			0.3654	0	ERR	3.3058		1.03	34	71
92-5106	9	Hot Cell Blank	BL		150	1	35	14.8803	0	0.200	2.251	100.3	1.87	0.82	9.56
				3.5	3			0.2654	2	ERR	3.3357		3.42	2.87	1.23
BL	10	reagent blank	BL					1	0	2.200	2.721	100.0	2.15	2.42	0.46
								2	2	ERR	3.3352		3.75	2.77	0.25
BB	11	blank spike	BS					1	2	2.200	3.952	100.3	103.14	207	458
										2.200	1.17		0.17	0.5	0.5
92-5282	12	Matrix Spike	MS	1.7331	250	1	35	4.9601	2	2.200	3.821	100.0	171.7	1239	1154
				0.5	3			0.2218			2.2257		1.01	19	32
DETLM_8		Det lla sludge sa	S	2.75	250	1		5		2.5	3.5		2.5555		3

nominal sample size

 $\sum s^2$

integrated

100-46 10 0.7

 $\frac{26.06 \times 100}{100} = 0.2606$

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PCT RECON.	WT ANAL. ID	SLUDGE NO-60	cpm/g NO-60	cpm/g NO-63	CPM MI-5P (net)	Fluor Cor Factor	FL DCR MI-5P (net)	DFM MI-5P	cpm/g MI-5P	gCi/g N-15P	60/55 RATIO	
	7											
	0.044625	0.915+00	17121.50	2.667	0.249	2.398	0.265	154	69.27	185	92-5086	
	0.022215	0.125+00	347.59	0.071	0.049	2.099	0.756	20	5.57	28		
	0.022749	0.035+04	16021.72	0.472	0.168	2.305	4.035	198	66.24	191	92-50870	
	0.022109	1.025+03	451.37	0.064	0.042	0.277	1.090	57	20.61	45		
	0.011374	1.155+04	15122.07	0.180	0.279	0.120	1.740	124	55.27	271	92-5067	
	0.020054	9.675+02	435.67	2.268	0.320	0.071	2.952	66	29.60	192		
	0.040894	1.065+05	61076.39	0.492	1.381	0.111	27.953	544	270	288	92-5092	
	0.020136	0.775+00	1556.49	0.070	0.350	2.707	15.434	116	30	45		
	0.249670	0.665+04	25557	1.755	0.587	1.167	15.452	348	157	167	92-5074	
	0.020240	1.555+00	711	0.351	2.145	0.169	0.160	40	27	29		
	0.020639	4.045+00	2180	2.054	0.036	2.026	2.379	14	1	356	92-5080	
	0.020174	1.305+00	49	0.241	0.007	0.041	0.011	27	17	22		
	0.037018	1.035+04	18111	0.001	0.174	2.727	4.023	124	57	166	92-5076	
	0.020179	0.745+00	207	0.076	0.041	1.030	1.071	71	17	40		
	0.033617	0.705+04	14075	1.839	0.002	1.320	15.245	507	255	134	92-5093	
	0.020160	0.145+00	935	0.062	0.136	0.155	2.167	89	42	21		
	0.259521	1.515+00	71	-0.722	0.001	-0.702	-9.567	-180	-80	-0.88	92-5089	
	0.020237	1.705+01	7.61	0.255	0.001	0.039	-1.220	27	10	-0.18		
	1	4.845+01	2.21	-0.067	0.007	-0.267	-0.003	-2.95	-2.44		Blank	
	1	0.005+01	0.09	0.057	0.007	1.057	-0.751	0.65	0.38		Blank spike	
91.96	1	9.245+00	417	0.152	0.152	0.000	0.220	0.32	0.00			
	1	1.525+01	10	0.049	0.049	0.069	0.920	0.96	0.40			
121.06	0.210305	1.035+02	125	0.005	0.140	-0.015	-0.150	-17	-8		Matrix spike	
	0.020067	0.505+00	7	0.040	0.011	0.077	-1.023	65	42			
	0.015	1.195+02	92.79	0.115		1.5157	201	91			Detection limit	

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201 Cont'd Date for 10-5V 0-50 samples

Channel	50-5062	50-5063	50-5064	50-5065	50-5066	50-5067	50-5068	50-5069	50-5070	50-5071	50-5072	50-5073	50-5074	50-5075	50-5076	50-5077	50-5078	50-5079	50-5080	50-5081	50-5082	50-5083	50-5084	50-5085	50-5086	50-5087	50-5088	50-5089	50-5090	50-5091	50-5092	50-5093	50-5094	50-5095	50-5096	50-5097	50-5098	50-5099	50-5100	50-5101	50-5102	50-5103	50-5104	50-5105	50-5106	50-5107	50-5108	50-5109	50-5110	50-5111	50-5112	50-5113	50-5114	50-5115	50-5116	50-5117	50-5118	50-5119	50-5120	50-5121	50-5122	50-5123	50-5124	50-5125	50-5126	50-5127	50-5128	50-5129	50-5130	50-5131	50-5132	50-5133	50-5134	50-5135	50-5136	50-5137	50-5138	50-5139	50-5140	50-5141	50-5142	50-5143	50-5144	50-5145	50-5146	50-5147	50-5148	50-5149	50-5150	50-5151	50-5152	50-5153	50-5154	50-5155	50-5156	50-5157	50-5158	50-5159	50-5160	50-5161	50-5162	50-5163	50-5164	50-5165	50-5166	50-5167	50-5168	50-5169	50-5170	50-5171	50-5172	50-5173	50-5174	50-5175	50-5176	50-5177	50-5178	50-5179	50-5180	50-5181	50-5182	50-5183	50-5184	50-5185	50-5186	50-5187	50-5188	50-5189	50-5190	50-5191	50-5192	50-5193	50-5194	50-5195	50-5196	50-5197	50-5198	50-5199	50-5200	50-5201	50-5202	50-5203	50-5204	50-5205	50-5206	50-5207	50-5208	50-5209	50-5210	50-5211	50-5212	50-5213	50-5214	50-5215	50-5216	50-5217	50-5218	50-5219	50-5220	50-5221	50-5222	50-5223	50-5224	50-5225	50-5226	50-5227	50-5228	50-5229	50-5230	50-5231	50-5232	50-5233	50-5234	50-5235	50-5236	50-5237	50-5238	50-5239	50-5240	50-5241	50-5242	50-5243	50-5244	50-5245	50-5246	50-5247	50-5248	50-5249	50-5250	50-5251	50-5252	50-5253	50-5254	50-5255	50-5256	50-5257	50-5258	50-5259	50-5260	50-5261	50-5262	50-5263	50-5264	50-5265	50-5266	50-5267	50-5268	50-5269	50-5270	50-5271	50-5272	50-5273	50-5274	50-5275	50-5276	50-5277	50-5278	50-5279	50-5280	50-5281	50-5282	50-5283	50-5284	50-5285	50-5286	50-5287	50-5288	50-5289	50-5290	50-5291	50-5292	50-5293	50-5294	50-5295	50-5296	50-5297	50-5298	50-5299	50-5300	50-5301	50-5302	50-5303	50-5304	50-5305	50-5306	50-5307	50-5308	50-5309	50-5310	50-5311	50-5312	50-5313	50-5314	50-5315	50-5316	50-5317	50-5318	50-5319	50-5320	50-5321	50-5322	50-5323	50-5324	50-5325	50-5326	50-5327	50-5328	50-5329	50-5330	50-5331	50-5332	50-5333	50-5334	50-5335	50-5336	50-5337	50-5338	50-5339	50-5340	50-5341	50-5342	50-5343	50-5344	50-5345	50-5346	50-5347	50-5348	50-5349	50-5350	50-5351	50-5352	50-5353	50-5354	50-5355	50-5356	50-5357	50-5358	50-5359	50-5360	50-5361	50-5362	50-5363	50-5364	50-5365	50-5366	50-5367	50-5368	50-5369	50-5370	50-5371	50-5372	50-5373	50-5374	50-5375	50-5376	50-5377	50-5378	50-5379	50-5380	50-5381	50-5382	50-5383	50-5384	50-5385	50-5386	50-5387	50-5388	50-5389	50-5390	50-5391	50-5392	50-5393	50-5394	50-5395	50-5396	50-5397	50-5398	50-5399	50-5400	50-5401	50-5402	50-5403	50-5404	50-5405	50-5406	50-5407	50-5408	50-5409	50-5410	50-5411	50-5412	50-5413	50-5414	50-5415	50-5416	50-5417	50-5418	50-5419	50-5420	50-5421	50-5422	50-5423	50-5424	50-5425	50-5426	50-5427	50-5428	50-5429	50-5430	50-5431	50-5432	50-5433	50-5434	50-5435	50-5436	50-5437	50-5438	50-5439	50-5440	50-5441	50-5442	50-5443	50-5444	50-5445	50-5446	50-5447	50-5448	50-5449	50-5450	50-5451	50-5452	50-5453	50-5454	50-5455	50-5456	50-5457	50-5458	50-5459	50-5460	50-5461	50-5462	50-5463	50-5464	50-5465	50-5466	50-5467	50-5468	50-5469	50-5470	50-5471	50-5472	50-5473	50-5474	50-5475	50-5476	50-5477	50-5478	50-5479	50-5480	50-5481	50-5482	50-5483	50-5484	50-5485	50-5486	50-5487	50-5488	50-5489	50-5490	50-5491	50-5492	50-5493	50-5494	50-5495	50-5496	50-5497	50-5498	50-5499	50-5500	50-5501	50-5502	50-5503	50-5504	50-5505	50-5506	50-5507	50-5508	50-5509	50-5510	50-5511	50-5512	50-5513	50-5514	50-5515	50-5516	50-5517	50-5518	50-5519	50-5520	50-5521	50-5522	50-5523	50-5524	50-5525	50-5526	50-5527	50-5528	50-5529	50-5530	50-5531	50-5532	50-5533	50-5534	50-5535	50-5536	50-5537	50-5538	50-5539	50-5540	50-5541	50-5542	50-5543	50-5544	50-5545	50-5546	50-5547	50-5548	50-5549	50-5550	50-5551	50-5552	50-5553	50-5554	50-5555	50-5556	50-5557	50-5558	50-5559	50-5560	50-5561	50-5562	50-5563	50-5564	50-5565	50-5566	50-5567	50-5568	50-5569	50-5570	50-5571	50-5572	50-5573	50-5574	50-5575	50-5576	50-5577	50-5578	50-5579	50-5580	50-5581	50-5582	50-5583	50-5584	50-5585	50-5586	50-5587	50-5588	50-5589	50-5590	50-5591	50-5592	50-5593	50-5594	50-5595	50-5596	50-5597	50-5598	50-5599	50-5600	50-5601	50-5602	50-5603	50-5604	50-5605	50-5606	50-5607	50-5608	50-5609	50-5610	50-5611	50-5612	50-5613	50-5614	50-5615	50-5616	50-5617	50-5618	50-5619	50-5620	50-5621	50-5622	50-5623	50-5624	50-5625	50-5626	50-5627	50-5628	50-5629	50-5630	50-5631	50-5632	50-5633	50-5634	50-5635	50-5636	50-5637	50-5638	50-5639	50-5640	50-5641	50-5642	50-5643	50-5644	50-5645	50-5646	50-5647	50-5648	50-5649	50-5650	50-5651	50-5652	50-5653	50-5654	50-5655	50-5656	50-5657	50-5658	50-5659	50-5660	50-5661	50-5662	50-5663	50-5664	50-5665	50-5666	50-5667	50-5668	50-5669	50-5670	50-5671	50-5672	50-5673	50-5674	50-5675	50-5676	50-5677	50-5678	50-5679	50-5680	50-5681	50-5682	50-5683	50-5684	50-5685	50-5686	50-5687	50-5688	50-5689	50-5690	50-5691	50-5692	50-5693	50-5694	50-5695	50-5696	50-5697	50-5698	50-5699	50-5700	50-5701	50-5702	50-5703	50-5704	50-5705	50-5706	50-5707	50-5708	50-5709	50-5710	50-5711	50-5712	50-5713	50-5714	50-5715	50-5716	50-5717	50-5718	50-5719	50-5720	50-5721	50-5722	50-5723	50-5724	50-5725	50-5726	50-5727	50-5728	50-5729	50-5730	50-5731	50-5732	50-5733	50-5734	50-5735	50-5736	50-5737	50-5738	50-5739	50-5740	50-5741	50-5742	50-5743	50-5744	50-5745	50-5746	50-5747	50-5748	50-5749	50-5750	50-5751	50-5752	50-5753	50-5754	50-5755	50-5756	50-5757	50-5758	50-5759	50-5760	50-5761	50-5762	50-5763	50-5764	50-5765	50-5766	50-5767	50-5768	50-5769	50-5770	50-5771	50-5772	50-5773	50-5774	50-5775	50-5776	50-5777	50-5778	50-5779	50-5780	50-5781	50-5782	50-5783	50-5784	50-5785	50-5786	50-5787	50-5788	50-5789	50-5790	50-5791	50-5792	50-5793	50-5794	50-5795	50-5796	50-5797	50-5798	50-5799	50-5800	50-5801	50-5802	50-5803	50-5804	50-5805	50-5806	50-5807	50-5808	50-5809	50-5810	50-5811	50-5812	50-5813	50-5814	50-5815	50-5816	50-5817	50-5818	50-5819	50-5820	50-5821	50-5822	50-5823	50-5824	50-5825	50-5826	50-5827	50-5828	50-5829	50-5830	50-5831	50-5832	50-5833	50-5834	50-5835	50-5836	50-5837	50-5838	50-5839	50-5840	50-5841	50-5842	50-5843	50-5844	50-5845	50-5846	50-5847	50-5848	50-5849	50-5850	50-5851	50-5852	50-5853	50-5854	50-5855	50-5856	50-5857	50-5858	50-5859	50-5860	50-5861	50-5862	50-5863	50-5864	50-5865	50-5866	50-5867	50-5868	50-5869	50-5870	50-5871	50-5872	50-5873	50-5874	50-5875	50-5876	50-5877	50-5878	50-5879	50-5880	50-5881	50-5882	50-5883	50-5884	50-5885	50-5886	50-5887	50-5888	50-5889	50-5890	50-5891	50-5892	50-5893	50-5894	50-5895	50-5896	50-5897	50-5898	50-5899	50-5900	50-5901	50-5902	50-5903	50-5904	50-5905	50-5906	50-5907	50-5908	50-5909	50-5910	50-5911	50-5912	50-5913	50-5914	50-5915	50-5916	50-5917	50-5918	50-5919	50-5920	50-5921	50-5922	50-5923	50-5924	50-5925	50-5926	50-5927	50-5928	50-5929	50-5930	50-5931	50-5932	50-5933	50-5934	50-5935	50-5936	50-5937	50-5938	50-5939	50-5940	50-5941	50-5942	50-5943	50-5944	50-5945	50-5946	50-5947	50-5948	50-5949	50-5950	50-5951	50-5952	50-5953	50-5954	50-5955	50-5956	50-5957	50-5958	50-5959	50-5960	50-5961	50-5962	50-5963	50-5964	50-5965	50-5966	50-5967	50-5968	50-5969	50-5970	50-5971	50-5972	50-5973	50-5974	50-5975	50-5976	50-5977	50-5978	50-5979	50-5980	50-5981	50-5982	50-5983	50-5984	50-5985	50-5986	50-5987	50-5988	50-5989	50-5990	50-5991	50-5992	50-5993	50-5994	50-5995	50-5996	50-5997	50-5998	50-5999	50-6000	50-6001	50-6002	50-6003	50-6004	50-6005	50-6006	50-6007	50-6008	50-6009	50-6010	50-6011	50-6012	50-6013	50-6014	50-6015	50-6016	50-6017	50-6018	50-6019	50-6020	50-6021	50-6022	50-6023	50-6024	50-6025	50-6026	50-6027	50-6028	50-6029	50-6030	50-6031	50-6032	50-6033	50-6034	50-6035	50-6036	50-6037	50-6038	50-6039	50-6040	50-6041	50-6042	50-6043	50-6044	50-6045	50-6046	50-6047	50-6048	50-6049	50-6050	50-6051	50-6052	50-6053	50-6054	50-6055	50-6056	50-6057	50-6058	50-6059	50-6060	50-6061	50-6062	50-6063	50-6064	50-6065	50-6066	50-6067	50-6068	50-6069	50-6070	50-6071	50-6072	50-6073	50-6074	50-6075	50-6076	50-6077	50-6078	50-6079	50-6080	50-6081	50-6082	50-6083	50-6084	50-6085	50-6086	50-6087	50-6088	50-6089	50-6090	50-6091	50-6092	

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net

gross net

34.11 0.067272
449 0.066782
134.28 0.071746
2.367 + 0.049
2.273

51.27 ✓
510.17 ✓
78.18 ✓
2.192 ✓
0.048 ✓

76.70 0.22
6.92 1.4707
84.85 0.48
2.470 ERM
2.364 ERM

possible

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92-5367 S 1405.12e	CPM	92-5392 S 1425.87	CPM	92-5374 S 1427.9698	CPM	92-5360 S 1428	CPM	92-5376 S 1.12E+02	CPM	92-5367 S 1428.53	CPM	92-5389 S 15.11.21	CPM	BLANK_13 S 1640
376	0.1486	378	0.1636	357	0.1500	192	0.1352	300	0.1601	174	0.1416	320	0.1712	351
319	0.1270	263	0.1871	379	0.1374	185	0.1296	399	0.1474	175	0.1425	1676	0.1517	370
301	0.1235	213	0.1515	382	0.1145	165	0.1155	292	0.1377	178	0.1449	1454	0.1602	352
290	0.1264	147	0.1757	312	0.1165	194	0.1359	210	0.1954	194	0.1498	1207	0.1709	331
252	0.1779	214	0.1522	290	0.1371	187	0.1282	229	0.1364	176	0.1364	1235	0.1611	353
229	0.1638	229	0.1629	256	0.1797	234	0.1429	217	0.1744	197	0.1492	955	0.1559	314
211	0.1532	250	0.1779	276	0.1653	147	0.1320	180	0.1481	179	0.1457	774	0.1515	314
179	0.1535	224	0.1574	252	0.1751	178	0.1246	128	0.1632	183	0.1465	676	0.1773	196
195	0.1355	204	0.1594	227	0.1350	164	0.1148	177	0.1405	151	0.1477	552	0.1511	203
192	0.1366	204	0.1594	214	0.1469	143	0.1141	170	0.1428	131	0.1636	519	0.1602	156
181	0.1359	277	0.1386	226	0.1597	179	0.1070	197	0.1359	178	0.1445	444	0.1545	187
182	0.1295	199	0.1217	247	0.1730	148	0.1336	174	0.1457	185	0.1578	415	0.1642	186
184	0.1721	157	0.1726	750	0.1481	172	0.1190	144	0.1573	270	0.1367	794	0.1577	184
184	0.1712	187	0.1741	484	0.1755	162	0.1174	154	0.1384	220	0.1294	774	0.1587	172
174	0.1627	172	0.1629	357	0.1451	170	0.1204	145	0.1331	142	0.1350	706	0.1517	173
177	0.1655	171	0.1656	635	0.1467	181	0.1364	120	0.1316	143	0.1427	704	0.1425	182
171	0.1530	1361	0.1667	614	0.1382	160	0.1364	135	0.1376	130	0.1376	716	0.1574	160
171	0.1577	1164	0.1601	521	0.1664	142	0.1394	124	0.1721	149	0.1655	581	0.1649	143
162	0.1438	165	0.1624	462	0.1625	145	0.1315	135	0.1644	170	0.1703	299	0.1615	137
147	0.1159	620	0.1438	354	0.1479	174	0.1373	139	0.1533	200	0.1651	537	0.1624	139
148	0.1357	485	0.1453	277	0.1640	154	0.1363	156	0.1372	254	0.1705	254	0.1615	154
141	0.1203	400	0.1346	247	0.1730	135	0.1345	127	0.1324	194	0.1577	161	0.1675	116
172	0.1425	212	0.1222	223	0.1541	118	0.1324	144	0.1109	167	0.1385	173	0.1653	141
153	0.1160	276	0.1679	160	0.1176	120	0.1390	137	0.1115	140	0.1156	244	0.1327	134
150	0.1266	192	0.1752	166	0.1162	101	0.1737	135	0.1349	125	0.1650	162	0.1674	109
119	0.1357	170	0.1209	171	0.1198	114	0.1378	125	0.1317	117	0.1352	154	0.1312	131
127	0.1384	223	0.1536	289	0.1464	14	0.1663	116	0.1344	123	0.1301	255	0.1314	127
116	0.1282	284	0.1451	287	0.1453	115	0.1325	142	0.1170	126	0.1267	141	0.1355	122
114	0.1311	175	0.1221	162	0.1176	115	0.1225	135	0.1171	125	0.1127	257	0.1350	99
137	0.1375	162	0.1152	185	0.1296	114	0.1373	125	0.1217	128	0.1343	146	0.1275	110
155	0.1180	162	0.1152	159	0.1186	112	0.1372	127	0.1321	97	0.1373	246	0.1334	110

510

gross
2806
30.57
3332.5
3332.57464
26.05
1335.805650
75.19
3147.5

BEST COPY AVAILABLE

2229
47.20
1132.52713
60.97
2257.51572
67.55
1272.53281
71.25
1592.51470
49.72
3242.5

511

Next
 79.68
 253.5
 93.85
 3.188
 0.268

*batch
 not in select*

54.68
 4989.88
 182.28
 3.492
 0.273

** 21-1-1*

88.71
 2585.5
 116.25
 1.7554
 0.381

now

73.22
 76.5
 86.33
 2.854
 0.261

no peak

75.75
 615.5
 93.34
 3.581
 0.378

75.37
 2259.5
 181.86
 1.839
 2.282

131.27
 -1811.5
 149.77
 -3.752
 2.255

no peak

79.73
 -1397.5
 93.75
 -2.067
 2.357

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CPM	MS_5022 02 2517.75	CFM
0.1530	370	0.1470
0.1482	364	0.1446
0.1536	342	0.1358
0.1488	346	0.1374
0.1554	328	0.1271
0.1504	343	0.1358
0.1504	722	0.1279
0.1287	702	0.1199
0.1266	322	0.1271
0.1175	333	0.1283
0.1115	278	0.1104
0.1133	296	0.1176
0.1210	293	0.1164
0.1048	291	0.1156
0.1091	292	0.1150
0.1109	291	0.1156
0.0975	281	0.1094
0.1085	287	0.1037
0.0835	289	0.1045
0.0847	270	0.1011
0.0939	287	0.1019
0.0727	263	0.1045
0.0859	243	0.0985
0.0817	221	0.0878
0.0786	216	0.0858
0.0798	222	0.0882
0.0835	211	0.0833
0.0751	196	0.0778
0.0683	206	0.0818
0.0725	191	0.0759
0.0618	201	0.0798

4548
57.44
1992.5

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BEST COPY AVAILABLE

2002
+ 100000
100000
100000
100000

513

Prepared By: J. Kaye Date: 6/16/92 Project: 101-SY
 Title/Subject: Check on Spreadsheet Calculations

Calculate for case of ^{63}Ni in 92-5080 (L#5)

1) Calculation of yield based on weight of Ni plated

$$\begin{array}{r}
 \text{a) Wt of Ni + SS disk} \quad 1.91542 \text{ g} \\
 \text{SS disk} \quad 1.91394 \text{ g} \\
 \hline
 0.00148 \text{ g}
 \end{array}$$

b) Amount of Ni added to samples

$$1.98597$$

$$10.015 \frac{\text{mg}}{\text{ml}} \times (0.1983) \text{ ml} = 1.98597 \text{ mg} \checkmark$$

c) Yield

$$Y = \left(\frac{1.48 \text{ mg}}{1.98597} \right) = 0.745 \text{ } \checkmark \text{ } \text{ver. } 0.745 \checkmark$$

2) Calculation of DPM ^{63}Ni in sample

a) LSC outputs net cpm using as blank the reagent blank. Use data Σ 0-50 KeV

$$\begin{array}{r}
 \text{CPM for SP956.1} = 30.10 \\
 \text{" for SP951.1} = 6.34 \\
 \hline
 \text{net} = 23.76 \text{ from}
 \end{array}$$

Spectrograph files, re 23.74 from Protocol #9 printout 9-June-92.

Prepared By: J. Hays Date: 6/16/92 Project: Title/Subject:

b) Calculation of DPM of ^{63}Ni
 $\Sigma 0-50$ LSC counts SP 9510.1 = 557.79 CPM
 to V SP 9511.1 = 553.33 CPM
 $\text{avg} = 555.56 \text{ CPM} \checkmark$
 (Counts on two ^{63}Ni standards)

^{63}Ni activity in ^{63}Ni standard
 on 31-July-1989, activity of ^{63}Ni was
 4.68 μCi per gram

$$A_0 = 4680 \frac{\mu\text{Ci}}{\text{g}} \times (0.996 \pm 0.004) \frac{\text{g}}{\text{ml}}^*$$

* LRB 53647, p 80

$$A_0 = 4661 \mu\text{Ci/ml} \times 2.22 \frac{\text{DPM}}{\mu\text{Ci}}$$

$$A_0 = 10348 \text{ DPM/ml} \text{ on } 7/31/89 \checkmark$$

Decay of ^{63}Ni , $T_{1/2} = 100 \text{ y}$, to 9-June-1992

$$\frac{A}{A_0} = e^{-\lambda t} = e^{-\frac{\ln 2 t}{H}} = e^{-\frac{\ln 2 (1,044 \text{ days})}{100 \times 365.25}}$$

$$\frac{A}{A_0} = e^{-0.019812} = 0.980383$$

$$A = (0.980383)(10,348) = 10,145.000 \text{ DPM/ml}$$

In samples

$$(10,145.000 \frac{\text{DPM}}{\text{ml}})(0.09953 \text{ ml}) = 1009.73 \text{ DPM} \checkmark$$

Prepared By: <u>J. H. Kays</u>	Date: <u>6/16/92</u>	Project: <u> </u>
Title/Subject: <u> </u>		

$$\begin{aligned}
 \text{DPM } ^{63}\text{Ni} &= \frac{(\text{LSC net CPM}) (\text{DPM } ^{63}\text{Ni in STD})}{(\text{net CPM } ^{63}\text{Ni in STD}) \times \text{Yield}} \\
 &= \frac{23.76 \times 1009.73}{(555.56) (0.745)}
 \end{aligned}$$

$$\text{DPM } ^{63}\text{Ni} = 57.96 \quad \text{vs } 58 \quad \checkmark$$

Correction for sample removed for ICP analysis

$$\begin{aligned}
 &\frac{(1.020 \pm 0.003)}{[(1.020 \pm 0.003) - (0.1005 \pm 0.003)]} = 1.109299 \pm 0.006069 \\
 &\quad \quad \quad \approx 1.109298?
 \end{aligned}$$

$$\begin{aligned}
 \text{Sample } 57.96 \text{ DPM} \times 1.109299 &= 64.29 \text{ DPM} \\
 &\approx 64.23 \text{ DPM}
 \end{aligned}$$

Reviewed: S.K. Joddy 6/25/92

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

Calibration Certificate

Description

Principal radionuclide **NICKEL-63** Half-life **100±2 years**
Nominal activity **23.4** **nano** curies
Nominal volume **5** ml in ampoule/bottle number **2452-1**

Measurement Activity of principal radionuclide

Activity per gram of this solution

4.68 **nano** curies of **Nickel-63**
at 0400 hours PST on **July 31, 1989**

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 four pi efficiency tracing using a liquid scintillation counter.

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

Useful Life

This radionuclide has decayed through **0.04** half lives since it was obtained by EMSL-LV

We recommend that this solution should not be used after

Prepared By: <u>J. H. Kays</u>	Date: <u> </u>	Project: <u>101-SY Ni</u>
Title/Subject: <u> </u>		

activity of ^{63}Ni

$$4.68 \times 10^{-9} \frac{\text{Ci}}{\text{g}} \quad \text{on } 7/31/89 \pm 2.6\%$$

(from EPA Calibration Certificate)

$$(4.68 \pm 0.12) \times 10^{-9} \text{ Ci/g}$$

$$(4680 \pm 120) \mu\text{Ci/g} \times (0.996 \pm 0.004)^* \text{ g/ml}$$

$$(4661 \pm 121) \mu\text{Ci/ml} \times \left(\frac{2.22 \text{ dpm}}{\mu\text{Ci}} \right)$$

$$(10,348 \pm 2694.4) \text{ dpm/ml on } 7/31/89$$

* from LRB 53647, p 80

Revised S.K. Jodoff 6/15/92

80

Bal 510 - 06 - 01 - 009

5-29-92

 $T = ^\circ C = 21^\circ C$ Vol Factor 1.00198 = VP

ppt 11.0 1024654, 6000 gm

1.01390, 1.01344, 1.01027, 1.01451, 1.01241

1.01633, 1.00836, 1.01122, 1.01363, 1.00861

 $T = 21^\circ C$ $T = 23^\circ C$ VP 1.00211 $\bar{X} = 1.01247$ $\bar{X}_{VP} = 1.01447$ $\bar{X}_{VP} = 1.014606$ $\sigma = 0.002775$ $\sigma_{VP} = 0.00278$ $\sigma_{VP} = 0.00278$ $\bar{X} = 1.014 \pm 0.003 \text{ ml}$ $\bar{X} = 1.015 \pm 0.003 \text{ ml}$

EPA 63N, 2452-1

4.68 nanoG / gm, 7-3-87 0500PST

opened 5-29-92

54124-90-0

1.00971, 1.00623, 1.00341, 1.01273

1.01152, 1.00822, 1.01269, 1.01088

 $\bar{X} = 1.009499$ $\bar{X}_{VP} = 1.01498$ 105-11-9 $\sigma = 0.003271$ $\sigma_{VP} = 0.003277$ 105-11-12 $\bar{X} = 1.012 \pm 0.003 \text{ gm}$ 1.009 ± 0.003

$$\Rightarrow \text{density} = \frac{\frac{\text{P.S. wt.}}{\text{P.S. vol.}}}{\frac{\text{P.S. wt.}}{\text{P.S. vol.}}} = \frac{1.012 \pm 0.003 \text{ gm}}{1.014 \pm 0.003} = 0.996 \pm 0.004$$

NIST SRM 4726B Dec 1, 1984 N. 1.346 $\times 10^6$ g / gm

54124-91-0

1.03435, 1.03155, 1.03069, 1.02850

1.02689, 1.02773, 1.02719, 1.02417

 $T = 23$ $\bar{X} = 1.02889$ $\sigma = 0.00318$ $\bar{X} = 1.029 \pm 0.003 \text{ gm}$

$$\Rightarrow \text{density} = \frac{1.029 \pm 0.003 \text{ gm}}{1.015 \pm 0.003 \text{ ml}} = 1.014 \pm 0.004$$

S N W LABORATORY
NOTEBOOK NO

53547

Project No.

Date of Work

Entered By

Date

Disclosed To and Understood By

Date

Signed 1.

Date

2.

Date

54124-91-1000

Lab 510-06-01-009

5-28-92

81

$T = 23^{\circ}\text{C}$ $\text{vol flask} = 1.00211$

Appt No K04863, yellow Gx

0.09972, 0.09982, 0.09958, 0.09958, 0.09957
0.09973, 0.09994

$\bar{x} = 0.099706$ $\bar{x}_{UR} = 0.099916$
 $\sigma = 0.000141$ $\sigma_{UR} = 0.000141$

$\bar{x} = 0.0999 \pm 0.0001$

100 ml calibrated vol flask # 5680 4-28-89 by DM
100 $\pm$ 0.08 ml at 20°C

vol flask w/ 64.4760 gm

vol flask + 100 ml spk = 64.5761 gm

vol flask + spk + 1M HCl 165.7969 gm

Robert H. Heston
5-29-92

solution 101.32 gm, 1M HCl dilution 100 $\rightarrow$ 1 ml, 1M HCl

$1.346 \pm 0.015 \text{ } \frac{\text{mg}}{\text{ml}}$, $\frac{60000}{\text{min}}$ $1.014 \pm 0.004 \text{ } \frac{\text{gm}}{\text{ml}}$, $0.0999 \pm 0.001 \text{ } \frac{\text{ml}}{\text{ml}}$ $\frac{1}{100.00 \pm 0.08 \text{ ml}}$

$= 81809. \frac{\text{mg}}{\text{ml}} \pm 973$ 81810 ± 970

Appt No 6-29-92

Robert H. Heston
6-2-92

SNW LABORATORY
NOTEBOOK NO

53647

Project No.

Date of Work

Entered By

Date

Disclosed To and Understood By

Signed 1

Date

2

Date

Error m 92-5093

$$3 \times 4.9601 \text{ ml} \stackrel{\pm 0.0218}{=} 14.8803 \pm 0.03776$$

$$\sqrt{\sum s^2}$$

$$\text{yield: } \frac{0.46298 \stackrel{\pm 0.00005}{-} 0.46115 \stackrel{\pm 0.00005}{\text{g}}}{2.021 \pm 0.013 \text{ mg}} = \frac{1.83 \pm 0.0707 \text{ mg}}{2.021 \pm 0.013 \text{ mg}} = 0.905 \pm 0.035$$

dpm Ni-63 :

$$\frac{(1065.83 \stackrel{\pm 3.26}{\text{cpm}}) (1.9738 \pm 0.0518 \%) }{0.905 \pm 0.035} = 2325 \text{ dpm} \pm 109$$

corrected dpm

$$\frac{2325 \text{ dpm} \pm 109}{1.111228 \pm 0.00219} = 2585 \pm 121 \text{ dpm Ni-63}$$

weight analyzed

$$\frac{(0.5648 \pm 0.0005 \text{ g})}{250 \pm 0.5 \text{ ml}} (14.8803 \pm 0.03776 \text{ ml}) = 0.033618 \pm 0.00011 \text{ g}$$

$$\text{dpm/g: } \frac{2585 \pm 121 \text{ dpm}}{0.033618 \pm 0.00011 \text{ g}} = 76,893 \pm 3,608$$

$$\text{pCi/g} \quad \frac{76,893 \pm 3,608 \text{ dpm}}{2.22 \text{ dpm/pCi}} = 34,636 \pm 1,625 \text{ pCi/g}$$

J. K. - fadoff 6/26/92

Revised J. H. Kage 6/26/92

Fluor Cor factor

$$\text{blank spike: } \frac{833 \text{ dpm} \times 0.192 \pm 0.048 \text{ cpm Ni fluorescein}}{(833)_{38} \times 5.86 \times 10^{-5}} = 2.305 \times 10^{-4} \text{ cpm fl./dpm Ni}^{63}$$

$$92-5093 \quad \frac{2325 \text{ dpm } ^{63}\text{Ni}}{107} \times 2.305 \times 10^{-4} \times 5.86 \times 10^{-5} = 0.5359 \pm 0.1385 \text{ cpm fl}$$

Fl corrected ^{63}Ni :

$$1.339 \pm 0.022 \text{ cpm} - 0.5359 \pm 0.1385 \text{ cpm} = 1.303 \pm 0.161$$

Need d/c determination.

dpm/g:

$$\frac{17.249 \text{ dpm} \times 0.033618 \text{ g}}{0.905 \pm 0.035} = 567 \text{ dpm/g} \pm 90$$

pCi/g

$$\frac{567 \text{ dpm/g}}{2.22 \text{ dpm/pCi}} = 255 \pm 41 \text{ pCi/g}$$

$^{63}\text{Ni}/^{59}\text{Ni}$:

$$\frac{34675 \text{ pCi/g}}{255 \text{ pCi/g}} = 136 \pm 23$$

D. L. Fadoff 6/24/92

Reviewed J. H. Kays 6/26/92

**First Batch Nickel Radioisotopic
Analyst Sheets**

Ni-59 AND Ni-63 ANALYSIS
ANALYST SHEET

Procedure PNL-ALO-473

Date Sample Prep Started 5-8-92

Nickel Carrier

Volume 0.1983 ml $\pm$ 0.0019 ml Date pipetted 5-8-92 BNW 53647 p 79
 Pipet No. 26299 Standard ID 53293 p 30 Concentration 10.015 mg/ml
 Standard Expiration Date 9-1-92 Inorganic Ventures Lot F-Ni 0112

Nickel-63 Spike

Volume 0.09953 ml $\pm$ 0.00015 ml Date pipetted 5-8-92
 Pipet No. 3877 Spike ID 54124-16-0 Spike Conc. _____
BNW 53647 p 69 for data sheet

Sample Information

	Sample ID	Sample Size	Initial Volume	Aliquot Volume	Sample Splits LSC	LEPS
1	^{#1200} 92-5070	4.993				
2	92-5070 Dup	4.993				
3	^{#1212} 92-5074	4.993				
4	^{#1213} 92-5076	4.993				
5	^{#1214} 92-5080	4.993				
6	^{Blank} 92-5688	4.993				
7	reagent BK	— (5 ml)				
8	reagent BK	—				
9	Spk BK	—				
10	Spk BK	—				

Balance No. _____

- 1st Final Sample Aliquot Volume (Step 8.2) 1.020 ml $\pm$ 0.003 ml
 Pipet No. 1024646 Date 6-9-92
 - 2nd Aliquot for stable Ni determination (Step 8.3) 0.0030/0.005 ml $\pm$ 0.003 ml
 Pipet No. 0-1005387 Date 6-9-92
 - 3rd Final Solution Volume for Ni determination (Step 8.3) 5.014 ml $\pm$ 0.006 ml
 Pipet No. 0287 Date 6-9-92 pipet twice for 10 ml

Reference Pipet/Balance Log LRB 53647 page(s) 83

Robert L. Sullivan 7-29-92
 Analyst's Signature date

J. H. Kays 6/14/92
 Reviewer's Signature date

niana1.log

Sample Pipet 5A-26 ^{pt 5-8-92} 4.9946 4.993 $\pm$ 0.017 BNW 54371 p 34

NI-59 AND NI-63 ANALYSIS ANALYST SHEET

Procedure PNL-ALO-473

Date Sample Prep Started 5/19/92

Nickel Carrier

Volume _____ ml $\pm$ _____ ml Date pipetted _____
 Pipet No. _____ Standard ID _____ Concentration _____
 Standard Expiration Date _____

Nickel-63 Spike

Volume _____ ml $\pm$ _____ ml Date pipetted _____
 Pipet No. _____ Spike ID _____ Spike Conc. _____

Sample Information

Sample ID	^{Doc} Sample Size (g)	^{Doc} Initial Volume	^{Ni plated} Aliquot Volume	^{% Ni} Sample LSC	Splits LEPS
92-5070 (1)	1.91317	1.91459	.00142		
92-5070 (2)	1.91619	1.91795	.00176		
92-5074 (3)	1.90740	1.90879	.00139		
92-5074 (4)	1.92418	1.92556	.00138		
92-5080 (5)	1.91394	1.91542	.00148		
92-5688 (6)	1.92106	1.92273	.00167		
REAG. BLK (7)	1.92900	1.93006	.00106		
REAG. BLK (8)	1.91371	1.91521	.00150		
SPK BLK (9)	1.92803	1.92933	.00130		
SPK BLK (10)	1.94044	1.94173	.00129		

Balance No. 510-06-01-009Final Sample Aliquot Volume (Step 8.2) _____ ml $\pm$ _____ ml

Pipet No. _____ Date _____

Aliquot for stable Ni determination (Step 8.3) _____ ml $\pm$ _____ ml

Pipet No. _____ Date _____

Final Solution Volume for Ni determination (Step 8.3) _____ ml $\pm$ _____ ml

Pipet No. _____ Date _____

Reference Pipet/Balance Log LRB _____ page(s) _____

J. H. Kane 5/21/92
 Analyst's Signature date

A. K. Indry 6/15/92
 Reviewer's Signature date

nialanal.log

BETA COUNTING DATA

REQUESTED BY: *R. Stebin* DATE ANALYZED: *5-19-92* SAMPLE TYPE: CHARGE CODE: *M 999B*

REMARKS: *Ni - 10158*

DESIGNATION	SAMPLE	DATE - TIME	CARRIER (M L)	WT. ANALYZED	WT. RESIDUE	ANALYST	SET NUMBER	SHELF	DATE - TIME	COUNTS	MINUTES	BKG. C/M	BKG. CORR. C/M	TECHNICIAN	CALCULATIONS		RESULTS
															IC/M (VOLUME FACTOR)	UNITS OF	
																	µC/
5-20-92 sat																	
1) 92-5070				1						17686	1000	0.919					
3) 92-5074				2						27932		0.537					
4) 92-5076				3						7285		0.634					
5) 92-5080				(4)						2332		()					
2) 92-5070				1						19692	1000	0.919					
92-5080				2						2224		0.557					
BA9				3						684		0.634					
BA9				4						833		()					
92-5688				1						761	1000	0.919					
roy blank				2						528		0.557					
spike blank				3						21754		0.634					
roy blank				4						813		()					
roy blank				1						828		0.919					
spike blank				2						21476		0.557					
															Ranand K. K. K.		6/15/92
															110/11/11		1257

Ronald K. Hagg
6/15/92
No. 1367

526

Second Batch Nickel Radioisotopic
Analyst Sheets

Ni-59 AND Ni-63 ANALYSIS ANALYST SHEET

Procedure PNL-ALO-473

Date Sample Prep Started 5/21/92

Nickel Carrier

Volume 0.2018 ml $\pm$ 0.0013 ml Date pipetted 5/21/92Pipet No. 1024646 Standard ID 53293 pg 3C Concentration 10,015 mg/mlStandard Expiration Date 9/1/92 ^{CG-Ni10 Lot No. C5020, Inorganic Ventures}

Nickel-63 Spike

Volume 0.09928 ml $\pm$ 0.00058 ml Date pipetted 5/21/92Pipet No. 3B-III Spike ID 54124-16-0 Spike Conc. _____

Sample Volume

Volume 4.9601 ml $\pm$ 0.0218 ml Date pipetted 5/21/92 Pipet No. 3B-4

Holdback Carriers 200 μ Fe, 9.97 mg/ml; 100 μ Ba, 10 mg/ml; 1 ml Co, 1 mg/ml; 50 μ Sb, 20 mg/ml; 100 μ Zn, 10 mg/ml; 100 μ Re, 10 mg/ml; 1 ml Sr, 1 mg/ml; 100 μ La, 10 mg/ml; 100 μ Y, 10 mg/ml; 100 μ Mn, 10 mg/ml; 100 μ Cr, 10 mg/ml; 100 μ Cs, 10 mg/ml; 2.5 μ Ru, 0.0436 mg; 50 μ Sr, 20 mg/ml

Sample Information

Balance No. 510-06-01-009

Sample ID	Sample Size	Initial Volume	Aliquot Volume	Sample Splits LSC	LEPS
1 92-5086	4 x 5 ml	0.4095 g	0.41105		
2 92-5086 ^D	2 x 5 ml	0.4427	0.44453		
3 92-5087	1 x 5 ml	0.41464 g ^{0.4214 g}	0.41636		
4 92-5092	4 x 5 ml	0.43034 g ^{0.4239 g}	0.43277		
5 92-5074	3 x 5 ml	0.40078	0.40258		
6 92-5080	2 x 5 ml	0.46030	0.46211		
7 92-5076	3 x 5 ml	0.39533	0.39708		
8 92-5093	3 x 5 ml	0.46115	0.46298		
9 92-5089 HC-Blank	3 x 5 ml	0.40642	0.40820		
10 BL		0.42069	0.42251		
11 BS		0.40214	0.40406		
12 MS-5080	1 x 5 ml	0.42261	0.42427		

* 5 ml pipet: 3B-4 4.9601 $\pm$ 0.0218 ml, 5/21/92Final Sample Aliquot Volume (Step 8.2) 1.0000 ml $\pm$ 0.0013 mlPipet No. Gilson variable Date 6/19/92Aliquot for stable Ni determination (Step 8.3) 0.10058 ml $\pm$ 0.00026 mlPipet No. 3B-III Date 6/19/92Final Solution Volume for Ni determination (Step 8.3) 5.04625 ml $\pm$ 0.00929 mlPipet No. 5 ml Oxford Date 6/19/92 ^{used 2x}Reference Pipet/Balance Log LRB 53647 page(s) 79 and 8454371

Nanaim K. Todor 5/21/92
Analyst's Signature date
nialanal.log

J. H. Kasper 6/21/92
Reviewer's Signature date

Battelle, PNL

NI-59 AND NI-63 ANALYSIS
ANALYST SHEET

Procedure PNL-ALO-473

Date Sample Prep Started 5/21/92

Nickel Carrier

Volume 0.2018 ml $\pm$ 0.0013 ml Date pipetted 5/21/92
Pipet No. 1024646 Standard ID 5329.3 pg 30 Concentration 10.015 mg/ml
Standard Expiration Date 9/1/92

Nickel-63 Spike

Volume 0.09928 ml $\pm$ 0.00058 ml Date pipetted 5/21/92
Pipet No. 30-III Spike ID 54124-16.0 Spike Conc. _____

Sample Information Nickel carrier? 63 Ni added?

Sample ID	Sample Size	Initial Volume	Aliquot Volume	Sample Splits LSC	LEPS
ICP-a	✓				
ICP-b	✓				
LSC-a	✓	✓			
LSC-b	✓	✓			
LSC-c	✓				

Balance No. _____

Final Sample Aliquot Volume (Step 8.2) _____ ml $\pm$ _____ ml

Pipet No. _____ Date _____

Aliquot for stable Ni determination (Step 8.3) _____ ml $\pm$ _____ ml

Pipet No. _____ Date _____

Final Solution Volume for Ni determination (Step 8.3) _____ ml $\pm$ _____ ml

Pipet No. _____ Date _____

Reference Pipet/Balance Log LRB _____ page(s) _____

A. L. Taddy 5/21/92
Analyst's Signature date

J. M. Kay 6/21/92
Reviewer's Signature date

nianal.log

BETA COUNTING DATA

REQUESTED BY *Fadoff* DATE ANALYZED *6/17/92* SAMPLE TYPE *Ni* CHARGE CODE
REMARKS *Stripped disks from sample prep 5/21/92*

SAMPLE DESIGNATION	DATE SAMPLED	CARRIER (M L)	PROCESS	WT. - VOL. ANALYZED	WT. RESIDUE	ANALYST	SET NUMBER	SHEET COUNTED	DATE - TIME COUNTED	COUNTS	MINUTES	BKG. C/M	BKG. CORR. C/M	TECHNICIAN	CALCULATIONS		RESULTS	
															(C/M) (VOLUME FACTOR)		UNITS OF	
															(GC) (2.22 x 10 ⁶) (NS) (SSA) (AW) (YIELD)		µC/	
1								3	6/17/92 12:20	22	30	0.633	0.100					
2								2	6/17/92 1:20	20	30	0.635	0.232					
3								1	6/18/92 9:30	38	30	0.827	0.4397					
4								2	↓	65	30	0.635	1.53					
5								1	6/19/92 9:30	50	30	0.827	0.840					
6								2	↓	17	30	0.635	-0.068					
7								1	6/17/92 11:40	31	30	0.827	0.206					
8								1	6/17/92 1:20	65	30	0.827	1.340					
9								2	6/17/92 11:40	20	30	0.635	0.032					
10								1	6/17/92 12:20	35	30	0.827	0.340					
11								3	6/17/92 11:40	19	30	0.633	0					
12								2	6/17/92 12:20	34	30	0.635	0.498					
												d.c. = $\frac{3(0.827 \times 30)}{30}$		= 0.498 cpm		Revised		
												= $\frac{3(0.635 \times 30)}{30}$		= 0.436 cpm		J. H. Kage 6/21/92		
																J. K. Fadoff 6/19/92		
																Nº 1380		

BETA COUNTING DATA

REQUESTED BY

DATE ANALYZED

SAMPLE TYPE

CHARGE CODE

REMARKS

NL - 101SY

SAMPLE DESIGNATION	DATE SAMPLED	CARRIER (M L)	PROCESS	WT. - VOL. ANALYZED	WT. RESIDUE	ANALYST	SET NUMBER	SHELF COUNTED	DATE - TIME	COUNTS	MINUTES	BKG. C/M	BKG. CORR. C/M	TECHNICIAN	CALCULATIONS		RESULTS
															(C/M) (VOLUME FACTOR)	(GEO) (2.22 x 10 ⁶) (55) (85) (58A) (AW) (YIELD)	UNITS OF
12								1		847	30	0.741					
11								2		725		0.583					
10								3		28		0.687					
9								X1		23		0.741					
8								4	6/15/92 8:40	1959	30	23/30 0.747					
7								3	6/15/92 8:40	663	30	0.633					
6								66	6/16/92 12:00	567	30	16.7					
5								3		2324	30	0.633					
4								67		3513	30	0.633					
3								1	6/16/92 12:00	330	30	0.827					
2								2	6/15/92 8:40	628	30	0.633					
1								1	6/15/92 8:40	910	30	0.827					
8								3	6/15/92 9:20	2003	30	0.633					

*Revised J. H. Hays
6/21/92*

J. K. Fudge 6/16/92

Nº 1377

126

3-3-77 1892-126-0 Ni 59 .001 mci 2-28-77
opened and diluted to 25ml with 1N HNO₃
Label 1892-126-0
~ 88800 dpm/ml based on 100/MG.

LRB BNW 1892, pg 126

Project No. _____ Date of Work _____
Entered By _____ Date _____
Disclosed To and Understood By: _____
Signed 1. _____ Date _____
2. _____ Date _____

RR 7-11-80

yield
100%

912.2-

gem.

yield

active Ni Case 2 hr - 5mg 25% of same
direct plates 50% and spike 50% to each of
following:

63 Ni 1892-41-250 25% ~ 8880 d/m ~ 100% yield

Ni 59 1892-126-0 50% ~ 4480 d/m ~ 100% yield
electroplate

counted the direct plate and used a 100%
for the electroplate spike.

SPECIAL INSTRUCTIONS 63 Ni 25% 1892-41-250 (See 2614-P6-1)									
DATE TIME COUNTED	ABSORBER MG/CM ²	OBSERVED					BKG.	CORRECTED C/M	LAB.
		REG.	LTS.	TOTAL	MIN.	%M			
7-11-80	none	65		8678	30	289.26	15.9	273.36	
7-11-80	2.3	65		1518	30	50.6	15.9	34.7	

SPECIAL INSTRUCTIONS Ni 59 50% 1892-126-0 electroplate See (2614-P6-2)									
DATE TIME COUNTED	ABSORBER MG/CM ²	OBSERVED					BKG.	CORRECTED C/M	LAB.
		REG.	LTS.	TOTAL	MIN.	%M			
7-11-80	none	65		10276	30	342.53	15.9	326.63	
7-11-80	2.3	65		5518	30	183.93	15.9	168.03	

LRB BNU 2614, pg 86

Project No. _____ Date of Work _____
 Entered By _____ Date _____
 Disclosed To and Understood By: _____
 Signed 1. _____ Date _____
 2. _____ Date _____

59 NI STD 2614-86-2 1892-126-0 50 LAMBOA

SAMPLE ID..... SY:59NISTD.B;2

OF CHANNELS..... 2048

DIODE I.D..... 8

SHELF NUMBER..... 8

CALIBRATION..... 8.8 KEV/CH

TIME ZERO 5/10/88 AT 15:57:57

COUNTED..... 5/10/88 AT 15:57:57

(8.88 MINUTES DECAY TIME)

LIVE COUNT TIME.... 1 HOURS 11 MINUTES 46 SECONDS (71.77 MIN.)

ELAPSED TIME..... 1 HOURS 11 MINUTES 46 SECONDS (71.77 MIN.)

(DEAD TIME = 8.888)

FLUX CORRECTION.... 8.8888

GEOM CORRECTION.... 8.8888 8.8888 8.8888 8.8888 8.8888

WEIGHT..... 8.8888 GRAMS

ANTI: 8 SLP: 8 AREA: 8 P-T: 8 ERR: 8 ZER: 8 OPR: 8 NOV: -1

23749 ± 15 420 ± 30 $\frac{22329 \pm 157}{71.77}$ 312 ± 2.19
 $\frac{4200 \pm 400}{312 \pm 2.19} = 13.21 \pm 1.26$ D/C diode B
 59NI;

59NISTD
 2614-86-2
 1892-126-0 50λ
 4200 ± 400
 7-1-83
~~125~~ 1445
 5-10-88
 B

534

59 NI STD 2614-86-2 1892-126-0 50 LAMDA

SY:59NISTD.B:2 COUNTED 5/18/88 @ 15:57:57 GAIN: 0.0 KEV/CHAN

535

	0	50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950
0	4306	11	12	6	3	3	4	5	0	1	2	1	3	3	5	3	4	4	2	4
1	0	11	6	1	2	1	1	1	2	1	3	1	4	4	2	4	1	1	3	2
2	0	12	4	0	1	2	4	5	5	4	0	2	0	3	4	4	3	1	2	2
3	0	17	6	2	4	2	2	3	2	2	1	3	1	2	5	5	2	3	4	2
4	0	13	5	6	7	1	3	5	0	4	2	2	1	1	1	0	2	4	4	1
5	0	16	2	6	1	3	6	2	3	3	4	1	4	4	2	0	2	2	4	6
6	0	16	11	4	4	5	1	3	1	2	1	2	2	4	1	1	0	2	2	1
7	0	9	4	2	2	4	2	3	5	1	3	2	4	5	3	2	2	5	2	1
8	0	16	0	2	1	2	6	2	4	3	4	1	2	5	4	2	4	3	2	1
9	0	10	5	6	1	1	1	1	3	2	3	5	0	1	2	4	1	4	3	1
10	0	8	6	4	5	4	3	0	4	3	1	1	3	2	3	0	3	4	3	1
11	346	11	13	1	0	1	2	3	2	5	0	3	1	3	3	1	2	2	0	0
12	490	8	7	4	1	2	3	2	2	5	1	0	3	3	7	3	2	4	0	1
13	276	16	6	5	0	1	4	5	4	6	2	5	3	0	1	2	5	2	2	2
14	142	13	8	3	2	2	3	4	2	14	3	5	3	1	5	4	1	3	2	1
15	117	14	8	3	5	5	3	8	3	7	7	5	7	3	4	4	3	1	3	0
16	100	15	6	0	3	5	3	7	4	10	3	2	2	5	5	5	2	1	0	0
17	92	21	7	2	3	2	12	6	4	3	4	2	2	0	7	0	2	4	1	3
18	96	10	9	3	2	3	3	6	4	4	3	2	3	3	4	6	8	2	3	3
19	81	9	1	1	1	1	6	3	3	2	1	4	3	5	3	4	3	1	1	3
20	98	6	4	1	4	1	3	3	4	6	1	4	2	2	2	0	3	4	1	3
21	109	15	8	1	3	2	2	1	5	4	3	1	5	1	5	1	2	1	1	3
22	85	12	7	4	4	3	2	1	0	3	4	2	3	1	4	0	3	0	1	3
23	68	9	6	4	3	2	0	4	5	2	2	2	1	2	2	4	3	3	1	2
24	87	15	4	2	0	4	2	7	5	1	4	5	5	3	3	2	2	1	4	0
25	94	6	7	2	2	1	3	15	8	4	3	3	0	3	3	5	1	2	2	3
26	149	8	9	3	0	6	3	12	6	2	1	2	2	3	2	5	2	2	1	2
27	219	8	7	4	3	1	0	6	1	6	2	4	2	0	0	3	0	2	2	4
28	284	18	9	3	2	2	6	7	3	4	6	3	5	4	3	4	2	1	7	1
29	220	13	7	2	3	3	4	4	3	4	3	2	2	3	1	2	3	4	5	2
30	190	4	7	3	5	4	3	2	2	4	7	1	1	0	3	4	1	3	6	4
31	221	19	4	3	1	4	4	2	3	4	4	0	3	3	6	1	5	0	6	2
32	357	13	11	1	9	2	4	3	3	4	4	0	2	2	1	0	1	10	3	2
33	977	12	8	5	6	5	3	4	0	2	4	4	3	3	1	4	2	1	3	1
34	3266	18	7	2	9	2	0	3	2	1	2	3	1	1	2	1	0	3	6	4
35	6243	19	7	3	5	1	4	6	3	4	2	0	3	2	4	3	2	1	2	1
36	6423	6	7	1	2	5	3	5	1	1	2	1	2	2	6	1	5	3	4	3
37	3389	6	3	3	1	2	3	3	0	6	2	3	4	4	3	3	4	0	1	1
38	1470	6	5	2	3	3	3	0	3	5	3	4	3	3	2	1	1	4	7	4
39	1167	8	5	2	3	3	3	7	3	0	2	1	2	2	3	2	4	2	0	3
40	814	4	3	7	2	3	4	6	3	3	2	2	5	2	4	3	1	5	2	0
41	327	5	4	5	4	2	2	3	6	2	2	1	3	1	4	1	5	3	3	3
42	75	2	3	5	2	3	3	5	3	2	1	6	3	3	1	0	3	4	1	1
43	34	7	4	2	5	0	1	2	1	2	5	1	3	3	5	1	3	2	1	3
44	9	9	6	2	1	4	3	1	5	5	5	4	3	2	4	1	2	4	4	1
45	11	9	5	2	1	5	2	2	1	1	3	3	0	2	0	0	3	1	6	1
46	12	10	4	2	2	3	5	4	0	2	7	2	4	3	0	3	1	0	4	3
47	11	6	6	4	0	1	5	6	3	1	6	2	1	1	2	2	3	5	5	2
48	16	7	10	3	4	2	4	2	4	2	5	0	1	4	1	2	2	5	4	2
49	11	5	1	3	2	3	4	6	2	4	2	2	5	1	2	0	2	0	2	3

59 Ni STD 2614-86-2 1892-126-0 50 LAMDA

SAMPLE ID..... SY:59NISTD.A;2

$$33447 \pm 183 - 860 = 29 = \frac{32587 \pm 185}{102.9} = 316.7 \text{ C/m}$$

OF CHANNELS..... 2E48

$$\frac{4200 \pm 400 \text{ g/m}}{316.7 \text{ C/m}} = 13.26 \pm 1.26 \text{ d/C}$$

13.26 $\pm$ 1.26 d/C Diode A
59 Ni

DIODE I.D..... A

SHELF NUMBER..... B

CALIBRATION..... B.B KEV/CH

TIME ZERO 5/10/88 AT 14:39:35

COUNTED..... 5/10/88 AT 14:39:35

(B.BB MINUTES DECAY TIME)

LIVE COUNT TIME.... 1 HOURS 42 MINUTES 54 SECONDS (102.90 MIN.)

ELAPSED TIME..... 1 HOURS 42 MINUTES 54 SECONDS (102.90 MIN.)

(DEAD TIME = B.BBB)

FLUX CORRECTION.... B.BBBB

GEOM CORRECTION.... B.BBBB B.BBBB B.BBBB B.BBBB B.BBBB

WEIGHT..... B.BBBBB GRAMS

ANTI: B SLP: B AREA: B P-T: B ERR: B ZER: B OPR: B NOV: -1

59 Ni STD

2614-862

1892-126.0 50X

4200 $\pm$ 400

05127-1-83

1255

5-10-88

Diode A

536

	#	50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950
0	6174	10	10	8	7	6	5	4	4	1	5	1	6	3	8	4	3	3	5	1
1	0	12	8	4	13	8	5	4	4	10	8	5	4	1	3	5	2	2	2	4
2	0	18	8	8	9	6	6	5	6	7	6	5	4	4	1	3	6	6	0	5
3	0	17	12	8	6	3	5	5	12	3	5	6	4	2	10	1	9	5	3	1
4	0	7	5	14	6	4	6	3	5	4	6	4	2	7	7	5	3	5	1	1
5	0	7	6	1	8	7	7	1	6	4	4	2	5	3	5	2	4	4	3	4
6	0	13	11	3	13	6	1	4	5	2	2	4	5	5	2	7	2	6	2	3
7	0	13	9	5	13	5	6	3	5	1	11	1	7	3	2	1	4	6	3	5
8	0	9	5	8	6	2	3	9	3	6	7	5	5	10	2	1	2	2	1	3
9	69	9	8	8	9	8	2	6	6	9	3	3	6	3	3	1	3	1	3	3
10	302	8	8	6	4	5	11	5	4	7	11	3	6	3	6	2	3	3	4	5
11	257	11	10	3	5	6	12	5	6	9	4	2	7	2	3	3	4	1	4	3
12	157	9	7	4	7	8	7	11	4	8	10	5	4	2	3	3	4	1	7	4
13	146	12	8	7	7	7	5	8	2	12	3	3	4	2	1	4	2	2	2	2
14	115	17	6	1	8	6	4	7	6	9	2	6	5	5	2	2	1	5	1	2
15	93	27	7	9	9	7	12	5	6	10	2	8	5	2	5	3	1	3	6	2
16	101	19	5	8	2	4	17	7	2	4	6	1	6	3	5	5	1	5	3	2
17	81	16	11	8	1	10	6	8	4	4	7	5	4	2	4	5	3	4	1	3
18	67	11	11	5	1	5	11	4	3	9	5	4	2	7	5	4	1	0	4	3
19	57	13	5	6	6	4	8	3	8	2	6	2	4	4	2	5	0	1	1	5
20	60	12	7	7	8	2	5	5	12	7	6	3	6	3	4	2	2	1	3	1
21	66	11	4	5	5	4	2	9	9	6	2	7	5	4	2	3	6	1	3	3
22	70	10	6	6	3	9	7	7	10	0	3	8	3	7	1	0	1	2	2	1
23	80	4	12	9	4	9	2	10	14	7	0	4	2	4	4	7	4	1	2	4
24	135	12	6	6	8	4	6	13	6	5	5	7	1	5	6	2	3	3	3	4
25	204	17	9	5	7	9	4	12	11	5	10	5	6	1	5	10	3	4	5	2
26	304	9	1	6	7	9	7	16	15	5	1	4	7	6	4	2	2	7	2	2
27	372	10	5	7	6	9	10	7	3	5	1	9	6	5	6	3	2	6	7	4
28	293	20	9	6	7	5	7	5	8	0	6	4	5	4	4	2	4	1	10	1
29	277	19	9	6	11	3	5	5	4	4	4	4	3	6	4	5	2	2	5	2
30	204	15	3	4	3	6	10	5	6	3	4	11	6	6	5	6	2	1	7	7
31	569	24	7	8	2	4	9	9	4	5	2	4	8	3	2	1	2	3	3	1
32	1810	15	7	4	5	4	2	10	3	3	4	3	5	5	2	5	3	3	3	3
33	5354	15	7	4	5	8	5	7	6	3	0	4	7	4	3	3	2	2	5	5
34	8895	16	6	7	8	4	6	5	4	4	1	6	3	5	4	3	3	1	4	3
35	8399	4	2	5	3	1	9	5	5	4	5	3	3	5	3	3	4	4	3	3
36	4459	10	2	7	3	4	6	5	4	4	4	5	4	6	9	1	6	3	6	1
37	1999	7	9	6	8	6	3	5	5	2	3	3	4	2	2	1	1	6	3	4
38	1519	8	7	5	6	6	5	11	6	3	2	2	5	5	3	4	6	2	2	2
39	1012	4	3	5	5	6	5	3	5	4	4	6	1	0	3	3	3	7	3	3
40	427	7	7	11	6	9	5	4	6	3	5	0	2	5	5	4	3	3	1	3
41	98	6	6	3	4	5	7	3	3	7	4	7	7	3	5	2	4	4	3	3
42	27	6	6	7	7	3	8	4	10	3	3	7	5	4	5	4	6	3	7	1
43	19	13	10	6	10	9	3	9	6	4	7	7	3	3	7	1	2	1	3	3
44	11	15	6	7	7	7	7	6	4	7	7	6	6	4	3	2	4	3	5	1
45	14	12	6	4	4	6	6	5	7	5	8	5	4	2	7	3	3	4	1	6
46	15	9	7	6	4	10	4	4	3	2	2	5	6	2	6	1	0	1	4	4
47	19	15	6	7	2	3	6	6	4	6	3	2	2	3	3	3	2	3	3	2
48	18	10	11	5	9	8	1	3	3	4	3	4	5	5	7	3	6	3	5	4
49	12	11	4	4	4	4	5	7	4	8	2	4	3	5	3	6	3	3	2	8

NI59 STD #2614-86-2: 1 IN. SS PLATE, PLATED

SAMPLE ID..... SY:NI59STD.A#1

$$22160 - 660 = 21500 \div 70.13 \text{ min} = 306.6 \text{ cpm} \quad \pm 2.2$$

OF CHANNELS..... Z#48

DIODE I.D..... A

$$\frac{4200 \text{ dpm} \pm 400}{306.6 \text{ cpm} \pm 2.2} = 13.70 \text{ d/c} \pm 1.3$$

SHELF NUMBER..... 8

CALIBRATION..... 0.2 KEV/CH

TIME ZERO 3/30/89 AT 10: 6: 8

COUNTED..... 3/30/89 AT 10: 6: 8

(0.00 MINUTES DECAY TIME)

LIVE COUNT TIME.... 1 HOURS 10 MINUTES 8 SECONDS (70.13 MIN.)

ELAPSED TIME..... 1 HOURS 10 MINUTES 8 SECONDS (70.13 MIN.)

(DEAD TIME = 0.000)

FLUX CORRECTION.... 0.0000

GEOM CORRECTION.... 0.0000 0.0000 0.0000 0.0000 0.0000

WEIGHT..... 1.00000 GRAMS

ANTI: 0 SLP: 0 AREA: 0 P-T: 0 ERR: 0 ZER: 0 OPR: 0 NOV: -1

(THIS SAMPLE HAS BEEN FLAGGED FOR USE AS A STANDARD.)

538

MSJ
4/5/89

NI59 STD #2614-86-2: 1 IN. SS PLATE, PLATED

SY:NI59STD.A0:1 COUNTED 3/30/89 @ 10: 6: 0 GAIN: 0.2 KEV/CHAN

		50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950
0	4200	9	7	4	7	5	4	5	4	4	0	2	5	0	2	2	1	2	4	4
1	957	12	6	4	6	2	2	5	2	2	6	3	3	4	1	2	1	0	1	1
2	2365	0	4	5	6	4	8	6	4	4	2	1	2	1	2	2	2	3	3	1
3	3177	6	0	0	4	2	4	3	5	2	4	3	0	3	2	4	4	1	1	2
4	2400	6	0	9	9	0	6	7	0	5	1	3	4	5	4	4	2	2	2	0
5	1697	10	4	5	2	7	1	4	8	1	7	2	3	4	1	0	2	6	2	2
6	1205	5	9	5	3	10	6	2	5	5	3	2	2	3	4	2	1	3	3	2
7	732	8	5	7	11	4	5	1	1	2	4	2	1	6	1	4	1	1	3	1
8	340	5	13	2	3	5	6	9	4	2	3	7	2	2	2	3	2	4	3	2
9	90	7	6	5	2	1	8	1	4	7	6	3	4	6	3	2	1	3	1	5
10	53	5	3	3	2	3	1	4	3	7	3	0	2	2	2	3	5	2	4	2
11	40	6	6	6	3	3	0	6	7	7	1	3	3	5	4	3	4	2	1	0
12	41	9	3	5	3	1	4	1	9	5	0	3	4	7	4	2	3	3	0	4
13	40	15	4	3	6	4	2	2	1	10	2	1	0	3	3	7	1	2	2	2
14	41	10	11	2	7	3	2	4	2	9	2	2	0	1	5	5	5	1	2	1
15	40	12	5	0	4	2	9	7	4	6	2	3	2	1	1	2	2	1	3	1
16	31	10	2	9	2	4	6	10	8	7	3	4	1	3	6	2	4	5	1	5
17	35	12	3	6	3	4	2	4	8	3	4	4	2	3	5	1	5	1	5	1
18	44	8	4	4	4	2	7	4	0	5	5	0	3	2	1	2	2	0	0	5
19	47	13	6	6	5	4	6	8	1	6	6	4	7	4	6	3	2	2	2	4
20	30	7	0	6	5	7	3	5	0	7	4	5	6	5	3	4	3	4	2	3
21	47	9	6	4	5	7	7	4	2	4	1	5	3	5	2	0	0	2	2	0
22	45	7	3	3	0	3	4	5	1	2	1	4	4	5	7	1	3	4	3	3
23	54	6	6	5	5	4	2	0	6	3	2	6	1	3	0	4	2	3	2	1
24	95	6	0	4	2	4	4	7	3	4	6	0	4	4	2	1	3	4	2	0
25	155	6	4	4	2	4	8	5	3	4	3	1	1	2	3	4	5	2	2	2
26	185	0	4	3	5	3	4	13	5	3	4	2	2	2	2	2	5	2	3	3
27	199	10	6	6	5	2	3	9	6	5	2	2	5	1	4	6	4	3	0	0
28	109	12	4	7	1	3	2	7	6	5	2	5	5	1	1	2	1	2	2	3
29	194	0	5	6	5	3	6	6	4	1	4	2	2	3	5	3	3	2	0	6
30	311	13	6	10	3	1	2	6	5	2	4	3	4	4	2	2	2	1	2	6
31	784	9	2	7	6	4	4	2	8	4	6	1	1	2	1	2	2	2	0	1
32	2360	15	0	3	10	0	5	4	0	5	3	2	3	5	2	3	5	2	1	2
33	4366	14	4	7	4	5	5	5	2	6	4	5	3	2	3	6	2	1	3	6
34	4925	11	7	5	3	5	3	2	5	5	3	4	3	3	3	2	3	2	1	1
35	3604	10	0	6	2	2	4	2	4	6	4	2	3	3	2	2	4	3	7	0
36	2025	6	6	5	5	3	4	6	2	2	2	7	1	0	3	3	2	2	4	3
37	2143	7	10	6	7	6	4	6	3	4	0	2	3	4	0	1	3	3	3	3
38	1153	7	12	5	6	7	4	3	4	2	0	4	3	4	3	2	1	2	1	2
39	569	7	6	3	4	6	6	7	6	5	3	2	5	3	2	2	4	3	1	5
40	320	5	6	7	5	4	5	3	3	5	2	1	8	3	1	2	1	0	0	2
41	170	7	6	7	5	6	4	7	4	4	0	1	4	2	4	6	2	4	0	1
42	61	4	11	5	2	7	2	3	7	5	5	2	5	0	1	3	3	5	1	4
43	22	6	11	5	4	4	2	2	4	4	3	5	1	2	3	1	2	2	0	2
44	17	6	4	8	2	3	1	0	2	1	3	2	2	4	2	2	2	1	3	1
45	9	9	4	5	5	3	6	4	6	4	2	3	5	4	2	3	1	3	2	3
46	10	6	7	10	7	3	3	4	4	4	3	3	2	7	5	2	4	1	2	1
47	5	7	6	11	5	3	4	5	3	5	2	1	7	5	4	4	1	4	2	2
48	9	7	10	2	4	4	3	2	2	5	2	2	2	5	6	0	0	0	1	4
49	6	7	2	2	7	3	4	2	5	2	4	2	1	2	0	1	2	1	1	1

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pg 1 of 2

Calibration of LEPS detectors for Ni-59 plated on 7/8" Pt disk
based on Fe-55 standards

Filename: NICALFE

Calculation of Counts per Second in Fe-55 peak

Detector:	8	9	A	A	Q	02	02
Std ID:	#1	#2	#1	#2	bkg;1	#1	#2
Channel							
12	310	297	469	447	353	249	221
13	361	327	460	443	278	258	212
14	421	394	439	413	221	237	209
15	438	426	463	427	159	254	214
16	515	450	479	457	171	273	269
17	533	533	514	474	143	261	283
18	610	578	529	540	138	308	311
19	662	732	582	635	137	342	385
20	757	788	692	661	148	369	358
21	801	899	785	754	125	427	371
22	1063	1031	857	837	109	507	425
23	1218	1226	1041	1055	102	525	546
24	1791	1846	1533	1488	134	669	621
25	3976	3912	3883	3186	122	1072	1106
26	10773	10619	9266	9047	135	2925	3259
27	24203	23695	19436	19182	143	10058	10281
28	38538	38492	34037	24095	127	24025	24285
29	45281	43910	44853	43615	120	40983	38722
30	38306	36926	41689	39588	133	44015	41575
31	25123	23802	37937	26617	158	32135	30812
32	14587	13579	16018	15442	132	19476	16119
33	7818	7514	8653	8292	120	10015	9637
34	3923	3623	4202	3877	155	4907	4866
35	1486	1388	1544	1438	132	1881	1867
36	375	344	429	390	131	458	523
37	95	45	94	84	127	96	98
38	33	24	38	27	103	28	30
39	19	16	19	20	92	19	17
40	18	16	20	16	96	13	9
Total:	223956	217424	219791	212371	4264	196505	189443
15-channel ROI:	216238	209719	212522	205192	1972	192463	185721
Counted, min:	100	100	100	100	984.22	100	100
total cps	37.326	36.237	36.632	35.395	0.711	32.751	31.674
ROI cps	36.038	34.953	35.420	34.199	0.033	32.077	30.954

bkg is approx. 2% of gross

Prepared 2 standards by stippling a known weight of Fe-55 standard solution #54124-60-2, and undiluted NIST SRM, onto a Pt disk and drying it. Duplicate standards, #1 and #2, were prepared. It is assumed that the counter efficiency, counts/x-ray, is the same at 5.93 keV (Ni-59) as it is at 5.90 keV (Fe-55).

Fe-55 activity: 10440 X x-rays/sec/g
uncertainty: 2.5 %
reference date: 08/01/85
wt. stippled: 0.10125 grams
uncertainty: 0.00024 grams
Fe-55 half-life: 1007.4 days
uncertainty: 1 days
Ni-59 intensity, absolute: 0.331 x/d

reference: NIST Certificate
reference: NIST Certificate
reference: Table of Radioactive Isotopes, Browne & Firestone, 1986

Detector ID Std ID	Count Date	Count per Sec		Activity in std** on 8/1/85 (corrected) JCF 8/7/92	Counter Efficiency, c/n		Ni-59 d/c		Average d/c ***
		total*	ROI*		total*	ROI*	total*	ROI*	
B, #1	07/28/92	37.326	36.038	182.48	0.2046	0.1975	14.770	15.297	
B, #2	07/29/92	36.237	34.953	182.55	0.1967	0.1917	15.203	15.762	
A, #1	07/29/92	36.632	35.420	182.55	0.2009	0.1942	15.039	15.554	15.585 +/- 20%
A, #2	07/28/92	35.395	34.199	182.48	0.1940	0.1874	15.375	16.120	
02, #1	07/29/92	32.751	32.077	182.35	0.1796	0.1759	16.321	17.175	
02, #2	07/30/92	31.974	30.954	182.23	0.1733	0.1699	17.436	17.786	17.480 +/- 20%

counts per sec
Counter efficiency = $\frac{\text{counts per sec}}{\text{X x-rays per sec}}$
X x-rays per sec
Ni-59 d/c = $\frac{\text{X x-rays per sec}}{\text{Ni-59 x-rays/disintegration X counts per sec}}$

- * total = entire peak, channels 12 - 40
ROI = 15-channel ROI, 29 - 43, that is,
peak channel (35) -6 and +8
- ** corrected for decay and weight used, in X x-rays/sec
- *** The d/c values of diodes A and B are averaged together because their response is essentially the same.
The uncertainty is estimated to be 20%.

M/D gr W
8/7/92

Received 11 July 8/7/92

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

CERTIFICATE
Standard Reference Material 4929-D
X-Ray Emission-Rate Standard

Radionuclide	Iron-55
Source identification	4929-D-
Source description	Solution flame-sealed in NBS borosilicate-glass ampoule (1)*
Chemical form	20 µg Fe ⁺³ per gram of 1 N HCl
Mass	5.05 grams
K x-ray emission rate	$1.044 \times 10^4 \text{ K s}^{-1} \text{g}^{-1}$ (2)
Reference time	1200 EST August 1, 1985
Overall uncertainty	2.6 percent (3)
Photon-emitting impurities (Activity ratios at reference time)	$^{60}\text{Co}/^{55}\text{Fe}: 6.6 \times 10^{-4} \pm 10\%$
Measuring instrument	Low-geometry NaI(Tl) x-ray detector (5)
Half life	1007.4 ± 1 days (6)

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
February 1986
(Revised)

Stanley D. Hasberry, Chief
Office of Standard Reference Materials

*Notes on back

NOTES

(1) Ampoule specifications:

body diameter	16.5 ± 0.5 mm
wall thickness	0.60 ± 0.04 mm
barium content	less than 2.5 percent
lead oxide content	less than 0.02 percent
other heavy elements	trace quantities

- (2) The radioactivity concentration for SRM 4929-D may be obtained by dividing the K x-ray emission rate by the product $P_{K\alpha}$. A value of $P_{K\alpha}$ equal to $0.2841 \pm 0.88\%$ ($n = 5$) has been recommended based on an international intercomparison of ^{55}Fe organized by the Bureau International des Poids et Mesures [D. Smith, Nuclear Instruments and Methods, **200**, 383 (1982)]. The uncertainty is one standard deviation. Using this value for $P_{K\alpha}$, one obtains a radioactivity concentration of $3.673 \times 10^4 \text{ Bq g}^{-1}$ on the reference date, with a combined uncertainty of 0.95 percent and an overall uncertainty of 2.86 percent. (3,4)

- (3) The overall uncertainty was formed by taking three times the quadratic combination of standard deviations of the mean, or assumed approximations thereof, for the following:

a) low-geometry ~~counted~~ , 1977, $n = 5$	0.07 percent
b) dead layer	0.10 percent
c) diaphragm diameter	0.10 percent
d) distance	0.10 percent
e) air absorption	0.05 percent
f) extrapolation	0.60 percent
g) absorption in Be and Al	0.50 percent
h) liquid-scintillation comparison of 1977 and 1979 standards ($n = 15$)	0.20 percent
i) source preparation in 1979	0.10 percent
j) quenching in liquid-scintillation measurements	0.10 percent
k) liquid-scintillation comparison of 1979 and 1985 standards ($n = 20$)	0.07 percent
l) impurities	0.05 percent
m) quenching in liquid-scintillation	0.10 percent
n) source preparation in 1985	0.05 percent
o) <u>half-life correction for $\Delta t = 2374$ days</u>	<u>0.16 percent</u>
combined uncertainty	0.87 percent

- (4) The overall uncertainty in the radioactivity concentration was formed by taking three times the quadratic combination of standard deviations of the mean for the K x-ray emission rate (0.87 percent) and the product $P_{K\alpha}$ (0.39 percent).

- (5) The NBS low-geometry NaI(Tl) photon counter is described in Hutchinson, J.M.R., Mann, W.B., and Mullen, P.A. in Proceedings ERDA Symposium on X- and Gamma-ray Sources and Applications, Ann Arbor, MI, May 19-21, 1976 (CONF 760539).

- (6) NBS measured value. NCRP Report 58, Appendix A3, 1985 edition lists a value of 2.72 ± 0.02 years.

SRM 4929-D

VAI/VMS Peak Search Report V1.8 Generated 29-JUL-1992 09:48:37

Configuration : SYS\$SYSDEVICE:[USER]FE55_01.B;1
 Analyses by : PEAK V16.1
 Sample date : Acquisition date : 28-JUL-1992 17:17:53
 Sample ID : Fe-55 #1 Sample quantity : 1.0000 SAMPLE
 Elapsed live time: 0 01:40:00.00 Elapsed real time: 0 01:40:03.49 0.1%
 Start energy : 0.20 keV End energy : 409.60 keV
 Sensitivity : 5.00 Gaussian : 10.00
 Critical level : No

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	5.84	215362	6349	0.87	29.20	17	24	3.59E+01	0.2	
2	0	30.95	264	71	0.85	154.74	147	15	4.41E-02	9.9	
3	0	35.08	44	85	0.36	175.39	166	17	7.33E-03	56.4	
4	0	80.86	114	76	0.73	404.28	394	19	1.90E-02	18.4	
5	0	356.12	25	18	1.43	1780.60	1772	15	4.24E-03	36.7	

H. Hays
 7/29/92

Channel Contents for FE55_01.B;1

$$\sum_{ch 12}^{40} = 223,956c$$

Channel

1:	0	0	0	0	0	1172	378	414
9:	380	298	260	(310	361	421	438	515
17:	533	610	662	757	801	1063	1218	[791
25:	3976	10773	24203	38538	45281	38306	25125	14507
33:	7818	3923	1486	375	95	33	19	18)
41:	24	21	14	24	13	12	18	20
49:	15	22	14	15	19	18	13	9
57:	11	13	10	7	13	7	7	12
65:	13	26	18	15	9	6	8	11
73:	10	5	9	3	10	16	13	19
81:	16	10	14	10	7	10	12	9
89:	4	4	5	11	6	6	8	10
97:	11	10	8	8	9	12	10	5
105:	9	5	8	10	4	6	6	3
113:	3	4	8	6	4	6	7	11
121:	5	5	4	11	5	7	5	3
129:	11	7	6	5	5	7	7	3
137:	3	4	6	3	1	7	3	5
145:	6	9	4	5	13	4	10	26
153:	44	63	58	55	27	13	7	5
161:	1	5	5	8	8	2	8	5
169:	7	5	6	3	12	12	9	19
177:	13	5	6	6	6	5	5	6
185:	5	4	6	9	10	6	5	5
193:	1	3	7	7	6	3	3	5
201:	4	3	3	10	3	1	6	5
209:	2	3	6	3	6	1	4	6
217:	7	6	3	6	12	4	8	5
225:	3	4	4	9	4	5	7	8
233:	8	6	6	4	6	4	2	5
241:	2	3	4	7	2	5	4	6
249:	6	6	4	6	6	6	3	12
257:	5	3	4	4	2	1	4	6
265:	5	3	1	4	4	4	1	2
273:	5	6	5	4	6	5	7	5
281:	6	6	7	4	5	8	4	6
289:	3	5	6	5	5	9	4	1
297:	5	3	7	3	5	5	1	3
305:	4	14	2	8	7	10	4	8
313:	9	2	11	10	17	6	6	3
321:	6	4	6	8	11	7	9	4
329:	5	10	1	6	8	7	7	6
337:	6	2	3	5	5	4	4	3
345:	2	7	5	8	7	10	5	3
353:	4	3	3	4	6	6	6	7
361:	6	4	7	10	7	11	5	3
369:	5	8	7	7	8	12	11	11
377:	10	8	4	5	4	3	4	4
385:	6	6	6	0	9	2	0	4
393:	6	1	2	5	5	4	10	5
401:	10	16	17	22	22	32	16	10
409:	3	3	5	2	7	4	4	4
417:	6	4	7	6	10	10	10	6
425:	10	12	7	12	6	5	2	3

VAX/VMS Peak Search Report V1.8 Generated 29-JUL-1992 17:18:31

Configuration : SYSSYSDEVICE:[USER]FE55_02.B;1
 Analyses by : PEAK V16.1
 Sample date : Acquisition date : 29-JUL-1992 10:08:04
 Sample ID : Fe-55 #2 Sample quantity : 1.0000 SAMPLE
 Elapsed live time: 0 01:40:00.00 Elapsed real time: 0 01:40:03.40 0.1%
 Start energy : 0.20 keV End energy : 409.60 keV
 Sensitivity : 5.00 Gaussian : 10.00
 Critical level : No

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	5.83	209454	6060	0.86	29.14	17	23	3.49E+01	0.2	
2	0	30.98	263	68	0.75	154.91	148	17	4.38E-02	9.1	
3	0	80.85	87	80	0.84	404.25	394	21	1.44E-02	25.7	
4	0	92.50	50	60	0.76	462.50	456	15	8.27E-03	34.0	

J. H. Gage
 7/29/92

Channel Contents for FE55_02.B;1

$$\frac{40}{\text{ch } 12} = 217,424c$$

Channel

1:	0	0	0	0	0	1172	407	387
9:	372	332	212	[297	327	394	426	450
17:	(533	578	732	780	899	1031	1226	[1846
25:	3912	10619	23695	38492	43910	36926	23802	13579
33:	7514	3623	1388	344	45	24	16	16
41:	17	21	14	17	17	18	15	17
49:	14	23	23	21	17	23	21	18
57:	13	16	17	14	11	11	16	11
65:	15	18	13	18	8	15	2	6
73:	7	6	9	6	7	11	9	16
81:	11	18	17	7	11	8	9	5
89:	4	8	7	8	9	10	4	14
97:	12	8	9	7	3	11	10	8
105:	9	8	8	9	2	6	4	5
113:	9	6	7	6	4	7	4	8
121:	6	9	1	3	9	6	5	7
129:	7	6	8	4	3	6	7	4
137:	7	7	4	6	6	4	3	4
145:	8	4	5	6	7	8	16	20
153:	36	63	53	51	24	12	8	9
161:	3	3	6	6	0	4	5	5
169:	8	8	3	10	17	12	11	12
177:	11	8	9	7	2	6	4	6
185:	4	4	2	4	5	6	1	6
193:	5	5	3	3	2	10	3	5
201:	4	4	5	3	2	0	2	7
209:	7	3	8	5	1	2	1	6
217:	6	0	5	9	3	8	1	9
225:	5	2	6	7	4	6	5	11
233:	4	5	8	6	3	4	3	6
241:	4	5	3	5	2	5	5	8
249:	3	4	3	5	6	3	3	4
257:	1	4	1	5	10	5	5	12
265:	2	4	4	7	1	6	3	8
273:	4	2	6	3	3	3	4	7
281:	6	4	3	4	2	8	6	5
289:	7	4	4	7	5	5	6	5
297:	3	3	3	9	4	4	7	10
305:	9	6	5	8	10	13	8	8
313:	2	11	7	9	15	7	8	8
321:	7	10	2	6	10	6	7	12
329:	6	8	6	10	9	7	5	2
337:	1	5	6	6	5	10	3	5
345:	4	5	11	2	5	3	7	6
353:	9	7	5	6	6	4	4	3
361:	7	9	3	10	9	5	4	4
369:	6	3	4	3	8	10	13	10
377:	11	12	9	7	8	3	5	2
385:	7	4	2	5	5	7	5	6
393:	2	4	10	3	2	4	7	5
401:	3	8	17	25	16	19	14	5
409:	3	8	3	5	4	2	5	4
417:	5	1	7	7	3	5	7	7
425:	5	11	3	4	6	6	1	7

$$\frac{39}{17} = 215,514$$

(not word)

FE-55 #1, 100 UL OF 54124-60-0 ON PT DISK, STIPP

SAMPLE ID..... SY:FE5501.A;1

OF CHANNELS..... 2048

DIODE I.D..... A

SHELF NUMBER..... 0

CALIBRATION..... 0.2 KEV/CH

TIME ZERO 7/29/92 AT 10:12: 0

COUNTED..... 7/29/92 AT 10:12: 0

(0.00 MINUTES DECAY TIME)

LIVE COUNT TIME.... 1 HOURS 40 MINUTES 0 SECONDS (100.00 MIN.)

ELAPSED TIME..... 1 HOURS 40 MINUTES 0 SECONDS (100.00 MIN.)
(DEAD TIME = 0.000)

FLUX CORRECTION.... 0.0000

GEOM CORRECTION.... 0.0000 0.0000 0.0000 0.0000 0.0000

WEIGHT..... 1.00000 GRAMS

ANTI: 0 SLP: 0 AREA: 0 P-T: 0 ERR: 0 ZER: 0 OPR: 0 NOV: -1

J. H. Kage
7/29/92

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	50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950
1	6200	8	5	6	5	11	6	4	6	6	6	3	7	4	2	18	3	2	4
2	16	7	7	7	4	11	6	4	6	5	4	8	4	1	1	8	2	1	5
3	16	5	18	9	8	5	6	5	4	8	4	5	3	1	5	7	1	4	3
4	14	18	6	6	9	7	8	3	8	7	8	6	4	3	3	6	18	2	2
5	17	7	6	7	9	1	18	3	11	4	5	5	3	6	3	4	3	8	5
6	12	8	5	5	6	4	1	8	1	18	2	4	4	2	2	5	1	1	2
7	12	11	5	9	12	2	9	5	2	3	7	2	3	6	3	9	3	1	4
8	18	13	12	2	5	3	9	9	4	5	4	3	2	4	5	6	1	2	3
9	21	13	8	11	2	9	3	2	4	2	4	5	1	3	4	3	6	5	2
10	28	5	7	7	5	2	5	1	7	3	5	4	5	6	2	4	3	3	3
11	414	16	8	4	7	8	4	7	9	5	5	4	4	2	1	1	3	1	2
12	620	18	5	9	6	5	7	9	1	9	3	4	3	7	3	8	6	1	2
13	469	16	7	8	9	5	4	8	6	14	10	7	4	4	3	3	2	1	4
14	460	19	3	8	3	2	9	11	4	12	7	1	6	5	5	1	2	1	5
15	439	19	3	7	9	1	8	5	5	9	5	4	4	5	3	2	4	2	6
16	463	21	6	11	6	5	9	9	3	6	4	3	4	2	6	3	2	5	1
17	479	28	7	7	8	7	18	15	7	7	7	5	6	6	5	2	6	1	3
18	514	14	4	5	7	8	12	4	4	7	3	4	3	4	3	3	4	5	2
19	529	9	11	6	11	5	14	3	6	5	4	3	5	3	4	2	3	2	4
20	582	18	12	11	8	5	6	7	4	5	5	2	5	8	2	4	6	1	1
21	592	13	11	11	8	7	6	3	9	7	4	4	5	2	7	8	2	4	3
22	785	14	5	5	13	6	7	8	5	4	5	2	6	4	2	3	1	4	3
23	857	9	18	15	8	3	6	4	3	6	1	6	6	3	5	6	3	4	3
24	1841	12	8	18	6	18	7	8	5	8	2	4	6	2	4	5	2	3	1
25	1533	9	6	9	3	3	9	14	18	3	7	6	5	5	3	5	5	3	3
26	3883	19	3	9	7	3	7	14	11	1	7	3	2	6	9	4	1	3	4
27	8266	7	7	9	5	4	8	10	18	12	4	4	4	6	3	4	2	5	4
28	19436	12	4	18	3	12	9	14	7	5	6	6	4	5	4	8	3	2	5
29	34837	7	1	3	5	3	7	14	5	4	3	6	5	3	4	6	2	8	2
30	44853	18	2	6	4	5	4	8	6	3	5	5	4	7	1	1	2	7	5
31	41689	18	11	13	8	4	1	7	2	6	4	2	6	4	5	3	5	3	4
32	27937	22	5	4	9	3	2	2	8	8	3	6	5	5	2	7	2	5	5
33	16818	17	7	4	11	3	12	7	18	6	2	1	6	4	1	3	6	1	6
34	8553	17	18	6	8	5	4	6	4	9	7	3	6	2	3	1	5	2	3
35	4282	14	14	18	6	4	18	7	1	3	6	5	1	3	2	6	3	2	2
36	1544	18	8	7	8	3	7	5	6	3	5	5	2	5	2	3	5	3	2
37	429	6	5	4	5	6	18	3	4	4	3	1	7	2	4	2	4	4	8
38	84	6	8	1	2	4	14	8	4	1	5	1	5	4	3	3	4	6	2
39	38	8	18	5	18	8	7	9	4	4	6	7	4	2	2	5	2	1	7
40	19	9	8	5	9	3	7	5	5	7	2	7	1	3	1	6	3	4	3
41	28	6	6	9	7	6	18	5	6	4	4	2	2	3	3	3	4	2	5
42	21	14	7	8	4	8	8	5	5	5	6	3	3	2	4	6	2	2	2
43	21	14	5	4	8	8	6	2	8	2	2	5	2	5	2	4	4	5	4
44	17	6	15	8	5	5	5	7	7	6	5	4	5	7	8	3	4	2	3
45	17	11	7	7	2	7	7	8	4	8	3	7	2	2	3	1	3	3	4
46	19	7	6	7	3	4	7	11	6	2	6	6	6	8	6	2	5	4	4
47	17	8	5	3	6	5	4	5	6	4	6	3	6	5	5	5	5	2	1
48	16	8	4	6	2	5	2	4	2	4	4	5	3	7	5	1	4	2	2
49	13	7	7	12	4	7	8	5	4	1	6	5	8	1	2	3	4	1	2
50	23	18	4	4	9	5	9	5	8	7	4	9	2	4	3	7	2	5	3

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FE-65 #1, 1800 HZ OF 54124-68-B ON PT DISK, STIPPSY/FESS51.A:1 COUNTED 7/29/92 @ 18:12: # GAIN: 8.2 KEV/CHAN

	1800	1850	1900	1950	2000	2050	2100	2150	2200	2250	2300	2350	2400	2450	2500	2550	2600	2650	2700	2750	2800	2850	2900	2950
1	6	5	3	4	3	2	1	1	3	3	8	1	3	1	2	4	1	1	2	2	8	4	2	8
2	2	1	3	2	1	3	2	2	8	2	2	2	2	2	1	4	1	1	2	3	2	8	1	1
3	2	3	1	4	2	2	2	2	8	3	2	2	2	2	1	1	1	1	2	2	1	8	1	2
4	1	1	1	1	1	1	1	1	8	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
5	3	2	1	2	3	3	4	1	8	1	1	1	1	1	3	1	8	2	8	8	8	1	1	1
6	1	1	2	1	1	2	2	2	1	1	1	1	1	1	2	8	1	1	3	8	1	8	2	2
7	3	2	2	1	2	8	2	3	8	3	8	8	8	8	8	8	1	1	1	1	8	3	8	8
8	1	3	1	2	3	2	1	1	4	2	2	1	8	8	1	1	1	1	1	1	1	1	1	1
9	4	4	2	8	5	1	1	2	1	1	1	1	1	1	1	1	4	2	4	1	2	1	1	1
10	1	2	4	4	2	1	8	8	2	2	3	1	2	2	1	1	1	1	1	1	1	8	2	2
11	3	2	3	8	4	2	3	8	1	1	2	2	1	1	1	1	1	1	1	2	1	1	1	8
12	1	1	2	3	8	1	2	2	1	1	8	1	8	1	1	2	8	1	3	2	1	3	8	8
13	2	2	2	4	4	2	4	1	8	8	1	5	2	1	1	4	8	3	8	8	2	1	1	2
14	1	4	8	1	3	8	1	2	8	3	1	8	1	7	1	1	8	1	7	2	1	1	1	1
15	3	1	8	3	2	3	1	3	2	3	2	8	3	1	1	1	1	1	1	1	1	1	1	2
16	3	1	8	2	3	6	8	3	2	8	8	1	8	1	1	1	1	1	3	2	4	2	8	8
17	6	1	2	8	3	1	5	3	8	1	8	2	1	1	3	1	8	1	1	1	8	8	8	8
18	8	2	8	2	5	4	1	2	2	1	2	1	8	8	8	8	3	8	8	1	1	1	1	1
19	4	5	2	1	2	2	8	2	8	7	1	1	8	1	1	8	1	1	1	1	1	1	8	8
20	7	4	1	3	4	3	2	1	8	8	8	2	2	1	2	1	4	1	1	4	1	1	1	8
21	6	3	1	4	8	1	1	2	1	2	1	1	4	8	1	1	8	8	1	1	1	8	3	8
22	2	8	1	8	3	2	5	8	2	5	8	3	2	8	2	2	8	2	2	4	1	8	1	1
23	3	3	5	3	3	8	1	3	2	2	4	1	1	1	1	8	4	8	8	1	1	8	8	8
24	1	3	3	4	1	1	3	2	1	1	2	2	8	1	1	1	1	8	8	1	4	8	8	8
25	3	1	2	1	1	2	2	2	2	2	1	1	2	1	1	3	1	1	1	1	1	3	8	8
26	8	4	8	1	8	8	1	2	2	1	2	1	1	1	2	1	1	1	2	1	2	1	1	8
27	6	2	2	3	1	8	2	2	8	8	1	1	1	1	2	2	1	8	1	1	1	1	1	1
28	1	2	2	3	2	2	1	8	3	2	8	8	4	8	8	2	1	1	1	1	1	1	1	1
29	5	3	3	1	1	2	2	8	1	1	1	1	8	1	1	8	1	8	8	8	1	1	1	1
30	8	5	3	3	3	1	4	3	2	1	2	8	2	1	2	1	1	1	2	1	8	8	8	8
31	1	4	1	1	1	2	8	3	1	1	2	8	2	2	1	2	1	2	1	2	8	8	8	8
32	8	4	2	3	1	1	5	1	8	1	8	1	8	1	1	1	1	1	1	1	3	1	1	8
33	3	2	5	4	3	3	3	1	3	2	1	3	2	1	1	8	1	8	2	2	2	2	2	2
34	2	4	5	8	1	1	1	2	2	8	1	1	1	1	1	8	3	1	8	1	1	1	1	8
35	3	8	1	4	3	1	1	2	1	2	1	2	8	2	8	3	1	4	8	1	1	1	1	1
36	2	4	1	2	3	8	4	8	1	1	3	2	8	8	1	8	1	2	1	1	2	1	1	8
37	8	1	2	1	2	8	3	1	2	1	1	1	8	1	1	1	1	1	1	1	1	1	1	8
38	1	7	2	4	2	1	5	2	1	3	2	1	3	2	1	8	1	1	1	1	1	1	1	8
39	2	2	2	2	5	1	2	2	1	2	1	2	1	1	4	2	1	4	8	2	8	1	1	8
40	4	2	2	1	2	2	2	1	2	8	2	8	1	1	1	8	2	4	2	1	1	1	1	2
41	4	3	8	2	2	3	1	3	2	1	3	3	1	1	2	3	2	2	2	2	2	1	1	2
42	6	4	3	3	3	1	1	4	1	1	3	1	1	1	1	8	1	1	1	2	1	1	1	8
43	2	3	8	3	3	3	3	1	8	1	5	8	2	1	1	2	1	2	1	1	8	8	1	2
44	1	1	3	3	2	2	8	2	3	1	1	1	4	1	1	1	1	3	8	3	2	1	1	8
45	4	1	2	3	2	1	1	1	2	1	1	1	1	1	1	2	1	3	2	8	8	1	1	8
46	1	3	8	3	4	3	2	8	1	8	2	2	2	2	2	1	1	2	1	1	8	2	1	8
47	2	3	1	4	8	2	8	1	1	3	2	2	1	1	5	3	2	1	1	1	1	1	1	8
48	5	8	2	5	4	3	2	2	2	2	2	1	2	1	2	8	8	1	1	1	1	1	1	2
49	2	2	1	1	2	1	4	8	8	2	8	1	1	1	1	1	1	1	1	1	1	1	1	1

FE-55 100 UL OF 54124-60-0 ON PT DISK, STIPPLED

SAMPLE ID..... SY:FE5002.A;1

OF CHANNELS..... 2048

DIODE I.D..... A

SHELF NUMBER..... 0

CALIBRATION..... 0.2 KEV/CH

TIME ZERO 7/28/92 AT 17:45: 0

COUNTED..... 7/28/92 AT 17:45: 0

(0.00 MINUTES DECAY TIME)

LIVE COUNT TIME.... 1 HOURS 40 MINUTES 0 SECONDS (100.00 MIN.)

ELAPSED TIME..... 1 HOURS 40 MINUTES 0 SECONDS (100.00 MIN.)

(DEAD TIME = 0.000)

FLUX CORRECTION.... 0.0000

GEOM CORRECTION.... 0.0000 0.0000 0.0000 0.0000 0.0000

WEIGHT..... 1.00000 GRAMS

ANTI: 0 SLP: 0 AREA: 0 P-T: 0 ERR: 0 ZER: 0 OPR: 0 NOV: -1

550

J. H. Kage
7/29/92

1 E 1

	0	50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950
0	6800	15	18	4	11	8	2	6	2	7	2	6	2	4	7	2	2	1	4	6
1	15	6	9	7	11	7	8	18	18	4	7	5	6	2	5	4	5	4	4	6
2	22	9	8	8	6	5	4	5	2	8	1	6	4	9	5	2	6	2	2	6
3	10	7	8	5	8	5	13	7	3	6	4	5	6	5	9	4	6	2	1	1
4	17	5	11	5	8	6	7	3	9	2	6	4	5	3	2	2	6	7	7	7
5	18	3	11	11	6	3	3	8	3	4	1	4	4	3	4	8	2	2	8	8
6	21	7	8	7	7	6	7	6	8	8	5	3	2	9	2	2	2	2	3	3
7	14	3	11	5	18	9	7	9	3	1	1	9	8	8	4	2	5	1	4	4
8	20	8	9	7	9	2	8	7	3	6	4	5	5	7	6	1	3	5	4	4
9	121	14	6	7	18	5	7	1	4	3	6	3	4	11	3	8	6	4	3	4
10	423	28	3	7	6	4	7	6	18	2	8	4	5	8	4	4	2	2	5	5
11	647	20	3	6	6	2	7	7	4	6	6	5	2	3	5	4	5	1	4	3
12	447	14	18	7	4	8	8	7	8	15	6	5	6	8	4	3	5	4	2	2
13	443	16	7	5	7	7	6	2	18	13	2	4	4	7	6	7	4	8	4	4
14	413	16	18	9	6	7	9	18	6	3	3	9	7	4	3	5	6	3	3	4
15	427	29	7	9	18	4	12	11	7	12	4	5	4	9	5	2	4	7	7	5
16	457	21	3	5	5	8	17	7	4	18	9	5	11	4	5	1	2	2	2	5
17	474	17	5	5	3	9	14	3	5	3	3	9	4	4	4	1	3	3	2	1
18	548	16	5	5	5	4	12	3	5	7	8	5	4	2	1	3	2	4	2	4
19	535	11	16	7	5	18	14	9	6	7	6	7	5	4	1	4	5	3	5	4
20	661	13	18	12	6	7	11	3	4	4	5	5	4	2	3	6	8	3	3	4
21	754	14	6	8	8	3	3	7	7	4	4	2	3	5	8	5	3	5	5	5
22	837	9	9	9	5	4	5	8	4	4	8	7	4	3	3	6	7	3	8	8
23	1855	8	12	7	7	6	6	9	18	4	4	6	2	1	6	2	8	5	2	1
24	1488	13	4	9	8	4	4	17	18	7	5	3	7	3	6	12	4	1	3	4
25	3186	18	5	12	9	6	9	12	18	5	2	12	6	3	2	6	8	4	3	5
26	8847	16	11	7	7	7	18	18	12	8	7	8	4	1	5	1	2	3	4	3
27	19182	17	18	6	6	7	8	11	8	6	4	3	4	5	4	4	5	3	4	3
28	34895	9	4	8	18	9	7	11	8	3	9	2	8	7	6	2	1	4	4	3
29	43615	19	13	8	18	7	5	5	7	6	3	5	6	6	6	2	4	4	7	3
30	39598	15	9	7	9	4	6	6	7	7	4	5	2	8	3	2	8	2	2	2
31	26617	28	11	4	7	7	4	7	7	9	5	6	3	2	6	4	2	4	7	3
32	15442	26	5	8	7	7	5	5	5	5	4	4	3	3	2	6	4	6	6	4
33	8292	18	11	5	3	7	2	2	9	4	5	1	4	7	4	4	2	6	4	3
34	3877	18	18	4	3	7	7	8	3	5	3	8	5	8	8	5	2	3	2	4
35	1438	13	18	4	8	7	14	5	7	5	3	4	6	5	5	5	5	1	4	5
36	398	18	4	5	8	9	18	5	6	3	5	4	7	5	2	4	8	2	5	1
37	84	14	8	4	18	4	7	18	6	6	8	3	3	5	2	2	1	5	4	3
38	27	14	7	17	9	7	3	4	3	5	4	5	4	2	2	3	2	3	4	2
39	28	5	5	12	18	6	3	8	7	3	3	5	2	2	4	5	2	3	5	2
40	16	7	5	8	4	8	7	3	9	3	4	2	3	7	7	5	8	4	5	3
41	28	18	6	3	7	13	7	4	6	5	2	3	6	3	5	4	2	2	3	2
42	13	8	5	2	9	8	9	7	3	6	5	4	6	5	3	8	6	5	8	1
43	9	6	6	4	8	1	7	5	9	7	4	4	3	4	3	4	1	1	5	4
44	15	6	6	6	9	8	4	5	6	7	6	4	5	4	3	4	4	6	2	6
45	28	9	18	8	4	4	16	6	7	6	2	5	4	2	6	3	3	4	2	3
46	12	11	8	17	6	5	9	8	7	11	3	4	5	5	3	6	3	5	2	4
47	16	13	5	7	7	7	8	6	5	4	5	4	7	8	3	1	3	3	2	8
48	15	18	18	1	7	5	18	6	5	4	5	2	4	1	7	2	1	4	2	3
49	18	11	9	8	8	4	12	9	18	9	8	2	1	4	5	3	2	2	1	1

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FE-55 188 UL OF 54124-58-W ON PT DISK, STIPPLED SY:FE5592.A:1 COUNTED 7/28/92 @ 17:45: 8 GAIN: 8.2 KEV/CHAN

	1000	1050	1100	1150	1200	1250	1300	1350	1400	1450	1500	1550	1600	1650	1700	1750	1800	1850	1900	1950
0	4	1	7	2	4	3	2	4	2	9	1	1	2	2	8	1	3	7	1	1
1	2	2	1	2	2	1	5	8	8	2	3	3	1	5	2	8	3	4	1	1
2	3	8	4	3	1	1	2	3	2	8	2	2	1	3	1	2	1	2	3	2
3	2	2	2	5	3	3	1	3	5	1	1	8	1	1	1	2	8	2	8	8
4	2	7	3	8	1	1	2	3	1	1	2	2	1	1	1	2	1	7	8	8
5	3	4	1	2	3	2	2	1	2	2	8	8	3	7	1	8	3	3	3	3
6	1	1	3	2	8	2	8	3	2	2	2	1	1	7	8	2	8	2	8	8
7	8	8	2	2	4	1	2	8	2	2	8	2	2	8	1	3	1	8	1	8
8	1	4	2	4	2	4	1	2	2	3	2	8	1	3	2	2	2	1	1	1
9	2	1	1	8	1	3	3	1	1	3	2	5	1	4	8	8	2	1	8	1
10	2	1	2	1	3	4	8	1	4	8	2	1	8	1	1	2	2	8	8	8
11	3	3	2	4	1	4	1	8	8	2	8	1	1	1	4	2	8	2	8	8
12	7	1	8	1	3	2	2	8	1	8	1	8	8	8	1	8	3	8	1	2
13	6	1	2	2	2	1	2	7	8	1	8	8	1	8	2	3	3	8	1	2
14	3	3	2	2	2	1	2	2	8	2	1	8	1	2	1	8	3	8	8	8
15	5	3	1	1	8	2	3	1	4	2	7	3	1	8	1	2	8	3	2	2
16	2	5	1	3	1	4	2	2	2	2	1	1	4	2	1	1	7	2	1	1
17	3	4	4	8	8	1	8	8	2	1	1	1	1	8	2	8	3	8	8	1
18	4	3	2	8	8	2	1	7	2	1	2	1	1	3	8	8	1	1	1	1
19	5	2	2	2	1	1	4	2	1	2	2	3	2	8	1	1	2	1	1	3
20	1	5	2	3	1	2	2	2	8	1	1	5	1	3	8	8	2	1	1	8
21	2	2	2	3	1	2	3	8	2	1	1	2	8	4	1	1	1	8	2	2
22	8	1	4	4	1	1	2	2	4	8	2	8	1	8	2	1	1	8	1	1
23	4	5	2	2	2	1	2	3	1	2	8	8	3	2	1	2	1	8	3	3
24	7	4	7	2	1	3	2	2	2	8	1	3	2	1	3	8	1	3	1	8
25	5	1	3	1	2	5	4	2	3	1	1	8	2	1	8	1	1	1	8	1
26	3	1	3	4	1	4	2	3	2	1	2	8	8	1	2	2	8	1	1	8
27	4	5	3	3	1	5	3	2	1	5	2	1	3	1	2	1	1	2	1	1
28	4	3	3	2	2	3	2	1	2	2	2	8	1	1	4	1	1	8	2	2
29	2	3	7	3	1	2	2	1	5	2	8	8	2	8	8	1	2	1	1	8
30	4	6	2	2	2	2	1	3	1	4	3	8	8	8	2	1	1	8	8	8
31	4	6	2	1	2	4	2	2	2	5	1	1	8	1	1	3	8	8	3	3
32	5	5	2	3	1	2	1	4	3	3	8	8	2	1	8	8	1	8	1	1
33	8	1	3	3	3	2	1	7	1	1	1	1	1	5	2	1	3	1	3	1
34	2	5	4	2	2	8	4	8	1	1	3	8	1	3	8	8	1	8	2	1
35	4	2	5	7	3	3	2	2	4	1	5	2	1	1	2	1	1	2	1	4
36	3	3	8	8	1	1	3	8	3	1	1	1	1	2	8	8	8	1	8	1
37	6	2	4	1	1	1	2	8	1	1	2	2	3	1	4	8	1	8	1	1
38	1	2	8	1	3	3	2	1	2	1	4	2	2	4	3	8	8	8	1	1
39	4	4	4	2	1	4	1	3	2	8	8	3	1	2	8	1	1	8	1	1
40	4	1	2	2	1	8	3	7	1	1	1	2	1	4	8	3	1	1	2	1
41	5	4	2	7	1	3	2	1	2	2	1	1	1	2	3	1	3	1	3	1
42	5	3	2	5	2	1	1	1	7	7	8	1	1	2	8	8	1	1	1	1
43	4	3	3	8	3	8	5	2	1	8	1	1	8	1	3	8	1	2	1	2
44	1	1	2	5	8	3	1	2	1	8	2	1	2	1	8	8	1	1	1	1
45	2	3	7	4	1	2	3	8	2	1	1	1	8	1	8	1	3	5	1	1
46	3	2	2	3	2	1	3	7	2	2	2	1	3	1	1	2	8	3	1	2
47	4	2	1	2	1	1	4	1	4	8	2	1	8	1	1	2	3	3	1	2
48	7	3	8	4	3	8	2	7	1	7	8	3	1	1	2	1	8	1	8	2
49	4	6	5	5	2	1	4	3	1	8	1	2	8	7	1	1	3	8	8	8

FE-55 #2 (100 UL 54124-60-0 STIPPLED ON PT DIS

SAMPLE ID..... SY:FE55#2.02;1

OF CHANNELS..... 2048

DIODE I.D..... 02

SHELF NUMBER..... 0

CALIBRATION..... 0.2 KEV/CH

TIME ZERO 7/29/92 AT 17:30: 0

COUNTED..... 7/29/92 AT 17:30: 0

(0.00 MINUTES DECAY TIME)

LIVE COUNT TIME.... 1 HOURS 40 MINUTES 0 SECONDS (100.00 MIN.)

ELAPSED TIME..... 1 HOURS 40 MINUTES 0 SECONDS (100.00 MIN.)

(DEAD TIME = 0.000)

FLUX CORRECTION.... 0.0000

GEOM CORRECTION.... 0.0000 0.0000 0.0000 0.0000 0.0000

WEIGHT..... 1.00000 GRAMS

ANTI: 0 SLP: 0 AREA: 0 P-T: 0 ERR: 0 ZER: 0 OPR: 0 NOV: -1

552

J. H. Kaye
7/29/92

101

554

FE-55, 100 UL OF 54124-60-0 STIPPLED ON PT

SAMPLE ID..... SYIFE5501.D2;1

OF CHANNELS..... 2048

DIODE I.D..... 02

SHELF NUMBER..... 0

CALIBRATION..... 0.2 KEV/CH

TIME ZERO 7/30/92 AT 10: 1: 0

COUNTED..... 7/30/92 AT 10: 1: 0

(0.00 MINUTES DECAY TIME)

LIVE COUNT TIME.... 1 HOURS 40 MINUTES 0 SECONDS (100.00 MIN.)

ELAPSED TIME..... 1 HOURS 40 MINUTES 0 SECONDS (100.00 MIN.)

(DEAD TIME = 0.000)

FLUX CORRECTION.... 0.0000

GEOM CORRECTION.... 0.0000 0.0000 0.0000 0.0000 0.0000

WEIGHT..... 1.00000 GRAMS

ANTI: 0 SLP: 0 AREA: 0 P-T: 0 ERR: 0 ZER: 0 OPR: 0 NOV: -1

J. H. Kaye
7/30/92

Calib 3B-III

$T = 24^{\circ}\text{C}$

$V_f = 1.00268$

~~0.02538~~

~~0.10024~~

0.10099

0.10110

$\bar{x} = (0.10125 \pm 0.00024) \text{ g}$

0.10162

0.10129

0.10127

100 λ ^{55}Fe #54124-60-0 on P π (stepped)

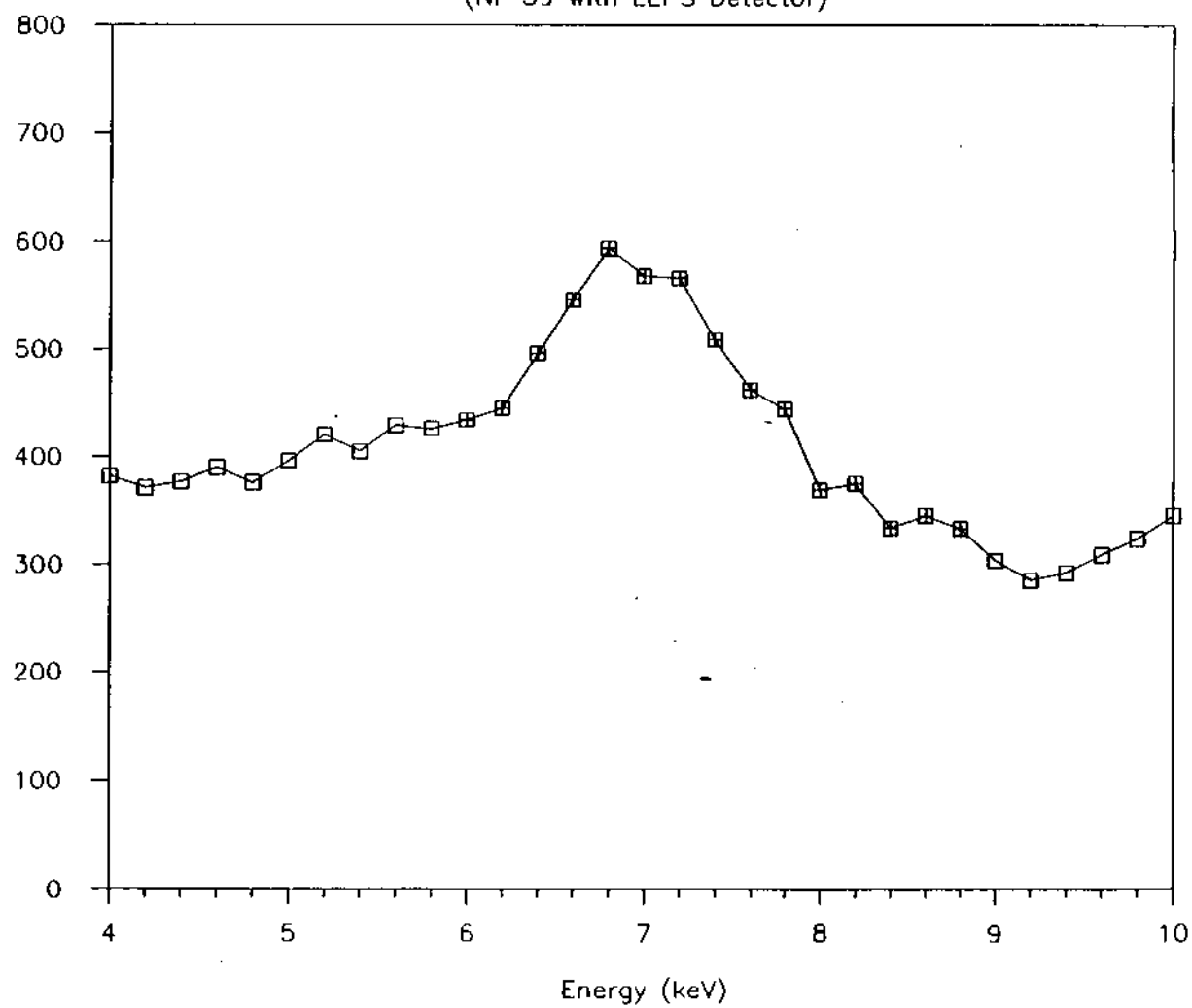
**First Batch N1-59 Determination
by Low Energy Photon Spectroscopy**

558

Counts

SPECTRUM OF 92-5070

(Ni-59 with LEPS Detector)



J. H. Kaya
6/24/92

92-5070 NI, FOR NI-59 ANAL., ON 5/20/92

SAMPLE ID..... SY:925070NI.A;1

OF CHANNELS..... 2048

DIODE I.D..... A

SHELF NUMBER..... B

CALIBRATION..... 0.2 KEV/CH

TIME ZERO 5/22/92 AT 16:31:45

COUNTED..... 5/22/92 AT 16:31:45

(0.00 MINUTES DECAY TIME)

LIVE COUNT TIME.... 47 HOURS 0 MINUTES 7 SECONDS (2820.12 MIN.)

ELAPSED TIME..... 47 HOURS 0 MINUTES 7 SECONDS (2820.12 MIN.)
(DEAD TIME = 0.000)

FLUX CORRECTION.... 0.0000

GRON CORRECTION.... 0.0000 0.0000 0.0000 0.0000 0.0000

WEIGHT..... 1.00000 GRAMS

ANLI: 0 SLP: 0 AREA: 0 P-T: 0 ERR: 0 ZER: 0 OPR: 0 NOV: 1

J. H. Hage

5/22/92

92-5878 NI, FOR NI-59 ANAL., ON 5/28/92

SY:925878NI.A:1 COUNTED 5/22/92 @ 16:31:45 GAIN: 8.2 KEV/CHAN

	0	50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950
0	169207	345	276	211	197	182	165	151	165	138	123	133	118	116	116	94	91	84	82	80
1	0	378	263	182	178	158	162	149	148	144	143	117	116	111	116	86	93	101	83	76
2	0	365	249	198	172	179	184	183	162	162	129	135	132	122	118	97	86	93	84	88
3	0	397	238	248	213	166	173	168	179	142	137	128	116	122	113	101	108	83	94	75
4	0	323	217	246	196	178	149	156	142	123	148	123	128	115	124	108	92	83	84	86
5	0	276	215	232	205	175	175	164	154	126	117	136	127	112	119	96	98	87	92	75
6	0	291	216	228	208	188	162	169	163	116	123	134	139	118	107	109	107	88	87	71
7	0	276	198	231	217	174	159	165	155	137	131	144	129	124	109	99	88	81	86	67
8	38	315	288	187	171	148	153	162	146	129	119	128	118	117	122	108	75	93	64	73
9	1658	263	235	193	164	177	161	157	159	183	124	122	114	102	124	96	84	76	105	61
10	2437	287	217	205	179	173	177	165	167	236	142	138	118	86	104	97	111	104	87	61
11	1991	301	203	193	184	172	149	192	172	258	138	128	108	126	116	94	101	93	56	63
12	1214	323	196	236	197	188	181	217	144	306	136	101	105	103	115	105	96	91	89	94
13	931	379	223	198	197	169	196	261	131	318	125	136	119	98	105	119	96	91	87	79
14	788	515	214	208	198	198	215	258	141	254	123	139	148	113	124	96	85	99	69	68
15	588	578	231	186	205	162	255	265	166	233	164	122	105	117	116	128	84	98	88	68
16	495	658	238	193	193	191	348	241	134	225	119	153	103	117	97	91	116	86	95	78
17	432	476	283	174	173	198	333	196	152	183	128	112	108	119	122	107	97	87	87	99
18	427	399	219	228	164	168	249	171	154	131	121	119	128	125	124	99	101	98	92	82
19	361	335	229	191	194	187	192	165	145	132	148	121	102	125	111	108	101	87	95	66
20	382	389	237	207	169	146	165	168	166	138	144	149	138	128	129	113	104	93	78	71
21	371	246	231	167	184	174	164	179	183	119	113	134	132	116	107	106	98	91	79	83
22	377	266	216	204	172	169	154	222	208	134	128	129	111	108	118	85	82	88	85	100
23	398	257	217	222	182	188	198	265	237	124	138	137	119	119	118	94	108	83	92	71
24	376	276	214	204	178	153	158	346	232	145	148	147	126	117	106	95	101	102	97	79
25	396	263	226	198	189	171	169	333	191	127	126	98	105	96	107	107	89	108	108	82
26	428	298	219	208	169	178	341	194	138	128	115	112	111	106	111	87	110	122	77	77
27	405	331	238	225	176	165	158	268	192	126	133	128	116	105	102	108	87	85	116	89
28	429	359	225	192	175	151	167	217	161	126	148	131	125	117	113	93	89	74	138	78
29	426	455	256	199	184	168	155	161	154	139	119	127	116	109	108	86	104	76	136	74
30	434	591	228	189	177	173	167	139	133	103	128	104	125	103	92	98	89	85	148	74
31	445	635	218	187	188	173	171	177	145	142	148	121	117	103	116	99	111	88	118	74
32	496	575	219	186	216	173	154	167	168	128	131	102	114	124	104	108	88	84	114	64
33	546	498	213	207	187	176	181	144	148	123	118	143	119	115	115	92	98	93	88	92
34	594	395	199	182	193	157	188	165	158	134	122	127	119	117	116	108	79	77	87	77
35	568	331	197	197	192	168	152	147	153	118	105	108	117	128	97	93	82	93	81	72
36	566	273	204	178	168	173	175	187	178	145	119	114	118	126	118	109	97	78	91	78
37	589	291	201	195	201	176	152	178	158	136	115	119	112	103	116	98	92	79	88	83
38	462	256	208	203	163	157	177	155	168	156	146	131	111	104	101	88	92	73	71	98
39	444	243	214	189	141	168	154	158	131	132	113	143	118	118	92	109	87	96	77	84
40	369	235	199	183	182	176	154	144	141	128	125	117	112	106	96	98	101	83	88	58
41	375	252	182	197	173	188	163	139	137	137	116	133	88	113	108	107	85	85	87	77
42	334	243	212	227	178	142	183	125	117	142	128	145	128	103	118	98	105	77	96	89
43	345	269	198	198	198	187	154	147	128	114	134	138	107	119	113	101	107	71	78	93
44	333	298	196	199	152	195	162	142	136	127	138	124	114	138	86	98	104	86	85	84
45	304	289	186	183	167	166	174	161	129	134	138	143	128	107	107	108	82	71	75	66
46	286	308	202	184	158	158	166	143	155	133	118	136	107	101	109	94	103	79	72	85
47	293	326	215	192	204	168	166	138	137	127	113	129	113	105	105	97	103	82	88	72
48	389	277	216	181	179	177	151	131	146	123	151	111	113	115	91	116	87	89	76	68
49	324	273	238	197	175	185	147	153	142	137	124	127	124	129	98	99	91	88	89	66

560

10
2

92-5070 NI, FOR NI-59 ANAL., ON 5/22/92

SY:925070NI.A;1 COUNTED 5/22/92 @ 16:31:45 GAIN: 8.2 KEV/CHAN

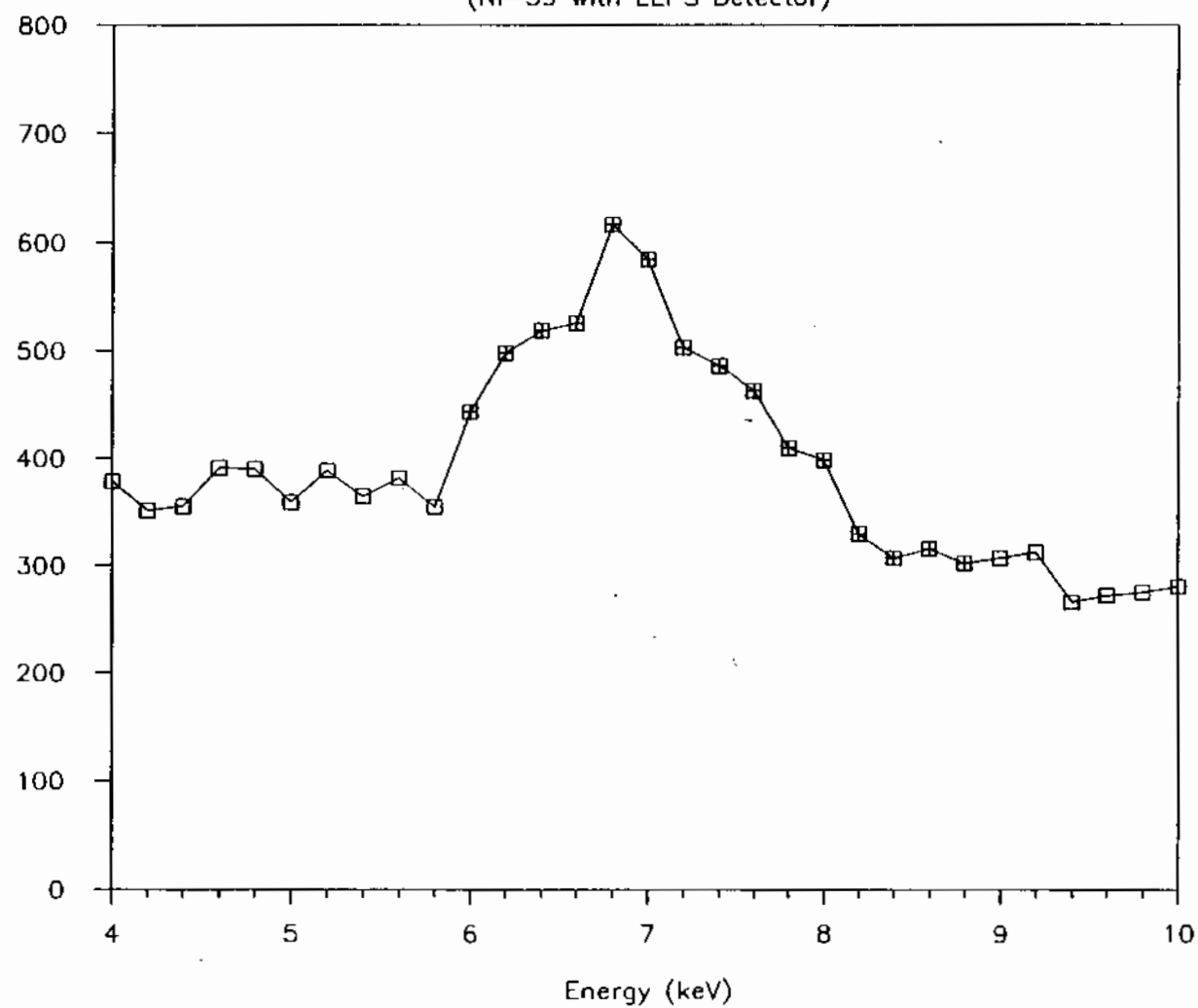
	1000	1050	1100	1150	1200	1250	1300	1350	1400	1450	1500	1550	1600	1650	1700	1750	1800	1850	1900	1950
0	87	72	61	67	44	48	52	49	49	54	47	39	41	39	39	23	38	23	27	24
1	64	56	62	67	57	52	48	42	44	47	34	35	38	44	33	34	37	22	32	33
2	93	53	67	67	71	49	58	49	41	37	48	48	29	34	33	34	36	27	36	32
3	62	68	66	64	78	55	49	47	43	33	46	34	26	32	33	25	41	33	48	24
4	78	72	63	78	77	65	48	48	46	29	41	39	26	28	31	38	37	43	25	38
5	67	86	69	79	71	46	43	46	51	39	35	22	42	39	36	37	28	33	26	37
6	61	75	79	63	44	62	56	43	49	51	38	29	41	33	39	37	24	29	31	22
7	65	64	64	64	63	54	58	34	52	43	38	48	46	48	37	42	22	36	12	28
8	79	56	55	66	51	58	58	55	37	48	41	34	36	41	34	54	31	29	23	25
9	78	71	73	63	59	67	45	48	37	32	36	41	39	44	42	47	33	36	29	24
10	71	64	59	44	63	56	58	47	47	28	26	34	53	34	32	48	36	23	24	36
11	79	63	68	58	67	55	58	44	48	44	39	42	37	25	23	48	23	17	29	26
12	67	55	68	61	63	59	58	58	53	58	36	38	29	26	28	26	29	25	25	27
13	72	61	75	62	62	66	47	43	41	44	46	48	48	48	31	33	26	31	29	21
14	73	78	64	58	64	37	36	47	47	45	46	44	36	33	23	32	39	34	34	28
15	83	59	57	59	62	46	47	48	35	39	38	48	33	30	26	34	48	38	36	25
16	65	71	63	65	58	61	44	58	42	44	49	41	41	27	37	38	39	34	26	25
17	77	61	78	68	62	66	56	45	41	46	33	41	35	37	47	28	24	48	24	22
18	88	62	61	64	68	62	51	44	48	44	42	34	33	25	29	38	25	36	32	29
19	71	67	69	61	63	64	62	49	37	38	41	41	27	48	32	27	23	36	41	22
20	73	87	64	68	48	42	47	59	38	48	45	36	37	31	29	29	22	33	37	38
21	64	76	51	68	45	49	46	42	46	41	46	36	38	48	36	24	29	27	38	31
22	55	62	68	61	68	45	54	57	31	48	45	38	37	36	27	36	48	18	38	38
23	73	58	55	43	62	52	64	36	43	58	43	44	32	36	27	31	22	31	41	24
24	66	73	57	65	56	56	63	54	45	55	26	49	42	44	31	28	28	38	38	24
25	76	63	61	42	56	58	52	37	45	61	34	33	41	38	36	38	31	36	18	25
26	77	49	61	56	61	47	63	53	29	48	32	38	43	36	39	43	26	38	35	24
27	78	74	71	72	68	45	51	44	36	64	27	45	36	42	32	36	38	27	27	23
28	59	66	64	62	55	45	46	43	42	49	49	47	29	36	48	31	25	29	26	33
29	68	58	76	63	68	51	51	42	55	44	42	32	48	36	34	31	32	31	32	38
30	73	57	61	78	45	56	58	48	34	68	33	36	62	34	36	43	34	25	29	15
31	68	67	69	45	39	62	65	42	29	33	42	41	31	44	31	34	33	23	23	38
32	71	78	58	61	43	49	48	52	58	41	33	33	49	48	35	34	32	41	25	36
33	71	59	57	63	52	58	46	43	52	33	39	34	58	41	41	46	29	42	32	35
34	61	54	64	78	59	53	51	46	54	48	48	37	37	27	36	37	35	22	42	28
35	77	55	58	58	54	55	48	44	46	34	39	29	35	41	24	34	26	21	31	38
36	74	69	64	62	51	47	48	38	34	48	38	52	37	48	28	36	32	22	23	25
37	88	61	66	49	53	63	53	41	41	39	31	39	32	35	31	29	28	25	27	28
38	77	74	63	54	59	46	37	51	37	48	43	44	37	39	38	28	33	31	28	33
39	86	54	64	65	57	62	48	48	38	45	27	38	38	36	44	37	41	33	27	25
40	73	63	54	88	58	62	45	39	39	34	42	48	28	48	34	42	35	21	31	32
41	73	76	49	83	49	61	49	38	36	34	35	35	42	36	33	38	31	28	28	35
42	68	56	69	94	49	41	46	39	41	44	41	43	46	41	26	32	36	39	26	22
43	79	58	56	74	78	58	68	54	37	35	42	41	48	49	34	24	31	21	14	28
44	75	54	58	76	54	61	53	42	45	36	48	27	34	45	49	32	28	28	21	31
45	77	64	54	81	41	53	48	32	36	43	36	33	33	35	39	35	35	28	22	29
46	76	64	64	68	55	49	48	48	46	44	55	47	34	31	26	44	31	29	28	29
47	65	75	77	57	48	48	42	41	48	33	48	32	44	29	31	38	29	29	28	38
48	89	56	63	61	68	58	41	58	51	44	25	38	42	36	35	46	48	24	26	38
49	69	58	73	52	43	42	67	45	36	39	29	33	42	31	31	38	31	26	28	26

562

Counts

SPECTRUM OF 92-5070D

(Ni-59 with LEPS Detector)



J. H. Kape
6/24/92

NI-59 ON 92-5070 DUP

SAMPLE ID..... SY:925070DM1.A;1

OF CHANNELS..... 2048

DIODE I.D..... A

SHELF NUMBER..... 0

CALIBRATION..... 0.2 KEV/CH

TIME ZERO 5/24/92 AT 16: 4: 0

COUNTED..... 5/24/92 AT 16: 4: 0
(0.00 MINUTES DECAY TIME)

LIVE COUNT TIME.... 42 HOURS 27 MINUTES 35 SECONDS (2547.58 MIN.)

ELAPSED TIME..... 42 HOURS 27 MINUTES 35 SECONDS (2547.58 MIN.)
(DEAD TIME = 0.000)

FLUX CORRECTION.... 0.0000

GEOM CORRECTION.... 0.0000 0.0000 0.0000 0.0000 0.0000

WEIGHT..... 1.00000 GRAMS

ANTI: 0 SLP: 0 AREA: 0 P-T: 0 ERR: 0 ZER: 0 OPR: 0 NOV: 1

563

MWp
5/26/92

002

NI-59 ON 92-5078 DUP

SY:925078DMLA:1 COUNTED 5/24/92 @ 16: 41 # GAIN: #.2 KEV/CHAN

	#	50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950
0	152855	280	256	175	171	161	187	146	115	135	112	141	109	113	89	83	90	75	77	84
1	#	350	220	174	188	157	158	136	136	137	147	120	113	105	100	93	90	80	75	75
2	#	340	253	207	167	154	144	144	136	120	110	123	126	128	102	100	99	81	74	79
3	#	321	211	203	147	153	158	153	127	127	81	112	99	127	112	102	90	92	74	73
4	#	330	182	205	193	154	143	130	139	122	111	114	119	102	82	101	75	105	75	78
5	#	300	221	188	160	173	123	162	122	115	109	96	112	111	93	96	94	81	67	76
6	#	296	205	187	194	154	154	141	153	118	126	102	112	94	100	96	95	80	95	79
7	#	267	192	169	162	158	154	154	161	120	124	109	110	99	113	94	92	77	79	59
8	18	280	217	190	160	161	142	140	145	137	105	140	116	105	96	97	80	80	81	75
9	1217	272	212	174	163	143	156	147	127	150	132	132	104	113	101	82	89	91	70	75
10	1077	247	195	184	164	153	127	159	116	184	98	113	121	106	88	90	91	96	95	81
11	1502	202	199	183	177	146	170	160	145	230	112	129	120	147	91	87	93	83	77	89
12	1013	307	215	174	165	163	147	173	145	249	105	124	129	129	88	101	91	80	80	62
13	044	339	184	190	168	154	181	200	144	290	122	119	113	92	117	85	95	60	89	78
14	633	478	206	186	188	170	217	244	125	269	98	113	113	121	119	85	82	80	90	61
15	536	506	167	174	144	159	251	250	145	241	96	126	100	104	110	90	97	96	62	71
16	448	534	195	181	177	168	283	235	120	204	119	119	100	112	91	81	110	92	78	67
17	433	445	224	171	177	160	287	199	133	150	111	121	91	125	101	104	94	77	74	75
18	389	346	189	185	155	170	256	162	136	141	117	134	105	104	116	103	100	99	67	72
19	380	297	201	187	151	157	236	164	137	136	122	97	102	90	101	102	98	86	78	67
20	378	242	209	176	157	140	185	165	163	122	120	114	106	116	98	90	89	70	77	60
21	351	272	206	172	176	150	157	160	150	133	128	100	87	99	109	96	88	74	89	82
22	355	267	206	191	171	136	151	185	175	120	119	133	109	107	92	94	82	71	75	58
23	391	284	182	208	181	160	174	245	199	123	111	107	106	110	92	88	86	92	72	74
24	390	230	189	177	174	143	146	315	195	110	113	105	101	106	98	88	90	89	81	74
25	359	240	201	177	155	149	146	364	190	131	110	124	104	105	103	81	95	101	79	67
26	388	271	200	167	172	140	167	342	179	109	122	124	127	106	103	105	83	86	112	84
27	364	299	211	160	174	162	147	296	182	116	101	125	102	105	93	96	77	83	114	61
28	381	381	210	163	161	163	144	205	150	124	114	102	99	119	99	90	93	89	143	65
29	354	445	239	177	177	144	161	181	127	134	123	123	101	86	90	100	72	62	120	70
30	443	522	187	193	156	155	150	113	149	127	122	114	99	104	105	96	87	78	137	55
31	498	585	185	174	154	159	170	146	132	107	127	116	100	103	105	88	65	76	99	81
32	519	556	180	206	202	159	131	174	115	116	119	117	100	98	105	90	74	73	100	77
33	526	492	205	173	161	154	161	169	130	114	130	114	110	97	116	100	87	92	89	70
34	617	370	171	187	186	156	137	154	123	114	126	105	101	120	90	101	60	79	82	80
35	585	300	200	166	186	140	176	162	136	113	121	111	120	98	99	100	87	77	94	75
36	503	285	180	154	120	145	120	145	156	115	126	109	120	90	100	84	81	82	79	70
37	406	250	192	175	148	162	157	150	102	139	114	98	92	105	95	85	78	76	81	66
38	463	227	179	157	137	154	136	145	165	107	103	94	118	92	107	94	82	80	64	77
39	409	228	199	177	177	171	142	135	156	123	105	96	114	100	85	93	85	78	67	78
40	390	219	173	140	150	130	162	159	126	135	110	123	112	85	92	79	99	85	83	80
41	329	207	179	182	159	147	140	141	129	122	116	117	111	89	93	86	72	86	76	76
42	307	216	181	176	165	160	140	136	136	131	133	115	112	99	101	94	84	79	93	87
43	315	240	176	179	138	145	153	134	122	129	113	86	100	105	111	94	73	65	59	82
44	302	257	203	162	147	154	160	133	129	145	96	101	74	79	99	104	83	73	76	68
45	307	303	199	167	190	172	155	111	124	123	117	97	112	99	106	94	73	75	91	73
46	312	283	185	181	166	149	156	116	124	129	119	93	125	105	93	80	72	86	76	67
47	266	284	203	181	140	164	147	137	126	119	144	114	107	106	103	87	95	74	63	65
48	272	267	184	175	163	144	133	142	135	126	109	103	119	123	107	72	80	86	76	69
49	275	234	195	170	189	139	157	140	156	119	127	105	90	104	100	90	79	80	78	70

NI-59 ON 92-5878 DUP

SY:925878DNI.A;1 COUNTED 5/24/92 @ 16: 4: 8 GAIN; 8.2 KEV/CHAN

	1000	1050	1100	1150	1200	1250	1300	1350	1400	1450	1500	1550	1600	1650	1700	1750	1800	1850	1900	1950
0	73	61	77	53	53	50	36	54	34	42	43	35	42	32	29	36	33	27	23	20
1	67	75	63	69	46	49	38	45	42	51	38	39	37	29	37	28	25	11	33	26
2	61	68	59	50	61	61	53	61	48	46	38	35	35	24	37	25	29	31	25	22
3	66	68	39	44	54	51	49	58	39	51	39	36	48	34	37	38	21	34	30	24
4	69	55	62	53	56	50	52	44	27	41	36	46	24	31	29	22	26	30	23	26
5	74	85	65	54	44	38	44	49	47	47	40	44	30	24	34	32	30	27	27	28
6	81	49	58	60	57	52	54	47	34	44	42	37	42	31	27	20	25	27	36	27
7	66	66	61	63	55	62	54	48	45	38	30	37	61	42	32	45	25	30	21	22
8	78	54	68	50	50	36	51	43	37	53	36	36	34	27	31	50	31	26	21	17
9	62	74	63	63	63	36	46	38	48	44	50	31	34	39	26	56	17	27	27	25
10	67	45	57	59	55	40	44	41	31	47	45	35	38	27	26	60	34	36	38	26
11	68	62	65	50	69	43	49	44	34	44	42	29	41	38	36	34	28	20	21	16
12	75	63	36	55	64	46	33	40	35	46	45	32	36	40	32	47	40	22	21	20
13	68	59	60	40	53	35	53	31	37	33	33	42	35	23	19	43	31	20	27	22
14	57	67	66	58	56	41	49	35	39	30	49	43	38	32	30	31	33	33	25	24
15	58	73	52	46	41	44	42	36	40	44	47	36	30	37	27	27	23	18	25	18
16	73	62	66	71	56	40	54	43	39	39	36	39	31	25	39	37	22	29	22	24
17	70	61	52	52	56	49	32	43	44	34	49	36	44	35	36	21	35	28	27	24
18	79	54	49	45	58	47	45	34	36	51	37	33	29	30	37	27	24	24	20	18
19	63	59	55	55	44	56	27	47	40	33	34	36	20	27	30	19	27	27	21	27
20	66	69	50	71	54	37	45	51	39	27	23	42	34	39	38	34	34	25	24	39
21	77	65	61	56	48	54	44	48	40	34	42	33	30	24	31	22	37	30	20	24
22	68	57	73	58	53	49	43	39	40	43	33	34	34	36	33	25	37	20	28	26
23	71	75	58	55	49	58	47	59	36	43	37	35	23	27	28	30	27	28	20	27
24	69	74	67	54	54	47	45	42	33	44	28	29	41	30	28	23	26	30	26	21
25	58	63	51	57	52	50	42	20	37	57	36	31	23	31	26	25	25	32	22	32
26	61	65	55	59	46	50	44	43	32	52	35	41	31	32	35	44	20	26	28	42
27	74	61	54	52	45	48	44	45	42	56	30	35	43	44	32	26	27	27	22	13
28	69	64	56	48	51	37	44	50	46	67	42	29	42	44	30	35	23	25	20	18
29	50	56	56	63	39	55	49	44	37	43	40	36	35	29	17	34	31	27	29	19
30	67	66	62	46	49	44	39	43	38	43	33	38	28	34	35	33	29	27	28	29
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32	65	39	58	45	52	49	45	40	47	37	37	37	20	34	30	43	21	23	25	26
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37	58	70	50	49	59	55	42	35	34	43	27	33	35	39	26	32	34	29	20	10
38	53	59	54	56	49	45	49	49	30	31	44	35	33	40	29	31	26	35	29	25
39	72	71	52	59	48	46	53	38	43	44	38	27	33	40	34	29	25	24	23	23
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41	69	63	64	62	48	46	39	42	48	39	31	32	42	35	23	37	26	23	21	27
42	82	57	50	73	46	62	42	47	29	43	26	30	38	34	15	32	25	30	23	19
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45	60	65	60	67	46	41	44	37	39	33	42	33	30	30	25	26	35	23	22	30
46	69	54	80	55	40	55	52	39	34	44	39	42	29	34	28	30	26	26	23	19
47	66	59	61	74	40	30	49	45	41	24	41	35	34	30	38	34	29	24	30	23
48	71	68	62	53	41	44	53	45	36	42	38	42	45	36	30	35	28	20	25	36
49	61	57	63	58	61	54	66	39	38	34	35	38	49	34	24	38	29	20	25	25

565

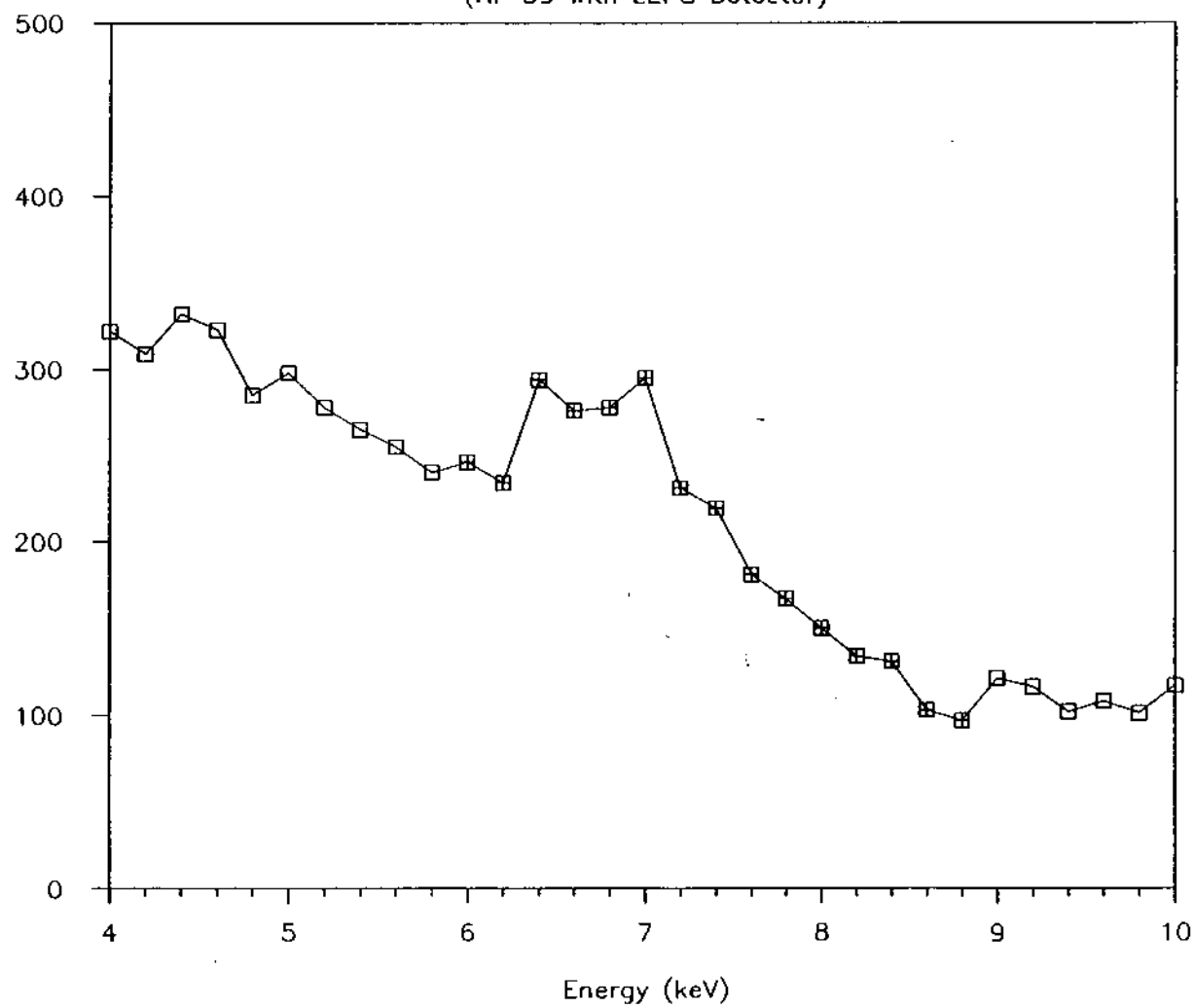
752

566

Counts

SPECTRUM OF 92-5074

(Ni-59 with LEPS Detector)



J. H. Kays
6/24/92

Channel Contents for 925074NI.8;1

ELT = 18:43:00.44 =

1,123.01 min

Channel

1:	0	0	0	0	4333
6:	15500	1634	1112	938	584
11:	214	208	276	266	277
16:	299	299	306	334	322
21:	309	332	323	285	298
26:	278	265	255	240	246
31:	234	294	276	278	295
36:	231	219	181	167	150
41:	134	131	103	97	121
46:	116	102	108	101	117
51:	132	148	139	111	98
56:	115	81	95	103	91
61:	115	107	137	157	195
66:	173	140	133	114	89
71:	81	93	85	98	83
76:	79	102	105	130	208
81:	220	179	166	145	119
86:	89	69	87	79	73
91:	81	81	85	82	80
96:	94	88	97	88	87
101:	86	73	86	84	97
106:	101	80	61	60	72
111:	69	58	44	68	82
116:	59	72	70	70	62
121:	53	73	79	71	82
126:	58	79	67	67	52
131:	57	65	50	51	69
136:	59	81	75	63	79
141:	56	55	74	68	66
146:	73	67	68	62	105
151:	169	300	473	602	545
156:	351	193	108	61	60
161:	57	58	49	51	58
166:	61	60	60	73	70
171:	63	71	142	176	188
176:	145	103	101	88	81
181:	61	60	50	54	62
186:	63	44	48	55	45
191:	50	57	58	48	61
196:	55	50	56	51	52
201:	49	45	63	47	61
206:	54	44	53	53	60
211:	24	48	40	55	53
216:	50	45	53	62	61
221:	60	50	43	45	53
226:	52	55	55	55	45
231:	72	74	75	65	43
236:	56	40	46	49	55
241:	57	50	37	53	52
246:	55	55	52	45	49
251:	48	41	48	48	54
256:	61	46	56	43	50
261:	62	50	57	64	72
266:	70	61	66	44	50

$$41$$

$$28 \quad ? \quad \Sigma = 3200c$$

28

0.047 cps

$$ch \ 28 = 255c$$

$$ch \ 41 = 134c$$

(14 ch)

$$avg = 2723$$

$$net \ 477c = 0.425c/m$$

$$1123m$$

J. H. Kage

925074N1.B.1

271:	39	65	50	51	44
276:	45	57	45	52	46
281:	46	48	36	52	50
286:	56	50	48	54	55
291:	63	54	50	53	49
296:	64	48	64	61	45
301:	55	51	59	54	85
306:	97	84	86	119	84
311:	83	70	79	76	111
316:	128	104	82	66	48
321:	54	54	50	51	56
326:	66	69	83	86	77
331:	79	64	66	61	58
336:	64	48	63	36	48
341:	46	50	50	51	56
346:	61	50	56	51	50
351:	73	51	62	53	59
356:	67	69	62	53	60
361:	61	83	88	104	92
366:	68	69	63	69	64
371:	66	74	101	134	145
376:	119	87	67	66	44
381:	50	64	59	68	66
386:	57	56	51	44	58
391:	46	40	46	57	59
396:	52	52	72	68	43
401:	80	125	210	249	258
406:	225	122	89	52	42
411:	47	58	54	52	56
416:	63	61	58	62	64
421:	76	98	79	69	81
426:	70	58	50	53	51
431:	50	51	47	69	65
436:	68	80	63	56	54
441:	49	51	53	53	51
446:	52	41	50	55	63
451:	55	50	50	38	50
456:	45	55	64	74	88
461:	106	145	141	115	93
466:	79	62	45	51	50
471:	48	50	45	52	48
476:	47	59	51	44	60
481:	59	53	49	42	49
486:	48	51	55	44	46
491:	48	49	52	56	50
496:	55	43	37	42	51
501:	49	41	56	37	41
506:	41	45	46	58	59
511:	51	50	62	49	44
516:	57	45	57	51	46
521:	46	45	45	39	45
526:	54	48	44	41	48
531:	46	43	54	53	49
536:	48	54	45	58	47
541:	40	46	45	46	50
546:	50	35	57	51	63
551:	49	70	52	68	57
556:	74	75	101	97	87
561:	78	56	43	64	48
566:	39	51	42	59	41

571:	47	38	54	55	48
576:	51	56	53	55	60
581:	47	44	51	56	38
586:	44	59	52	44	61
591:	53	48	57	48	63
596:	52	46	62	43	54
601:	55	57	53	57	59
606:	46	53	51	47	45
611:	52	49	50	32	50
616:	43	51	41	62	49
621:	53	63	46	43	52
626:	62	38	36	49	41
631:	34	54	45	45	56
636:	41	46	53	43	42
641:	47	38	60	45	37
646:	60	37	51	60	47
451:	55	45	42	49	57
456:	41	41	55	43	42
661:	57	42	44	42	33
666:	58	48	42	46	47
671:	61	49	43	47	49
476:	48	57	61	37	54
681:	48	42	43	29	37
686:	44	44	50	53	43
691:	52	48	46	41	55
696:	53	45	54	35	46
701:	44	40	38	54	44
706:	41	44	52	44	57
711:	40	44	56	42	34
716:	51	39	55	71	51
721:	40	40	62	34	37
726:	49	51	27	42	45
731:	44	46	40	41	38
736:	47	49	37	39	42
741:	58	46	40	40	47
746:	56	43	51	41	48
751:	36	38	43	35	32
756:	41	41	41	41	41
761:	43	48	39	39	38
766:	46	44	44	40	40
771:	47	46	49	36	48
776:	42	32	31	29	37
781:	46	41	48	35	37
786:	45	43	42	34	40
791:	37	36	45	39	28
796:	41	36	39	49	33
801:	49	48	40	55	47
806:	33	48	54	49	28
811:	45	46	48	41	50
816:	43	41	42	35	58
821:	42	36	45	40	31
826:	38	43	41	40	41
831:	43	41	42	38	37
836:	25	49	44	39	40
841:	35	34	38	44	36
846:	53	40	26	34	32
851:	40	34	35	43	39
856:	44	37	42	33	49
861:	37	42	48	38	40
866:	31	33	37	41	33

925074N1.B.1

871:	43	35	40	45	35
876:	39	38	32	26	49
881:	36	41	45	23	38
886:	43	46	40	37	35
891:	42	31	31	32	28
896:	34	38	31	33	25
901:	34	41	45	36	44
906:	44	35	39	33	35
911:	39	30	37	31	42
916:	32	33	34	33	30
921:	44	38	42	33	55
926:	55	72	58	67	51
931:	59	37	40	29	34
936:	31	36	26	36	35
941:	43	25	30	35	37
946:	27	33	34	30	25
951:	40	34	29	25	34
956:	27	31	36	38	29
961:	26	42	10	35	34
966:	25	36	29	32	24
971:	28	39	35	48	37
976:	28	30	31	31	37
981:	38	35	30	21	42
986:	39	37	49	40	45
991:	38	44	46	34	34
996:	32	25	31	35	23
1001:	31	26	23	29	35
1006:	37	33	23	38	31
1011:	26	28	26	30	26
1016:	31	36	36	28	34
1021:	38	34	30	29	36
1026:	36	37	29	37	28
1031:	23	36	22	33	27
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1091:	31	25	39	27	18
1096:	28	33	34	26	38
1101:	36	33	26	33	34
1106:	28	24	35	28	31
1111:	28	34	23	28	34
1116:	26	29	27	34	36
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1126:	25	25	25	19	28
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1146:	33	31	32	32	32
1151:	26	29	22	32	24
1156:	26	27	33	32	29
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1166:	20	25	27	28	31

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1191:	30	51	47	46	37
1196:	27	33	28	20	18
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1251:	17	33	21	29	29
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1261:	26	22	22	21	26
1266:	20	22	29	22	20
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1281:	26	24	15	26	21
1286:	14	23	20	15	22
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1371:	21	17	17	19	26
1376:	20	23	23	17	23
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1386:	20	16	16	21	19
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1456:	18	18	10	20	12
1461:	17	11	16	17	19
1466:	28	13	20	20	19

925074N(1.8)1

925074 N1.8j1

1471:	21	19	25	19	31
1476:	21	21	26	25	25
1481:	26	16	12	17	12
1486:	19	26	22	15	13
1491:	16	15	12	14	18
1496:	18	26	14	16	15
1501:	27	17	20	12	20
1506:	16	18	15	21	18
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1606:	16	13	19	11	11
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1626:	17	18	16	12	13
1631:	11	16	11	18	20
1636:	12	12	8	16	14
1641:	17	15	16	8	11
1646:	16	11	16	16	13
1651:	15	16	17	11	11
1656:	10	11	13	12	14
1661:	13	16	21	17	11
1666:	17	18	22	12	15
1671:	16	15	15	16	19
1676:	13	9	14	18	13
1681:	10	13	15	11	16
1686:	20	13	18	19	19
1691:	23	13	19	15	18
1696:	9	6	16	11	7
1701:	12	15	13	11	13
1706:	9	13	11	7	20
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1721:	7	9	15	8	16
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1731:	14	11	11	12	15
1736:	10	17	8	13	12
1741:	11	13	14	13	14
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1751:	14	10	15	10	15
1756:	23	21	14	28	19
1761:	17	25	20	24	13
1766:	16	9	9	16	16

1771:	16	12	13	22	31
1776:	40	54	57	52	53
1781:	43	42	26	14	9
1786:	13	13	8	14	16
1791:	15	10	13	12	9
1796:	12	14	15	12	9
1801:	14	15	19	13	14
1806:	12	21	13	18	9
1811:	16	11	9	12	9
1816:	8	9	12	11	17
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1886:	14	10	14	6	12
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1896:	11	9	14	11	9
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1911:	11	9	16	8	13
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1926:	10	13	12	12	18
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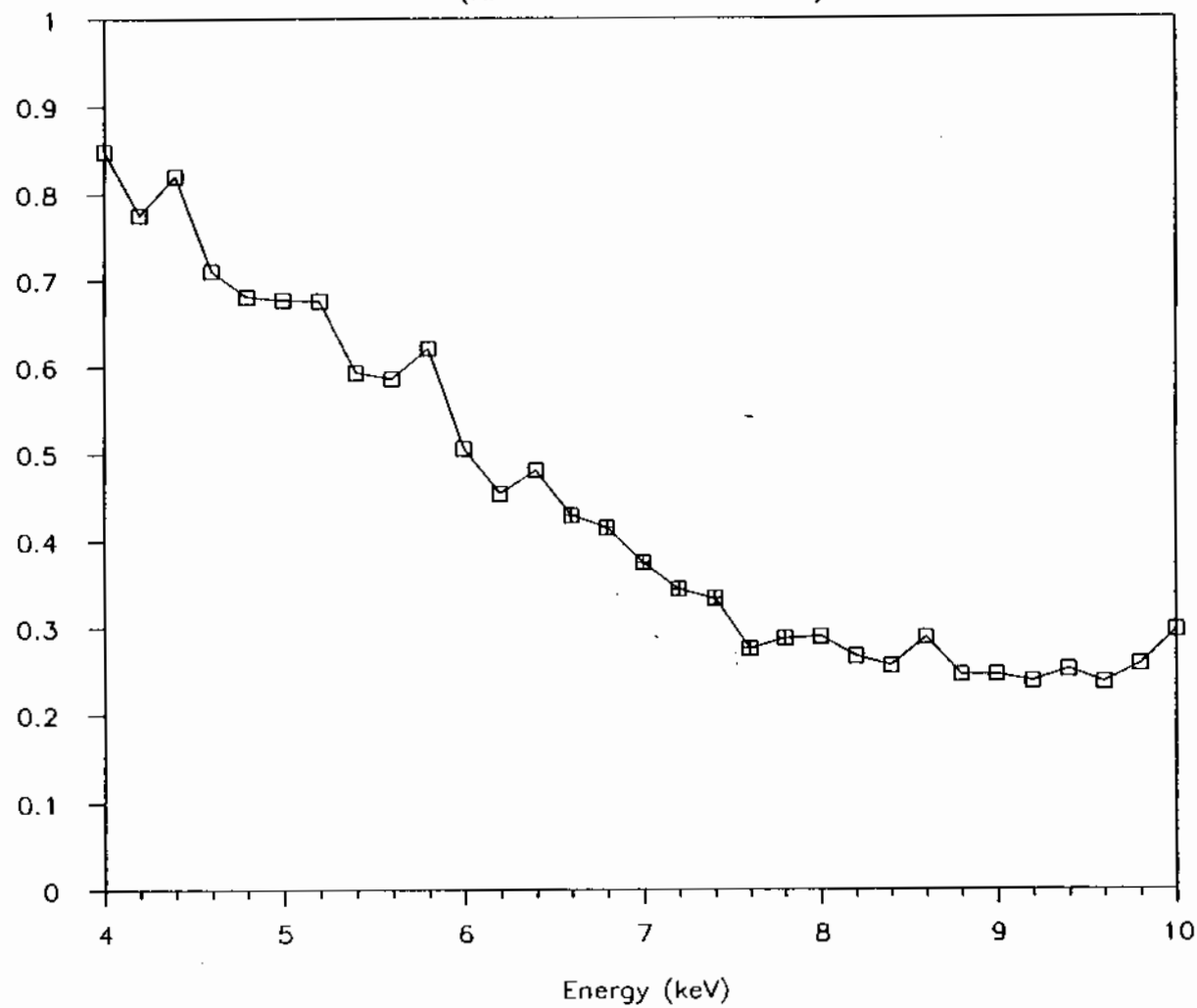
925074N(1.B51)

574

Counts
(Thousands)

SPECTRUM OF 92-5076

(Ni-59 with LEPS Detector)



J. H. Hage
6/24/92

Channel Contents for 925076NI.B;1

1/7

M. J. W. W.
5/26/92
min

Channel

ELT = 1d 18:58:37.42 = 2578.62

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6:	28342	3649	2741	2292	1246
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16:	652	661	698	753	(849
21:	776	821	711	681	677
26:	676	593	586	621	506
31:	454	481	429	415	375
36:	344	334	275	287	289
41:	266	255	288	245	245
46:	237	231	236	257	296)
51:	336	355	316	274	224
56:	232	266	218	221	211
61:	226	232	304	376	395
66:	403	318	268	216	191
71:	187	196	196	197	199
76:	205	254	259	358	433
81:	415	413	357	275	229
86:	208	156	163	178	157
91:	171	201	226	199	204
96:	213	207	198	201	180
101:	184	191	194	195	228
106:	183	143	142	140	140
111:	179	141	127	153	137
116:	165	150	130	150	151
121:	139	144	135	164	137
126:	178	184	170	150	123
131:	118	153	141	129	145
136:	134	171	161	143	176
141:	164	155	159	157	146
146:	132	167	161	171	250
151:	420	722	1180	1379	1197
156:	820	452	208	143	131
161:	131	127	118	142	129
166:	138	129	143	152	142
171:	127	198	299	401	390
176:	326	252	227	209	186
181:	146	137	145	121	113
186:	131	179	104	117	129
191:	116	119	121	109	115
196:	140	111	142	143	119
201:	114	140	114	121	106
206:	117	141	131	143	122
211:	101	136	106	127	107
216:	103	123	121	102	114
221:	110	135	116	114	118
226:	145	140	141	125	147
231:	189	148	158	123	135
236:	101	131	97	93	123
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246:	110	95	120	131	113
251:	99	125	118	116	120
256:	123	143	109	110	113
261:	113	103	114	137	162
266:	158	147	149	116	111

271:	145	101	117	118	120
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281:	134	95	120	135	96
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291:	107	127	93	111	133
296:	134	118	120	122	107
301:	109	108	97	131	156
306:	190	236	233	209	199
311:	164	161	184	164	218
316:	270	236	194	164	121
321:	132	123	134	140	106
326:	157	147	177	186	143
331:	139	161	142	141	123
336:	173	131	124	121	143
341:	112	112	130	132	128
346:	123	134	127	162	119
351:	140	127	144	137	137
356:	145	132	141	109	146
361:	140	209	226	273	171
366:	181	131	124	132	117
371:	152	192	268	332	320
376:	284	190	153	114	144
381:	125	127	126	127	151
386:	141	121	139	130	109
391:	111	107	112	138	146
396:	132	155	141	164	131
401:	180	277	487	590	581
406:	491	286	181	140	116
411:	133	132	123	131	120
416:	127	137	137	143	157
421:	208	208	215	223	202
426:	195	131	137	113	136
431:	128	112	126	119	141
436:	163	146	145	127	113
441:	127	110	118	108	109
446:	130	123	113	116	132
451:	136	116	107	97	108
456:	113	116	143	163	208
461:	282	289	301	272	225
466:	178	145	132	126	127
471:	127	123	126	114	120
476:	122	114	96	116	112
481:	115	96	118	109	114
486:	112	122	113	101	113
491:	129	111	108	134	125
496:	114	114	126	104	114
501:	113	131	103	126	117
506:	95	123	129	108	135
511:	88	102	101	114	112
516:	114	113	124	113	117
521:	143	109	121	107	106
526:	137	118	137	126	127
531:	128	131	122	125	113
536:	117	108	111	110	117
541:	101	117	129	139	114
546:	137	135	116	142	119
551:	117	146	141	118	169
556:	143	208	191	212	193
561:	143	132	159	124	131
566:	124	111	103	110	124

925076NI.B;1 2/7

925076NI.B;1 3/7

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576:	113	117	144	111	143
581:	142	140	127	105	109
586:	97	126	114	113	109
591:	110	127	97	103	109
596:	107	112	92	134	123
601:	117	116	129	122	121
606:	114	115	99	112	119
611:	119	111	113	113	117
616:	125	113	97	109	119
621:	111	104	115	126	122
626:	108	120	108	112	96
631:	117	110	116	121	131
636:	107	135	116	110	112
641:	118	109	119	119	112
646:	103	125	107	122	124
651:	111	113	130	135	105
656:	110	110	108	94	106
661:	121	91	109	117	117
666:	133	102	106	89	117
671:	100	114	104	113	105
676:	104	100	118	118	106
681:	118	105	106	95	108
686:	109	87	120	107	102
691:	127	114	110	119	100
696:	107	96	103	132	109
701:	126	93	113	105	121
706:	115	105	117	120	101
711:	83	93	107	101	112
716:	112	114	125	132	122
721:	107	118	117	118	104
726:	109	89	96	127	92
731:	91	111	119	116	103
736:	94	103	104	105	104
741:	100	80	88	92	105
746:	92	92	96	104	97
751:	113	117	113	101	123
756:	84	77	107	97	97
761:	111	111	98	105	91
766:	107	94	85	105	100
771:	105	99	108	115	102
776:	85	112	110	104	98
781:	106	102	104	90	91
786:	106	111	96	105	105
791:	87	107	92	115	99
796:	93	92	91	88	93
801:	88	100	100	108	98
806:	112	110	103	89	104
811:	84	96	100	90	106
816:	110	112	91	109	92
821:	85	104	80	107	111
826:	109	108	95	82	92
831:	103	92	107	94	92
836:	91	85	85	78	80
841:	84	80	86	94	90
846:	105	72	80	81	89
851:	84	84	88	89	93
856:	91	81	64	79	96
861:	83	95	88	100	93
866:	111	87	82	85	74

925076NI.B;1 4/7

871:	86	94	91	83	85
876:	79	92	84	102	80
881:	84	98	79	83	81
886:	82	84	82	82	97
891:	87	80	79	82	68
896:	92	57	89	83	100
901:	78	87	85	81	89
906:	79	89	71	93	99
911:	80	69	88	93	81
916:	74	91	70	102	72
921:	96	77	75	96	93
926:	125	157	162	149	132
931:	106	102	85	81	82
936:	81	81	79	77	70
941:	75	62	85	86	72
946:	76	86	83	60	77
951:	71	88	81	88	66
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961:	70	79	80	71	76
966:	85	80	90	68	89
971:	73	74	84	71	82
976:	61	86	71	78	91
981:	72	96	70	75	80
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991:	101	80	92	89	76
996:	72	63	88	84	85
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1006:	72	72	69	61	85
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1016:	80	76	76	64	71
1021:	84	96	63	63	77
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1101:	62	66	73	71	55
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1111:	60	70	58	49	69
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1126:	74	71	54	54	52
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1166:	60	53	59	65	65

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1281:	46	47	60	50	53
1286:	35	39	61	37	95
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1296:	46	50	47	54	43
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1306:	57	49	35	47	52
1311:	53	57	44	44	47
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1371:	42	51	42	37	47
1376:	43	53	55	51	52
1381:	69	55	50	52	48
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925076NI.B;1 517

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1476:	51	45	46	37	39
1481:	49	31	45	35	44
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1761:	48	48	32	33	41
1766:	28	25	34	39	29

925076NI.B,1 617

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1796:	27	37	24	35	28
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1876:	22	28	35	23	31
1881:	29	25	32	26	29
1886:	22	20	24	13	24
1891:	28	25	21	15	31
1896:	21	30	21	32	24
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1911:	26	21	27	26	32
1916:	43	50	48	42	44
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1931:	44	55	50	51	47
1936:	48	39	42	42	41
1941:	34	22	16	16	22
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1996:	32	20	22	25	20
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2016:	20	29	20	27	27
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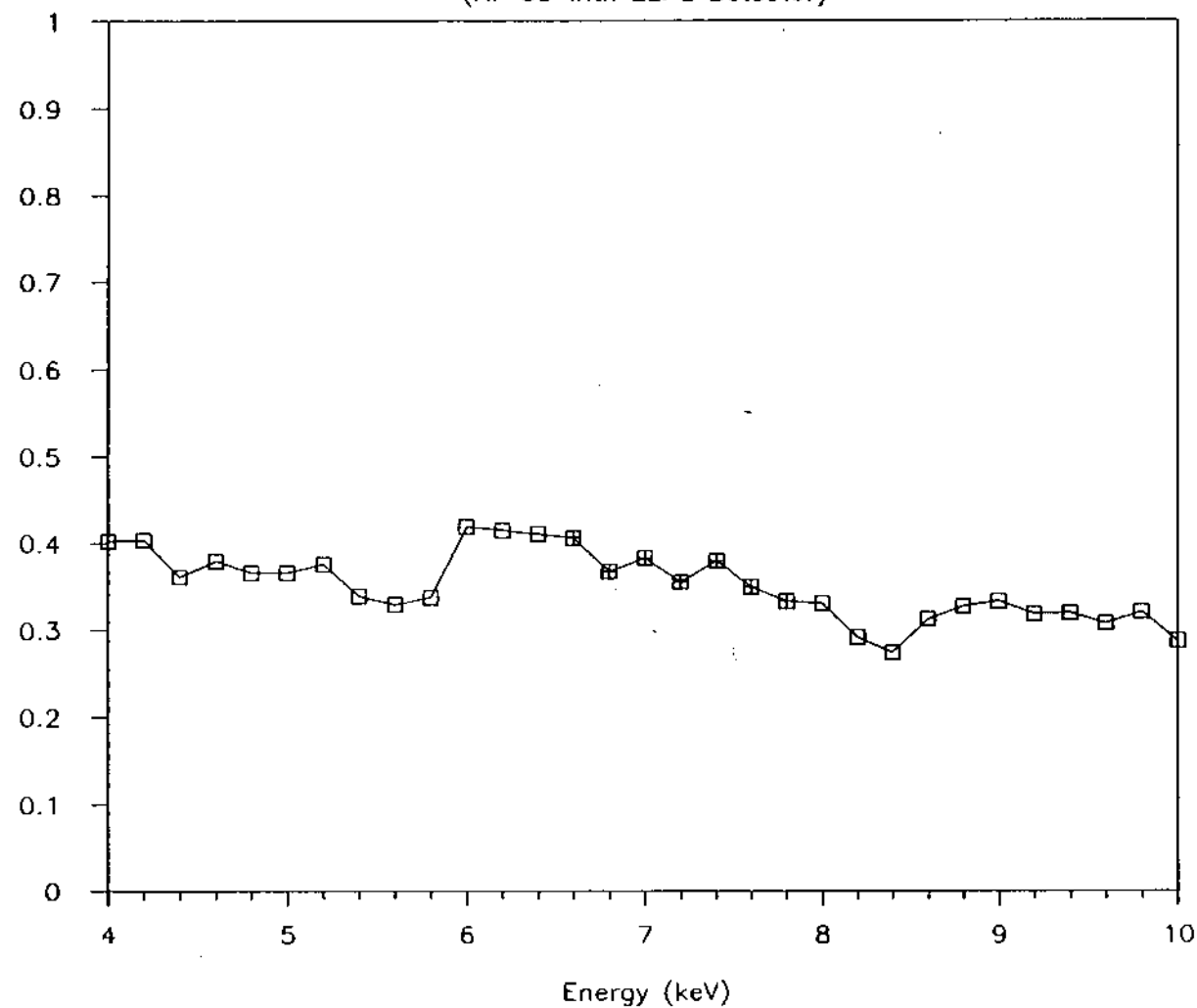
925076NI.B;1 7/7

582

Counts
(Thousands)

SPECTRUM OF 92-5080

(Ni-59 with LEPS Detector)



J. H. Page
6/24/92

925000NI.A;1 FOR NI-59

SAMPLE ID..... SY:925000NI.A;1

OF CHANNELS..... 2048

DIODE I.D..... A

SHELF NUMBER..... 0

CALIBRATION..... 0.2 KEV/CH

TIME ZERO 5/22/92 AT 17:43: 0

COUNTED..... 5/22/92 AT 17:43: 0

(0.00 MINUTES DECAY TIME)

LIVE COUNT TIME.... 46 HOURS 57 MINUTES 28 SECONDS (2757.47 MIN.)

ELAPSED TIME..... 46 HOURS 57 MINUTES 28 SECONDS (2757.47 MIN.)

(DEAD TIME = 0.000)

FLUX CORRECTION.... 0.0000

GEOM CORRECTION.... 0.0000 0.0000 0.0000 0.0000 0.0000

WEIGHT..... 1.00000 GRAMS

ANTI: 0 SLP: 0 AREA: 0 P-T: 0 ERR: 0 ZER: 0 OPR: 0 NOV: 1

583

J. H. Gage
5/26/92

738

925888NI.A:1 FOR NI-59

SY:925888NI.A:1 COUNTED 5/22/92 @ 17:43: # GAIN: 8.2 KEV/CHAN

	#	58	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	910
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1	#	331	251	235	221	182	172	157	139	135	139	130	109	115	103	100	109	87	84	76
2	#	382	236	217	181	172	193	167	147	129	114	116	119	116	116	96	92	98	87	82
3	#	356	218	231	175	203	158	159	171	158	116	143	118	131	131	111	93	111	89	79
4	#	334	214	210	182	181	166	169	163	148	135	118	146	111	102	102	96	105	86	86
5	#	326	238	226	201	178	166	158	158	135	138	135	109	123	112	111	91	86	88	75
6	#	334	231	202	189	173	157	169	154	137	126	105	132	105	123	108	107	98	92	87
7	#	262	237	193	171	164	188	172	138	126	128	126	116	116	137	104	110	97	87	74
8	22	259	198	178	176	157	158	148	141	168	124	117	116	116	101	107	86	95	94	83
9	1274	294	214	201	215	138	178	159	151	177	115	141	117	128	124	99	95	83	77	73
10	1938	296	242	188	181	177	169	178	133	223	124	117	108	117	96	102	95	98	92	95
11	1668	275	238	202	181	177	181	166	148	248	132	136	115	123	98	79	81	81	78	81
12	1010	334	224	202	172	168	169	223	143	318	129	135	132	122	118	124	96	76	74	86
13	879	412	194	181	168	162	192	231	138	285	118	134	138	104	104	102	95	108	79	98
14	597	608	231	223	204	194	202	276	148	282	143	138	113	111	106	123	103	75	85	69
15	533	563	191	195	178	178	276	266	157	226	143	127	116	95	118	104	101	93	93	83
16	481	567	215	191	193	178	342	228	136	226	127	148	131	109	112	103	110	86	65	81
17	416	482	214	175	182	179	384	193	152	175	119	128	113	96	114	91	112	102	88	92
18	385	353	225	193	167	181	302	167	136	141	141	148	126	119	103	91	88	99	91	55
19	377	334	214	193	183	178	224	163	136	131	127	143	106	128	119	107	96	97	69	77
20	403	253	202	216	195	173	169	146	164	131	107	117	128	113	117	89	99	96	82	75
21	404	262	238	188	194	155	154	194	194	125	135	119	121	107	128	112	79	95	90	78
22	361	298	221	181	166	159	168	221	235	136	137	122	136	103	110	101	77	94	84	73
23	388	244	222	197	196	147	152	278	211	123	127	97	128	127	113	98	78	92	88	67
24	366	255	217	199	204	194	175	341	245	128	134	123	113	118	92	99	87	77	77	101
25	366	231	209	189	163	163	139	359	242	137	124	121	116	104	100	88	89	91	91	64
26	376	288	218	194	186	192	167	352	203	124	116	138	128	129	103	92	116	76	109	57
27	339	337	219	163	178	164	172	265	185	148	134	118	134	136	108	113	89	92	138	66
28	329	382	249	209	206	169	173	198	166	134	118	148	115	142	108	111	97	98	158	69
29	337	446	238	204	158	174	166	148	133	116	138	131	128	108	116	101	82	95	143	69
30	419	569	214	183	188	178	159	164	148	151	132	121	113	116	96	99	98	84	123	82
31	416	583	218	185	193	166	182	152	162	151	121	127	112	113	103	106	94	74	116	61
32	411	596	247	188	195	192	185	178	143	148	165	123	117	101	122	93	83	102	76	74
33	406	495	198	163	205	151	173	144	158	116	132	125	111	124	88	86	101	77	113	70
34	368	392	213	173	209	166	184	167	151	109	132	128	111	103	113	112	96	94	88	84
35	383	328	221	184	169	151	198	167	171	123	145	127	126	125	115	103	107	86	68	57
36	355	318	216	175	198	174	126	168	156	143	137	122	128	118	111	103	109	81	85	85
37	388	249	197	204	166	179	168	152	171	133	106	122	116	116	116	92	84	83	78	91
38	349	232	217	189	189	164	158	138	168	144	126	149	138	101	106	107	96	61	67	79
39	333	233	237	189	171	196	166	148	153	134	155	137	133	129	102	103	103	93	88	85
40	338	248	224	188	166	166	173	148	165	149	128	114	107	98	98	107	98	76	59	87
41	291	238	217	178	183	168	173	167	153	137	127	131	105	109	96	99	93	97	73	92
42	274	238	194	194	188	177	165	135	117	138	127	126	129	107	117	87	91	111	75	87
43	312	279	233	181	165	172	168	174	128	105	146	129	125	92	116	109	91	78	84	84
44	327	316	194	206	169	186	143	136	128	128	118	109	127	96	95	81	109	88	93	78
45	333	295	197	189	164	159	166	148	126	138	127	117	107	96	99	89	95	96	71	85
46	318	318	197	189	156	176	162	137	127	137	127	124	87	97	92	119	92	72	88	71
47	319	296	227	183	178	153	119	167	136	109	128	109	127	109	115	94	76	84	93	78
48	307	291	218	198	159	181	168	149	135	119	117	109	116	103	115	98	109	92	76	74
49	321	239	222	189	161	188	159	141	125	138	143	113	124	129	109	98	87	99	92	73

926000NI.A:1 FOR NI-59

SY:926000NI.A:1 COUNTED 5/22/92 @ 17:43: # GAIN: 8.2 KEV/CHAN

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0	56	88	69	68	54	43	46	48	47	51	34	41	36	40	39	23	36	37	24	30
1	60	71	62	51	44	57	58	47	46	42	26	38	44	39	34	37	34	24	27	23
2	59	75	65	52	49	42	48	58	58	42	48	38	36	29	42	33	28	36	28	39
3	58	78	78	68	56	58	38	37	45	44	33	38	47	37	48	28	31	29	19	29
4	78	73	64	56	63	49	44	62	38	41	41	44	24	34	32	37	29	29	29	25
5	67	87	76	56	53	57	63	63	45	56	36	37	49	27	42	23	33	16	25	24
6	78	67	53	72	71	61	61	37	37	43	38	55	38	33	36	35	31	19	25	23
7	64	85	62	86	68	49	54	44	39	42	32	34	33	29	37	44	24	38	21	25
8	64	73	73	47	56	45	44	41	44	36	44	43	33	33	29	48	34	26	35	22
9	66	73	79	72	76	56	32	48	42	47	32	48	31	29	32	53	21	39	27	26
10	87	66	67	63	64	48	42	54	46	48	58	48	42	43	38	46	24	23	19	32
11	68	75	51	82	68	46	45	58	39	42	41	48	38	35	39	32	33	27	31	25
12	72	67	61	64	71	49	58	52	26	58	46	32	41	36	28	61	28	26	27	24
13	58	77	59	68	59	48	42	48	47	62	29	45	33	32	36	38	31	37	31	29
14	76	67	67	57	62	68	41	39	55	46	42	42	28	38	46	29	33	38	23	28
15	66	78	72	53	64	39	56	58	62	58	43	29	28	31	42	26	26	25	27	31
16	71	63	58	69	63	51	34	56	48	56	35	37	42	34	28	31	38	18	31	25
17	79	71	65	71	57	44	47	56	49	41	34	25	35	41	42	34	32	31	33	35
18	65	54	67	58	58	69	47	48	41	42	37	34	39	33	28	38	27	32	22	25
19	86	63	53	58	43	55	58	38	39	38	34	48	36	28	31	34	28	37	28	23
20	52	68	81	78	46	51	54	58	51	51	48	32	36	38	23	26	23	19	31	28
21	56	64	76	46	58	64	68	48	58	34	29	27	26	39	34	35	24	31	18	25
22	76	77	58	64	52	54	58	41	41	41	45	34	39	45	41	23	26	22	32	31
23	56	59	65	68	58	56	46	41	45	51	45	38	31	35	36	39	25	33	28	26
24	88	65	62	52	58	42	58	48	51	45	34	46	31	48	32	39	28	25	25	21
25	76	64	67	58	62	44	58	43	43	63	48	33	38	32	28	43	26	22	38	27
26	75	73	66	56	53	43	39	49	51	47	42	46	44	51	32	29	29	37	24	29
27	67	67	57	56	62	49	49	43	45	52	38	35	37	51	48	41	26	32	27	37
28	64	73	61	56	51	51	48	47	36	63	41	28	35	31	38	41	34	27	28	35
29	66	61	66	71	55	64	46	58	39	43	31	38	34	38	37	31	32	29	34	33
30	61	63	73	61	57	52	39	45	41	48	41	38	35	42	31	36	38	25	22	27
31	67	81	62	57	32	44	51	44	48	37	35	31	68	29	48	36	32	25	32	19
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37	73	61	61	49	45	47	34	49	46	38	41	29	36	36	33	25	26	21	38	32
38	62	67	67	59	56	53	47	47	49	43	36	34	38	27	37	34	26	35	26	17
39	67	59	69	57	62	54	47	42	47	46	39	34	33	33	35	28	18	34	39	29
40	65	68	82	57	53	68	48	48	44	38	37	34	36	31	29	35	22	31	25	23
41	73	61	65	81	68	61	42	48	39	36	35	36	31	32	32	24	26	17	24	25
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43	78	75	65	79	53	48	45	55	44	34	32	26	43	32	33	34	25	27	32	31
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45	77	59	79	77	49	61	58	49	33	37	44	31	37	38	32	35	19	29	22	38
46	65	67	72	65	46	47	68	35	42	44	45	39	33	38	29	38	19	25	18	21
47	75	53	76	64	59	51	43	43	52	38	28	35	34	48	29	25	28	25	17	24
48	74	56	57	45	53	45	43	55	45	32	44	43	36	37	29	22	48	25	27	27
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585

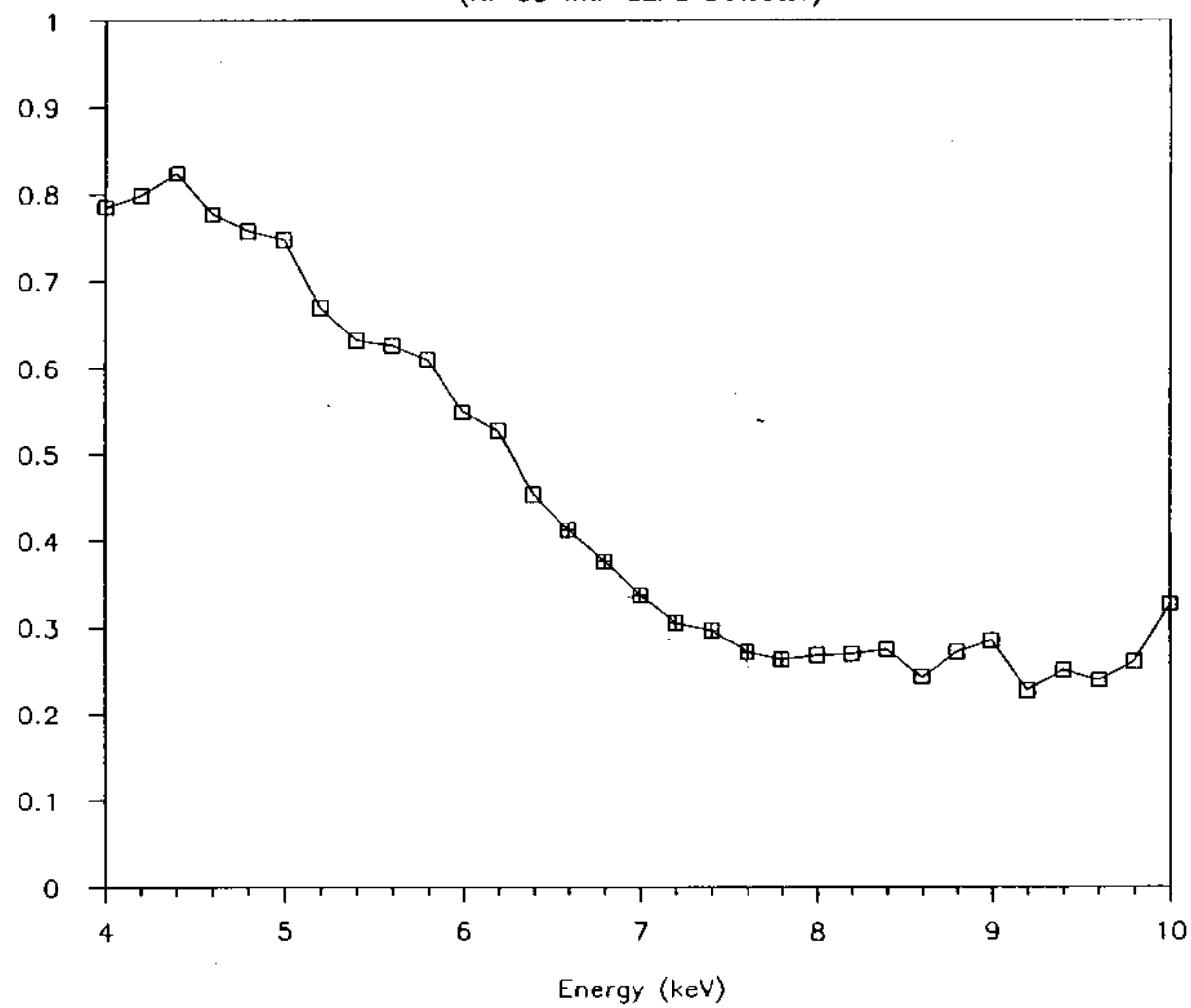
700

586
989

Counts
(Thousands)

SPECTRUM OF 92-5688

(Ni-59 with LEPS Detector)



ELT = 2,746.55 min

VAX/VMS Peak Search Report V1.8 Generated 15-JUN-1992 14:12:26

Configuration : SYSSYSDEVICE:[USER]925688NI.B;1
Analyses by : PEAK V16.1
Sample date : Acquisition date : 22-MAY-1992 16:43:34
Sample ID : Sample quantity : 1.0000 SAMPLE
Elapsed live time: 1 21:46:32.80 Elapsed real time: 1 21:46:39.64 0.0%
Start energy : 0.20 keV End energy : 409.60 keV
Sensitivity : 5.00 Gaussian : 10.00
Critical level : No

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	10.41	610	2706	0.73	52.05	47	12	3.70E-03	17.9	
2	0	13.11	1324	2975	0.72	65.54	59	15	8.03E-03	9.5	
3	0	16.23	1778	2740	1.06	81.23	74	15	1.08E-02	6.9	
4	0	30.78	5911	2421	0.87	153.92	147	17	3.59E-02	2.4	
5	0	35.19	1741	2272	0.82	175.94	168	18	1.06E-02	7.1	
6	0	46.48	242	1432	0.79	232.41	227	11	1.47E-03	31.5	
7	4	61.58	592	1831	0.93	307.89	300	23	3.59E-03	14.2	3.18E+00
8	4	63.07	714	1842	0.96	315.37	300	23	4.34E-03	12.0	
9	3	72.66	649	1774	1.09	363.31	356	24	3.94E-03	12.5	1.39E+00
10	3	74.87	1059	1389	0.85	374.36	356	24	6.43E-03	6.7	
11	0	80.89	2057	1898	0.81	404.46	397	14	1.25E-02	4.4	
12	0	84.62	555	1831	1.18	423.12	416	14	3.37E-03	14.6	
13	0	92.54	1227	1847	1.07	462.72	456	16	7.45E-03	7.4	
14	0	111.76	631	2405	0.98	558.79	550	19	3.83E-03	16.5	
15	0	185.67	449	1563	0.94	928.37	919	18	2.72E-03	18.4	
16	0	302.61	265	528	0.98	1513.07	1507	15	1.41E-03	17.6	
17	0	351.40	144	649	0.44	1757.00	1749	20	8.71E-04	38.5	
18	0	355.81	783	699	1.01	1779.06	1768	24	4.75E-03	8.6	
19	0	386.66	256	368	1.30	1933.32	1926	14	1.55E-03	15.3	

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Channel Contents for ~~LEPS~~ 925688NI.B;1

(7 pages)

Channel

1:	0	0	0	0	10168
6:	25388	3573	2689	2360	1224
11:	548	579	563	614	667
16:	694	676	750	768	(785
21:	799	824	777	758	748
26:	670	632	626	610	549
31:	528	453	412	376	337
36:	305	296	271	263	267
41:	269	274	242	271	284
46:	226	250	238	260	326)
51:	322	377	332	246	282
56:	242	225	216	215	231
61:	227	263	315	418	503
66:	452	349	274	211	220
71:	227	190	204	165	203
76:	213	240	313	370	453
81:	490	483	418	309	265
86:	215	184	197	165	192
91:	164	191	201	245	228
96:	246	228	242	201	190
101:	189	212	232	213	234
106:	207	180	164	162	141
111:	143	140	159	152	174
116:	154	180	145	156	170
121:	150	149	146	139	169
126:	162	196	151	186	164
131:	129	158	159	138	143
136:	173	170	157	160	165
141:	155	146	161	156	173
146:	156	138	178	199	259
151:	483	847	1265	1411	1333
156:	845	439	228	141	147
161:	125	166	128	150	136
166:	142	158	117	143	124
171:	180	205	322	448	446
176:	362	280	242	216	224
181:	175	140	143	131	115
186:	119	127	133	152	124
191:	125	142	126	129	131
196:	135	131	132	140	128
201:	124	115	120	118	113
206:	134	107	131	120	137
211:	145	128	128	155	146
216:	111	146	133	118	114
221:	124	131	152	141	137
226:	151	141	156	133	135
231:	190	188	189	179	128
236:	118	117	118	143	121
241:	120	129	121	142	136
246:	118	124	119	129	134
251:	137	114	100	115	123
256:	134	116	125	131	134
261:	121	134	148	133	148
266:	160	156	128	118	131

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925688 Ni. B, 1

271:	127	135	118	121	126
276:	138	143	129	131	126
281:	140	134	136	123	119
286:	109	126	112	129	107
291:	129	132	111	124	129
296:	106	140	127	143	120
301:	124	121	110	160	186
306:	200	228	242	235	202
311:	208	155	156	207	258
316:	290	253	203	169	118
321:	143	123	134	140	146
326:	157	165	189	186	171
331:	169	164	136	143	143
336:	145	133	137	168	126
341:	116	129	151	137	160
346:	126	157	141	150	143
351:	147	125	133	127	133
356:	121	134	141	138	139
361:	167	227	243	233	216
366:	161	161	140	137	151
371:	159	223	272	365	358
376:	285	185	155	121	123
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386:	157	127	114	129	128
391:	125	154	137	110	142
396:	158	133	147	139	152
401:	206	331	459	603	604
406:	452	284	186	144	115
411:	146	120	118	149	119
416:	126	130	151	165	159
421:	200	189	230	206	217
424:	198	157	134	124	129
431:	138	113	149	130	150
436:	188	150	144	145	120
441:	107	131	121	140	112
446:	134	125	126	134	140
451:	129	116	129	125	120
456:	109	132	160	171	240
461:	288	327	306	286	226
466:	182	144	128	117	139
471:	119	108	113	147	110
476:	122	104	120	113	130
481:	134	133	110	129	113
486:	126	128	120	142	107
491:	126	134	140	123	107
496:	126	132	126	148	117
501:	112	101	114	152	125
506:	132	115	122	136	137
511:	116	128	112	131	123
516:	135	124	131	121	110
521:	117	109	133	116	130
526:	137	119	111	119	124
531:	118	114	127	122	119
536:	118	118	116	128	105
541:	112	122	125	140	160
546:	127	131	131	149	136
551:	146	136	151	141	160
556:	184	223	237	226	202
561:	177	126	136	147	147
566:	118	125	118	109	122

571:	131	130	129	134	109
576:	108	148	141	139	151
581:	129	129	152	139	154
586:	130	125	117	130	115
591:	133	140	119	118	121
596:	120	146	125	110	110
601:	120	140	131	129	129
606:	134	136	112	122	122
611:	136	116	126	118	126
616:	120	129	104	118	136
621:	110	111	117	119	131
626:	128	124	99	123	123
631:	133	119	115	113	102
636:	117	140	127	127	128
641:	112	116	111	143	116
646:	122	110	141	103	105
651:	122	104	115	122	116
656:	105	121	141	134	108
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666:	108	121	119	126	133
671:	143	105	107	113	129
676:	109	129	114	110	116
681:	114	123	104	123	116
686:	128	119	117	110	107
691:	103	103	114	110	117
696:	129	130	132	122	90
701:	136	93	106	127	115
706:	116	109	120	141	100
711:	115	119	125	124	106
716:	142	120	131	134	136
721:	135	110	110	104	103
726:	107	108	115	102	123
731:	116	94	117	120	112
736:	110	108	119	103	101
741:	107	88	95	111	118
746:	131	106	121	101	128
751:	128	96	107	102	118
756:	94	86	109	110	100
761:	113	115	106	123	105
766:	102	105	99	102	101
771:	110	114	100	120	100
776:	88	100	116	90	104
781:	106	115	120	91	111
786:	115	105	110	107	146
791:	99	113	113	105	106
796:	104	96	107	105	109
801:	118	111	97	109	122
806:	122	105	95	87	100
811:	98	113	114	96	112
816:	110	114	102	101	113
821:	97	93	94	97	94
826:	112	102	110	104	97
831:	80	110	101	112	92
836:	113	103	106	82	107
841:	100	113	94	86	100
846:	107	81	107	97	96
851:	82	86	99	92	96
856:	102	87	88	101	87
861:	95	86	119	89	88
866:	82	76	81	97	77

9256 18N(1.8);1

871:	97	106	88	99	91
876:	96	97	97	105	88
881:	87	80	104	112	96
886:	72	100	88	101	97
891:	87	82	83	89	77
896:	89	101	67	83	87
901:	88	74	85	82	89
906:	76	102	92	93	80
911:	78	87	86	95	91
916:	84	88	90	81	90
921:	85	88	105	100	104
926:	131	148	175	151	167
931:	115	102	96	93	93
936:	88	82	92	100	84
941:	94	82	84	86	82
946:	86	87	98	82	78
951:	84	82	71	82	91
956:	71	84	95	82	76
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966:	79	89	94	70	89
971:	84	89	90	87	71
976:	87	82	73	78	64
981:	81	87	73	87	84
986:	83	78	89	85	110
991:	94	87	71	108	96
996:	72	93	69	83	84
1001:	94	70	81	94	79
1006:	93	72	98	73	76
1011:	89	69	74	87	62
1016:	91	70	67	73	77
1021:	84	73	65	86	87
1026:	90	94	65	66	92
1031:	64	64	66	73	68
1036:	83	80	77	75	62
1041:	66	78	74	76	72
1046:	65	81	80	80	80
1051:	83	76	81	83	80
1056:	64	82	72	88	75
1061:	79	64	74	85	63
1066:	73	68	83	73	77
1071:	78	70	81	75	69
1076:	75	69	76	68	79
1081:	55	66	70	68	79
1086:	67	66	70	66	68
1091:	55	73	72	76	56
1096:	70	67	59	57	69
1101:	70	58	67	51	62
1106:	75	66	56	64	73
1111:	67	68	63	57	76
1116:	68	58	73	55	55
1121:	72	64	62	96	79
1126:	58	73	76	69	75
1131:	64	64	68	71	67
1136:	44	62	72	79	65
1141:	59	60	61	70	65
1146:	50	51	83	50	45
1151:	57	41	53	62	64
1156:	74	54	75	48	66
1161:	61	72	67	63	64
1166:	58	58	56	60	70

925688A1.8,1

1171:	81	53	59	46	65
1176:	60	38	65	63	60
1181:	55	71	52	77	73
1186:	78	75	65	86	85
1191:	86	94	116	91	83
1196:	78	77	62	56	56
1201:	63	54	53	52	68
1206:	74	61	75	54	64
1211:	59	69	60	46	58
1216:	43	51	52	49	52
1221:	48	49	41	66	60
1226:	64	50	57	51	59
1231:	57	58	56	60	58
1236:	63	62	53	48	55
1241:	52	57	32	51	56
1246:	62	43	58	58	57
1251:	56	50	41	70	61
1256:	48	47	49	60	51
1261:	49	43	53	66	58
1266:	55	52	52	50	49
1271:	59	56	44	45	54
1276:	58	43	55	52	50
1281:	49	62	44	59	50
1286:	56	51	49	59	58
1291:	50	45	43	42	63
1296:	66	57	52	46	56
1301:	53	56	55	48	57
1306:	50	59	45	55	60
1311:	67	53	43	51	51
1316:	58	51	51	42	37
1321:	49	48	49	47	43
1326:	46	45	49	48	50
1331:	49	43	48	34	46
1336:	49	43	45	44	45
1341:	48	42	62	51	61
1346:	41	49	45	53	42
1351:	47	41	37	56	48
1356:	55	58	36	42	41
1361:	42	41	54	54	39
1366:	47	42	56	48	57
1371:	36	48	44	50	46
1376:	41	45	50	61	65
1381:	55	54	64	62	56
1386:	42	58	54	52	52
1391:	47	40	36	57	56
1396:	42	47	43	44	47
1401:	30	46	44	50	59
1406:	42	55	37	53	43
1411:	44	38	37	47	43
1416:	33	41	54	37	43
1421:	41	45	64	41	37
1426:	43	38	49	45	46
1431:	39	35	51	45	42
1436:	56	39	36	44	45
1441:	45	44	39	43	34
1446:	47	34	42	40	39
1451:	34	49	50	40	47
1456:	44	41	54	37	38
1461:	42	45	42	43	41
1466:	49	31	44	50	44

925688 N(1. B)1

1471:	44	57	45	46	57
1476:	50	66	54	46	44
1481:	43	46	36	50	36
1486:	45	40	44	50	42
1491:	30	35	37	37	38
1496:	52	41	37	48	46
1501:	52	39	43	45	36
1506:	34	34	50	45	52
1511:	59	89	74	60	43
1516:	43	49	47	36	35
1521:	37	32	38	36	41
1526:	42	50	35	36	41
1531:	35	45	41	57	45
1536:	46	51	39	40	45
1541:	32	45	34	30	26
1546:	29	31	46	26	40
1551:	30	37	44	35	35
1556:	33	30	42	36	32
1561:	42	27	41	42	33
1566:	48	32	33	29	40
1571:	31	30	32	41	24
1576:	43	41	47	27	33
1581:	34	39	49	28	40
1586:	38	39	51	33	39
1591:	42	33	38	30	32
1596:	38	35	30	35	34
1601:	51	43	39	31	39
1606:	38	36	40	34	44
1611:	36	43	38	29	32
1616:	43	40	41	47	38
1621:	43	25	43	30	40
1626:	38	35	38	25	37
1631:	35	34	41	34	31
1636:	24	37	31	37	39
1641:	49	44	43	26	30
1646:	42	36	40	46	39
1651:	37	32	38	32	37
1656:	33	31	32	43	37
1661:	34	33	39	41	42
1666:	43	51	49	62	54
1671:	40	46	37	35	47
1676:	26	31	43	48	43
1681:	38	36	34	30	25
1686:	39	35	36	45	44
1691:	55	38	47	40	28
1696:	31	31	26	30	23
1701:	37	38	42	25	40
1706:	32	29	40	22	39
1711:	41	28	32	24	39
1716:	30	24	33	43	32
1721:	38	26	39	28	35
1726:	36	32	34	26	27
1731:	29	26	48	36	33
1736:	27	38	25	31	32
1741:	31	32	30	35	23
1746:	33	37	24	28	34
1751:	31	48	30	34	41
1756:	45	42	42	56	72
1761:	51	52	33	28	37
1766:	36	27	26	41	38

925688N1.0;1

1771:	31	35	31	41	62
1776:	82	88	150	168	148
1781:	111	107	64	45	31
1786:	34	27	35	29	33
1791:	25	28	33	27	26
1796:	28	27	34	29	34
1801:	24	21	36	32	27
1806:	32	24	27	17	27
1811:	26	30	30	35	27
1816:	33	27	19	34	27
1821:	22	33	21	38	35
1826:	20	24	28	38	23
1831:	36	29	22	26	35
1836:	18	32	31	24	35
1841:	22	29	21	23	24
1846:	35	25	21	39	24
1851:	32	30	29	30	30
1856:	17	30	26	23	27
1861:	26	33	31	30	25
1866:	15	34	33	28	28
1871:	34	29	27	32	31
1876:	27	28	25	26	33
1881:	24	27	31	18	37
1886:	27	32	40	29	41
1891:	27	27	21	35	18
1896:	21	21	27	33	30
1901:	21	34	20	26	30
1906:	23	26	29	20	28
1911:	32	38	34	25	40
1916:	40	41	54	54	46
1921:	37	43	22	27	25
1926:	29	29	30	29	47
1931:	57	55	59	68	69
1936:	58	43	31	20	23
1941:	34	35	27	26	24
1946:	25	27	24	24	21
1951:	28	22	26	45	32
1956:	42	31	18	18	48
1961:	39	32	29	27	20
1966:	27	33	36	26	30
1971:	32	26	26	24	26
1976:	22	32	21	24	28
1981:	22	29	31	27	25
1986:	39	27	17	28	25
1991:	20	23	16	26	31
1996:	28	23	28	29	20
2001:	31	30	27	22	29
2006:	24	28	28	22	24
2011:	25	35	18	22	28
2016:	20	26	20	21	27
2021:	18	31	23	24	25
2026:	22	28	23	23	30
2031:	29	26	22	23	21
2036:	16	18	26	25	20
2041:	24	30	24	21	22
2046:	25	26	37		

925088N1.051

REAGENT BLANK # 07

SAMPLE ID..... SY:RB07.D2;1

OF CHANNELS..... 2048

DIODE I.D..... D2

SHELF NUMBER..... 0

CALIBRATION..... 0.2 KEV/CH

TIME ZERO 5/22/92 AT 17:40: 0

COUNTED..... 5/22/92 AT 17:48: 0

(0.00 MINUTES DECAY TIME)

LIVE COUNT TIME.... 46 HOURS 18 MINUTES 0 SECONDS (2778.00 MIN.)

ELAPSED TIME..... 46 HOURS 18 MINUTES 0 SECONDS (2778.00 MIN.)

(DEAD TIME = 0.000)

FLUX CORRECTION.... 0.0000

GEOM CORRECTION.... 0.0000 0.0000 0.0000 0.0000 0.0000

WEIGHT..... 1.00000 GRAMS

ANTI: 0 SLP: 0 AREA: 0 P-T: 0 ERR: 0 ZER: 0 OPR: 0 MOV: -1

J. H. Gage
5/24/92

REAGENT BLANK # 87

SY:RB87.D2;1 COUNTED 5/22/92 @ 17:48: # GAIN: #.2 KEV/CHAN

	#	50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950
0	35581	249	102	87	67	69	77	70	60	66	72	81	90	77	67	69	57	56	45	42
1	35594	234	99	85	77	78	65	61	73	72	65	78	85	63	72	72	76	74	42	47
2	0	237	91	93	70	62	75	63	72	65	83	81	83	81	78	57	58	56	43	39
3	0	203	95	106	67	63	71	66	74	57	60	62	91	88	67	70	65	53	48	56
4	0	222	109	84	70	63	59	75	77	77	72	74	59	77	67	62	68	70	42	67
5	0	165	106	119	64	68	64	64	89	80	70	82	91	71	75	76	70	52	62	65
6	0	190	99	79	89	61	71	68	102	81	82	76	86	59	69	72	57	58	44	49
7	0	159	74	80	78	63	67	68	86	70	73	65	79	89	74	63	66	61	54	41
8	0	157	98	84	66	65	76	61	83	92	76	87	81	80	72	63	69	64	43	31
9	0	130	92	76	63	72	69	63	73	84	71	64	75	78	68	55	55	62	56	43
10	0	169	104	74	66	83	87	72	92	105	78	95	73	71	78	58	66	37	45	46
11	4	162	90	86	63	61	68	87	63	105	64	64	80	73	66	71	47	47	44	38
12	493	167	121	100	65	73	64	83	59	93	82	66	75	70	69	76	59	59	60	59
13	439	160	106	90	64	64	77	96	59	117	102	81	66	74	55	67	55	48	48	43
14	466	203	105	78	70	62	68	104	79	135	83	68	68	80	63	91	68	67	44	46
15	464	216	87	91	84	73	94	103	65	121	52	82	64	59	71	50	69	41	44	40
16	459	246	90	79	76	71	111	106	67	120	81	82	72	67	77	67	60	44	61	41
17	440	177	100	77	70	69	116	81	88	86	70	73	82	80	78	48	60	46	55	42
18	393	166	104	85	67	80	96	80	79	85	73	72	94	59	69	65	56	54	54	47
19	410	155	106	69	75	70	78	72	69	100	75	82	70	72	72	68	54	49	59	48
20	401	169	99	79	70	70	67	69	92	69	69	73	76	73	83	59	64	63	50	50
21	404	139	95	66	64	72	69	84	76	65	92	84	71	61	69	56	59	50	50	53
22	380	116	82	76	72	71	67	107	97	69	73	68	66	81	67	60	55	43	61	46
23	351	129	83	89	62	57	59	137	95	73	73	61	98	77	69	62	57	60	48	41
24	336	141	91	62	69	79	68	141	89	78	78	71	76	74	81	59	62	60	53	32
25	356	151	92	93	73	67	56	102	87	73	76	77	63	75	68	62	50	62	47	55
26	353	130	94	85	68	62	63	131	66	81	79	69	83	77	74	68	58	45	59	42
27	306	129	115	72	85	68	69	109	97	72	86	73	85	80	60	70	70	57	63	43
28	350	170	92	69	71	60	70	88	77	73	74	85	74	79	67	60	60	52	65	46
29	334	167	89	76	70	67	65	60	61	73	69	78	79	72	68	61	56	40	90	36
30	315	195	87	71	80	85	66	56	72	65	69	76	83	92	72	50	63	51	69	40
31	332	191	62	91	96	79	79	67	69	70	80	82	70	74	65	51	53	51	67	43
32	272	103	82	72	86	61	71	66	70	79	82	73	82	66	64	57	47	42	48	44
33	208	173	79	66	104	63	77	101	87	73	78	91	61	72	63	61	50	40	40	48
34	242	132	88	70	87	74	69	86	85	81	74	70	94	73	68	54	51	46	58	48
35	296	146	98	76	79	81	78	90	98	67	75	61	66	68	69	64	50	50	39	49
36	250	149	107	74	70	64	72	101	89	71	89	76	80	83	63	57	39	54	44	46
37	253	122	90	79	67	69	69	92	89	73	86	77	101	85	68	62	76	51	57	53
38	220	123	89	74	77	66	57	62	86	60	73	76	77	67	66	62	73	50	51	43
39	229	121	71	77	57	57	61	68	79	82	74	74	79	59	81	50	50	45	48	50
40	256	119	83	79	68	71	63	77	76	79	57	79	77	62	69	49	57	55	51	21
41	235	119	91	86	74	66	81	75	76	59	65	74	96	89	54	60	55	66	45	45
42	212	104	76	72	67	73	71	68	68	82	73	74	80	65	61	70	68	39	51	50
43	209	102	101	68	81	66	71	67	64	79	77	81	79	83	62	65	48	51	39	49
44	211	110	74	66	74	70	66	73	82	90	81	73	84	71	84	48	49	58	53	45
45	202	136	91	79	56	74	81	58	66	90	86	63	62	67	66	48	52	44	39	47
46	225	122	73	67	45	68	71	71	78	80	84	69	81	81	80	62	55	54	45	44
47	199	116	94	80	77	75	70	75	66	66	76	79	76	78	73	57	56	51	40	34
48	179	121	81	80	56	62	76	68	72	74	69	68	82	68	63	71	53	44	48	41
49	220	100	96	80	79	57	75	65	66	74	77	81	82	77	73	73	65	50	46	45

596

745

REAGENT BLANK # 07

SY:RB07.D2;1 COUNTED 5/22/92 @ 17:48: 0 GAIN: 0.2 KEV/CHAN

	1000	1050	1100	1150	1200	1250	1300	1350	1400	1450	1500	1550	1600	1650	1700	1750	1800	1850	1900	1950
0	47	33	35	32	26	24	21	27	31	13	18	25	19	14	17	15	18	17	19	13
1	38	32	46	47	33	32	23	21	22	23	12	22	16	16	17	20	16	16	12	14
2	44	36	36	38	23	22	27	23	28	17	16	22	18	19	16	13	14	22	13	12
3	47	38	28	37	36	28	32	32	37	23	18	21	16	22	12	11	16	12	17	11
4	48	42	38	32	30	32	23	27	16	16	24	27	16	14	11	19	13	17	11	14
5	42	41	37	40	34	31	35	32	25	27	15	22	18	23	14	7	23	9	14	4
6	45	49	40	37	33	25	26	27	41	21	20	22	24	14	12	13	10	16	14	18
7	43	40	44	29	32	35	23	17	30	13	18	22	19	9	21	21	12	6	12	16
8	50	43	43	34	32	31	28	29	27	14	26	20	29	19	8	20	14	18	11	10
9	51	43	33	21	46	23	22	21	15	21	20	19	20	22	18	25	17	16	12	18
10	43	45	30	36	44	24	33	20	20	17	20	22	18	25	16	33	11	10	12	10
11	43	41	35	35	34	34	24	22	20	27	23	20	20	13	17	23	11	6	14	13
12	50	47	38	37	41	50	44	14	27	16	24	14	16	20	14	37	14	16	19	11
13	45	44	38	40	38	32	33	22	27	23	18	11	9	19	21	30	16	18	11	9
14	43	44	39	32	30	20	29	26	14	22	20	21	23	16	20	24	13	13	11	11
15	53	43	30	35	44	22	24	27	20	20	13	19	24	19	10	21	13	14	13	16
16	36	29	37	29	38	34	31	21	26	22	21	22	20	21	16	26	20	18	21	25
17	42	39	29	39	37	36	35	23	29	17	24	20	13	8	18	16	10	8	21	9
18	42	44	29	40	33	31	30	32	20	22	19	30	19	18	13	17	17	8	19	11
19	41	36	34	29	33	30	27	20	23	19	24	13	21	20	19	10	16	15	13	16
20	44	40	33	30	25	24	25	36	27	21	22	24	22	14	12	16	14	13	19	7
21	39	38	33	44	26	27	31	24	18	20	23	26	16	18	10	14	17	10	23	7
22	35	38	33	41	31	26	25	23	24	27	26	21	19	22	14	25	15	8	20	14
23	38	38	41	33	38	30	22	24	23	25	22	22	17	13	14	12	26	9	16	11
24	49	45	34	23	21	32	25	35	15	23	21	25	26	14	15	15	19	10	21	11
25	38	46	32	35	22	20	28	36	19	20	18	15	23	22	19	18	33	17	13	6
26	33	36	43	40	35	30	20	26	17	25	25	18	21	22	9	15	16	10	16	11
27	42	35	45	39	28	33	29	28	19	30	24	23	16	14	13	19	22	13	17	13
28	36	31	38	30	26	25	29	34	20	39	24	14	20	18	16	19	13	15	9	10
29	46	40	39	37	33	24	25	27	10	24	20	18	20	21	13	17	12	13	9	12
30	41	35	21	35	34	31	21	23	16	24	25	17	18	21	12	15	14	13	12	9
31	41	35	36	38	24	27	18	27	21	21	19	18	23	11	18	22	16	19	15	8
32	41	37	34	40	27	42	19	32	25	25	19	18	22	15	24	16	17	11	14	16
33	46	42	43	38	35	25	27	23	25	24	15	20	25	17	26	19	16	13	20	22
34	39	30	41	38	25	27	35	30	12	21	23	19	10	19	16	22	21	14	11	14
35	43	39	36	35	35	28	26	22	17	19	12	25	13	9	19	26	13	14	10	10
36	37	37	56	26	23	24	22	26	21	22	20	20	24	16	11	13	16	13	9	12
37	43	35	38	39	32	26	28	32	17	21	23	17	19	13	20	12	17	15	14	14
38	38	43	36	39	33	21	39	22	27	15	12	30	27	14	23	14	12	18	15	5
39	38	41	30	29	29	26	29	34	30	19	23	16	20	15	11	14	18	9	12	10
40	33	34	42	33	35	33	19	21	15	21	22	24	14	24	14	16	7	10	15	12
41	34	35	42	44	25	39	25	25	27	28	20	16	21	23	17	14	10	11	9	18
42	44	31	36	67	31	26	18	26	21	16	21	13	21	32	16	12	16	13	14	17
43	36	39	34	64	30	33	25	30	27	23	19	19	26	30	15	10	12	16	9	19
44	35	27	47	64	27	36	29	34	22	26	20	15	20	15	19	16	7	12	13	12
45	37	24	24	51	25	37	20	24	20	13	17	23	20	20	25	11	14	15	9	9
46	31	41	20	64	31	23	25	16	22	24	13	14	19	12	18	6	14	11	20	11
47	35	41	36	39	29	28	30	28	17	20	22	24	16	10	17	19	15	11	18	9
48	44	45	32	33	27	23	17	23	21	19	18	18	17	17	15	14	16	11	14	11
49	42	30	36	34	26	19	26	33	20	20	26	15	15	20	21	10	11	12	18	11

REAGENT BLANK #8, 101-SY NI SA

SAMPLE ID..... SYIRB8.A;1

OF CHANNELS..... 2048

DIODE I.D..... A

SHELF NUMBER..... 0

CALIBRATION..... 0.2 KEV/CH

TIME ZERO 5/27/92 AT 10:36: 0

COUNTED..... 5/27/92 AT 10:36: 0

(0.00 MINUTES DECAY TIME)

LIVE COUNT TIME.... 22 HOURS 19 MINUTES 28 SECONDS (1339.47 MIN.)

ELAPSED TIME..... 22 HOURS 19 MINUTES 28 SECONDS (1339.47 MIN.)

(DEAD TIME = 0.000)

FLUX CORRECTION.... 0.0000

GEOM CORRECTION.... 0.0000 0.0000 0.0000 0.0000 0.0000

WEIGHT..... 1.00000 GRAMS

ANTI: 0 SLP: 0 AREA: 0 P-T: 0 ERR: 0 ZER: 0 OPR: 0 MOV: 1

598

J. H. Faye
5/28/92

598

REAGENT BLANK #8, 101-SY NI SA

SY:RB8.A;1 COUNTED 5/27/92 @ 10:36: 0 GAIN: 0.2 KEV/CHAN

	#	50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950
0	80368	192	108	102	79	88	76	69	85	58	70	63	68	66	60	43	43	43	44	51
1	0	156	130	102	79	90	80	90	91	62	60	61	83	62	44	59	61	38	39	36
2	0	153	118	117	98	73	74	70	67	74	64	76	73	64	50	55	50	40	43	26
3	0	182	100	102	106	81	71	62	69	71	70	61	77	54	57	44	60	37	31	35
4	0	146	106	114	83	86	77	70	89	73	66	62	65	59	50	49	37	31	37	43
5	0	154	104	102	88	78	78	67	68	63	63	61	55	65	40	46	50	37	35	32
6	0	153	103	112	104	69	71	83	75	63	62	62	64	47	52	49	48	40	33	35
7	0	128	107	95	78	90	69	74	73	63	56	64	68	69	47	39	47	42	45	36
8	13	136	92	99	97	85	93	81	68	72	63	56	69	60	63	43	37	45	42	28
9	711	132	100	97	77	91	70	83	68	61	66	62	60	58	39	49	39	34	42	31
10	1041	139	95	99	66	105	86	83	67	81	61	69	62	67	37	42	50	47	38	34
11	856	131	99	74	86	76	89	74	62	116	53	58	61	67	66	42	39	45	36	39
12	554	161	88	94	84	96	77	91	60	148	69	55	63	56	49	45	45	43	40	42
13	429	190	94	91	77	91	86	121	75	163	58	69	51	50	49	43	43	30	34	42
14	344	225	102	90	78	70	117	146	73	124	49	64	68	67	50	42	51	45	45	36
15	283	275	88	101	99	83	116	126	66	134	57	69	64	60	40	40	43	46	35	32
16	225	305	97	98	92	89	144	100	75	101	66	60	67	55	50	62	60	41	40	30
17	197	220	107	104	95	94	158	94	67	76	53	62	58	52	62	40	54	45	44	39
18	198	202	113	97	91	98	131	87	82	77	58	73	70	76	63	49	41	40	45	42
19	191	120	117	85	94	81	122	71	96	60	50	74	67	61	68	66	52	52	35	39
20	175	131	113	96	78	70	75	89	98	62	63	62	64	57	57	49	45	35	43	34
21	193	132	106	86	92	79	86	70	81	62	63	56	51	44	50	73	37	42	36	36
22	170	124	86	94	87	80	86	111	97	70	60	62	59	56	64	49	36	37	35	40
23	190	131	100	107	86	82	92	137	100	61	64	59	66	45	60	58	51	40	41	33
24	188	138	92	80	101	76	74	159	120	60	62	50	74	58	50	55	40	35	48	43
25	163	144	101	103	75	81	80	102	103	52	56	66	55	50	40	50	52	45	50	43
26	177	134	105	87	81	82	76	156	97	54	64	66	59	62	60	39	39	34	40	37
27	285	145	106	100	77	80	69	129	82	62	66	79	61	67	46	49	37	39	59	44
28	198	178	95	107	97	100	75	102	63	56	73	55	59	44	47	53	50	51	58	40
29	185	245	109	85	86	81	93	87	81	65	67	72	65	65	64	36	48	43	75	32
30	162	263	98	100	99	69	62	70	55	63	44	58	66	57	55	44	47	42	85	34
31	201	310	113	87	87	73	75	80	53	62	69	60	69	53	46	67	37	51	57	30
32	199	234	106	89	93	86	82	67	63	62	56	54	72	55	54	49	41	28	49	47
33	187	247	115	99	87	76	86	67	80	79	66	61	49	67	46	45	47	53	54	37
34	159	179	118	102	96	70	86	73	84	66	60	43	57	70	49	47	42	43	37	39
35	150	154	101	97	92	80	92	73	93	50	74	57	52	50	49	40	34	44	36	50
36	156	143	100	87	75	80	80	77	74	49	64	53	64	60	60	40	44	44	40	38
37	147	123	106	97	72	80	72	76	79	68	63	68	67	51	42	40	36	46	41	37
38	154	130	111	83	83	79	76	93	86	59	61	57	64	57	37	54	33	42	35	34
39	152	115	97	104	90	61	81	77	71	78	66	56	55	54	45	40	45	40	36	41
40	160	122	101	100	72	80	88	81	63	57	55	64	61	45	47	31	47	43	44	41
41	155	99	97	87	95	86	62	71	68	94	50	73	43	42	62	59	45	55	38	46
42	102	117	117	86	92	90	76	71	54	64	55	63	44	48	45	61	50	44	38	35
43	170	117	103	88	79	76	81	73	60	61	68	64	63	45	50	41	37	34	43	34
44	141	139	96	102	99	86	83	68	73	55	64	63	60	59	54	35	44	44	30	35
45	162	161	81	89	101	89	70	71	52	67	52	74	66	55	41	46	45	35	33	33
46	162	162	103	90	80	111	92	76	49	50	70	63	57	54	52	40	40	31	41	39
47	127	129	95	82	83	72	76	74	67	57	68	73	52	59	57	37	40	30	39	43
48	121	143	110	96	79	86	81	69	73	68	49	48	60	53	47	46	37	30	37	32
49	145	109	104	98	88	78	81	50	66	68	64	63	60	47	53	47	37	30	31	25

599

REAGENT BLANK #8, 101-SY NI SA

SY:RBB.A;1 COUNTED 6/27/92 @ 10:36: 0 GAIN: 0.2 KEV/CHAN

	1000	1050	1100	1150	1200	1250	1300	1350	1400	1450	1500	1550	1600	1650	1700	1750	1800	1850	1900	1950
0	39	33	36	34	23	16	31	34	24	12	21	20	17	9	16	18	18	14	13	18
1	27	34	31	32	29	34	22	21	24	15	17	20	13	15	14	20	16	12	10	13
2	29	33	27	29	27	19	20	24	15	22	16	20	18	18	22	16	16	15	14	16
3	34	30	34	25	34	32	26	16	25	18	19	17	27	18	16	15	10	12	13	11
4	32	34	32	25	23	29	25	24	26	14	17	20	22	15	23	0	17	13	16	13
5	31	23	45	33	31	30	25	20	30	22	24	15	19	9	10	23	13	16	12	16
6	34	29	33	35	29	26	23	21	9	25	14	20	23	19	12	16	12	20	19	18
7	26	39	31	26	32	23	35	20	22	20	14	21	14	27	9	10	19	12	13	14
8	33	30	37	29	10	10	22	23	25	16	31	12	26	20	8	22	9	19	14	13
9	23	37	30	24	28	23	21	27	17	23	12	18	16	15	17	19	13	13	12	15
10	44	31	25	29	35	26	20	21	18	24	22	15	20	21	10	30	12	7	11	17
11	33	30	26	28	29	26	26	13	16	22	20	20	16	16	22	20	19	13	9	15
12	32	35	27	21	28	26	22	26	23	18	22	17	13	17	15	20	18	15	17	14
13	37	27	28	24	29	26	21	17	20	21	13	21	21	13	16	24	0	18	12	11
14	29	32	36	26	33	23	23	26	26	12	20	17	23	14	29	13	6	9	24	7
15	32	42	30	35	28	16	22	24	19	16	21	19	26	11	24	8	11	13	11	12
16	42	25	36	31	25	21	22	12	15	24	15	11	16	25	17	12	10	20	15	19
17	46	43	32	34	25	31	22	15	22	29	20	20	14	11	14	13	15	7	15	12
18	31	21	40	31	32	24	26	13	10	0	15	21	22	17	10	12	7	12	17	15
19	33	20	26	32	31	27	17	31	18	14	19	16	12	11	14	13	15	12	12	14
20	29	31	30	36	17	19	23	31	20	16	16	28	21	17	12	14	12	14	12	10
21	28	30	26	29	26	21	25	14	29	20	24	26	20	18	16	12	11	15	22	0
22	27	34	35	25	28	25	21	21	16	21	16	14	13	14	21	12	15	10	13	16
23	20	36	21	20	20	26	20	23	20	23	21	11	22	19	15	17	12	9	14	13
24	26	34	32	21	24	21	24	27	17	26	19	17	23	10	10	20	10	13	11	12
25	43	25	36	31	21	19	18	25	33	21	20	20	16	16	22	16	12	16	5	8
26	37	42	26	23	19	20	23	29	14	26	9	12	16	12	19	14	17	10	10	12
27	40	33	37	25	16	21	16	23	24	19	11	26	10	9	22	14	10	24	13	15
28	36	30	30	27	22	25	21	24	20	21	25	16	18	14	23	15	13	14	20	14
29	45	39	26	30	25	26	27	19	21	20	22	13	18	10	19	14	14	16	16	12
30	39	30	29	27	25	25	23	20	18	15	24	17	16	19	16	26	17	23	22	11
31	34	24	37	25	22	30	19	23	25	24	15	23	12	19	13	17	0	17	11	13
32	46	37	37	44	22	19	15	27	20	19	19	27	15	17	10	17	9	12	15	14
33	33	31	26	20	21	21	27	23	21	29	18	16	22	10	17	16	10	14	18	14
34	32	33	31	21	25	20	23	19	27	22	20	14	20	20	11	22	16	12	15	12
35	41	32	30	20	42	25	21	24	24	30	21	24	23	17	7	13	14	15	13	12
36	27	37	40	26	27	27	27	27	24	12	12	26	16	12	17	13	21	9	13	6
37	36	31	20	30	20	24	10	27	10	17	17	16	22	23	19	17	10	13	15	10
38	32	40	20	21	29	27	21	22	24	20	19	17	15	22	11	14	19	21	12	12
39	33	21	30	20	23	25	29	23	18	19	16	16	25	17	13	12	17	11	9	11
40	34	20	52	36	22	25	16	21	10	21	21	13	15	22	11	19	15	16	17	17
41	37	25	37	23	19	20	30	20	12	10	16	15	16	11	19	16	13	13	19	14
42	34	37	35	45	32	26	24	23	20	16	19	23	26	16	12	24	16	15	17	10
43	47	22	26	40	17	24	16	29	21	27	24	22	13	15	19	24	19	17	11	9
44	33	19	29	37	20	26	17	30	20	26	25	10	20	16	9	24	12	12	14	10
45	29	37	29	42	35	25	21	19	22	23	10	20	14	26	14	16	13	9	12	17
46	40	31	39	26	23	32	15	23	20	17	19	15	16	24	17	16	10	13	10	8
47	36	25	33	24	24	24	18	20	19	16	18	21	16	0	13	17	14	11	11	13
48	37	31	30	25	28	20	26	30	27	10	25	7	16	19	14	17	14	13	16	11
49	33	42	32	32	26	25	33	16	23	21	15	15	10	11	14	22	17	13	15	15

000

0.15

SPIKE BLANK #9, COUNTED 5/24/92

SAMPLE ID..... SY:SPIKEBLK9.D2;1

OF CHANNELS..... 2048

DIODE I.D..... 02

SHELF NUMBER..... 0

CALIBRATION..... 0.2 KEV/CH

TIME ZERO 5/24/92 AT 16:27: 0

COUNTED..... 5/24/92 AT 16:27: 0

(0.00 MINUTES DECAY TIME)

LIVE COUNT TIME.... 46 HOURS 22 MINUTES 0 SECONDS (2782.00 MIN.)

ELAPSED TIME..... 46 HOURS 22 MINUTES 0 SECONDS (2782.00 MIN.)
(DEAD TIME = 0.000)

FLUX CORRECTION.... 0.0000

GEOH CORRECTION.... 0.0000 0.0000 0.0000 0.0000 0.0000

WEIGHT..... 1.00000 GRAMS

ANTI: 0 SLP: 0 AREA: 0 P-T: 0 ERR: 0 ZER: 0 OPR: 0 NOV: -1

601

J. H. Hays
5/26/92

601

SPIKE BLANK #9, COUNTED 6/24/92

SY:SPIKEBLK9.D2;1 COUNTED 5/24/92 @ 16:27: # GAIN: 8.2 KEV/CHAN

	#	50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950
0	35869	239	120	93	81	74	55	67	80	71	91	66	70	86	86	64	60	47	43	48
1	35882	276	105	88	74	71	61	62	76	83	76	89	70	86	76	79	45	59	49	64
2	#	261	98	96	64	72	64	65	81	73	78	95	67	66	66	63	55	57	52	47
3	#	254	109	87	73	81	81	73	72	73	83	87	80	79	64	79	71	65	46	43
4	#	221	105	99	76	71	70	73	84	86	78	88	61	89	76	58	62	68	60	55
5	#	193	111	98	73	69	64	70	99	87	84	85	82	71	49	81	52	52	59	48
6	#	174	104	78	67	62	79	70	78	82	65	66	69	79	65	61	54	71	54	38
7	#	187	111	95	65	66	73	63	86	73	61	83	66	72	78	80	59	56	54	52
8	#	182	104	78	74	62	68	78	90	84	71	74	73	73	61	60	70	58	49	53
9	#	149	105	87	82	59	75	71	66	95	81	78	81	75	80	58	54	61	50	53
10	#	158	102	84	83	73	74	82	69	105	68	85	70	68	62	61	61	53	57	41
11	#	193	109	80	81	78	62	73	67	105	81	73	79	86	60	54	62	56	46	61
12	479	170	107	98	75	70	63	81	77	122	78	82	80	82	54	58	59	38	64	44
13	517	164	98	83	88	64	86	102	55	130	89	75	68	85	64	64	49	44	56	45
14	490	225	108	87	64	62	92	117	64	151	79	79	82	83	74	67	73	42	42	40
15	447	234	103	89	71	72	101	132	64	133	75	78	86	66	81	69	62	71	54	37
16	438	214	85	87	64	91	141	92	83	113	79	75	62	78	66	60	84	36	43	54
17	431	176	97	78	68	73	105	75	76	98	74	88	86	63	73	67	68	64	53	42
18	426	168	104	78	74	82	99	68	66	83	77	73	61	84	61	58	70	47	53	47
19	454	151	100	94	63	64	76	68	70	93	81	76	84	89	83	58	62	44	44	52
20	410	153	90	81	67	86	80	61	88	55	61	84	75	78	79	72	49	50	50	72
21	430	146	93	78	79	63	65	94	93	79	70	83	86	81	83	59	50	56	46	45
22	412	157	93	73	71	62	75	96	102	71	64	80	65	74	90	71	37	46	44	49
23	390	128	88	100	68	56	69	131	105	70	90	61	72	65	83	60	54	52	33	40
24	377	161	91	83	64	80	81	158	96	76	79	81	79	89	64	69	66	62	62	49
25	356	142	97	79	73	86	73	144	116	81	73	84	74	78	77	74	58	56	52	49
26	421	133	98	93	58	81	51	131	93	66	90	72	81	66	67	73	60	62	43	54
27	331	163	104	92	72	66	56	115	104	92	81	70	71	57	72	62	62	54	68	47
28	356	171	98	80	90	87	68	81	88	70	82	97	60	63	69	51	67	51	72	36
29	347	200	94	81	71	66	70	74	88	64	82	83	64	75	66	66	58	46	68	48
30	357	188	104	67	82	54	71	52	77	83	89	71	81	80	57	60	66	52	80	40
31	384	192	79	78	68	63	93	66	72	92	81	81	86	77	80	61	55	44	81	48
32	389	195	89	77	79	62	80	76	69	69	66	74	80	76	63	67	58	36	64	39
33	326	158	77	68	100	82	62	84	82	83	77	63	105	81	82	77	50	47	59	38
34	319	160	76	93	83	90	62	97	78	77	90	84	75	84	74	60	48	60	49	36
35	353	157	106	75	82	61	76	103	76	75	80	64	81	72	73	59	70	58	45	42
36	385	138	83	64	79	51	55	65	101	62	79	92	72	70	55	71	52	48	60	56
37	369	120	91	70	61	74	60	77	75	82	69	60	73	71	73	53	57	56	50	49
38	356	122	92	84	76	75	61	70	88	70	74	75	78	73	80	63	46	51	47	42
39	299	119	82	70	67	72	69	75	88	92	80	86	87	70	61	56	61	52	49	42
40	277	133	84	71	97	87	63	69	87	72	74	87	78	72	61	70	62	53	50	50
41	264	112	101	79	61	63	70	69	83	80	81	76	79	63	62	75	46	55	35	49
42	241	115	95	78	66	79	73	84	76	73	76	82	73	63	58	64	52	66	44	45
43	226	130	85	62	72	72	72	66	73	77	77	64	72	75	78	60	52	42	64	45
44	234	132	90	75	62	78	71	72	66	82	88	74	69	73	60	84	65	54	47	50
45	244	117	87	71	53	63	74	68	59	85	75	84	82	83	69	61	55	50	51	47
46	188	126	99	77	69	80	76	60	72	93	79	77	81	70	54	61	48	58	34	38
47	229	139	93	71	60	83	68	85	78	91	89	91	73	73	75	70	65	52	50	31
48	199	141	91	61	60	67	67	79	76	70	83	82	77	90	64	61	55	51	61	44
49	213	100	82	70	77	70	80	84	75	76	68	85	71	69	63	51	47	49	45	50

SPIKE BLANK #9, COUNTED 5/24/92

SY:SPIKEBLK9.D2;1 COUNTED 5/24/92 @ 16:27; # GAIN: #.2 KEY/CHAN

	1000	1050	1100	1150	1200	1250	1300	1350	1400	1450	1500	1550	1600	1650	1700	1750	1800	1850	1900	1950
0	38	46	39	31	33	39	29	36	25	15	26	16	16	17	18	20	20	14	20	10
1	44	46	37	30	37	28	26	28	21	16	25	22	11	24	15	16	14	11	20	13
2	50	27	43	36	38	18	20	31	23	25	18	27	21	14	21	18	14	11	14	10
3	36	45	34	33	32	33	21	24	24	24	24	23	17	18	27	15	27	27	12	13
4	55	27	37	32	36	33	20	32	22	14	31	28	11	18	12	22	15	15	11	10
5	47	31	41	35	42	32	24	29	23	24	18	16	15	18	11	18	18	13	17	12
6	35	49	34	34	30	24	24	27	19	16	16	20	21	22	24	12	13	19	13	14
7	43	37	39	33	32	36	30	15	25	21	22	22	10	22	19	19	19	11	10	7
8	52	41	35	29	33	17	33	21	27	22	24	20	17	18	14	21	16	16	16	14
9	44	41	36	29	41	29	22	15	22	22	26	16	15	18	15	27	15	17	16	10
10	34	46	25	38	36	28	24	24	28	19	26	9	17	21	13	29	23	20	25	10
11	45	27	46	36	34	21	28	29	22	20	17	19	25	18	22	28	11	20	15	22
12	52	37	41	40	31	31	31	29	19	22	15	16	15	12	14	24	16	14	8	18
13	49	37	29	20	26	20	22	32	22	15	17	18	17	23	23	28	17	15	17	7
14	35	37	38	36	37	32	21	25	20	10	19	22	16	16	17	26	13	9	11	11
15	50	38	43	28	47	25	29	33	15	36	27	12	14	17	16	24	17	17	13	12
16	38	37	37	30	23	16	24	29	21	27	30	22	26	13	20	14	18	14	16	10
17	47	50	35	37	24	27	25	21	30	30	33	16	12	19	12	13	19	11	8	23
18	47	39	33	33	30	33	21	20	24	18	25	12	22	20	14	16	20	14	20	18
19	45	43	41	34	37	27	30	24	28	20	19	17	17	20	22	12	17	20	17	13
20	43	43	26	27	31	32	28	15	27	21	15	23	22	18	19	21	13	14	12	13
21	49	50	42	33	32	28	27	22	21	20	18	12	18	20	15	10	24	13	17	13
22	28	30	33	26	31	27	23	17	27	24	24	13	15	17	15	13	11	12	13	14
23	42	38	37	34	35	34	25	22	22	17	27	13	26	23	23	12	21	10	14	12
24	34	43	38	38	31	28	26	23	24	27	13	20	14	12	25	30	14	12	16	20
25	53	41	35	32	34	20	22	20	18	21	11	20	20	25	26	17	15	12	7	15
26	40	39	41	37	21	30	23	17	23	21	21	19	21	18	13	12	10	9	6	14
27	39	42	42	33	23	27	24	18	15	30	24	19	24	22	17	10	11	20	14	11
28	46	34	36	52	22	35	31	17	19	39	14	19	17	24	14	22	12	17	19	14
29	45	28	27	44	33	38	25	28	23	29	26	22	17	15	17	20	18	14	16	10
30	51	45	36	41	22	30	21	18	28	28	18	20	21	17	19	26	16	15	12	16
31	41	37	38	35	28	34	26	20	16	25	23	22	28	24	14	29	19	15	10	22
32	43	32	25	33	35	25	34	33	20	25	19	16	17	16	13	22	16	19	15	10
33	44	58	33	25	26	28	21	19	28	16	22	14	17	14	18	22	12	17	15	12
34	54	45	30	27	25	20	25	29	32	23	19	31	12	18	18	12	16	15	8	12
35	44	44	43	43	28	33	25	21	31	27	22	17	14	18	17	25	11	12	10	7
36	40	32	34	18	37	32	22	27	34	19	26	24	10	21	12	13	13	19	17	10
37	32	36	42	35	28	28	30	26	23	28	24	15	14	22	10	8	19	16	17	8
38	50	32	35	45	20	28	26	27	14	17	21	19	20	14	13	15	15	18	16	15
39	43	32	39	32	22	31	29	30	24	32	13	23	23	33	20	14	10	17	11	15
40	34	46	38	39	30	29	32	21	26	17	21	17	24	22	17	15	10	15	9	8
41	37	42	35	40	32	26	28	22	16	15	17	9	12	15	19	18	17	16	11	17
42	49	39	34	48	29	37	30	25	25	23	23	13	20	26	14	13	11	12	14	13
43	44	27	32	42	26	25	33	35	15	17	16	20	12	23	8	16	18	8	14	18
44	27	33	30	66	27	24	21	17	21	24	9	18	20	17	14	17	23	18	20	12
45	38	30	38	60	27	26	31	19	22	17	19	18	19	23	14	15	14	22	12	12
46	51	35	34	48	27	27	25	29	22	19	17	21	19	13	23	20	13	11	12	15
47	40	54	31	40	26	19	27	20	16	21	17	25	10	18	18	12	20	8	19	13
48	40	32	28	31	32	26	28	21	25	26	21	15	21	16	19	12	16	17	6	9
49	44	38	42	39	29	27	35	24	14	16	17	13	17	14	18	16	15	19	24	10

SPIKE BLANK #10, 101-SV NI SA

SAMPLE ID..... SV:SPIKEBLK.D2;1

OF CHANNELS..... 2048

DIODE I.D..... D2

SHELF NUMBER..... #

CALIBRATION..... 0.2 KEV/CH

TIME ZERO 5/27/92 AT 10:39: #

COUNTED..... 5/27/92 AT 10:39: #

(0.00 MINUTES DECAY TIME)

LIVE COUNT TIME.... 22 HOURS 25 MINUTES # SECONDS (1345.00 MIN.)

ELAPSED TIME..... 22 HOURS 26 MINUTES # SECONDS (1345.00 MIN.)

(DEAD TIME = 0.000)

FLUX CORRECTION.... 0.0000

GEOM CORRECTION.... 0.0000 0.0000 0.0000 0.0000 0.0000

WEIGHT..... 1.00000 GRAMS

ANTI: # SLP: # AREA: # P-T: # ERR: # ZER: # OPR: # NOV: -1

J. H. Hays
5/28/92

604

518

SPIKE BLANK #10, 101-SY NI SA

SY:SPIKEBLK.D2;1 COUNTED 5/27/92 @ 10:39: 0 GAIN: 0.2 KEV/CHAN

	#	50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950
0	15317	133	45	60	31	42	30	34	28	45	39	32	26	42	40	32	23	28	25	19
1	15323	147	52	40	28	43	36	36	34	28	57	27	47	39	36	24	29	18	25	20
2	0	139	52	40	39	28	31	38	36	43	28	36	34	52	26	27	22	26	19	14
3	0	95	58	43	41	36	45	32	48	39	39	31	34	29	30	29	27	17	18	18
4	0	89	48	50	20	29	22	38	40	37	24	33	28	24	43	31	31	30	30	22
5	0	81	38	46	39	33	27	28	44	31	50	24	32	38	33	31	26	27	27	20
6	0	86	66	38	33	38	32	30	40	30	36	34	32	36	28	30	29	26	33	26
7	0	72	51	46	42	33	31	38	45	36	38	39	35	24	39	28	33	37	26	28
8	0	77	37	55	33	36	22	35	41	37	41	31	44	37	33	25	29	26	29	16
9	0	90	45	46	28	40	32	36	33	32	31	53	38	29	30	30	15	25	24	18
10	0	79	51	33	27	27	29	27	32	43	44	34	36	41	30	29	24	28	26	21
11	0	77	50	37	34	33	28	50	35	62	36	43	32	35	37	33	32	18	22	21
12	218	76	44	38	40	34	40	36	26	68	35	53	25	29	36	39	29	17	20	24
13	274	96	53	36	29	28	33	43	35	72	39	37	36	28	32	36	33	18	24	23
14	252	75	43	37	29	37	28	51	37	50	27	37	42	37	34	24	27	19	25	16
15	219	117	67	37	38	30	41	37	34	52	37	35	24	40	40	25	21	22	20	28
16	216	106	44	37	34	24	60	39	27	51	40	35	41	50	20	31	26	23	30	20
17	216	96	60	39	33	37	67	32	42	39	34	43	33	39	28	33	30	27	24	25
18	216	93	44	37	21	39	48	27	35	43	35	32	34	39	34	24	35	23	27	23
19	214	72	46	37	29	26	31	41	31	30	33	44	33	35	36	33	28	24	23	26
20	193	63	52	32	28	31	34	41	34	35	34	47	33	31	34	23	28	23	21	20
21	204	61	47	47	34	37	30	35	35	37	33	42	42	38	39	37	27	23	18	21
22	173	61	47	28	44	23	38	41	55	31	32	38	39	30	30	23	26	21	31	21
23	165	79	49	44	34	25	35	70	45	42	26	31	39	24	45	26	34	36	29	26
24	196	68	43	36	41	20	38	65	45	40	43	40	30	30	28	34	23	29	28	24
25	101	64	51	47	35	37	33	53	47	38	32	24	39	26	32	31	20	26	18	17
26	173	80	44	36	39	25	32	70	36	36	34	43	38	29	35	25	15	21	24	13
27	178	63	45	30	29	35	23	50	34	49	28	29	46	36	34	33	17	22	23	24
28	172	73	36	40	17	29	40	47	36	49	50	39	31	29	30	32	25	21	29	17
29	175	95	40	46	35	31	32	49	39	23	31	40	30	31	20	27	28	23	27	13
30	173	87	50	33	37	31	38	37	24	34	31	48	46	31	24	21	28	30	51	22
31	169	110	40	51	52	33	33	32	26	26	34	35	44	35	32	32	17	27	28	19
32	171	85	39	32	56	31	35	29	28	34	38	38	35	46	36	37	20	29	30	25
33	161	71	38	35	41	38	38	42	26	31	31	30	29	34	33	32	27	30	21	29
34	156	73	42	40	46	21	46	38	35	34	41	34	28	34	27	19	36	27	29	21
35	161	59	46	53	29	26	34	52	41	33	34	25	36	31	27	38	34	25	27	23
36	162	64	43	39	34	34	20	41	37	26	42	36	43	30	33	24	25	20	19	19
37	175	50	38	36	34	31	30	40	41	21	35	42	37	32	24	25	23	19	19	16
38	149	49	37	32	42	21	36	37	51	37	27	33	36	38	40	23	28	24	17	21
39	175	59	20	37	38	20	27	32	36	29	49	33	39	31	40	31	24	23	17	26
40	148	49	36	32	29	29	35	41	34	31	31	42	41	26	29	34	28	25	17	
41	129	48	38	43	29	43	26	39	31	35	43	30	41	32	40	23	25	21	27	22
42	115	54	35	29	37	33	30	42	38	28	34	36	41	39	32	26	24	28	19	22
43	102	60	33	36	33	31	42	29	34	31	31	41	37	35	37	36	35	21	29	19
44	100	67	50	36	39	27	38	34	46	38	33	30	39	36	34	37	20	25	23	29
45	112	61	42	45	34	28	41	31	34	36	40	38	30	31	26	30	32	19	17	18
46	108	69	57	33	31	29	33	32	31	39	32	33	41	28	24	28	21	29	24	22
47	116	53	40	29	29	29	42	25	31	31	32	42	32	43	25	30	34	21	22	18
48	104	53	38	36	34	29	34	34	41	28	43	39	33	35	36	40	23	23	16	12
49	88	61	31	33	30	23	26	28	35	31	38	33	41	37	26	27	27	21	20	23

SPIKE BLANK #10, 101-SY NI SA

SY:SPIKEBLK.D2;1 COUNTED 5/27/92 @ 10:39:00 GAIN: 0.2 KEV/CHAN

	1000	1050	1100	1150	1200	1250	1300	1350	1400	1450	1500	1550	1600	1650	1700	1750	1800	1850	1900	1950
0	23	13	23	17	11	14	0	10	13	6	7	10	6	10	11	9	10	5	5	5
1	24	25	19	19	15	15	17	11	11	13	9	9	6	10	5	9	9	4	2	6
2	23	21	15	20	16	8	15	12	10	3	7	6	13	13	14	6	6	10	10	6
3	21	21	17	22	21	10	17	17	9	11	14	8	9	9	6	9	11	6	5	3
4	26	13	21	16	14	16	17	15	12	10	14	8	9	7	4	6	6	8	14	5
5	23	10	16	17	14	16	13	13	16	11	6	11	9	8	0	6	3	4	11	4
6	20	13	13	20	16	15	0	10	10	16	4	9	10	3	7	12	7	7	3	11
7	12	12	20	15	20	10	12	9	9	10	7	6	7	4	5	6	8	5	9	7
8	21	15	10	14	13	15	7	10	17	19	5	6	10	7	0	13	9	7	3	5
9	20	22	16	14	14	16	7	8	15	10	10	8	5	11	12	13	9	9	5	7
10	22	21	10	14	15	12	17	14	7	14	12	7	10	9	8	12	5	2	4	4
11	17	10	17	15	22	14	15	15	19	15	9	9	12	7	4	16	6	4	6	6
12	15	11	15	11	14	13	13	12	6	12	9	11	12	8	16	10	11	4	5	7
13	10	13	20	7	19	10	10	0	11	6	11	7	7	0	4	0	7	6	5	7
14	14	24	14	21	15	10	11	10	16	11	10	13	8	7	5	12	5	5	3	6
15	23	15	21	11	21	17	13	10	8	7	0	11	7	9	5	5	7	6	6	2
16	22	20	16	13	14	15	16	11	13	14	11	10	7	6	6	5	9	11	12	5
17	24	26	16	19	16	10	14	11	0	7	4	10	3	4	6	14	5	6	5	3
18	20	22	23	15	0	14	10	15	6	16	17	9	4	15	9	7	3	5	2	7
19	12	19	16	8	11	15	16	11	15	7	12	5	5	5	6	9	6	4	8	0
20	21	17	16	10	13	11	16	7	15	0	0	9	6	15	6	10	5	7	7	7
21	21	26	21	14	16	14	7	21	0	14	11	0	11	8	6	5	4	7	6	7
22	24	10	12	19	13	10	14	11	10	10	6	8	11	5	7	0	7	10	6	4
23	31	17	23	20	11	10	14	7	0	8	4	12	9	6	6	4	3	3	3	6
24	17	22	22	20	14	19	9	14	12	14	14	11	10	11	9	9	4	6	5	4
25	23	15	16	21	17	9	11	12	6	13	10	6	7	11	5	8	5	5	5	4
26	23	14	10	17	9	15	8	15	10	13	10	4	7	10	12	8	5	9	11	6
27	25	22	14	16	7	11	9	10	11	15	12	9	2	7	0	6	14	9	7	4
28	21	16	11	20	8	13	14	14	9	17	10	7	6	6	10	6	6	12	3	7
29	19	20	19	0	10	6	0	17	19	11	9	6	9	0	10	4	10	7	12	5
30	24	15	12	12	9	8	9	9	13	18	5	9	7	5	6	7	2	4	6	0
31	10	0	17	13	9	11	6	22	6	6	10	9	6	9	0	7	8	5	6	6
32	21	19	9	15	13	7	15	15	9	14	15	6	0	6	5	16	7	11	10	9
33	14	10	13	20	13	17	13	10	9	7	7	14	12	11	14	15	6	10	7	6
34	13	17	23	14	15	14	13	12	11	15	13	6	7	11	11	13	10	6	12	7
35	21	23	19	15	13	14	7	6	11	6	16	12	9	0	10	4	6	6	3	2
36	21	19	12	6	7	12	12	13	9	14	7	11	17	7	6	8	9	5	6	5
37	24	15	14	20	14	7	16	19	4	13	0	11	12	3	0	6	7	0	4	5
38	19	23	19	18	16	12	5	12	10	0	11	0	8	7	9	11	7	5	6	5
39	12	20	19	13	12	14	0	12	10	12	7	10	7	7	5	4	11	4	6	7
40	28	25	23	20	18	17	17	9	12	11	5	11	11	8	0	6	4	5	6	5
41	19	19	16	10	13	11	12	12	11	9	13	5	9	9	4	5	10	0	7	3
42	10	20	9	23	10	16	8	15	13	9	10	13	14	10	7	7	5	6	7	7
43	23	23	22	24	14	9	9	7	14	12	8	10	9	10	7	0	5	2	3	6
44	17	26	19	32	13	11	7	0	16	11	0	12	11	9	9	12	12	0	7	6
45	10	10	11	32	7	10	21	10	4	17	4	7	8	15	11	5	7	0	6	4
46	10	22	12	22	13	10	12	7	8	11	9	11	9	11	13	7	4	2	4	3
47	13	20	19	19	12	16	12	15	14	0	10	13	14	6	12	9	8	5	9	10
48	16	13	9	16	9	13	11	9	16	5	0	0	13	5	5	12	3	0	5	7
49	20	20	12	22	10	10	10	1	10	14	9	11	10	4	5	4	4	5	7	6

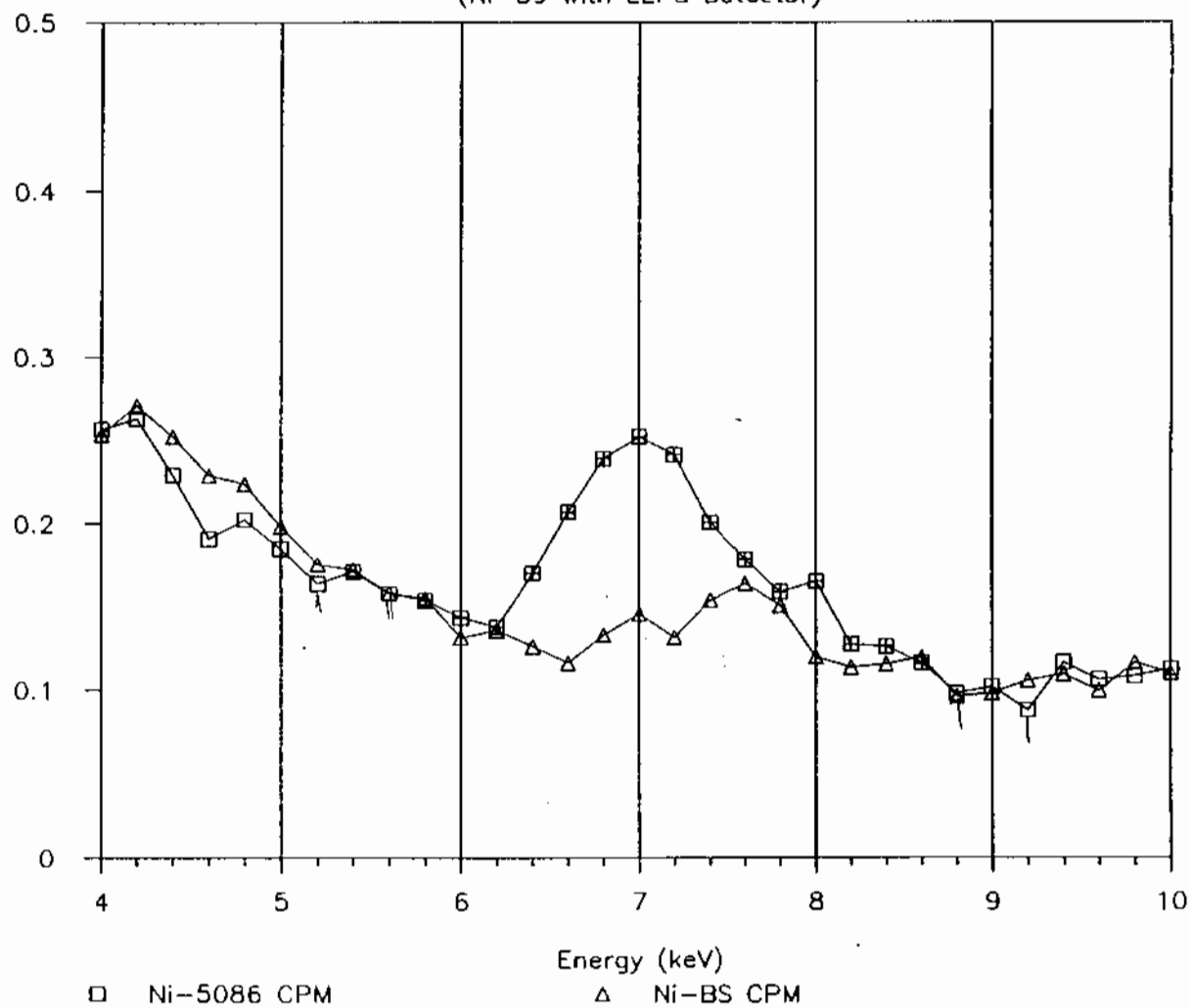
**Second Batch Ni-59 Determination
by Low Energy Photon Spectroscopy**

809

Counts per Minute

SPECTRUM OF 92-5086

(Ni-59 with LEPS Detector)



J. H. Kays
6/26/62

VAX/VMS Peak Search Report V1.8 Generated 16-JUN-1992 11:39:04

Configuration : SYS\$SYSDEVICE:[USER]925086NI.B;1
 Analyses by : PEAK V16.1
 Sample title : 101SY NI #1
 Sample date : Acquisition date : 15-JUN-1992 11:21:02
 Sample ID : 101SY NI #1 Sample quantity : 1.0000 SAMPLE
 Elapsed live time: 1 00:13:25.37 Elapsed real time: 1 00:13:29.48 0.0%
 Start energy : 0.20 keV End energy : 409.60 keV
 Sensitivity : 5.00 Gaussian : 10.00
 Critical level : No

Pk	It	Energy	Area	Skymd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	7.15	942	2257	0.97	35.75	31	12	1.08E-02	10.5	
2	0	10.47	454	1918	0.77	52.35	46	15	5.21E-03	21.9	
3	0	13.09	510	1430	0.73	65.47	61	12	5.85E-03	15.4	
4	0	16.35	849	1103	0.98	81.77	77	11	9.74E-03	8.5	
5	0	20.73	187	1300	0.42	103.65	98	14	2.14E-03	42.7	
6	0	30.95	3053	1139	0.88	154.77	148	15	3.50E-02	3.0	
7	0	35.24	819	1434	0.76	176.22	167	20	9.39E-03	12.1	
8	6	61.66	412	834	0.90	308.31	302	39	4.72E-03	14.5	1.83E+00
9	6	63.25	634	1396	1.54	316.27	302	39	7.27E-03	14.3	
10	6	65.93	252	1436	1.67	329.65	302	39	2.89E-03	35.1	
11	6	66.68	146	943	1.37	333.41	302	39	1.67E-03	42.2	
12	4	73.07	232	784	1.02	365.37	360	23	2.66E-03	21.8	1.87E+00
13	4	75.09	566	961	0.93	375.43	360	23	6.50E-03	11.1	
14	0	80.96	1280	1221	0.83	404.80	394	18	1.47E-02	6.1	
15	0	92.69	659	1132	1.08	463.44	455	18	7.56E-03	11.0	
16	0	111.88	183	1126	1.06	559.40	551	16	2.09E-03	35.8	
17	0	185.78	317	536	1.14	928.89	922	13	3.63E-03	14.4	
18	0	238.60	194	437	1.09	1193.02	1186	16	2.22E-03	21.9	
19	0	352.12	78	201	1.02	1760.58	1754	13	8.97E-04	35.0	
20	0	355.96	480	290	0.82	1779.78	1768	22	5.50E-03	9.2	
21	0	387.10	162	249	1.53	1935.49	1925	18	1.86E-03	22.4	

J. K. Jodoff 6/16/92

$$1:00:13:25.37 = 1440 \text{ m} + 13 \text{ m} + \left(\frac{25.37}{60} \right) \text{ m} = 1453.4228 \text{ m}$$

Channel Contents for 925086NI.B;1

Channel

1:	0	0	0	0	42	72782	3893	1738
9:	1287	1022	456	309	359	360	360	339
17:	359	323	378	(373	382	333	277	294
25:	268	238	248	229	223	208	200	247
33:	300	347	366	350	291	259	231	240
41:	185	183	169	142	148	127	169	154
49:	157	163)	182	218	195	201	142	145
57:	138	143	120	118	122	123	151	227
65:	214	259	194	167	148	111	112	112
73:	125	109	121	100	100	154	171	213
81:	250	254	236	180	151	151	92	109
89:	99	115	93	105	110	122	107	127
97:	102	101	114	120	106	92	106	136
105:	145	104	109	109	82	79	84	88
113:	81	76	81	82	101	81	84	64
121:	105	74	74	78	79	78	79	90
129:	100	92	69	90	70	76	96	77
137:	91	68	83	74	87	84	87	92
145:	92	77	93	81	88	101	197	299
153:	499	686	700	643	344	204	123	78
161:	81	64	68	80	84	70	75	68
169:	75	81	77	85	145	161	233	211
177:	165	136	152	119	105	69	88	72
185:	71	65	77	69	67	69	58	79
193:	71	58	67	71	72	63	65	58
201:	74	66	69	63	64	62	59	57
209:	57	71	69	62	73	77	71	67
217:	56	65	69	60	77	61	65	54
225:	81	73	64	71	78	81	83	91
233:	86	88	82	73	61	58	74	60
241:	59	46	56	71	71	67	68	73
249:	60	100	60	66	77	66	76	59
257:	73	70	71	70	66	68	62	71
265:	75	88	82	92	91	61	53	56
273:	51	66	49	53	67	55	83	68
281:	57	52	68	52	65	62	63	63
289:	61	59	66	60	60	71	69	69
297:	67	59	69	69	58	49	68	59
305:	63	108	131	142	142	131	112	115
313:	84	102	122	141	144	129	124	101
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92506N1.B;1

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92582N1.8)

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2009:	10	14	14	11	13	17	10	14
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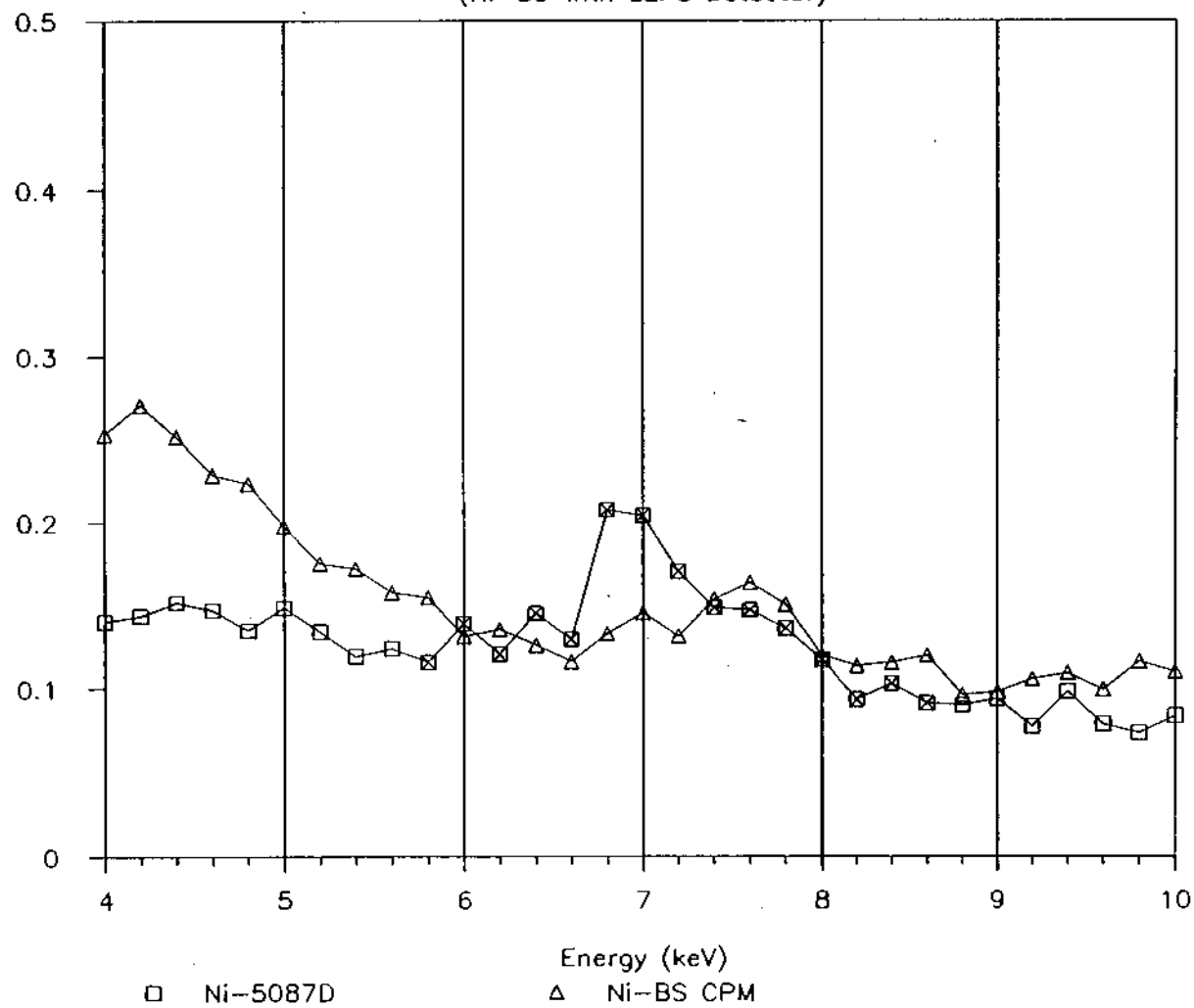
925086 N1. B.

615

Counts per Minute

SPECTRUM OF 92-5087D

(Ni-59 with LEPS Detector)



J. H. Kage
6/26/92

616

101SY NI #2 92-5087 DUPLICATE 5/21/92

SAMPLE ID..... SY:925087DN.D2;2

OF CHANNELS..... 2048

DIODE I.D..... D2

SHELF NUMBER..... 0

CALIBRATION..... 0.2 KEV/CH

TIME ZERO 6/15/92 AT 11:23:45

COUNTED..... 6/15/92 AT 11:23:45

(0.00 MINUTES DECAY TIME)

LIVE COUNT TIME.... 24 HOURS 21 MINUTES 0 SECONDS (1461.00 MIN.)

ELAPSED TIME..... 24 HOURS 21 MINUTES 0 SECONDS (1461.00 MIN.)
(DEAD TIME = 0.000)

FLUX CORRECTION.... 0.0000

GEOM CORRECTION.... 0.0000 0.0000 0.0000 0.0000 0.0000

WEIGHT..... 1.00000 GRAMS

ANTI: 0 SLP: 0 AREA: 0 P-T: 0 ERR: 0 ZER: 0 OPR: 0 NOV: -1

J. L. Joddy 6/16/92

100

1015V NI #2 92-6007 DUPLICATE 6/21/92 SV:925007DN.D2:2 COUNTED 6/16/92 @ 11:23:45 GAIN: 0.2 KEV/CHAN

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3	0	130	49	45	36	23	37	37	37	26	31	31	42	27	28	30	33	22	28	24
4	0	106	57	46	60	32	45	31	42	30	37	40	36	32	33	42	26	28	24	32
5	0	98	45	36	60	45	30	36	48	32	40	35	36	31	31	20	35	25	14	32
6	0	85	51	49	38	33	37	35	44	37	27	37	44	32	36	38	27	21	31	25
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181SV NI #2 92-5887 DUPLICATE 6/21/92

SV:925887DN.D2:2 COUNTED 6/16/92 @ 11:23:45 GAIN: 0.2 KEV/CHAN

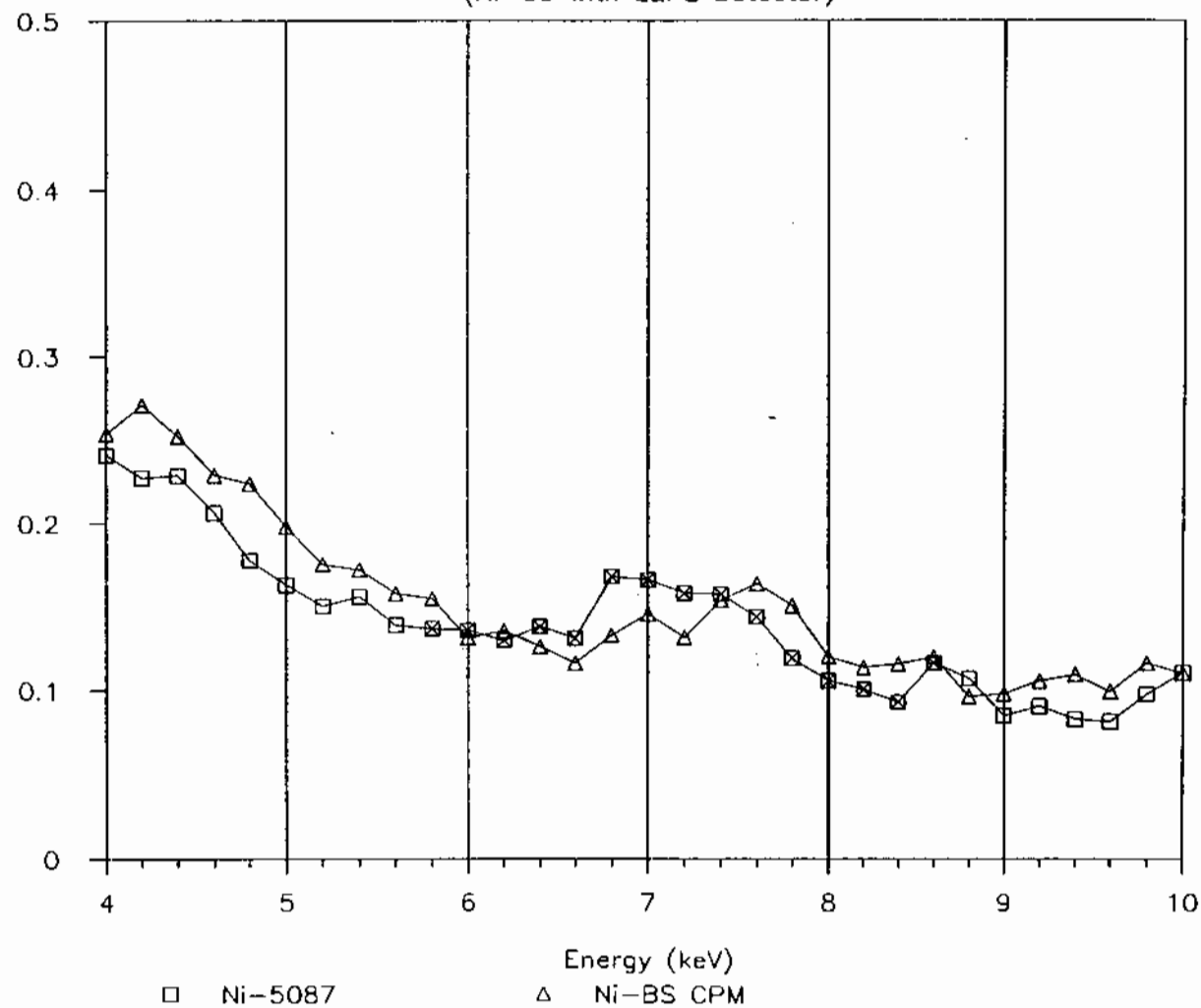
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16	17	17	19	20	14	14	14	12	14	7	7	12	11	8	10	3	7	5	7	7
17	23	13	21	19	18	20	9	13	8	11	12	9	8	11	2	8	6	6	6	16
18	20	21	15	11	10	16	20	17	14	8	13	8	7	13	13	11	9	12	7	9
19	18	26	15	18	13	9	16	21	10	6	15	10	8	9	7	5	4	7	4	6
20	32	19	17	15	16	16	13	15	16	11	10	10	8	7	10	9	4	10	2	2
21	18	21	29	19	22	13	13	22	11	12	14	12	3	9	14	6	6	7	10	10
22	24	21	13	17	10	7	10	8	11	12	14	7	11	15	4	9	5	9	4	10
23	17	15	17	15	9	16	18	15	10	5	10	7	11	9	4	6	6	8	10	10
24	22	22	18	16	16	6	14	15	12	14	9	9	9	15	5	8	11	5	8	3
25	11	15	15	12	23	9	12	18	14	8	14	9	14	3	6	7	8	5	9	13
26	15	15	12	17	12	14	6	10	4	17	14	9	12	11	6	10	6	13	8	8
27	26	16	18	13	20	11	11	6	12	12	6	11	7	9	9	11	7	7	7	10
28	25	16	18	10	15	14	13	12	10	17	11	8	15	13	9	9	8	6	4	7
29	17	20	19	14	21	17	12	9	7	12	13	11	5	6	15	7	4	6	8	7
30	26	16	19	22	17	13	12	8	13	15	5	11	9	9	3	9	4	8	10	7
31	14	18	16	14	11	17	16	11	13	12	13	7	15	11	4	18	8	3	14	5
32	20	22	22	20	13	13	8	8	14	7	14	3	9	9	12	12	7	10	7	7
33	21	21	12	25	17	14	15	6	8	12	9	3	17	7	5	11	6	8	8	7
34	20	18	24	15	13	9	15	19	13	12	11	3	17	7	7	9	6	10	7	7
35	20	11	17	17	21	13	10	13	11	10	14	10	8	7	8	12	6	11	5	5
36	24	19	12	19	8	19	17	9	12	15	12	12	7	13	7	4	6	20	7	3
37	16	19	17	17	12	11	14	20	9	11	12	10	12	12	9	15	6	7	8	6
38	18	19	19	12	19	15	16	15	14	14	17	7	9	11	3	9	6	3	9	3
39	22	8	22	17	15	12	11	12	13	10	9	14	8	12	4	11	9	6	5	5
40	23	18	16	23	22	20	12	8	17	12	12	12	5	5	12	8	10	12	2	2
41	23	13	18	19	18	15	10	11	9	8	12	8	13	9	7	7	11	10	7	7
42	21	15	23	11	16	9	13	12	16	12	17	10	6	12	9	15	8	11	8	8
43	18	19	11	31	19	11	9	12	14	6	9	10	9	11	7	6	4	5	6	6
44	17	28	26	34	21	11	21	8	10	11	12	9	11	13	10	8	2	14	4	9
45	30	21	20	28	16	14	11	11	8	11	12	9	11	4	8	14	7	5	4	8
46	33	23	11	24	13	18	11	16	13	13	10	6	7	8	10	5	5	7	6	4
47	18	23	15	24	17	10	7	16	5	9	11	6	13	11	16	5	5	2	6	5
48	15	22	9	22	10	16	12	12	8	9	11	17	7	10	7	8	6	5	4	4
49	16	20	12	20	13	11	16	11	8	8	12	7	9	3	8	10	6	3	9	10

619

Counts per Minute

SPECTRUM OF 92-5087

(Ni-59 with LEPS Detector)



J. H. Kage
6/26/92

VAX/VMS Peak Search Report V1.8 Generated 18-JUN-1992 08:30:35

Configuration : SYSSYSDEVICE:[USER]925087NI.B;1
 Analyses by : PEAK V16.1
 Sample title : 92-05087 5 ML
 Sample date :
 Sample ID : 5/21/92 START Acquisition date : 17-JUN-1992 09:01:24
 Elapsed live time: 0 23:25:06.40 Sample quantity : 1.0000 SAMPLE
 Elapsed real time: 0 23:25:10.06 0.04
 Start energy : 0.20 keV End energy : 409.60 keV
 Sensitivity : 5.00 Gaussian : 10.00
 Critical level : No

PK	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	10.63	459	1337	1.12	53.15	48	12	5.45E-03	16.7	
2	0	13.14	606	1409	0.73	65.70	61	13	7.18E-03	13.5	
3	0	16.28	661	1575	0.88	81.39	74	15	7.84E-03	13.4	
4	0	30.87	3073	1344	0.87	154.34	145	18	3.65E-02	3.3	
5	0	35.38	959	1482	0.88	176.90	165	23	1.14E-02	11.1	
6	0	46.43	211	557	1.27	232.13	228	10	2.50E-03	23.1	
7	3	61.76	271	930	0.95	308.81	300	23	3.21E-03	22.5	2.26E+00
8	3	63.25	406	944	0.95	316.27	300	23	4.81E-03	15.3	
9	0	75.17	575	1052	0.88	375.83	371	16	6.82E-03	11.9	
10	0	80.98	1228	1146	0.82	404.91	394	18	1.46E-02	6.3	
11	0	84.85	358	881	1.39	424.25	417	15	4.25E-03	16.5	
12	0	92.66	595	1093	1.22	463.29	455	18	7.06E-03	11.9	
13	0	111.90	294	797	1.01	559.48	554	13	3.49E-03	18.3	
14	0	185.82	322	571	1.11	929.11	922	15	3.82E-03	15.2	
15	0	302.40	96	385	0.68	1511.98	1509	18	1.16E-03	43.7	
16	0	356.17	371	300	0.75	1780.87	1771	20	4.40E-03	11.1	

A.L. Jodoff 6/12/92

$$23:25:06.40 = (23 \times 60) \text{ min} + 25 \text{ min} + \frac{6.40}{60} \text{ min}$$

$$\text{ELT} = 1405.1067 \text{ min}$$

Channel Contents for 925087NI.B;1

Channel

1:	0	0	0	0	25	45415	2992	1579
9:	1214	911	371	304	297	315	348	348
17:	337	329	351	(338	319	321	290	250
25:	229	211	219	195	192	191	182	194
33:	184	236	233	222	221	202	167	148
41:	141	130	163	150	119	127	116	114
49:	137	155)	179	187	185	163	155	137
57:	135	133	116	101	113	110	147	206
65:	266	228	195	173	124	113	120	113
73:	107	112	111	117	127	129	143	203
81:	232	250	213	176	122	103	96	102
89:	100	81	109	99	106	101	139	107
97:	96	122	123	95	93	100	83	108
105:	108	113	99	69	90	85	87	84
113:	80	90	69	69	84	83	82	82
121:	94	86	86	70	75	85	97	85
129:	87	89	97	77	73	86	74	73
137:	76	83	97	88	72	101	77	66
145:	74	87	77	75	101	113	190	337
153:	534	688	729	545	354	176	93	80
161:	81	85	74	72	80	76	73	92
169:	82	75	83	82	118	183	215	189
177:	172	128	132	125	89	94	60	80
185:	76	75	62	46	75	75	72	64
193:	77	53	72	60	72	62	75	75
201:	73	56	62	66	63	66	70	50
209:	60	62	53	79	50	62	83	57
217:	63	63	54	62	79	73	74	62
225:	71	61	64	52	76	97	85	101
233:	85	70	93	64	45	63	67	68
241:	55	61	64	63	62	69	54	62
249:	82	64	57	62	60	48	77	71
257:	55	71	74	69	71	71	62	69
265:	65	88	84	71	67	63	58	66
273:	70	75	69	69	50	62	53	55
281:	49	58	71	47	57	54	54	57
289:	61	63	51	58	70	81	65	84
297:	87	75	64	57	61	78	65	59
305:	80	97	91	128	140	112	100	89
313:	82	74	135	135	143	124	94	68
321:	71	75	57	73	82	91	95	90
329:	105	82	93	88	89	103	93	80
337:	60	67	77	69	72	52	58	79
345:	66	73	64	74	70	71	58	73
353:	81	65	82	68	83	77	63	70
361:	84	93	91	108	112	92	99	81
369:	69	68	68	87	110	169	163	191
377:	143	123	95	76	66	71	73	73
385:	63	56	68	68	76	51	69	62
393:	71	59	67	63	68	74	85	76
401:	78	124	188	272	340	317	231	124
409:	83	67	58	60	72	71	58	70
417:	53	57	72	91	84	104	117	99
425:	113	92	86	61	83	60	67	36

433:	69	58	71	74	105	88	68	68
441:	54	62	65	59	68	74	58	66
449:	71	75	55	63	60	65	55	69
457:	54	72	69	103	148	147	156	144
465:	142	117	81	62	82	66	63	58
473:	62	64	54	59	72	44	45	48
481:	70	69	57	67	52	52	50	59
489:	65	77	59	53	63	61	56	61
497:	59	75	52	75	64	69	60	79
505:	70	63	66	49	57	62	57	54
513:	58	43	63	47	62	58	68	51
521:	57	60	53	68	53	47	60	55
529:	65	69	59	54	50	60	58	57
537:	56	65	72	65	71	74	53	61
545:	54	61	73	66	60	71	74	57
553:	66	56	60	80	98	115	115	109
561:	111	70	72	70	68	67	64	57
569:	69	60	70	64	73	55	57	59
577:	69	69	76	77	69	59	86	68
585:	74	51	52	56	55	51	55	65
593:	51	46	62	55	57	66	61	59
601:	55	60	62	60	53	71	53	60
609:	62	61	60	48	54	69	62	66
617:	58	64	63	66	63	76	50	69
625:	60	58	57	52	60	71	68	67
633:	52	50	64	55	55	43	66	73
641:	66	63	58	58	60	51	55	62
649:	63	60	65	61	54	67	54	57
657:	54	61	65	45	47	55	64	52
665:	76	60	56	68	53	56	55	65
673:	57	44	62	55	55	48	59	52
681:	58	59	46	68	56	61	67	57
689:	66	64	53	59	53	58	71	60
697:	56	56	59	67	58	60	47	45
705:	46	58	57	68	59	61	58	69
713:	55	55	57	45	35	55	70	54
721:	56	76	60	59	59	64	60	54
729:	60	60	73	55	46	57	43	54
737:	51	64	54	33	47	51	47	53
745:	63	41	51	56	43	52	49	56
753:	57	44	56	62	51	62	50	55
761:	50	52	51	49	43	43	37	56
769:	45	51	54	57	46	49	47	45
777:	45	40	60	56	39	46	49	54
785:	69	59	44	51	55	47	49	46
793:	61	58	51	54	43	47	39	55
801:	42	58	51	50	40	53	52	53
809:	63	56	42	53	37	52	54	46
817:	52	54	46	45	56	48	43	55
825:	48	49	42	38	47	44	56	44
833:	31	47	45	48	54	36	42	46
841:	38	55	47	48	49	64	58	38
849:	45	48	56	40	51	46	52	41
857:	41	46	36	41	49	39	51	27
865:	61	43	56	50	46	58	53	35
873:	49	53	55	37	36	40	40	48
881:	45	40	36	57	34	41	39	44
889:	54	42	47	37	39	36	55	42
897:	53	47	48	52	41	40	49	41
905:	46	34	48	30	53	52	44	39

925087-NK B)

913:	50	34	44	51	50	46	31	47
921:	35	28	52	43	42	62	74	87
929:	93	83	89	60	47	56	44	33
937:	42	43	40	45	40	47	43	48
945:	41	37	43	37	36	40	45	40
953:	47	39	46	48	40	34	29	41
961:	38	44	51	50	40	39	28	48
969:	37	40	37	41	45	50	55	42
977:	42	47	37	37	38	43	39	28
985:	38	52	46	46	48	44	41	56
993:	34	54	35	34	37	32	48	39
1001:	32	34	43	40	39	43	38	43
1009:	45	41	25	48	37	41	43	38
1017:	42	39	44	34	36	36	44	45
1025:	39	50	45	35	48	42	34	36
1033:	56	37	31	39	38	42	49	35
1041:	37	28	52	27	33	34	45	39
1049:	40	33	35	33	46	38	48	30
1057:	37	34	41	40	34	38	46	42
1065:	41	42	44	56	37	37	38	30
1073:	31	30	35	31	32	30	38	32
1081:	44	36	28	40	32	37	35	42
1089:	35	39	26	34	40	47	31	31
1097:	28	39	36	29	33	33	45	26
1105:	28	37	42	25	27	37	23	34
1113:	26	38	31	37	28	43	35	32
1121:	31	24	43	33	41	32	27	32
1129:	26	29	39	14	36	33	36	38
1137:	34	32	34	29	27	36	32	26
1145:	38	32	34	33	31	25	29	41
1153:	29	35	31	25	27	38	30	31
1161:	30	36	40	31	27	30	46	29
1169:	42	25	28	30	25	26	30	34
1177:	30	33	23	27	24	24	30	26
1185:	34	26	26	43	29	36	39	53
1193:	50	43	44	54	37	26	32	29
1201:	39	35	29	31	28	27	39	28
1209:	34	25	32	27	38	27	38	18
1217:	28	25	32	32	30	26	24	30
1225:	17	26	28	23	26	24	23	23
1233:	29	24	30	22	23	27	31	37
1241:	33	26	35	22	33	23	21	32
1249:	27	32	33	24	27	21	24	27
1257:	27	29	15	34	27	29	21	32
1265:	35	26	26	35	23	29	26	27
1273:	28	26	38	28	32	20	30	30
1281:	19	20	37	21	25	28	25	26
1289:	23	33	21	21	26	38	21	24
1297:	32	31	28	28	26	21	14	29
1305:	24	26	25	27	20	21	22	28
1313:	26	20	30	31	21	30	26	31
1321:	23	22	21	21	33	20	25	24
1329:	29	39	20	27	26	36	23	32
1337:	20	30	21	22	23	22	18	27
1345:	25	24	29	25	22	30	33	23
1353:	17	27	24	26	23	19	36	24
1361:	18	26	17	22	24	20	23	24
1369:	25	12	34	21	23	21	33	24
1377:	20	21	25	35	25	39	23	32
1385:	31	29	25	18	25	22	21	26

925087 N1.B.1

1393:	26	28	25	25	21	24	23	28
1401:	33	23	18	24	33	21	26	21
1409:	27	16	24	13	14	14	29	26
1417:	32	12	26	25	25	19	24	16
1425:	21	25	27	26	14	19	18	28
1433:	20	20	21	23	17	16	15	12
1441:	18	24	26	28	18	23	17	24
1449:	22	17	16	26	19	22	27	22
1457:	17	22	22	22	26	13	14	18
1465:	23	16	25	12	12	18	20	24
1473:	23	24	26	23	24	23	31	24
1481:	18	23	15	19	18	27	21	24
1489:	24	30	17	17	22	28	19	21
1497:	18	19	24	24	16	16	17	21
1505:	20	24	25	19	15	31	27	31
1513:	43	45	47	29	25	22	27	23
1521:	19	22	21	22	18	14	24	30
1529:	19	21	15	29	15	22	21	22
1537:	26	28	27	14	21	31	18	20
1545:	22	13	25	14	18	18	15	24
1553:	24	19	26	22	27	18	20	16
1561:	15	28	20	23	25	17	15	14
1569:	23	20	17	20	19	14	22	18
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1585:	18	16	18	22	15	22	28	19
1593:	26	15	15	22	15	14	25	12
1601:	16	17	15	20	16	15	17	20
1609:	16	19	24	15	10	18	15	15
1617:	26	27	16	27	17	13	19	14
1625:	23	13	18	16	12	18	16	15
1633:	17	22	24	19	16	16	17	29
1641:	22	22	21	19	15	22	19	16
1649:	20	13	18	15	17	15	20	13
1657:	20	20	19	24	18	18	19	13
1665:	26	25	31	18	30	28	27	22
1673:	25	17	19	8	26	17	12	22
1681:	22	15	23	19	25	15	14	18
1689:	17	22	21	13	19	32	21	21
1697:	21	23	15	17	17	13	19	28
1705:	24	17	16	17	28	17	9	15
1713:	19	15	10	19	11	12	17	16
1721:	13	16	19	11	18	17	14	17
1729:	22	19	11	13	14	17	20	12
1737:	10	11	23	17	22	13	20	12
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1753:	18	18	22	27	27	25	35	24
1761:	37	27	24	20	22	18	10	14
1769:	22	17	15	12	22	12	17	32
1777:	39	38	87	89	77	92	38	36
1785:	28	16	16	15	17	13	13	11
1793:	16	16	14	13	13	15	15	22
1801:	14	18	22	16	13	12	15	18
1809:	15	14	12	15	20	14	18	14
1817:	16	15	18	13	18	12	15	16
1825:	18	21	15	18	18	13	12	13
1833:	17	17	15	8	30	16	14	18
1841:	14	17	23	12	10	11	14	14
1849:	21	20	17	11	12	17	7	13
1857:	13	23	18	10	11	16	19	11
1865:	12	10	13	18	11	15	12	12

92 5087 Nt. B.

1873:	11	12	8	17	15	18	13	15
1881:	18	18	15	19	10	21	18	16
1889:	17	18	14	13	13	11	15	11
1897:	15	14	13	15	12	11	21	11
1905:	16	15	18	18	20	10	15	14
1913:	9	12	14	25	24	21	28	23
1921:	28	16	24	13	11	14	9	20
1929:	21	23	24	22	30	28	29	24
1937:	22	26	11	12	10	14	17	15
1945:	18	10	11	10	12	12	11	18
1953:	16	16	14	24	26	17	22	9
1961:	14	17	11	18	15	12	12	11
1969:	17	8	20	14	15	18	11	13
1977:	17	13	12	14	11	11	14	21
1985:	15	13	15	13	12	15	14	5
1993:	14	14	11	8	12	10	15	12
2001:	14	10	10	17	14	11	18	13
2009:	13	15	9	19	21	14	9	8
2017:	13	16	15	9	20	8	12	10
2025:	10	14	12	6	11	13	9	18
2033:	10	10	10	15	7	10	7	13
2041:	4	15	8	14	7	16	16	11

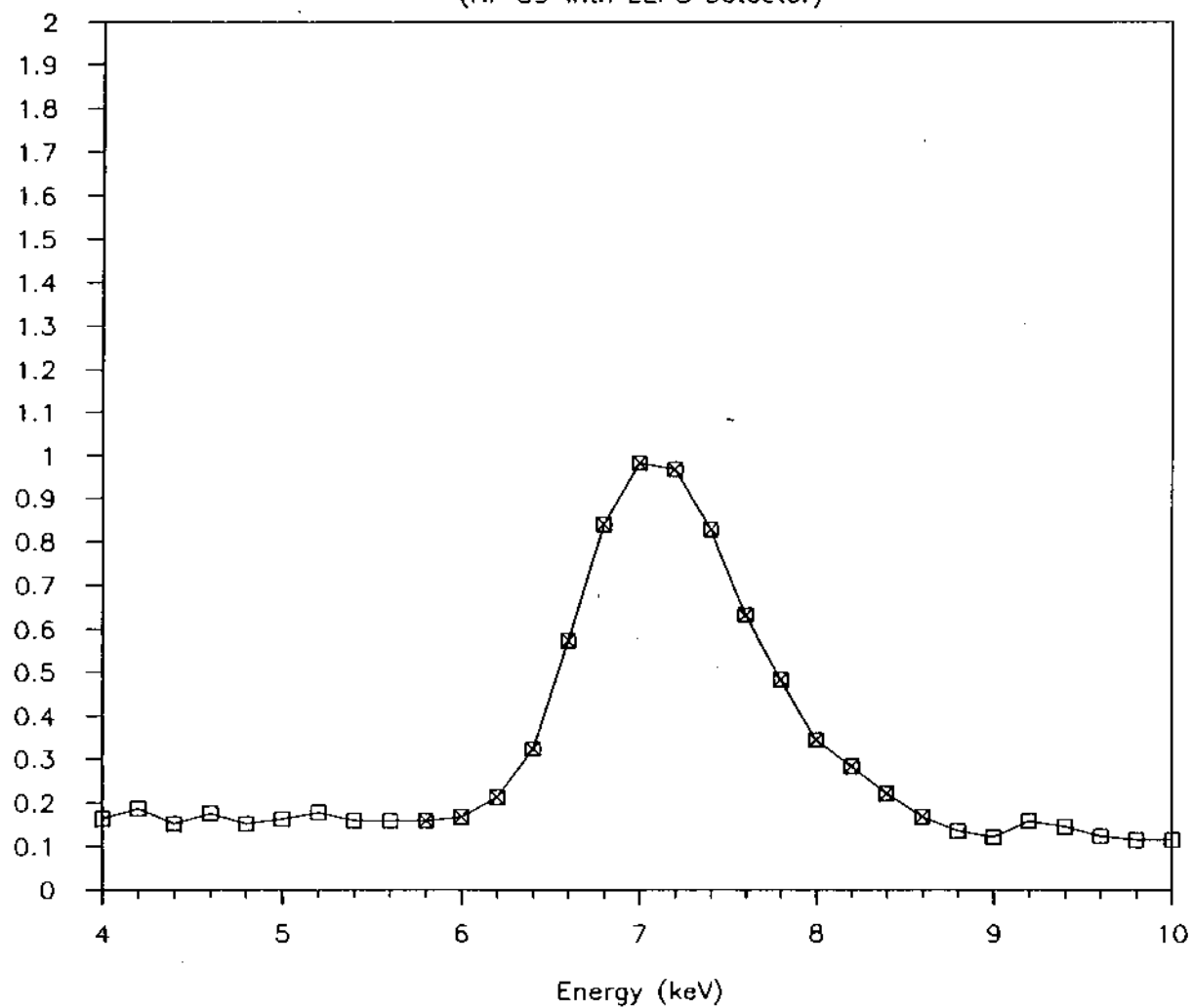
925087N1.(Bj)

926

Counts per Minute

SPECTRUM OF 92-5092

(Ni-59 with LEPS Detector)



J. H. Kage
6/26/92

92-05092 20ML START 5/21/92

SAMPLE ID..... SY:925092NI.D2;1

OF CHANNELS..... 2048

DIODE I.D..... D2

SHELF NUMBER..... 0

CALIBRATION..... 0.2 KEV/CH

TIME ZERO 6/17/92 AT 9: 5: 0

COUNTED..... 6/17/92 AT 9: 5: 0

(0.00 MINUTES DECAY TIME)

LIVE COUNT TIME.... 23 HOURS 25 MINUTES 40 SECONDS (1405.67 MIN.)

ELAPSED TIME..... 23 HOURS 25 MINUTES 40 SECONDS (1405.67 MIN.)

(DEAD TIME = 0.000)

FLUX CORRECTION.... 0.0000

GEOM CORRECTION.... 0.0000 0.0000 0.0000 0.0000 0.0000

WEIGHT..... 1.00000 GRAMS

ANTI: 0 SLP: 0 AREA: 0 P-T: 0 ERR: 0 ZER: 0 OPR: 0 NOV: -1

627

D. K. Jodoff 6/18/92

130

J. H. Kays 6/18/92

92-05032 20ML START 5/21/92

SY:925092NI.02;1 COUNTED 6/17/92 @ 9: 5: 8 GAIN: 8.2 KEV/CHAN

	#	50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950
0	18760	162	67	44	40	36	32	30	33	25	31	42	33	35	45	24	20	19	21	12
1	18767	149	72	36	37	28	36	40	35	29	37	33	20	33	24	25	29	18	24	17
2	0	172	68	59	49	39	35	39	26	30	39	36	35	41	34	20	25	25	22	20
3	0	160	59	51	41	42	22	27	30	31	32	33	30	34	40	29	31	36	19	26
4	0	166	45	43	35	32	26	31	29	34	35	33	46	47	31	35	27	32	33	19
5	0	130	54	57	44	45	34	31	54	32	30	42	30	36	25	25	17	23	10	21
6	0	191	61	40	34	26	33	39	36	37	31	40	39	37	41	32	20	30	15	23
7	0	142	55	44	27	20	30	37	37	27	22	37	37	32	29	22	20	24	19	26
8	0	136	40	31	34	28	34	33	31	41	32	29	41	36	41	27	20	20	16	20
9	0	102	50	31	35	34	35	23	30	40	24	30	37	33	23	37	35	23	19	15
10	0	97	50	41	31	28	32	39	35	61	24	26	31	41	31	35	30	30	25	25
11	0	86	61	51	37	34	32	35	24	44	26	31	34	29	20	30	20	27	27	21
12	176	09	63	37	29	32	33	36	25	70	32	35	38	20	24	19	20	20	20	24
13	254	110	45	39	30	34	34	50	32	63	48	34	34	37	32	27	21	23	20	13
14	273	122	57	39	25	33	41	47	29	59	32	34	46	30	32	26	34	22	26	19
15	261	133	46	47	23	23	45	52	37	43	26	43	42	24	27	24	29	26	26	17
16	260	125	53	34	29	46	49	40	20	54	30	35	40	26	32	25	33	24	16	20
17	252	121	49	44	32	42	57	51	26	45	24	35	31	36	32	31	25	31	18	24
18	231	104	35	32	39	39	44	47	42	35	30	37	33	25	26	31	35	19	23	27
19	275	75	49	36	38	34	40	37	36	27	32	35	36	30	26	20	31	19	22	23
20	230	97	45	37	31	35	34	36	42	37	31	34	30	26	37	40	27	30	22	17
21	263	04	60	39	32	27	35	35	35	31	20	33	36	29	39	30	19	32	22	11
22	213	01	40	35	37	43	22	40	32	35	29	37	20	30	31	32	21	19	10	26
23	247	78	44	44	34	36	31	48	54	37	35	32	42	39	27	36	26	29	19	20
24	214	05	45	31	25	39	40	66	44	37	20	40	35	20	25	30	20	33	26	19
25	229	00	42	30	46	31	53	73	41	61	35	47	42	33	33	36	27	20	33	19
26	250	95	47	46	42	34	57	73	49	24	34	25	42	35	34	27	10	29	21	20
27	224	05	47	44	27	31	46	73	40	37	47	33	33	27	44	25	27	25	25	18
28	224	75	50	50	40	33	38	59	34	29	40	33	41	30	33	30	19	16	29	21
29	224	07	51	38	32	35	43	36	29	31	36	41	30	30	39	24	19	36	33	16
30	237	06	42	35	29	29	32	51	27	45	44	38	34	23	32	25	29	30	36	24
31	299	113	57	33	34	37	47	30	34	33	29	32	32	25	36	20	20	17	37	17
32	457	96	50	34	37	47	47	36	20	27	35	31	46	27	31	37	17	19	32	10
33	007	78	56	42	44	25	57	25	24	27	39	40	29	20	35	20	21	22	26	22
34	1102	95	46	40	40	24	64	33	38	35	33	36	36	24	24	33	22	25	10	21
35	1301	05	46	38	37	34	50	32	32	34	29	36	41	42	23	29	24	15	19	10
36	1361	00	46	29	35	27	44	44	43	37	43	31	34	41	37	31	29	24	30	17
37	1164	70	41	34	34	40	42	46	46	37	30	33	32	34	31	26	20	25	17	12
38	009	62	43	39	33	32	42	50	46	32	35	33	36	29	37	43	30	29	20	19
39	600	50	47	44	20	30	37	40	41	32	30	24	37	43	25	34	16	10	13	23
40	405	60	41	34	42	31	36	39	17	35	41	29	40	34	23	16	25	21	22	20
41	400	72	44	40	30	42	34	31	34	35	29	32	42	34	31	32	20	23	20	15
42	312	67	50	49	29	33	25	33	30	32	33	27	33	31	29	22	27	21	23	24
43	236	67	43	35	41	23	32	31	26	34	41	31	33	33	31	34	23	22	17	10
44	190	60	30	35	30	39	36	26	37	45	40	32	24	41	35	26	24	30	21	22
45	170	62	42	35	31	30	34	36	39	30	24	30	36	30	20	23	19	25	10	23
46	223	50	36	33	33	36	40	32	35	29	40	36	44	33	30	30	32	22	15	20
47	204	65	41	40	29	41	43	30	29	37	43	50	37	36	30	25	20	20	27	24
48	173	64	57	36	24	20	33	34	35	33	40	32	29	33	40	36	17	25	16	14
49	162	40	42	37	39	25	29	29	37	20	49	20	37	33	30	27	10	30	10	20

628

100

92-05092 20ML START 5/21/92

SY:925092NI.02;1 COUNTED 6/17/92 0 9: 5: 8 GAIN: 0.2 KEV/CHAN

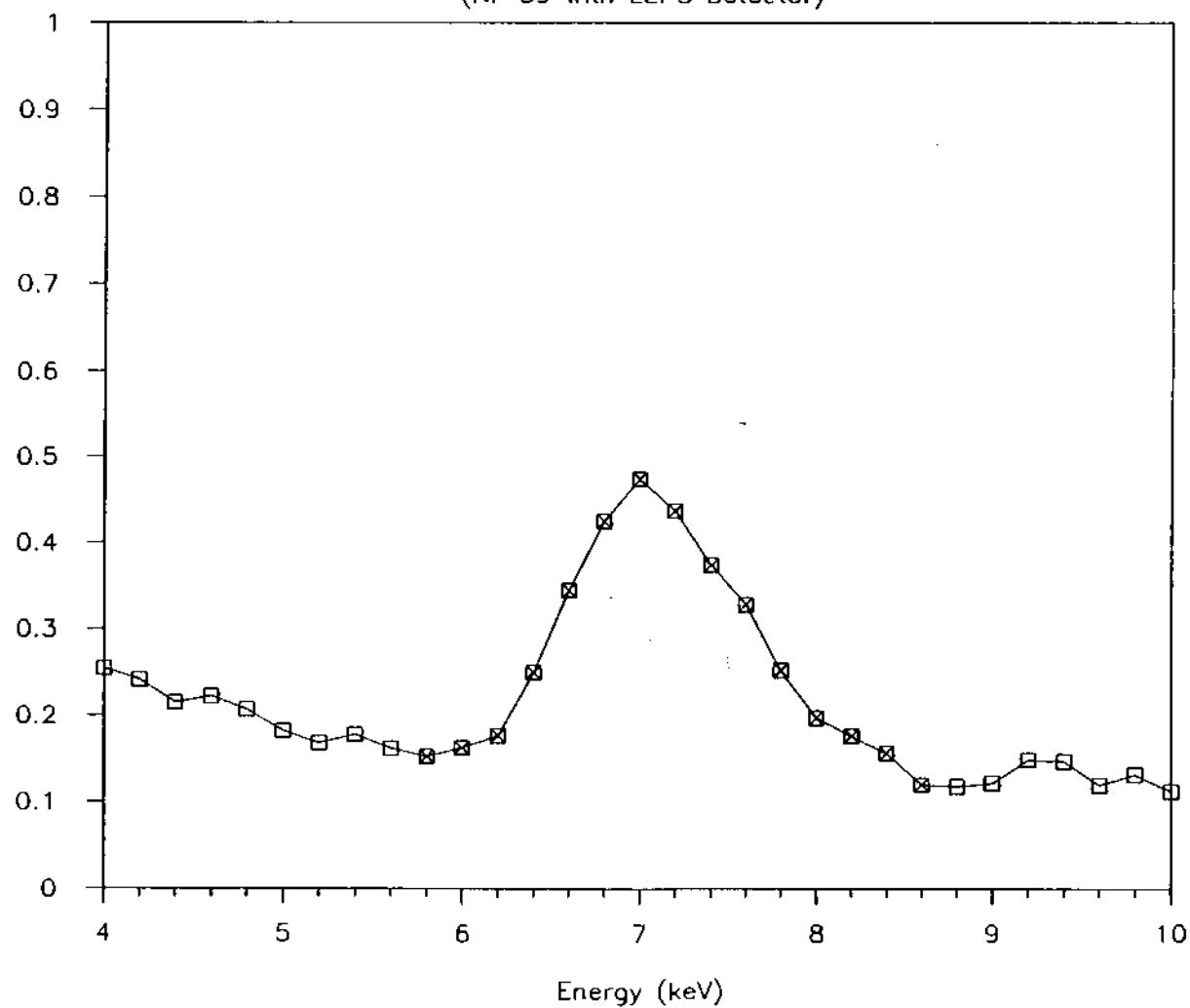
	1000	1050	1100	1150	1200	1250	1300	1350	1400	1450	1500	1550	1600	1650	1700	1750	1800	1850	1900	1950
0	16	17	13	18	12	17	11	18	11	15	13	6	8	14	9	14	5	8	6	12
1	9	19	15	26	16	17	15	18	14	9	18	9	15	8	8	18	6	7	5	6
2	17	18	16	22	13	18	11	18	15	18	7	4	14	18	6	7	9	12	5	11
3	23	22	18	18	14	15	13	12	8	8	12	12	8	8	18	15	18	6	3	9
4	17	28	17	11	13	11	18	14	8	16	7	8	12	15	6	5	8	18	6	3
5	17	15	23	16	7	21	18	12	18	13	18	15	12	9	9	9	5	15	18	6
6	24	21	22	16	23	28	6	15	11	18	18	9	7	15	4	6	8	5	6	18
7	29	23	18	7	13	28	12	11	9	11	16	12	11	9	7	7	5	6	6	14
8	38	15	12	23	23	18	12	18	12	15	15	6	18	11	12	11	6	5	5	6
9	28	26	16	13	15	8	13	15	6	16	14	9	7	8	9	7	15	18	18	3
10	17	19	11	14	21	17	17	9	12	9	12	8	16	18	5	8	8	12	12	4
11	15	28	18	18	25	15	9	14	9	9	7	9	11	8	9	14	7	7	9	3
12	26	28	16	9	13	14	7	12	14	18	9	14	9	18	6	15	6	11	9	7
13	28	16	16	9	13	28	14	18	17	14	12	12	4	6	9	18	5	12	5	8
14	16	11	14	17	18	13	8	9	13	18	12	13	9	13	7	14	8	7	7	8
15	27	15	17	19	28	18	15	7	15	18	18	13	7	9	5	11	6	6	3	11
16	21	18	11	13	13	17	14	16	16	19	17	18	11	5	12	9	6	18	7	1
17	23	16	17	28	11	18	9	18	8	6	13	18	13	8	8	7	4	18	8	2
18	12	16	17	18	17	8	11	18	13	18	9	3	18	2	8	6	7	4	4	6
19	19	23	17	15	15	14	13	17	11	8	18	3	7	7	6	5	3	9	5	6
20	21	15	19	22	14	22	12	15	17	14	11	18	11	9	6	12	8	8	6	9
21	22	15	14	12	14	8	7	18	7	8	13	13	7	5	11	8	7	5	4	1
22	17	16	11	4	11	7	14	13	12	4	9	2	9	5	8	9	7	6	11	5
23	14	29	17	15	14	17	9	16	11	6	6	7	8	11	18	8	4	18	7	3
24	28	16	18	28	15	14	8	11	13	13	5	18	7	7	8	12	18	8	6	6
25	13	15	14	17	23	16	18	11	12	9	13	5	8	12	18	5	5	7	5	2
26	24	18	13	14	12	9	18	18	3	18	11	8	7	12	8	8	11	2	6	4
27	21	11	15	16	18	8	19	16	12	12	6	14	11	16	18	6	5	9	7	5
28	27	23	15	14	11	6	9	14	12	12	14	6	15	6	18	11	4	6	1	4
29	21	23	12	24	13	12	15	17	3	18	9	18	9	9	9	9	4	8	4	5
30	26	28	22	18	13	14	7	18	18	14	8	12	8	9	12	9	11	9	3	6
31	25	23	8	28	12	8	11	13	18	7	9	7	5	7	9	14	8	6	6	5
32	18	28	17	19	14	12	14	11	15	5	8	6	7	8	9	14	6	6	18	7
33	22	28	14	14	12	9	7	12	9	11	9	8	11	7	9	7	6	6	9	2
34	28	21	14	17	9	14	15	16	9	6	18	5	8	18	11	12	7	5	4	8
35	16	16	14	24	26	9	9	15	3	8	8	3	13	7	8	7	7	4	8	9
36	16	9	17	12	18	9	8	13	8	18	15	6	5	6	7	4	9	7	18	7
37	23	13	19	7	19	9	13	14	11	11	18	6	11	2	4	9	2	7	6	7
38	14	19	12	16	18	18	18	15	16	18	11	18	7	18	9	7	5	7	7	4
39	17	18	28	19	14	13	14	12	16	13	8	18	18	13	11	4	6	8	11	7
40	13	13	24	17	16	14	7	13	15	18	9	6	9	18	6	13	9	9	12	4
41	19	15	17	18	11	18	18	11	9	5	8	9	6	11	9	7	14	8	4	7
42	26	15	24	19	17	18	15	28	16	8	18	7	13	13	6	12	2	6	5	6
43	21	17	17	25	13	19	11	13	3	11	12	11	18	13	7	7	8	18	6	9
44	16	16	25	25	15	13	9	4	19	11	6	13	18	9	13	6	6	5	4	3
45	22	14	12	27	17	17	11	13	12	11	7	18	12	14	16	4	18	8	4	18
46	17	18	18	25	15	18	8	17	9	15	11	12	9	8	9	7	2	7	6	9
47	22	17	17	28	13	13	13	6	11	7	2	8	7	17	3	3	6	6	7	8
48	16	22	17	24	9	12	18	5	7	18	2	13	17	5	5	5	18	6	9	5
49	23	25	15	18	13	14	16	12	14	16	14	13	4	9	6	8	6	5	4	9

630

Counts per Minute

SPECTRUM OF 92-5074

(Ni-59 with LEPS Detector)



J. H. Hage
6/26/92

VAI/VMS Peak Search Report V1.8 Generated 19-JUN-1992 08:39:45

Configuration : SYSSYSDEVICE:[USER]925074NI.B;2
 Analyses by : PEAK V16.1
 Sample title : 92-5074
 Sample data :
 Sample ID : 101SY 15 ML
 Elapsed live time: 0 23:47:58.19
 Start energy : 0.20 keV
 Sensitivity : 5.00
 Critical level : No
 Acquisition date : 18-JUN-1992 08:42:13
 Sample quantity : 1.0000 SAMPLE
 Elapsed real time: 0 23:48:01.98 0.04
 End energy : 409.60 keV
 Gaussian : 10.00

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	7.18	2787	2866	1.15	35.89	29	15	3.25E-02	4.7	
2	0	13.19	649	1365	0.71	65.94	61	12	7.58E-03	12.3	
3	0	16.31	922	1740	0.99	81.55	73	17	1.08E-02	11.0	
4	0	30.89	3058	1303	0.78	154.44	144	19	3.57E-02	3.4	
5	0	35.06	776	1491	0.93	175.29	164	22	9.04E-03	13.2	
6	0	53.24	122	730	0.78	266.20	262	12	1.42E-03	39.8	
7	3	61.75	223	970	0.95	308.74	301	21	2.61E-03	27.8	2.60E+00
8	3	63.21	333	818	0.95	316.07	301	21	3.89E-03	16.7	
9	0	66.20	421	1160	1.53	331.02	323	18	4.91E-03	17.0	
10	4	72.91	124	836	0.87	364.57	359	24	1.44E-03	40.9	1.36E+00
11	4	75.02	417	1017	0.87	375.08	359	24	4.86E-03	14.4	
12	0	80.88	1344	1137	0.74	404.41	394	19	1.57E-02	5.9	
13	0	84.69	329	806	1.15	423.44	417	13	3.84E-03	16.6	
14	0	92.65	586	937	0.86	463.27	455	16	6.85E-03	11.1	
15	0	111.88	325	767	1.10	559.42	554	13	3.79E-03	16.6	
16	0	185.71	226	726	0.86	928.56	921	17	2.64E-03	24.7	
17	0	302.71	148	346	1.18	1513.56	1505	18	1.73E-03	27.7	
18	0	352.21	49	179	0.62	1761.04	1758	11	5.75E-04	47.9	
19	0	356.19	447	376	1.20	1780.95	1771	25	5.21E-03	11.1	
20	0	386.97	139	339	0.65	1934.84	1925	21	1.62E-03	29.8	

D. K. Jodoff 6/19/92

$$23:47:58.19 = (23 \times 60) \text{ min} + 47 \text{ min} + \left(\frac{58.19}{60} \right) \text{ min}$$

$$= 1427.9698 \text{ min}$$

Channel Contents for 925074NI.B;2

Channel

1:	0	0	0	0	18	68199	3056	1550
9:	1220	915	392	287	350	354	315	351
17:	366	334	370	357	339	302	312	290
25:	256	236	250	227	214	228	247	350
33:	484	597	665	614	526	462	354	277
41:	247	220	168	166	171	209	207	168
49:	185	158	208	205	220	181	186	166
57:	151	131	132	125	103	129	150	204
65:	272	262	203	184	145	135	112	115
73:	112	117	118	120	124	150	180	223
81:	266	275	222	202	148	115	119	88
89:	83	102	88	102	119	118	108	128
97:	111	128	104	116	104	100	102	119
105:	117	123	90	86	103	90	84	79
113:	81	75	81	75	76	86	100	85
121:	87	86	91	81	99	77	100	79
129:	101	78	72	72	87	96	72	77
137:	88	83	94	99	85	76	73	68
145:	70	92	83	96	92	105	169	311
153:	457	744	685	566	323	185	95	67
161:	78	75	58	72	71	71	79	74
169:	69	77	72	85	128	176	211	201
177:	161	139	110	100	81	87	71	67
185:	65	76	63	71	53	74	57	68
193:	70	58	82	60	66	70	69	55
201:	69	78	76	56	60	64	61	70
209:	69	61	47	78	74	60	58	59
217:	79	56	55	60	70	72	66	65
225:	51	77	67	80	74	86	87	93
233:	85	72	80	57	63	56	64	63
241:	64	61	62	63	72	64	59	80
249:	60	57	62	59	63	64	68	53
257:	69	78	54	59	56	56	64	60
265:	93	85	91	82	75	58	62	67
273:	59	65	68	73	67	68	66	68
281:	64	61	81	61	64	67	56	60
289:	76	63	54	72	62	63	65	77
297:	84	78	83	73	55	59	68	59
305:	77	100	114	113	112	129	98	86
313:	75	92	109	137	156	118	101	79
321:	56	78	68	89	82	90	83	99
329:	96	90	101	116	104	120	102	71
337:	72	71	63	64	62	60	56	68
345:	82	68	44	85	69	69	66	84
353:	77	86	90	69	80	74	71	70
361:	72	95	108	110	117	111	78	77
369:	75	73	70	101	127	162	158	155
377:	140	90	87	64	76	73	75	91
385:	79	82	74	75	78	60	58	60
393:	67	62	64	77	84	75	97	84
401:	79	135	189	278	352	319	195	144
409:	82	63	66	56	67	68	52	75
417:	59	80	62	82	90	102	119	104
425:	119	114	86	61	57	68	61	66

433:	58	67	87	98	87	72	75	70
441:	59	69	69	58	56	53	67	69
449:	63	61	62	70	67	54	49	62
457:	63	63	71	86	113	159	180	164
465:	129	107	79	72	75	51	66	64
473:	64	62	56	68	59	46	51	54
481:	52	62	62	71	58	50	71	55
489:	65	66	64	74	65	55	63	59
497:	56	61	53	68	77	67	54	65
505:	61	63	66	60	63	69	60	73
513:	63	57	76	66	71	46	60	69
521:	70	69	57	65	63	86	68	50
529:	53	61	52	73	55	60	69	57
537:	67	64	57	66	66	70	73	62
545:	71	55	67	71	73	90	73	59
553:	61	44	80	74	100	98	126	93
561:	108	98	66	67	82	56	71	61
569:	64	59	46	74	66	64	60	66
577:	71	71	79	69	65	82	66	58
585:	67	71	62	47	65	67	72	76
593:	80	56	64	70	77	62	56	66
601:	55	64	70	52	77	63	62	53
609:	66	59	52	53	65	63	66	70
617:	67	53	70	68	42	63	65	59
625:	67	56	66	54	66	62	71	67
633:	53	64	54	80	73	66	60	65
641:	57	66	60	63	71	53	65	55
649:	63	66	53	60	61	68	47	59
657:	50	66	64	54	50	52	69	52
665:	66	56	56	61	62	62	68	65
673:	61	66	59	69	44	60	71	66
681:	45	56	52	64	64	58	47	65
689:	66	63	69	74	47	42	53	62
697:	69	58	73	74	70	54	54	55
705:	56	61	58	47	55	60	68	57
713:	78	69	55	61	65	69	63	71
721:	66	54	69	63	56	57	60	63
729:	48	56	52	63	46	36	57	61
737:	51	75	48	53	49	60	69	56
745:	52	60	51	60	49	61	57	57
753:	62	60	59	56	54	57	43	59
761:	39	49	66	55	58	46	64	60
769:	54	62	52	63	48	55	56	37
777:	50	45	47	51	55	54	63	58
785:	49	51	39	57	52	52	46	57
793:	52	62	57	45	58	50	44	48
801:	58	47	47	50	51	65	52	55
809:	48	49	56	43	41	58	58	42
817:	54	40	47	44	53	54	52	50
825:	42	54	43	61	43	38	51	39
833:	52	55	51	51	43	49	43	59
841:	49	50	52	51	65	37	58	44
849:	49	49	58	52	42	43	48	53
857:	45	42	47	45	47	55	44	42
865:	51	35	43	48	35	51	49	54
873:	43	48	37	46	51	47	44	49
881:	42	58	51	45	46	42	48	40
889:	43	48	47	49	54	43	44	56
897:	48	47	38	53	50	37	49	39
905:	44	33	38	40	38	40	35	40

913:	51	47	45	49	48	40	45	39
921:	43	44	45	43	57	52	79	71
929:	95	79	68	57	55	43	42	38
937:	41	37	51	57	47	42	58	44
945:	44	42	42	47	35	41	39	36
953:	44	34	32	49	43	42	62	50
961:	40	29	42	36	34	34	41	46
969:	48	38	43	40	38	31	52	50
977:	49	39	31	43	42	40	50	50
985:	43	37	47	46	34	49	47	50
993:	35	41	54	41	53	39	39	40
1001:	38	33	51	31	46	49	42	42
1009:	44	43	39	36	45	38	31	42
1017:	49	35	37	43	50	40	37	35
1025:	52	33	45	44	42	38	41	39
1033:	21	33	40	26	29	35	39	38
1041:	39	38	36	36	43	29	35	36
1049:	37	37	32	31	41	37	38	34
1057:	35	34	38	31	43	39	33	37
1065:	43	37	42	35	33	38	37	37
1073:	30	34	37	32	39	37	34	25
1081:	45	42	40	39	41	32	44	30
1089:	44	31	36	49	32	34	32	35
1097:	29	26	43	35	36	45	36	50
1105:	24	42	32	36	37	31	29	39
1113:	48	42	31	28	28	30	35	33
1121:	32	30	33	37	29	34	28	36
1129:	27	35	31	30	31	35	45	25
1137:	36	32	31	31	24	35	27	30
1145:	38	26	31	29	30	40	30	36
1153:	29	29	29	20	38	30	42	38
1161:	30	31	34	30	33	33	30	19
1169:	48	33	34	36	21	36	32	36
1177:	32	29	34	28	39	27	32	28
1185:	33	33	30	35	25	37	34	46
1193:	43	53	44	35	37	40	29	30
1201:	23	26	21	27	29	30	37	38
1209:	36	35	25	34	35	29	29	22
1217:	28	23	32	30	19	27	26	18
1225:	33	30	18	30	35	24	32	30
1233:	31	26	29	28	21	26	21	30
1241:	28	16	29	23	36	31	26	39
1249:	22	30	22	32	25	31	21	32
1257:	32	30	22	25	19	27	35	22
1265:	20	32	19	27	29	22	25	27
1273:	29	35	26	21	23	32	22	23
1281:	29	17	26	34	29	24	26	27
1289:	19	28	22	36	29	21	27	26
1297:	29	24	26	29	25	20	26	22
1305:	17	16	29	16	23	33	21	23
1313:	24	22	25	20	22	34	22	22
1321:	34	24	30	12	25	33	27	20
1329:	26	27	21	24	14	24	23	23
1337:	22	22	17	26	26	26	27	28
1345:	21	24	30	20	27	22	28	26
1353:	33	25	24	30	27	24	27	18
1361:	33	32	17	29	26	23	17	26
1369:	26	27	25	23	25	21	20	22
1377:	30	22	21	23	21	35	36	28
1385:	31	28	33	21	29	23	33	12

925074N1.B57

[illegible]

925074 J1. B.2

925076 N1. B32

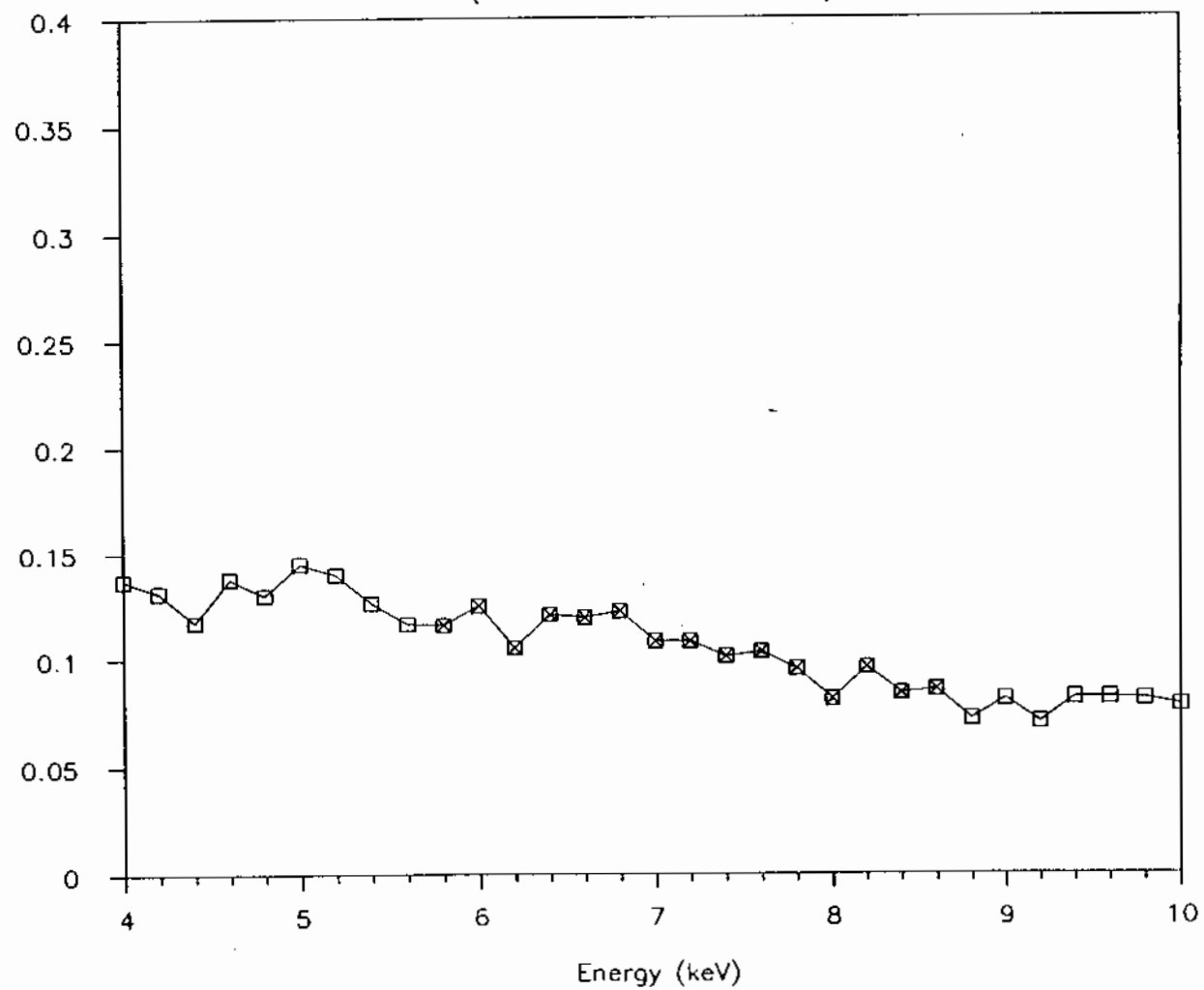
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1881:	16	18	19	14	15	19	16	10
1889:	9	15	9	16	12	22	14	15
1897:	14	12	7	16	14	14	16	16
1905:	9	13	19	11	16	19	13	13
1913:	14	11	14	17	27	30	28	21
1921:	21	21	20	18	17	18	23	15
1929:	23	19	18	23	33	51	38	40
1937:	16	29	20	18	15	20	20	13
1945:	9	16	18	7	14	14	12	22
1953:	19	14	14	14	14	17	12	15
1961:	18	14	9	11	10	19	16	19
1969:	12	23	19	10	13	9	9	10
1977:	16	8	17	14	5	8	21	10
1985:	12	10	11	11	8	13	8	18
1993:	14	14	12	18	9	5	14	18
2001:	11	15	19	15	19	13	14	10
2009:	15	13	14	8	10	10	14	12
2017:	13	14	11	9	12	12	19	8
2025:	13	11	9	14	10	10	15	13
2033:	11	17	17	5	18	12	13	20
2041:	12	10	9	5	11	12	8	11

637

Counts

SPECTRUM OF 92-5080

(Ni-59 with LEPS Detector)

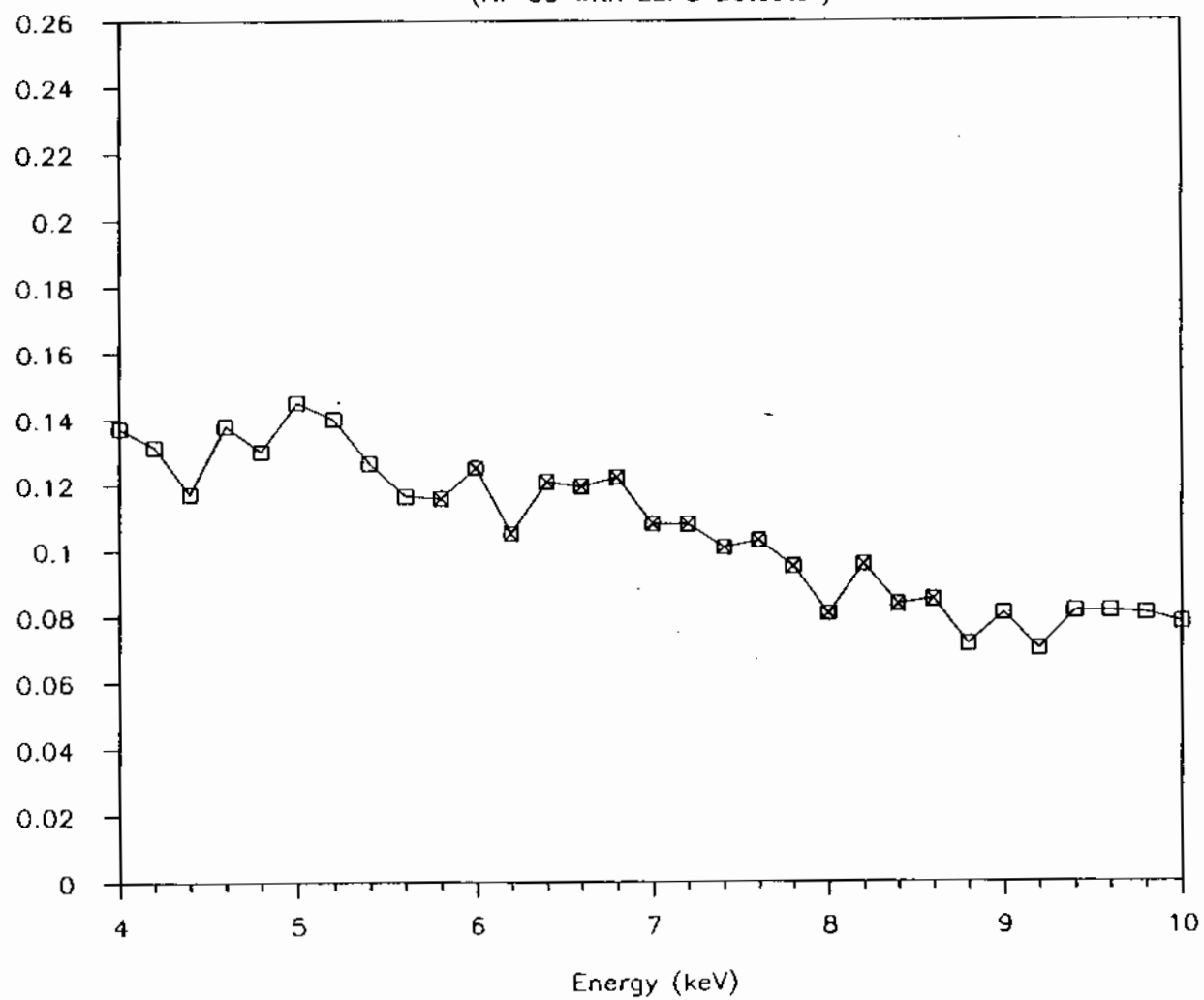


638

Counts per Minute

SPECTRUM OF 92-5080

(Ni-59 with LEPS Detector)



92-05000 2ND RUN 10 ML ON 5/21/92

SAMPLE ID..... SY:925000NI.02;2

OF CHANNELS..... 2048

DIODE I.D..... 02

SHELF NUMBER..... 0

CALIBRATION..... 0.2 KEV/CH

TIME ZERO 6/18/92 AT 0:45: 0

COUNTED..... 6/18/92 AT 0:45: 0

(0.00 MINUTES DECAY TIME)

LIVE COUNT TIME.... 23 HOURS 48 MINUTES 0 SECONDS (1428.00 MIN.)

ELAPSED TIME..... 23 HOURS 48 MINUTES 0 SECONDS (1428.00 MIN.)
(DEAD TIME = 0.000)

FLUX CORRECTION.... 0.0000

GEOM CORRECTION.... 0.0000 0.0000 0.0000 0.0000 0.0000

WEIGHT..... 1.00000 GRAMS

ANTI: 0 SLP: 0 AREA: 0 P-T: 0 ERR: 0 ZER: 0 OPR: 0 NOV: -1

639

A.K. Jackoff 6/18/92

92-85888 2ND RUN 18 HL ON 5/21/92

SY:925888NI.D2;2 COUNTED 6/18/92 @ 8:45; # GAIN: 0.2 KEV/CHAN

	#	50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950
#	20115	110	52	34	30	32	35	33	35	36	30	28	26	25	34	26	26	23	24	16
1	20121	105	48	52	39	40	27	33	33	37	36	36	33	30	31	36	33	23	30	21
2	#	120	51	40	27	32	44	31	28	32	20	36	36	33	29	30	32	20	24	22
3	#	130	50	45	35	30	31	30	30	53	35	29	31	31	31	21	23	17	20	19
4	#	114	53	46	30	35	30	34	30	27	29	34	30	20	30	36	29	27	25	22
5	#	100	54	47	26	22	30	24	47	38	37	41	36	30	26	29	29	24	24	21
6	#	95	43	36	31	22	28	28	43	28	31	34	34	30	24	36	26	17	20	24
7	#	90	40	34	38	29	31	41	47	35	37	34	30	26	34	23	22	19	20	21
8	#	73	41	34	44	30	19	37	39	20	35	40	33	36	27	27	33	22	27	22
9	#	86	40	35	24	35	28	38	34	42	27	29	33	33	29	28	25	23	23	23
10	#	68	50	44	47	36	35	34	37	43	32	39	33	33	32	26	22	26	23	24
11	#	70	45	22	26	20	37	36	33	40	37	41	36	42	26	30	27	36	24	20
12	165	76	46	36	20	29	34	37	34	66	30	40	31	30	34	33	31	20	28	16
13	259	80	42	40	20	27	30	39	28	70	26	35	33	28	32	30	37	26	29	23
14	241	101	30	33	33	29	26	49	24	64	30	26	41	33	39	27	10	22	26	21
15	219	107	54	35	34	20	34	62	33	56	37	39	36	27	22	19	17	24	24	20
16	220	96	59	41	30	20	51	45	39	63	23	20	36	30	23	30	23	15	23	10
17	242	89	41	44	31	40	57	32	36	35	30	37	24	26	22	24	21	20	16	25
18	217	77	52	20	33	32	53	32	20	29	20	30	35	35	26	19	31	25	21	19
19	218	83	46	45	27	34	38	26	33	36	36	28	28	24	30	36	27	26	17	10
20	193	60	42	41	36	29	29	42	30	39	30	34	28	32	24	20	36	17	25	21
21	105	76	40	24	30	43	40	34	42	41	33	31	39	25	36	30	24	20	22	21
22	165	74	39	30	30	24	27	46	41	32	37	32	30	23	26	26	24	23	23	10
23	194	67	46	30	34	22	45	40	23	25	37	27	34	31	36	22	26	17	10	20
24	103	57	34	27	26	25	41	54	40	34	20	39	26	27	31	36	26	23	21	20
25	204	68	40	43	37	33	41	71	42	35	34	33	33	20	41	23	21	26	27	13
26	197	74	40	34	29	32	53	64	42	20	30	30	30	25	34	27	30	20	25	13
27	170	72	44	40	24	32	31	69	30	24	34	23	26	27	29	25	24	24	31	27
28	164	75	40	30	42	27	56	60	31	29	34	41	34	29	20	27	21	24	32	31
29	163	84	53	35	44	19	37	39	37	32	46	40	24	30	34	25	21	21	29	23
30	176	84	41	30	31	40	36	42	39	36	19	37	36	27	30	23	20	26	22	22
31	140	120	36	29	36	37	42	38	52	36	43	28	34	28	35	30	7	23	35	21
32	170	90	50	41	43	30	41	44	20	35	37	41	33	26	25	31	23	26	33	22
33	160	102	47	27	41	35	54	34	32	22	30	37	35	24	22	32	25	16	18	19
34	172	87	40	31	46	33	50	41	44	39	20	28	30	24	40	19	26	23	25	10
35	152	62	37	32	36	40	55	28	30	42	21	30	31	19	40	33	20	23	19	19
36	152	62	42	43	40	31	50	47	34	29	30	27	53	34	25	33	24	31	25	19
37	142	71	34	30	31	24	47	24	45	40	35	29	29	44	29	25	22	24	23	10
38	145	43	31	31	23	20	38	39	43	20	36	34	33	30	26	25	26	27	16	27
39	134	44	36	29	33	34	42	32	21	34	34	33	45	28	22	32	19	22	10	32
40	114	63	45	24	31	37	34	25	27	32	41	32	33	30	30	18	29	30	17	16
41	135	48	45	37	30	30	23	32	27	36	41	20	31	20	29	27	34	32	21	10
42	118	56	37	33	24	28	34	36	27	29	30	34	33	20	41	29	19	23	31	29
43	120	70	37	34	33	34	38	33	34	36	31	20	26	29	16	32	23	19	21	18
44	101	48	40	35	29	27	26	27	24	27	32	32	32	32	27	36	26	23	16	17
45	114	61	43	34	27	22	35	37	27	33	28	31	32	26	20	18	18	20	20	10
46	99	77	30	40	32	39	38	36	34	20	35	30	46	26	24	24	16	23	19	26
47	115	66	40	42	22	45	28	27	34	24	29	33	21	29	32	20	30	20	18	26
48	115	56	40	31	34	29	44	20	34	37	35	31	39	36	31	24	19	25	25	24
49	114	49	37	26	29	36	44	35	36	32	33	37	36	29	32	26	22	18	26	12

92-85000 2ND RUN 18 ML ON 6/21/92

SY:925000NI.D2:2 COUNTED 6/18/92 @ 8:45; # GAIN: 8.2 KEV/CHAN

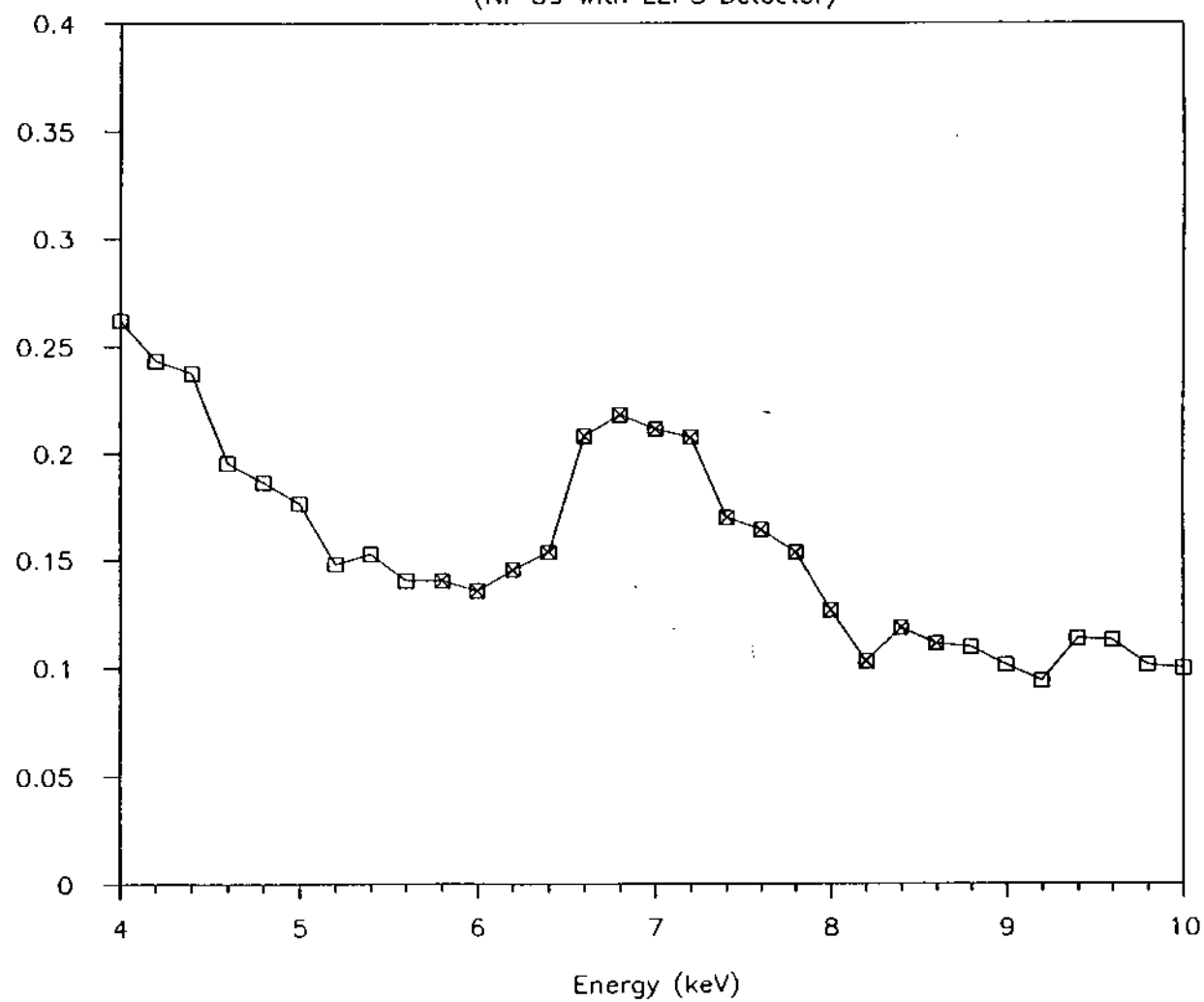
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1	10	13	14	8	16	11	22	13	8	16	14	14	5	7	8	3	7	14	9	5
2	21	15	19	12	16	16	12	8	17	9	8	11	7	9	6	9	9	8	9	3
3	20	16	15	14	16	11	14	12	14	11	9	5	8	9	5	12	7	5	12	12
4	15	16	15	16	10	13	15	13	12	8	8	8	6	11	6	2	8	3	12	7
5	20	18	14	14	19	12	12	16	10	7	13	6	11	8	9	9	6	7	5	7
6	24	23	17	10	19	12	18	13	11	6	8	5	7	9	11	7	11	8	4	7
7	20	16	14	13	11	15	11	13	11	9	11	11	8	13	5	4	9	9	8	13
8	20	16	15	10	19	11	21	12	13	11	14	8	10	3	8	3	8	5	7	4
9	32	15	26	14	16	13	8	10	13	14	13	6	8	9	7	4	6	8	4	7
10	22	22	19	15	24	12	10	12	15	9	6	9	8	3	12	6	7	11	6	5
11	18	20	12	10	9	12	16	12	9	9	11	6	9	7	13	9	5	13	6	7
12	20	15	16	11	19	12	12	13	11	15	11	11	8	7	6	10	11	6	5	9
13	16	15	16	12	16	6	10	10	6	14	16	12	7	6	6	9	9	8	7	13
14	10	15	8	20	20	12	11	9	2	9	13	11	12	10	1	13	5	10	5	4
15	19	21	20	16	13	14	14	15	10	11	7	6	5	2	9	9	6	9	7	7
16	25	14	18	23	16	13	22	7	12	9	20	8	10	12	3	11	4	5	7	7
17	20	19	18	12	10	12	15	11	10	12	11	14	11	10	14	4	5	4	4	5
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19	24	13	15	10	14	8	10	9	13	14	12	5	10	7	8	6	7	8	7	5
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39	17	16	25	13	8	14	13	9	11	11	9	7	9	15	8	10	5	7	10	7
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43	26	21	21	25	13	10	15	5	13	9	11	8	10	10	13	4	11	7	7	6
44	19	15	14	27	10	14	10	10	14	9	9	10	9	6	4	6	9	6	8	15
45	18	17	14	33	22	12	16	10	10	9	12	11	8	8	5	10	2	7	8	3
46	18	16	16	24	13	14	13	12	9	10	10	8	11	11	4	8	9	6	3	3
47	22	19	11	26	22	13	11	8	8	8	15	10	5	2	3	10	8	5	5	9
48	20	19	12	21	9	13	7	9	10	14	10	5	11	12	8	8	5	11	4	5
49	29	14	22	17	12	11	14	13	15	12	9	8	13	4	10	10	7	2	6	8

642

Counts per Minute

SPECTRUM OF 92-5076

(Ni-59 with LEPS Detector)



J. H. Rye
6/27/92

VAI/VMS Peak Search Report V1.8 Generated 17-JUN-1992 08:40:53

Configuration : SYS\$SYSDEVICE:[USER]925076N1.B;2
 Analyses by : PEAK V16.1
 Sample title : 92-5076 FUSION
 Sample date : 21-MAY-1992 00:00:00 Acquisition date : 16-JUN-1992 11:57:11
 Sample ID : REPEAT-15 ML Sample quantity : 1.0000 SAMPLE
 Sample type : FUSION FR HOTCEL Sample geometry :
 Elapsed live time: 0 20:28:33.15 Elapsed real time: 0 20:28:36.39 0.04
 Start energy : 0.20 keV End energy : 409.60 keV
 Sensitivity : 5.00 Gaussian : 10.00
 Critical level : No

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	7.06	641	1989	1.16	35.30	29	13	8.70E-03	15.1	
2	0	13.11	523	1154	0.85	65.56	58	13	7.10E-03	15.3	
3	0	16.24	663	1299	0.89	81.19	75	14	9.00E-03	12.1	
4	0	30.94	2737	901	0.86	154.70	148	15	3.71E-02	3.2	
5	0	35.18	838	1301	0.99	175.90	164	25	1.14E-02	12.0	
6	5	61.70	234	842	1.31	308.52	302	21	3.17E-03	24.6	4.22E+00
7	5	63.19	244	838	1.08	315.93	302	21	3.31E-03	23.9	
8	8	73.01	193	1102	1.17	365.07	356	27	2.62E-03	35.3	1.64E+00
9	8	75.08	379	810	1.05	375.40	356	27	5.14E-03	14.9	
10	0	80.90	1083	1037	0.74	404.49	393	19	1.47E-02	7.0	
11	0	84.85	286	802	1.05	424.27	417	15	3.88E-03	20.2	
12	0	92.63	554	1115	0.99	463.17	454	21	7.51E-03	13.4	
13	0	112.19	232	907	0.74	560.95	553	17	3.15E-03	26.8	
14	0	185.70	168	703	0.71	928.50	920	18	2.28E-03	32.0	
15	0	238.65	163	413	1.12	1193.25	1185	18	2.22E-03	26.0	
16	0	355.94	363	245	1.01	1779.70	1768	21	4.92E-03	10.7	

J. K. Jachff 6/17/92

$$ELT = 20:28:33.15 = (20 \times 60) \text{ min} + 28 \text{ min} + \left(\frac{33.15}{60} \right) \text{ min}$$

$$ELT = 1228.5525 \text{ min}$$

Channel Contents for 925076WI.B;2

(5 pages)

Channel

1:	0	0	0	0	31	43395	2626	1362
9:	1099	829	339	237	281	264	286	311
17:	312	312	304	322	299	292	240	229
25:	217	182	188	173	173	167	179	189
33:	256	268	260	255	209	202	189	156
41:	127	166	137	135	125	116	140	139
49:	125	123	153	160	171	154	128	146
57:	103	76	95	103	91	114	125	173
65:	211	152	194	136	122	85	91	109
73:	107	91	94	100	97	154	150	183
81:	220	225	189	151	127	100	88	84
89:	102	64	84	71	96	105	93	99
97:	87	91	86	88	99	107	83	111
105:	113	84	80	77	75	71	67	76
113:	62	64	91	45	68	69	76	76
121:	64	67	60	84	81	93	77	82
129:	85	76	63	58	64	58	71	68
137:	81	70	78	66	69	72	71	74
145:	64	81	81	58	76	91	147	268
153:	470	635	644	503	308	161	96	69
161:	59	53	52	60	65	72	59	57
169:	63	67	61	71	113	157	184	181
177:	151	120	104	81	79	71	54	63
185:	57	48	56	45	52	49	37	50
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925076NLS

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925076 NP.BJ2

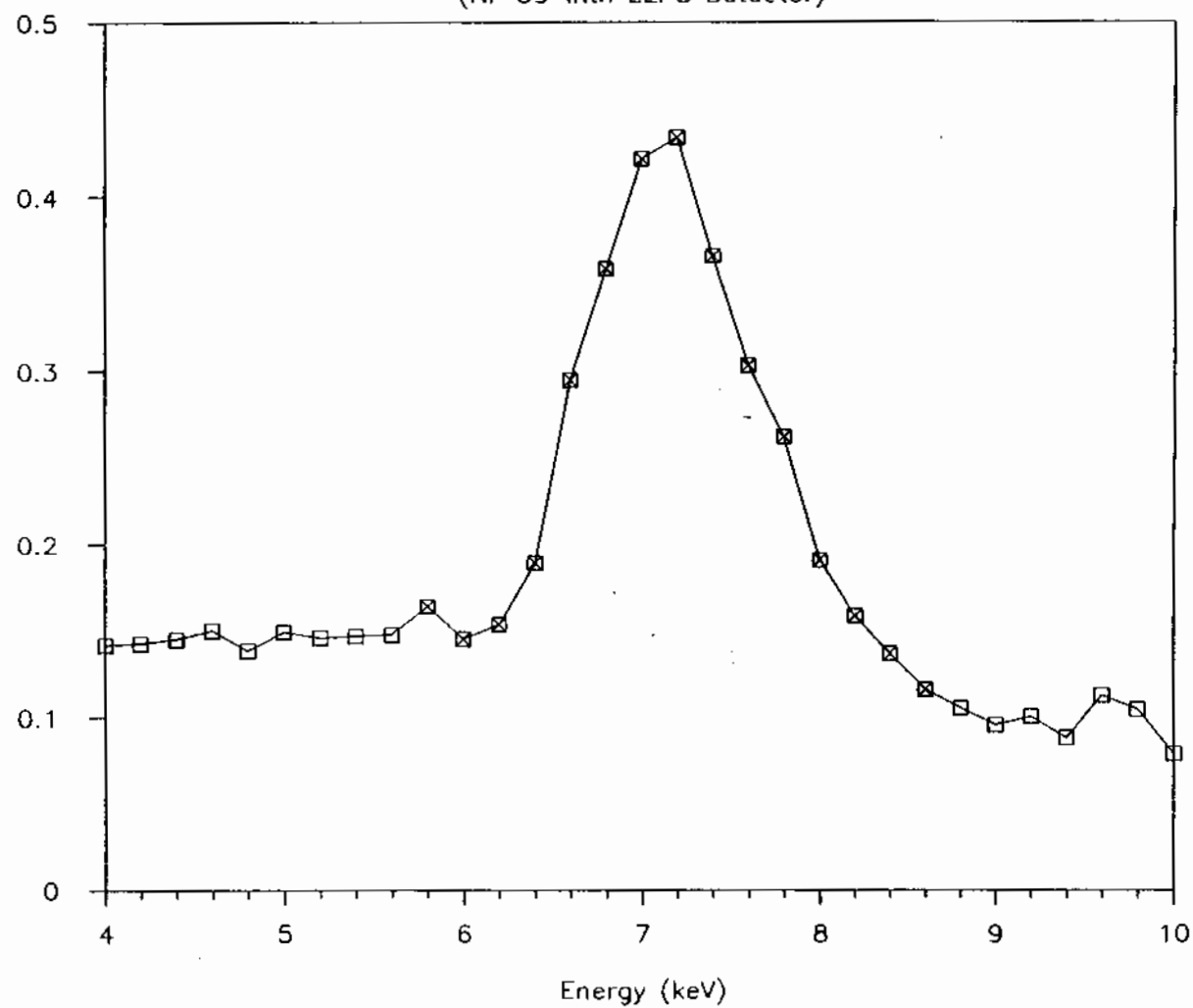
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2017:	16	16	9	7	12	17	16	11
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2041:	8	14	15	10	13	8	10	8

649

Counts per Minute

SPECTRUM OF 92-5093

(Ni-59 with LEPS Detector)



101SY NI-59 92-05093 15ML

SAMPLE ID..... SY:925093NI.D2;1

OF CHANNELS..... 2048

DIODE I.D..... D2

SHELF NUMBER..... 0

CALIBRATION..... 0.2 KEV/CH

TIME ZERO 6/16/92 AT 12: 0: 0

COUNTED..... 6/16/92 AT 12: 0: 0

(0.00 MINUTES DECAY TIME)

LIVE COUNT TIME.... 20 HOURS 20 MINUTES 30 SECONDS (1220.50 MIN.)

ELAPSED TIME..... 20 HOURS 20 MINUTES 30 SECONDS (1220.50 MIN.)
(DEAD TIME = 0.000)

FLUX CORRECTION.... 0.0000

GEOM CORRECTION.... 0.0000 0.0000 0.0000 0.0000 0.0000

WEIGHT..... 1.00000 GRAMS

ANTI: 0 SLP: 0 AREA: 0 P-T: 0 ERR: 0 ZER: 0 OPR: 0 NOV: -1

630

S. L. Jodoff 6/17/92

(7)
(6)
(5)

101SV NI-69 92-06093 15ML

SY:925093NI.D2:1 COUNTED 6/16/92 @ 12:01:00 GAIN: 0.2 KEV/CHAN

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1	8145	131	42	35	32	26	26	32	40	37	28	34	40	40	29	37	27	22	29	22
2	0	116	53	49	35	35	30	34	32	33	35	29	31	30	26	30	32	22	21	23
3	0	111	41	43	39	27	32	34	35	41	43	26	20	25	39	22	24	25	25	21
4	0	114	56	30	25	22	34	34	40	35	25	24	42	33	31	29	10	27	24	14
5	0	116	60	49	30	27	30	27	43	29	26	39	35	31	36	30	30	22	10	21
6	0	92	59	41	40	30	28	33	47	27	30	25	26	30	28	20	29	21	22	21
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16	225	118	43	26	35	34	69	36	34	59	31	29	35	33	29	22	24	20	20	21
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22	170	65	44	36	35	19	30	41	36	20	36	32	24	20	36	32	32	18	19	20
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181SY NI-59 92-85893 15ML

SY:925893MI.02;1 COUNTED 6/16/92 @ 12: 8: 8 GAIN: 8.2 KEV/CHAN

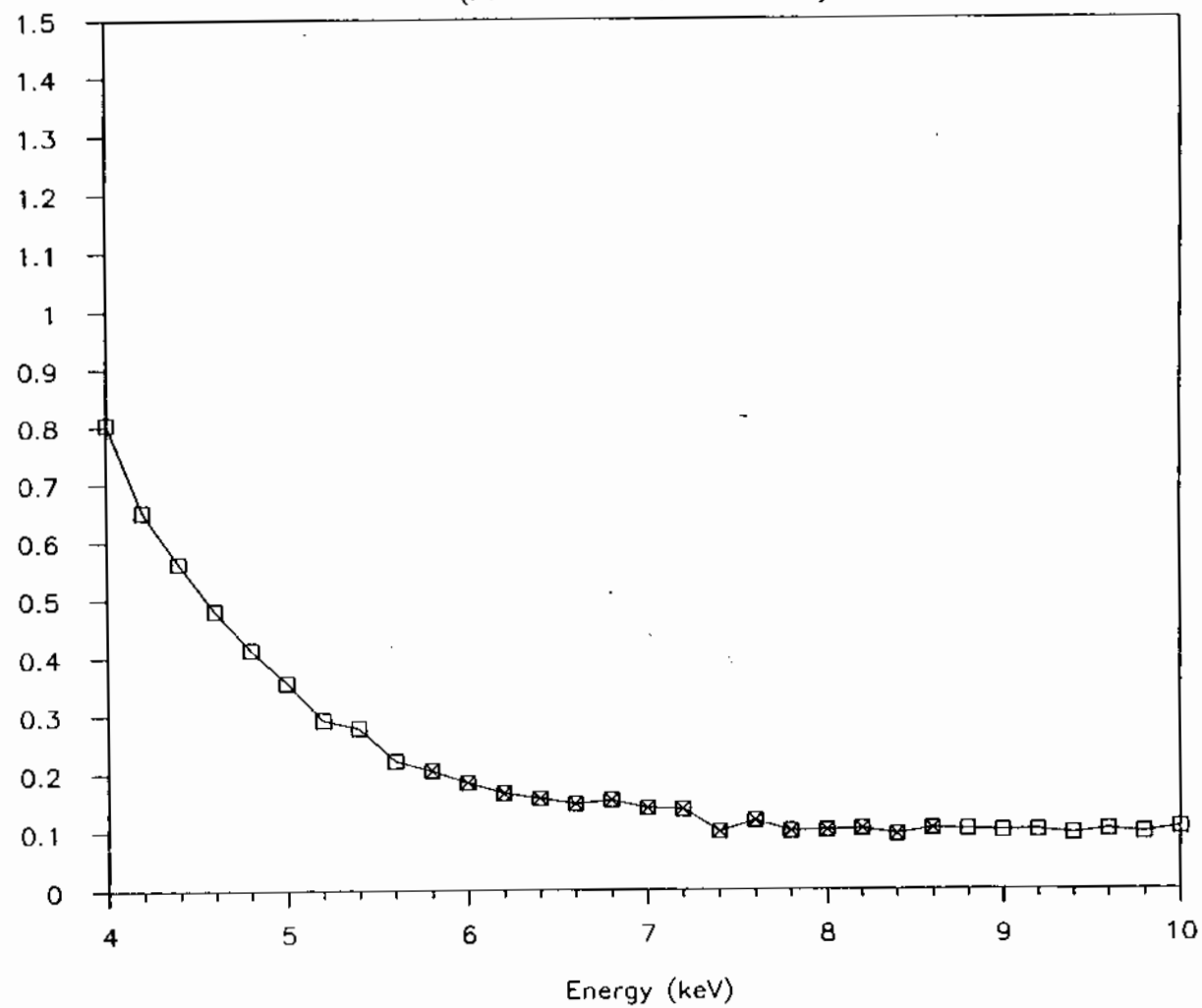
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14	23	21	20	16	15	8	9	3	11	13	18	7	11	3	9	11	5	8	4	9
15	15	16	16	8	10	15	11	13	15	11	12	4	3	12	7	9	5	7	10	11
16	15	12	15	15	12	10	6	17	13	9	9	9	7	7	6	10	8	10	6	9
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18	20	15	15	10	9	16	15	7	7	7	10	8	13	7	14	7	9	3	5	3
19	17	20	8	16	9	15	10	11	18	11	8	7	7	9	7	9	8	10	7	8
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26	19	21	18	10	9	14	9	8	10	17	9	9	11	7	13	7	6	6	7	3
27	26	16	14	9	13	13	11	14	16	11	11	5	7	12	8	7	7	7	6	4
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40	10	11	24	14	11	11	12	12	12	13	8	8	11	12	4	9	7	8	8	9
41	23	15	17	25	13	12	12	10	10	5	11	6	7	12	7	5	7	5	5	4
42	15	24	14	21	11	10	15	7	6	5	10	15	10	8	3	4	6	4	10	9
43	16	20	16	30	9	7	12	14	7	7	8	9	6	9	12	2	6	6	5	3
44	22	20	16	23	8	9	6	12	12	7	10	4	8	7	8	11	9	5	9	8
45	18	13	15	27	15	12	9	8	8	10	5	9	10	8	4	8	2	7	10	8
46	19	14	15	33	17	15	11	5	6	7	10	8	7	14	8	10	5	5	5	6
47	21	21	13	12	18	9	12	10	10	14	7	7	10	14	12	10	7	2	2	6
48	30	15	29	15	8	9	7	9	12	13	4	12	4	10	8	7	6	9	10	7
49	19	20	21	10	14	11	11	8	12	17	13	6	5	11	7	5	3	6	6	7

653

Counts per Minute

SPECTRUM OF 92-5689

(Ni-59 with LEPS Detector)



VAX/VMS Peak Search Report V1.8 Generated 15-JUN-1992 10:57:51

Configuration : SYSSYSDEVICE:[USER]925689NI.B;1
 Analyses by : PEAK V16.1
 Sample date : Acquisition date : 13-JUN-1992 16:49:54
 Sample ID : HOT CELL BLANK Sample quantity : 1.0000 SAMPLE
 Elapsed live time: 1 17:54:45.75 Elapsed real time: 1 17:54:54.82 0.0%
 Start energy : 0.20 keV End energy : 409.60 keV
 Sensitivity : 5.00 Gaussian : 10.00
 Critical level : No

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	10.66	665	2811	0.61	53.32	47	13	4.41E-03	17.4	
2	0	13.09	1009	2509	0.92	65.43	60	13	6.69E-03	10.8	
3	0	16.39	1561	2671	1.03	81.94	75	16	1.03E-02	8.0	
4	0	30.95	5265	1879	0.83	154.75	147	15	3.49E-02	2.3	
5	0	35.28	1479	2240	0.98	176.40	168	19	9.80E-03	8.4	
6	0	46.59	348	1578	0.61	232.93	226	15	2.30E-03	26.2	
7	5	61.70	572	1485	0.90	308.48	302	21	3.79E-03	13.1	4.33E+00
8	5	63.29	838	1488	0.97	316.45	302	21	5.55E-03	9.2	
9	0	72.15	198	2084	0.85	360.75	357	15	1.31E-03	46.8	
10	0	75.01	785	1674	0.84	375.05	371	13	5.20E-03	10.0	
11	0	80.95	2192	2206	0.77	404.73	394	20	1.45E-02	5.0	
12	0	84.75	666	2007	1.36	423.75	414	18	4.41E-03	14.1	
13	0	92.67	1070	1550	0.94	463.37	456	15	7.09E-03	7.7	
14	0	111.96	342	1763	0.90	559.79	553	15	2.40E-03	22.6	
15	0	185.87	485	1399	0.74	929.35	920	19	3.21E-03	16.5	
16	0	238.59	248	841	1.06	1192.94	1185	14	1.65E-03	24.1	
17	0	355.92	733	595	1.14	1779.62	1769	22	4.86E-03	8.2	
18	0	385.67	361	943	4.07	1928.37	1908	38	2.39E-03	23.3	

adk. Fitch
 6/15/92

$$\begin{aligned}
 \text{ELT} &= 1:17:54:54.82 \\
 &= 1440 \text{ min} + (17 \times 60) \text{ min} + 54 \text{ min} + \left(\frac{54.82}{60} \right) \text{ min} \\
 &= 2514.9137 \text{ min}
 \end{aligned}$$

Channel Contents for 925689WI.B;1

(5 pages)

Channel

1:	0	0	0	0	66	177367	32442	25176
9:	19011	15523	11794	9303	7343	6027	4975	4080
17:	3405	2768	2318	2022	1638	1414	1207	1039
25:	895	734	698	556	516	464	418	396
33:	374	388	354	348	251	299	253	256
41:	261	239	264	260	254	255	241	257
49:	246	268	297	370	327	290	249	260
57:	258	230	183	198	225	214	259	348
65:	388	407	380	305	227	184	184	199
73:	191	188	178	204	195	245	305	387
81:	384	407	459	354	225	201	204	165
89:	168	151	157	181	176	211	203	221
97:	180	183	189	178	202	162	184	205
105:	205	185	163	172	160	149	136	135
113:	138	137	148	148	151	159	139	153
121:	168	137	153	157	168	152	119	156
129:	134	148	146	139	126	131	135	132
137:	154	144	142	154	174	152	152	131
145:	158	133	129	143	139	173	281	461
153:	812	1204	1295	1059	652	331	196	158
161:	111	128	144	139	96	134	144	106
169:	140	112	137	188	202	336	389	345
177:	295	260	232	185	176	138	129	118
185:	125	106	118	118	124	105	115	116
193:	129	122	133	127	115	99	127	133
201:	91	117	129	130	153	108	117	120
209:	117	116	109	118	114	126	120	101
217:	99	122	96	105	129	109	119	134
225:	114	115	112	121	133	128	146	179
233:	173	142	118	120	127	103	115	94
241:	101	103	108	96	114	94	117	93
249:	111	113	104	113	100	120	89	105
257:	125	115	119	134	123	107	126	140
265:	140	134	130	115	121	119	100	123
273:	111	89	93	107	114	128	104	103
281:	100	102	118	109	116	119	101	93
289:	115	110	131	131	123	110	112	123
297:	124	129	131	108	125	109	120	131
305:	151	151	182	221	242	187	168	177
313:	134	156	181	264	300	253	181	174
321:	110	96	134	114	139	168	174	156
329:	185	158	167	182	151	176	179	140
337:	128	111	132	109	117	112	131	139
345:	133	144	118	126	130	132	122	145
353:	119	134	125	105	125	122	120	128
361:	150	161	185	215	211	189	184	124
369:	124	133	109	169	194	273	302	320
377:	258	203	150	122	113	127	119	135
385:	147	129	142	133	104	114	137	110
393:	112	103	121	125	132	152	134	137
401:	145	170	302	510	551	609	388	235
409:	137	114	108	112	113	106	118	115
417:	113	121	141	149	168	190	191	178
425:	212	188	189	132	135	123	104	127

433:	107	119	114	129	138	148	130	110
441:	111	103	120	99	101	105	88	106
449:	97	121	117	123	135	101	108	100
457:	102	113	127	182	207	255	310	285
465:	237	195	162	142	109	94	110	107
473:	103	125	119	97	113	109	101	104
481:	118	105	126	128	117	107	87	105
489:	107	108	103	110	135	111	119	122
497:	126	108	127	117	106	107	98	110
505:	93	103	97	113	109	117	99	104
513:	87	108	103	100	103	114	106	112
521:	99	111	110	118	93	114	100	109
529:	102	142	113	100	117	147	101	125
537:	95	105	106	116	117	97	115	103
545:	118	100	108	109	126	142	118	122
553:	110	111	107	135	157	181	183	190
561:	198	139	135	137	111	116	115	126
569:	114	110	125	128	134	108	118	110
577:	117	125	119	116	127	128	99	108
585:	116	105	92	106	110	132	124	114
593:	109	109	99	116	95	108	119	105
601:	101	117	128	106	138	106	108	114
609:	102	106	115	110	108	100	101	124
617:	90	91	101	105	117	113	87	111
625:	105	96	100	92	102	103	102	129
433:	89	95	94	116	102	93	107	98
641:	116	110	100	107	112	107	104	110
649:	107	109	126	115	97	111	110	108
657:	115	107	103	105	95	122	90	83
465:	116	110	114	106	117	127	93	99
673:	96	82	118	99	98	110	116	109
681:	96	104	99	99	107	105	96	111
689:	111	85	101	88	89	94	90	85
697:	104	113	114	103	87	117	85	88
705:	106	106	107	107	99	108	102	109
713:	106	114	116	90	105	105	108	102
721:	112	101	108	113	101	101	83	87
729:	102	81	114	113	118	121	102	93
737:	123	96	86	102	88	93	86	101
745:	103	79	107	99	103	91	87	97
753:	105	96	119	91	101	94	97	101
761:	97	96	95	90	98	117	92	91
769:	107	97	102	99	112	97	96	94
777:	102	92	80	91	80	86	112	96
785:	92	96	92	95	92	92	85	96
793:	80	96	83	89	100	96	82	97
801:	92	94	103	90	93	105	82	73
809:	72	99	82	95	83	74	88	88
817:	95	96	98	84	88	106	104	80
825:	83	88	89	94	96	82	75	94
833:	89	82	86	82	85	104	75	94
841:	91	87	101	85	88	82	81	81
849:	66	94	84	90	90	97	84	73
857:	99	83	80	91	98	80	90	82
865:	89	83	96	87	79	72	106	85
873:	91	89	86	99	89	74	91	93
881:	89	101	63	90	99	86	81	89
889:	74	80	73	55	84	78	83	79
897:	80	87	68	69	70	74	79	85
905:	75	71	81	105	80	64	93	97

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913:	86	95	88	83	85	85	78	82
921:	85	86	80	82	99	91	126	131
929:	175	161	123	103	95	74	68	79
937:	85	59	65	76	65	97	73	93
945:	65	93	77	77	84	89	73	68
953:	83	84	77	66	70	68	65	61
961:	81	71	66	70	66	64	68	70
969:	68	77	81	70	78	68	84	74
977:	79	85	75	69	82	68	86	68
985:	88	86	79	90	71	59	73	90
993:	63	70	63	67	73	62	83	62
1001:	62	95	71	79	75	67	71	68
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1017:	74	60	62	64	78	65	64	71
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1089:	62	56	55	61	48	72	61	58
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1129:	72	54	70	55	63	53	57	58
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1161:	45	57	73	56	54	57	55	61
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1185:	49	62	59	48	63	80	74	89
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1273:	45	41	50	53	47	40	43	42
1281:	42	53	51	43	48	53	43	36
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1297:	39	54	39	47	61	37	39	37
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1417:	42	34	32	41	37	45	37	23
1425:	40	37	38	50	36	34	43	43
1433:	40	44	44	37	48	34	40	50
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1473:	42	52	43	45	64	49	47	42
1481:	35	40	30	34	34	42	40	31
1489:	43	33	43	40	37	36	38	31
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1673:	28	23	30	32	32	34	44	27
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1697:	32	42	27	32	37	32	26	35
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1713:	25	37	20	29	29	25	23	29
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1785:	45	41	29	31	27	27	34	28
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1809:	29	31	25	31	20	19	28	28
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1833:	22	27	22	30	25	27	34	22
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1857:	25	18	26	26	20	18	39	26
1865:	22	21	23	27	24	23	15	21

1873:	33	23	23	19	33	29	26	29
1881:	21	24	21	23	26	28	36	15
1889:	23	22	23	22	27	16	27	28
1897:	31	21	19	35	25	20	30	27
1905:	24	27	27	24	36	26	25	25
1913:	21	24	31	42	37	47	48	50
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1929:	34	28	50	39	50	59	47	58
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1945:	20	29	22	14	23	32	27	28
1953:	23	30	21	24	37	43	20	22
1961:	26	27	32	24	22	26	12	18
1969:	24	22	25	20	26	22	22	18
1977:	23	23	24	26	26	33	23	29
1985:	32	24	24	27	20	24	29	27
1993:	15	22	19	23	23	32	25	21
2001:	28	24	21	27	26	19	19	28
2009:	29	27	16	20	14	22	15	19
2017:	18	34	22	21	25	19	30	23
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2033:	23	20	17	23	28	21	25	26
2041:	20	36	23	20	14	20	20	19

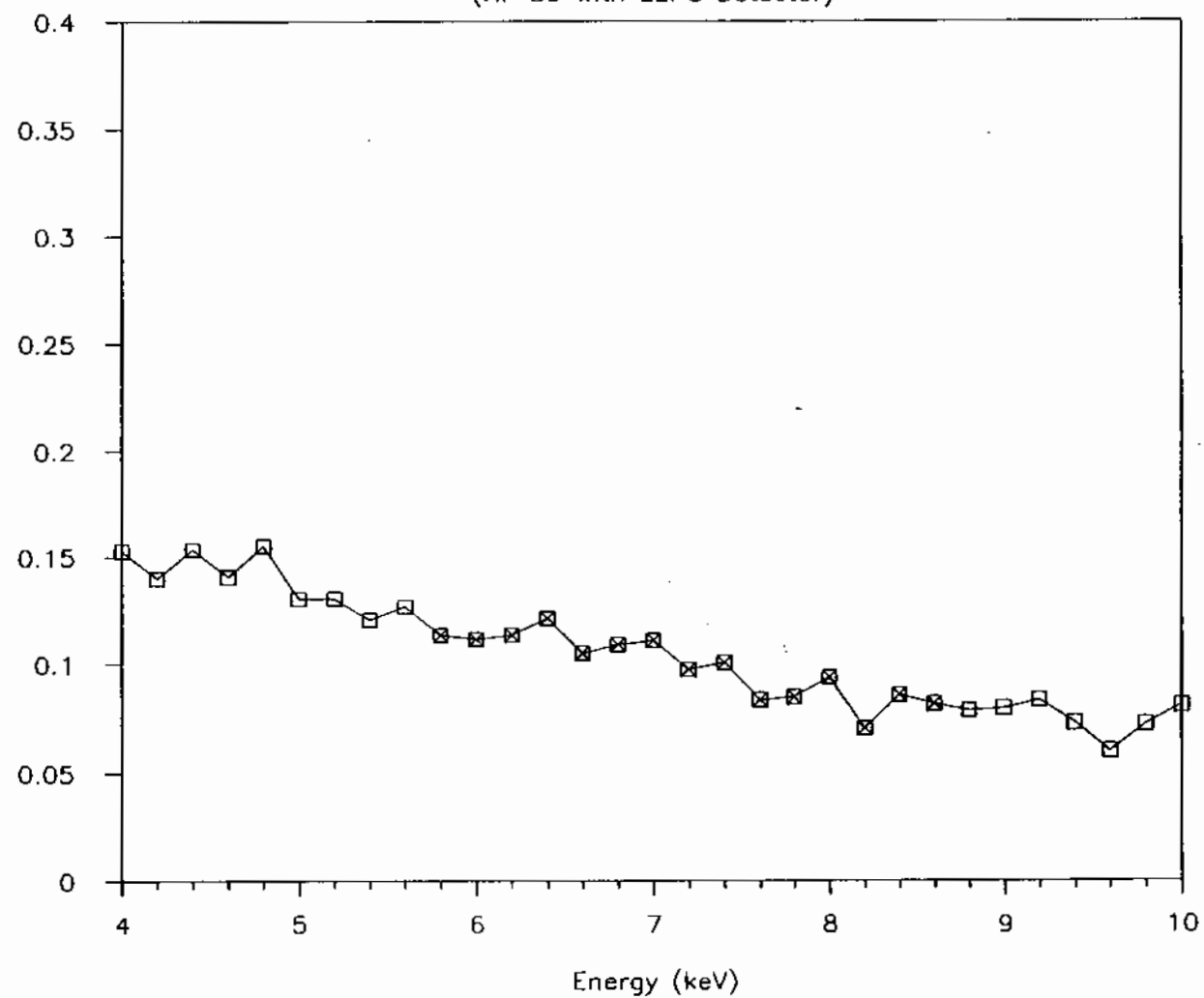
92587N1.B.1

099

Counts per Minute

SPECTRUM OF BLANK #10 ON D

(Ni-59 with LEPS Detector)



SANDY'S NI BLANK #10

SAMPLE ID..... SY:BLANK10.D2:1

OF CHANNELS..... 2048

DIODE I.D..... D2

SHELF NUMBER..... 0

CALIBRATION..... 0.2 KEV/CH

TIME ZERO 6/13/92 AT 16:55:31

COUNTED..... 6/13/92 AT 16:55:31

(0.00 MINUTES DECAY TIME)

LIVE COUNT TIME.... 27 HOURS 21 MINUTES 0 SECONDS (1641.00 MIN.)

ELAPSED TIME..... 27 HOURS 21 MINUTES 0 SECONDS (1641.00 MIN.)

(DEAD TIME = 0.000)

FLUX CORRECTION.... 0.0000

GEOM CORRECTION.... 0.0000 0.0000 0.0000 0.0000 0.0000

WEIGHT..... 1.00000 GRAMS

ANTI: 0 SLP: 0 AREA: 0 P-T: 0 ERR: 0 ZER: 0 OPR: 0 NOV: -1

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J. H. Kays
6/13/92

15
10

SANDY'S NI BLANK #10

SY:BLANK10.D2:1 COUNTED 6/13/92 @ 16:56:31 GAIN: 0.2 KEV/CHAN

	#	50	100	160	200	250	300	360	400	460	500	600	660	700	750	800	850	900	950	
0	#	133	60	68	20	32	46	40	35	36	43	47	42	56	50	47	41	34	27	25
1	#	148	61	63	43	48	41	46	36	45	37	46	36	48	54	30	46	39	35	23
2	#	140	55	54	47	49	39	41	48	41	36	62	44	34	47	25	38	34	34	31
3	#	126	56	51	43	35	48	44	45	43	46	34	37	43	43	36	37	33	36	20
4	#	130	70	62	33	41	51	40	50	54	46	60	37	41	38	30	40	35	40	27
5	#	100	51	56	42	51	38	34	54	45	34	37	46	42	35	37	43	27	33	29
6	#	99	63	59	35	41	36	36	54	37	47	36	51	53	37	42	28	43	25	30
7	#	84	58	46	39	52	28	50	59	35	44	53	36	64	51	45	37	26	20	27
8	#	107	71	49	42	39	35	47	55	42	34	40	38	31	26	42	30	31	27	26
9	#	102	46	48	40	36	40	43	53	39	49	35	54	41	37	30	36	45	34	23
10	#	91	64	48	30	40	32	36	45	62	47	43	48	43	42	30	20	39	35	33
11	#	100	61	46	46	32	36	36	43	74	49	46	47	46	41	33	29	30	26	36
12	235	97	50	37	30	45	41	37	42	85	50	55	44	27	42	26	30	20	17	
13	294	84	66	33	30	33	41	50	39	70	53	46	34	38	40	33	33	27	28	30
14	319	126	65	42	42	35	44	81	42	77	40	43	50	34	29	24	33	19	35	31
15	277	113	71	62	34	42	59	55	36	63	45	58	45	37	40	33	23	30	37	26
16	292	133	64	42	49	41	60	62	51	63	37	39	46	37	30	30	33	31	30	29
17	275	117	62	51	50	43	79	54	40	56	47	62	33	39	42	41	39	33	26	40
18	246	103	48	36	34	39	64	24	53	40	40	37	43	48	36	40	42	31	30	23
19	232	70	61	69	30	43	39	42	29	42	32	39	60	52	43	41	45	23	21	10
20	261	76	53	46	41	36	52	46	43	40	47	35	45	32	49	37	30	36	26	23
21	230	00	53	49	57	46	45	45	48	36	51	39	47	51	34	40	36	28	20	29
22	252	73	48	50	33	47	38	56	53	31	35	48	43	30	44	43	20	37	30	17
23	231	72	51	44	48	62	64	62	49	41	43	63	41	40	43	34	31	30	34	21
24	255	03	47	55	35	30	44	85	66	41	35	45	30	38	44	33	25	32	22	27
25	214	79	60	50	34	34	47	104	50	26	30	44	54	46	39	39	35	31	25	20
26	214	03	60	49	46	39	50	70	51	43	46	41	44	40	37	35	37	28	30	33
27	198	74	60	48	36	35	50	75	49	37	52	51	36	49	40	33	24	26	36	21
28	200	84	57	62	44	32	54	54	42	38	38	48	48	40	41	45	32	20	39	31
29	186	88	50	30	51	33	40	50	30	34	38	35	43	40	34	29	34	31	40	22
30	103	90	30	51	37	32	47	43	42	40	36	50	57	43	30	28	30	31	42	21
31	106	124	67	48	48	40	59	40	50	39	41	46	40	34	35	37	29	30	34	31
32	199	115	53	46	50	30	52	47	37	44	40	50	49	37	37	27	34	35	45	23
33	172	94	56	43	55	39	60	47	40	43	40	37	52	27	35	31	27	28	32	29
34	179	86	46	43	51	32	72	43	45	44	39	64	46	29	30	49	43	35	23	39
35	102	76	54	45	42	39	68	30	40	41	37	39	32	35	40	43	36	25	19	24
36	160	81	47	50	35	37	67	50	45	47	34	40	43	47	29	37	38	30	30	24
37	165	69	62	41	33	35	46	50	44	37	50	53	36	34	42	40	44	39	28	24
38	137	66	41	46	44	30	64	59	59	41	43	58	46	39	46	37	22	33	24	21
39	139	62	37	49	32	53	60	42	43	39	33	48	42	50	43	34	29	20	45	26
40	154	64	49	40	29	33	44	45	44	49	43	32	41	42	37	33	30	29	26	25
41	116	71	42	40	33	34	33	30	47	47	48	50	48	46	35	29	21	29	30	30
42	141	56	50	46	38	33	38	54	43	40	48	36	41	43	35	24	33	35	24	19
43	134	74	49	45	35	38	37	41	34	55	51	37	39	39	41	30	30	31	25	27
44	129	73	52	30	44	48	40	45	44	47	59	49	42	37	35	41	24	15	24	27
45	131	64	50	40	34	38	43	41	35	40	38	50	43	57	34	37	27	29	33	32
46	137	74	50	44	34	37	53	64	35	44	33	30	52	32	37	32	32	31	34	20
47	120	72	61	30	42	42	41	41	53	48	46	46	40	45	39	39	23	30	34	38
48	99	69	48	33	33	37	50	30	60	36	41	45	45	34	41	27	40	27	24	31
49	119	60	35	43	40	46	41	40	37	49	40	36	34	36	30	32	25	33	23	21

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SANDY'S NI BLANK #1#

SY:BLANK10,02;1 COUNTED 6/13/92 @ 16:55:31 GAIN: #.2 KEY/CHAN

	1000	1050	1100	1150	1200	1250	1300	1350	1400	1450	1500	1550	1600	1650	1700	1750	1800	1850	1900	1950
0	23	18	18	17	19	13	16	16	10	11	14	6	10	14	5	9	8	3	11	8
1	23	28	15	28	16	7	26	21	24	10	12	16	5	14	7	7	10	13	3	6
2	22	20	24	23	14	17	19	20	15	12	12	0	10	13	9	8	7	8	10	5
3	23	23	24	16	16	16	17	14	12	12	15	11	16	10	15	5	10	7	12	7
4	17	32	19	26	17	15	14	12	11	9	11	7	0	5	14	9	8	8	8	9
5	23	28	17	28	13	7	14	25	12	9	19	8	11	14	7	4	9	5	7	4
6	18	23	21	20	13	13	20	9	14	12	20	14	10	12	16	14	9	8	9	5
7	24	26	28	20	16	12	22	16	11	16	17	20	10	6	7	17	10	9	3	11
8	16	19	26	16	18	14	14	15	16	12	11	9	10	10	13	9	6	2	7	6
9	29	26	17	20	20	18	18	11	12	18	8	13	14	7	7	14	10	6	13	9
10	20	21	14	21	16	12	14	10	9	11	18	9	10	9	13	14	12	5	5	8
11	30	20	21	18	18	18	13	19	15	13	12	8	11	19	5	15	9	13	3	15
12	30	26	23	19	14	15	17	12	10	13	16	8	15	10	10	23	6	4	8	14
13	26	16	20	19	27	19	18	14	12	12	23	8	0	16	9	12	6	8	14	12
14	18	18	19	23	14	21	16	22	14	13	18	14	11	7	6	10	7	7	7	8
15	26	26	19	20	21	12	17	14	16	13	11	9	15	13	11	11	8	4	11	5
16	21	19	22	15	20	13	13	10	16	9	15	12	8	7	12	7	8	10	6	9
17	27	23	16	26	21	12	18	15	13	12	16	7	12	9	11	7	12	15	0	6
18	21	32	20	17	10	12	16	12	11	13	14	7	5	10	9	10	15	4	9	5
19	26	24	25	21	22	14	8	23	15	12	9	10	10	9	8	7	11	11	7	8
20	29	27	23	21	22	15	12	10	9	15	21	11	14	10	1	8	7	8	14	11
21	20	26	19	20	12	21	19	18	14	17	11	15	17	12	4	4	7	10	7	8
22	24	16	20	18	21	17	12	17	14	10	11	16	14	9	8	5	14	5	4	9
23	31	26	15	21	12	17	16	9	21	13	14	13	14	12	14	16	8	6	7	15
24	22	15	24	10	19	21	20	12	9	10	9	7	10	12	7	5	10	6	8	6
25	20	19	21	18	19	15	11	16	6	13	0	12	6	16	4	5	11	13	17	14
26	16	21	16	21	23	18	23	15	13	11	12	14	6	7	10	9	9	9	17	4
27	23	16	23	26	15	11	18	19	11	18	6	14	10	10	12	13	7	4	11	8
28	26	31	25	23	14	21	16	14	12	22	13	7	6	11	11	10	4	8	10	9
29	29	23	19	12	11	17	11	15	14	16	15	8	10	11	16	14	7	10	4	6
30	32	24	17	24	18	22	15	19	15	13	12	9	10	11	9	7	11	9	9	8
31	24	29	10	20	21	21	13	14	9	12	6	13	13	15	8	22	8	9	12	7
32	27	31	21	22	15	19	14	11	15	13	15	14	10	9	8	11	7	7	8	11
33	21	21	25	16	18	13	16	19	18	12	17	15	8	11	11	15	7	8	6	9
34	28	26	27	13	12	21	8	12	14	12	8	11	8	10	9	9	9	10	5	7
35	24	17	24	26	23	25	24	12	12	1	14	14	9	12	12	12	7	4	6	11
36	24	23	18	21	15	17	12	21	12	20	15	8	8	9	9	8	8	10	8	8
37	21	25	26	14	19	23	17	21	10	12	2	14	12	6	12	11	11	10	4	8
38	20	16	17	9	18	14	11	18	13	19	16	7	11	12	10	9	2	6	7	7
39	33	33	16	18	17	14	11	13	15	12	13	14	10	11	8	6	10	8	8	10
40	18	22	22	18	17	13	15	14	9	14	12	15	6	7	11	14	8	9	7	10
41	21	15	21	24	18	19	11	11	10	10	4	9	9	15	12	9	8	14	6	12
42	30	19	19	27	14	10	13	18	14	14	18	11	10	13	12	11	3	10	5	10
43	18	31	20	33	14	22	9	13	18	15	13	9	13	20	8	8	8	6	2	9
44	19	28	18	40	14	28	20	16	17	14	13	12	13	9	9	4	7	6	6	5
45	26	25	27	25	25	19	15	13	13	10	20	10	9	14	9	5	12	7	9	3
46	26	25	18	26	22	15	15	10	11	9	9	12	14	13	8	7	7	12	10	4
47	21	18	20	26	26	16	14	13	13	20	13	11	13	9	8	14	4	13	6	7
48	16	22	17	17	13	16	13	15	16	12	15	11	8	10	11	9	14	6	10	5
49	28	16	21	26	19	21	16	24	10	18	10	7	15	10	8	12	9	8	8	10

663

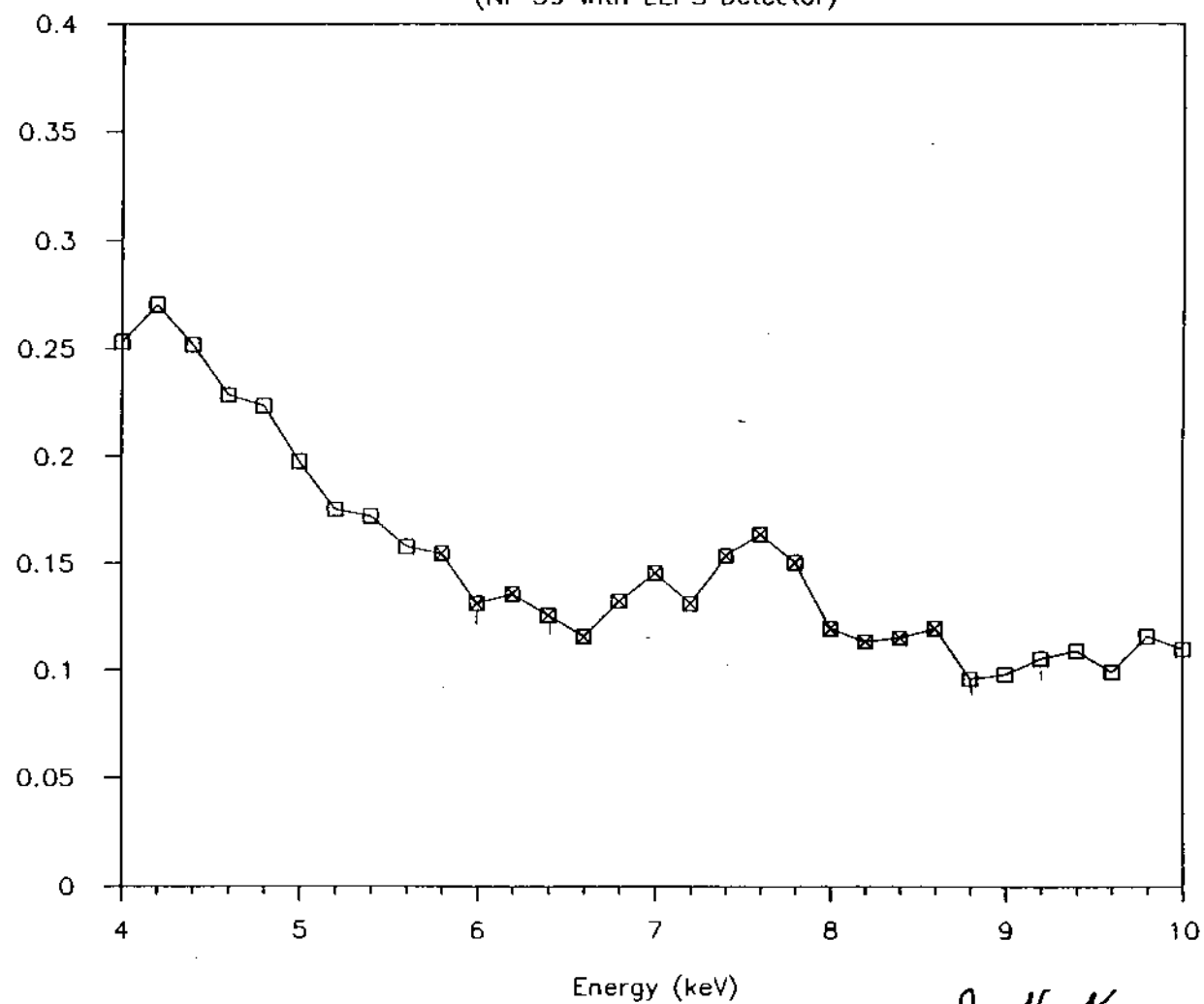
210

664

Counts per Minute

SPECTRUM OF BLANK SPIKE

(Ni-59 with LEPS Detector)



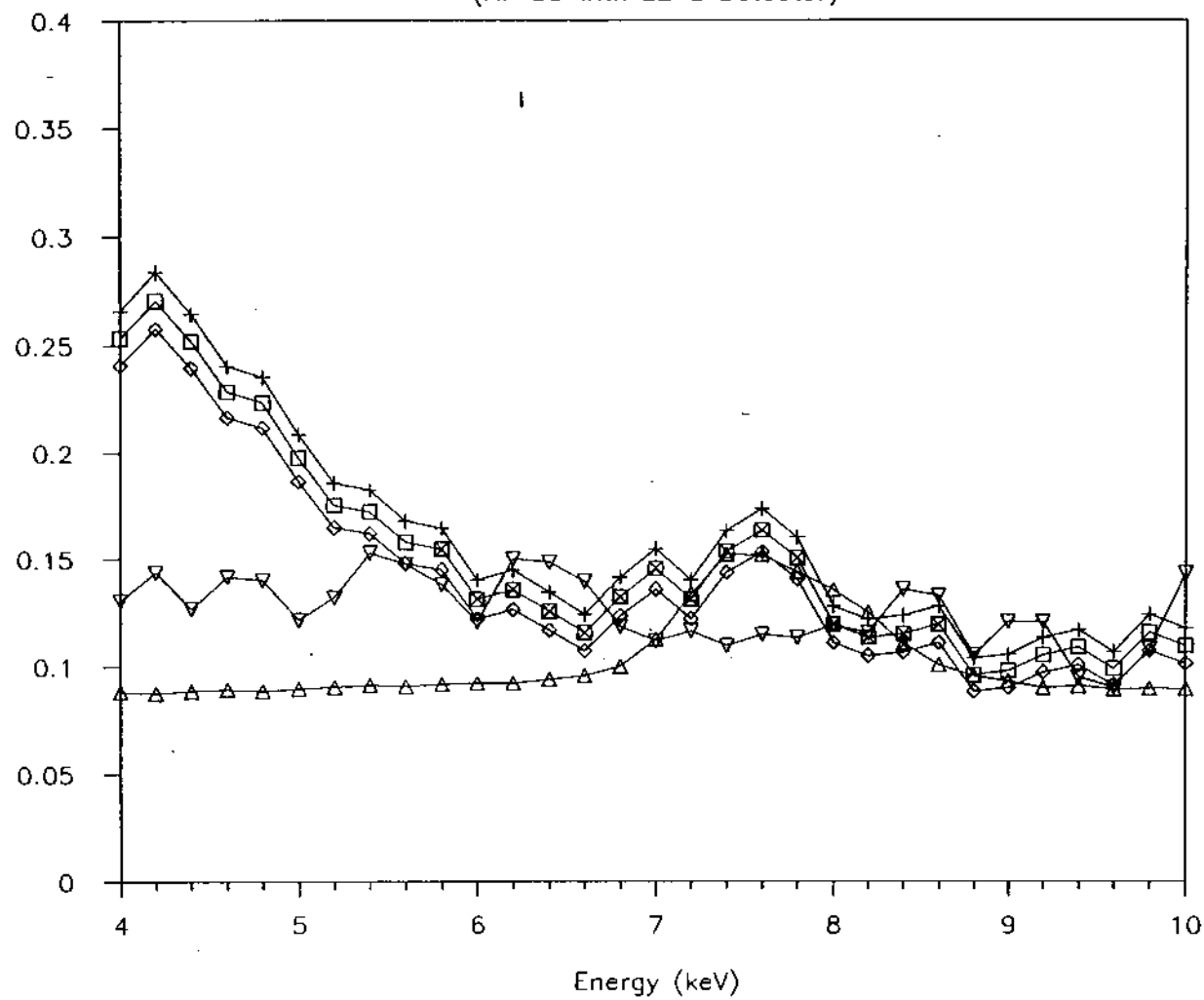
J. H. Kage
6/26/92

665

Counts per Minute

SPECTRUM OF BLANK SPIKE

(Ni-59 with LEPS Detector)



J. H. Kage
6/27/92

VAX/VMS Peak Search Report V1.8 Generated 13-JUN-1992 16:35:48

Configuration : SYSSYSDEVICE:[USER]NI_BS.B;1
 Analyses by : PEAK V16.1
 Sample date : Acquisition date : 12-JUN-1992 13:31:59
 Sample ID : BLANK SPIKE Sample quantity : 1.0000 SAMPLE
 Elapsed live time: 1 02:54:29.47 Elapsed real time: 1 02:54:33.96 0.04
 Start energy : 0.20 keV End energy : 409.60 keV
 Sensitivity : 5.00 Gaussian : 10.00
 Critical level : No

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	13.21	663	1506	0.86	66.05	61	12	6.84E-03	12.6	
2	0	16.42	895	1656	1.14	82.10	75	15	9.24E-03	10.6	
3	0	30.95	3409	1406	0.84	154.73	146	14	3.52E-02	3.0	
4	0	35.29	845	1313	1.02	176.43	169	17	8.72E-03	10.6	
5	6	61.70	367	869	0.82	308.52	302	21	3.78E-03	15.6	2.89E+00
6	6	63.14	520	1054	1.18	315.71	302	21	5.37E-03	12.7	
7	6	73.01	287	1188	0.99	365.06	358	25	2.96E-03	24.0	1.59E+00
8	6	75.02	591	1113	0.94	375.09	358	25	6.11E-03	11.3	
9	0	80.99	1410	1555	0.82	404.94	394	22	1.46E-02	6.8	
10	0	84.70	386	1163	1.69	423.52	415	17	3.98E-03	18.6	
11	0	92.64	754	1153	1.12	463.20	455	18	7.79E-03	9.9	
12	0	111.95	228	855	0.79	559.75	555	12	2.35E-03	24.1	
13	0	186.11	238	850	1.03	930.53	921	17	2.46E-03	25.1	
14	0	238.82	166	580	0.80	1194.12	1186	18	1.71E-03	30.4	
15	0	303.13	196	370	1.52	1515.66	1508	18	2.03E-03	21.9	
16	0	356.06	433	243	1.32	1780.30	1772	15	6.47E-03	8.6	

$$1:02:54:29.47 = 1440 \text{ min} + 120 \text{ min} + 54 \text{ min} + \left(\frac{29.47}{60} \right) \text{ min}$$

$$= 1614.4912 \text{ min} \text{ ELT}$$

J. H. Gage
 6/13/92

Channel Contents for MI_BS.B;1

Channel

1:	0	0	0	0	109	79184	4055	1866
9:	1468	1156	538	298	364	397	373	409
17:	387	434	423	409	437	407	369	361
25:	319	283	278	255	250	212	219	203
33:	187	214	235	212	248	264	243	193
41:	183	186	193	155	158	170	176	160
49:	187	177	190	212	216	188	189	165
57:	172	148	125	154	115	137	164	220
65:	278	290	225	217	167	139	111	106
73:	131	120	111	140	127	128	168	242
81:	249	251	235	220	175	157	122	128
89:	98	114	95	117	132	125	136	125
97:	106	120	123	105	123	118	103	114
105:	118	132	106	101	88	107	89	99
113:	92	88	93	81	101	108	101	98
121:	89	105	89	89	105	84	91	96
129:	99	95	73	79	78	83	89	76
137:	92	101	74	112	84	97	91	94
145:	108	93	91	100	103	120	180	346
153:	563	837	829	640	435	210	106	84
161:	78	71	86	87	83	96	80	86
169:	69	84	71	95	140	194	228	230
177:	174	167	143	120	122	83	83	79
185:	76	78	82	75	72	97	67	80
193:	94	80	73	76	79	86	66	77
201:	71	77	85	85	73	77	89	74
209:	79	74	74	90	60	82	76	75
217:	68	77	74	72	77	83	77	90
225:	68	85	72	83	84	92	72	126
233:	98	92	73	84	61	51	83	67
241:	66	62	59	77	70	79	77	65
249:	89	71	79	68	77	62	82	64
257:	80	87	78	75	69	84	94	66
265:	87	92	78	81	72	76	76	68
273:	76	67	88	67	75	83	69	78
281:	56	71	77	82	72	68	68	80
289:	67	82	67	79	68	67	70	74
297:	82	73	83	73	78	61	70	74
305:	94	99	109	154	132	156	130	107
313:	101	107	141	163	183	137	114	94
321:	73	70	80	82	96	107	106	102
329:	113	89	99	116	126	110	123	86
337:	67	75	78	69	57	81	66	79
345:	76	93	66	78	61	85	76	87
353:	84	86	86	83	85	69	88	70
361:	95	97	113	135	138	121	106	114
369:	94	79	98	103	139	169	201	200
377:	145	126	69	75	70	72	84	83
385:	92	90	89	74	72	79	83	76
393:	76	73	85	76	83	108	93	98
401:	91	109	189	317	356	353	240	160
409:	91	81	74	90	70	62	66	67
417:	67	102	64	95	117	89	134	107
425:	121	113	85	84	91	76	71	63

NI-BS.B51

433:	78	85	79	80	102	86	83	75
441:	71	71	69	62	76	85	63	81
449:	61	89	95	74	67	69	68	67
457:	66	81	85	134	149	191	192	177
465:	163	98	82	84	72	68	74	56
473:	65	61	66	68	68	67	75	66
481:	70	70	70	64	75	70	63	68
489:	66	61	68	72	84	81	75	57
497:	83	52	86	80	75	64	69	53
505:	58	76	69	64	78	40	66	74
513:	79	76	66	76	57	81	51	70
521:	61	77	68	60	56	59	77	66
529:	78	60	70	71	75	65	69	57
537:	83	77	62	81	79	63	69	81
545:	74	48	80	62	78	92	74	90
553:	77	82	52	69	102	116	120	134
561:	103	91	74	89	75	58	81	77
569:	76	76	69	78	83	69	63	53
577:	78	77	85	86	87	83	94	70
585:	56	76	66	55	75	71	76	62
593:	62	83	69	62	61	81	61	74
601:	67	75	68	73	57	65	71	65
609:	73	56	92	76	90	59	78	58
617:	66	69	63	64	69	65	66	59
625:	75	72	72	85	68	71	76	79
633:	78	70	63	52	68	64	67	65
641:	57	71	67	56	64	78	60	62
649:	78	59	73	87	71	60	69	73
657:	82	68	58	58	68	67	66	69
665:	66	75	65	53	69	68	65	61
673:	55	79	60	58	51	71	70	60
681:	60	68	71	50	61	64	50	58
689:	55	68	60	68	58	63	56	77
697:	80	56	73	64	69	71	75	65
705:	63	70	65	52	67	76	62	65
713:	56	71	73	67	68	81	76	83
721:	56	59	58	56	64	56	70	71
729:	59	66	68	61	55	69	65	64
737:	63	63	47	56	61	55	57	70
765:	54	66	55	53	67	69	57	51
753:	59	73	68	59	74	62	57	68
761:	61	59	68	71	49	66	59	72
769:	66	56	61	63	71	56	72	68
777:	54	64	59	59	64	61	53	51
785:	50	69	55	66	66	58	57	60
793:	62	53	68	63	64	48	48	61
801:	62	61	59	66	52	57	51	61
809:	69	53	48	56	62	53	55	78
817:	45	56	65	61	54	54	58	59
825:	47	61	56	63	51	49	65	57
833:	59	72	48	59	57	57	43	51
841:	46	53	51	56	39	45	67	63
849:	54	58	52	42	60	45	55	47
857:	61	47	44	53	48	50	46	54
865:	51	58	46	69	60	43	45	69
873:	48	54	59	63	52	45	42	51
881:	55	53	56	55	45	51	49	39
889:	33	47	49	45	58	53	48	51
897:	48	46	55	50	38	51	48	41
905:	61	38	52	63	60	40	37	64

913:	53	65	47	51	44	40	62	62
921:	38	39	51	55	60	65	77	104
929:	90	97	84	81	47	44	50	55
937:	51	37	51	57	58	40	38	61
945:	43	49	50	43	42	43	45	54
953:	68	49	47	53	47	57	49	51
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969:	51	50	43	46	41	56	41	44
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985:	72	40	41	55	49	44	54	49
993:	64	56	58	46	47	44	40	32
1001:	53	36	35	56	43	32	41	36
1009:	53	34	38	37	46	45	39	43
1017:	44	45	50	41	48	46	38	42
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1033:	47	41	46	40	47	32	34	35
1041:	44	43	47	44	43	45	50	47
1049:	46	30	38	36	42	51	31	46
1057:	44	41	41	29	52	32	34	36
1065:	28	31	46	41	51	39	34	51
1073:	34	41	37	51	41	44	40	42
1081:	24	38	31	42	48	37	28	45
1089:	40	28	37	40	46	37	47	37
1097:	32	33	35	43	34	36	38	43
1105:	31	41	26	35	27	43	34	43
1113:	45	36	41	43	39	32	32	36
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1129:	23	35	48	34	39	34	46	30
1137:	38	30	34	37	35	40	39	35
1145:	36	36	32	30	36	34	35	35
1153:	33	31	32	29	34	27	38	36
1161:	39	40	35	32	35	35	29	33
1169:	34	31	25	35	44	23	38	34
1177:	32	43	39	31	24	41	25	33
1185:	42	26	35	35	33	33	52	58
1193:	65	75	64	34	41	33	26	33
1201:	38	37	28	30	35	34	29	37
1209:	31	36	45	35	45	29	29	43
1217:	29	32	30	38	28	27	23	42
1225:	35	37	27	30	32	23	30	26
1233:	33	33	27	29	35	30	31	24
1241:	42	33	38	29	30	32	26	34
1249:	26	25	29	24	37	34	28	35
1257:	35	28	25	39	31	28	25	34
1265:	20	26	25	41	27	25	31	39
1273:	38	32	26	28	35	21	26	23
1281:	29	28	28	26	29	33	31	27
1289:	27	41	23	21	32	28	28	34
1297:	25	24	26	27	32	27	28	32
1305:	34	32	26	28	26	21	20	29
1313:	26	37	33	31	41	32	25	18
1321:	33	28	32	22	27	27	24	31
1329:	32	35	26	37	30	27	36	23
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1345:	26	29	37	37	34	20	21	30
1353:	26	28	28	23	36	29	31	30
1361:	34	29	24	18	35	31	32	30
1369:	26	21	28	26	27	33	24	24
1377:	29	21	28	26	37	30	35	33
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NI-BS.B31

1393:	28	30	18	24	26	19	26	26
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1457:	27	30	27	13	28	22	19	26
1465:	20	30	29	23	28	18	20	24
1473:	23	25	27	26	26	35	18	20
1481:	24	31	23	21	21	23	29	19
1489:	19	21	25	18	17	28	24	27
1497:	17	27	27	24	27	25	26	26
1505:	30	25	20	15	27	27	30	27
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1657:	23	18	14	20	13	24	17	18
1665:	18	21	31	28	34	36	25	23
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1681:	15	14	20	19	21	23	15	22
1689:	22	25	23	18	22	16	23	28
1697:	17	22	21	19	19	20	18	19
1705:	11	15	15	24	17	11	12	24
1713:	24	17	15	19	17	25	17	17
1721:	15	15	22	14	18	18	15	20
1729:	18	14	19	14	19	25	18	14
1737:	13	13	17	18	11	16	16	20
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1753:	14	28	26	24	28	27	35	41
1761:	34	31	22	19	31	25	13	15
1769:	21	17	25	15	19	26	22	25
1777:	57	57	87	81	74	80	64	36
1785:	22	11	14	15	22	21	20	18
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1825:	16	19	18	19	13	15	15	24
1833:	20	20	18	16	15	16	21	18
1841:	22	14	15	13	19	18	15	13
1849:	13	23	17	19	16	20	23	17
1857:	19	14	12	13	23	10	16	23
1865:	15	18	20	18	16	14	21	17

NI-AS.B.1

NI-BS.B31

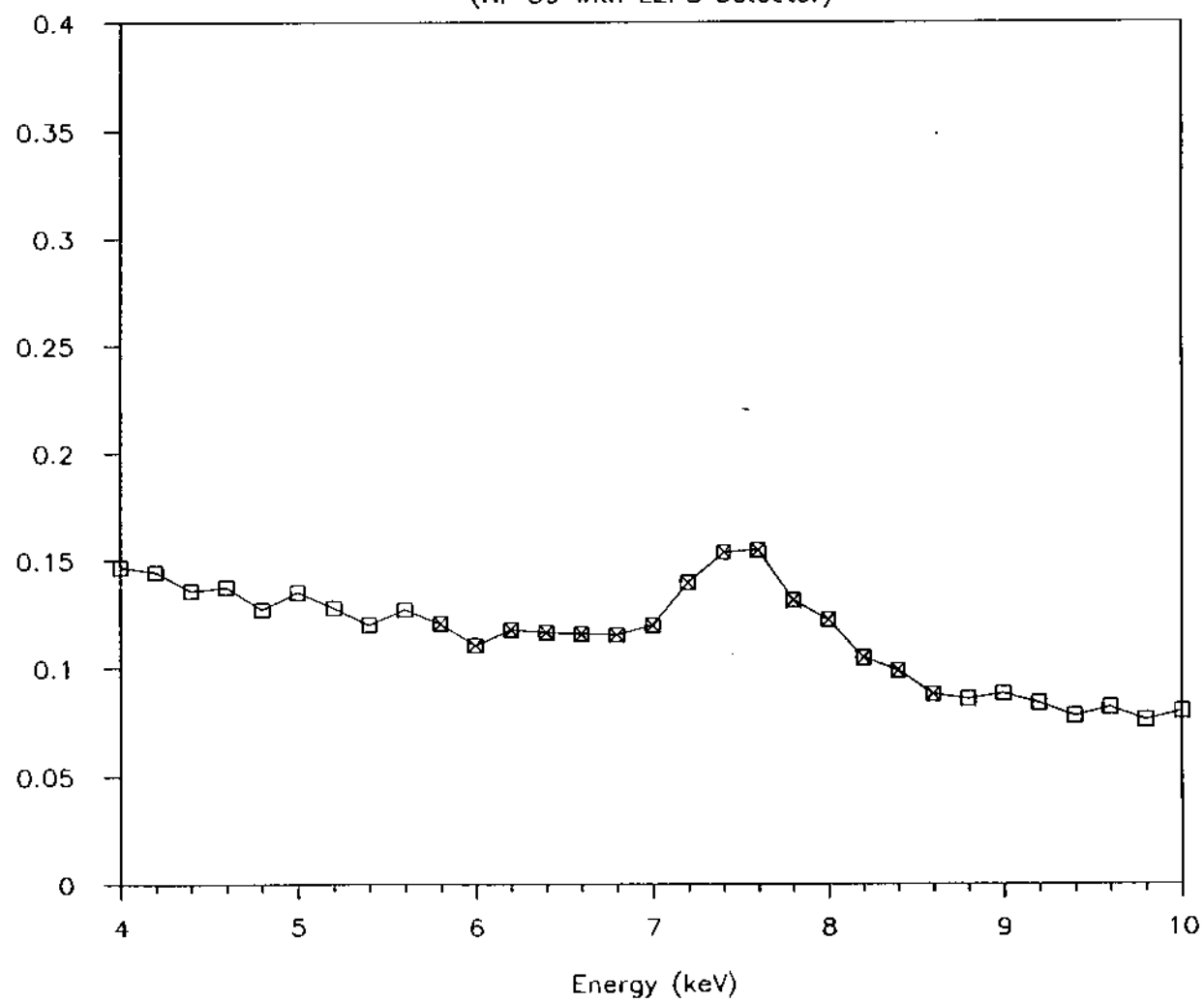
1873:	22	14	13	8	20	14	14	13
1881:	19	14	14	14	11	21	18	13
1889:	15	13	14	25	22	14	24	15
1897:	16	20	11	9	15	16	15	16
1905:	10	15	16	14	14	12	14	19
1913:	15	17	22	17	19	22	31	27
1921:	34	21	20	13	21	17	12	13
1929:	27	16	32	32	36	36	31	32
1937:	30	29	18	19	25	16	7	19
1945:	15	14	9	11	14	18	20	18
1953:	20	13	21	26	22	21	29	13
1961:	13	14	15	15	14	10	11	10
1969:	6	16	24	14	17	17	18	19
1977:	24	10	17	14	18	10	15	13
1985:	9	14	10	22	14	14	15	11
1993:	16	18	10	9	12	20	11	17
2001:	19	18	10	13	24	13	22	11
2009:	12	18	16	13	9	20	19	11
2017:	25	8	10	13	20	15	13	21
2025:	12	16	12	15	12	12	20	3
2033:	18	22	13	14	18	14	17	10
2041:	17	17	15	16	10	11	20	8

672

Counts per Minute

MATRIX SPIKE (5080)

(Ni-59 with LEPS Detector)



MATRIX SPIKE NICKEL ANALYSIS 92-5888 101SY

SAMPLE ID..... SY:MS5888NI.D2;1

OF CHANNELS..... 2048

DIODE I.D..... 02

SHELF NUMBER..... 0

CALIBRATION..... 0.2 KEV/CH

TIME ZERO 6/13/92 AT 17: 5: 0

COUNTED..... 6/13/92 AT 17: 5: 0

(0.00 MINUTES DECAY TIME)

LIVE COUNT TIME.... 41 HOURS 57 MINUTES 45 SECONDS (2517.75 MIN.)

ELAPSED TIME..... 41 HOURS 57 MINUTES 45 SECONDS (2517.75 MIN.)
(DEAD TIME = 0.000)

FLUX CORRECTION.... 0.0000

GEOM CORRECTION.... 0.0000 0.0000 0.0000 0.0000 0.0000

WEIGHT..... 1.00000 GRAMS

ANTI: 0 SLP: 0 AREA: 0 P-T: 0 ERR: 0 ZER: 0 OPR: 0 NOV: -1

673

A.L. Jodoff 6/15/92

0.0

MATRIX SPIKE NICKEL ANALYSIS 92-6000 101SY

SY:MS5088NI.D2;1 COUNTED 6/13/92 @ 17: 5: 0 GAIN: 0.2 KEV/CHAN

	#	50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950
#	20000	201	89	79	72	50	63	56	41	72	66	72	60	55	65	51	40	55	30	45
1	20020	221	86	63	53	69	60	60	40	57	45	60	61	60	47	55	64	44	40	38
2	#	247	92	83	64	57	61	64	71	72	52	45	50	57	66	49	56	50	37	26
3	#	220	91	86	65	47	57	53	74	53	59	53	62	62	49	54	47	44	46	44
4	#	187	79	100	64	51	57	47	57	62	57	66	48	65	48	59	30	41	36	50
5	#	186	83	89	57	65	57	65	87	55	65	47	50	60	40	65	42	41	41	45
6	#	152	90	84	60	53	56	67	81	57	51	84	58	66	54	61	44	51	37	54
7	#	180	96	60	65	49	61	71	61	60	63	61	53	64	63	42	38	30	35	44
8	#	175	72	71	72	60	70	61	70	70	66	50	57	60	66	40	41	36	36	43
9	#	130	77	78	65	49	48	56	57	65	64	59	62	50	60	65	48	40	60	32
10	#	134	93	57	58	60	59	60	60	75	63	50	47	55	50	41	48	50	47	43
11	#	143	87	60	63	59	56	83	53	80	55	65	57	57	74	59	48	47	31	33
12	349	143	84	60	55	56	59	60	41	106	54	52	72	67	51	53	50	48	33	33
13	407	161	82	60	65	52	50	93	51	95	57	61	60	65	62	42	42	43	45	47
14	399	196	89	67	57	71	75	99	58	109	65	77	47	52	46	67	50	45	41	37
15	430	225	89	66	70	65	77	90	62	120	60	75	69	59	59	53	57	37	36	39
16	391	183	89	62	50	70	91	91	58	92	53	66	64	45	47	49	62	47	40	36
17	400	160	86	64	53	65	111	73	56	80	62	70	73	61	53	44	47	42	48	29
18	300	163	94	59	60	57	89	70	60	74	55	78	64	51	59	45	64	47	46	42
19	303	132	85	75	74	61	64	67	50	71	55	61	51	67	61	49	50	35	30	30
20	370	119	61	72	61	59	56	80	59	65	63	60	62	72	71	55	43	29	40	46
21	364	132	80	69	64	57	50	60	62	62	53	69	61	64	62	54	46	37	30	41
22	342	104	70	80	50	44	44	60	81	62	50	50	60	64	50	63	57	62	39	37
23	346	135	85	64	62	42	64	83	85	52	54	70	65	67	40	60	50	48	45	43
24	320	125	70	50	64	55	79	123	81	62	65	63	66	63	42	55	44	40	36	31
25	340	110	93	94	66	60	82	136	83	60	71	66	59	64	53	62	40	36	46	43
26	322	119	83	71	59	49	84	119	83	52	65	67	52	50	47	47	49	51	45	36
27	302	149	90	70	65	60	86	114	62	40	56	67	71	59	30	55	44	46	53	41
28	320	126	90	75	57	50	82	81	72	65	62	56	40	49	60	50	44	49	54	39
29	303	153	91	67	75	54	64	93	63	60	57	66	60	54	50	51	47	45	70	39
30	270	156	74	64	50	40	48	78	44	65	60	51	65	70	45	50	40	43	66	27
31	296	163	85	50	56	66	79	84	57	59	62	60	65	50	61	52	54	45	63	30
32	293	204	59	60	80	69	76	67	48	53	49	64	64	76	39	55	44	44	65	43
33	291	160	76	73	87	68	82	69	59	61	59	53	72	50	49	39	61	36	43	33
34	290	141	60	65	59	64	99	46	59	44	61	65	53	62	49	41	47	35	52	50
35	301	116	62	50	64	47	105	62	61	54	83	56	62	42	55	41	46	50	31	40
36	351	133	65	71	65	61	86	76	58	70	60	60	47	51	59	41	56	44	37	27
37	307	115	60	62	63	66	59	57	66	66	61	51	69	54	66	59	46	43	26	32
38	309	80	79	50	56	50	71	69	80	50	60	57	50	81	55	44	53	44	30	46
39	330	92	53	49	40	62	56	57	69	55	63	62	62	51	52	47	47	54	42	31
40	307	92	87	65	63	60	47	61	48	67	63	59	54	60	47	51	46	42	41	30
41	263	97	76	57	55	49	51	70	55	67	50	60	40	64	54	40	39	44	40	41
42	240	84	84	45	56	75	57	50	50	69	78	49	50	56	54	52	52	52	30	42
43	221	121	67	61	50	60	51	60	61	56	70	64	50	54	46	49	33	34	41	25
44	216	113	69	63	49	53	56	63	56	62	62	55	69	62	61	47	36	43	30	43
45	222	102	50	61	60	47	50	59	59	57	51	59	66	62	56	52	39	50	34	45
46	211	103	91	74	50	61	64	74	61	72	69	67	52	54	50	42	41	47	49	39
47	196	111	82	50	49	60	61	60	55	62	65	57	69	63	50	41	37	43	30	37
48	206	97	70	80	54	69	61	74	52	63	60	40	63	50	60	66	41	37	34	34
49	191	94	61	63	54	72	57	46	72	65	71	53	65	59	62	50	49	40	42	40

MATRIX SPIKE NICKEL ANALYSIS 92-5080 101SY

SY:MS5080NI.D2;1 COUNTED 6/13/92 @ 17: 5: # GAIN: 0.2 KEV/CHAN

	1000	1050	1100	1150	1200	1250	1300	1350	1400	1450	1500	1550	1600	1650	1700	1750	1800	1850	1900	1950
0	28	32	24	37	22	26	23	27	22	20	25	27	9	16	12	0	16	11	10	12
1	51	39	28	23	26	13	16	20	22	16	23	19	21	20	20	16	12	12	13	12
2	43	26	29	29	36	28	17	23	10	10	22	10	11	10	10	10	15	11	11	10
3	30	34	32	27	19	32	15	24	15	19	21	7	14	16	12	16	16	14	13	14
4	40	27	26	37	32	19	29	17	15	18	15	17	10	11	17	13	11	14	12	9
5	46	40	37	29	25	33	25	23	24	10	10	12	22	10	0	15	16	10	17	16
6	37	30	30	29	30	19	17	26	30	10	14	17	9	12	13	13	19	16	14	10
7	25	29	32	30	20	32	21	17	18	22	15	17	13	13	16	15	15	9	16	7
8	27	30	21	24	21	21	21	20	17	12	14	22	15	14	20	16	22	11	10	7
9	35	40	43	27	26	23	18	20	26	13	19	18	12	10	6	26	21	13	5	9
10	35	30	29	25	31	25	21	10	21	21	20	15	11	21	13	17	15	11	11	11
11	35	42	33	31	34	32	21	21	10	31	12	14	14	15	10	27	12	13	15	9
12	40	26	31	34	34	16	29	20	23	12	22	12	12	0	9	17	19	16	6	14
13	45	29	24	22	30	30	17	21	17	19	21	19	29	19	16	19	7	15	13	10
14	43	33	32	21	25	24	13	21	23	24	20	11	10	14	15	25	14	17	8	10
15	33	46	25	31	24	14	19	34	20	19	19	10	11	16	13	14	12	19	5	14
16	37	30	33	29	22	19	15	24	17	22	22	14	16	9	22	11	0	17	7	10
17	30	35	31	29	18	20	26	19	19	21	21	19	16	12	17	17	14	8	10	15
18	27	42	30	37	26	31	17	34	24	21	17	21	7	14	17	16	0	10	11	14
19	42	35	27	20	23	23	25	21	16	19	26	22	16	12	15	12	15	13	18	6
20	23	20	44	23	25	14	18	23	21	21	16	23	19	13	8	13	15	12	20	19
21	40	25	24	26	33	26	29	21	25	16	17	25	19	13	14	16	15	12	17	8
22	41	25	34	23	26	21	27	17	20	21	17	7	13	20	14	12	19	9	8	13
23	34	34	32	30	22	21	21	18	17	19	24	21	7	20	18	13	10	12	8	13
24	33	35	32	30	22	22	19	20	22	14	10	10	20	14	10	12	17	16	9	14
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45	41	20	18	54	24	21	27	24	20	17	22	13	25	16	10	16	16	13	7	9
46	29	23	26	45	32	23	26	12	27	17	20	14	14	10	10	20	9	13	8	15
47	36	36	27	42	24	22	25	18	21	14	33	17	17	14	16	13	12	12	10	12
48	33	37	33	32	15	22	23	21	24	19	18	20	13	12	12	12	17	10	15	8
49	30	22	20	34	20	10	31	17	20	21	17	13	16	8	15	17	12	12	9	8

675

DON'T SAY IT -- Write It!

Date: July 29, 1992

To: File

From: Sandy Fadeff *Sd. Fadeff*

Subject: LSC Controls for Ni-63 Counting in Support of 101SY

The attached forms show the Packard 2260XL system was functioning properly during the counting period of the 101SY samples. Tritium and ^{14}C are routinely run standards. The data show the stability of the instrument background and efficiency for these isotopes. Also the system has an internal error flag which will appear as a flag on data generated when the system is out of control.

Further evidence of control is indicated during the course of the second batch analysis by inspection of the standard ^{63}Ni data. Two replicate standards were prepared and counted at the beginning of the run and the end of the run. The cpm data are consistent from the beginning to the end of the run: 505 cpm and 514 cpm. This is evidence that the system was stable during the entire batch run.

**First Batch Ni-63 Determination
by Liquid Scintillation Counting**

Protocol <u>9</u>		Date/Time <u>5/28/92 @ 1304</u>									
1D Ni: Bk	4D 63Ni +Ni	10A SPK BLK	5D 63Ni -Ni	11A SPK BK	6D 63Ni +	10B SPK R6BK	8B R6BK BK	9B R6BK BK	2D Ni BLANK		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)		

100 min counts

J. B. Hays 5/28/92

Protocol <u>9</u>		Date/Time <u>6-8-92</u>									
2D Ni: Blank	63Ni Test +50% each										
2D Ni: Blank											

Protocol <u>9</u>		Date/Time <u>6-9-92 on 14:33</u>									
8 regrBk	1 92 5070	2 Dup 92 5070	3 92 5074	4 92 5076	5 92 5080	6 92 5088	9 Spk Bk	10 Spk Bk	LSC1 63Ni	LSC2 63Ni	LSC3 63Ni
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
7 regrBk											

not
counted →

(13) 100 min counts

J. B. Hays 6/9/92

Protocol _____		Date/Time _____									

Reference date for batch run = 5/8/92

Protocol #: 9 Name: JHK 09-Jun-92 15:15
 Region A: LL-UL= 0.0-45.0 Lcr= 0 Bkg= 0.00 %2 Sigma=0.00
 Region B: LL-UL= 0.0-50.0 Lcr= 0 Bkg= 0.00 %2 Sigma=0.00
 Region C: LL-UL= 0.0-2000 Lcr= 0 Bkg= 0.00 %2 Sigma=0.00
 Time =100.00 QIP = tSIE ES Terminator = Count
 101-SY N1 SAMPLES, SET 1, 5/8/92
 Low Level Count Mode

S#	TIME	CPMA	CPMB	CPMC	tSIE	FLAG	ELTIME
1	100.00	6.57	6.75	30.27	607.	B	102
2	100.00	267.17	267.18	267.76	614.		204
3	100.00	303.10	303.21	304.86	612.		306
4	100.00	408.27	408.49	408.52	612.		408
5	100.00	92.93	92.94	92.99	616.		510
6	100.00	23.77	23.74	24.27	615.		612
7	100.00	0.00	0.00	0.52	615.		714
8	100.00	300.41	300.45	300.06	616.		816
9	100.00	293.08	293.14	293.42	618.		918
10	100.00	557.78	557.79	557.86	607.		1020
11	100.00	553.21	553.33	552.49	606.		1122

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J. H. Kage
 6/9/92

continued pg 292

12 100.00 0.28 0.25 1.12 609.

gone with 09-JUN 92 15:15

1224 LSC3-63Ni

Reference date for batch = 5/8/92

SA#12 $\epsilon = 100.00$

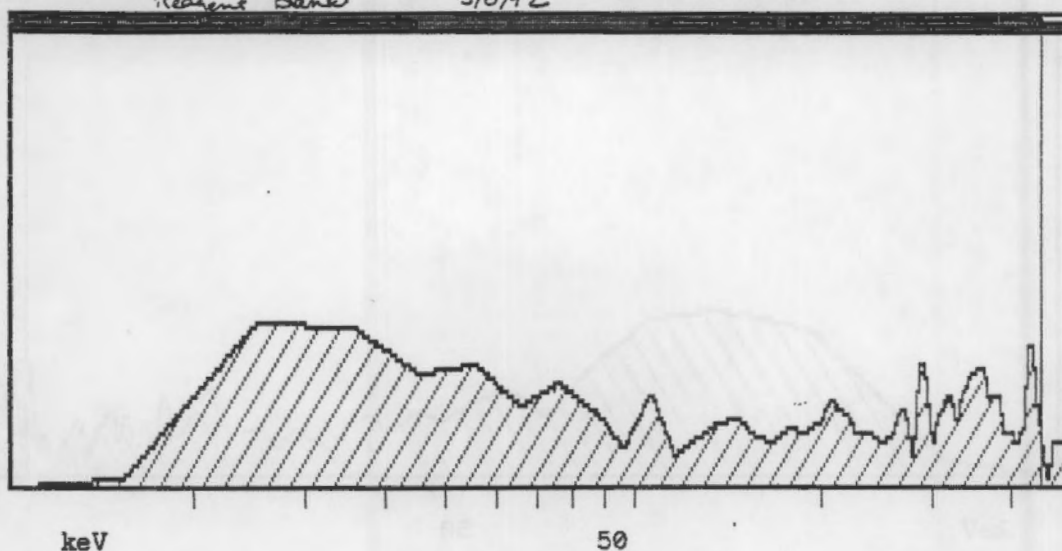
CPMA: 6.85

CPMB: 7.00

J. H. Kays
6/10/92

Log VIEW

20.0 Y Transform Log max Endpoint 1977 keV
 // Active File: SP9S1.1 \\ NonActive File:
Reagent Blank 5/8/92



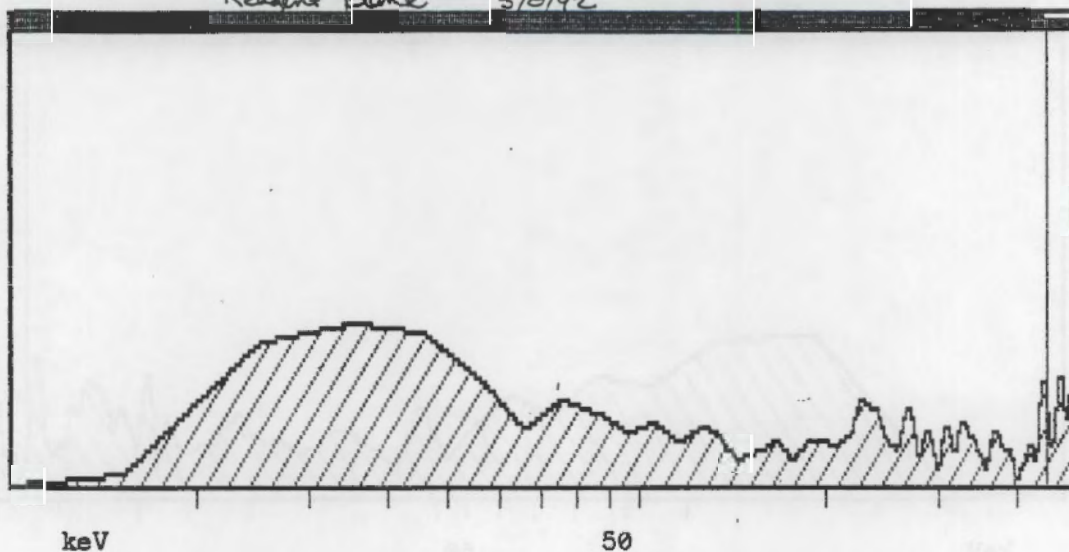
Regions of Interest

	LL	UL	CPM
A:	0.0	45.0	6.34
B:	0.0	50.0	6.49
C:	0.0	1700	27.37
D:	0.0	2000	29.58
E:	0.0	0.0	0.00
F:	0.0	0.0	0.00

Reagent blank SP9S1.1 9-Jun-92 15:15

J. H. Hays
 6/16/92

Log VIEW
20.0 Y Transform Log max Endpoint 1975 keV
// Active File: SP9S1.1 \\ NonActive File:
Reagent Blank *5/8/92*



Regions of Interest		
	LL	UL
A:	0.0	45.0
B:	0.0	50.0
C:	0.0	1700
D:	0.0	2000
E:	0.0	0.0
F:	0.0	0.0

Ni blank SP9S1.1 29-Jan-92 18:15

J. H. Kays
6/16/92

L o g V I E W

363.3 Y Transform Log max

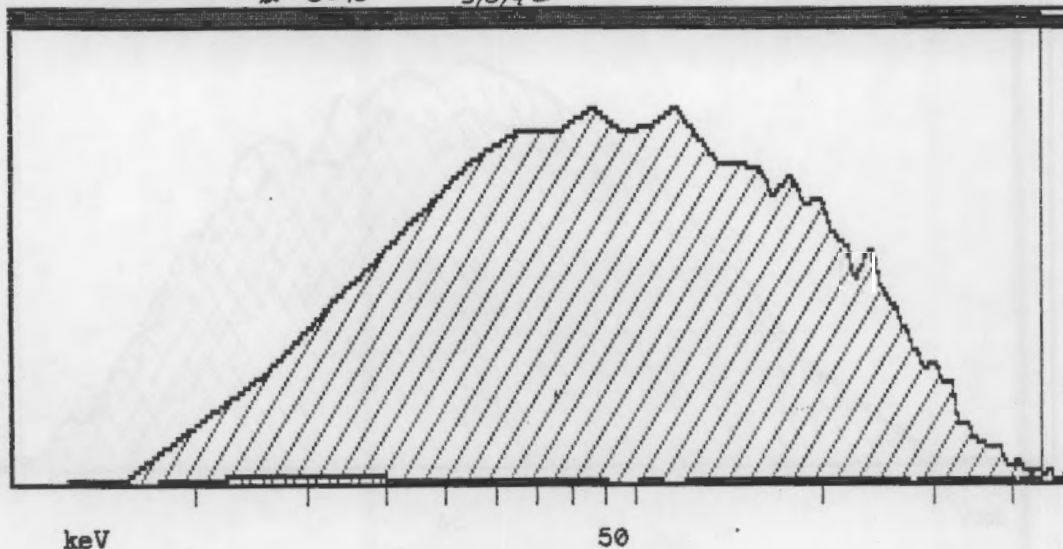
Endpoint 1821 keV

// Active File: SP9S2.1

\\ NonActive File: SP9S1.1

92-5070

5/8/92

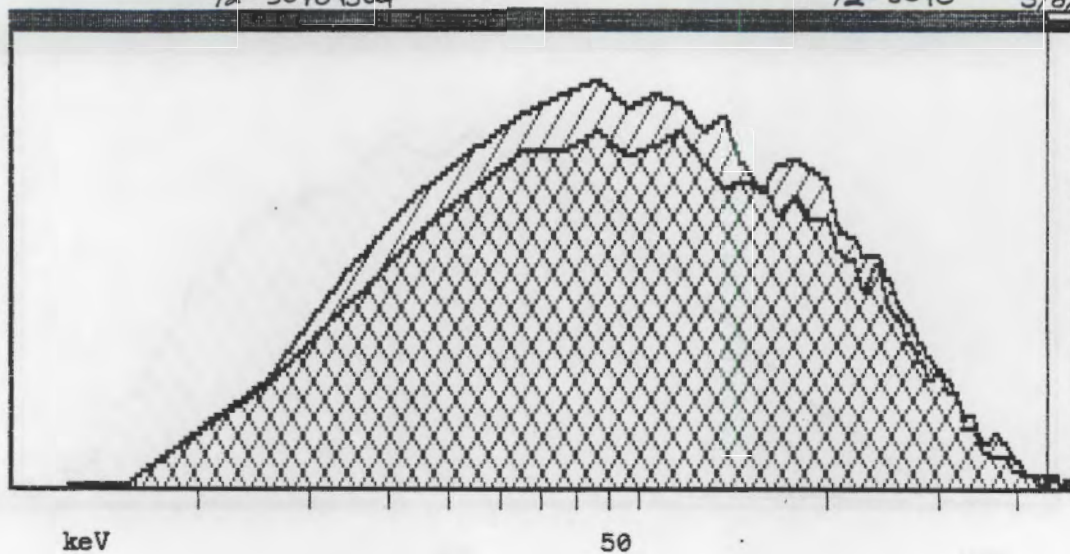


Regions of Interest

	LL	UL	SP9S2.1	CPM	SP9S1.1
A:	0.0	45.0	273.50		6.34
B:	0.0	50.0	273.65		6.49
C:	0.0	1700	294.90		27.37
D:	0.0	2000	297.22		29.58
E:	0.0	0.0	0.00		0.00
F:	0.0	0.0	0.00		0.00

J. H. Kage
6/14/92

Log VIEW
3812 Y Transform Log max Endpoint 1797 keV
// Active File: SP9S3.1 \\ NonActive File: SP9S2.1
92-5070 Dup 92-5070 5/8/92



Regions of Interest

	LL	UL	SP9S3.1	CPM	SP9S2.1
A:	0.0	45.0	309.44		273.50
B:	0.0	50.0	309.70		273.65
C:	0.0	1700	331.85		294.90
D:	0.0	2000	334.32		297.22
E:	0.0	0.0	0.00		0.00
F:	0.0	0.0	0.00		0.00

J. H. Hays
6/14/92

L o g V I E W

495.8 Y Transform Log max

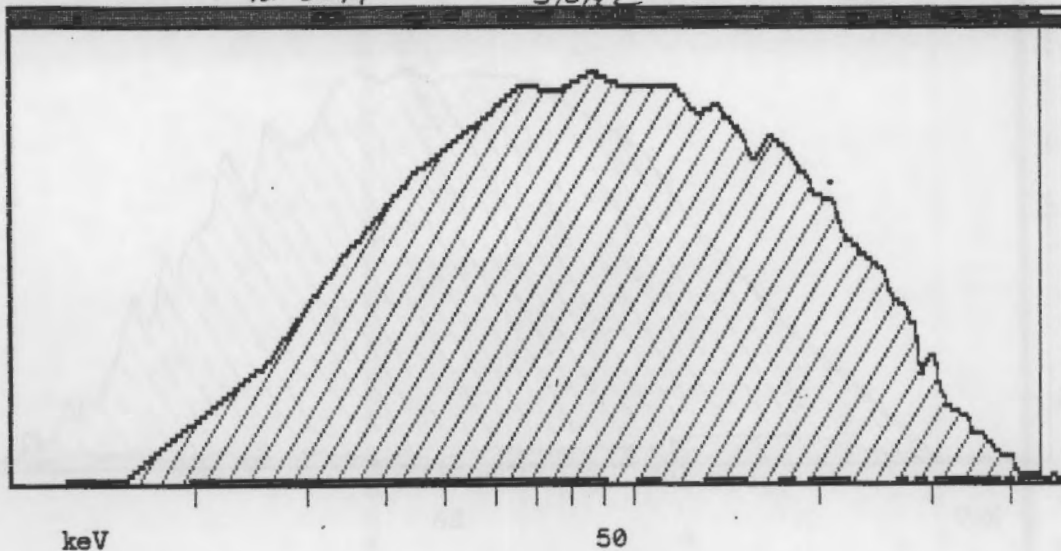
Endpoint 1891 keV

// Active File: SP9S41

// NonActive File: SP9S11

92-5074

5/8/92



Regions of Interest

	LL	UL	SP9S41	CPM	SP9S11
A:	0.0	45.0	414.62		6.34
B:	0.0	50.0	414.99		6.49
C:	0.0	1700	435.93		27.37
D:	0.0	2000	438.08		29.58
E:	0.0	0.0	0.00		0.00
F:	0.0	0.0	0.00		0.00

J. H. Hoge
6/14/92

Log VIEW

120.0 Y Transform Log max

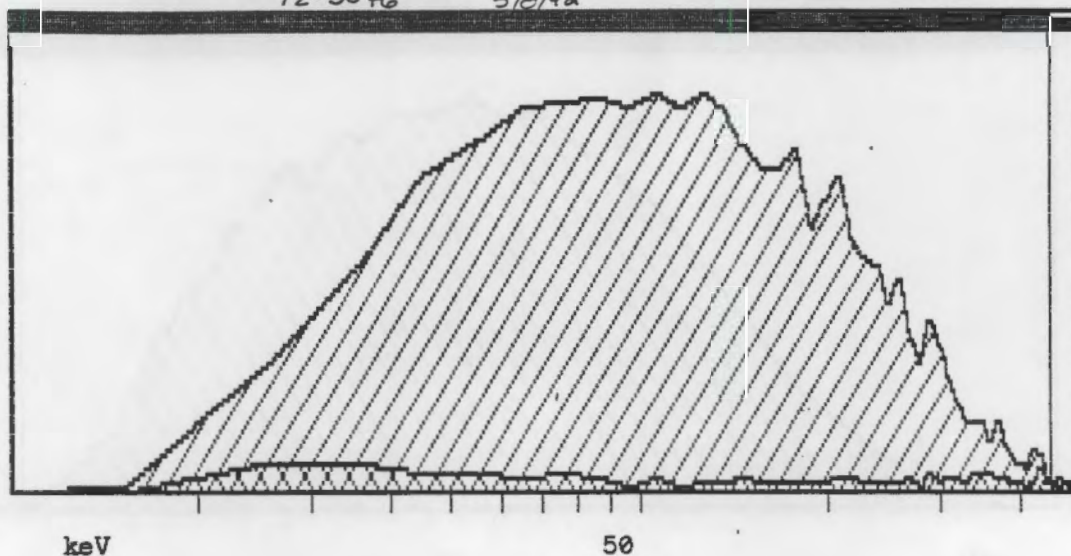
Endpoint 1931 keV

// Active File: SP9S5.1

\\ NonActive File: SP9SL1

92-5076

5/8/92



Regions of Interest

	LL	UL	SP9S5.1	CPM	SP9SL1
A:	0.0	45.0	99.26		6.34
B:	0.0	50.0	99.43		6.49
C:	0.0	1700	120.31		27.37
D:	0.0	2000	122.52		29.58
E:	0.0	0.0	0.00		0.00
F:	0.0	0.0	0.00		0.00

J. H. Kage
6/14/92

L o g V I E W

50.0 Y Transform Log max

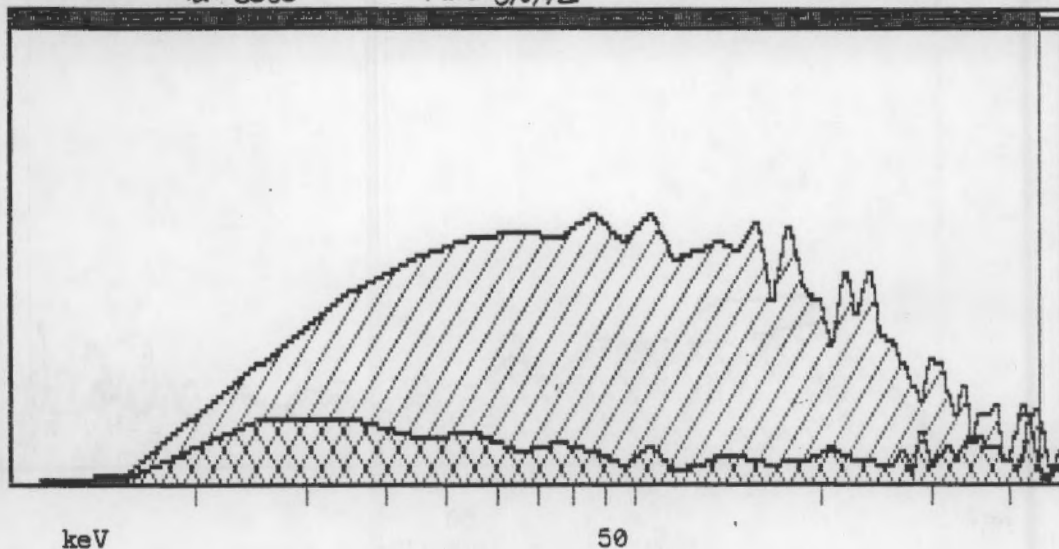
Endpoint 1974 keV

// Active File: SP9S6.1

\\ NonActive File: SP9SL1

92-5080

run 5/8/92



Regions of Interest

	LL	UL	SP9S6.1	CPM	SP9SL1
A:	0.0	45.0	30.10		6.34
B:	0.0	50.0	30.22		6.49
C:	0.0	1700	51.61		27.37
D:	0.0	2000	53.74		29.58
E:	0.0	0.0	0.00		0.00
F:	0.0	0.0	0.00		0.00

J. H. Kays
6/15/92

L o g V I E W

20.0 Y Transform Log max

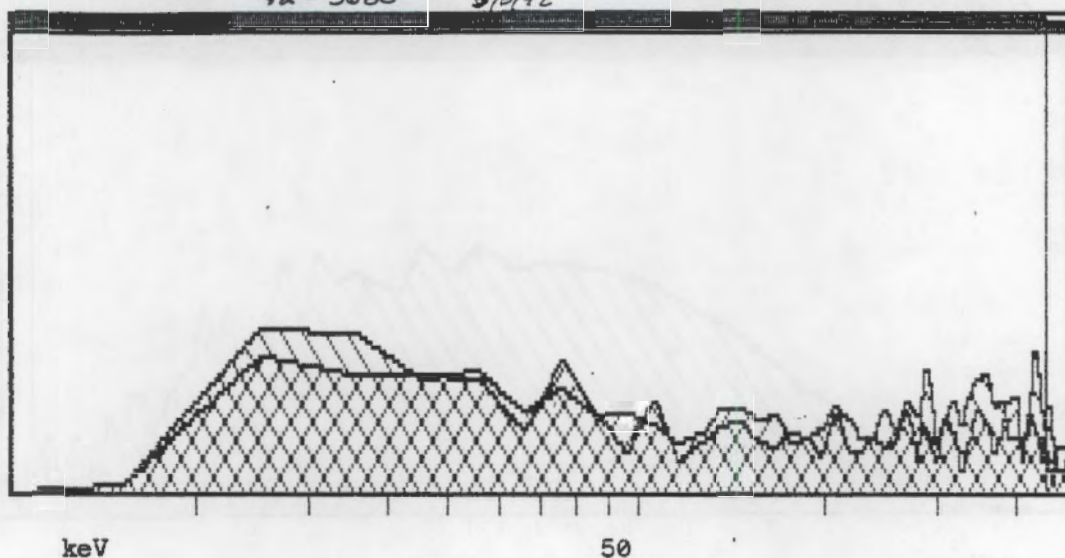
Endpoint 1982 keV

// Active File: SP9S7.1

\\ NonActive File: SP9SL1

92-5680

5/8/92



Regions of Interest

	LL	UL	SP9S7.1	CPM	SP9SL1
A:	0.0	45.0	5.89		6.34
B:	0.0	50.0	5.99		6.49
C:	0.0	1700	27.93		27.37
D:	0.0	2000	29.92		29.58
E:	0.0	0.0	0.00		0.00
F:	0.0	0.0	0.00		0.00

J. H. Hays
6/14/92

Log VIEW

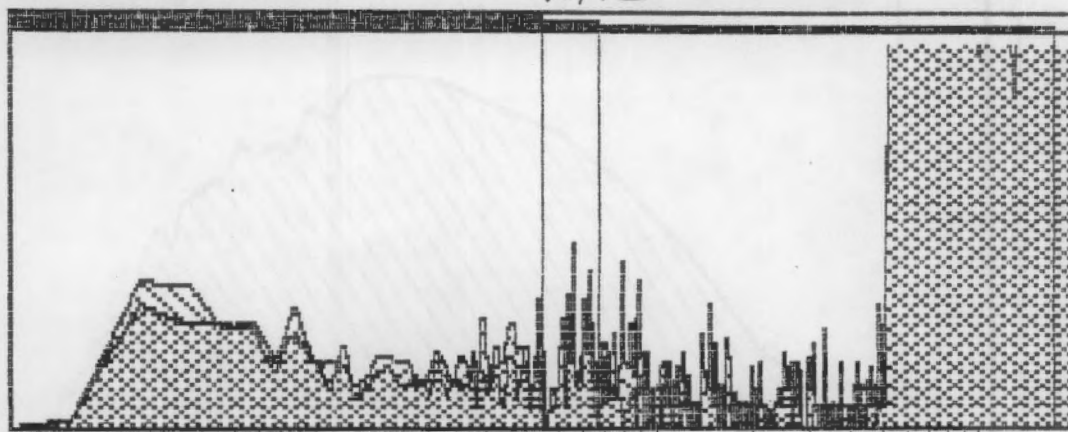
20.0 Y Transform Log max
// Active File: SP9S7.1

Endpoint 1982 keV

\\ NonActive File: SP9S1.1

92-5688

5/8/92



1

keV

2000

Regions of Interest

CPM

	LL	UL	SP9S7.1	SP9S1.1
A:	0.0	45.0	5.89	6.34
B:	0.0	67.0	6.47	7.00
C:	0.0	1700	27.93	27.37
D:	0.0	2000	29.92	29.58
E:	0.0	0.0	0.00	0.00
F:	0.0	0.0	0.00	0.00

J. H. Kage

6/10/92

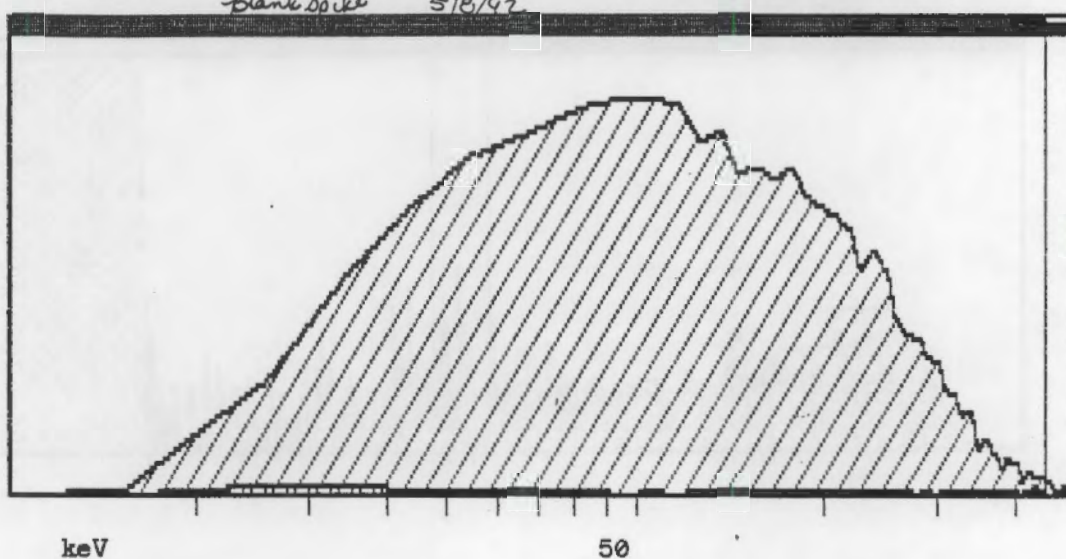
L o g V I E W

38L1 Y Transform Log max

Endpoint 1754 keV

// Active File: SP9S8.1

\\ NonActive File: SP9SL1



Regions of Interest

	LL	UL	SP9S8.1	CPM	SP9SL1
A:	0.0	45.0	306.75		6.34
B:	0.0	50.0	306.94		6.49
C:	0.0	1700	327.52		27.37
D:	0.0	2000	329.57		29.58
E:	0.0	0.0	0.00		0.00
F:	0.0	0.0	0.00		0.00

J. H. Kays
6/15/92

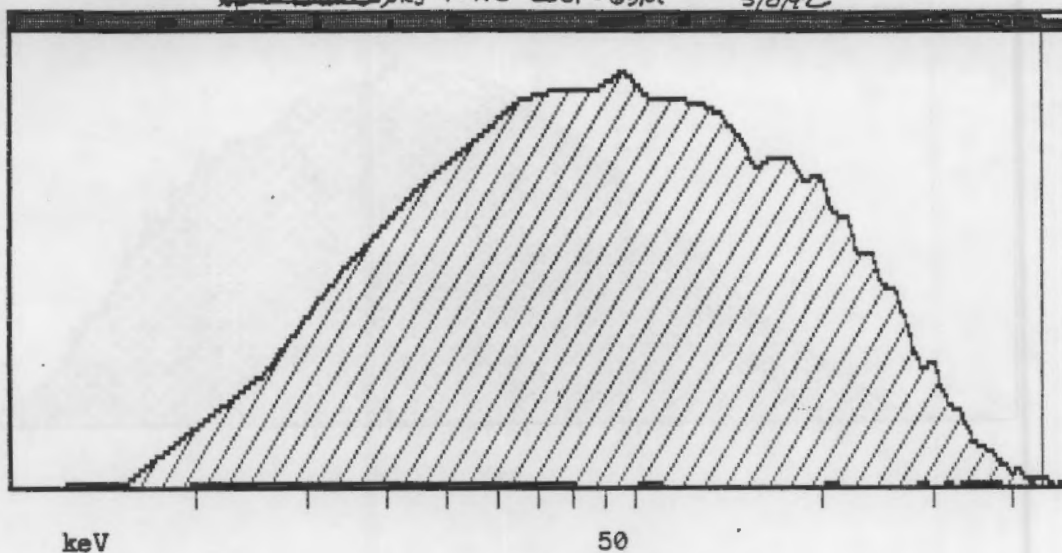
L o g V I E W

686.2 Y Transform Log max

Endpoint 1593 keV

// Active File: SP9S10.1

\\ NonActive File: SP9SL1

~~SP9S10.1~~ 8/3 7/29/92 LSC1-63Ni 5/8/92

Regions of Interest

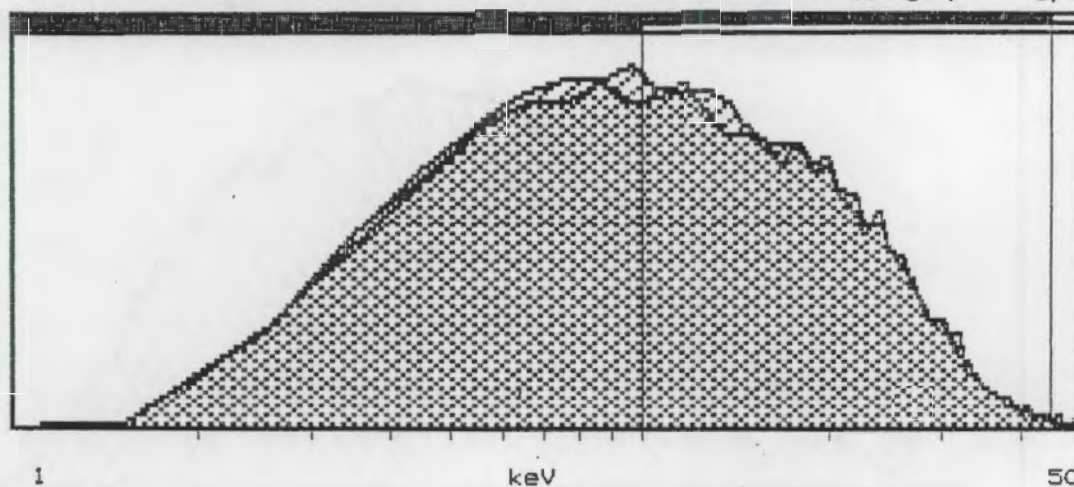
	LL	UL	SP9S10.1	CPM	SP9SL1
A:	0.0	45.0	564.13		6.34
B:	0.0	50.0	564.28		6.49
C:	0.0	1700	585.25		27.37
D:	0.0	2000	587.43		29.58
E:	0.0	0.0	0.00		0.00
F:	0.0	0.0	0.00		0.00

J. H. Kays
6/15/92

Log VIEW
 343.1 Y Transform Log max Endpoint 1752 keV
 // Active File: SP9S10.1 \\ NonActive File: SP9S2.1

LSC 1 - ^{63}Ni

92-5070 5/8/92



Regions of Interest

	LL	UL	SP9S10.1	CPM	SP9S2.1
A:	0.0	45.0	282.34		273.50
B:	0.0	50.0	282.45		273.65
C:	0.0	10.0	172.78		166.28
D:	0.0	2000	299.86		297.22
E:	0.0	0.0	0.00		0.00
F:	0.0	0.0	0.00		0.00

J. H. Hays
 6/10/92

101-SY Ni 6/10/92

Protocol # = 9 Copy Protocol #? no
 Protocol Name? JHK
 Cycles? 1
 Count Time? 100.00
 2 Sigma Coincidence? no
 # Counts/Vial? 1
 # Vials/Standard? 1 # Vials/Sample? 1
 1st Vial Background? yes
 Radionuclide? manual

(1st LSC Counts)

	LL	UL	Bkg	2 Sigma%	LCR
Region A:	0.0	45.0	0.00	.00	0
Region B:	0.0	50.0	0.00	.00	0
Region C:	0.0	2000	0.00	.00	0

Qip? tSIE ES Terminator? count
 % of Reference? no
 Data Mode? cpm

Protocol # = 9 Protocol Name = JHK
 Half Life ? A: 0.00 B: 0.00
 Ref Date ? A: 8 / 1 / 87 B: 8 / 1 / 87
 Ref Time ? A: 0 : 0 B: 0 : 0
 Single Photon Count ? no
 Colored Samples ? no
 RS232 Computer Output ? no

Low Level Count Mode ? yes
 Data/Application Drive & Path ? a:\jkh01
 Save Data ? short
 Save Spectrum ? yes
 Run User Application ? no
 File Name ? SPECTRA2
 Command String ?
 Static controller ? on

Protocol #: 9 Name: JHK
 Additional Heading? SS Disk, effect of pot on Ni-63 spectrum

C#	Name	Format	C#	Name	Format	C#	Name	Format	Equation
0	CRLF	X	11	C:2S%	BXX.XX	21	test	BXXXX.XX	2.5
1	PID	BXXX	12	C:%REF	BXXX.XX	22	p	BXXXXX	C21*C4
2	S#	BXXX	13	SIS	BXX.XXX	23			
3	TIME	BXXX.XX	14	DPM1	BXXXX.XX	24			
4	CPMA	BXXXX.XX	15	DPM2	BXXXX.XX	25			
5	A:2S%	BXX.XX	16	EL TIME	BXXXXXX	26			
6	A:%REF	BXXX.XX	17	FLAG	BXXXX	27			
7	CPMB	BXXXX.XX	18	BLANK	BBBBBBBB	28			
8	B:2S%	BXX.XX	19	tSIE	B.XXX	29			
9	B:%REF	BXXX.XX	20	%LUM	BXXX	30			
10	CPMC	BXXXX.XX				31			

Define Cell #? 1 Name? Format? Operators: +, -, *, /, SQRT, LN
 Print Cells? 2 3 4 7 10 19 17 16 0 BXXX Equation?

Protocol #: 9

Name: JHK

Additional Heading? 101-SY Ni SAMPLES, SET 1, 5/8/92

C#	Name	Format	C#	Name	Format	C#	Name	Format	Equation
0	CRLF	X	11	C:2S%	BXX.XX	21	test	BXXXX.XX	2.5
1	PID	BXXX	12	C:%REF	BXXX.XX	22	p	BXXXXX	C21*C4
2	S#	BXXX	13	SIS	BXX.XXX	23			
3	TIME	BXXX.XX	14	DPM1	BXXXX.XX	24			
4	CPMA	BXXXX.XX	15	DPM2	BXXXX.XX	25			
5	A:2S%	BXX.XX	16	ELTIME	BXXXXXX	26			
6	A:%REF	BXXX.XX	17	FLAG	BXXXX	27			
7	CPMB	BXXXX.XX	18	BLANK	BBBBBBBB	28			
8	B:2S%	BXX.XX	19	tsIE	B.XXX	29			
9	B:%REF	BXXX.XX	20	%LUM	BXXX	30			
10	CPMC	BXXXX.XX				31			

Operators: +,-,*,/,SQR,LN

Define Cell #? 1

Name?

Format?

BXXX Equation?

Print Cells? 2 3 4 7 10 19 17 16 0

**Second Batch Ni-63 Determination
by Liquid Scintillation Counting**

Protocol #: 9 Name: JHK 19-Jun-92 14:36
 Region A: LL-UL= 0.0-45.0 Lcr= 0 Bkg= 0.00 %2 Sigma=0.00
 Region B: LL-UL= 0.0-50.0 Lcr= 0 Bkg= 0.00 %2 Sigma=0.00
 Region C: LL-UL= 0.0-2000 Lcr= 0 Bkg= 0.00 %2 Sigma=0.00
 Time =100.00 QIP = tSIE ES Terminator = Count
 101SY Ni samples 5/21/92 S. K. Fadeff
 Low Level Count Mode

S#	TIME	CPMA	CPMB	CPMC	tSIE	FLAG	ELTIME
1	100.00	6.21	6.32	30.10	612.	8	101 LSC-C (blank w/ Ni carrier)
2	100.00	504.57	504.79	504.99	619.		204 LSC-a
3	100.00	452.53	452.78	452.64	621.		306 1 92-5086
4	100.00	332.62	332.84	332.72	617.		408 1 92-5087
5	100.00	164.95	165.05	164.79	618.		510 3 92-5087
6	100.00	2892.81	2893.85	2893.49	619.		612 4 92-5092
7	100.00	1147.01	1147.46	1147.70	617.		714 3 92-5074
8	100.00	54.86	54.93	54.29	618.		816 6 92-5080
9	100.00	330.58	330.67	330.20	621.		918 7 92-5076
10	100.00	1065.41	1065.83	1065.61	621.		1020 8 92-5093
11	100.00	3.74	3.83	3.30	618.		1122 9 92-5089 4+ cell blank
12	100.00	0.15	0.19	0.00	612.		1224 10 reagent blank
13	100.00	399.96	400.14	400.07	620.		1326 11 blank spike
14	100.00	431.42	431.70	431.48	617.		1428 12 matrix spike
15	100.00	513.52	513.74	514.00	618.		1530 LSC-b

S. K. Fadeff 6/22/92

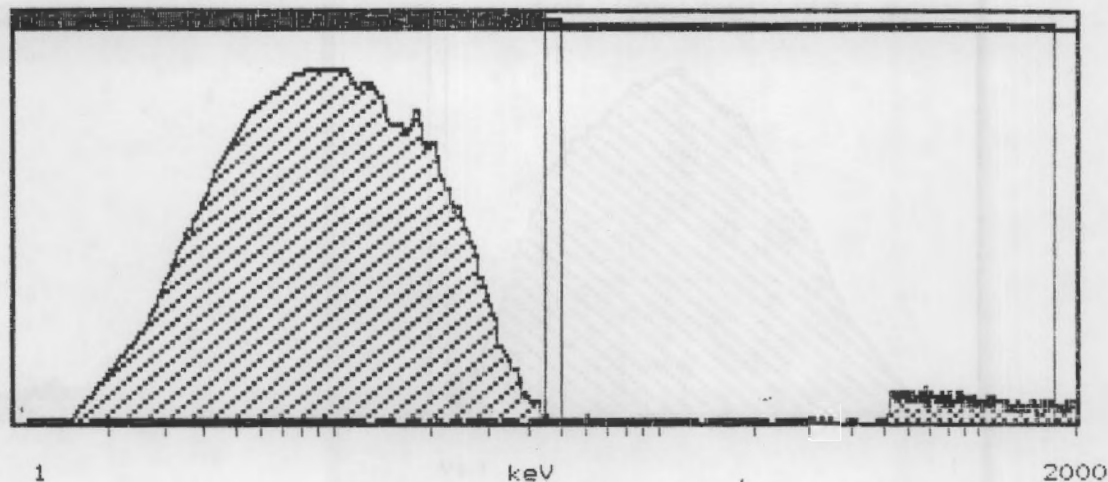
Log VIEW

610.2 Y Transform Log max

Endpoint 1626 keV

// Active File: SP9S2.1

\\ NonActive File: SP9S1.1

⁶³Ni spike: LSC-a

Regions of Interest

CPM

	LL	UL	SP9S2.1	SP9S1.1
A:	0.0	45.0	510.56	5.98
B:	0.0	50.0	510.86	6.06
C:	0.0	1700	532.26	27.33
D:	0.0	2000	534.29	29.40
E:	0.0	0.0	0.00	0.00
F:	0.0	0.0	0.00	0.00

S.L. Jodoff
6/22/92

Log VIEW

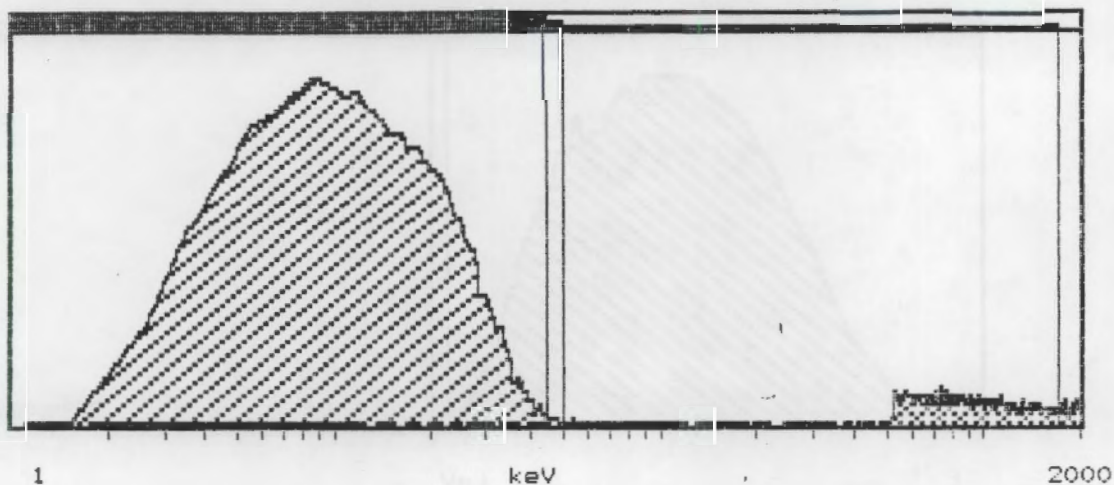
563.0 Y Transform Log max

Endpoint 1673 keV

// Active File: SP9S3.1

\\ NonActive File: SP9S1.1

92-5086



Regions of Interest

	LL	UL	SP9S3.1	SP9S1.1
A:	0.0	45.0	458.55	5.98
B:	0.0	50.0	458.87	6.06
C:	0.0	1700	479.92	27.33
D:	0.0	2000	482.14	29.40
E:	0.0	0.0	0.00	0.00
F:	0.0	0.0	0.00	0.00

S.K. Fadoff
6/22/92

L o g V I E W

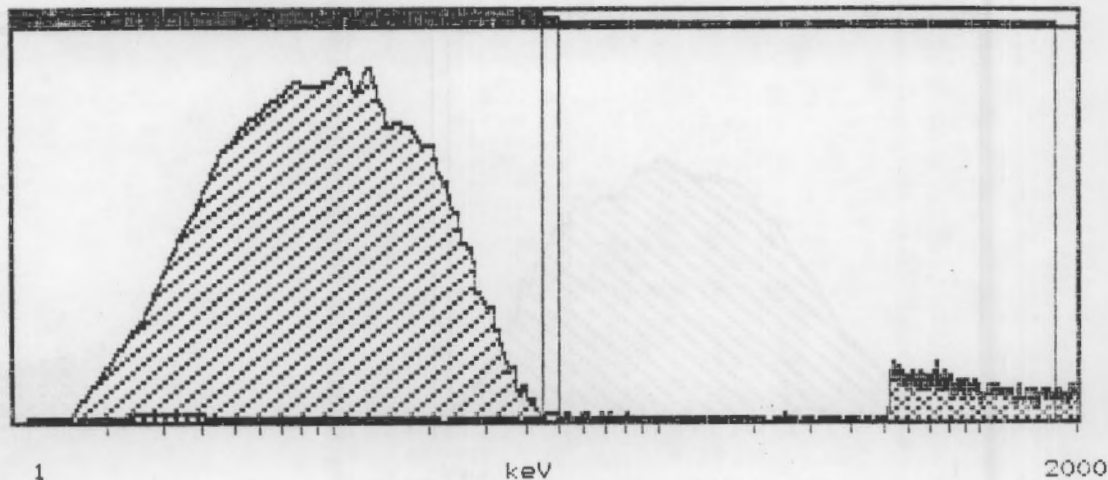
409.7 Y Transform Log max

Endpoint 1735 keV

// Active File: SP9S4.1

\\ NonActive File: SP9S1.1

92-5087D



Regions of Interest

	LL	UL	SP9S4.1	CPM	SP9S1.1
A:	0.0	45.0	338.61		5.98
B:	0.0	50.0	338.91		6.06
C:	0.0	1700	360.00		27.33
D:	0.0	2000	362.14		29.40
E:	0.0	0.0	0.00		0.00
F:	0.0	0.0	0.00		0.00

h.k. Judd 6/22/92

Log VIEW

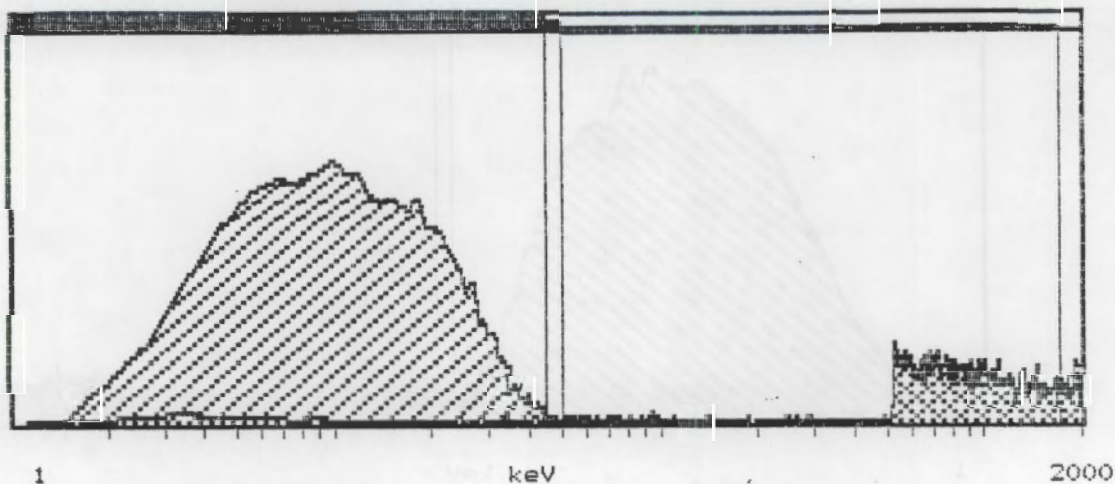
275.2 Y Transform Log max

Endpoint 1885 keV

// Active File: SP9S3.1

\\ NonActive File: SP9S1.1

92-5087



Regions of Interest

	LL	UL	SP9S3.1	SP9S1.1
A:	0.0	45.0	170.90	5.98
B:	0.0	50.0	171.07	6.06
C:	0.0	1700	191.63	27.33
D:	0.0	2000	194.05	29.40
E:	0.0	0.0	0.00	0.00
F:	0.0	0.0	0.00	0.00

CPM

S.K. Jodoff 6/22/92

L o g V I E W

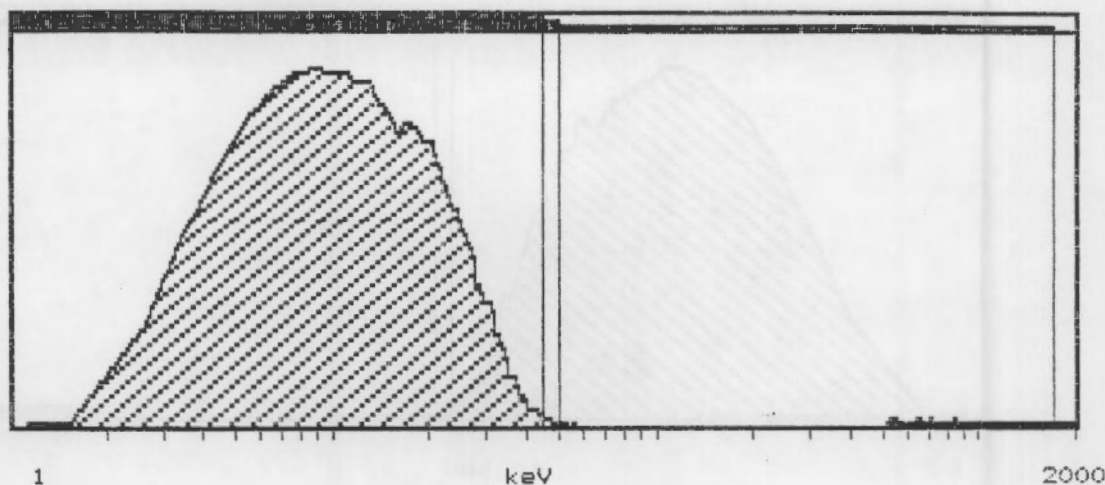
3420.8 Y Transform Log max

Endpoint 682 keV

// Active File: SP9S6.1

\\ NonActive File: SP9S1.1

92-5092

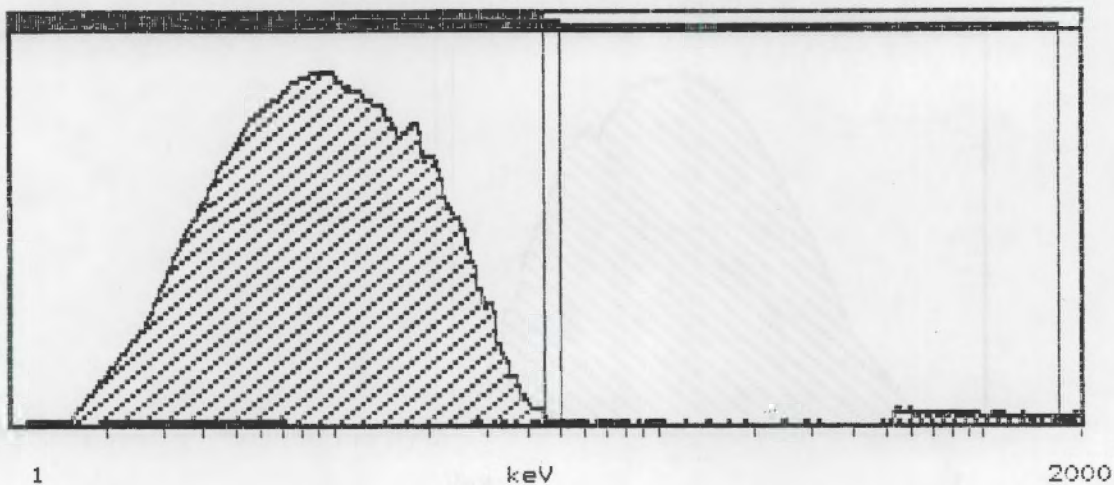


Regions of Interest

	LL	UL	SP9S6.1	CPM	SP9S1.1
A:	0.0	45.0	2898.81		5.98
B:	0.0	50.0	2899.95		6.06
C:	0.0	1700	2920.50		27.33
D:	0.0	2000	2922.79		29.40
E:	0.0	0.0	0.00		0.00
F:	0.0	0.0	0.00		0.00

A.k. Jodoff
6/22/92

Log VIEW
 1390.0 Y Transform Log max Endpoint 1231 keV
 // Active File: SP9S7.1 \\ NonActive File: SP9S1.1
 92-5074



Regions of Interest

	LL	UL	SP9S7.1	CPM	SP9S1.1
A:	0.0	45.0	1153.00		5.98
B:	0.0	50.0	1153.52		6.06
C:	0.0	1700	1174.78		27.33
D:	0.0	2000	1176.98		29.40
E:	0.0	0.0	0.00		0.00
F:	0.0	0.0	0.00		0.00

A. k. Joddy 6/22/92

Log VIEW

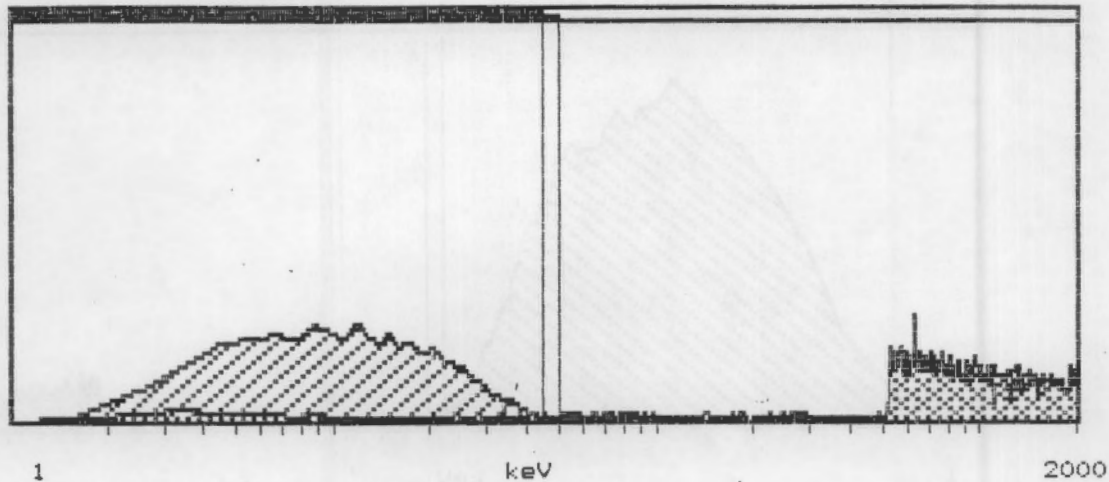
275.2 Y Transform Log max

Endpoint 1944 keV

// Active File: SP9S8.1

\\ NonActive File: SP9S1.1

92-5080



Regions of Interest

	LL	UL	SP9S8.1	CPM	SP9S1.1
A:	0.0	45.0	60.85		5.98
B:	0.0	50.0	60.99		6.06
C:	0.0	2000	83.61		29.40
D:	0.0	0.0	0.00		0.00
E:	0.0	0.0	0.00		0.00
F:	0.0	0.0	0.00		0.00

J. L. Jodoff 6/22/92

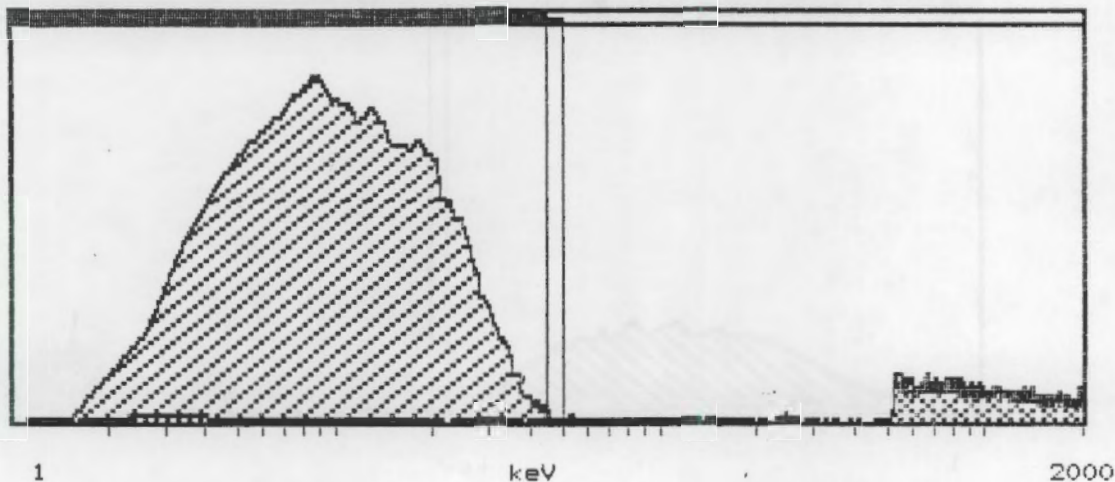
L o g V I E W

426.6 Y Transform Log max
// Active File: SP9S9.1

Endpoint 1725 keV

\\ NonActive File: SP9S1.1

92-5076



Regions of Interest

CPM

	LL	UL	SP9S9.1	SP9S1.1
A:	0.0	45.0	336.54	5.98
B:	0.0	50.0	336.71	6.06
C:	0.0	2000	359.54	29.40
D:	0.0	0.0	0.00	0.00
E:	0.0	0.0	0.00	0.00
F:	0.0	0.0	0.00	0.00

S.k. Fadoff
6/22/92

Log VIEW

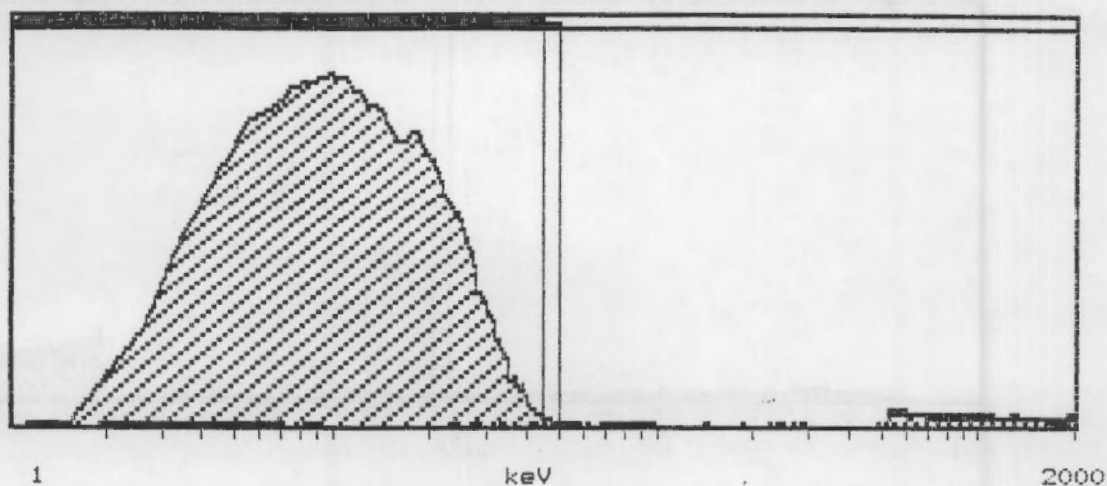
1303.0 Y Transform Log max

Endpoint 1262 keV

// Active File: SP9S10.1

\\ NonActive File: SP9S1.1

92-5093



Regions of Interest

	LL	UL	SP9S10.1	CPM	SP9S1.1
A:	0.0	45.0	1071.44		5.98
B:	0.0	50.0	1071.93		6.06
C:	0.0	2000	1094.97		29.40
D:	0.0	0.0	0.00		0.00
E:	0.0	0.0	0.00		0.00
F:	0.0	0.0	0.00		0.00

S.K. Fadoff 6/22/92

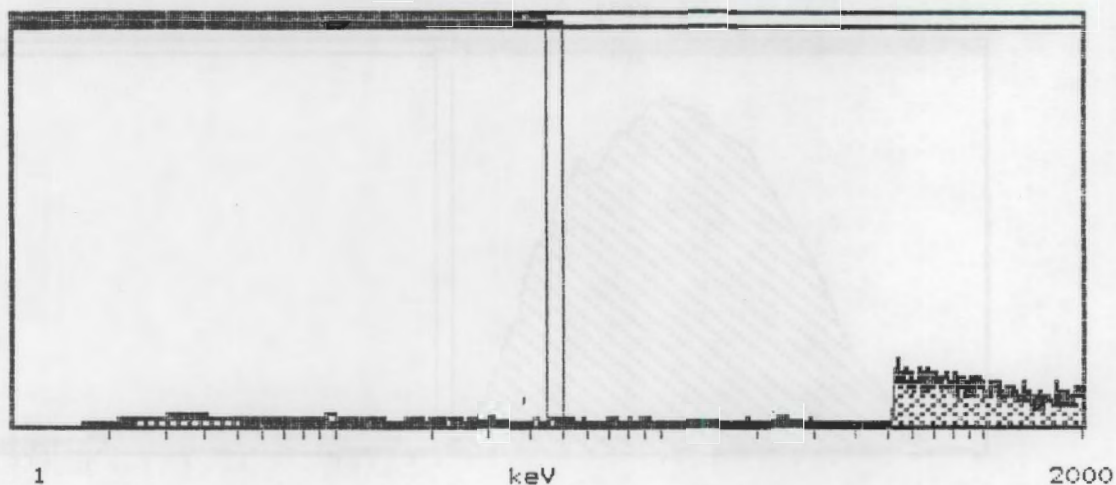
Log VIEW

338.0 Y Transform Log max

Endpoint 1979 keV

// Active File: SP9S11.1

// NonActive File: SP9S1.1

92-5689 Not cell blank

Regions of Interest

CPM

	LL	UL	SP9S11.1	SP9S1.1
A:	0.0	45.0	9.67	5.98
B:	0.0	50.0	9.84	6.06
C:	0.0	2000	32.59	29.40
D:	0.0	0.0	0.00	0.00
E:	0.0	0.0	0.00	0.00
F:	0.0	0.0	0.00	0.00

*A.k. Jodoff**6/22/92*

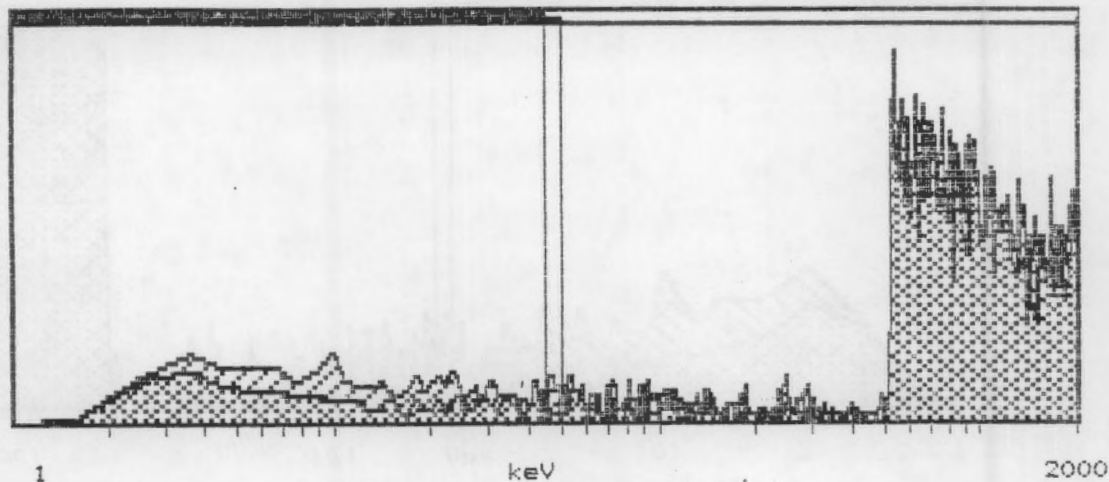
Log VIEW

60.0 Y Transform Log max

Endpoint 1979 keV

// Active File: SP9S11.1

\\ NonActive File: SP9S1.1

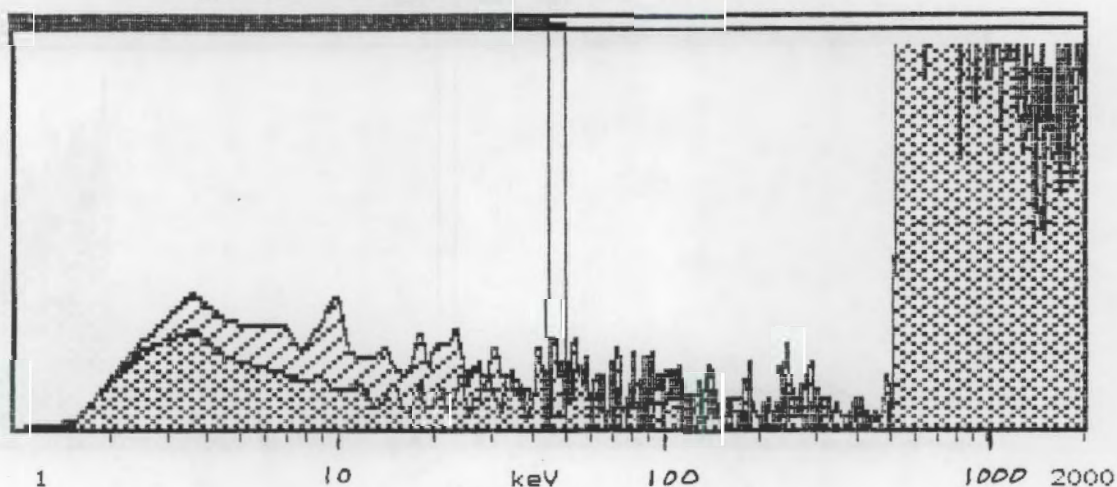
92-5689 Hot cell blank

Regions of Interest

	LL	UL	SP9S11.1	CPM	SP9S1.1
A:	0.0	45.0	9.67		5.98
B:	0.0	50.0	9.84		6.06
C:	0.0	2000	32.59		29.40
D:	0.0	0.0	0.00		0.00
E:	0.0	0.0	0.00		0.00
F:	0.0	0.0	0.00		0.00

S.K. Jodoff
6/22/92

Log VIEW
 30.0 Y Transform Log max Endpoint 1979 keV
 // Active File: SP9S11.1 \\ NonActive File: SP9S1.1
 92-5609 Hot cell blank

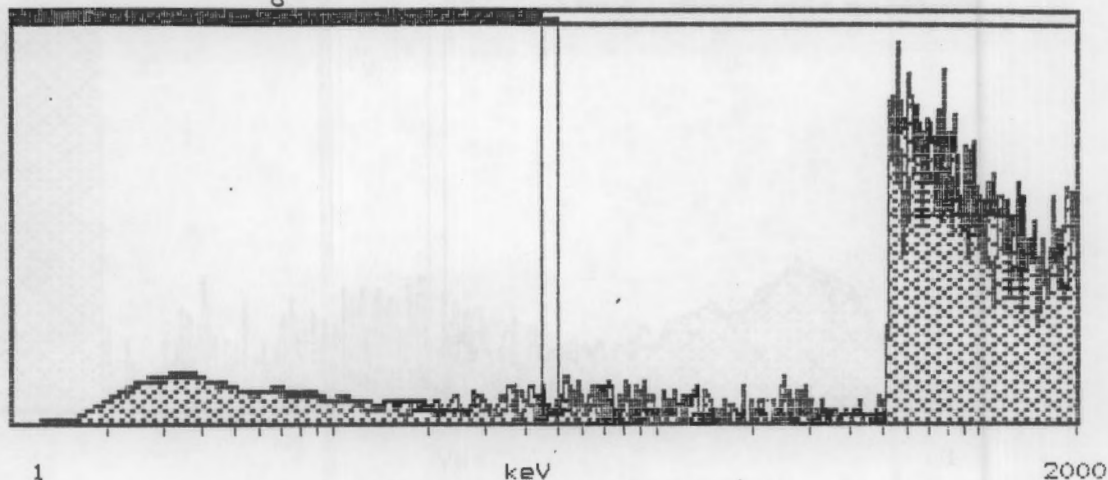


Regions of Interest

	LL	UL	SP9S11.1	SP9S1.1
A:	0.0	45.0	9.67	5.98
B:	0.0	50.0	9.84	6.06
C:	0.0	2000	32.59	29.40
D:	0.0	0.0	0.00	0.00
E:	0.0	0.0	0.00	0.00
F:	0.0	0.0	0.00	0.00

A.k. Judd 6/22/92

Log VIEW

60.0 Y Transform Log max
// Active File: SP9S12.1Endpoint 1972 keV
\\ NonActive File: SP9S1.1*Reagent Blank BL*

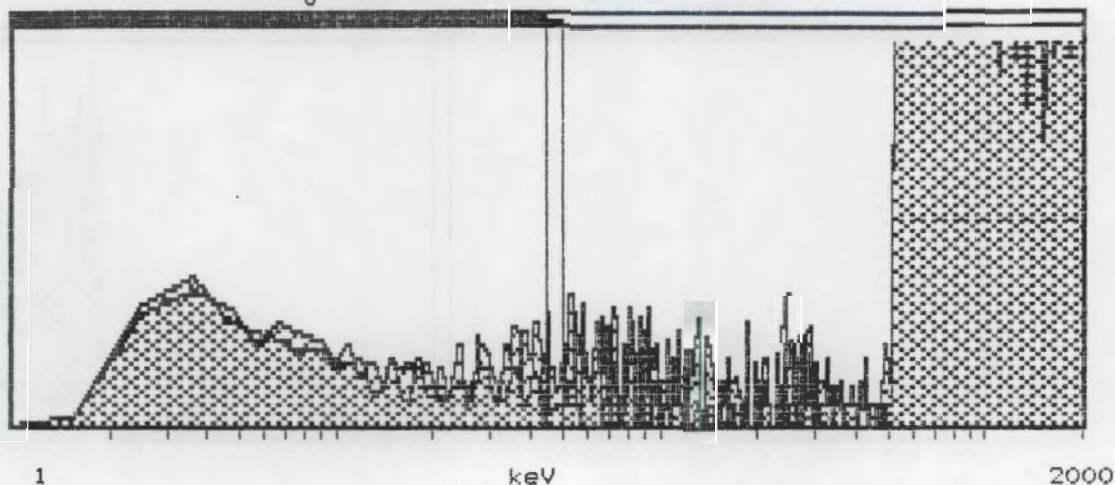
Regions of Interest

CPM

	LL	UL	SP9S12.1	SP9S1.1
A:	0.0	45.0	6.13	5.98
B:	0.0	50.0	6.24	6.06
C:	0.0	2000	29.15	29.40
D:	0.0	0.0	0.00	0.00
E:	0.0	0.0	0.00	0.00
F:	0.0	0.0	0.00	0.00

D. K. Jodoff 6/22/92

Log VIEW
 20.0 Y Transform Log max Endpoint 1972 keV
 // Active File: SP9S12.1 // NonActive File: SP9S1.1
 Recount Bank: BL

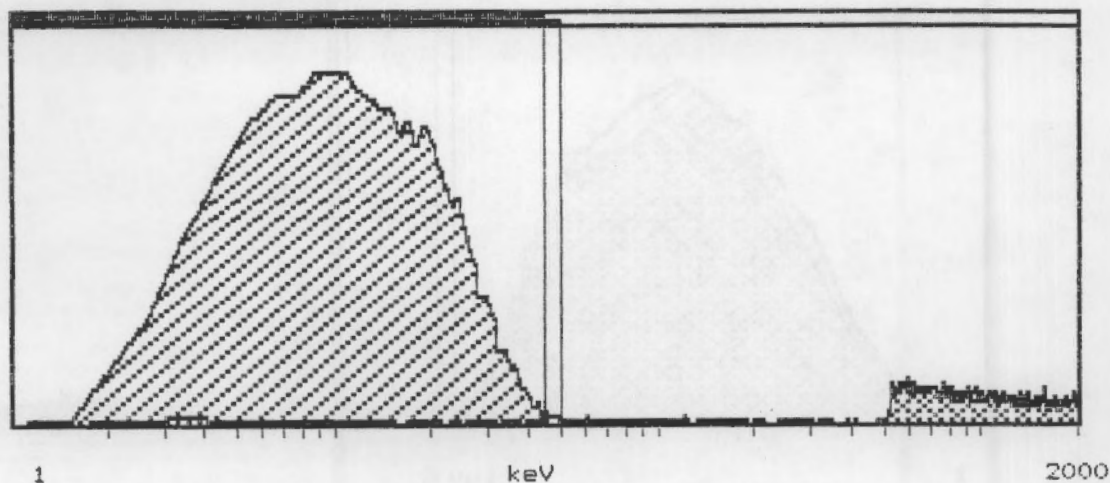


Regions of Interest

	LL	UL	SP9S12.1	CPM	SP9S1.1
A:	0.0	45.0	6.13		5.98
B:	0.0	50.0	6.24		6.06
C:	0.0	2000	29.15		29.40
D:	0.0	0.0	0.00		0.00
E:	0.0	0.0	0.00		0.00
F:	0.0	0.0	0.00		0.00

S. L. Jachy 6/22/92

Log VIEW
 487.5 Y Transform Log max Endpoint 1698 keV
 // Active File: SP9S13.1 \\ NonActive File: SP9S1.1
Blank spike BS



Regions of Interest

	LL	UL	SP9S13.1	CPM	SP9S1.1
A:	0.0	45.0	405.93		5.98
B:	0.0	50.0	406.19		6.06
C:	0.0	2000	429.42		29.40
D:	0.0	0.0	0.00		0.00
E:	0.0	0.0	0.00		0.00
F:	0.0	0.0	0.00		0.00

S.K. Fadoff 6/22/92

Log VIEW

563.0 Y Transform Log max

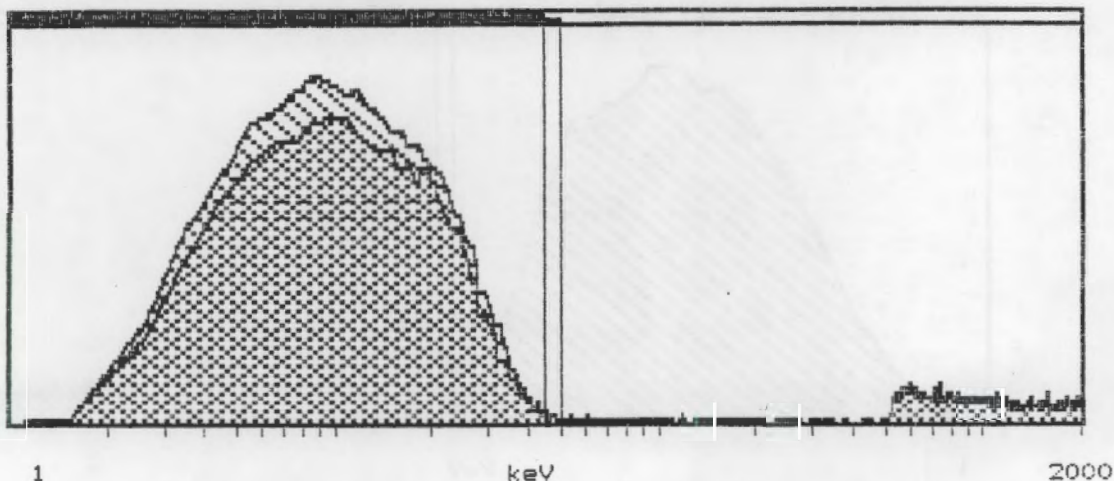
Endpoint 1698 keV

// Active File: SP9S13.1

\\ NonActive File: SP9S3.1

Blank spike BS

92-5086



Regions of Interest

	LL	UL	SP9S13.1	SP9S3.1
A:	0.0	45.0	405.93	458.55
B:	0.0	50.0	406.19	458.87
C:	0.0	2000	429.42	482.14
D:	0.0	0.0	0.00	0.00
E:	0.0	0.0	0.00	0.00
F:	0.0	0.0	0.00	0.00

J.K. Fadoff 6/22/92

Log VIEW

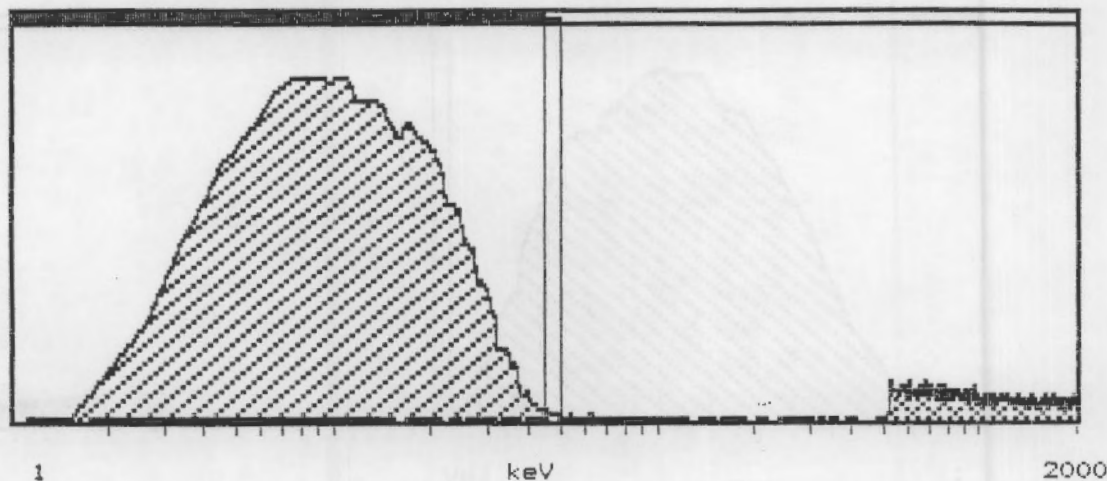
534.6 Y Transform Log max

Endpoint 1671 keV

// Active File: SP9S14.1

\\ NonActive File: SP9S1.1

MS-5080



Regions of Interest

CFM

	LL	UL	SP9S14.1	SP9S1.1
A:	0.0	45.0	437.35	5.98
B:	0.0	50.0	437.71	6.06
C:	0.0	2000	460.84	29.40
D:	0.0	0.0	0.00	0.00
E:	0.0	0.0	0.00	0.00
F:	0.0	0.0	0.00	0.00

D.K. Indigo 6/22/92

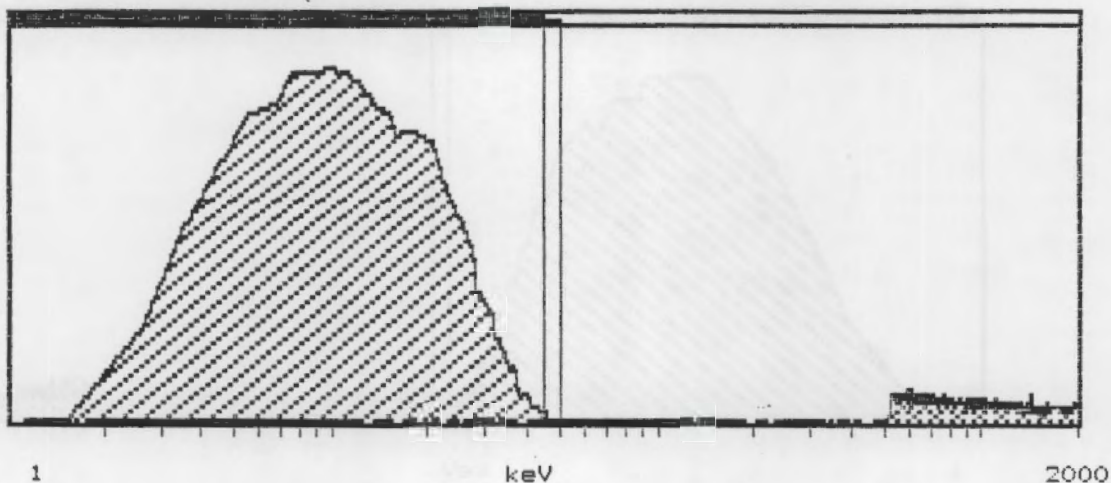
Log VIEW

620.5 Y Transform Log max

Endpoint 1636 keV

// Active File: SP9S15.1

\\ NonActive File: SP9S1.1

⁶³Ni spike ZSC-b

Regions of Interest

CPM

	LL	UL	SP9S15.1	SP9S1.1
A:	0.0	45.0	519.52	5.98
B:	0.0	50.0	519.81	6.06
C:	0.0	2000	543.29	29.40
D:	0.0	0.0	0.00	0.00
E:	0.0	0.0	0.00	0.00
F:	0.0	0.0	0.00	0.00

S.K. Fadoff 6/22/92

Protocol <u>9</u>		<u>W.K. Jodoff 67015</u>		Date/Time <u>6/18/92</u>		<u>1:05 p.m.</u>					
Bk1	502	Y9 6964 A	Y964 B	6964 A	6964 B	Dup 6964 A	Dup 6964 B	1002	BK2		
1	2	3	4	5	6	7	8	9	10		

Protocol <u>9</u>		<u>A.L. Jodoff 67015</u>		Date/Time <u>6/19/92</u>		<u>1:50 p.m.</u>					
LSC-C	LSG -a	1	2	3	4	5	6	7	8	9	10
run from 5/21/92 - ⁶³ Ni determination											
"	12	LSG b									

Protocol _____		Date/Time _____									

Protocol _____		Date/Time _____									

Protocol #: 9 Name: JHK

Additional Heading? 101SY Ni samples 5/21/92 S. K. Fadeff

C#	Name	Format	C#	Name	Format	C#	Name	Format	Equation
0	CRLF	X	11	C:2S%	BXX.XX	21	test	BXXXX.XX	2.5
1	PID	BXXX	12	C:%REF	BXXX.XX	22	p	BXXXXX	C21*C4
2	S#	BXXX	13	SIS	BXX.XXX	23			
3	TIME	BXXX.XX	14	DPM1	BXXXX.XX	24			
4	CPMA	BXXXX.XX	15	DPM2	BXXXX.XX	25			
5	A:2S%	BXX.XX	16	ELTIME	BXXXXXX	26			
6	A:%REF	BXXX.XX	17	FLAG	BXXXX	27			
7	CPMB	BXXXX.XX	18	BLANK	BBBBBBBB	28			
8	B:2S%	BXX.XX	19	tSIE	B.XXX	29			
9	B:%REF	BXXX.XX	20	%LUM	BXXX	30			
10	CPMC	BXXXX.XX				31			

Operators: +,-,*,/,SQR,LN

Define Cell #? 1 Name? Format? BXXX Equation?

Print Cells? 2 3 4 7 10 19 17 16 0

ICP-325-405
INORGANIC ANALYTICAL REPORT

ICP: Final Results
(Cover)

Report Date: June 17, 1992

Project/WO: 19607/M99913
Client: R. Strebin
Impact Level: II

PNL ALO Log-In Number

92-(07919-07932)

(14 samples)

Procedure: PNL-ALO-211, "Determination of Elements by Inductively Coupled Argon Plasma Atomic Emission Spectrometry" (ICP-AES).

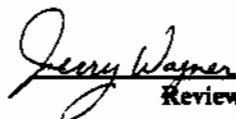
Analyst: D.R. Sanders

Analysis Date/Filename: 06/12/92 (92D164B)

Measurement & Test Equipment number:

ICP-AES instrument -- WB73520

Mettler AT400 Balance -- Ser.No. 384-06-01-006

 6-17-92
Reviewed by

 6-19-92
Approved by TGL or PM

ICP-325-405
INORGANIC ANALYTICAL REPORT
ICP: Final Results
Definitions, Notes and Comments
Report Date: June 17, 1992

Definitions (where applicable):

ID means Identification.

ADF means Analysis Dilution Factor: this factor accounts for any dilution that was performed on a sample during ICP analysis (this factor is independent from any dilution caused by sample processing).

D.L. or DL means Detection Limit.

PF means Processing Factor: this factor accounts for any dilution or concentration that was performed during sample preparation prior to analysis (ie. solubilization of solids, etc.).

"Analyte" is the chemical element being measured.

"Analyte solution" is the actual material (liquid) introduced into the ICP instrument.

The "@" column when present may display one of the following codes:

- N --** means value is at or within three times the detection limit.
- * --** means value exceeded high calibration concentration by more than 10% (this "flag" requires a comment by the responsible cognizant scientist).

ICP-325-405
INORGANIC ANALYTICAL REPORT
ICP: Final Results
Definitions, Notes and Comments (continued)
Report Date: June 17, 1992

Notes:

- 1) "Final Results" have been corrected for all laboratory dilutions performed on the sample during processing and analysis.
- 2) Detection limits (DL) shown are for acidified water. Detection limits for other matrices can be determined if requested.
- 3) Routine precision and bias is typically $\pm 15\%$ or better for samples in dilute, acidified water (eg. 2% v/v HNO_3 or less) at analyte concentrations, greater than ten times detection limit up to the high calibration level. This also assumes that the total dissolved solids concentration in the sample is less than 5000 $\mu\text{g/mL}$ (0.5 weight per cent).
- 4) Absolute precision, bias and detection limits can be determined on each sample if required by the client.
- 5) The maximum number of significant figures for all ICP measurements is 2.
- 6) To convert "WT%" to "mg/Kg" or " $\mu\text{g/g}$ ", multiply concentration value by 10,000.
- 7) To convert "mg/Kg" or " $\mu\text{g/g}$ " to "WT%", divide concentration value by 10,000.

1CP-325-405
INORGANIC ANALYTICAL REPORT
ICP: Final Results
Definitions, Notes and Comments (continued)
Report Date: June 17, 1992

Comments:

Cross reference:

<u>ALO numbers</u>	<u>Client ID</u>	<u>Date analyzed</u>	<u>File name</u>
92-(07919-	("1E"-	06/12/92	92D164B
-07932)	-"14E")	"	"

The analytes requested were: Ni, Fe, Co, and Cr. All other analytes reported are for information only.

<<< INORGANIC ANALYTICAL REPORT >>>

ICP : FINAL RESULTS

(Archive RIDS file: ICP-325-405)

Client: R Streblin

Work Order: M99913/18067

Report Date: 6/17/92

Ques>	WSDT 13E			
ALOPes>	92-07931			
PFes>	1			
SAMPLE				
Analyte	Q.L	CONC		
ID	(ug/ml)	(ug/ml)	Q	ADF
Ag	0.01			1
Al	0.06	0.2	N	1
As	0.08			1
B	0.02	1.1		1
Ba	0.01			1
Be	0.005			1
Bi	0.1			1
Ca	0.05	0.1	N	1
Cd	0.005			1
Ce	0.08			1
Co	0.01	0.02	N	1
Cr	0.02	1.7		1
Cu	0.005	0.21		1
Dy	0.02			1
Eu	0.01			1
Fe	0.01	7.5		1
Gd	0.2			1
K	1			1
La	0.03			1
Li	0.02			1
Mg	0.08			1
Mn	0.005	0.14		1
Mo	0.02	0.03	N	1
Na	0.08	2		1
Nd	0.03			1
Ni	0.03	0.85		1
P	0.1			1
Pb	0.06			1
Pd	0.2			1
Rh	0.1			1
Ru	0.05			1
Sb	0.05			1
Se	0.08			1
Si	0.05			1
Sn	0.8			1
Sr	0.005			1
Te	0.1			1
Th	0.8			1
Ti	0.005			1
Tl	0.5			1
U	1			1
V	0.01			1
W	0.08			1
Y	0.01			1
Zn	0.02	0.75		1
Zr	0.01			1

Form: GENERAL RPT (03/12/92)

Ques>	WSDT 14E			
ALOPes>	92-07732			
PFes>	1			
SAMPLE				
Analyte	Q.L.	CONC.	Q	ADF
ID	(ug/mL)	(ug/mL)		
Ag	0.01			1
Al	0.06			
As	0.08			1
B	0.02	0.03	N	1
Ba	0.01			1
Be	0.005			1
Bi	0.1			1
Ca	0.05	0.93		1
Cd	0.005			1
Ce	0.08			1
Co	0.01			1
Cr	0.02	0.2		1
Cu	0.005			1
Dy	0.02			
Eu	0.01			1
Fe	0.01	0.57		1
Gd	0.2			1
K	1			1
La	0.03			1
Li	0.02			1
Mg	0.08			
Mn	0.005	0.01	N	1
Mo	0.02			1
Na	0.08			1
Nd	0.03			1
Ni	0.03	0.07	N	1
P	0.1			1
Pb	0.06			1
Pd	0.2			
Rh	0.1			1
Ru	0.05			1
Sb	0.05			1
Se	0.08			1
Si	0.05			1
Sn	0.8			1
Sr	0.005			1
Te	0.1			1
Th	0.8			1
Ti	0.005			1
Tl	0.5			1
U	1			1
V	0.01			1
W	0.08			1
Y	0.01			
Zn	0.02			1
Zr	0.01			

See "COVER" letter for discussion of tests, abbreviations and comments.

Data Filename: 92D164B

Date Analyzed: 06/12/92

Analyst: DR Sanders

Preparer: N Cleavenger

Reviewer: *Skaggs* 6-17-92

Ques>				
ALOPes>				
PFes>				
SAMPLE				
Analyte ID	Q.L. (ug/mL)	CONC. (ug/mL)	Q	ADF
Ag	0.01			1
Al	0.06			1
As	0.08			1
B	0.02			1
Ba	0.01			1
Be	0.005			1
Bi	0.1			1
Ca	0.05			1
Cd	0.005			1
Ce	0.08			1
Co	0.01			1
Cr	0.02			1
Cu	0.005			1
Dy	0.02			1
Eu	0.01			1
Fe	0.01			1
Gd	0.2			1
K	1			1
La	0.03			1
Li	0.02			1
Mg	0.08			1
Mn	0.005			1
Mo	0.02			1
Na	0.08			1
Nd	0.03			1
Ni	0.03			1
P	0.1			1
Pb	0.06			1
Pd	0.2			1
Rh	0.1			1
Ru	0.05			1
Sb	0.05			1
Se	0.08			1
Si	0.05			1
Sn	0.8			1
Sr	0.005			1
Te	0.1			1
Th	0.8			1
Ti	0.005			1
Tl	0.5			1
U	1			1
V	0.01			1
W	0.08			1
Y	0.01			1
Zn	0.02			1
Zr	0.01			1

<<< INORGANIC ANALYTICAL REPORT >>>

ICP : FINAL RESULTS
(Archive RIDS file: ICP-325-405)Client: R Strebien
Work Order: M99913/19067
Report Date: 8/17/92

Elem>	WSDT 10E			
ALOF=>	92-07928			
PF>	1			
	SAMPLE			
Analyte	D.L.	CONC.		
ID	(ug/ml)	(ug/ml)	Q	ADF
Ag	0.01			1
Al	0.06			1
As	0.08			1
B	0.02	0.2		1
Ba	0.01			1
Be	0.005			1
Bi	0.1			1
Ca	0.05			1
Cd	0.005			1
Ce	0.08			1
Co	0.01			1
Cr	0.02	0.1		1
Cu	0.005	0.02		1
Dy	0.02			1
Eu	0.01			1
Fe	0.01	0.5		1
Gd	0.2			1
K	1			1
La	0.03			1
Li	0.02			1
Mg	0.08			1
Mn	0.005	0.01	N	1
Mo	0.02			1
Na	0.08	0.3		1
Nd	0.03			1
Ni	0.03	12		1
P	0.1			1
Pb	0.06			1
Pd	0.2			1
Rh	0.1			1
Ru	0.05			1
Sb	0.05			1
Se	0.08			1
Si	0.05			1
Sn	0.8			1
Sr	0.005			1
Te	0.1			1
Th	0.8			1
Ti	0.005			1
Tl	0.5			1
U	1			1
V	0.01			1
W	0.08			1
Y	0.01			1
Zn	0.02	0.04	N	1
Zr	0.01			1

Form: GENERAL.RPT (03/12/92)

Elem>	WSDT 11E			
ALOF=>	92-07929			
PF=>	1			
SAMPLE				
Analyte	D.L	CONC	Q	ADF
ID	(ug/ml)	(ug/ml)		
Ag	0.01			1
Al	0.06			1
As	0.08	0.1	N	1
B	0.02	0.03	N	1
Ba	0.01			1
Be	0.005			1
Bi	0.1			1
Ca	0.05			1
Cd	0.005			1
Ce	0.08			1
Co	0.01			1
Cr	0.02			1
Cu	0.005			1
Dy	0.02			1
Eu	0.01			1
Fe	0.01			1
Gd	0.2			1
K	1			1
La	0.03			1
Li	0.02			1
Mg	0.08			1
Mn	0.005			1
Mo	0.02			1
Na	0.08			1
Nd	0.03			1
Ni	0.3	200		10
P	0.1			1
Pb	0.06	0.4		1
Pd	0.2	0.4	N	1
Rh	0.1			1
Ru	0.05			1
Sb	0.05			1
Se	0.08			1
Si	0.05			1
Sn	0.8			1
Sr	0.005			1
Te	0.1			1
Th	0.8			1
Ti	0.005			1
Tl	0.5			1
U	1			1
V	0.01			1
W	0.08	0.2	N	1
Y	0.01			1
Zn	0.02			1
Zr	0.01	0.03	N	1

See "COVER" letter for discussion of terms, abbreviations and comments.

Data Filename: 92D164B
Date Analyzed: 06/12/92
Analyst: DR Sanders
Preparer: N Cleavenger
Reviewer: *Wagner 6-17-92*

Qw=>	WSDT	12E		
ALOf=>	92-07930			
PFw=>	1			
	SAMPLE			
Analyte	D.L.	CONC.	Q	ADF
ID	(ug/ml)	(ug/ml)		
Ag	0.01			1
Al	0.06			1
As	0.08	0.1	N	1
B	0.02			1
Ba	0.01			1
Be	0.005			1
Bi	0.1			1
Ca	0.05			1
Cd	0.005			1
Ce	0.08			1
Co	0.01			1
Cr	0.02			1
Cu	0.005			1
Dy	0.02			1
Eu	0.01			1
Fe	0.01			1
Gd	0.2			1
K	1			1
La	0.03			1
Li	0.02			1
Mg	0.08			1
Mn	0.005			1
Mo	0.02			1
Na	0.08			1
Nd	0.03			1
Ni	0.3	200		10
P	0.1			1
Pb	0.06	0.3		1
Pd	0.2	0.4	N	1
Rh	0.1			1
Ru	0.05			1
Sb	0.05			1
Se	0.08			1
Si	0.05			1
Sn	0.8			1
Sr	0.005			1
Te	0.1			1
Th	0.8			1
Ti	0.005			1
Tl	0.5			1
U	1			1
V	0.01			1
W	0.08	0.2	N	1
Y	0.01			1
Zn	0.02			1
Zr	0.01	0.03	N	1

<<< INORGANIC ANALYTICAL REPORT >>>

ICP : FINAL RESULTS

(Archive RIDS file: ICP-325-405)

Client: R Strehin

Work Order: M99913/19067

Report Date: 6/17/92

Data Filename: 92D164B

Date Analyzed: 06/12/92

Analyst: DR Sanders

Preparer: N Cleavenger

Reviewer: *Wagner* 6.17.92

Q=	WSDT	7E		
ALOP=	92-07925			
PF=	1			
SAMPLE				
Analyte ID	Q.L. (ug/ml)	CONC. (ug/ml)	Q	ADF
Ag	0.01			1
Al	0.06			1
As	0.06			1
B	0.02	0.1		1
Ba	0.01			1
Be	0.005			1
Bi	0.1			1
Ca	0.05			1
Cd	0.005			1
Ce	0.08			1
Co	0.01			1
Cr	0.02	0.08		1
Cu	0.005			1
Dy	0.02			1
Eu	0.01			1
Fe	0.01	0.46		1
Gd	0.2			1
K	1			1
La	0.03			1
Li	0.02			1
Mg	0.08			1
Mn	0.005	0.009	N	1
Mo	0.02			1
Na	0.08	0.3		1
Nd	0.03			1
Ni	0.03	9.8		1
P	0.1			1
Pb	0.06			1
Pd	0.2			1
Rh	0.1			1
Ru	0.05			1
Sb	0.05			1
Se	0.08			1
Si	0.05			1
Sn	0.8			1
Sr	0.005			1
Te	0.1			1
Th	0.8			1
Ti	0.005			1
Tl	0.5			1
U	1			1
V	0.01			1
W	0.08			1
Y	0.01			1
Zn	0.02	0.05	N	1
Zr	0.01			1

Form: GENERALRPT (03/12/92)

Draw>	WSDT	8E		
ALOP>	92-07926			
PFee>	1			
SAMPLE				
Analyte ID	Q.L. (ug/ml)	CONC. (ug/ml)	Q	ADF
Ag	0.01			1
Al	0.06	0.07	N	
As	0.08			1
B	0.02	0.1		1
Ba	0.01			1
Be	0.005			1
Bi	0.1			1
Ca	0.05			1
Cd	0.005			1
Ce	0.08			1
Co	0.01			1
Cr	0.02	0.06		1
Cu	0.005			1
Dy	0.02			1
Eu	0.01			1
Fe	0.01			1
Gd	0.2			1
K	1			1
La	0.03			1
Li	0.02			1
Mg	0.08			1
Mn	0.005	0.007	N	1
Mo	0.02			1
Na	0.08	0.3		1
Nd	0.03			1
Ni	0.03	13		1
P	0.1			1
Pb	0.06			1
Pd	0.2			1
Rh	0.1			1
Ru	0.05			1
Sb	0.05			1
Se	0.08			1
Si	0.05			1
Sn	0.8			1
Sr	0.005			1
Te	0.1			1
Th	0.8			1
Ti	0.005			1
Tl	0.5			1
U	1			1
V	0.01			1
W	0.08			1
Y	0.01			1
Zn	0.02	0.07		1
Zr	0.01			1

See "COVER" letter for discussion of terms, abbreviations and comments.

Review: 9207927		WSDT	9E
ALOP=>	92-07927		
PF=>	1		
SAMPLE			
Analyte ID	Q.L. (ug/mL)	CONC (ug/mL)	Q ADF
Ag	0.01		1
Al	0.06		
As	0.08		1
B	0.02	0.1	1
Ba	0.01		1
Be	0.005		1
Bi	0.1		1
Ca	0.05		1
Cd	0.005		1
Ce	0.08		1
Co	0.01		1
Cr	0.02	0.09	1
Cu	0.005		1
Dy	0.02		1
Eu	0.01		1
Fe	0.01	0.45	1
Gd	0.2		1
K	1		1
La	0.03		1
Li	0.02		1
Mg	0.08		1
Mn	0.005	0.009	N 1
Mo	0.02		1
Na	0.08	0.2	1
Nd	0.03		1
Ni	0.03	13	1
P	0.1		1
Pb	0.06		1
Pd	0.2		1
Rh	0.1		1
Ru	0.05		1
Sb	0.05		1
Se	0.08		1
Si	0.05		1
Sn	0.8		1
Sr	0.005		1
Te	0.1		1
Th	0.8		1
Ti	0.005		1
Tl	0.5		1
U	1		1
V	0.01		1
W	0.08		1
Y	0.01		1
Zn	0.02	0.04	N 1
Zr	0.01		1

<<< INORGANIC ANALYTICAL REPORT >>>

ICP : FINAL RESULTS

(Archive RIDS file: ICP-325-405)

Client: R Strabin

Work Order: M99913/19067

Report Date: 6/17/92

Data Filename: 92D164B

Date Analyzed: 06/12/92

Analyst: DR Sanders

Preparer: N. Cleavenger

Reviewer: J. Wagner 6-17-92

Ques>	WSOT		4E	
ALOF#>	92-07922			
PF#>	1			
SAMPLE				
Analyte ID	Q.L. (ug/mL)	CONC (ug/mL)	Q	ADF
Ag	0.01			1
Al	0.06			1
As	0.08			1
B	0.02	0.24		1
Ba	0.01			1
Be	0.005			1
Bi	0.1			1
Ca	0.05			1
Cd	0.005			1
Ce	0.08			1
Co	0.01			1
Cr	0.02	0.2		1
Cu	0.005	0.008	N	1
Dy	0.02			1
Eu	0.01			1
Fe	0.01	0.77		1
Gd	0.2			1
K	1			1
La	0.03			1
Li	0.02			1
Mg	0.08			1
Mn	0.005	0.01	N	1
Mo	0.02			1
Na	0.08	0.2	N	1
Nd	0.03			1
Ni	0.03	14		1
P	0.1			1
Pb	0.06			1
Pd	0.2			1
Rh	0.1			1
Ru	0.05			1
Sb	0.05			1
Se	0.08			1
Si	0.05			1
Sn	0.8			1
Sr	0.005			1
Te	0.1			1
Th	0.8			1
Ti	0.005			1
Tl	0.5			1
U	1			1
V	0.01			1
W	0.08			1
Y	0.01			1
Zn	0.02	0.04	N	1
Zr	0.01			1

Form: GENERAL RPT (03/12/92)

Ques>	WSDT 5E			
ALOF#>	92-07923			
PF#>	1			
	SAMPLE			
Analyte	Q.L.	CONC.		
ID	(ug/mL)	(ug/mL)	Q	ADF
Ag	0.01			1
Al	0.06			1
As	0.08			1
B	0.02	0.21		1
Ba	0.01			1
Be	0.005			1
Bi	0.1			1
Ca	0.05			1
Cd	0.005			1
Ce	0.08			1
Co	0.01			1
Cr	0.02	0.1		1
Cu	0.005			1
Dy	0.02			1
Eu	0.01			1
Fe	0.01	0.61		1
Gd	0.2			1
K	1			1
La	0.03			1
Li	0.02			1
Mg	0.08			1
Mn	0.005	0.01	N	1
Mo	0.02			1
Na	0.08	0.2	N	1
Nd	0.03			1
Ni	0.03	15		1
P	0.1			1
Pb	0.06			1
Pd	0.2			1
Rh	0.1			1
Ru	0.05			1
Sb	0.05			1
Se	0.08			1
Si	0.05			1
Sn	0.8			1
Sr	0.005			1
Te	0.1			1
Th	0.8			1
Ti	0.005			1
Tl	0.5			1
U	1			1
V	0.01			1
W	0.08			1
Y	0.01			1
Zn	0.02	0.09		1
Zr	0.01			1

See "COVER" letter for discussion of limits, abbreviations and comments.

Des>	WSD1	6E		
ALOF#>	92-07924			
PF#>	1			
	SAMPLE			
Analyte	Q.L.	CONC.		
ID	(ug/mL)	(ug/mL)	Q	ADF
Ag	0.01			1
Al	0.06			1
As	0.08			1
B	0.02	0.21		1
Ba	0.01			1
Be	0.005			1
Bi	0.1			1
Ca	0.05			1
Cd	0.005			1
Ce	0.08			1
Co	0.01			1
Cr	0.02	0.08		1
Cu	0.005			1
Dy	0.02			1
Eu	0.01			1
Fe	0.01	0.42		1
Gd	0.2			1
K	1			1
La	0.03			1
Li	0.02			1
Mg	0.08			1
Mn	0.005	0.008	N	1
Mo	0.02			1
Na	0.08	0.3		1
Nd	0.03			1
Ni	0.03	16		1
P	0.1			1
Pb	0.06			1
Pd	0.2			1
Rh	0.1			1
Ru	0.05			1
Sb	0.05			1
Se	0.08			1
Si	0.05			1
Sn	0.8			1
Sr	0.005			1
Te	0.1			1
Th	0.8			1
Ti	0.005			1
Tl	0.5			1
U	1			1
V	0.01			1
W	0.08			1
Y	0.01			1
Zn	0.02	0.1		1
Zr	0.01			1

<<< INORGANIC ANALYTICAL REPORT >>>

ICP : FINAL RESULTS

(Archive RIDS file: ICP-325-405)

Client: R Streblin

Work Order: M99813/19067

Report Date: 6/17/92

Q==>	WSDT	1E		
ALOP==>	92-07919			
PF==>	1			
SAMPLE				
Analyte	Q.L.	CONC.	Q	ADF
ID	(ug/mL)	(ug/mL)		
Ag	0.01			1
Al	0.06			1
As	0.08			1
B	0.02	0.25		1
Ba	0.01			1
Be	0.005			1
Bi	0.1			1
Ca	0.05	0.83		1
Cd	0.005			1
Ce	0.08			1
Co	0.01			1
Cr	0.02	0.08		1
Cu	0.005	0.006	N	1
Dy	0.02			1
Eu	0.01			1
Fe	0.01	0.4		1
Gd	0.2			1
K	1			1
La	0.03			1
Li	0.02			1
Mg	0.08			1
Mn	0.005	0.009	N	1
Mo	0.02			1
Na	0.08	0.3		1
Nd	0.03			1
Ni	0.03	15		1
P	0.1			1
Pb	0.06			1
Pd	0.2			1
Rh	0.1			1
Ru	0.05			1
Sb	0.05			1
Se	0.08			1
Si	0.05			1
Sn	0.8			1
Sr	0.005			1
Te	0.1			1
Th	0.8			1
Ti	0.005			1
Tl	0.5			1
U	1			1
V	0.01			1
W	0.08			1
Y	0.01			1
Zn	0.02	0.2		1
Zr	0.01			1

Form: GENERALRPT (03/12/92)

Q==>	WSDT				2E	
ALOP==>	92-07920					
PF==>	1					
SAMPLE						
Analyte	Q.L.	CONC.				
ID	(ug/mL)	(ug/mL)	Q	ADF		
Ag	0.01					1
Al	0.06					
As	0.08					1
B	0.02	0.2				1
Ba	0.01					1
Be	0.005					1
Bi	0.1					1
Ca	0.05	0.08	N			1
Cd	0.005					1
Ce	0.08					1
Co	0.01					1
Cr	0.02	0.1				1
Cu	0.005	0.007	N			1
Dy	0.02					1
Eu	0.01					1
Fe	0.01	0.5				1
Gd	0.2					1
K	1					1
La	0.03					1
Li	0.02					1
Mg	0.08					1
Mn	0.005	0.01	N			1
Mo	0.02					1
Na	0.08	0.2	N			1
Nd	0.03					1
Ni	0.03	18				1
P	0.1					1
Pb	0.06					1
Pd	0.2					1
Rh	0.1					1
Ru	0.05					1
Sb	0.05					1
Se	0.08					1
Si	0.05					1
Sn	0.8					1
Sr	0.005					1
Te	0.1					1
Th	0.8					1
Ti	0.005					1
Tl	0.5					1
U	1					1
V	0.01					1
W	0.08					1
Y	0.01					1
Zn	0.02	0.06	N			1
Zr	0.01					1

See "COVER" letter for discussion of terms, abbreviations and comments.

Data Filename: 92D164B

Data Analyzed: 06/12/92

Analyst: DR Sanders

Preparer: N Cleavenger

Reviewer: *McLaguer 6-17-92*

Q==>	WSOT		3E	
ALOP==>	92-07921			
PF==>	1			
SAMPLE				
Analyte	Q.L.	CONC.		
ID	(ug/mL)	(ug/mL)	Q	ADF
Ag	0.01			1
Al	0.06			
As	0.08			1
B	0.02	0.2		1
Ba	0.01			1
Be	0.005			
Bi	0.1			1
Ca	0.05			1
Cd	0.005			1
Ce	0.08			1
Co	0.01			1
Cr	0.02	0.1		1
Cu	0.005			1
Dy	0.02			
Eu	0.01			1
Fe	0.01	0.62		1
Gd	0.2			1
K	1			1
La	0.03			1
Li	0.02			
Mg	0.08			1
Mn	0.005	0.01	N	1
Mo	0.02			1
Na	0.08	0.2	N	1
Nd	0.03			1
Ni	0.03	15		1
P	0.1			1
Pb	0.06			
Pd	0.2			1
Rh	0.1			1
Ru	0.05			1
Sb	0.05			1
Se	0.08			1
Si	0.05			1
Sn	0.8			1
Sr	0.005			
Te	0.1			1
Th	0.8			1
Ti	0.005			1
Tl	0.5			1
U	1			1
V	0.01			1
W	0.08			
Y	0.01			1
Zn	0.02	0.05	N	1
Zr	0.01			1

Analytical Chemistry Laboratory (ACL) Analytical Request Form

To: Mike Urie Date: 6-9-92 W.O. Number: M99913

Requested By: R.S. Strebin Jr [Signature] 6-2262 PR-08
 Print Name Signature Phone MSIN

Delivered By: _____
 Print Name Signature Date

Material Description: 10ml of 2% HNO₃ (trace of ⁶³Ni)

Identification Number(s): see attached list

Analyses Requested: Ni, nominally 0.1mg Ni in each SQ(1-10E)
11E & 12E have 2mg Ni (direct carrier), 13E & 14E I am not
sure of the level and they may be higher so use caution
other analyses of solvent Fe, Co, Cr

Special Storage or Handling Requirements: none

Disposal of Samples (discard return, other):

Requested Reports/Additional Instructions:

PNL-MA-70 Impact Level: 2 QA Plan: MCS033

Additional QA Requirements (SOW, other):

None

To the best of my knowledge, this work was accomplished in accordance with the requirements of this Analytical Request Form:

Signed: Jerry Wagner (ICP only) Recipient Date: 6-17-92

(Results must be signed and dated by the analyst and reviewer, identifying the measuring and test equipment, procedure used (including revision), Laboratory Record Book reference, etc.)

Recipient: Return form, with results, for Requestor's signature.

The report/data received has been reviewed, and to the best of my knowledge complies with the request submitted for analytical services:

Signed: _____ Requestor Date: _____

Requestor: Please return signed form to Analytical Laboratory Operations,

PT-37

Analytical Chemistry Laboratory (ACL) Analytical Request Form

To: Mike Urie Date: 6-9-92 W.O. Number: M99913

Requested By: R.S. Strebin [Signature] 6-2262 PS-08
 Print Name Signature Phone MSIN

Delivered By: _____
 Print Name Signature Date

Material Description: 10 ml of 2% HNO₃

Identification Number(s): see attached list

Analyses Requested: Ni, nominally 0.1 mg Ni in each SQ(1-10E)
11E & 12E have 2 mg Ni (direct carrier), 13E & 14E I am not
sure of the level and they may be higher so use caution

Special Storage or Handling Requirements: none

Disposal of Samples (discard) return, other):

Requested Reports/Additional Instructions:

PHL-MA-70 Impact Level: 2 QA Plan: MCS033

Additional QA Requirements (SOW, other):

None

To the best of my knowledge, this work was accomplished in accordance with the requirements of this Analytical Request Form:

Signed: _____ Recipient Date: _____

(Results must be signed and dated by the analyst and reviewer, identifying the measuring and test equipment, procedure used (including revision), Laboratory Record Book reference, etc.)

Recipient: Return form, with results, for Requester's signature.

The report/data received has been reviewed, and to the best of my knowledge complies with the request submitted for analytical services:

Signed: _____ Requester Date: _____

Requester: Please return signed form to Analytical Laboratory Operations.

PT-17

J. H. Hage

6/9T/92

La #

1E	5-8-92	92-5070	#1200
2E		92-5070 DUP	
3E		92-5074	#1212
4E		92-5076	#1213
5E		92-5080	#1298
6E		92-5688	BLANK
7E		REAGENT BK	
8E		REAGENT BK	
9E		SPK BK	
10E		SPK BK	
11E		ICP-1	5/8/92 2mj Ni carrier
12E		ICP-2	5/8/92 2mj Ni carrier
13E		SS Disk 1 each	> - <u>Caution</u> maybe a little high for analysis
14E		SS Disk solution	

DON'T SAY IT -- *Write It!*

Date: July 29, 1992

To: Project File

From: Sandy Fadeff *S. L. Fadeff*

Subject: ICP Analysis Results for Second Batch 101SY Run

Funding was cut from the program before we could obtain the ICP results for the stable nickel determination. Therefore, no such report exists. Only the gravimetric results could be used to determine the Ni yield for each sample. This is not the optimal method of performing the yield determination.

Analytical Request Form

To: Mike Uris Date: 6/19/92 WP/NO Number: M99913-

Requested by: S.K. Fadeff S.K. Fadeff 67015 PB-08
(name) (signature) (phone) (mail stop)

Analysis Requested:
Ni

Identification Numbers: ICP-a, ICP-b, ICP-c, LSC-a, LSC-b, LSC-c, and
#1 - 12 on run date 5/21/92

Material Description:

2% HNO₃, 10ml volume [Ni] ~ 200ppm on ICP-~~LSC~~ samples
[Ni] ~ 20ppm on 1-12 & LSC samples.

Special Storage or Handling Requirements: ☒ None, ☐ Other:

Disposal of Samples: ☐ Discard, ☐ Return, ☐ Other:

Requested Reports/Additional Instructions:

QA Requirements: ☐ Impact Level: I II (indicate level)
☐ SOW number
☐ Other:

Results must be signed and dated by the analyst and reviewer, identifying the measuring and test equipment and the procedure used (including revision).

QP Representative sign/date QP Representative approval required only for the first ARF in a series for internal work.
Approval not required for external work.

To the best of my knowledge, this work was accomplished in accordance with the requirements of this Analytical Request Form:

By: _____ Date: _____
Responsible Analyst or Group Manager

(Return this form or a copy to the requestor).

The report/data furnished has been reviewed and to the best of my knowledge complies with the above request.

By: _____ Date: _____
Requestor

This is a recommended format. Other forms may be used if they provide information which is equivalent to that required by this exhibit.

Battelle, PNL

NI-59 AND NI-63 ANALYSIS ANALYST SHEET

Procedure PNL-ALO-473

Date Sample Prep Started 5/21/92

Nickel Carrier

Volume 0.2018 ml $\pm$ 0.0013 ml Date pipetted 5/21/92

Pipet No. 1024646 Standard ID 53293 pg 30 Concentration 10,015 μ g/ml

Standard Expiration Date 9/1/92

Nickel-63 Spike

Volume 0.09928 ml $\pm$ 0.00058 ml Date pipetted 5/21/92

Pipet No. 30-III Spike ID 54124-16-0 Spike Conc. _____

Sample Volume

Volume _____ ml $\pm$ _____ ml Date pipetted _____ Pipet No. _____

Holdback Carriers 200 λ Fe, 9.97 mg/ml; 100 λ Ba, 10 mg/ml; 1 ml Co, 1 mg/ml; 50 λ Sb, 20 mg/ml; 100 λ , 10 mg/ml; 20 λ Zn; 100 λ Re, 10 mg/ml; 1 ml Zr, 1 mg/ml; 100 λ La, 10 mg/ml; 100 λ Y, 10 mg/ml; Mn, 100 λ , 10 mg/ml; 100 λ Cr, 10 mg/ml; 100 λ Cs, 10 mg/ml; 2.5 λ Rn, 0.04241; 50 λ Sr, 20 mg/ml

Sample Information

Balance No. _____

Sample ID	Sample Size	disc tare wt.	Initial Volume	Aliquot disc Volume	Sample Splits LSC Net wt.	approx. LEPS yield
1 92-5086	4 x 5 ml		0.4095 g	0.41105	1.55 mg	79 %
2 92-5086 ^T	2 x 5 ml		0.4427	0.44453	1.8	89 %
3 92-5087	1 x 5 ml		0.41464 ^{akt} ~~0.4214~~	0.41636	1.92	95.0
4 92-5092	4 x 5 ml		0.43084 ^{akt} ~~0.4239~~	0.43277	1.93	95.5
5 92-5074	3 x 5 ml		0.40078	0.40258	1.80	89.1
6 92-5080	2 x 5 ml		0.46030	0.46211	1.81	89.6
7 92-5076	3 x 5 ml		0.39533	0.39708	1.75	86.6
8 92-5093	3 x 5 ml		0.46115	0.46298	1.83	90.5
9 ⁹²⁻⁵⁶⁸⁹ HC Blank	3 x 5 ml			0.40320	1.78	88 %
10 BL				0.42251	1.82	90.1
11 BS				0.40406	1.92	96.95
12 MS-5080	1 x 5 ml			0.42427	1.66	83.82

Final Sample Aliquot Volume (Step 8.2) _____ ml $\pm$ _____ ml

Pipet No. _____ Date _____

Aliquot for stable Ni determination (Step 8.3) _____ ml $\pm$ _____ ml

Pipet No. _____ Date _____

Final Solution Volume for Ni determination (Step 8.3) _____ ml $\pm$ _____ ml

Pipet No. _____ Date _____

Reference Pipet/Balance Log LRB 53647 page(s) 79

Stanley K. Todeff 5/21/92
Analyst's Signature date
nialanal.log

Reviewer's Signature date

30-4 ¹⁷ 37
4.960 μ g $\pm$ 0.0218 μ g

6/19/42

Estimate of Fluorescence Correction
for 92-5070 Ni (Plated on SS)

For 1ml ^{63}Ni + 1mg Ni on SS, count
FLUORNI.D2;3 given

$$\frac{3343 \text{ c}}{884 \text{ min}} \text{ in ch 37}$$

$$\text{Ch 37} = 3.78 \text{ cpm}$$

$$\frac{2403 \text{ c}}{884 \text{ min}} \text{ in ch 32}$$

$$\text{Ch 32} = 2.72 \text{ cpm}$$

$$1 \text{ ml } ^{63}\text{Ni} \sim (81,810 \pm 970) \text{ dpm}$$

$$92-5070 \text{ has } (679 \pm 20) \text{ dpm } ^{63}\text{Ni}$$

$$\frac{3.78 \text{ cpm}}{81,810 \text{ dpm}} = \frac{x \text{ cpm}}{679 \text{ dpm}}$$

$$x = 0.03137 \text{ cpm}$$

$$0.03137 \text{ cpm} \times 2820.12 \text{ min} = 88.48 \text{ counts in ch 37}$$

Spectrum has 509 counts in ch 37 (17%)

$$\frac{2.72 \text{ cpm}}{81,810 \text{ dpm}} = \frac{x}{679 \text{ dpm}}$$

$$x = 0.02258 \text{ cpm}$$

$$0.02258 \times 2820.12 \text{ min} = 63.66 \text{ counts in ch 32}$$

Spectrum has 496 counts in ch 32 (13%)

$$\text{MSB } 3.169g$$

$$\frac{3.169g}{40} \times 10 = 0.7923g$$

$$< 1.7 \times \frac{1}{.7923} = < 2.14$$

$$92 - 5491$$

$$\frac{3.656g}{40} \times 10 = 0.9140g$$

$$< 1.7$$

$$1044 - 1630$$

$$\frac{1044}{1630 + 75.7} =$$

$$\frac{81,809 \text{ dpm}}{800 \text{ dpm}} = \frac{3343c / \text{ch}}{X}$$

$$X = 3343 \times \frac{800}{81,809} = 32.7c / \text{ch mol}$$

ch $37\frac{1}{2}$

$$X = \frac{2403 \times 800}{81,809} = 23.5c / \text{ch mol}$$

ch 32

$$X = \frac{3343 \times (679 \pm 20) \text{ dpm}}{81,809} = 27.7c / \text{ch} \approx 37\frac{1}{2}$$

$$X = \frac{2403 \times (679 \pm 20)}{81,809} = 19.9c / \text{ch} \approx 32$$

Prepared By: J. H. Long Date: 6/25/92 Project: 101-54
Title/Subject: Fluorescence Correction for Ni Plated on Pt

Blank Spike Sample

$$\Sigma SUM (E67..E77) = 2358 \pm 48.56$$

$$Bkgd = \frac{11}{6} * \Sigma SUM (E64..E66, E78..E80) = 2047.83 \pm 61.27$$

$$Net = 310.17 \pm \sqrt{2358 + (61.27)^2}$$

$$Net = (310.17 \pm 78.18) \text{ counts}$$

$$cpm (net) = \frac{(310.17 \pm 78.18) \text{ c}}{1614.4912 \text{ m}} = (0.192 \pm 0.048)$$

$$dpm \text{ } ^{63}\text{Ni in Blank Spike} = (926 \pm 26)$$

$$\begin{aligned} \text{Here } \frac{cpm \text{ fluorescence}}{dpm \text{ } ^{63}\text{Ni}} &= \frac{(0.192 \pm 0.048)}{(926 \pm 26)} \\ &= (2.073 \pm 0.5216) \times 10^{-4} \frac{cpm}{dpm} \end{aligned}$$

Reviewed J. K. Judy
6/24/92

APPENDIX E

ORGANIC ANALYSIS PRIMARY DATA

E1 - CHELATOR AND PEROXIDE RESULTS

ANALYSIS OF WINDOW E COMPOSITE SAMPLES FOR CHELATORS AND PEROXIDES

J.A. CAMPBELL

INTRODUCTION

Ethylenediaminetetraacetic acid (EDTA) and hydroxyethylenediaminetriacetic acid (HEDTA) entered waste streams through various processes and were finally deposited in the waste tanks after various stages of waste processing. These organics are reportedly the major organic components in Tank 101-SY. Knowledge of the organic constituents present in the waste Tank 101-SY is necessary to understand the chemical mechanism(s) responsible for producing hydrogen and other gases.

The goal of this task is to develop analytical methods for analyzing simulated and actual waste samples for chelators, chelator fragments, and other organic constituents. Liquid chromatography (LC), derivatization gas chromatography/mass spectrometry (GC/MS), and liquid chromatography/mass spectrometry (LC/MS) are the three techniques that have been focused on for analysis of chelators and chelator fragments. Ion chromatography/MS and derivatization GC/MS are also being developed to identify smaller degradation products such as oxalate and glycolate. These techniques should be considered complementary, and can also be applied to waste samples to identify components other than chelators. As these and other techniques are developed, they will be transferred to personnel in the 325 Building to be used for routine analyses. At this time, the developed techniques have not been validated; therefore, the data discussed here should be evaluated accordingly.

EXPERIMENTAL

Samples designated 1197, 1199, 1215, 1214, 1196, 1299, and 1306, composited by Westinghouse Hanford Company personnel, were received into the hot cell facilities in the 325 Building. Approximately 2 g of solid sample was weighed and placed in an Erlenmeyer flask with 20 mL of demineralized water. The solution was stirred for 24 hours and then filtered through a 0.45- μ m filter to remove any undissolved solid material. The water solution was concentrated to dryness using nitrogen blow down techniques. The remaining residue was then derivatized with boron trifluoride/methanol solution in the following manner: 2 mL of boron trifluoride/methanol solution (Aldrich) was added to the residue and heated to 100° C for 1 hr in a sealed Reactivial^R. After cooling, 1 mL of chloroform was added and the mixture was vortexed. The entire reaction mixture was then added to a test tube containing 5 mL of 0.1M KH₂PO₄ adjusted to pH 7.0 with NaOH. After vortexing this mixture, the top layer was

removed and the bottom layer containing the methyl esters of the chelators was collected. The chloroform solution was removed from the hot cell, monitored for radioactivity levels, and concentrated and prepared for GC/MS analysis. Each sample was also analyzed by positive ion chemical ionization MS.

RESULTS

The following samples were analyzed for chelators by derivatization GC/MS:

<u>Sample #</u>	<u>Description</u>
1197	Core composite 1, bulk sample, convective layer
1199	Core composite 1, bulk sample, convective layer
1215	Core composite 2, bulk sample, convective layer
1214	Core composite 2, bulk sample, convective layer
1196	Core composite 3, bulk sample, non-convective layer
1198	Core composite 3, bulk sample, non-convective layer not analyzed
1299	Core composite 4, bulk sample, non-convective layer
1306	Core composite 4, bulk sample, non-convective layer

Figure 1 is a total ion chromatogram of one of the derivatized samples. Figure 2 illustrates the structures for the major components. Proposed structures for the identified components will be in a subsequent report.

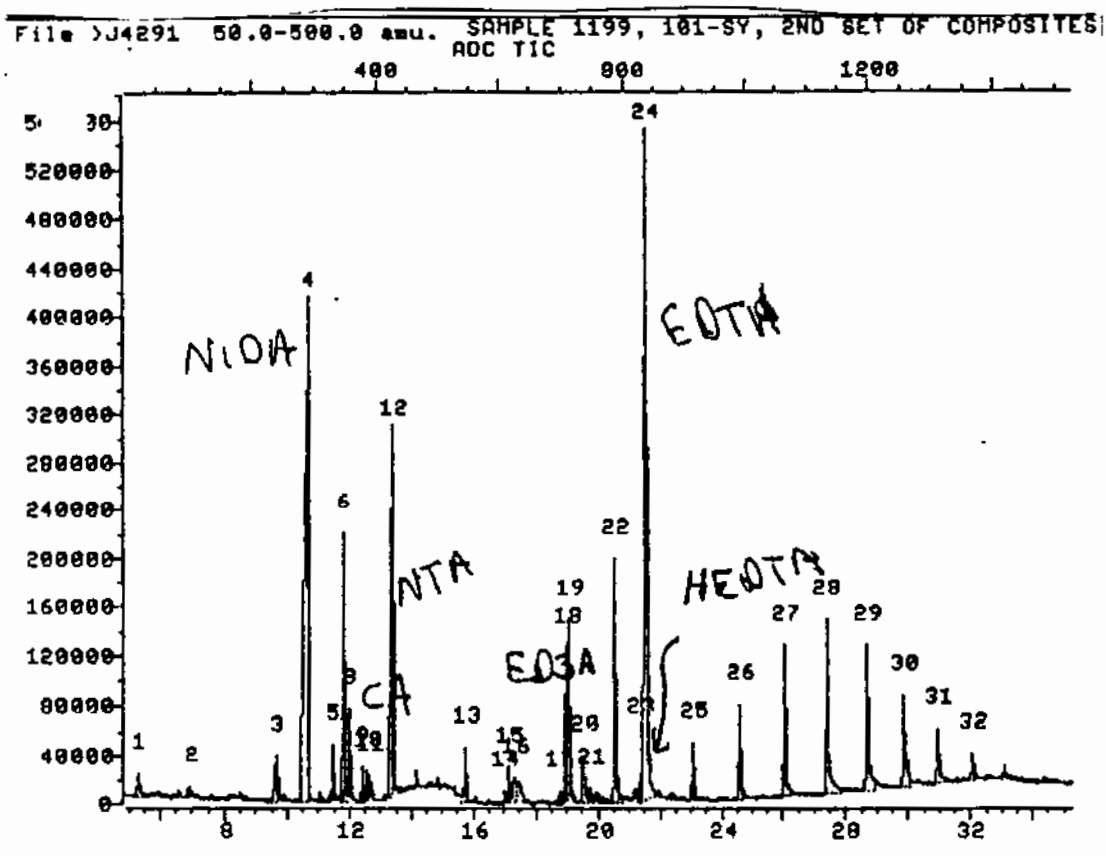
Table 1 summarizes the concentration for the major components. The components are abbreviated in the following manner: NIDA- nitrosoiminodiacetic acid; NTA- nitrilotriacetic acid; CA- citric acid; ED3a- ethylenediaminetriacetic acid; EDTA-ethylenediaminetetraacetic acid; and HEDTA- N-(2-hydroxyethylethylenediaminetriacetic acid). This method is in the development stage and has not been validated. Therefore, the results should be treated accordingly.

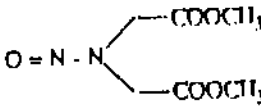
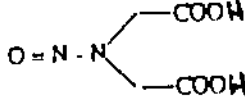
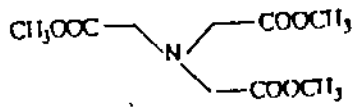
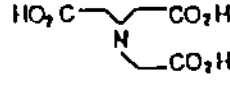
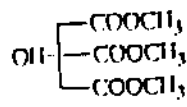
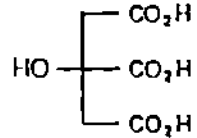
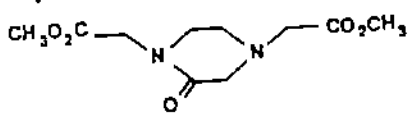
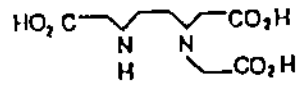
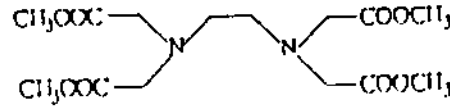
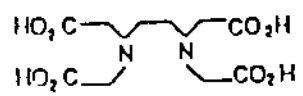
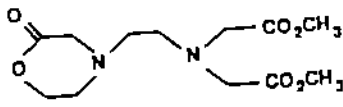
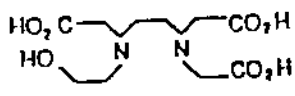
The concentrations are only approximate. The derivatization GC/MS method is only in the development stages and has not been validated. Numbers may be subject to change.

Table 1. Concentration of Major Components (μg Carbon/g sample)

<u>Sample #</u>	<u>NIDA</u>	<u>NTA</u>	<u>CA</u>	<u>ED3A</u>	<u>EDTA</u>	<u>HEDTA</u>
1197	750	54	10	90	120	10
1199	760	337	15	153	338	20
1215	2610	242	20	40	70	10
1214	940	165	10	20	51	10
1196	226	87	30	134	480	10
1198	Not analyzed					
1299	222	110	40	260	290	20
1306	168	65	84	210	192	10

Figure 1. Total Ion Chromatogram of Derivatized Composite Sample



Compound	Structure Detected by MS	Probable Structure in Tank ^(c)
NIDA		
NTA		 NTA (Nitrilotriacetic Acid)
CA		 Citric Acid
ED3A ^(a)		 ED3A ⁻ (Ethylenediaminetriacetic Acid)
EDTA		 EDTA ⁻ (Ethylenediaminetetraacetic Acid)
HEDTA ^(b)		 HEDTA (N-(2-Hydroxyethyl)ethylenediaminetriacetic Acid)

(a) Identified as the intramolecular lactam. This is formed as a result of the derivatization procedure.

(b) Identified as the intramolecular lactone. This is formed as a result of the derivatization procedure.

(c) Under basic conditions, compounds probably exist as the COO⁻ or salt

E2 - SEMIVOLATILE ANALYSIS RESULTS

ORGANIC COMPOUND ANALYSIS REPORT

SEMIVOLATILE COMPOUNDS

SAMPLE ANALYSIS REPORTED

This report presents results from the analyses of four composite samples from 101-SY Window E for semivolatile organic compounds by gas chromatography/mass spectrometry (GC/MS).

COMMENTS ON THE VALIDITY OF THE ANALYTICAL RESULTS PRESENTED IN THIS REPORT

The results presented in this report are based on analyses for which some quality requirements in the US EPA Contract Laboratory Program (CLP) Statement of Work (SOW) 2/88, from which method PNL-ALO-120 is derived, were not met. One problem was a high, out-of-limit recovery for one of the surrogate compounds in the method blank. If correction of this problem is not verified by a repeat GC/MS analysis, the requirement is that both the blank and samples are reextracted and reanalyzed. The correction activities performed were unsuccessful and the reanalysis of the blank did not result in the acceptable surrogate compound recovery. The other problem was failure of the system autosampler during late evening resulting in some of the samples not being analyzed within the required 12 hour time window for a given system calibration. Time and sample were not available to perform a reextraction and reanalysis for preparation of a requested preliminary report, so the analysis was continued on the remaining samples. A preliminary report was issued, and direction was requested as to need for reextraction and reanalysis. For the following reasons, direction provided by the Westinghouse Hanford Company was that the reextraction and reanalysis was not necessary.

- The generally high surrogate spike and matrix spike recoveries strongly indicate that the problem was associated with extraction solvent evaporation occurring during the sonication extraction process. The extraction was performed in a different location than usual for this type of sample, and the evaporation rate was unexpectedly greater than usual.
- Review of the analytical results showed only three target compounds in just one of the samples (see forms 1B/C included in this data package), and these were considerably below the quantitation limits for those compounds. In general, the results indicate a nominal 20% increase in surrogate spike recoveries (a solvent evaporation of about 20%). Loss of any of the semivolatile compounds would not be expected in this process. Consequently, the maximum expected error for any results would be a 20% high bias. None of the results are compromised by this uncertainty. The concentrations of the three target compounds found in the one duplicate of one sample were below the quantitation limit for which the resulting uncertainty is greater than 20%, and the uncertainty of the TIC concentrations is certainly greater than the 20% because of estimated, rather than true, calibration factors.

SAMPLE DESCRIPTION AND PREPARATION

<u>Sample ID</u>	<u>ACL Lab Number</u>
Vial 1295	92-05072
Vial 1296	92-05078
Vial 1203	92-05085
Vial 1307	92-05091

The samples were received 04/07/92. Extractions of both samples and spiked samples were performed. Since these samples were at a pH of >12, the cognizant scientist was consulted as to sample pH adjustment. Because of the experience with poor acid surrogate recoveries in the first set of 101-SY samples analyzed, the decision was to adjust the pH to the 6-8 range. This was accomplished by addition of 1:10 H₂SO₄ to the sample aliquots prior to the extraction.

• Extraction procedure	PNL-ALO-120
• Extraction location	Lab 302, 325 building
• Extraction type	Sonication, medium level, soil
• Sample/Extract storage temperature	4°C(+/-2°)

ANALYSIS METHOD

• GC/MS procedure:	PNL-ALO-345.
• GC/MS instrumentation:	HP-5890/5970 GC/MS (WB38473)
• GC/MS location:	Lab 325, 325 building.

QUALITY CONTROL

The QC features in the analytical procedure were followed as described in the method.

The following comments summarize QC and related information for analysis of these samples.

• Holding time.	The hold time requirements for the sample extraction and GC/MS analysis were met.
• Blank analysis.	The blank analysis requirements were met except for the surrogate recovery described below.
• Surrogate recoveries.	The surrogate Phenol-d5 recovery exceeded control limits for the blank. One sample analysis had four surrogates out of limit, five samples had no surrogates out and three had one surrogate out. For samples, one surrogate out of limits is acceptable, and two out requires reanalysis.

- MS/MSD recoveries. None of the ten acid MS and MSD recoveries were within the method limits and six of twelve of the base-neutral MS and MSD recoveries were within limits. Reanalysis is not required for out of limit MS and MSD results. The recoveries were generally high agreeing with the high surrogate spike recoveries. There were matrix effects on recoveries of the chlorinated compounds, 4-nitrophenol, and pentachlorophenol. Reproducibility was satisfactory.

DATA

The data and calibration are archived on magnetic tape in the 325 building 325 laboratory. The following is the list of the pertinent files.

<u>File Name</u>	<u>Sample Number</u>	<u>Sample Analyzed</u>
>DC401		Mass calibration and tune check
>DC402		Continuing calibration
>DC403		SBLK106, method blank
>DC404	92-05072-A1	Vial 1295
>DC405	92-05072-A4	Vial 1295
>DC406	92-05072-B	Vial 1295
>DC407	92-05078-A2	Vial 1296
>DC408	92-05078-B2	Vial 1296
>DC409	92-05085-2	Vial 1203
>DC410	92-05091-2	Vial 1307
>DC411	92-05072-MS	Vial 1295 MS
>DC412	92-05072-MSD	Vial 1295 MSD

Laboratory data is maintained as follows:

<u>Activity</u>	<u>Location</u>
• GC/MS injection log	BNW-52908 pg. 126-127
• Extraction bench sheet:	filed with data in the ACL/ALO records center
• GC/MS data, sample report:	filed with data in the ACL/ALO records center

RESULTS

CLP Target Compounds: As seen in the attached 1B,C Forms, the only target compounds found were in one of the duplicate samples for Vial 1296, 92-05078-A2. These were:

Di-n-butylphthalate	330 µg/Kg
Benzo(a)pyrene	660 µg/Kg
Benzo(g,h,i)perylene	1500 µg/Kg

Tentatively Identified Compounds (TIC): The attached 1F Forms show results for the TIC's. Concentration estimates for the TIC's are made assuming that the response factor for each TIC is one. The peak area for each TIC is then compared to the area of the nearest internal standard (for which concentrations are known) to estimate the TIC concentrations. Identification of the TIC is made by a computer search of the NIST mass spectral library to attempt a match with the spectrum of each of the TIC's. The TIC's reported as "Unknown" did not have satisfactory matches with library spectra. The TIC concentration estimate and identification are reported only if the TIC peak area is 10% or greater than the nearest internal standard peak area.

Normal paraffin hydrocarbon constituents were found in all the samples along with triphenyl phosphine oxide contamination that is also in the blank. This compound is associated with laboratory upgrade activities. The source of the 1,1'-sulfonylbis(2-chloro)benzene that is in the blank and samples from vials 1295 and 1296 (one of the duplicates) is currently unknown. One of the vial 1296 samples also contained a relatively long chain, branched alkane, and possibly a derivative of the triphenyl phosphine oxide contaminant.

Comments on the Analysis: Several observations can be made regarding the analyses of these samples.

- The extracts of these samples are generally higher in radioactivity than has been found for most of the waste and Hanford site soil samples analyzed so far. This can be attributed to the presence of complexants in the samples that solubilize the radionuclides in the relatively non-polar organic extractant. Support for this interpretation is the five-fold increase in radioactivity in the samples that have had the matrix spike mix added. The matrix spiked samples contain 20% more methanol which substantially increases the polarity of the extraction solvent. This will favor an even greater concentration of the complexed radionuclides in the organic phase.
- There is a significant matrix effect of the sample (vial 1295) on recoveries of the stronger acid and chlorinated benzene spike compounds.
- In contrast to the first set of 101-SY samples (WHC 1060 series samples), there were very few "Unknown" TIC's. These Window E samples contained mostly normal paraffin hydrocarbons, which were not present in the first set of samples. This result indicates inhomogeneity in the two sets of samples.
- There was a significant increase in the chromatographic baseline after two analyses which was a cumulative effect rather than being associated with one of the samples. The mass spectra in the region of the increased baseline indicated chromatographic column decomposition products and other undefined organic products, but no CO₂ as noted in the analysis of the first 101-SY samples. However, there was strong additional evidence of a high concentration of nonvolatile organics in these samples: a noticeably large amount of carbon from decomposed organics was deposited on the glass wool in the injection port of the

gas chromatograph after just two sample analyses (just 2- μ L of sample). As before, this points out the need for an analysis of the nonvolatiles by a technique such as liquid chromatography with mass spectra detection if an adequate characterization of the samples for organics is to be achieved.

- Results provided in this preliminary report are most likely not compromised by the failed quality control requirements. Thus, for a characterization process, these data are valid (see the section COMMENTS ON THE VALIDITY OF THE ANALYTICAL RESULTS PRESENTED IN THIS REPORT).

The following defines the Q-flags in the Form 1's

<u>"Q" Flag</u>	<u>Definition</u>
U	Indicates the compound was analyzed for but not detected, the U-flagged concentration is the Contract Required Quantitation Limit.
J	Indicates an estimated value for target and tentatively identified compounds, spectra meet criteria but response is below Contract Required Quantitation Limit for the target compounds.
B	Indicates compound was found in the blank.
X	Indicates compound was manually deleted because all requirements were not met.
D	Indicates analysis was performed on a diluted sample.
E	Indicates that quantitation was outside of the calibration range.
A	Aldol condensation product.

ANALYST

W. H. H. H. H.

DATE 6/8/92

REVIEW

C. S. H. H.

DATE 6-4-92

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

SBLK106

Lab Name: BATTELLE-PNL

Contract: -----

Lab Code: ----- Case No.: ----- SAS No.: ----- SDG No.: --

Matrix: (soil/water) SOIL

Lab Sample ID: MET BLANK

Sample wt/vol: 1 (g/mL) G

Lab File ID: >DC403

Level: (low/med) MED

Date Received: ----

% Moisture: not dec..1 dec. --

Date Extracted: 04/15/92

Extraction: (Sepf/Cont/Sonc) SONC

Date Analyzed: 4/24/92

GPC Cleanup: (Y/N) N pH: ----

Dilution Factor: 1.00000

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) ug/Kg	Q

108-95-2-----	Phenol	20000.	U
111-44-4-----	bis(2-Chloroethyl) Ether	20000.	U
95-57-8-----	2-Chlorophenol	20000.	U
541-73-1-----	1,3-Dichlorobenzene	20000.	U
106-46-7-----	1,4-Dichlorobenzene	20000.	U
100-51-6-----	Benzyl alcohol	20000.	U
95-50-1-----	1,2-Dichlorobenzene	20000.	U
95-48-7-----	2-Methylphenol	20000.	U
39638-32-9-----	bis(2-chloroisopropyl) ether	20000.	U
106-44-5-----	4-Methylphenol	20000.	U
621-64-7-----	N-Nitroso-Di-n-propylamine	20000.	U
67-72-1-----	Hexachloroethane	20000.	U
98-95-3-----	Nitrobenzene	20000.	U
78-59-1-----	Isophorone	20000.	U
88-75-5-----	2-Nitrophenol	20000.	U
105-67-9-----	2,4-Dimethylphenol	20000.	U
65-85-0-----	Benzoic acid	100000.	U
111-91-1-----	bis(2-Chloroethoxy) methane	20000.	U
120-83-2-----	2,4-Dichlorophenol	20000.	U
120-82-1-----	1,2,4-Trichlorobenzene	20000.	U
91-20-3-----	Naphthalene	20000.	U
106-47-8-----	4-Chloroaniline	20000.	U
87-68-3-----	Hexachlorobutadiene	20000.	U
59-50-7-----	4-Chloro-3-methylphenol	20000.	U
91-57-6-----	2-Methylnaphthalene	20000.	U
77-47-4-----	Hexachlorocyclopentadiene	20000.	U
88-06-2-----	2,4,6-Trichlorophenol	20000.	U
95-95-4-----	2,4,5-Trichlorophenol	100000.	U
91-58-7-----	2-Chloronaphthalene	20000.	U
88-74-4-----	2-Nitroaniline	100000.	U
131-11-3-----	Dimethylphthalate	20000.	U
208-96-8-----	Acenaphthylene	20000.	U
606-20-2-----	2,6-Dinitrotoluene	20000.	U

1C
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

SBLK106

Lab Name: BATTELLE-PNL

Contract: -----

Lab Code: ----- Case No.: ----- SAS No.: ----- SDG No.: --

Matrix: (soil/water) SOIL

Lab Sample ID: MET BLANK

Sample wt/vol: 1 (g/mL) G

Lab File ID: >DC403

Level: (low/med) MED

Date Received: ----

% Moisture: not dec..1 dec. --

Date Extracted: 04/15/92

Extraction: (Sepf/Cont/Sonc) SONC

Date Analyzed: 4/24/92

GPC Cleanup: (Y/N) N pH: ----

Dilution Factor: 1.00000

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) ug/Kg	Q

99-09-2-----	3-Nitroaniline	100000.	U
83-32-9-----	Acenaphthene	20000.	U
51-28-5-----	2,4-Dinitrophenol	100000.	U
100-02-7-----	4-Nitrophenol	100000.	U
132-64-9-----	Dibenzofuran	20000.	U
121-14-2-----	2,4-Dinitrotoluene	20000.	U
84-66-2-----	Diethylphthalate	7800.	J
7005-72-3-----	4-Chlorophenyl-phenylether	20000.	U
86-73-7-----	Fluorene	20000.	U
100-01-6-----	4-Nitroaniline	20000.	U
534-52-1-----	4,6-Dinitro-2-methylphenol	100000.	U
86-30-6-----	N-Nitrosodiphenylamine (1)	20000.	U
101-55-3-----	4-Bromophenyl-phenylether	20000.	U
118-74-1-----	Hexachlorobenzene	20000.	U
87-86-5-----	Pentachlorophenol	100000.	U
85-01-8-----	Phenanthrene	20000.	U
120-12-7-----	Anthracene	20000.	U
84-74-2-----	Di-n-butylphthalate	20000.	U
206-44-0-----	Fluoranthene	20000.	U
129-00-0-----	Pyrene	20000.	U
85-68-7-----	Butylbenzylphthalate	20000.	U
91-94-1-----	3,3'-Dichlorobenzidine	40000.	U
56-55-3-----	Benzo(a)anthracene	20000.	U
218-01-9-----	Chrysene	20000.	U
117-81-7-----	bis(2-Ethylhexyl)phthalate	20000.	U
117-84-0-----	Di-n-octylphthalate	20000.	U
205-99-2-----	Benzo(b)fluoranthene	20000.	U
207-08-9-----	Benzo(k)fluoranthene	20000.	U
50-32-8-----	Benzo(a)pyrene	20000.	U
193-39-5-----	Indeno(1,2,3-cd)pyrene	20000.	U
53-70-3-----	Dibenz(a,h)anthracene	20000.	U
191-24-2-----	Benzo(g,h,i)perylene	20000.	U

(1) - Cannot be separated from Diphenylamine

FORM I SV-2

1/87 Rev.

1F
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

SBLK106

Lab Name: BATTELLE-PNL

Contract: -----

Lab Code: ----- Case No.: ----- SAS No.: ----- SDG No.: --

Matrix: (soil/water) SOIL

Lab Sample ID: MET BLANK

Sample wt/vol: 1 (g/mL) G

Lab File ID: >DC403

Level: (low/med) MED

Date Received: ----

% Moisture: not dec.-- dec. --

Date Extracted: 04/15/92

Extraction: (Sepf/Cont/Sonc) SONC

Date Analyzed: 4/24/92

GPC Cleanup: (Y/N) N pH: ----

Dilution Factor: 1.00000

Number TICs found: 2

CONCENTRATION UNITS:

(ug/L or ug/Kg) ug/Kg

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1. 80079	Benzene, 1,1'-sulfonylbis[4-	31.01	1300.	J
2. 2605676	Acetic acid, (triphenylphosp	34.60	7800.	J
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1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VIAL 1295 A

Lab Name: BATTELLE-PNL

Contract: -----

Lab Code: ----- Case No.: ----- SAS No.: ----- SDG No.: --

Matrix: (soil/water) SOIL

Lab Sample ID: 92-05072-A1

Sample wt/vol: 1.0144 (g/mL) G

Lab File ID: >DC404

Level: (low/med) MED

Date Received: 04/07/92

% Moisture: not dec..1 dec. --

Date Extracted: 04/15/92

Extraction: (Sepf/Cont/Sonc) SONC

Date Analyzed: 4/24/92

GPC Cleanup: (Y/N) N pH: >12

Dilution Factor: 1.00000

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) ug/Kg	Q
108-95-2-----	Phenol	20000.	U
111-44-4-----	bis(2-Chloroethyl) Ether	20000.	U
95-57-8-----	2-Chlorophenol	20000.	U
541-73-1-----	1,3-Dichlorobenzene	20000.	U
106-46-7-----	1,4-Dichlorobenzene	20000.	U
100-51-6-----	Benzyl alcohol	20000.	U
95-50-1-----	1,2-Dichlorobenzene	20000.	U
95-48-7-----	2-Methylphenol	20000.	U
39638-32-9-----	bis(2-chloroisopropyl) ether	20000.	U
106-44-5-----	4-Methylphenol	20000.	U
621-64-7-----	N-Nitroso-Di-n-propylamine	20000.	U
67-72-1-----	Hexachloroethane	20000.	U
98-95-3-----	Nitrobenzene	20000.	U
78-59-1-----	Isophorone	20000.	U
88-75-5-----	2-Nitrophenol	20000.	U
105-67-9-----	2,4-Dimethylphenol	20000.	U
65-85-0-----	Benzoic acid	99000.	U
111-91-1-----	bis(2-Chloroethoxy) methane	20000.	U
120-83-2-----	2,4-Dichlorophenol	20000.	U
120-82-1-----	1,2,4-Trichlorobenzene	20000.	U
91-20-3-----	Naphthalene	20000.	U
106-47-8-----	4-Chloroaniline	20000.	U
87-68-3-----	Hexachlorobutadiene	20000.	U
59-50-7-----	4-Chloro-3-methylphenol	20000.	U
91-57-6-----	2-Methylnaphthalene	20000.	U
77-47-4-----	Hexachlorocyclopentadiene	20000.	U
88-06-2-----	2,4,6-Trichlorophenol	20000.	U
95-95-4-----	2,4,5-Trichlorophenol	99000.	U
91-58-7-----	2-Chloronaphthalene	20000.	U
88-74-4-----	2-Nitroaniline	99000.	U
131-11-3-----	Dimethylphthalate	20000.	U
208-96-8-----	Acenaphthylene	20000.	U
606-20-2-----	2,6-Dinitrotoluene	20000.	U

1C
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VIAL 1295 A

Lab Name:BATTELLE-PNL

Contract:-----

Lab Code: ----- Case No.: ----- SAS No.: ----- SDG No.: --

Matrix: (soil/water) SOIL

Lab Sample ID: 92-05072-A1

Sample wt/vol: 1.0144 (g/mL) G

Lab File ID: >DC404

Level: (low/med) MED

Date Received: 04/07/92

% Moisture: not dec..1 dec. --

Date Extracted:04/15/92

Extraction: (Sepf/Cont/Sonc) SONC

Date Analyzed: 4/24/92

GPC Cleanup: (Y/N) N pH:>12

Dilution Factor: 1.00000

CAS NO.	COMPOUND	CONCENTRATION UNITS:	
		(ug/L or ug/Kg)	ug/Kg Q
99-09-2-----	3-Nitroaniline	99000.	U
83-32-9-----	Acenaphthene	20000.	U
51-28-5-----	2,4-Dinitrophenol	99000.	U
100-02-7-----	4-Nitrophenol	99000.	U
132-64-9-----	Dibenzofuran	20000.	U
121-14-2-----	2,4-Dinitrotoluene	20000.	U
84-66-2-----	Diethylphthalate	1400.	JB
7005-72-3-----	4-Chlorophenyl-phenylether	20000.	U
86-73-7-----	Fluorene	20000.	U
100-01-6-----	4-Nitroaniline	99000.	U
534-52-1-----	4,6-Dinitro-2-methylphenol	99000.	U
86-30-6-----	N-Nitrosodiphenylamine (1)	20000.	U
101-55-3-----	4-Bromophenyl-phenylether	20000.	U
118-74-1-----	Hexachlorobenzene	20000.	U
87-86-5-----	Pentachlorophenol	99000.	U
85-01-8-----	Phenanthrene	20000.	U
120-12-7-----	Anthracene	20000.	U
84-74-2-----	Di-n-butylphthalate	20000.	U
206-44-0-----	Fluoranthene	20000.	U
129-00-0-----	Pyrene	20000.	U
85-68-7-----	Butylbenzylphthalate	20000.	U
91-94-1-----	3,3'-Dichlorobenzidine	39000.	U
56-55-3-----	Benzo(a)anthracene	20000.	U
218-01-9-----	Chrysene	20000.	U
117-81-7-----	bis(2-Ethylhexyl)phthalate	20000.	U
117-84-0-----	Di-n-octylphthalate	20000.	U
205-99-2-----	Benzo(b)fluoranthene	20000.	U
207-08-9-----	Benzo(k)fluoranthene	20000.	U
50-32-8-----	Benzo(a)pyrene	20000.	U
193-39-5-----	Indeno(1,2,3-cd)pyrene	20000.	U
53-70-3-----	Dibenz(a,h)anthracene	20000.	U
191-24-2-----	Benzo(g,h,i)perylene	20000.	U

(1) - Cannot be separated from Diphenylamine

FORM I SV-2

1/87 Rev.

1F
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

VIAL 1295 A

Lab Name:BATTELLE-PNL

Contract:-----

Lab Code: ----- Case No.: ----- SAS No.: ----- SDG No.: --

Matrix: (soil/water) SOIL

Lab Sample ID: 92-05072-A1

Sample wt/vol: 1.0144 (g/mL) G

Lab File ID: >DC404

Level: (low/med) MED

Date Received: 04/07/92

% Moisture: not dec.-- dec. --

Date Extracted:04/15/92

Extraction: (Sepf/Cont/Sonc) SONC

Date Analyzed: 4/24/92

GPC Cleanup: (Y/N) N pH:>12

Dilution Factor: 1.00000

Number TICs found: 6

CONCENTRATION UNITS:
(ug/L or ug/Kg) ug/Kg

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1. 112403	Dodecane	8.42	200000.	J
2. 629505	Tridecane	10.64	620000.	J
3. 629594	Tetradecane	13.08	480000.	J
4. 629629	Pentadecane	15.54	18000.	J
5. 80079	Benzene, 1,1'-sulfonylbis[4-	31.00	13000.	JB
6. 791286	Phosphine oxide, triphenyl-	34.57	120000.	JB
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FORM I SV-TIC

1/87 Rev.

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VIAL 1295 A

Lab Name: BATTELLE-PNL Contract: -----

Lab Code: ----- Case No.: ----- SAS No.: ----- SDG No.: --

Matrix: (soil/water) SOIL Lab Sample ID: 92-05072-A4

Sample wt/vol: 1.0126 (g/mL) G Lab File ID: >DC405

Level: (low/med) MED Date Received: 04/07/92

% Moisture: not dec..1 dec. -- Date Extracted: 04/15/92

Extraction: (Sepf/Cont/Sonc) SONC Date Analyzed: 4/24/92

GPC Cleanup: (Y/N) N pH: >12 Dilution Factor: 1.00000

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) ug/Kg	Q
108-95-2-----	Phenol	20000.	U
111-44-4-----	bis(2-Chloroethyl) Ether	20000.	U
95-57-8-----	2-Chlorophenol	20000.	U
541-73-1-----	1,3-Dichlorobenzene	20000.	U
106-46-7-----	1,4-Dichlorobenzene	20000.	U
100-51-6-----	Benzyl alcohol	20000.	U
95-50-1-----	1,2-Dichlorobenzene	20000.	U
95-48-7-----	2-Methylphenol	20000.	U
39638-32-9-----	bis(2-chloroisopropyl) ether	20000.	U
106-44-5-----	4-Methylphenol	20000.	U
621-64-7-----	N-Nitroso-Di-n-propylamine	20000.	U
67-72-1-----	Hexachloroethane	20000.	U
98-95-3-----	Nitrobenzene	20000.	U
78-59-1-----	Isophorone	20000.	U
88-75-5-----	2-Nitrophenol	20000.	U
105-67-9-----	2,4-Dimethylphenol	20000.	U
65-85-0-----	Benzoic acid	99000.	U
111-91-1-----	bis(2-Chloroethoxy) methane	20000.	U
120-83-2-----	2,4-Dichlorophenol	20000.	U
120-82-1-----	1,2,4-Trichlorobenzene	20000.	U
91-20-3-----	Naphthalene	20000.	U
106-47-8-----	4-Chloroaniline	20000.	U
87-68-3-----	Hexachlorobutadiene	20000.	U
59-50-7-----	4-Chloro-3-methylphenol	20000.	U
91-57-6-----	2-Methylnaphthalene	20000.	U
77-47-4-----	Hexachlorocyclopentadiene	20000.	U
88-06-2-----	2,4,6-Trichlorophenol	20000.	U
95-95-4-----	2,4,5-Trichlorophenol	99000.	U
91-58-7-----	2-Chloronaphthalene	20000.	U
88-74-4-----	2-Nitroaniline	99000.	U
131-11-3-----	Dimethylphthalate	20000.	U
208-96-8-----	Acenaphthylene	20000.	U
606-20-2-----	2,6-Dinitrotoluene	20000.	U

FORM I SV-1

1/87 Rev.

1C
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VIAL 1295 A

Lab Name: BATTELLE-PNL

Contract: -----

Lab Code: ----- Case No.: ----- SAS No.: ----- SDG No.: --

Matrix: (soil/water) SOIL

Lab Sample ID: 92-05072-A4

Sample wt/vol: 1.0126 (g/mL) G

Lab File ID: >DC405

Level: (low/med) MED

Date Received: 04/07/92

% Moisture: not dec..1 dec. --

Date Extracted: 04/15/92

Extraction: (Sepf/Cont/Sonc) SONC

Date Analyzed: 4/24/92

GPC Cleanup: (Y/N) N pH: >12

Dilution Factor: 1.00000

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) ug/Kg	Q
99-09-2-----	3-Nitroaniline	99000.	U
83-32-9-----	Acenaphthene	20000.	U
51-28-5-----	2,4-Dinitrophenol	99000.	U
100-02-7-----	4-Nitrophenol	99000.	U
132-64-9-----	Dibenzofuran	20000.	U
121-14-2-----	2,4-Dinitrotoluene	20000.	U
84-66-2-----	Diethylphthalate	20000.	U
7005-72-3-----	4-Chlorophenyl-phenylether	20000.	U
86-73-7-----	Fluorene	20000.	U
100-01-6-----	4-Nitroaniline	99000.	U
534-52-1-----	4,6-Dinitro-2-methylphenol	99000.	U
86-30-6-----	N-Nitrosodiphenylamine (1)	20000.	U
101-55-3-----	4-Bromophenyl-phenylether	20000.	U
118-74-1-----	Hexachlorobenzene	20000.	U
87-86-5-----	Pentachlorophenol	99000.	U
85-01-8-----	Phenanthrene	20000.	U
120-12-7-----	Anthracene	20000.	U
84-74-2-----	Di-n-butylphthalate	20000.	U
206-44-0-----	Fluoranthene	20000.	U
129-00-0-----	Pyrene	20000.	U
85-68-7-----	Butylbenzylphthalate	20000.	U
91-94-1-----	3,3'-Dichlorobenzidine	40000.	U
56-55-3-----	Benzo(a)anthracene	20000.	U
218-01-9-----	Chrysene	20000.	U
117-81-7-----	bis(2-Ethylhexyl)phthalate	20000.	U
117-84-0-----	Di-n-octylphthalate	20000.	U
205-99-2-----	Benzo(b)fluoranthene	20000.	U
207-08-9-----	Benzo(k)fluoranthene	20000.	U
50-32-8-----	Benzo(a)pyrene	20000.	U
193-39-5-----	Indeno(1,2,3-cd)pyrene	20000.	U
53-70-3-----	Dibenz(a,h)anthracene	20000.	U
191-24-2-----	Benzo(g,h,i)perylene	20000.	U

(1) - Cannot be separated from Diphenylamine

1F
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

VIAL 1295 A

Lab Name: BATTELLE-PNL

Contract: -----

Lab Code: ----- Case No.: ----- SAS No.: ----- SDG No.: --

Matrix: (soil/water) SOIL

Lab Sample ID: 92-05072-A4

Sample wt/vol: 1.0126 (g/mL) G

Lab File ID: >DC405

Level: (low/med) MED

Date Received: 04/07/92

% Moisture: not dec.-- dec. --

Date Extracted: 04/15/92

Extraction: (Sepf/Cont/Sonc) SONC

Date Analyzed: 4/24/92

GPC Cleanup: (Y/N) N pH: >12

Dilution Factor: 1.00000

Number TICs found: 6

CONCENTRATION UNITS:
(ug/L or ug/Kg) ug/Kg

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1. 112403	Dodecane	8.41	240000.	J
2. 629505	Tridecane	10.65	760000.	J
3. 629594	Tetradecane	13.08	560000.	J
4. 629629	Pentadecane	15.54	22000.	J
5. 80079	Benzene, 1,1'-sulfonylbis[4-	31.00	13000.	JB
6. 791286	Phosphine oxide, triphenyl-	34.57	120000.	JB
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1/87 Rev.

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VIAL 1295 B

Lab Name: BATTELLE-PNL

Contract: -----

Lab Code: ----- Case No.: ----- SAS No.: ----- SDG No.: --

Matrix: (soil/water) SOIL

Lab Sample ID: 92-05072-B

Sample wt/vol: 1.0151 (g/mL) G

Lab File ID: >DC406

Level: (low/med) MED

Date Received: 04/07/92

% Moisture: not dec..1 dec. --

Date Extracted: 04/15/92

Extraction: (Sepf/Cont/Sonc) SONC

Date Analyzed: 4/24/92

GPC Cleanup: (Y/N) N pH: >12

Dilution Factor: 1.00000

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) ug/Kg	Q

108-95-2-----	Phenol	20000.	U
111-44-4-----	bis(2-Chloroethyl) Ether	20000.	U
95-57-8-----	2-Chlorophenol	20000.	U
541-73-1-----	1,3-Dichlorobenzene	20000.	U
106-46-7-----	1,4-Dichlorobenzene	20000.	U
100-51-6-----	Benzyl alcohol	20000.	U
95-50-1-----	1,2-Dichlorobenzene	20000.	U
95-48-7-----	2-Methylphenol	20000.	U
39638-32-9-----	bis(2-chloroisopropyl) ether	20000.	U
106-44-5-----	4-Methylphenol	20000.	U
621-64-7-----	N-Nitroso-Di-n-propylamine	20000.	U
67-72-1-----	Hexachloroethane	20000.	U
98-95-3-----	Nitrobenzene	20000.	U
78-59-1-----	Isophorone	20000.	U
88-75-5-----	2-Nitrophenol	20000.	U
105-67-9-----	2,4-Dimethylphenol	20000.	U
65-85-0-----	Benzoic acid	99000.	U
111-91-1-----	bis(2-Chloroethoxy) methane	20000.	U
120-83-2-----	2,4-Dichlorophenol	20000.	U
120-82-1-----	1,2,4-Trichlorobenzene	20000.	U
91-20-3-----	Naphthalene	20000.	U
106-47-8-----	4-Chloroaniline	20000.	U
87-68-3-----	Hexachlorobutadiene	20000.	U
59-50-7-----	4-Chloro-3-methylphenol	20000.	U
91-57-6-----	2-Methylnaphthalene	20000.	U
77-47-4-----	Hexachlorocyclopentadiene	20000.	U
88-06-2-----	2,4,6-Trichlorophenol	20000.	U
95-95-4-----	2,4,5-Trichlorophenol	99000.	U
91-58-7-----	2-Chloronaphthalene	20000.	U
88-74-4-----	2-Nitroaniline	99000.	U
131-11-3-----	Dimethylphthalate	20000.	U
208-96-8-----	Acenaphthylene	20000.	U
606-20-2-----	2,6-Dinitrotoluene	20000.	U

FORM I SV-1

1/87 Rev.

1C
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VIAL 1295 B

Lab Name:BATTELLE-PNL

Contract:-----

Lab Code: ----- Case No.: ----- SAS No.: ----- SDG No.: --

Matrix: (soil/water) SOIL

Lab Sample ID: 92-05072-B

Sample wt/vol: 1.0151 (g/mL) G

Lab File ID: >DC406

Level: (low/med) MED

Date Received: 04/07/92

% Moisture: not dec..1 dec. --

Date Extracted:04/15/92

Extraction: (Sepf/Cont/Sonc) SONC

Date Analyzed: 4/24/92

GPC Cleanup: (Y/N) N pH:>12

Dilution Factor: 1.00000

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) ug/Kg	Q

99-09-2-----3-Nitroaniline	99000.	U
83-32-9-----Acenaphthene	20000.	U
51-28-5-----2,4-Dinitrophenol	99000.	U
100-02-7-----4-Nitrophenol	99000.	U
132-64-9-----Dibenzofuran	20000.	U
121-14-2-----2,4-Dinitrotoluene	20000.	U
84-66-2-----Diethylphthalate	20000.	U
7005-72-3-----4-Chlorophenyl-phenylether	20000.	U
86-73-7-----Fluorene	20000.	U
100-01-6-----4-Nitroaniline	99000.	U
534-52-1-----4,6-Dinitro-2-methylphenol	99000.	U
86-30-6-----N-Nitrosodiphenylamine (1)	20000.	U
101-55-3-----4-Bromophenyl-phenylether	20000.	U
118-74-1-----Hexachlorobenzene	20000.	U
87-86-5-----Pentachlorophenol	99000.	U
85-01-8-----Phenanthrene	20000.	U
120-12-7-----Anthracene	20000.	U
84-74-2-----Di-n-butylphthalate	20000.	U
206-44-0-----Fluoranthene	20000.	U
129-00-0-----Pyrene	20000.	U
85-68-7-----Butylbenzylphthalate	20000.	U
91-94-1-----3,3'-Dichlorobenzidine	39000.	U
56-55-3-----Benzo(a)anthracene	20000.	U
218-01-9-----Chrysene	20000.	U
117-81-7-----bis(2-Ethylhexyl)phthalate	20000.	U
117-84-0-----Di-n-octylphthalate	20000.	U
205-99-2-----Benzo(b)fluoranthene	20000.	U
207-08-9-----Benzo(k)fluoranthene	20000.	U
50-32-8-----Benzo(a)pyrene	20000.	U
193-39-5-----Indeno(1,2,3-cd)pyrene	20000.	U
53-70-3-----Dibenz(a,h)anthracene	20000.	U
191-24-2-----Benzo(g,h,i)perylene	20000.	U

(1) - Cannot be separated from Diphenylamine

FORM I SV-2

1/87 Rev.

1F
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

VIAL 1295 B

Lab Name: BATTELLE-PNL

Contract: -----

Lab Code: ----- Case No.: ----- SAS No.: ----- SDG No.: --

Matrix: (soil/water) SOIL

Lab Sample ID: 92-05072-B

Sample wt/vol: 1.0151 (g/mL) G

Lab File ID: >DC406

Level: (low/med) MED

Date Received: 04/07/92

% Moisture: not dec. -- dec. --

Date Extracted: 04/15/92

Extraction: (Sepf/Cont/Sonc) SONC

Date Analyzed: 4/24/92

GPC Cleanup: (Y/N) N pH: >12

Dilution Factor: 1.00000

Number TICs found: 6

CONCENTRATION UNITS:
(ug/L or ug/Kg) ug/Kg

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1. 112403	Dodecane	8.42	200000.	J
2. 629505	Tridecane	10.65	600000.	J
3. 629594	Tetradecane	13.08	440000.	J
4. 629629	Pentadecane	15.55	16000.	J
5. 80079	Benzene, 1,1'-sulfonylbis[4-	31.01	10000.	JB
6. 791286	Phosphine oxide, triphenyl-	34.57	110000.	JB
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1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VIAL 1296 A

Lab Name: BATTELLE-PNL

Contract: -----

Lab Code: ----- Case No.: ----- SAS No.: ----- SDG No.: --

Matrix: (soil/water) SOIL

Lab Sample ID: 92-05078-A2

Sample wt/vol: 1.0132 (g/mL) G

Lab File ID: >DC407

Level: (low/med) MED

Date Received: 04/07/92

% Moisture: not dec..1 dec. --

Date Extracted: 04/15/92

Extraction: (Sepf/Cont/Sonc) SONC

Date Analyzed: 4/25/92

GPC Cleanup: (Y/N) N pH: >12

Dilution Factor: 1.00000

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) ug/Kg	Q

108-95-2-----	Phenol	20000.	U
111-44-4-----	bis(2-Chloroethyl) Ether	20000.	U
95-57-8-----	2-Chlorophenol	20000.	U
541-73-1-----	1,3-Dichlorobenzene	20000.	U
106-46-7-----	1,4-Dichlorobenzene	20000.	U
100-51-6-----	Benzyl alcohol	20000.	U
95-50-1-----	1,2-Dichlorobenzene	20000.	U
95-48-7-----	2-Methylphenol	20000.	U
39638-32-9-----	bis(2-chloroisopropyl) ether	20000.	U
106-44-5-----	4-Methylphenol	20000.	U
621-64-7-----	N-Nitroso-Di-n-propylamine	20000.	U
67-72-1-----	Hexachloroethane	20000.	U
98-95-3-----	Nitrobenzene	20000.	U
78-59-1-----	Isophorone	20000.	U
88-75-5-----	2-Nitrophenol	20000.	U
105-67-9-----	2,4-Dimethylphenol	20000.	U
65-85-0-----	Benzoic acid	99000.	U
111-91-1-----	bis(2-Chloroethoxy) methane	20000.	U
120-83-2-----	2,4-Dichlorophenol	20000.	U
120-82-1-----	1,2,4-Trichlorobenzene	20000.	U
91-20-3-----	Naphthalene	20000.	U
106-47-8-----	4-Chloroaniline	20000.	U
87-68-3-----	Hexachlorobutadiene	20000.	U
59-50-7-----	4-Chloro-3-methylphenol	20000.	U
91-57-6-----	2-Methylnaphthalene	20000.	U
77-47-4-----	Hexachlorocyclopentadiene	20000.	U
88-06-2-----	2,4,6-Trichlorophenol	20000.	U
95-95-4-----	2,4,5-Trichlorophenol	99000.	U
91-58-7-----	2-Chloronaphthalene	20000.	U
88-74-4-----	2-Nitroaniline	99000.	U
131-11-3-----	Dimethylphthalate	20000.	U
208-96-8-----	Acenaphthylene	20000.	U
606-20-2-----	2,6-Dinitrotoluene	20000.	U

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1C
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VIAL 1296 A

Lab Name: BATTELLE-PNL

Contract: -----

Lab Code: ----- Case No.: ----- SAS No.: ----- SDG No.: --

Matrix: (soil/water) SOIL

Lab Sample ID: 92-05078-A2

Sample wt/vol: 1.0132 (g/mL) G

Lab File ID: >DC407

Level: (low/med) MED

Date Received: 04/07/92

% Moisture: not dec..1 dec. --

Date Extracted: 04/15/92

Extraction: (Sepf/Cont/Sonc) SONC

Date Analyzed: 4/25/92

GPC Cleanup: (Y/N) N pH: >12

Dilution Factor: 1.00000

CAS NO.	COMPOUND	CONCENTRATION UNITS:	
		(ug/L or ug/Kg)	ug/Kg
			Q
99-09-2-----	3-Nitroaniline	99000.	U
83-32-9-----	Acenaphthene	20000.	U
51-28-5-----	2,4-Dinitrophenol	99000.	U
100-02-7-----	4-Nitrophenol	99000.	U
132-64-9-----	Dibenzofuran	20000.	U
121-14-2-----	2,4-Dinitrotoluene	20000.	U
84-66-2-----	Diethylphthalate	20000.	U
7005-72-3-----	4-Chlorophenyl-phenylether	20000.	U
86-73-7-----	Fluorene	20000.	U
100-01-6-----	4-Nitroaniline	99000.	U
534-52-1-----	4,6-Dinitro-2-methylphenol	99000.	U
86-30-6-----	N-Nitrosodiphenylamine (1)	20000.	U
101-55-3-----	4-Bromophenyl-phenylether	20000.	U
118-74-1-----	Hexachlorobenzene	20000.	U
87-86-5-----	Pentachlorophenol	99000.	U
85-01-8-----	Phenanthrene	20000.	U
120-12-7-----	Anthracene	20000.	U
84-74-2-----	Di-n-butylphthalate	670.	J
206-44-0-----	Fluoranthene	20000.	U
129-00-0-----	Pyrene	20000.	U
85-68-7-----	Butylbenzylphthalate	20000.	U
91-94-1-----	3,3'-Dichlorobenzidine	40000.	U
56-55-3-----	Benzo(a)anthracene	20000.	U
218-01-9-----	Chrysene	20000.	U
117-81-7-----	bis(2-Ethylhexyl)phthalate	20000.	U
117-84-0-----	Di-n-octylphthalate	20000.	U
205-99-2-----	Benzo(b)fluoranthene	20000.	U
207-08-9-----	Benzo(k)fluoranthene	20000.	U
50-32-8-----	Benzo(a)pyrene	1300.	J
193-39-5-----	Indeno(1,2,3-cd)pyrene	20000.	U
53-70-3-----	Dibenz(a,h)anthracene	20000.	U
191-24-2-----	Benzo(g,h,i)perylene	3100.	J

(1) - Cannot be separated from Diphenylamine

1F
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

VIAL 1296 A

Lab Name: BATTELLE-PNL

Contract: -----

Lab Code: ----- Case No.: ----- SAS No.: ----- SDG No.: --

Matrix: (soil/water) SOIL

Lab Sample ID: 92-05078-A2

Sample wt/vol: 1.0132 (g/mL) G

Lab File ID: >DC407

Level: (low/med) MED

Date Received: 04/07/92

% Moisture: not dec.-- dec. --

Date Extracted: 04/15/92

Extraction: (Sepf/Cont/Sonc) SONC

Date Analyzed: 4/25/92

GPC Cleanup: (Y/N) N pH: >12

Dilution Factor: 1.00000

Number TICs found: 7

CONCENTRATION UNITS:
(ug/L or ug/Kg) ug/Kg

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1. 112403	Dodecane	8.39	50000.	J
2. 629505	Tridecane	10.60	160000.	J
3. 629594	Tetradecane	13.03	120000.	J
4. 80079	Benzene, 1,1'-sulfonylbis[4-	31.06	130000.	JB
5. 791286	Phosphine oxide, triphenyl-	34.82	960000.	JB
6. 2959742	Phosphine oxide, diphenyl(ph	35.32	32000.	J
7.	Unknown alkane	41.04	22000.	J
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1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VIAL 1296 B

Lab Name:BATTELLE-PNL

Contract:-----

Lab Code: ----- Case No.: ----- SAS No.: ----- SDG No.: --

Matrix: (soil/water) SOIL

Lab Sample ID: 92-05078-B2

Sample wt/vol: 1.0504 (g/mL) G

Lab File ID: >DC408

Level: (low/med) MED

Date Received: 04/07/92

% Moisture: not dec..1 dec. --

Date Extracted:04/15/92

Extraction: (Sepf/Cont/Sonc) SONC

Date Analyzed: 4/25/92

GPC Cleanup: (Y/N) N pH:>12

Dilution Factor: 1.00000

CONCENTRATION UNITS:
(ug/L or ug/Kg) ug/Kg Q

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) ug/Kg	Q
108-95-2-----	Phenol	19000.	U
111-44-4-----	bis(2-Chloroethyl) Ether	19000.	U
95-57-8-----	2-Chlorophenol	19000.	U
541-73-1-----	1,3-Dichlorobenzene	19000.	U
106-46-7-----	1,4-Dichlorobenzene	19000.	U
100-51-6-----	Benzyl alcohol	19000.	U
95-50-1-----	1,2-Dichlorobenzene	19000.	U
95-48-7-----	2-Methylphenol	19000.	U
39638-32-9----	bis(2-chloroisopropyl) ether	19000.	U
106-44-5-----	4-Methylphenol	19000.	U
621-64-7-----	N-Nitroso-Di-n-propylamine	19000.	U
67-72-1-----	Hexachloroethane	19000.	U
98-95-3-----	Nitrobenzene	19000.	U
78-59-1-----	Isophorone	19000.	U
88-75-5-----	2-Nitrophenol	19000.	U
105-67-9-----	2,4-Dimethylphenol	19000.	U
65-85-0-----	Benzoic acid	95000.	U
111-91-1-----	bis(2-Chloroethoxy) methane	19000.	U
120-83-2-----	2,4-Dichlorophenol	19000.	U
120-82-1-----	1,2,4-Trichlorobenzene	19000.	U
91-20-3-----	Naphthalene	19000.	U
106-47-8-----	4-Chloroaniline	19000.	U
87-68-3-----	Hexachlorobutadiene	19000.	U
59-50-7-----	4-Chloro-3-methylphenol	19000.	U
91-57-6-----	2-Methylnaphthalene	19000.	U
77-47-4-----	Hexachlorocyclopentadiene	19000.	U
88-06-2-----	2,4,6-Trichlorophenol	19000.	U
95-95-4-----	2,4,5-Trichlorophenol	95000.	U
91-58-7-----	2-Chloronaphthalene	19000.	U
88-74-4-----	2-Nitroaniline	95000.	U
131-11-3-----	Dimethylphthalate	19000.	U
208-96-8-----	Acenaphthylene	19000.	U
606-20-2-----	2,6-Dinitrotoluene	19000.	U

1C
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VIAL 1296 B

Lab Name: BATTELLE-PNL Contract: -----

Lab Code: ----- Case No.: ----- SAS No.: ----- SDG No.: --

Matrix: (soil/water) SOIL Lab Sample ID: 92-05078-B2

Sample wt/vol: 1.0504 (g/mL) G Lab File ID: >DC408

Level: (low/med) MED Date Received: 04/07/92

% Moisture: not dec..1 dec. -- Date Extracted: 04/15/92

Extraction: (Sepf/Cont/Sonc) SONC Date Analyzed: 4/25/92

GPC Cleanup: (Y/N) N pH: >12 Dilution Factor: 1.00000

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) ug/Kg	Q
99-09-2-----	3-Nitroaniline	95000.	U
83-32-9-----	Acenaphthene	19000.	U
51-28-5-----	2,4-Dinitrophenol	95000.	U
100-02-7-----	4-Nitrophenol	95000.	U
132-64-9-----	Dibenzofuran	19000.	U
121-14-2-----	2,4-Dinitrotoluene	19000.	U
84-66-2-----	Diethylphthalate	19000.	U
7005-72-3-----	4-Chlorophenyl-phenylether	19000.	U
86-73-7-----	Fluorene	19000.	U
100-01-6-----	4-Nitroaniline	95000.	U
534-52-1-----	4,6-Dinitro-2-methylphenol	95000.	U
86-30-6-----	N-Nitrosodiphenylamine (1)	19000.	U
101-55-3-----	4-Bromophenyl-phenylether	19000.	U
118-74-1-----	Hexachlorobenzene	19000.	U
87-86-5-----	Pentachlorophenol	95000.	U
85-01-8-----	Phenanthrene	19000.	U
120-12-7-----	Anthracene	19000.	U
84-74-2-----	Di-n-butylphthalate	19000.	U
206-44-0-----	Fluoranthene	19000.	U
129-00-0-----	Pyrene	19000.	U
85-68-7-----	Butylbenzylphthalate	19000.	U
91-94-1-----	3,3'-Dichlorobenzidine	38000.	U
56-55-3-----	Benzo(a)anthracene	19000.	U
218-01-9-----	Chrysene	19000.	U
117-81-7-----	bis(2-Ethylhexyl)phthalate	19000.	U
117-84-0-----	Di-n-octylphthalate	19000.	U
205-99-2-----	Benzo(b)fluoranthene	19000.	U
207-08-9-----	Benzo(k)fluoranthene	19000.	U
50-32-8-----	Benzo(a)pyrene	19000.	U
193-39-5-----	Indeno(1,2,3-cd)pyrene	19000.	U
53-70-3-----	Dibenz(a,h)anthracene	19000.	U
191-24-2-----	Benzo(g,h,i)perylene	19000.	U

(1) - Cannot be separated from Diphenylamine

1F
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

VIAL 1296 B

Lab Name: BATTELLE-PNL

Contract: -----

Lab Code: ----- Case No.: ----- SAS No.: ----- SDG No.: --

Matrix: (soil/water) SOIL

Lab Sample ID: 92-05078-B2

Sample wt/vol: 1.0504 (g/mL) G

Lab File ID: >DC408

Level: (low/med) MED

Date Received: 04/07/92

% Moisture: not dec. -- dec. --

Date Extracted: 04/15/92

Extraction: (Sepf/Cont/Sonc) SONC

Date Analyzed: 4/25/92

GPC Cleanup: (Y/N) N pH: >12

Dilution Factor: 1.00000

Number TICs found: 5

CONCENTRATION UNITS:
(ug/L or ug/Kg) ug/Kg

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	Unknown	4.17	9200.	J
2. 112403	Dodecane	8.40	54000.	J
3. 629505	Tridecane	10.60	170000.	J
4. 629594	Tetradecane	13.02	120000.	J
5. 791286	Phosphine oxide, triphenyl-	34.54	48000.	JB
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1/87 Rev.

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VIAL 1203 2

Lab Name: BATTELLE-PNL

Contract: -----

Lab Code: ----- Case No.: ----- SAS No.: ----- SDG No.: --

Matrix: (soil/water) SOIL

Lab Sample ID: 92-05085-2

Sample wt/vol: 1.0656 (g/mL) G

Lab File ID: >DC409

Level: (low/med) MED

Date Received: 04/07/92

% Moisture: not dec..1 dec. --

Date Extracted: 04/15/92

Extraction: (Sepf/Cont/Sonc) SONC

Date Analyzed: 4/25/92

GPC Cleanup: (Y/N) N pH: >12

Dilution Factor: 1.00000

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) ug/Kg	Q

108-95-2-----	Phenol	19000.	U
111-44-4-----	bis(2-Chloroethyl) Ether	19000.	U
95-57-8-----	2-Chlorophenol	19000.	U
541-73-1-----	1,3-Dichlorobenzene	19000.	U
106-46-7-----	1,4-Dichlorobenzene	19000.	U
100-51-6-----	Benzyl alcohol	19000.	U
95-50-1-----	1,2-Dichlorobenzene	19000.	U
95-48-7-----	2-Methylphenol	19000.	U
39638-32-9-----	bis(2-chloroisopropyl) ether	19000.	U
106-44-5-----	4-Methylphenol	19000.	U
621-64-7-----	N-Nitroso-Di-n-propylamine	19000.	U
67-72-1-----	Hexachloroethane	19000.	U
98-95-3-----	Nitrobenzene	19000.	U
78-59-1-----	Isophorone	19000.	U
88-75-5-----	2-Nitrophenol	19000.	U
105-67-9-----	2,4-Dimethylphenol	19000.	U
65-85-0-----	Benzoic acid	94000.	U
111-91-1-----	bis(2-Chloroethoxy) methane	19000.	U
120-83-2-----	2,4-Dichlorophenol	19000.	U
120-82-1-----	1,2,4-Trichlorobenzene	19000.	U
91-20-3-----	Naphthalene	19000.	U
106-47-8-----	4-Chloroaniline	19000.	U
87-68-3-----	Hexachlorobutadiene	19000.	U
59-50-7-----	4-Chloro-3-methylphenol	19000.	U
91-57-6-----	2-Methylnaphthalene	19000.	U
77-47-4-----	Hexachlorocyclopentadiene	19000.	U
88-06-2-----	2,4,6-Trichlorophenol	19000.	U
95-95-4-----	2,4,5-Trichlorophenol	94000.	U
91-58-7-----	2-Chloronaphthalene	19000.	U
88-74-4-----	2-Nitroaniline	94000.	U
131-11-3-----	Dimethylphthalate	19000.	U
208-96-8-----	Acenaphthylene	19000.	U
606-20-2-----	2,6-Dinitrotoluene	19000.	U

FORM I SV-1

1/87 Rev.

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1C
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VIAL 1203 2

Lab Name: BATTELLE-PNL

Contract: -----

Lab Code: ----- Case No.: ----- SAS No.: ----- SDG No.: --

Matrix: (soil/water) SOIL

Lab Sample ID: 92-05085-2

Sample wt/vol: 1.0656 (g/mL) G

Lab File ID: >DC409

Level: (low/med) MED

Date Received: 04/07/92

% Moisture: not dec..1 dec. --

Date Extracted: 04/15/92

Extraction: (Sepf/Cont/Sonc) SONC

Date Analyzed: 4/25/92

GPC Cleanup: (Y/N) N pH: >12

Dilution Factor: 1.00000

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) ug/Kg	Q

99-09-2-----	3-Nitroaniline	94000.	U
83-32-9-----	Acenaphthene	19000.	U
51-28-5-----	2,4-Dinitrophenol	94000.	U
100-02-7-----	4-Nitrophenol	94000.	U
132-64-9-----	Dibenzofuran	19000.	U
121-14-2-----	2,4-Dinitrotoluene	19000.	U
84-66-2-----	Diethylphthalate	19000.	U
7005-72-3-----	4-Chlorophenyl-phenylether	19000.	U
86-73-7-----	Fluorene	19000.	U
100-01-6-----	4-Nitroaniline	94000.	U
534-52-1-----	4,6-Dinitro-2-methylphenol	94000.	U
86-30-6-----	N-Nitrosodiphenylamine (1)	19000.	U
101-55-3-----	4-Bromophenyl-phenylether	19000.	U
118-74-1-----	Hexachlorobenzene	19000.	U
87-86-5-----	Pentachlorophenol	94000.	U
85-01-8-----	Phenanthrene	19000.	U
120-12-7-----	Anthracene	19000.	U
84-74-2-----	Di-n-butylphthalate	19000.	U
206-44-0-----	Fluoranthene	19000.	U
129-00-0-----	Pyrene	19000.	U
85-68-7-----	Butylbenzylphthalate	19000.	U
91-94-1-----	3,3'-Dichlorobenzidine	38000.	U
56-55-3-----	Benzo(a)anthracene	19000.	U
218-01-9-----	Chrysene	19000.	U
117-81-7-----	bis(2-Ethylhexyl)phthalate	19000.	U
117-84-0-----	Di-n-octylphthalate	19000.	U
205-99-2-----	Benzo(b)fluoranthene	19000.	U
207-08-9-----	Benzo(k)fluoranthene	19000.	U
50-32-8-----	Benzo(a)pyrene	19000.	U
193-39-5-----	Indeno(1,2,3-cd)pyrene	19000.	U
53-70-3-----	Dibenz(a,h)anthracene	19000.	U
191-24-2-----	Benzo(g,h,i)perylene	19000.	U

(1) - Cannot be separated from Diphenylamine

FORM I SV-2

1/87 Rev.

1F
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

VIAL 1203 2

Lab Name: BATTELLE-PNL

Contract: -----

Lab Code: ----- Case No.: ----- SAS No.: ----- SDG No.: --

Matrix: (soil/water) SOIL

Lab Sample ID: 92-05085-2

Sample wt/vol: 1.0656 (g/mL) G

Lab File ID: >DC409

Level: (low/med) MED

Date Received: 04/07/92

% Moisture: not dec.-- dec. --

Date Extracted: 04/15/92

Extraction: (Sepf/Cont/Sonc) SONC

Date Analyzed: 4/25/92

GPC Cleanup: (Y/N) N pH: >12

Dilution Factor: 1.00000

Number TICs found: 5

CONCENTRATION UNITS:

(ug/L or ug/Kg) ug/Kg

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	Unknown	4.18	16000.	J
2. 112403	Dodecane	8.39	7600.	J
3. 629505	Tridecane	10.57	24000.	J
4. 629594	Tetradecane	13.00	16000.	J
5. 791286	Phosphine oxide, triphenyl-	34.54	46000.	JB
6.				
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FORM I SV-TIC

1/87 Rev.

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

Lab Name: BATTELLE-PNL

Contract: -----

VIAL 1307 2

Lab Code: ----- Case No.: ----- SAS No.: ----- SDG No.: --

Matrix: (soil/water) SOIL Lab Sample ID: 92-05091-2

Sample wt/vol: 1.0237 (g/mL) G Lab File ID: >DC410

Level: (low/med) MED Date Received: 04/07/92

% Moisture: not dec..1 dec. -- Date Extracted: 04/15/92

Extraction: (Sepf/Cont/Sonc) SONC Date Analyzed: 4/25/92

GPC Cleanup: (Y/N) N pH: >12 Dilution Factor: 1.00000

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) ug/Kg	Q
108-95-2-----	Phenol	20000.	U
111-44-4-----	bis(2-Chloroethyl) Ether	20000.	U
95-57-8-----	2-Chlorophenol	20000.	U
541-73-1-----	1,3-Dichlorobenzene	20000.	U
106-46-7-----	1,4-Dichlorobenzene	20000.	U
100-51-6-----	Benzyl alcohol	20000.	U
95-50-1-----	1,2-Dichlorobenzene	20000.	U
95-48-7-----	2-Methylphenol	20000.	U
39638-32-9-----	bis(2-chloroisopropyl) ether	20000.	U
106-44-5-----	4-Methylphenol	20000.	U
621-64-7-----	N-Nitroso-Di-n-propylamine	20000.	U
67-72-1-----	Hexachloroethane	20000.	U
98-95-3-----	Nitrobenzene	20000.	U
78-59-1-----	Isophorone	20000.	U
88-75-5-----	2-Nitrophenol	20000.	U
105-67-9-----	2,4-Dimethylphenol	20000.	U
65-85-0-----	Benzoic acid	98000.	U
111-91-1-----	bis(2-Chloroethoxy) methane	20000.	U
120-83-2-----	2,4-Dichlorophenol	20000.	U
120-82-1-----	1,2,4-Trichlorobenzene	20000.	U
91-20-3-----	Naphthalene	20000.	U
106-47-8-----	4-Chloroaniline	20000.	U
87-68-3-----	Hexachlorobutadiene	20000.	U
59-50-7-----	4-Chloro-3-methylphenol	20000.	U
91-57-6-----	2-Methylnaphthalene	20000.	U
77-47-4-----	Hexachlorocyclopentadiene	20000.	U
88-06-2-----	2,4,6-Trichlorophenol	20000.	U
95-95-4-----	2,4,5-Trichlorophenol	98000.	U
91-58-7-----	2-Chloronaphthalene	20000.	U
88-74-4-----	2-Nitroaniline	98000.	U
131-11-3-----	Dimethylphthalate	20000.	U
208-96-8-----	Acenaphthylene	20000.	U
606-20-2-----	2,6-Dinitrotoluene	20000.	U

FORM I SV-1

1/87 Rev.

1C
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VIAL 1307 2

Lab Name: BATTELLE-PNL

Contract: -----

Lab Code: ----- Case No.: ----- SAS No.: ----- SDG No.: --

Matrix: (soil/water) SOIL

Lab Sample ID: 92-05091-2

Sample wt/vol: 1.0237 (g/mL) G

Lab File ID: >DC410

Level: (low/med) MED

Date Received: 04/07/92

% Moisture: not dec..1 dec. --

Date Extracted: 04/15/92

Extraction: (Sepf/Cont/Sonc) SONC

Date Analyzed: 4/25/92

GPC Cleanup: (Y/N) N pH: >12

Dilution Factor: 1.00000

CAS NO. COMPOUND CONCENTRATION UNITS:
(ug/L or ug/Kg) ug/Kg Q

99-09-2-----	3-Nitroaniline	98000.	U
83-32-9-----	Acenaphthene	20000.	U
51-28-5-----	2,4-Dinitrophenol	98000.	U
100-02-7-----	4-Nitrophenol	98000.	U
132-64-9-----	Dibenzofuran	20000.	U
121-14-2-----	2,4-Dinitrotoluene	20000.	U
84-66-2-----	Diethylphthalate	20000.	U
7005-72-3-----	4-Chlorophenyl-phenylether	20000.	U
86-73-7-----	Fluorene	20000.	U
100-01-6-----	4-Nitroaniline	98000.	U
534-52-1-----	4,6-Dinitro-2-methylphenol	98000.	U
86-30-6-----	N-Nitrosodiphenylamine (1)	20000.	U
101-55-3-----	4-Bromophenyl-phenylether	20000.	U
118-74-1-----	Hexachlorobenzene	20000.	U
87-86-5-----	Pentachlorophenol	98000.	U
85-01-8-----	Phenanthrene	20000.	U
120-12-7-----	Anthracene	20000.	U
84-74-2-----	Di-n-butylphthalate	20000.	U
206-44-0-----	Fluoranthene	20000.	U
129-00-0-----	Pyrene	20000.	U
85-68-7-----	Butylbenzylphthalate	20000.	U
91-94-1-----	3,3'-Dichlorobenzidine	39000.	U
56-55-3-----	Benzo(a)anthracene	20000.	U
218-01-9-----	Chrysene	20000.	U
117-81-7-----	bis(2-Ethylhexyl)phthalate	20000.	U
117-84-0-----	Di-n-octylphthalate	20000.	U
205-99-2-----	Benzo(b)fluoranthene	20000.	U
207-08-9-----	Benzo(k)fluoranthene	20000.	U
50-32-8-----	Benzo(a)pyrene	20000.	U
193-39-5-----	Indeno(1,2,3-cd)pyrene	20000.	U
53-70-3-----	Dibenz(a,h)anthracene	20000.	U
191-24-2-----	Benzo(g,h,i)perylene	20000.	U

(1) - Cannot be separated from Diphenylamine

FORM I SV-2

1/87 Rev.

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VIAL 1295 M

Lab Name: BATTELLE-PNL

Contract: -----

Lab Code: ----- Case No.: ----- SAS No.: ----- SDG No.: --

Matrix: (soil/water) SOIL

Lab Sample ID: 92-05072-MS

Sample wt/vol: 0.9781 (g/mL) G

Lab File ID: >DC411

Level: (low/med) MED

Date Received: 04/07/92

% Moisture: not dec..1 dec. --

Date Extracted: 04/15/92

Extraction: (Sepf/Cont/Sonc) SONC

Date Analyzed: 4/25/92

GPC Cleanup: (Y/N) N pH: >12

Dilution Factor: 1.00000

CONCENTRATION UNITS:
CAS NO. COMPOUND (ug/L or ug/Kg) ug/Kg Q

108-95-2-----	Phenol	220000.	
111-44-4-----	bis(2-Chloroethyl) Ether	20000.	U
95-57-8-----	2-Chlorophenol	220000.	
541-73-1-----	1,3-Dichlorobenzene	20000.	U
106-46-7-----	1,4-Dichlorobenzene	51000.	
100-51-6-----	Benzyl alcohol	20000.	U
95-50-1-----	1,2-Dichlorobenzene	20000.	U
95-48-7-----	2-Methylphenol	20000.	U
39638-32-9-----	bis(2-chloroisopropyl) ether	20000.	U
106-44-5-----	4-Methylphenol	20000.	U
621-64-7-----	N-Nitroso-Di-n-propylamine	140000.	
67-72-1-----	Hexachloroethane	20000.	U
98-95-3-----	Nitrobenzene	20000.	U
78-59-1-----	Isophorone	20000.	U
88-75-5-----	2-Nitrophenol	20000.	U
105-67-9-----	2,4-Dimethylphenol	20000.	U
65-85-0-----	Benzoic acid	100000.	U
111-91-1-----	bis(2-Chloroethoxy) methane	20000.	U
120-83-2-----	2,4-Dichlorophenol	20000.	U
120-82-1-----	1,2,4-Trichlorobenzene	87000.	
91-20-3-----	Naphthalene	20000.	U
106-47-8-----	4-Chloroaniline	20000.	U
87-68-3-----	Hexachlorobutadiene	20000.	U
59-50-7-----	4-Chloro-3-methylphenol	260000.	
91-57-6-----	2-Methylnaphthalene	20000.	U
77-47-4-----	Hexachlorocyclopentadiene	20000.	U
88-06-2-----	2,4,6-Trichlorophenol	20000.	U
95-95-4-----	2,4,5-Trichlorophenol	100000.	U
91-58-7-----	2-Chloronaphthalene	20000.	U
88-74-4-----	2-Nitroaniline	100000.	U
131-11-3-----	Dimethylphthalate	20000.	U
208-96-8-----	Acenaphthylene	20000.	U
606-20-2-----	2,6-Dinitrotoluene	20000.	U

1C
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VIAL 1295 M

Lab Name: BATTELLE-PNL

Contract: -----

Lab Code: ----- Case No.: ----- SAS No.: ----- SDG No.: --

Matrix: (soil/water) SOIL

Lab Sample ID: 92-05072-MS

Sample wt/vol: 0.9781 (g/mL) G

Lab File ID: >DC411

Level: (low/med) MED

Date Received: 04/07/92

% Moisture: not dec..1 dec. --

Date Extracted: 04/15/92

Extraction: (Sepf/Cont/Sonc) SONC

Date Analyzed: 4/25/92

GPC Cleanup: (Y/N) N pH: >12

Dilution Factor: 1.00000

CAS NO.	COMPOUND	CONCENTRATION UNITS:	
		(ug/L or ug/Kg)	ug/Kg Q
99-09-2-----	3-Nitroaniline	100000.	U
83-32-9-----	Acenaphthene	130000.	
51-28-5-----	2,4-Dinitrophenol	100000.	U
100-02-7-----	4-Nitrophenol	17000.	J
132-64-9-----	Dibenzofuran	20000.	U
121-14-2-----	2,4-Dinitrotoluene	100000.	
84-66-2-----	Diethylphthalate	20000.	U
7005-72-3-----	4-Chlorophenyl-phenylether	20000.	U
86-73-7-----	Fluorene	20000.	U
100-01-6-----	4-Nitroaniline	100000.	U
534-52-1-----	4,6-Dinitro-2-methylphenol	100000.	U
86-30-6-----	N-Nitrosodiphenylamine (1)	20000.	U
101-55-3-----	4-Bromophenyl-phenylether	20000.	U
118-74-1-----	Hexachlorobenzene	20000.	U
87-86-5-----	Pentachlorophenol	100000.	U
85-01-8-----	Phenanthrene	20000.	U
120-12-7-----	Anthracene	20000.	U
84-74-2-----	Di-n-butylphthalate	20000.	U
206-44-0-----	Fluoranthene	20000.	U
129-00-0-----	Pyrene	130000.	
85-68-7-----	Butylbenzylphthalate	20000.	U
91-94-1-----	3,3'-Dichlorobenzidine	41000.	U
56-55-3-----	Benzo(a)anthracene	20000.	U
218-01-9-----	Chrysene	20000.	U
117-81-7-----	bis(2-Ethylhexyl)phthalate	20000.	U
117-84-0-----	Di-n-octylphthalate	20000.	U
205-99-2-----	Benzo(b)fluoranthene	20000.	U
207-08-9-----	Benzo(k)fluoranthene	20000.	U
50-32-8-----	Benzo(a)pyrene	20000.	U
193-39-5-----	Indeno(1,2,3-cd)pyrene	20000.	U
53-70-3-----	Dibenz(a,h)anthracene	20000.	U
191-24-2-----	Benzo(g,h,i)perylene	20000.	U

(1) - Cannot be separated from Diphenylamine

FORM I SV-2

1/87 Rev.

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VIAL 1295 M

Lab Name: BATTELLE-PNL

Contract: -----

Lab Code: ----- Case No.: ----- SAS No.: ----- SDG No.: --

Matrix: (soil/water) SOIL

Lab Sample ID: 92-05072-MS

Sample wt/vol: 0.9944 (g/mL) G

Lab File ID: >DC412

Level: (low/med) MED

Date Received: 04/07/92

% Moisture: not dec..1 dec. --

Date Extracted: 04/15/92

Extraction: (Sepf/Cont/Sonc) SONC

Date Analyzed: 4/25/92

GPC Cleanup: (Y/N) N pH: >12

Dilution Factor: 1.00000

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) ug/Kg	Q

108-95-2-----	Phenol	220000.	
111-44-4-----	bis(2-Chloroethyl) Ether	20000.	U
95-57-8-----	2-Chlorophenol	220000.	
541-73-1-----	1,3-Dichlorobenzene	20000.	U
106-46-7-----	1,4-Dichlorobenzene	58000.	
100-51-6-----	Benzyl alcohol	20000.	U
95-50-1-----	1,2-Dichlorobenzene	20000.	U
95-48-7-----	2-Methylphenol	20000.	U
39638-32-9-----	bis(2-chloroisopropyl) ether	20000.	U
106-44-5-----	4-Methylphenol	20000.	U
621-64-7-----	N-Nitroso-Di-n-propylamine	180000.	
67-72-1-----	Hexachloroethane	20000.	U
98-95-3-----	Nitrobenzene	20000.	U
78-59-1-----	Isophorone	20000.	U
88-75-5-----	2-Nitrophenol	20000.	U
105-67-9-----	2,4-Dimethylphenol	20000.	U
65-85-0-----	Benzoic acid	100000.	U
111-91-1-----	bis(2-Chloroethoxy) methane	20000.	U
120-83-2-----	2,4-Dichlorophenol	20000.	U
120-82-1-----	1,2,4-Trichlorobenzene	97000.	
91-20-3-----	Naphthalene	20000.	U
106-47-8-----	4-Chloroaniline	20000.	U
87-68-3-----	Hexachlorobutadiene	20000.	U
59-50-7-----	4-Chloro-3-methylphenol	270000.	
91-57-6-----	2-Methylnaphthalene	20000.	U
77-47-4-----	Hexachlorocyclopentadiene	20000.	U
88-06-2-----	2,4,6-Trichlorophenol	20000.	U
95-95-4-----	2,4,5-Trichlorophenol	100000.	U
91-58-7-----	2-Chloronaphthalene	20000.	U
88-74-4-----	2-Nitroaniline	100000.	U
131-11-3-----	Dimethylphthalate	20000.	U
208-96-8-----	Acenaphthylene	20000.	U
606-20-2-----	2,6-Dinitrotoluene	20000.	U

1C
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VIAL 1295 M

Lab Name: BATTELLE-PNL

Contract: -----

Lab Code: ----- Case No.: ----- SAS No.: ----- SDG No.: --

Matrix: (soil/water) SOIL

Lab Sample ID: 92-05072-MS

Sample wt/vol: 0.9944 (g/mL) G

Lab File ID: >DC412

Level: (low/med) MED

Date Received: 04/07/92

% Moisture: not dec..1 dec. --

Date Extracted: 04/15/92

Extraction: (Sepf/Cont/Sonc) SONC

Date Analyzed: 4/25/92

GPC Cleanup: (Y/N) N pH: >12

Dilution Factor: 1.00000

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) ug/Kg	Q

99-09-2-----	3-Nitroaniline	100000.	U
83-32-9-----	Acenaphthene	150000.	
51-28-5-----	2,4-Dinitrophenol	100000.	U
100-02-7-----	4-Nitrophenol	100000.	U
132-64-9-----	Dibenzofuran	20000.	U
121-14-2-----	2,4-Dinitrotoluene	120000.	
84-66-2-----	Diethylphthalate	20000.	U
7005-72-3-----	4-Chlorophenyl-phenylether	20000.	U
86-73-7-----	Fluorene	20000.	U
100-01-6-----	4-Nitroaniline	100000.	U
534-52-1-----	4,6-Dinitro-2-methylphenol	100000.	U
86-30-6-----	N-Nitrosodiphenylamine (1)	20000.	U
101-55-3-----	4-Bromophenyl-phenylether	20000.	U
118-74-1-----	Hexachlorobenzene	20000.	U
87-86-5-----	Pentachlorophenol	100000.	U
85-01-8-----	Phenanthrene	20000.	U
120-12-7-----	Anthracene	20000.	U
84-74-2-----	Di-n-butylphthalate	20000.	U
206-44-0-----	Fluoranthene	20000.	U
129-00-0-----	Pyrene	160000.	
85-68-7-----	Butylbenzylphthalate	20000.	U
91-94-1-----	3,3'-Dichlorobenzidine	40000.	U
56-55-3-----	Benzo(a)anthracene	20000.	U
218-01-9-----	Chrysene	20000.	U
117-81-7-----	bis(2-Ethylhexyl)phthalate	20000.	U
117-84-0-----	Di-n-octylphthalate	20000.	U
205-99-2-----	Benzo(b)fluoranthene	20000.	U
207-08-9-----	Benzo(k)fluoranthene	20000.	U
50-32-8-----	Benzo(a)pyrene	20000.	U
193-39-5-----	Indeno(1,2,3-cd)pyrene	20000.	U
53-70-3-----	Dibenz(a,h)anthracene	20000.	U
191-24-2-----	Benzo(g,h,i)perylene	20000.	U

(1) - Cannot be separated from Diphenylamine

2D
SOIL SEMIVOLATILE SURROGATE RECOVERY

Lab Name:BATTELLE-PNL

Contract:-----

Lab Code: ----- Case No.: ----- SAS No.: ----- SDG No.: --

Level:(low/med) MED

	EPA SAMPLE NO.	S1 (NBZ) #	S2 (FBP) #	S3 (TPH) #	S4 (PHL) #	S5 (2FP) #	S6 (TBP) #	OTHER	TOT OUT
01	SBLK106	116	115	115	123 *	112	114		1
02	VIAL 1295	95	98	106	106	94	103		0
03	VIAL 1295	105	105	116	118 *	103	100		1
04	VIAL 1295	100	100	107	112	102	98		0
05	VIAL 1296	96	97	99	112	95	66		0
06	VIAL 1296	106	105	108	112	83	62		0
07	VIAL 1203	108	105	108	116 *	95	35		1
08	VIAL 1307	92	93	103	98	83	17 *		1
09	VIAL 1295	105	104	115	107	105	65		0
10	VIAL 1295	139 *	131 *	156 *	123 *	112	23		4
11									
12									
13									
14									
15									
16									
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28									
29									
30									

QC LIMITS

S1 (NBZ) = Nitrobenzene-d5 (23-120)
S2 (FBP) = 2-Fluorobiphenyl (30-115)
S3 (TPH) = Terphenyl-d14 (18-137)
S4 (PHL) = Phenol-d5 (24-113)
S5 (2FP) = 2-Fluorophenol (25-121)
S6 (TBP) = 2,4,6-Tribromophenol (19-122)

Column to be used to flag recovery values
* Values outside of contract required QC limits
D Surrogates diluted out

3D
SOIL SEMIVOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name:BATTELLE-PNL

Contract:-----

Lab Code: ----- Case No.: ----- SAS No.: ----- SDG No.: --

Matrix Spike - EPA Sample No.: VIAL 1295 Level:(low/med) MED

COMPOUND	SPIKE ADDED (ug/Kg)	SAMPLE CONCENTRATION (ug/Kg)	MS CONCENTRATION (ug/Kg)	MS % REC #	QC LIMITS REC.
Phenol	204000.00	0.00	219000.00	107 *	26- 90
2-Chlorophenol	204000.00	0.00	220000.00	108 *	25-102
1,4-Dichlorobenzene	102000.00	0.00	51000.00	50	28-104
N-Nitroso-di-n-prop. (1)	102000.00	0.00	141000.00	138 *	41-126
1,2,4-Trichlorobenzene	102000.00	0.00	87500.00	86	38-107
4-Chloro-3-methylphenol	204000.00	0.00	262000.00	128 *	26-103
Acenaphthene	102000.00	0.00	127000.00	125	31-137
4-Nitrophenol	204000.00	0.00	16900.00	8 *	11-114
2,4-Dinitrotoluene	102000.00	0.00	104000.00	102 *	28- 89
Pentachlorophenol	204000.00	0.00	0.00	0 *	17-109
Pyrene	102000.00	0.00	129000.00	127	35-142

COMPOUND	SPIKE ADDED (ug/Kg)	MSD CONCENTRATION (ug/Kg)	MSD % REC #	% RPD #	QC LIMITS RPD	REC.
Phenol	204000.00	221000.00	109 *	0	35	26- 90
2-Chlorophenol	204000.00	218000.00	107 *	1	50	25-102
1,4-Dichlorobenzene	102000.00	58200.00	57	11	27	28-104
N-Nitroso-di-n-prop. (1)	102000.00	175000.00	172 *	21	38	41-126
1,2,4-Trichlorobenzene	102000.00	97000.00	95	8	23	38-107
4-Chloro-3-methylphenol	204000.00	267000.00	130 *	1	33	26-103
Acenaphthene	102000.00	146000.00	143 *	13	19	31-137
4-Nitrophenol	204000.00	0.00	0 *	200 *	50	11-114
2,4-Dinitrotoluene	102000.00	116000.00	114 *	11	47	28- 89
Pentachlorophenol	204000.00	0.00	0 *	0	47	17-109
Pyrene	102000.00	158000.00	155 *	20	36	35-142

(1) N-Nitroso-di-n-propylamine

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of qc limits

RPD: 1 out of 11 outside limits

Spike Recovery: 16 out of 22 outside limits

COMMENTS:

4B
SEMIVOLATILE METHOD BLANK SUMMARY

Lab Name: BATTELLE-PNL Contract: -----
 Lab Code: ----- Case No.: ----- SAS No.: ----- SDG No.: --
 Lab File ID: >DC403 Lab Sample ID: MET BLANK
 Date Extracted 04/15/92 Extraction: (SepF/Cont/Sonc) SONC
 Date Analyzed: 4/24/92 Time Analyzed: 15:16
 Matrix: (soil/water) SOIL Level: (low/med) MED
 Instrument ID: BNA1

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS AND MSD:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED
01	VIAL 1295 A	92-05072-A1	>DC404	4/24/92
02	VIAL 1295 A	92-05072-A4	>DC405	4/24/92
03	VIAL 1295 B	92-05072-B	>DC406	4/24/92
04	VIAL 1296 A	92-05078-A2	>DC407	4/25/92
05	VIAL 1296 B	92-05078-B2	>DC408	4/25/92
06	VIAL 1203 2	92-05085-2	>DC409	4/25/92
07	VIAL 1307 2	92-05091-2	>DC410	4/25/92
08	VIAL 1295 M	92-05072-MS	>DC411	4/25/92
09	VIAL 1295 M	92-05072-MS	>DC412	4/25/92
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COMMENTS: _____

5B
SEMIVOLATILE ORGANIC GC/MS TUNING AND MASS
CALIBRATION - DECAFLUOROTRIPHENYLPHOSPHINE (DFTPP)

Lab Name: BATTELLE-PNL

Contract: -----

Lab Code: ----- Case No.: ----- SAS No.: ----- SDG No.: --

Lab File ID: >DC401

DFTPP Injection Date: 4/24/92

Instrument ID: BNA1

DFTPP Injection Time: 13:17

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
51	30.0 - 60.0% of mass 198	52.4
68	Less than 2.0% of mass 69	0.0(0.0)1
69	Mass 69 relative abundance	70.
70	Less than 2.0% of mass 69	.3(.4)1
127	40.0 - 60.0% of mass 198	42.9
197	Less than 1.0% of mass 198	0.0
198	Base Peak, 100% relative abundance	100.
199	5.0 - 9.0% of mass 198	7.4
275	10.0 - 30.0% of mass 198	22.3
365	Greater than 1.00% of mass 198	2.60
441	Present, but less than mass 443	14.1
442	Greater than 40.0% of mass 198	96.7
443	17.0 - 23.0% of mass 442	18.5(19.1)2

1-Value is % mass 69

2-Value is % mass 442

THIS TUNE APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, BLANKS, AND STANDARDS:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01	SSTD050	CONT CALIB	>DC402	4/24/92	13:55
02	SBLK106	MET BLANK	>DC403	4/24/92	15:16
03	VIAL 1295 A	92-05072-A1	>DC404	4/24/92	16:16
04	VIAL 1295 A	92-05072-A4	>DC405	4/24/92	17:17
05	VIAL 1295 B	92-05072-B	>DC406	4/24/92	18:18
06	VIAL 1296 A	92-05078-A2	>DC407	4/25/92	9:09
07	VIAL 1296 B	92-05078-B2	>DC408	4/25/92	10:10
08	VIAL 1203 2	92-05085-2	>DC409	4/25/92	11:10
09	VIAL 1307 2	92-05091-2	>DC410	4/25/92	12:11
10	VIAL 1295 M	92-05072-MS	>DC411	4/25/92	13:12
11	VIAL 1295 M	92-05072-MS	>DC412	4/25/92	14:12
12					
13					
14					
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22					

page 1 of 1

FORM V SV

1/87 Rev.

6B
SEMIVOLATILE ORGANICS INITIAL CALIBRATION DATA

Lab Name:BATTELLE-PNL

Contract:-----

Lab Code: ----- Case No.: ----- SAS No.: ----- SDG No.: 15

Instrument ID: BNA1 Calibration Date(s):12/30/91 ----

Min RRF for SPCC(#) = 0.050

Max %RSD for CCC(*) = 30.0%

LAB FILE ID:		RRF20 =>LC003		RRF50 =>LC002			
RRF80 =>LC004		RRF120=>LC005		RRF160=>LC006			
COMPOUND	RRF20	RRF50	RRF80	RRF120	RRF160	RRF	% RSD
Phenol	* 1.845	1.799	1.954	1.859	1.877	1.867	3.0*
bis(2-Chloroethyl) ether	1.775	1.648	1.952	1.943	2.198	1.903	10.9
2-Chlorophenol	1.466	1.416	1.527	1.515	1.540	1.493	3.4
1,3-Dichlorobenzene	1.588	1.497	1.524	1.529	1.502	1.528	2.4
1,4-Dichlorobenzene	* 1.787	1.735	1.805	1.665	1.660	1.730	3.9*
Benzyl alcohol	.900	.888	.977	.982	.980	.946	5.0
1,2-Dichlorobenzene	1.631	1.562	1.650	1.579	1.527	1.590	3.2
2-Methylphenol	1.273	1.235	1.319	1.295	1.288	1.282	2.4
bis(2-chloroisopropyl) ether	1.918	1.731	2.097	2.222	2.368	2.067	12.1
4-Methylphenol	1.303	1.229	1.375	1.379	1.402	1.338	5.3
N-Nitroso-di-n-propylamine	# .733	.727	.813	.850	.819	.788	7.0#
Hexachloroethane	.781	.770	.800	.774	.742	.773	2.7
Nitrobenzene	.487	.492	.494	.487	.469	.486	2.0
Isophorone	.983	.984	1.025	1.008	.992	.998	1.8
2-Nitrophenol	* .272	.256	.263	.264	.258	.263	2.4*
2,4-Dimethylphenol	.328	.322	.324	.316	.304	.319	3.0
Benzoic acid	0.000	.222	.257	.269	.266	.253	8.6
bis(2-Chloroethoxy) methane	.559	.545	.570	.564	.547	.557	1.9
2,4-Dichlorophenol	* .357	.355	.354	.342	.330	.348	3.3*
1,2,4-Trichlorobenzene	.404	.401	.397	.378	.359	.388	4.9
Naphthalene	1.137	1.099	1.096	1.055	1.000	1.078	4.8
4-Chloroaniline	.398	.327	.473	.498	.492	.438	16.8
Hexachlorobutadiene	* .266	.263	.246	.232	.220	.245	8.1*
4-Chloro-3-methylphenol	* .382	.385	.392	.386	.373	.384	1.8*
2-Methylnaphthalene	.672	.669	.661	.639	.612	.651	3.9
Hexachlorocyclopentadiene	# .429	.503	.492	.479	.456	.472	6.2#
2,4,6-Trichlorophenol	* .470	.471	.486	.469	.451	.469	2.6*
2,4,5-Trichlorophenol	0.000	.520	.540	.524	.497	.520	3.4
2-Chloronaphthalene	1.307	1.253	1.302	1.238	1.190	1.258	3.8
2-Nitroaniline	0.000	.519	.574	.562	.559	.554	4.3
Dimethylphthalate	1.713	1.654	1.699	1.642	1.595	1.661	2.8
Acenaphthylene	2.000	1.943	2.013	1.897	1.813	1.933	4.2
2,6-Dinitrotoluene	.422	.436	.457	.448	.436	.440	3.0
3-Nitroaniline	0.000	.267	.376	.416	.414	.368	19.0
Acenaphthene	* 1.234	1.191	1.216	1.166	1.110	1.183	4.1*
2,4-Dinitrophenol	# 0.000	.227	.265	.287	.299	.270	11.7#
4-Nitrophenol	# 0.000	.275	.285	.281	.271	.278	2.2#

6C
SEMIVOLATILE ORGANICS INITIAL CALIBRATION DATA

Lab Name: BATTELLE-PNL

Contract: -----

Lab Code: ----- Case No.: ----- SAS No.: ----- SDG No.: 15

Instrument ID: BNA1 Calibration Date(s): 12/30/91 ----

Min $\overline{RRF}$ for SPCC(%) = 0.050

Max %RSD for CCC(*) = 30.0%

LAB FILE ID:		RRF20 =>LC003		RRF50 =>LC002		RRF160 =>LC006	
RRF80 =>LC004		RRF120 =>LC005					
COMPOUND	RRF20	RRF50	RRF80	RRF120	RRF160	$\overline{RRF}$	% RSD
Dibenzofuran	1.721	1.718	1.792	1.724	1.684	1.728	2.3
2,4-Dinitrotoluene	.553	.585	.618	.617	.607	.596	4.6
Diethylphthalate	1.833	1.786	1.853	1.821	1.767	1.812	1.9
4-Chlorophenyl-phenylether	.744	.720	.717	.696	.673	.710	3.8
Fluorene	1.303	1.296	1.342	1.317	1.290	1.309	1.6
4-Nitroaniline	0.000	.247	.268	.327	.357	.300	16.9
4,6-Dinitro-2-methylphenol	0.000	.213	.226	.231	.227	.224	3.6
N-Nitrosodiphenylamine (1) *	.587	.572	.599	.565	.536	.572	4.2*
4-Bromophenyl-phenylether	.312	.295	.306	.299	.286	.300	3.4
Hexachlorobenzene	.407	.390	.395	.383	.370	.389	3.5
Pentachlorophenol *	0.000	.229	.238	.244	.245	.239	3.0*
Phenanthrene	1.192	1.138	1.181	1.152	1.117	1.156	2.7
Anthracene	1.205	1.150	1.189	1.164	1.123	1.166	2.8
Di-n-butylphthalate	2.024	1.983	2.026	1.964	1.882	1.976	3.0
Fluoranthene *	1.454	1.382	1.418	1.381	1.342	1.395	3.0*
Pyrene	1.365	1.350	1.375	1.359	1.351	1.360	.8
Butylbenzylphthalate	.881	.900	.912	.898	.870	.892	1.9
3,3'-Dichlorobenzidine	.278	.254	.300	.344	.358	.307	14.3
Benzo(a)anthracene	1.321	1.315	1.330	1.313	1.285	1.313	1.3
Chrysene	1.260	1.222	1.208	1.181	1.134	1.201	3.9
bis(2-Ethylhexyl)phthalate	1.301	1.335	1.313	1.267	1.203	1.283	4.0
Di-n-octylphthalate *	2.109	2.088	2.114	1.905	1.702	1.984	9.1*
Benzo(b)fluoranthene	1.282	1.306	1.356	1.454	1.406	1.361	5.2
Benzo(k)fluoranthene	1.234	1.138	.986	.997	.945	1.060	11.4
Benzo(a)pyrene *	1.171	1.146	1.180	1.120	1.095	1.142	3.1*
Indeno(1,2,3-cd)pyrene	1.381	1.411	1.413	1.376	1.339	1.384	2.2
Dibenz(a,h)anthracene	1.153	1.176	1.170	1.119	1.094	1.142	3.1
Benzo(g,h,i)perylene	1.171	1.186	1.188	1.163	1.132	1.168	1.9
Nitrobenzene-d5	.476	.480	.490	.479	.465	.478	1.9
2-Fluorobiphenyl	1.446	1.388	1.412	1.327	1.270	1.369	5.1
Terphenyl-d14	1.084	1.077	1.070	1.054	1.019	1.061	2.5
Phenol-d5	1.602	1.522	1.657	1.616	1.562	1.592	3.2
2-Fluorophenol	1.306	1.266	1.410	1.405	1.431	1.364	5.4
2,4,6-Tribromophenol	.206	.208	.217	.214	.206	.210	2.4

(1) Cannot be separated from Diphenylamine

7B
SEMIVOLATILE CONTINUING CALIBRATION CHECK

Lab Name: BATTELLE-PNL

Contract: -----

Lab Code: ----- Case No.: ----- SAS No.: ----- SDG No.: --

Instrument ID: BNA1 Calibration Date: 4/24/92 Time: 13:55

Lab File ID: >DC402 Init. Calib. Date(s): 12/30/91 04/24/92

Min RRF50 for SPCC(%) = 0.050

Max %D for CCC(*) = 25.0%

COMPOUND	RRF	RRF50	%D
Phenol	1.867	1.782	4.6 *
bis(2-Chloroethyl)ether	1.903	2.008	5.5
2-Chlorophenol	1.493	1.421	4.8
1,3-Dichlorobenzene	1.528	1.397	8.6
1,4-Dichlorobenzene	1.730	1.495	13.6 *
Benzyl alcohol	.946	.927	1.9
1,2-Dichlorobenzene	1.590	1.469	7.6
2-Methylphenol	1.282	1.252	2.3
bis(2-chloroisopropyl)ether	2.067	3.202	54.9
4-Methylphenol	1.338	1.279	4.4
N-Nitroso-di-n-propylamine	.788	0.876	11.2 #
Hexachloroethane	.773	.750	3.0
Nitrobenzene	.486	.501	3.2
Isophorone	.998	1.039	4.0
2-Nitrophenol	.263	.224	14.7 *
2,4-Dimethylphenol	.319	.295	7.5
Benzoic acid	.253	.237	6.6
bis(2-Chloroethoxy)methane	.557	.581	4.2
2,4-Dichlorophenol	.348	.296	15.0 *
1,2,4-Trichlorobenzene	.388	.327	15.8
Naphthalene	1.078	.918	14.8
4-Chloroaniline	.438	.388	11.4
Hexachlorobutadiene	.245	.196	20.0 *
4-Chloro-3-methylphenol	.384	.367	4.3 *
2-Methylnaphthalene	.651	.555	14.7
Hexachlorocyclopentadiene	.472	.407	13.8 #
2,4,6-Trichlorophenol	.469	.397	15.4 *
2,4,5-Trichlorophenol	.520	.445	14.5
2-Chloronaphthalene	1.258	1.084	13.8
2-Nitroaniline	.554	.640	15.7
Dimethylphthalate	1.661	1.451	12.6
Acenaphthylene	1.933	1.676	13.3
2,6-Dinitrotoluene	.440	.391	11.2
3-Nitroaniline	.368	.345	6.4
Acenaphthene	1.183	1.032	12.8 *
2,4-Dinitrophenol	.270	.230	14.8 #
4-Nitrophenol	.278	.216	22.4 #

7C
SEMIVOLATILE CONTINUING CALIBRATION CHECK

Lab Name: BATTELLE-PNL

Contract: -----

Lab Code: ----- Case No.: ----- SAS No.: ----- SDG No.: --

Instrument ID: BNA1 Calibration Date: 4/24/92 Time: 13:55

Lab File ID: >DC402 Init. Calib. Date(s): 12/30/91 04/24/92

Min RRF50 for SPCC(#) = 0.050

Max %D for CCC(*) = 25.0%

COMPOUND	RRF	RRF50	%D
Dibenzofuran	1.728	1.510	12.6
2,4-Dinitrotoluene	.596	.535	10.2
Diethylphthalate	1.812	1.669	7.9
4-Chlorophenyl-phenylether	.710	.602	15.3
Fluorene	1.309	1.176	10.2
4-Nitroaniline	.300	.270	9.9
4,6-Dinitro-2-methylphenol	.224	.172	23.2
N-Nitrosodiphenylamine (1)	*.572	.485	15.2 *
4-Bromophenyl-phenylether	.300	.231	22.9
Hexachlorobenzene	.389	.301	22.7
Pentachlorophenol	*.239	.197	17.4 *
Phenanthrene	1.156	.977	15.4
Anthracene	1.166	.998	14.4
Di-n-butylphthalate	1.976	1.694	14.3
Fluoranthene	*1.395	1.096	21.5 *
Pyrene	1.360	1.100	19.1
Butylbenzylphthalate	.892	.792	11.3
3,3'-Dichlorobenzidine	.307	.286	6.9
Benzo(a)anthracene	1.313	1.066	18.8
Chrysene	1.201	.935	22.1
bis(2-Ethylhexyl)phthalate	1.283	1.127	12.2
Di-n-octylphthalate	*1.984	1.882	5.1 *
Benzo(b)fluoranthene	1.361	1.051	22.7
Benzo(k)fluoranthene	1.060	.943	11.0
Benzo(a)pyrene	*1.142	.942	17.5 *
Indeno(1,2,3-cd)pyrene	1.384	1.118	19.2
Dibenz(a,h)anthracene	1.142	.913	20.1
Benzo(g,h,i)perylene	1.168	.959	17.9
Nitrobenzene-d5	.478	.488	2.1
2-Fluorobiphenyl	1.369	1.162	15.1
Terphenyl-d14	1.061	.752	29.1
Phenol-d5	1.592	1.480	7.0
2-Fluorophenol	1.364	1.283	5.9
2,4,6-Tribromophenol	.210	.150	28.4

(1) Cannot be separated from Diphenylamine

8B
SEMIVOLATILE INTERNAL STANDARD AREA SUMMARY

Lab Name:BATTELLE-PNL

Contract:-----

Lab Code: ----- Case No.: ----- SAS No.: ----- SDG No.: --

Lab File ID (Standard): >DC402

Date Analyzed: 4/24/92

Instrument ID: BNA1

Time Analyzed: 13:55

	IS1(DCB) AREA #	RT	IS2(NPT) AREA #	RT	IS3(ANT) AREA #	RT
12 HOUR STD	24890.	5.41	87937.	8.17	47070.	15.05
UPPER LIMIT	49780.		175874.		94140.	
LOWER LIMIT	12445.		43969.		23535.	
EPA SAMPLE NO.						
01 SBLK106	22227.	5.41	73041.	8.16	40085.	15.04
02 VIAL 1295 A1	22838.	5.41	76326.	8.16	41314.	15.05
03 VIAL 1295 A4	19503.	5.41	64656.	8.16	36505.	15.04
04 VIAL 1295 B	20661.	5.43	69422.	8.17	38050.	15.05
05 VIAL 1296 A2	27728.	5.42	90496.	8.17	49805.	15.05
06 VIAL 1296 B2	21518.	5.42	72275.	8.16	39748.	15.05
07 VIAL 1203 2	20866.	5.41	69098.	8.16	38775.	15.05
08 VIAL 1307 2	25475.	5.41	83046.	8.16	46186.	15.05
09 VIAL 1295 MS	19496.	5.41	69229.	8.16	39275.	15.04
10 VIAL 1295 MS	21129.	5.41	74683.	8.16	43441.	15.04
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IS1 (DCB) = 1,4-Dichlorobenzene-d4

IS2 (NPT) = Naphthalene-d8

IS3 (ANT) = Acenaphthene-d10

UPPER LIMIT = + 100%
of internal standard area.
LOWER LIMIT = - 50%
of internal standard area.

Column used to flag internal standard area values with an asterisk

8C
SEMIVOLATILE INTERNAL STANDARD AREA SUMMARY

Lab Name:BATTELLE-PNL

Contract:-----

Lab Code: ----- Case No.: ----- SAS No.: ----- SDG No.: --

Lab File ID (Standard): >DC402

Date Analyzed: 4/24/92

Instrument ID: BNA1

Time Analyzed: 13:55

	IS4 (PHN) AREA #	RT	IS5 (CRY) AREA #	RT	IS3 (PRY) AREA #	RT
12 HOUR STD	81388.	22.38	81856.	33.88	90335.	38.25
UPPER LIMIT	162776.		163712.		180670.	
LOWER LIMIT	40694.		40928.		45168.	
EPA SAMPLE NO.						
01 SBLK106	67551.	22.34	70914.	33.85	78026.	38.23
02 VIAL 1295 A1	70169.	22.36	74672.	33.86	81494.	38.23
03 VIAL 1295 A4	62530.	22.35	65536.	33.86	71846.	38.22
04 VIAL 1295 B	64904.	22.37	68471.	33.86	74964.	38.24
05 VIAL 1296 A2	84964.	22.38	90884.	33.87	102521.	38.27
06 VIAL 1296 B2	67565.	22.36	72950.	33.86	79654.	38.24
07 VIAL 1203 2	66290.	22.36	70734.	33.86	75986.	38.23
08 VIAL 1307 2	78309.	22.36	81628.	33.86	86322.	38.24
09 VIAL 1295 MS	67295.	22.35	73973.	33.85	72000.	38.22
10 VIAL 1295 MS	72875.	22.35	78292.	33.85	74286.	38.22
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IS4 (PHN) = Phenanthrene-d10
IS5 (CRY) = Chrysene-d12
IS6 (PRY) = Perylene-d12

UPPER LIMIT = + 100%
of internal standard area.
LOWER LIMIT = - 50%
of internal standard area.

Column used to flag internal standard area values with an asterisk

ORGANICS ANALYSIS BENCH SHEET

Battelle Memorial Institute Pacific Northwest Laboratories	EXTRACTION METHOD	DATE	EXTRACTION ANALYST	ANALYSIS METHOD	ANALYST
JOB NAME: <u>HSP- Window E-201</u>	<u>PAL-ALU-120</u>	<u>4-15-92</u>	<u>mjt/WTC</u>		
MATRIX: <u>Sludge</u>	<u>med level</u>				

SAMPLE NUMBER	WT./VOL.	original	1:10 H ₂ O			FINAL SOLVENT	FINAL VOLUME
	grams	pH	total pH	total pH	total pH		
92-05072 A	1.0425	12+	900 9.5	1000 9.0	---		
92-05072 B	1.0247	12+	900 9.5	1000 6	---		
92-05078 A	1.0298	12+	900 9.5	1000 6.5	---		
92-05078 B	1.1409	12+	900 9.5	1000 7	---		
92-05085	0.9671	12+	900 9.5	1000 9	1100 6.5		
92-05091	1.1075	12+	900 9.5	1000 9	1100 7.5		
		1:10 H ₂ O	Surr	Spike	CH ₂ Cl ₂	CH ₂ Cl ₂	1ml
		Blank	Blank	Blank	ml		
92-05012 A1	1.0144	200 ul	1	0	8		
92-05072 A4	1.0126	200 ul	1	0	8		
92-05072 MS	0.9781	200 ul	1	1	6		
92-05072 MSD	0.9944	200 ul	1	1	6		
92-05072 B	1.0151	200 ul	1	0	8		
92-05078 A2	1.0132	200 ul	1				
92-05078 B2	1.0504	200 ul	1				
92-05085 2	1.0656	220 ul	1				
92-05091 2	1.0237	220 ul	1				
92-Blank 106	0	0	1				

COMMENTS:

used 10ml DE H₂O for pH batch

B.V. - Surr & Spike = 100 ug/ml

Acid - Surr & Spike = 200 ug/ml

pH with narrow range paper

SURROGATES:

1000 ul of: 52901-28-8

1000 ul of: 52901-28-1

SPIKES:

1000 ul of: 52901-28-9

1000 ul of: 52901-28-10

STANDARDS:

ul of: _____

ul of: _____

ul of: _____

FRACTION AND METHOD	CHAIN OF CUSTODY SAMPLE EXTRACTION		RESIDUE TRANSFER TO STORAGE	RESIDUE LOCATION	ANALYSIS	
PAL-ALU-120 med level	Time out	Time in	Time out	700 #8	Time out	Time in
	Date	Initials	Date		Date	Initials
	Time out	Time in	Time out		Time out	Time in
	Date	Initials	Date		Date	Initials

GC/MS PERFORMANCE STANDARD

Decafluorotriphenylphosphine (DFTPP)

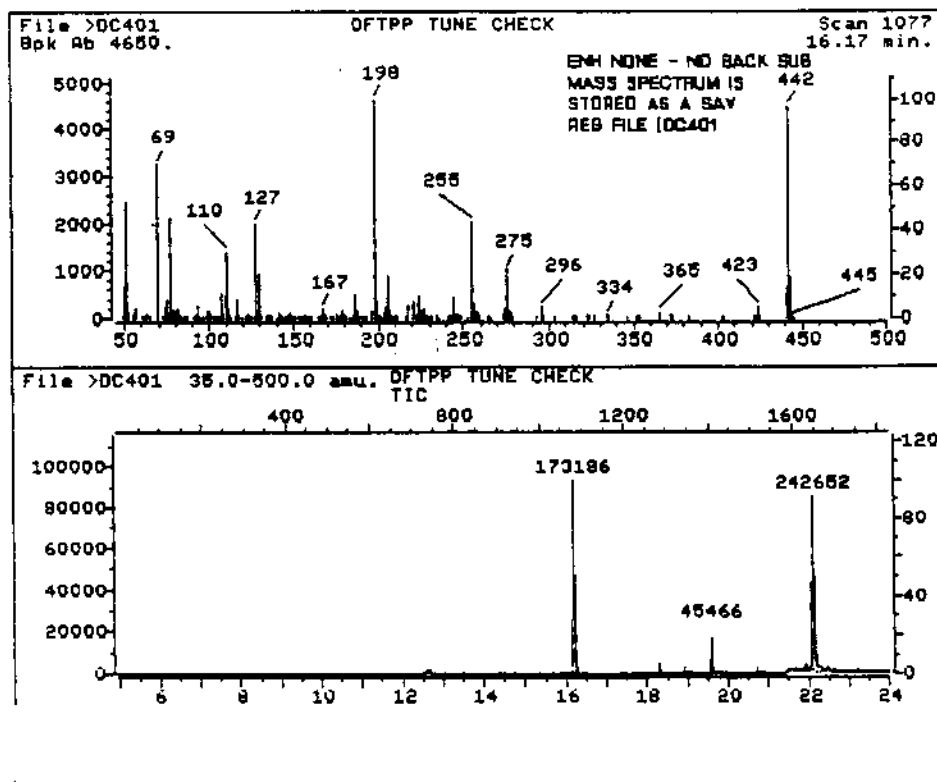
m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	% Relative Abundance Appropriate Peak	Status
51	30-60% of mass 198	52.43	52.43	Ok
68	Less than 2% of mass 69	0.00	0.00	Ok
69	(reference only)	70.11	70.11	Ok
70	Less than 2% of mass 69	.28	.40	Ok
127	40-60% of mass 198	42.88	42.88	Ok
197	Less than 1% of mass 198	0.00	0.00	Ok
198	Base peak, 100% relative abundance	100.00	100.00	Ok
199	5-9% of mass 198	7.38	7.38	Ok
275	10-30% of mass 198	22.26	22.26	Ok
365	Greater than 1% of mass 198	2.60	2.60	Ok
441	0-100% of mass 443	14.09	76.16	Ok
442	Greater than 40% of mass 198	96.69	96.69	Ok
443	17-23% of mass 442	18.49	19.13	Ok

Injection Date: 04/24/92

Injection Time: 13:17

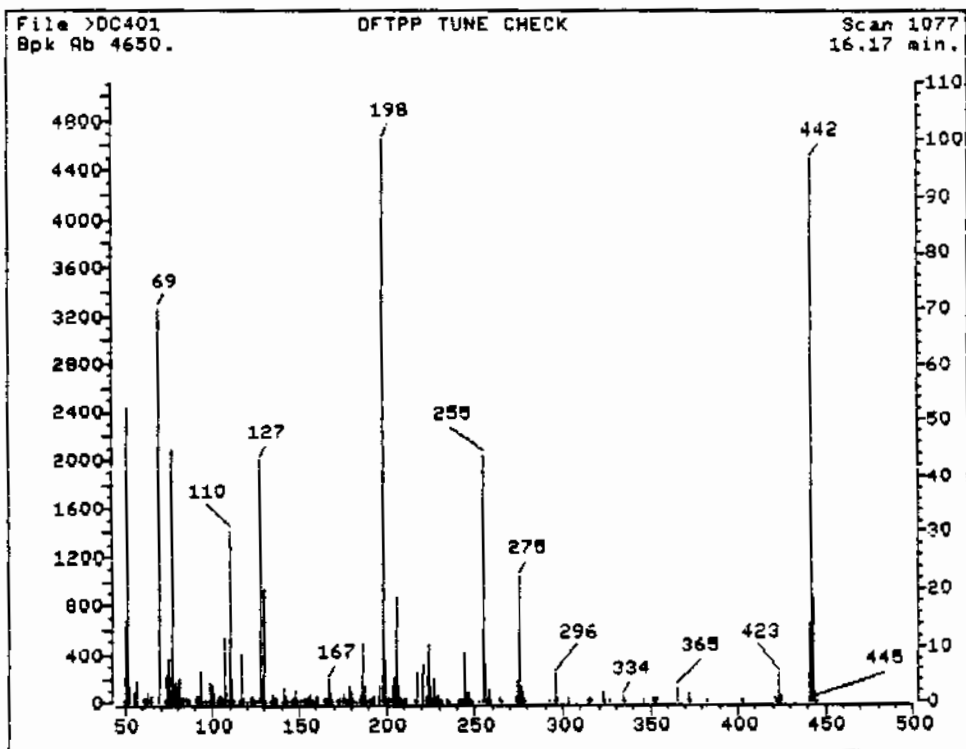
Data File: >DC401

Scan: 1077



Instrument ID: BNA1

Analyzed on: 4/24/92 13:17



Instrument ID: BNA1 Analyzed on: 4/24/92 13:17

>DC401 DFTPP TUNE CHECK
1077 NRM

File: >DC401 Scan #: 1077 Retn. time: 16.17

m/z	Int.	m/z	Int.	m/z	Int.	m/z	Int.	m/z	Int.
38.10	.796	99.00	3.161	154.00	.559	205.00	4.645	266.00	.129
39.00	5.140	99.90	.344	155.00	1.054	206.10	18.710	273.10	1.247
40.00	.624	101.00	1.806	156.00	1.462	207.00	2.753	274.05	3.763
41.10	.301	103.10	.452	157.10	.366	208.00	.667	275.05	22.258
43.00	.194	104.00	.946	158.00	.344	208.90	.194	276.05	2.925
44.10	1.785	105.00	1.011	159.00	.495	210.00	.344	277.15	1.892
49.00	.473	106.20	.452	160.10	.731	210.30	.366	278.15	.344
50.00	14.129	107.00	11.419	161.00	1.054	210.50	.387	293.05	.387
51.00	52.430	108.00	1.914	165.00	.731	211.10	.903	296.05	5.075
52.00	2.710	110.00	30.172	166.00	.645	216.00	.495	297.05	.753
55.10	.323	111.00	4.000	167.00	4.108	217.00	5.398	303.05	.624
56.00	1.634	112.00	.495	168.00	1.849	218.00	.645	314.05	.301
57.00	3.828	116.00	.559	169.00	.366	221.00	7.011	315.15	.624
61.00	.688	117.00	8.409	172.00	.430	223.00	1.226	316.05	.366
62.00	.796	118.00	.882	173.00	.409	224.00	10.258	323.15	1.785
63.00	1.699	119.90	.108	174.00	.688	225.00	2.774	324.15	.409
65.00	1.011	121.90	.796	175.10	1.505	226.00	.301	327.05	.366
69.00	70.108	123.00	1.161	176.10	.753	227.00	4.151	334.15	1.097
69.90	.280	124.00	.516	177.00	.817	228.00	.667	335.15	.366
72.90	.323	124.90	.495	177.90	.280	229.00	.989	346.05	.323
74.00	4.731	127.00	42.882	179.00	2.817	231.10	.387	352.05	.667
75.00	7.914	128.00	3.333	180.00	1.720	235.00	.258	353.15	.559
76.10	2.194	129.00	19.871	181.10	.925	235.80	.129	354.15	.645
77.10	44.753	130.00	1.720	183.00	.194	236.00	.129	365.05	2.602
78.10	3.290	131.00	.366	185.10	1.484	241.00	.323	366.05	.366
79.00	3.505	134.00	.559	186.00	10.602	242.10	.624	372.05	1.269
80.00	2.602	135.00	1.462	187.00	2.946	243.10	.581	373.15	.323
81.00	4.215	136.00	.602	188.10	.258	244.10	8.731	383.15	.323
82.00	.774	137.00	.624	189.00	.581	245.10	1.290	402.05	.452
83.00	.817	140.00	.194	191.10	.301	246.00	1.634	403.05	.516
85.10	.667	141.00	2.409	192.00	.753	246.90	.344	421.15	.602
86.00	.925	142.10	.946	193.00	1.011	249.00	.409	422.05	.559
87.10	.387	143.00	.538	196.00	2.839	252.90	.151	423.15	5.140
90.90	1.054	146.00	.280	198.00	100.000	255.00	43.720	424.15	.989
92.00	1.075	147.00	.882	199.00	7.376	256.00	6.688	441.15	14.086
93.00	5.333	148.00	1.978	200.00	.559	257.00	.452	442.15	96.688
94.00	.430	149.00	.516	201.60	.688	258.00	2.258	443.15	18.495
96.10	.301	151.10	.323	203.10	.473	258.90	.323	444.15	1.849
98.00	3.505	153.00	.667	204.00	2.710	265.10	.710	444.85	.194

Instrument ID: BNA1 Analyzed on: 4/24/92 13:17

Name: CONTINUING CALIB
Misc:

Instrument ID: BNA1
BTL# 1

ID File: ID1BNA::QT
Title: BNA ID QUANT FILE #1 GC/MS
Last Calibration: 911003 11:18

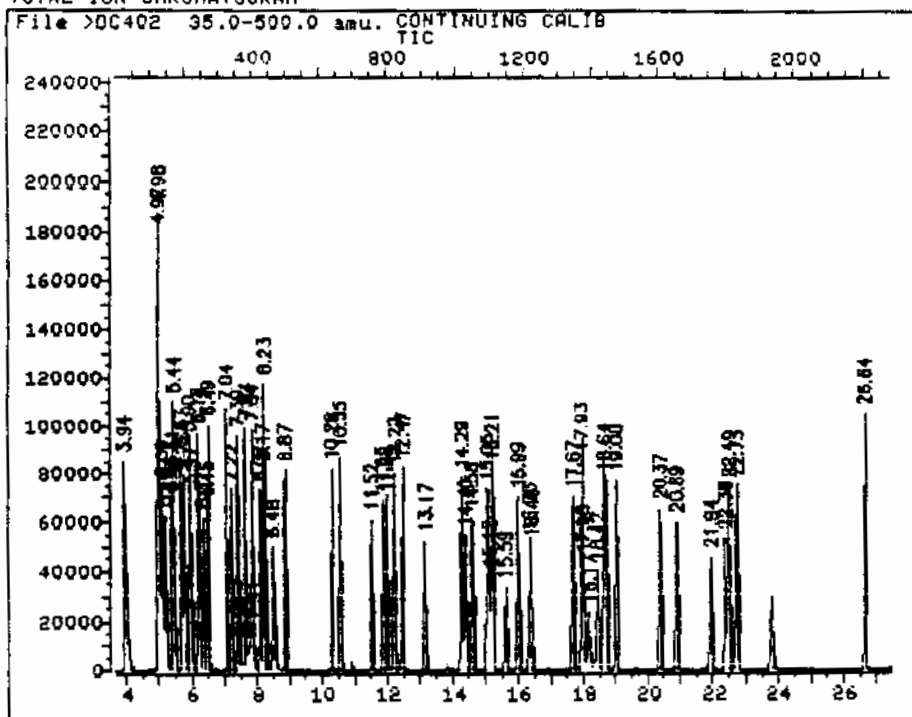
Last Qual Date: 920424 13:55

	Compound	R.T.	Scan#	Area	Conc	Units	q
1)	*1,4-Dichlorobenzene-d4	5.41	165	24890	40.00	ng/uL	97
2)	2-Fluorophenol	3.94	24	79868	100.00	ng/uL	89
3)	Phenol-d5	4.97	123	92109	100.00	ng/uL	83
4)	Phenol	4.98	124	55432	50.00	ng/uL	79
5)	bis(2-Chloroethyl)ether	5.09	134	62476	50.00	ng/uL	97
6)	2-Chlorophenol	5.16	141	44197	50.00	ng/uL	97
7)	1,3-Dichlorobenzene	5.36	160	43460	50.00	ng/uL	95
8)	1,4-Dichlorobenzene	5.44	168	46527	50.00	ng/uL	96
9)	Benzyl alcohol	5.67	190	28853	50.00	ng/uL	96
10)	1,2-Dichlorobenzene	5.75	197	45691	50.00	ng/uL	99
11)	2-Methylphenol	5.90	212	38953	50.00	ng/uL	97
12)	bis(2-Chloroisopropyl)ether	5.97	218	99610	50.00	ng/uL	88
13)	4-Methylphenol	6.18	239	39783	50.00	ng/uL	99
14)	N-Nitroso-di-n-propylamine	6.25	245	272650	49.44	ng/uL	
15)	Hexachloroethane	6.32	252	23343	50.00	ng/uL	97
16)	*Naphthalene-d8	8.17	429	87937	40.00	ng/uL	97
17)	Nitrobenzene-d5	6.45	264	53605	50.00	ng/uL	93
18)	Nitrobenzene	6.49	268	55120	50.00	ng/uL	92
19)	Isophorone	7.04	321	114152	50.00	ng/uL	96
20)	2-Nitrophenol	7.22	338	24649	50.00	ng/uL	91
21)	2,4-Dimethylphenol	7.39	355	32412	50.00	ng/uL	99
22)	Benzoic acid	7.91	404	26008	49.44	ng/uL	93
23)	bis(2-Chloroethoxy)methane	7.64	379	63813	50.00	ng/uL	91
24)	2,4-Dichlorophenol	7.84	398	32485	50.00	ng/uL	96
25)	1,2,4-Trichlorobenzene	8.07	420	35898	50.00	ng/uL	98
26)	Naphthalene	8.23	435	100895	50.00	ng/uL	98
27)	4-Chloroaniline	8.48	459	42642	50.00	ng/uL	98
28)	Hexachlorobutadiene	8.87	496	21587	50.00	ng/uL	98
29)	4-Chloro-3-methylphenol	10.28	632	40358	50.00	ng/uL	97
30)	2-Methylnaphthalene	10.55	658	61001	50.00	ng/uL	99
31)	*Acenaphthene-d10	15.05	1090	47070	40.00	ng/uL	98
32)	Hexachlorocyclopentadiene	11.52	751	23928	50.00	ng/uL	99
33)	2,4,6-Trichlorophenol	11.85	783	23369	50.00	ng/uL	98
34)	2,4,5-Trichlorophenol	11.98	795	26169	50.00	ng/uL	98
35)	2-Chloronaphthalene	12.47	842	63762	50.00	ng/uL	98
36)	2-Fluorobiphenyl	12.22	818	68377	50.00	ng/uL	98
37)	2-Nitroaniline	13.17	909	37673	50.00	ng/uL	96
38)	Dimethylphthalate	14.40	1027	85349	50.00	ng/uL	99
39)	Acenaphthylene	14.29	1017	98630	50.00	ng/uL	98
40)	2,6-Dinitrotoluene	14.58	1045	22994	50.00	ng/uL	99
41)	3-Nitroaniline	15.12	1096	20297	50.00	ng/uL	96
42)	Acenaphthene	15.21	1105	60743	50.00	ng/uL	98
43)	2,4-Dinitrophenol	15.59	1142	13515	50.00	ng/uL	99
44)	4-Nitrophenol	16.33	1213	12683	50.00	ng/uL	79
45)	Dibenzofuran	15.99	1180	88873	50.00	ng/uL	99
46)	2,4-Dinitrotoluene	16.40	1219	31486	50.00	ng/uL	94
47)	Diethylphthalate	17.98	1371	98181	50.00	ng/uL	94
48)	4-Chlorophenyl-phenylether	17.93	1366	35394	50.00	ng/uL	86
49)	Fluorene	17.67	1341	69213	50.00	ng/uL	97

50)	4-Nitroaniline	19.17	1389	15888	50.00	ng/uL	96
51)	*Phenanthrene-d10	22.38	1793	81388	40.00	ng/uL	99
52)	4,6-Dinitro-2-methylphenol	18.42	1413	17516	50.00	ng/uL	91
53)	N-Nitrosodiphenylamine	18.64	1434	49323	50.00	ng/uL	97
54)	2,4,6-Tribromophenol	19.00	1469	30617	100.00	ng/uL	99
55)	4-Bromophenyl-phenylether	20.37	1600	23499	50.00	ng/uL	97
56)	Hexachlorobenzene	20.89	1650	30598	50.00	ng/uL	96
57)	Pentachlorophenol	21.94	1751	20074	50.00	ng/uL	97
58)	Phenanthrene	22.49	1804	99436	50.00	ng/uL	97
59)	Anthracene	22.73	1827	101576	50.00	ng/uL	96
60)	Di-n-butylphthalate	26.64	2202	172356	50.00	ng/uL	97
61)	Fluoranthene	28.41	2373	111468	50.00	ng/uL	94
62)	*Chrysene-d12	33.88	2897	81856	40.00	ng/uL	93
63)	Pyrene	29.28	2456	112512	50.00	ng/uL	91
64)	Terphenyl-d14	30.32	2556	76936	50.00	ng/uL	91
65)	Butylbenzylphthalate	32.49	2764	81012	50.00	ng/uL	98
66)	3,3'-Dichlorobenzidine	33.95	2904	29228	50.00	ng/uL	94
67)	Benzo(a)anthracene	33.81	2891	109032	50.00	ng/uL	99
68)	Chrysene	33.97	2906	95715	50.00	ng/uL	98
69)	Bis(2-Ethylhexyl)phthalate	34.69	2975	115355	50.00	ng/uL	93
70)	*Perylene-d12	38.25	3315	90335	40.00	ng/uL	98
71)	Di-n-octylphthalate	36.58	3156	212549	50.00	ng/uL	98
72)	Benzo(b)fluoranthene	37.21	3216	118703	50.00	ng/uL	94
73)	Benzo(k)fluoranthene	37.30	3224	106511	50.00	ng/uL	90
74)	Benzo(a)pyrene	38.09	3300	106391	50.00	ng/uL	96
75)	Indeno(1,2,3-cd)pyrene	41.47	3624	126208	50.02	ng/uL	97
76)	Dibenz(a,h)anthracene	41.59	3635	103122	50.00	ng/uL	98
77)	Benzo(g,h,i)perylene	42.40	3712	108258	50.00	ng/uL	94

* Compound is ISTD

TOTAL ION CHROMATOGRAM



Data File: >OC402::D1
Name: CONTINUING CALIB
Misc:

Quant Output File: ^OC402::OF
Instrument ID: BNA1

BTL# 1

Id File: ID1BNA::QT
Title: BNA ID QUANT FILE #1 GC/MS
Last Calibration: 911003 11:18

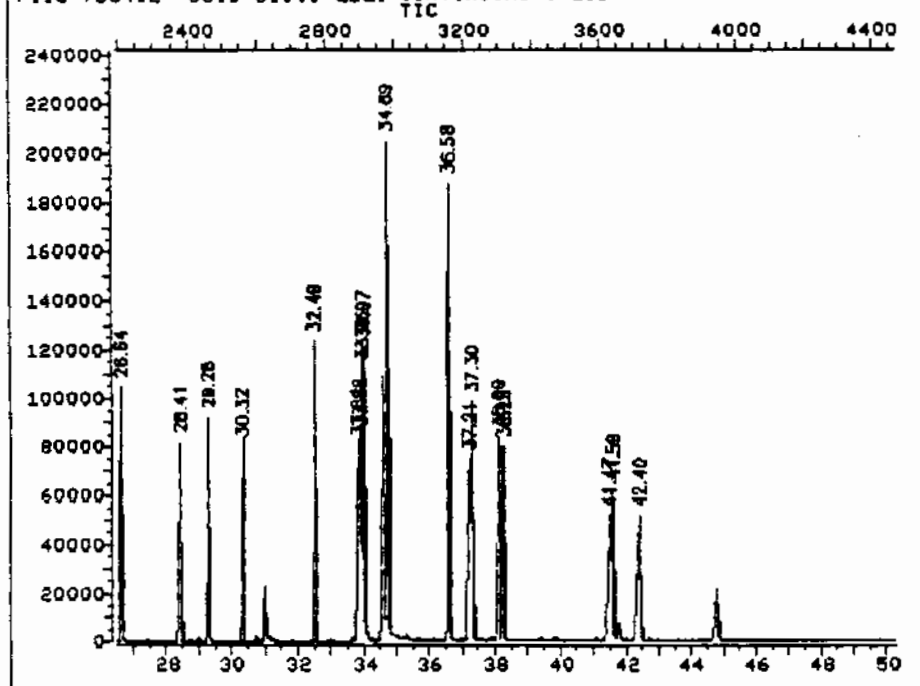
Last Qcal Time: 920423 08:37

Operator ID: BOB
Quant Time : 920424 14:46
Injected at: 920424 13:55

Page 1 of 2

TOTAL ION CHROMATOGRAM

File >OC402 35.0-500.0 amu. CONTINUING CALIB



Data File: >OC402::D1
Name: CONTINUING CALIB
Misc:

Quant Output File: ^OC402::OF
Instrument ID: BNA1

BTL# 1

Id File: ID1BNA::QT
Title: BNA ID QUANT FILE #1 GC/MS
Last Calibration: 911003 11:18

Last Qcal Time: 920423 08:37

Operator ID: B08
Quant Time : 920424 14:46
Injected at: 920424 13:55

Page 2 of 2

[CCC AND SPCC DAILY CALIBRATION CHECK OPERATOR REPORT BNA'S]

DATA FILE NAME = >DC402::D1
 DATE AND TIME OF ANALYSIS = 4/24/92 13:55
 SAMPLE = CONTINUING CALIB
 MISCELLANEOUS =
 METHOD = BNAME1
 INSTRUMENT = BNA1
 OPERATOR = BOB SUPER GRP

CCC COMPOUND	DAILY CAL RF	5-POINT AVE RF	%D
Pentachlorophenol	.1973	.2390	17.44
1,4-Dichlorobenzene	1.4954	1.7303	13.58
2-Nitrophenol	.2242	.2628	14.67
2,4-Dichlorophenol	.2955	.3477	17.65
Hexachlorobutadiene	.1964	.2454	19.97
4-Chloro-3-methylphenol	.3672	.3837	4.31
2,4,6-Trichlorophenol	.3972	.4693	15.37
Acenaphthene	1.0324	1.1833	12.75
N-Nitrosodiphenylamine	.4848	.5717	15.20
Fluoranthene	1.0957	1.3954	21.48
Di-n-octylphthalate	1.8823	1.9835	5.10
Benzo(a)pyrene	.9422	1.1424	17.53
Phenol	1.7817	1.8668	4.56

SPCC COMPOUND	DAILY RF
N-Nitroso-di-n-propylamine	.8775
Hexachlorocyclopentadiene	.4067
2,4-Dinitrophenol	.2297
4-Nitrophenol	.2156

DAILY CALIBRATION FOR BNA'S PASSED ALL CCC AND SPCC CRITERIA
 THE RF AND RT VALUES WILL AUTOMATICALLY BE UPDATED IN YOUR IDFILE

DATA FILE NAME = >DC4021:01
 DATE AND TIME OF ANALYSIS = 4/24/92 13:55
 SAMPLE = CONTINUING CALIB
 MISCELLANEOUS =
 METHOD = BNAME1
 INSTRUMENT = BNA1
 OPERATOR = BOB SUPER GRP

Compound Name	Retention Times			Response factors		
	RRT FOUND	RRT IN THE IDFILE	RT DIFF- ERENCE	RF FOUND	AVE. RF FROM 5-POINT	RATIO RF FOUND TO RF IN IDFILE
bis(2-Chloroethyl)ether	.94019	.93899	-.0538	2.0081	1.9032	.95968
1,3-Dichlorobenzene	.99033	.99045	-.0642	1.3969	1.5279	.97092
Benzyl alcohol	1.0482	1.0476	-.0641	.92738	.9455	.94750
1,2-Dichlorobenzene	1.0617	1.0591	-.0537	1.4686	1.5898	.94773
2-Methylphenol	1.0907	1.0877	-.0537	1.2520	1.2820	.94820
bis(2-Chloroisopropyl)ether	1.1023	1.1010	-.0641	3.2016	2.0671	.91459
4-Methylphenol	1.1427	1.1410	-.0642	1.2787	1.3377	.94074
Hexachloroethane	1.1678	1.1658	-.0641	.75028	.7733	.94481
Nitrobenzene	.79438	.79522	-.0747	.50145	.4857	.93838
Isophorone	.86192	.86210	-.0750	1.0385	.9982	.94016
2-Nitrophenol	.88363	.88358	-.0750	.22424	.2628	.94512
2,4-Dimethylphenol	.90535	.90508	-.0750	.29487	.3188	.95205
Benzoic acid	.96801	.96710	-.0751	.23927	.2534	.95685
bis(2-Chloroethoxy)methane	.93602	.93545	-.0751	.58053	.5569	.95992
2,4-Dichlorophenol	.96033	.95950	-.0751	.29553	.3477	.95377
Naphthalene	1.0077	1.0076	-.0853	.91788	1.0776	.96517
4-Chloroaniline	1.0384	1.0380	-.0853	.38793	.4376	.96607
Hexachlorobutadiene	1.0856	1.0847	-.0851	.19639	.2454	.93317
2-Methylnaphthalene	1.2921	1.2915	-.1056	.55495	.6509	.95403
Hexachlorocyclopentadiene	.76531	.76641	-.1056	.40668	.4719	.93803
2,4,6-Trichlorophenol	.78746	.78840	-.1058	.39718	.4693	.93610
2,4,5-Trichlorophenol	.79580	.79737	-.1163	.44477	.5201	.94119
2-Chloronaphthalene	.82843	.82974	-.1161	1.0837	1.2579	.95232
2-Nitroaniline	.87477	.87572	-.1162	.64029	.5535	.90742
Dimethylphthalate	.95638	.95672	-.1164	1.4506	1.6606	.94897
Acenaphthylene	.94943	.94982	-.1164	1.6763	1.9329	.94357
2,6-Dinitrotoluene	.96886	.96911	-.1164	.39081	.4399	.92595
3-Nitroaniline	1.0042	1.0055	-.1371	.34497	.3684	1.1727
2,4-Dinitrophenol	1.0360	1.0358	-.1161	.22970	.2696	.88693
Dibenzofuran	1.0624	1.0619	-.1161	1.5105	1.7279	.95337
Diethylphthalate	1.1945	1.1937	-.1268	1.6687	1.8118	.99060
4-Chlorophenyl-phenylether	1.1911	1.1910	-.1373	.60156	.7100	.94779
Fluorene	1.1737	1.1731	-.1270	1.1763	1.3095	.94624
4-Nitroaniline	1.2070	1.2055	-.1162	.27003	.2997	1.0101
4,6-Dinitro-2-methylphenol	.82309	.82374	-.1266	.17217	.2243	.89096
N-Nitrosodiphenylamine	.83290	.83395	-.1371	.48482	.5717	.97065
4-Bromophenyl-phenylether	.91016	.91026	-.1261	.23098	.2996	.94001
Hexachlorobenzene	.93345	.93386	-.1362	.30076	.3892	.92104
Phenanthrene	1.0052	1.0056	-.1465	.97740	1.1560	.94822
Anthracene	1.0159	1.0158	-.1360	.99844	1.1662	.94923

DATA FILE NAME = >DC402::D1
 DATE AND TIME OF ANALYSIS = 4/24/92 13:55
 SAMPLE = CONTINUING CALIB
 MISCELLANEOUS =
 METHOD = SNAME1
 INSTRUMENT = BNA1
 OPERATOR = BOB SUPER GRP

Compound Name	Retention Times			Response factors		
	RRT FOUND	RRT IN THE IDFILE	RT DIFF- ERENCE	RF FOUND	AVE. RF FROM 5-POINT	RATIO RF FOUND TO RF IN IDFILE
Di-n-butylphthalate	1.1902	1.1882	-.1154	1.6942	1.9760	.94299
Fluoranthene	1.2697	1.2677	-.1265	1.0957	1.3954	.93137
Butylbenzylphthalate	.95906	.95887	-.0935	.79175	.8923	.95970
3,3'-Dichlorobenzidine	1.0022	1.0019	-.0936	.28565	.3068	1.0749
Benzo(a)anthracene	.99813	.99845	-.1146	1.0656	1.3127	.94717
Chrysene	1.0028	1.0028	-.1042	.93545	1.2013	.94938
Bis(2-Ethylhexyl)phthalate	1.0242	1.0238	-.0929	1.1274	1.2835	.96089
Di-n-octylphthalate	.95649	.95611	-.0893	1.8823	1.9835	.98036
Benzo(b)fluoranthene	.97289	.97272	-.0991	1.0512	1.3606	.89868
Benzo(k)fluoranthene	.97510	.97492	-.0992	.94325	1.0601	1.0523
Benzo(a)pyrene	.99588	.99562	-.0981	.94219	1.1424	.95690
Indeno(1,2,3-cd)pyrene	1.0843	1.0854	-.1593	1.1174	1.3841	.95661
Dibenz(a,h)anthracene	1.0874	1.0882	-.1488	.91324	1.1424	.96435
Benzo(g,h,i)perylene	1.1085	1.1097	-.1694	.95872	1.1679	.95110
Phenol	.92088	.91990	-.0538	1.7817	1.8668	.91599
2-Chlorophenol	.95370	.95234	-.0538	1.4206	1.4927	.94422
1,4-Dichlorobenzene	1.0058	1.0038	-.0538	1.4954	1.7303	.93060
N-Nitroso-di-n-propylamine	1.1543	1.1525	-.0642	.87746	.7885	.93553
1,2,4-Trichlorobenzene	.98847	.98859	-.0854	.32658	.3880	.95560
4-Chloro-3-methylphenol	1.2589	1.2574	-.0952	.36715	.3837	.93551
Acenaphthene	1.0104	1.0103	-.1161	1.0324	1.1833	.94449
4-Nitrophenol	1.0852	1.0845	-.1164	.21556	.2777	.94372
2,4-Dinitrotoluene	1.0894	1.0894	-.1269	.53513	.5959	.93316
Pentachlorophenol	.98042	.98054	-.1362	.19732	.2390	.91359
Pyrene	.86432	.86511	-.1165	1.0996	1.3599	.97423
2-Fluorophenol	.72850	.72792	-.0436	1.2835	1.3637	.95584
Phenol-d5	.91895	.91609	-.0433	1.4803	1.5918	.94442
Nitrobenzene-d5	.78926	.78889	-.0642	.48767	.4778	.94850
2-Fluorobiphenyl	.81178	.81322	-.1162	1.1621	1.3687	.94502
2,4,6-Tribromophenol	.84924	.85019	-.1370	.15047	.2103	.90740
Terphenyl-d14	.89507	.89547	-.1065	.75192	1.0609	.97358

QUANT REPORT

Operator ID: BOB
 Output File: ^DC402::DF
 Data File: >DC402::D1

Quant Rev: 7 Quant Time: 920424 15:08
 Injected at: 920424 13:55
 Dilution Factor: 1.00000

QUANT REPORT

Operator ID: BOB
 Output File: ^DC403::OF
 Data File: >DC403::01
 Name: SBLK106
 Misc: METHOD BLANK

Quant Rev: 7 Quant Time: 920424 16:07
 Injected at: 920424 15:16
 Dilution Factor: 1.00000
 Instrument ID: BNA1
 BTL# 1

ID File: ID1BNA::QT
 Title: BNA ID QUANT FILE #1 GC/MS
 Last Calibration: 911003 11:18

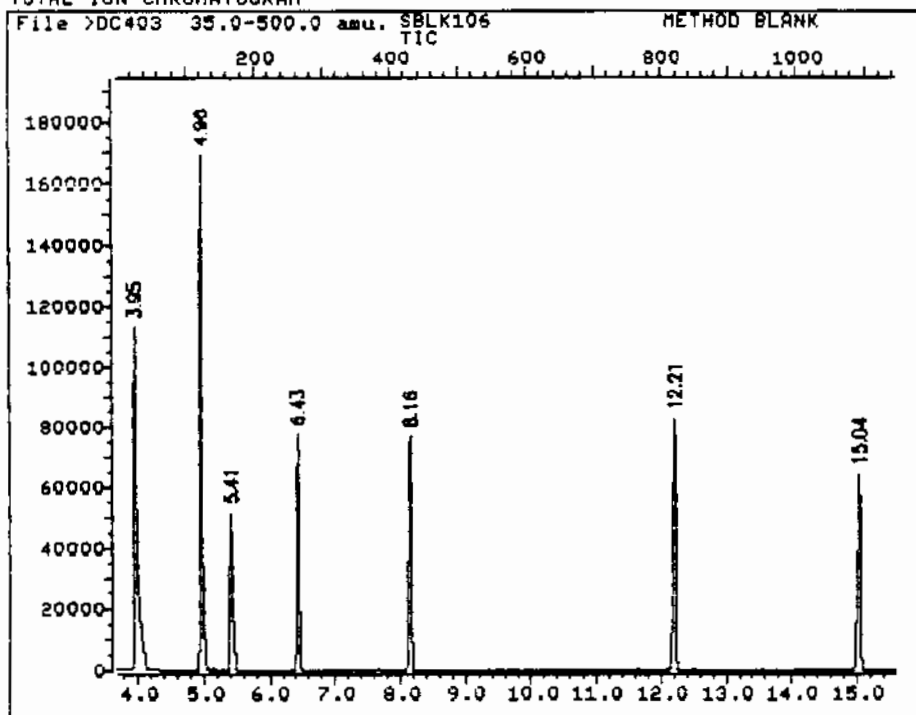
Last Qcal Date: 920424 13:55

	Compound	R.T.	Scan#	Area	Conc	Units	q
1)	*1,4-Dichlorobenzene-d4	5.41	165	22227	40.00	ng/uL	97
2)	2-Fluorophenol	3.95	25	80206	112.45	ng/uL	85
3)	Phenol-d5	4.96	122	100883	122.65	ng/uL	89
4)	Phenol	0.00	0	0	0.00	ng/uL	
5)	bis(2-Chloroethyl)ether	0.00	0	0	0.00	ng/uL	
6)	2-Chlorophenol	0.00	0	0	0.00	ng/uL	
7)	1,3-Dichlorobenzene	0.00	0	0	0.00	ng/uL	
8)	1,4-Dichlorobenzene	0.00	0	0	0.00	ng/uL	
9)	Benzyl alcohol	0.00	0	0	0.00	ng/uL	
10)	1,2-Dichlorobenzene	0.00	0	0	0.00	ng/uL	
11)	2-Methylphenol	0.00	0	0	0.00	ng/uL	
12)	bis(2-Chloroisopropyl)ether	0.00	0	0	0.00	ng/uL	
13)	4-Methylphenol	0.00	0	0	0.00	ng/uL	
14)	N-Nitroso-di-n-propylamine	0.00	263	0	0.00	ng/uL	
15)	Hexachloroethane	0.00	0	0	0.00	ng/uL	
16)	*Naphthalene-d8	8.16	429	73041	40.00	ng/uL	96
17)	Nitrobenzene-d5	6.43	263	51734	58.10	ng/uL	92
18)	Nitrobenzene	0.00	0	0	0.00	ng/uL	
19)	Isophorone	0.00	0	0	0.00	ng/uL	
20)	2-Nitrophenol	0.00	0	0	0.00	ng/uL	
21)	2,4-Dimethylphenol	0.00	0	0	0.00	ng/uL	
22)	Benzoic acid	0.00	0	0	0.00	ng/uL	
23)	bis(2-Chloroethoxy)methane	0.00	0	0	0.00	ng/uL	
24)	2,4-Dichlorophenol	0.00	0	0	0.00	ng/uL	
25)	1,2,4-Trichlorobenzene	0.00	0	0	0.00	ng/uL	
26)	Naphthalene	0.00	0	0	0.00	ng/uL	
27)	4-Chloroaniline	0.00	0	0	0.00	ng/uL	
28)	Hexachlorobutadiene	0.00	0	0	0.00	ng/uL	
29)	4-Chloro-3-methylphenol	0.00	0	0	0.00	ng/uL	
30)	2-Methylnaphthalene	0.00	0	0	0.00	ng/uL	
31)	*Acenaphthene-d10	15.04	1091	40085	40.00	ng/uL	99
32)	Hexachlorocyclopentadiene	0.00	0	0	0.00	ng/uL	
33)	2,4,6-Trichlorophenol	0.00	0	0	0.00	ng/uL	
34)	2,4,5-Trichlorophenol	0.00	0	0	0.00	ng/uL	
35)	2-Chloronaphthalene	0.00	0	0	0.00	ng/uL	
36)	2-Fluorobiphenyl	12.21	819	66699	57.27	ng/uL	98
37)	2-Nitroaniline	0.00	0	0	0.00	ng/uL	
38)	Dimethylphthalate	0.00	0	0	0.00	ng/uL	
39)	Acenaphthylene	0.00	0	0	0.00	ng/uL	
40)	2,6-Dinitrotoluene	0.00	1091	0	0.00	ng/uL	
41)	3-Nitroaniline	0.00	0	0	0.00	ng/uL	
42)	Acenaphthene	0.00	0	0	0.00	ng/uL	

43)	2,4-Dinitrophenol	0.00	0	0	0.00	ng/uL	
44)	4-Nitrophenol	0.00	0	0	0.00	ng/uL	
45)	Dibenzofuran	0.00	0	0	0.00	ng/uL	
46)	2,4-Dinitrotoluene	0.00	0	0	0.00	ng/uL	
47)	Diethylphthalate	17.87	1364	6503	3.89	ng/uL	93
48)	4-Chlorophenyl-phenylether	0.00	0	0	0.00	ng/uL	
49)	Fluorene	0.00	0	0	0.00	ng/uL	
50)	4-Nitroaniline	0.00	0	0	0.00	ng/uL	
51)	*Phenanthrene-d10	22.34	1794	67551	40.00	ng/uL	99
52)	4,6-Dinitro-2-methylphenol	0.00	0	0	0.00	ng/uL	
53)	N-Nitrosodiphenylamine	0.00	0	0	0.00	ng/uL	
54)	2,4,6-Tribromophenol	18.98	1470	29068	114.39	ng/uL	97
55)	4-Bromophenyl-phenylether	0.00	0	0	0.00	ng/uL	
56)	Hexachlorobenzene	0.00	0	0	0.00	ng/uL	
57)	Pentachlorophenol	0.00	0	0	0.00	ng/uL	
58)	Phenanthrene	0.00	0	0	0.00	ng/uL	
59)	Anthracene	0.00	0	0	0.00	ng/uL	
60)	Di-n-butylphthalate	0.00	0	0	0.00	ng/uL	
61)	Fluoranthene	0.00	0	0	0.00	ng/uL	
62)	*Chrysene-d12	33.85	2901	70914	40.00	ng/uL	93
63)	Pyrene	0.00	0	0	0.00	ng/uL	
64)	Terphenyl-d14	30.32	2562	76644	57.50	ng/uL	90
65)	Butylbenzylphthalate	0.00	0	0	0.00	ng/uL	
66)	3,3'-Dichlorobenzidine	0.00	0	0	0.00	ng/uL	
67)	Benzo(a)anthracene	0.00	0	0	0.00	ng/uL	
68)	Chrysene	0.00	0	0	0.00	ng/uL	
69)	Bis(2-Ethylhexyl)phthalate	0.00	0	0	0.00	ng/uL	
70)	*Perylene-d12	38.23	3321	78026	40.00	ng/uL	97
71)	Di-n-octylphthalate	0.00	0	0	0.00	ng/uL	
72)	Benzo(b)fluoranthene	0.00	0	0	0.00	ng/uL	
73)	Benzo(k)fluoranthene	0.00	0	0	0.00	ng/uL	
74)	Benzo(a)pyrene	0.00	0	0	0.00	ng/uL	
75)	Indeno(1,2,3-cd)pyrene	0.00	0	0	0.00	ng/uL	
76)	Dibenz(a,h)anthracene	0.00	0	0	0.00	ng/uL	
77)	Benzo(g,h,i)perylene	0.00	0	0	0.00	ng/uL	

* Compound is ISTD

TOTAL ION CHROMATOGRAM



Data File: >DC403::D1

Name: SBLK106

Misc: METHOD BLANK

Quant Output File: ^DC403::OF

Instrument ID: BNA1

BTL# 1

Id File: IO1BNA::QT

Title: BNA IO QUANT FILE #1 GC/MS

Last Calibration: 911003 11:18

Last Qcal Time: 920424 13:55

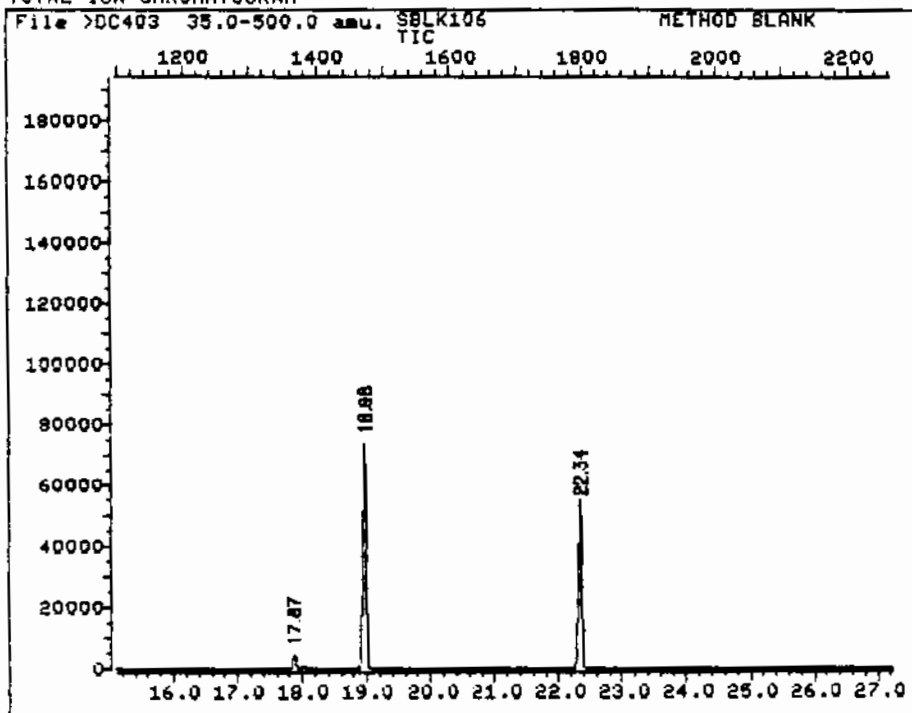
Operator ID: BOB

Quant Time : 920424 16:07

Injected at: 920424 15:16

Page 1 of 4

TOTAL ION CHROMATOGRAM



Data File: >DC403::D1
Name: SBLK106
Misc: METHOD BLANK

Quant Output File: ^DC403::OF
Instrument ID: BNA1

BTL# 1

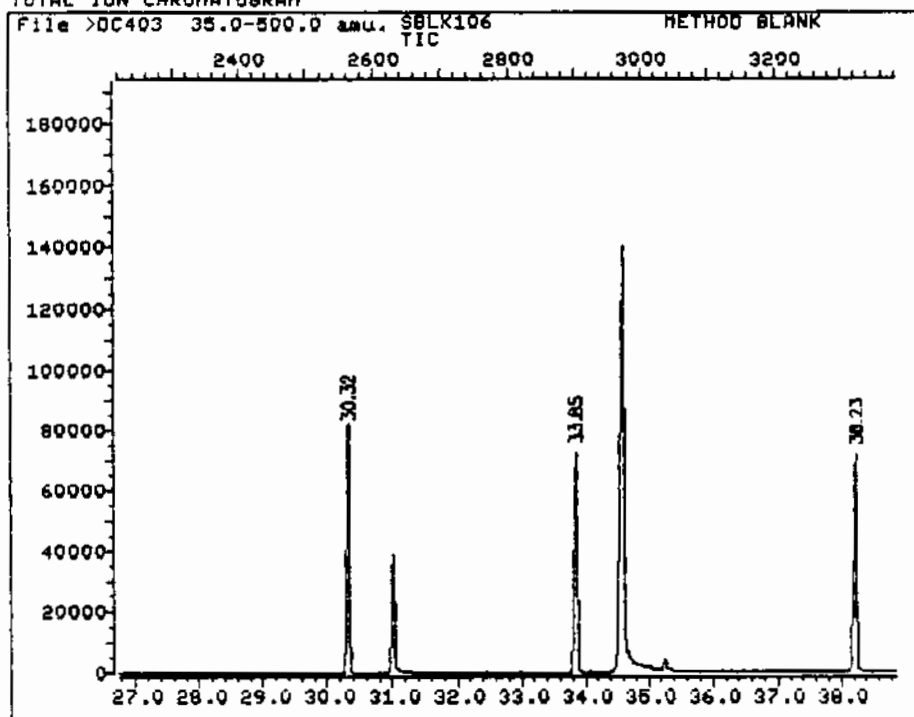
Id File: ID1BNA::QT
Title: BNA ID QUANT FILE #1 GC/MS
Last Calibration: 911003 11:18

Last Qcal Time: 920424 13:55

Operator ID: BDB
Quant Time : 920424 16:07
Injected at: 920424 15:16

Page 2 of 4

TOTAL ION CHROMATOGRAM



Data File: >DC403::D1

Name: SBLK106

Misc: METHOD BLANK

Quant Output File: ^DC403::OF

Instrument ID: BNA1

BTL# 1

Id File: ID1BNA::QT

Title: BNA ID QUANT FILE #1 GC/MS

Last Calibration: 911003 11:18

Last Qcal Time: 920424 13:55

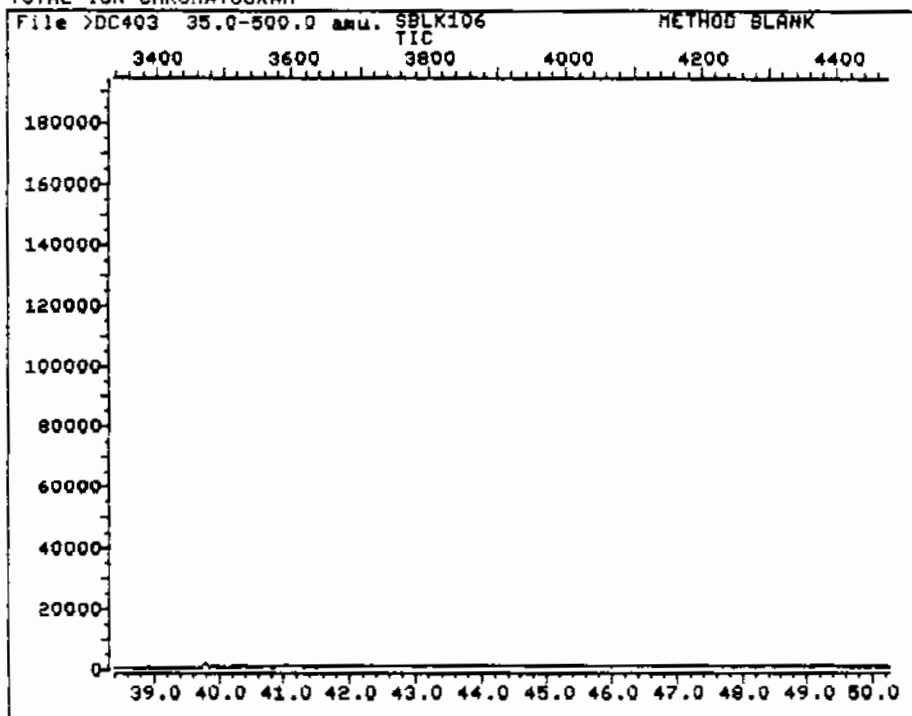
Operator ID: BOB

Quant Time : 920424 16:07

Injected at: 920424 19:16

Page 3 of 4

TOTAL ION CHROMATOGRAM



Data File: >DC403::01
Name: SBLK106
Misc: METHOD BLANK

Quant Output File: ^DC403::0F
Instrument ID: BNA1

STL# 1

Id File: ID1BNA::QT
Title: BNA ID QUANT FILE #1 GC/MS
Last Calibration: 911003 11:18

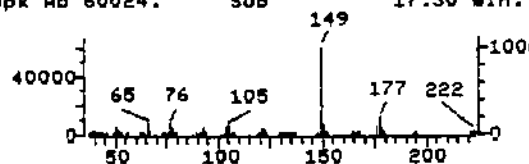
Last Qual Time: 920424 13:55

Operator ID: BOB
Quant Time : 920424 16:07
Injected at: 920424 15:16

Page 4 of 4

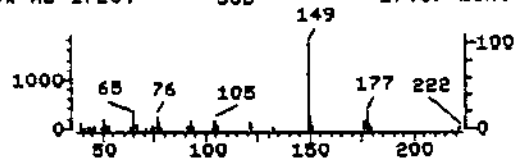
REFERENCE STANDARD SPECTRUM

File >80908 Diethylphthalate Scan 1282
Bpk Ab 60024. SUB 17.30 min.



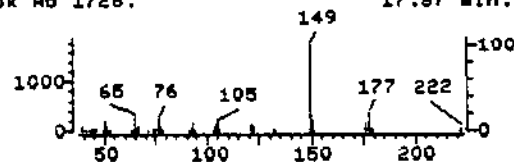
SAMPLE SPECTRUM (BACKGROUND SUBTRACTED)

File >DC403 SBLK106 Scan 1364
Bpk Ab 1728. SUB 17.87 min.

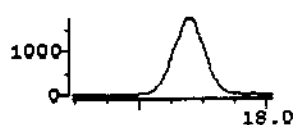


SAMPLE SPECTRUM (UNALTERED)

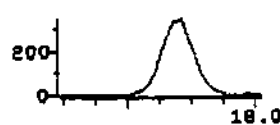
File >DC403 SBLK106 Scan 1364
Bpk Ab 1728. SUB 17.87 min.



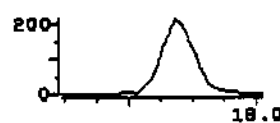
File >DC403 148.7-149.7



File >DC403 176.7-177.7



File >DC403 149.7-150.7



Data File: >DC403::D1
Name: SBLK106
Misc: METHOD BLANK
Quant Time: 920424 16:07
Injected at: 920424 15:16
Last Qcal Time: 920424 13:55

Quant Output File: ^DC403::OF
Instrument ID: BNA1
BTLE# 1
Quant ID File: ID1BNA::QT
Last Calibration: 911003 11:18

Compound No : 47
Compound Name : Diethylphthalate
Scan Number : 1364
Retention Time: 17.87 min.
Quant Ion : 149.0
Area : 6503
Concentration : 3.89 ng/uL
q-value : 93

0^c

[GC/MS OPERATOR REPORT]

[GC/MS LAB SEMIVOLATILES]

[INTERNAL STANDARD CHECK REPORT]

SAMPLE FILE = >DC403
 CAL CHECK FILE = >DC402
 DATE AND TIME OF ANALYSIS = 4/24/92 15:16
 MISCELLANEOUS = METHOD BLANK
 METHOD = BNAME1
 INSTRUMENT = BNA1
 OPERATOR = BOB SUPER GRP

I. Areas

Name of the BNA Internal Standard	The Sample ISTD Area	Daily Check ISTD Area	Daily Check ISTD Area / 2	Daily Check ISTD Area x 2	Status of the Sample ISTD Area Precision
1,4-Dichlorobenz-d4	22227	24890	12445	49780	OK
Naphthalene-d8	73041	87937	43969	175874	OK
Acenaphthene-d10	40085	47070	23535	94140	OK
Phenanthrene-d10	67551	81388	40694	162776	OK
Chrysene-d12	70914	81856	40928	163712	OK
Perylene-d12	78026	90335	45168	180670	OK

II. Retention Times

Name of the BNA Internal Standard	The Sample ISTD R.Time	Daily Check ISTD R.Time	Daily Check ISTD RT - 0.5	Daily Check ISTD RT + 0.5	Status of the Sample ISTD R.T. Precision
1,4-Dichlorobenz-d4	5.41	5.41	4.91	5.91	OK
Naphthalene-d8	8.16	8.17	7.67	8.67	OK
Acenaphthene-d10	15.04	15.05	14.55	15.55	OK
Phenanthrene-d10	22.34	22.38	21.88	22.88	OK
Chrysene-d12	33.85	33.88	33.38	34.38	OK
Perylene-d12	38.23	38.25	37.75	38.75	OK

[GC/MS OPERATOR REPORT]

[GC/MS LAB SEMIVOLATILES]

[Preliminary Surrogate Report]

DATA FILE NAME = >DC403::D1
 DATE AND TIME OF ANALYSIS = 4/24/92 15:16
 SAMPLE = SBLK106
 MISCELLANEOUS = METHOD BLANK
 METHOD = BNAME1
 INSTRUMENT = BNA1
 OPERATOR = BOB SUPER GRP

SURROGATE	AS FOUND IN SAMPLE	WAS SPIKED AT	WATER LIMITS	SOIL LIMITS	% RECOVERY
-----	-----	-----	-----	-----	-----
2-Fluorophenol	112.46	100.00	21-100	25-121	112.46
Phenol-d5	122.65	100.00	10-94	24-113	122.65
Nitrobenzene-d5	58.10	50.00	35-114	23-120	116.19
2-Fluorobiphenyl	57.27	50.00	43-116	30-115	114.54
2,4,6-tribromo- phenol	114.39	100.00	10-123	19-122	114.39
Terphenyl-d14	57.50	50.00	33-141	18-137	114.99

MS data file header from : >DC403::D1

Sample: SBLK106 Operator: BOB SUPER GRP. 4/24/92 15:16
Misc : METHOD BLANK BTL# 1
Sys. #: 1 MS model: 70 SW/HW rev.: LF ALS #: 1 Equip ID: BNA1
Method file: BNAME1 Tuning file: MTBNA1 No. of extra records: 2
Source temp.: N/A Analyzer temp.: N/A Transfer line temp.: 0

Chromatographic temperatures : 40. 100. 190. 300. 0.
Chromatographic times, min. : 1.5 .5 .5 12.0 0.0
Chromatographic rate, deg/min: 30.0 4.5 8.0 .5 0.0

>DC403 SBLK106 METHOD BLANK
35.01 500.0 CLP TIC
Upslope: .2000 Area Reject: 15697. Max Peaks: 2 Bunch: -1 Valley >100 %
Dnslope: 0.0000 Results File IDC403 Sorted by Time/Area INT

Peak #	R.T. min.	first scan	max scan	last scan	peak height	raw area	corr. area	corr. % max.	% of total
1	31.01	2618	2628	2645	38752	112860	110257	16.24	13.972
2	34.60	2957	2973	3004	139285	694950	678856	100.00	86.028

Sum of corrected areas: 789113.

Summary of Unknowns PBM Library Search and Quantitation

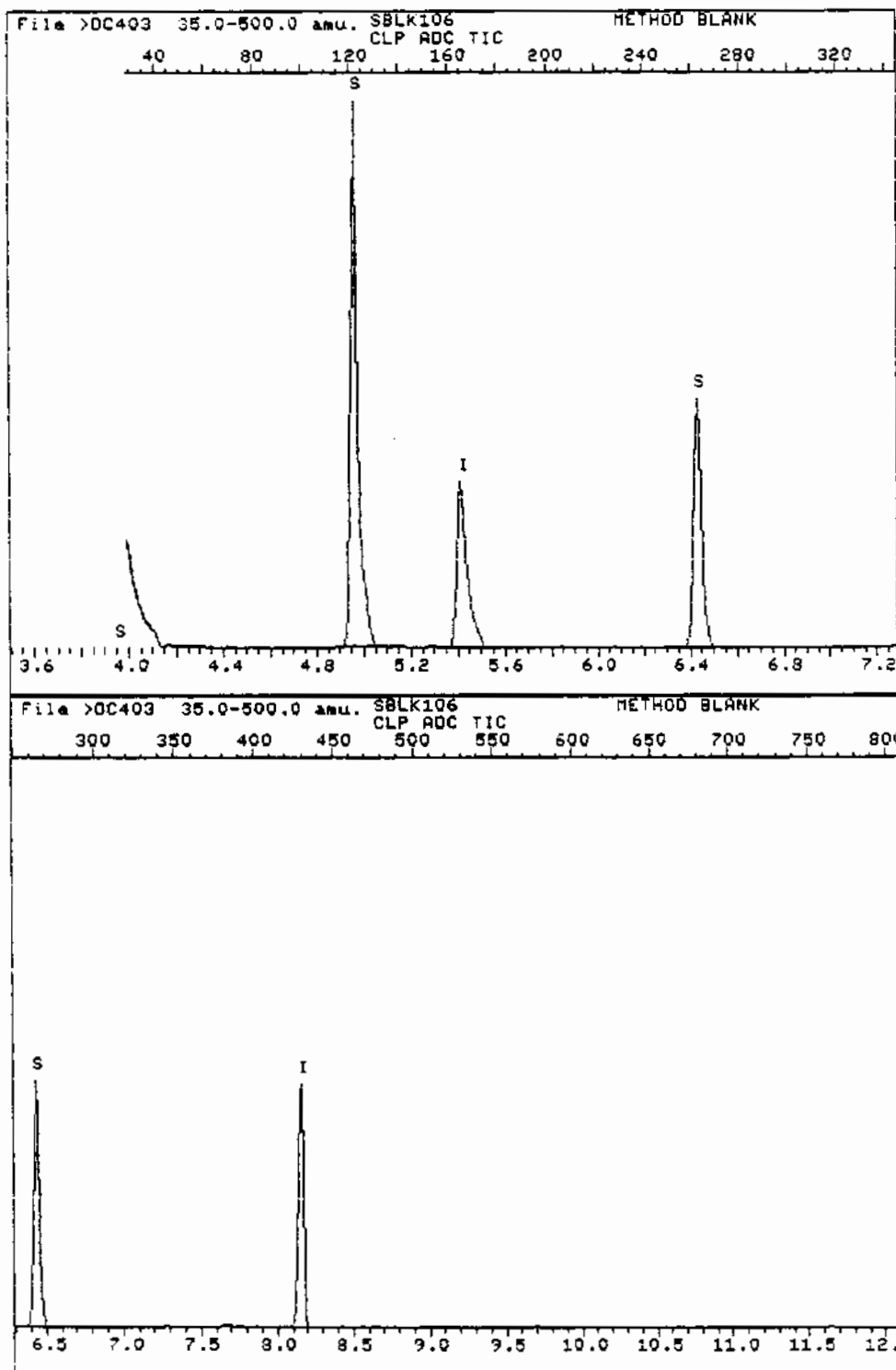
Standard	Concentration	Area	Retention Time	Unknown Window
1	40.0	156974.	5.41	4.00 - 6.79
2	40.0	184325.	8.16	6.79 - 11.60
3	40.0	200965.	15.04	11.60 - 18.69
4	40.0	209907.	22.34	18.69 - 28.10
5	40.0	233912.	33.85	28.10 - 36.04
6	40.0	246520.	38.23	36.04 - 50.26

Dilution Factor = 1.00 This sample was 30.0000 g or mL

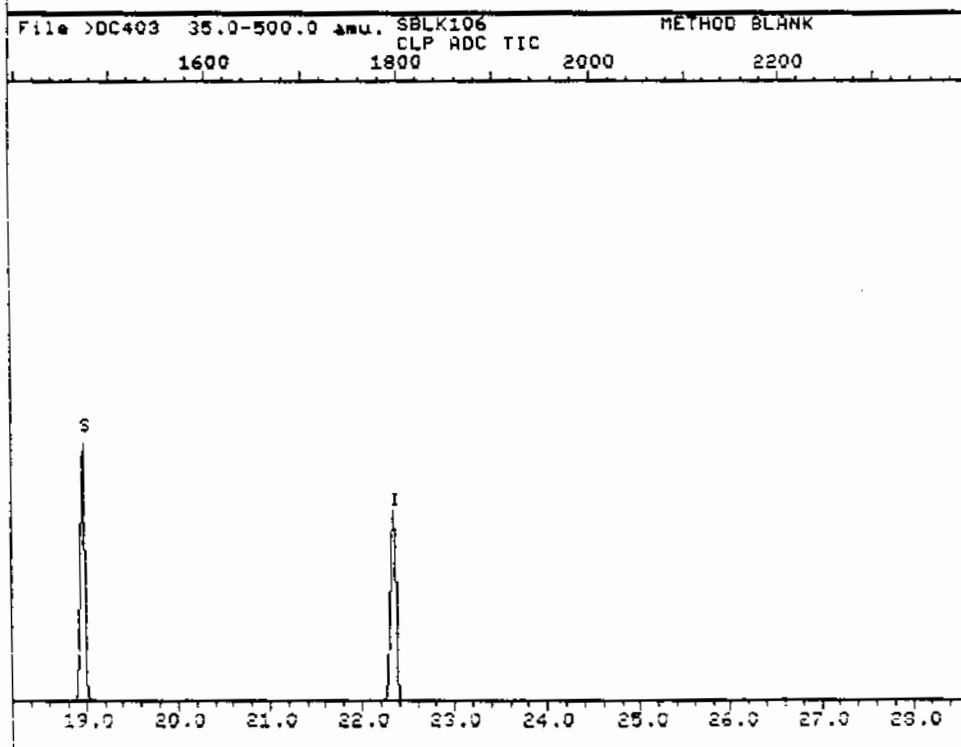
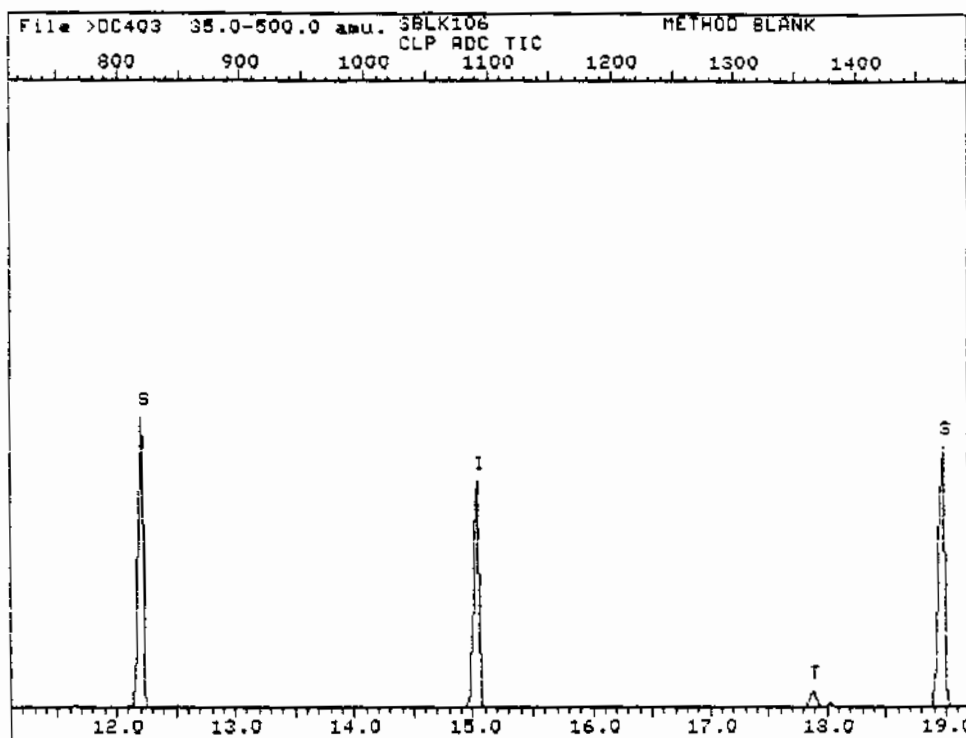
Correction Factor = 33.37

Unknown Concentration = $\frac{\text{Conc Int Std} \times \text{Area Unknown}}{\text{Area Int Std}}$ * Correction Factor

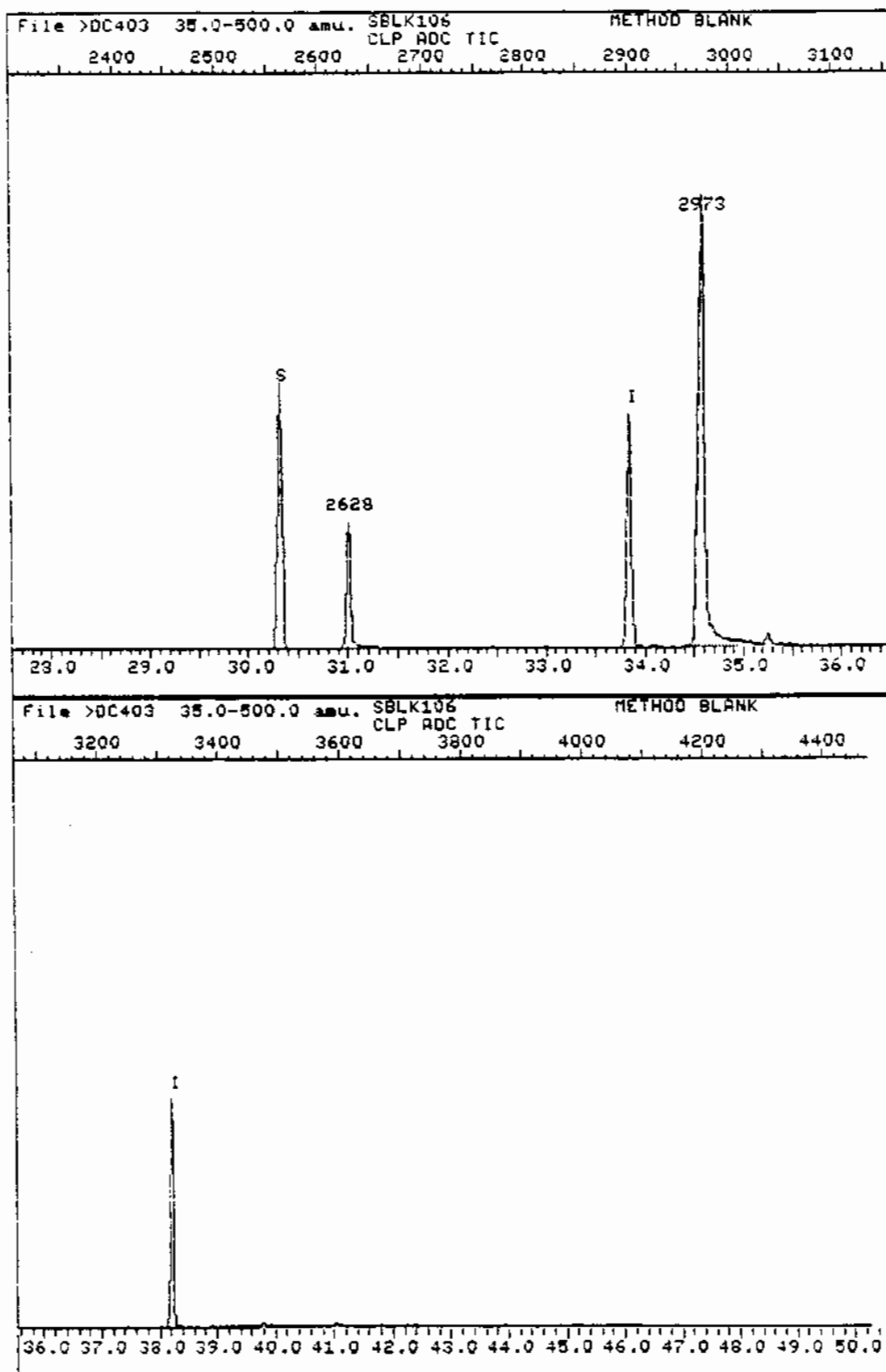
12:32 PM MON., 27 APR., 1992



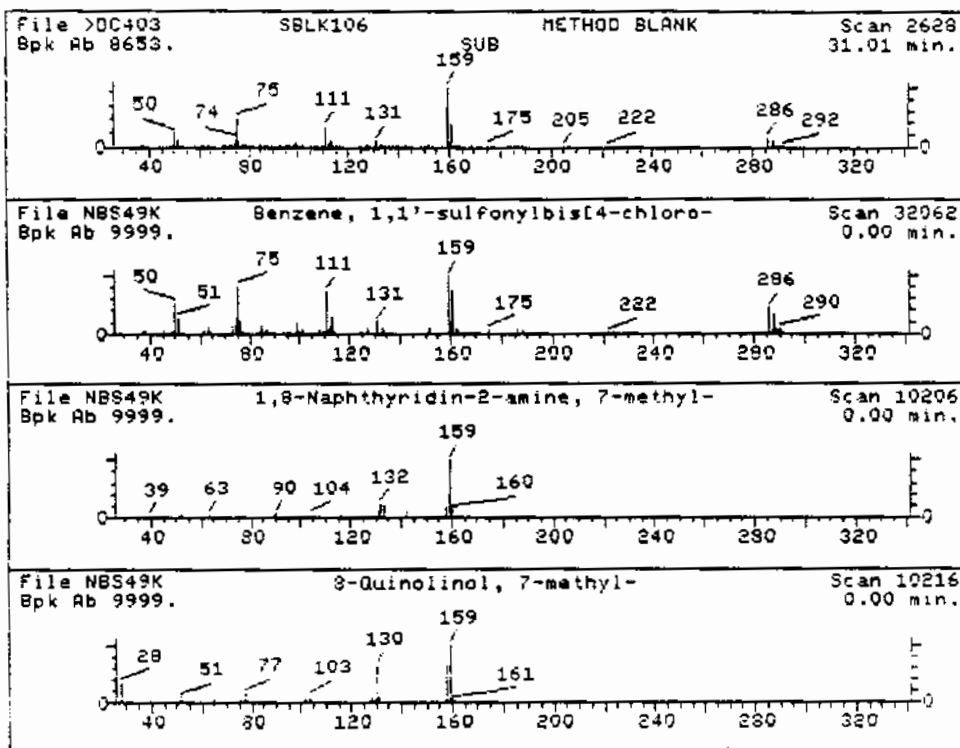
Instrument ID: BNA1 Analyzed on: 4/24/92 15:16



Instrument ID: BNA1 Analyzed on: 4/24/92 15:16



Instrument ID: BNA1 Analyzed on: 4/24/92 15:16



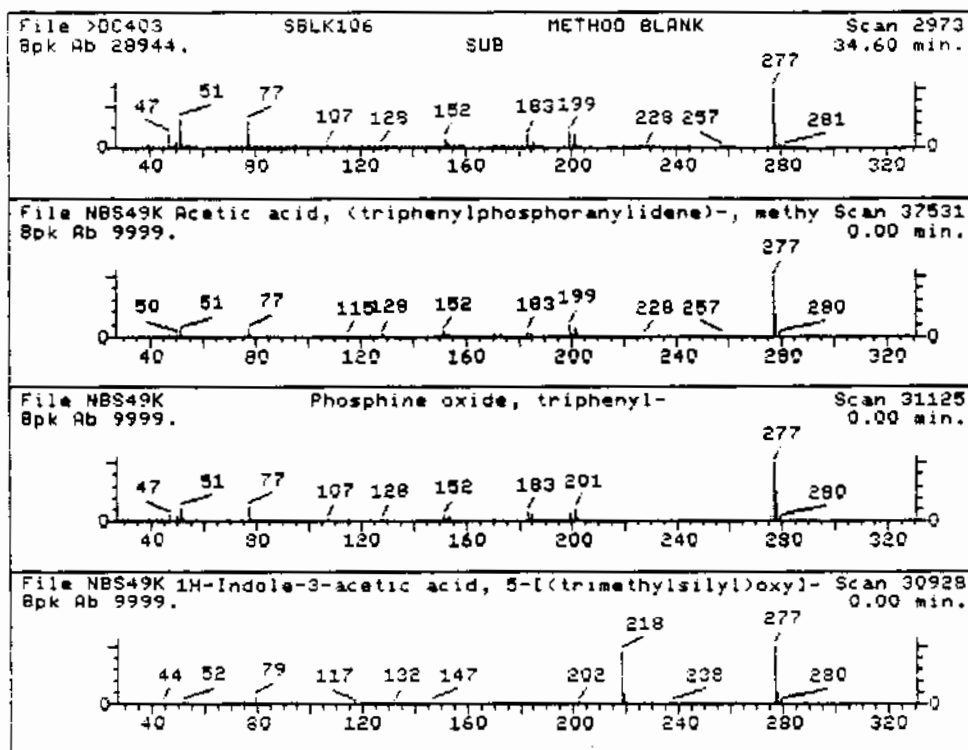
Instrument ID: BNA1 Analyzed on: 4/24/92 15:16
Result 1 in PBM results file: LDC403
Retention Time: 31.01 Area: 110257 Tentative Conc: 630.00
The unknown area is 47.14% of the nearest internal standard

1. Benzene, 1,1'-sulfonylbis(4-chloro-	286 C12H8Cl2O2S
2. 1,8-Naphthyridin-2-amine, 7-methyl-	159 C9H9N3
3. 8-Quinololinol, 7-methyl-	159 C10H9NO
4. Quinoline, 4-methyl-, 1-oxide	159 C10H9NO

Sample file: >DC403 Spectrum #: 2628
Search speed: 3 Tilting option: F No. of ion ranges searched: 61

	Prob.	CAS #	CON #	ROOT	K	DK	#FLG	TILT	%	CON	C_I	R_IU
1.	74*	80079	37916	NBS49K	128	32	0	0	35	53	35	99
2.	20*	1568930	20926	NBS49K	25	70	2	0	100	53	5	14
3.	20*	5541684	20931	NBS49K	23	83	3	0	100	52	5	12
4.	20*	4053401	20945	NBS49K	21	81	2	0	100	53	5	13

7 perhaps



Instrument ID: BNA1 Analyzed on: 4/24/92 15:16

Result 2 in PBM results file: LDC403

Retention Time: 34.60 Area: 678856 Tentative Conc: 3900.00

The unknown area is 290.22% of the nearest internal standard

1. Acetic acid, (triphenylphosphoranylidene)-, methyl ester 334 C21H19O2P
- ② 2. Phosphine oxide, triphenyl- 278 C18H15OP
3. 1H-Indole-3-acetic acid, 5-[(trimethylsilyl)oxyl]-, methyl ester 277 C14H19NO3Si
4. 1,5-Dioxo-2,4,6,8-tetrasilacyclooctane, 2,2,4,4,6,6,8,8-octamethyl- 292 C10H28O2Si4

Sample file: >DC403 Spectrum #: 2973
Search speed: 3 Tilting option: F No. of ion ranges searched: 36

	Prob.	CAS #	CON #	ROOT	K	DK	#FLG	TILT	%	CON	C_I	R_IU
1	84	2605676	37048	NBS49K	116	18	0	2	77	7	55	69
②	78*	791286	37022	NBS49K	98	50	1	1	64	29	37	76
3.	35*	72101350	37001	NBS49K	69	68	2	-1	95	50	11	31
4.	20*	15261060	37024	NBS49K	29	99	2	0	100	54	5	14

QUANT REPORT

Operator ID: BOB
Output File: ^DC404::OF
Data File: >DC404::D1
Name: UIAL 1295 pH.12
Misc: 92-05072-A1 1.0144 G

Quant Rev: 7 Quant Time: 920424 17:08
Injected at: 920424 16:16
Dilution Factor: 1.00000
Instrument ID: BNA1
BTL# 2

ID File: ID1BNA::QT
Title: BNA ID QUANT FILE #1 GC/MS
Last Calibration: 911003 11:18

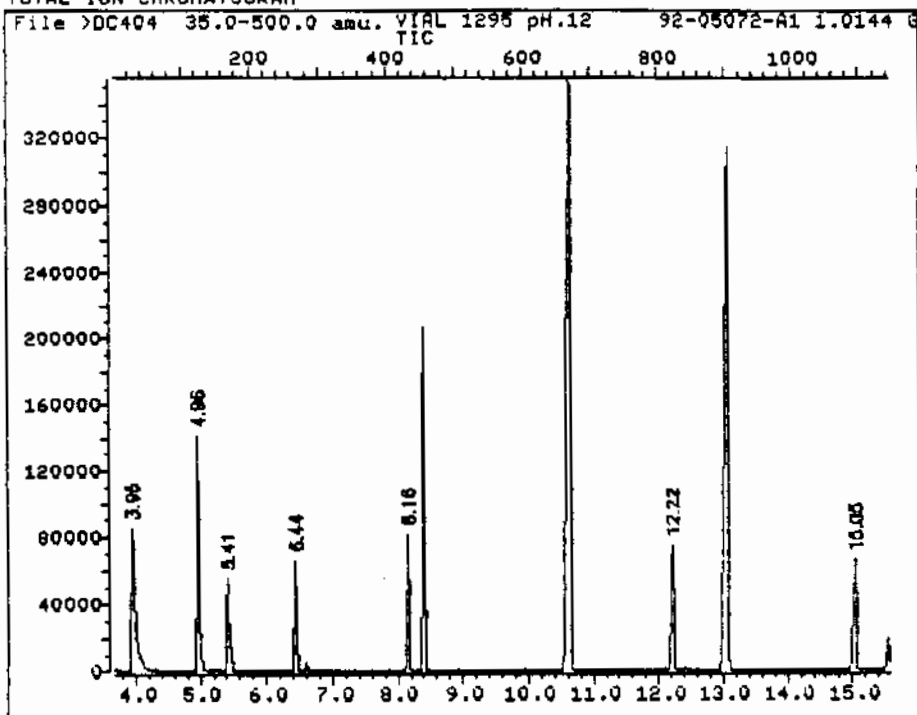
Last Qcal Date: 920424 13:55

	Compound	R.T.	Scan#	Area	Conc	Units	q
1)	*1,4-Dichlorobenzene-d4	5.41	167	22838	40.00	ng/uL	98
2)	2-Fluorophenol	3.95	27	69017	94.18	ng/uL	84
3)	Phenol-d5	4.96	124	89725	106.16	ng/uL	87
4)	Phenol	0.00	0	0	0.00	ng/uL	
5)	bis(2-Chloroethyl)ether	0.00	0	0	0.00	ng/uL	
6)	2-Chlorophenol	0.00	0	0	0.00	ng/uL	
7)	1,3-Dichlorobenzene	0.00	0	0	0.00	ng/uL	
8)	1,4-Dichlorobenzene	0.00	0	0	0.00	ng/uL	
9)	Benzyl alcohol	0.00	0	0	0.00	ng/uL	
10)	1,2-Dichlorobenzene	0.00	0	0	0.00	ng/uL	
11)	2-Methylphenol	0.00	0	0	0.00	ng/uL	
12)	bis(2-Chloroisopropyl)ether	0.00	0	0	0.00	ng/uL	
13)	4-Methylphenol	0.00	0	0	0.00	ng/uL	
14)	N-Nitroso-di-n-propylamine	0.00	266	0	0.00	ng/uL	
15)	Hexachloroethane	0.00	0	0	0.00	ng/uL	
16)	*Naphthalene-d8	8.16	431	76326	40.00	ng/uL	97
17)	Nitrobenzene-d5	6.44	266	44108	47.40	ng/uL	89
18)	Nitrobenzene	0.00	0	0	0.00	ng/uL	
19)	Isophorone	0.00	0	0	0.00	ng/uL	
20)	2-Nitrophenol	0.00	0	0	0.00	ng/uL	
21)	2,4-Dimethylphenol	0.00	0	0	0.00	ng/uL	
22)	Benzoic acid	0.00	0	0	0.00	ng/uL	
23)	bis(2-Chloroethoxy)methane	0.00	0	0	0.00	ng/uL	
24)	2,4-Dichlorophenol	0.00	0	0	0.00	ng/uL	
25)	1,2,4-Trichlorobenzene	0.00	0	0	0.00	ng/uL	
26)	Naphthalene	0.00	0	0	0.00	ng/uL	
27)	4-Chloroaniline	0.00	455	0	0.00	ng/uL	
28)	Hexachlorobutadiene	0.00	0	0	0.00	ng/uL	
29)	4-Chloro-3-methylphenol	0.00	0	0	0.00	ng/uL	
30)	2-Methylnaphthalene	0.00	0	0	0.00	ng/uL	
31)	*Acenaphthene-d10	15.05	1093	41314	40.00	ng/uL	98
32)	Hexachlorocyclopentadiene	0.00	0	0	0.00	ng/uL	
33)	2,4,6-Trichlorophenol	0.00	0	0	0.00	ng/uL	
34)	2,4,5-Trichlorophenol	0.00	0	0	0.00	ng/uL	
35)	2-Chloronaphthalene	0.00	0	0	0.00	ng/uL	
36)	2-Fluorobiphenyl	12.22	821	58748	48.94	ng/uL	99
37)	2-Nitroaniline	0.00	0	0	0.00	ng/uL	
38)	Dimethylphthalate	0.00	0	0	0.00	ng/uL	
39)	Acenaphthylene	0.00	0	0	0.00	ng/uL	
40)	2,6-Dinitrotoluene	0.00	1093	0	0.00	ng/uL	
41)	3-Nitroaniline	0.00	0	0	0.00	ng/uL	
42)	Acenaphthene	0.00	0	0	0.00	ng/uL	

43)	2,4-Dinitrophenol	0.00	0	0	0.00	ng/uL	
44)	4-Nitrophenol	0.00	0	0	0.00	ng/uL	
45)	Dibenzofuran	0.00	0	0	0.00	ng/uL	
46)	2,4-Dinitrotoluene	0.00	0	0	0.00	ng/uL	
47)	Diethylphthalate	17.89	1367	1211	.703	ng/uL	98
48)	4-Chlorophenyl-phenylether	0.00	0	0	0.00	ng/uL	
49)	Fluorene	0.00	0	0	0.00	ng/uL	
50)	4-Nitroaniline	0.00	0	0	0.00	ng/uL	
51)	*Phenanthrene-d10	22.36	1796	70169	40.00	ng/uL	99
52)	4,6-Dinitro-2-methylphenol	0.00	0	0	0.00	ng/uL	
53)	N-Nitrosodiphenylamine	0.00	0	0	0.00	ng/uL	
54)	2,4,6-Tribromophenol	18.98	1471	27181	102.97	ng/uL	99
55)	4-Bromophenyl-phenylether	0.00	0	0	0.00	ng/uL	
56)	Hexachlorobenzene	0.00	0	0	0.00	ng/uL	
57)	Pentachlorophenol	0.00	0	0	0.00	ng/uL	
58)	Phenanthrene	0.00	0	0	0.00	ng/uL	
59)	Anthracene	0.00	0	0	0.00	ng/uL	
60)	Di-n-butylphthalate	0.00	0	0	0.00	ng/uL	
61)	Fluoranthene	0.00	0	0	0.00	ng/uL	
62)	*Chrysene-d12	33.86	2901	74672	40.00	ng/uL	93
63)	Pyrene	0.00	0	0	0.00	ng/uL	
64)	Terphenyl-d14	30.34	2563	74607	53.15	ng/uL	91
65)	Butylbenzylphthalate	0.00	0	0	0.00	ng/uL	
66)	3,3'-Dichlorobenzidine	0.00	0	0	0.00	ng/uL	
67)	Benzo(a)anthracene	0.00	0	0	0.00	ng/uL	
68)	Chrysene	0.00	0	0	0.00	ng/uL	
69)	Bis(2-Ethylhexyl)phthalate	0.00	0	0	0.00	ng/uL	
70)	*Perylene-d12	38.23	3320	81494	40.00	ng/uL	98
71)	Di-n-octylphthalate	0.00	0	0	0.00	ng/uL	
72)	Benzo(b)fluoranthene	0.00	0	0	0.00	ng/uL	
73)	Benzo(k)fluoranthene	0.00	0	0	0.00	ng/uL	
74)	Benzo(a)pyrene	0.00	0	0	0.00	ng/uL	
75)	Indeno(1,2,3-cd)pyrene	0.00	0	0	0.00	ng/uL	
76)	Dibenz(a,h)anthracene	0.00	0	0	0.00	ng/uL	
77)	Benzo(g,h,i)perylene	0.00	0	0	0.00	ng/uL	

* Compound is ISTD

TOTAL ION CHROMATOGRAM



Data File: >DC404::D1
Name: UIAL 1295 pH.12
Misc: 92-05072-A1 1.0144 G

Quant Output File: ^DC404::OF
Instrument ID: BNA1

BTL# 2

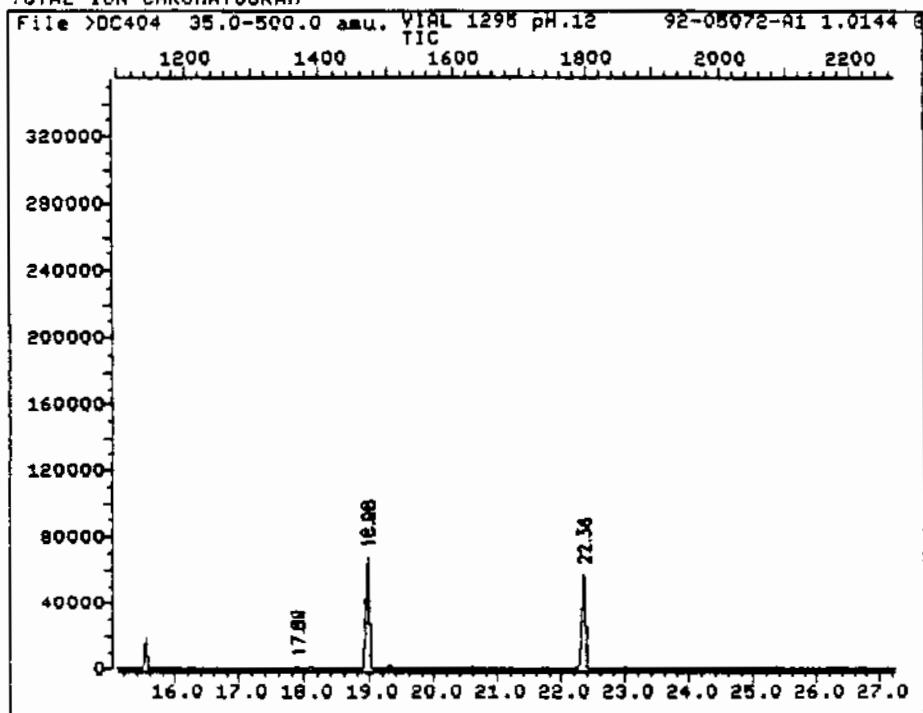
Id File: ID18NA::QT
Title: BNA ID QUANT FILE #1 GC/MS
Last Calibration: 911003 11:18

Last Qcal Time: 920424 13:55

Operator ID: BOB
Quant Time : 920424 17:08
Injected at: 920424 16:16

Page 1 of 4

TOTAL ION CHROMATOGRAM



Data File: >DC404::D1
Name: VIAL 1295 pH.12
Misc: 92-05072-A1 1.0144 G

Quant Output File: ^DC404::OF
Instrument ID: BNA1
BTL# 2

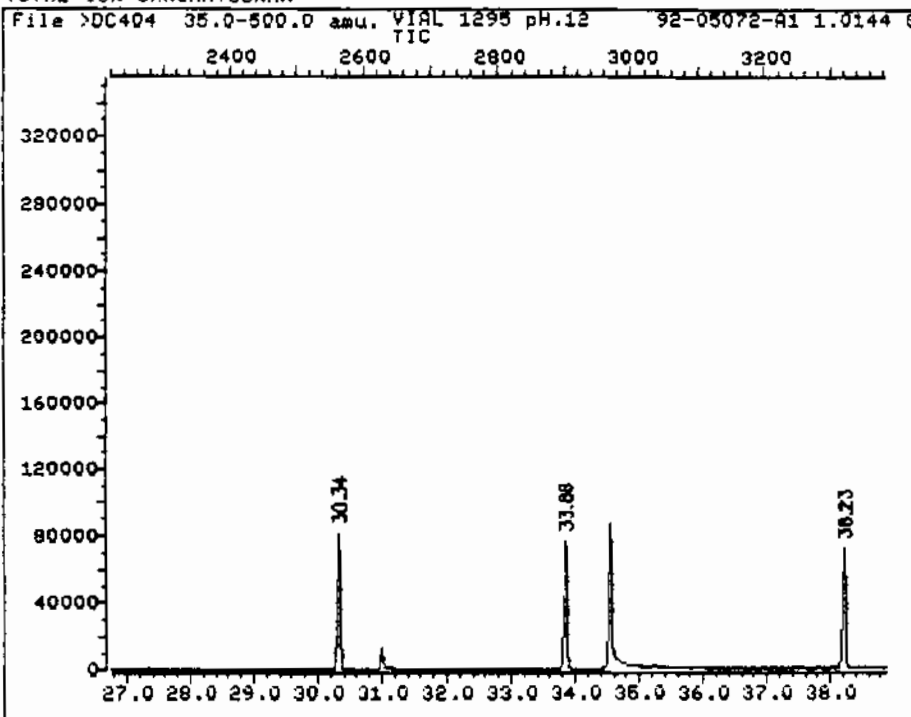
Id File: ID1BNA::QT
Title: BNA ID QUANT FILE #1 GC/MS
Last Calibration: 911003 11:18

Last Qcal Time: 920424 13:55

Operator ID: BOB
Quant Time : 920424 17:08
Injected at: 920424 16:16

Page 2 of 4

TOTAL ION CHROMATOGRAM



Data File: >DC404::D1
 Name: VIAL 1295 pH.12
 Misc: 92-05072-A1 1.0144 G

Quant Output File: ^DC404::OF
 Instrument ID: BNA1

BTLE# 2

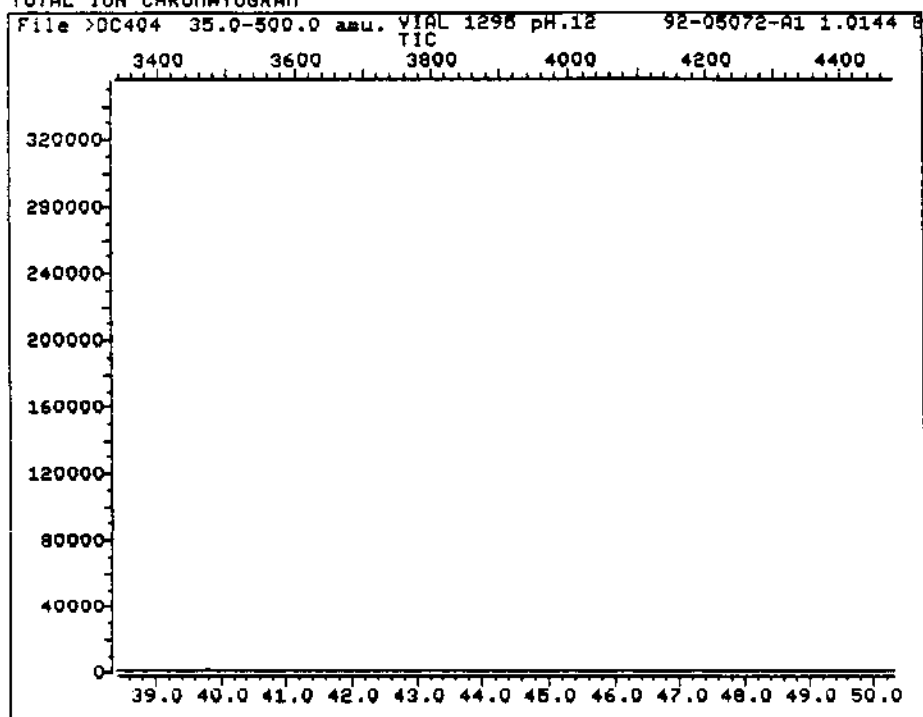
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 Title: BNA ID QUANT FILE #1 GC/MS
 Last Calibration: 911003 11:18

Last Qcal Time: 920424 13:55

Operator ID: 808
 Quant Time : 920424 17:08
 Injected at: 920424 16:16

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TOTAL ION CHROMATOGRAM



Data File: >DC404::D1
Name: VIAL 1295 pH.12
Misc: 92-05072-A1 1.0144 G

Quant Output File: ^DC404::OF
Instrument ID: BNA1

BTLE# 2

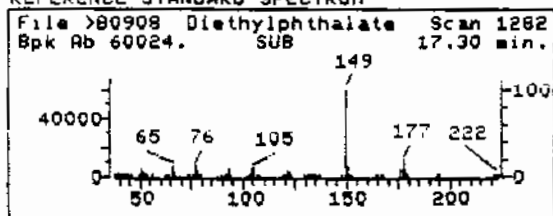
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Last Calibration: 911003 11:18

Last Qual Time: 920424 13:55

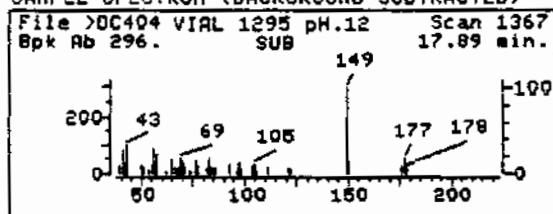
Operator ID: BOB
Quant Time : 920424 17:00
Injected at: 920424 16:16

Page 4 of 4

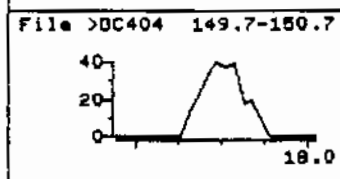
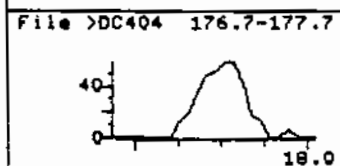
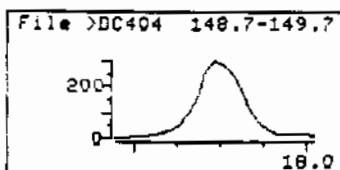
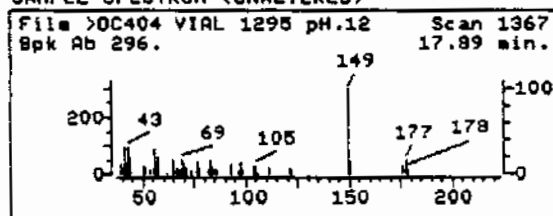
REFERENCE STANDARD SPECTRUM



SAMPLE SPECTRUM (BACKGROUND SUBTRACTED)



SAMPLE SPECTRUM (UNALTERED)



Data File: >DC404::D1
Name: VIAL 1295 pH.12
Misc: 92-05072-A1 1.0144 G
Quant Time: 920424 17:08
Injected at: 920424 16:16
Last Qcal Time: 920424 13:55

Quant Output File: ^DC404::OF
Instrument ID: BNA1
BTL# 2
Quant ID File: ID1BNA::QT
Last Calibration: 911003 11:18

Compound No : 47
Compound Name : Diethylphthalate
Scan Number : 1367
Retention Time: 17.89 min.
Quant Ion : 149.0
Area : 1211
Concentration : .703 ng/uL
q-value : 88

OK

[GC/MS OPERATOR REPORT]

[GC/MS LAB SEMIVOLATILES]

[INTERNAL STANDARD CHECK REPORT]

SAMPLE FILE = >DC404
 CAL CHECK FILE = >DC402
 DATE AND TIME OF ANALYSIS = 4/24/92 16:16
 MISCELLANEOUS = 92-05072-A1 1.0144 G
 METHOD = BNAME1
 INSTRUMENT = BNA1
 OPERATOR = BOB SUPER GRP

I. Areas

Name of the BNA Internal Standard	The Sample ISTD Area	Daily Check ISTD Area	Daily Check ISTD Area / 2	Daily Check ISTD Area x 2	Status of the Sample ISTD Area Precision
1,4-Dichlorobenz-d4	22838	24890	12445	49780	OK
Naphthalene-d8	76326	87937	43969	175874	OK
Acenaphthene-d10	41314	47070	23535	94140	OK
Phenanthrene-d10	70169	81388	40694	162776	OK
Chrysene-d12	74672	81856	40928	163712	OK
Perylene-d12	81494	90335	45168	180670	OK

II. Retention Times

Name of the BNA Internal Standard	The Sample ISTD R.Time	Daily Check ISTD R.Time	Daily Check ISTD RT - 0.5	Daily Check ISTD RT + 0.5	Status of the Sample ISTD R.T. Precision
1,4-Dichlorobenz-d4	5.41	5.41	4.91	5.91	OK
Naphthalene-d8	8.16	8.17	7.67	8.67	OK
Acenaphthene-d10	15.05	15.05	14.55	15.55	OK
Phenanthrene-d10	22.36	22.38	21.88	22.88	OK
Chrysene-d12	33.86	33.88	33.38	34.38	OK
Perylene-d12	38.23	38.25	37.75	38.75	OK

[GC/MS OPERATOR REPORT]

[GC/MS LAB SEMI-VOLATILES]

[Preliminary Surrogate Report]

DATA FILE NAME = >DC404::D1
 DATE AND TIME OF ANALYSIS = 4/24/92 16:16
 SAMPLE = VIAL 1295 pH.12
 MISCELLANEOUS = 92-05072-A1 1.0144 G
 METHOD = BNAME1
 INSTRUMENT = BNA1
 OPERATOR = BOB SUPER GRP

SURROGATE	AS FOUND IN SAMPLE	WAS SPIKED AT	WATER LIMITS	SOIL LIMITS	% RECOVERY
-----	-----	-----	-----	-----	-----
2-Fluorophenol	94.18	100.00	21-100	25-121	94.18
Phenol-d5	106.16	100.00	10-94	24-113	106.16
Nitrobenzene-d5	47.40	50.00	35-114	23-120	94.80
2-Fluorobiphenyl	48.94	50.00	43-116	30-115	97.89
2,4,6-tribromo- phenol	102.97	100.00	10-123	19-122	102.97
Terphenyl-d14	53.15	50.00	33-141	18-137	106.30

MS data file header from : >DC404::D1

Sample: VIAL 1295 pH.12 Operator: BOB SUPER GRP. 4/24/92 16:16
Misc : 92-05072-A1 1.0144 G BTL# 2
Sys. #: 1 MS model: 70 SW/HW rev.: LF ALS # : 2 Equip ID: BNA1
Method file: BNAME1 Tuning file: MTBNA1 No. of extra records: 2
Source temp.: N/A Analyzer temp.: N/A Transfer line temp.: 0

Chromatographic temperatures : 40. 100. 190. 300. 0.
Chromatographic times, min. : 1.5 .5 .5 12.0 0.0
Chromatographic rate, deg/min: 30.0 4.5 8.0 .5 0.0

>DC404 VIAL 1295 pH.12 92-05072-A1 1.0144 G
35.01 500.0 CLP TIC
Upslope: .2000 Area Reject: 16216. Max Peaks: 6 Bunch: -1 Valley >100 %
Dnslope: 0.0000 Results File IDC404 Sorted by Time/Area INT

Peak #	R.T. min.	first scan	max scan	last scan	peak height	raw area	corr. area	corr. % max.	% of total
1	8.42	446	456	461	206396	500458	498347	32.43	13.194
2	10.64	654	670	680	353987	1540737	1536556	100.00	40.681
3	13.08	887	904	917	314413	1296608	1293062	84.15	34.235
4	15.54	1132	1140	1146	18525	48344	47120	3.07	1.248
5	31.00	2619	2627	2649	11979	48553	40944	2.66	1.084
6	34.57	2956	2969	3005	86067	382210	361016	23.50	9.558

Sum of corrected areas: 3777045.

Summary of Unknowns PBM Library Search and Quantitation

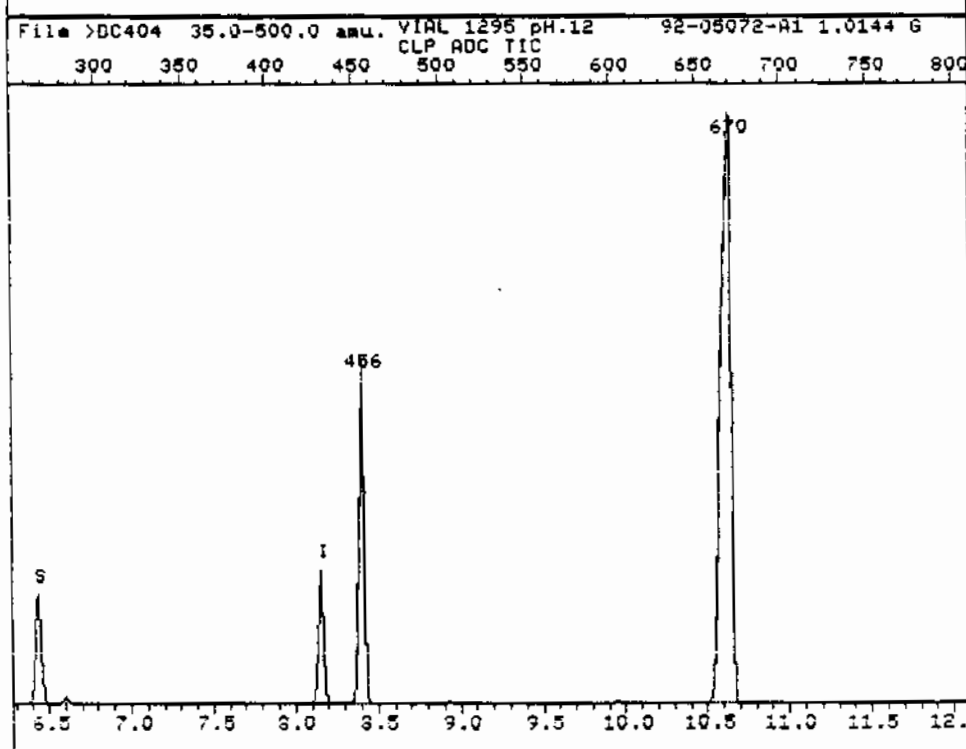
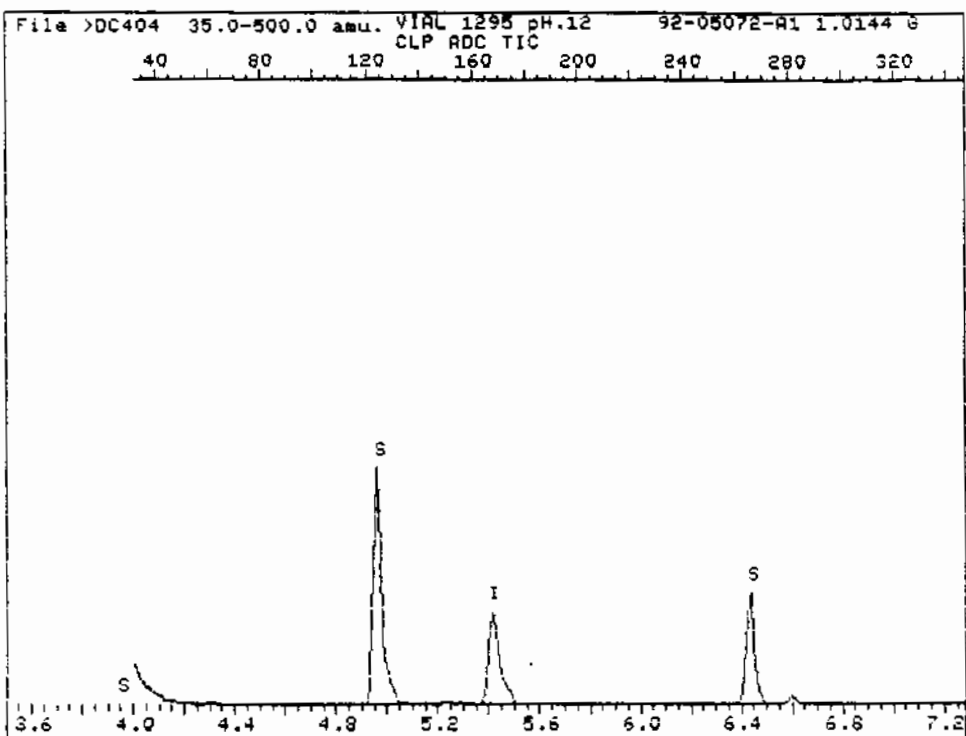
Standard	Concentration	Area	Retention Time	Unknown Window
1	40.0	162161.	5.41	4.00 - 6.78
2	40.0	194989.	8.16	6.78 - 11.60
3	40.0	211011.	15.05	11.60 - 18.70
4	40.0	219364.	22.36	18.70 - 28.11
5	40.0	246340.	33.86	28.11 - 36.04
6	40.0	259606.	38.23	36.04 - 50.31

Dilution Factor = 1.00 This sample was 1.01440 g or mL

Correction Factor = 986.79

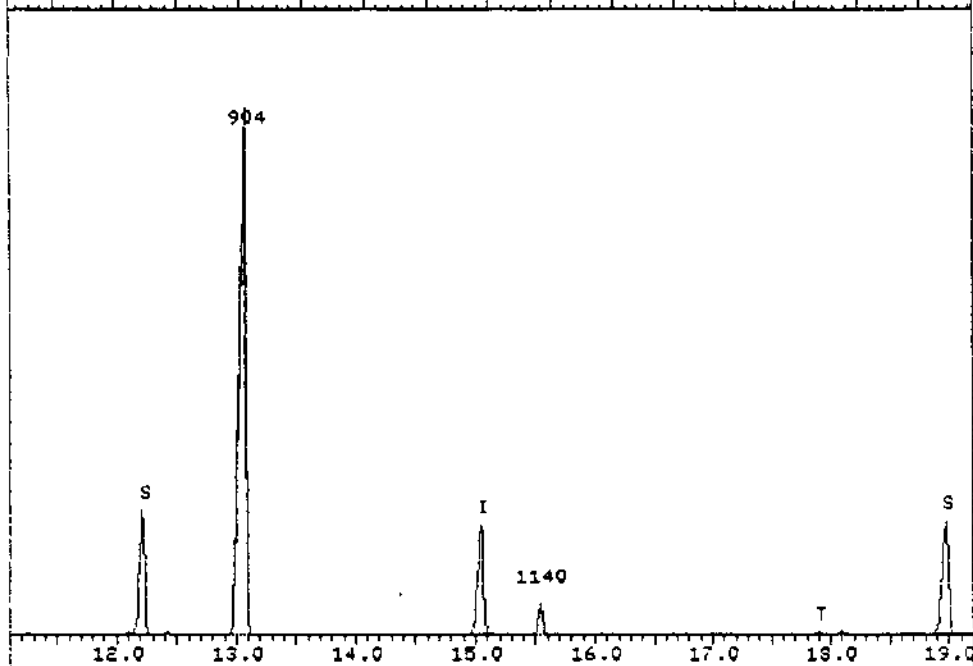
Unknown Concentration = $\frac{(\text{Conc Int Std} * \text{Area Unknown})}{(\text{Area Int Std})} * \text{Correction Factor}$

12:45 PM MON., 27 APR., 1992

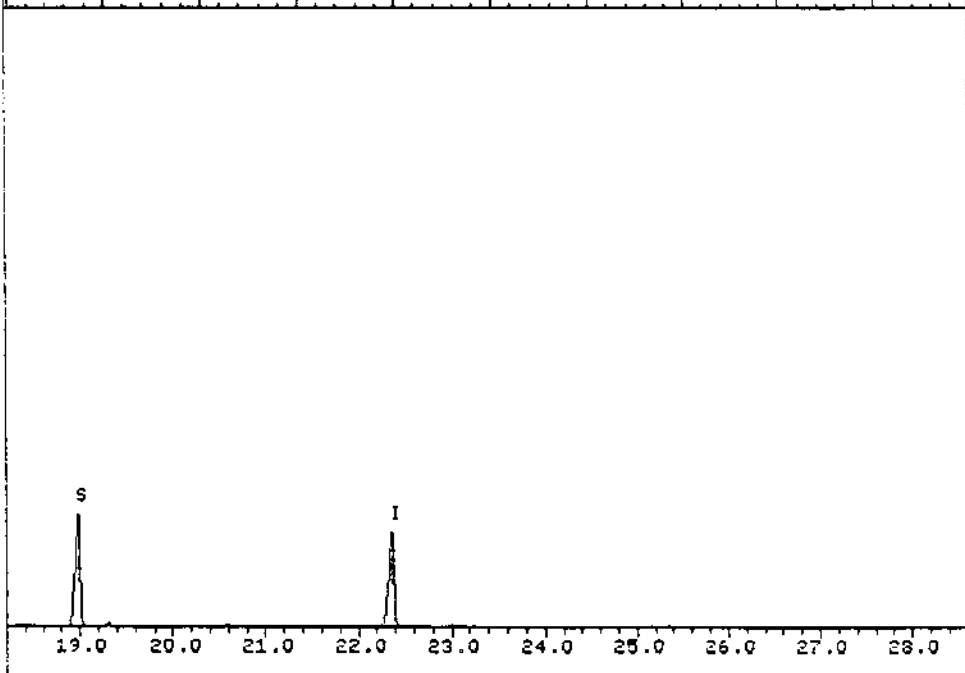


Instrument ID: BNA1 Analyzed on: 4/24/92 16:16

File >DC404 35.0-500.0 amu. VIAL 1295 pH.12 92-05072-A1 1.0144 G
CLP ADC TIC
800 900 1000 1100 1200 1300 1400

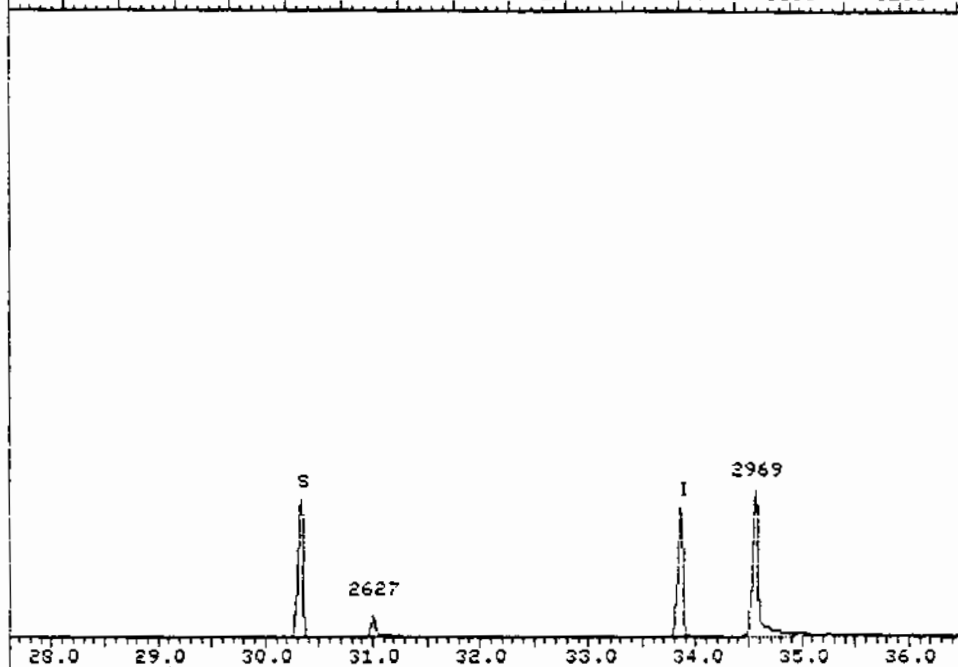


File >DC404 35.0-500.0 amu. VIAL 1295 pH.12 92-05072-A1 1.0144 G
CLP ADC TIC
1600 1800 2000 2200

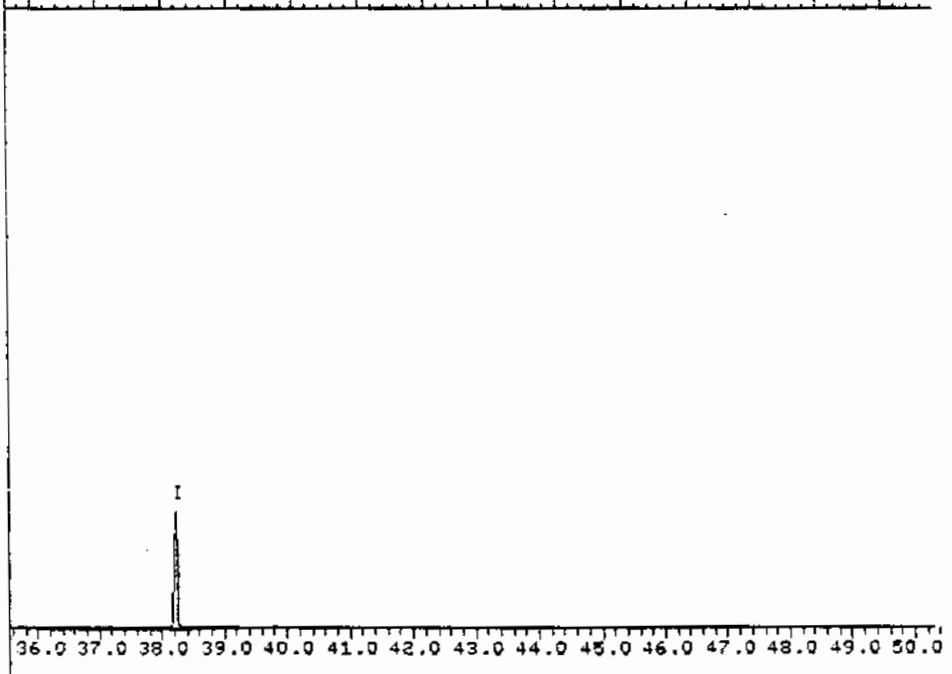


Instrument ID: BNA1 Analyzed on: 4/24/92 16:16

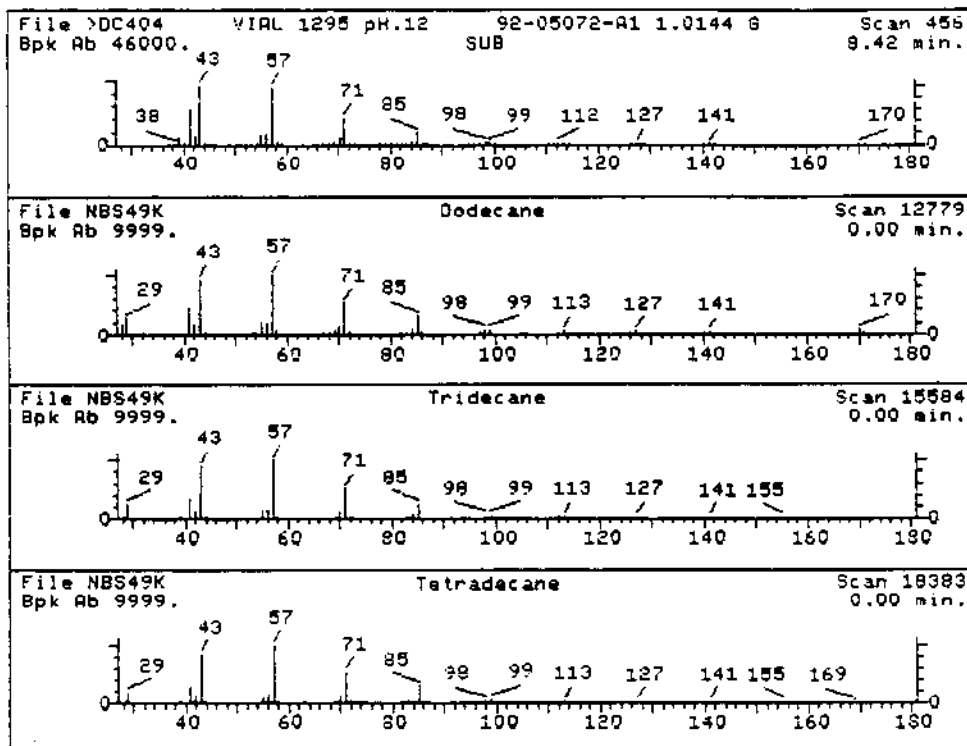
File >OC404 35.0-500.0 amu. VIAL 1295 pH.12 92-05072-A1 1.0144 6
CLP ADC TIC
2400 2500 2600 2700 2800 2900 3000 3100



File >OC404 35.0-500.0 amu. VIAL 1295 pH.12 92-05072-A1 1.0144 6
CLP ADC TIC
3200 3400 3600 3800 4000 4200 4400



Instrument ID: BNA1 Analyzed on: 4/24/92 16:16



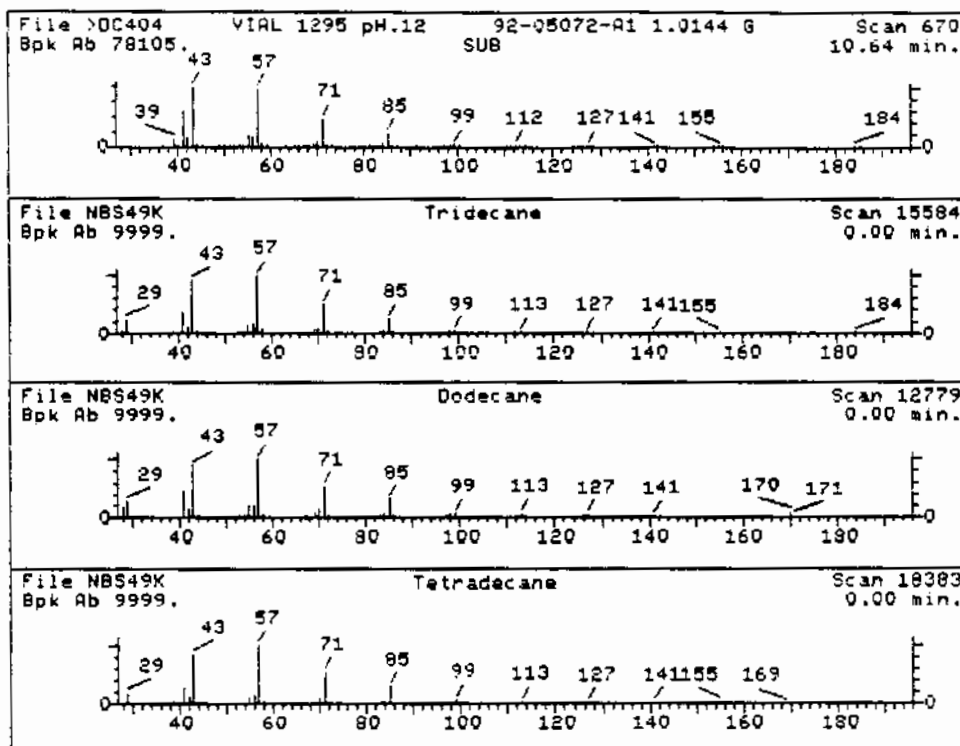
Instrument ID: BNA1 Analyzed on: 4/24/92 16:16
Result 1 in PBM results file: LDC404
Retention Time: 8.42 Area: 498347 Tentative Conc: 100000.00
The unknown area is 255.58% of the nearest internal standard

①. Dodecane	170 C12H26
2. Tridecane	184 C13H28
3. Tetradecane	198 C14H30
4. Pentadecane	212 C15H32
5. Heptadecane, 2,6,10,14-tetramethyl-	296 C21H44
6. Decane, 2,3,5-trimethyl-	184 C13H28

Sample file: >DC404 Spectrum #: 456
Search speed: 3 Tilting option: F No. of ion ranges searched: 58

	Prob.	CAS #	CON #	ROOT	K	DK	#FLG	TILT	%	CON	C_I	R_IV
①.	96*	112403	6732	NBS49K	99	0	0	4	81	0	72	94
2.	83	629505	6761	NBS49K	92	14	2	3	97	1	57	29
3.	83	629594	6804	NBS49K	92	16	2	4	100	1	57	29
4.	83	629629	6819	NBS49K	85	35	2	4	71	1	57	21
5.	78	18344371	6880	NBS49K	79	50	2	3	82	2	55	14
6.	76	62238113	6779	NBS49K	69	34	1	4	76	10	45	24

OK

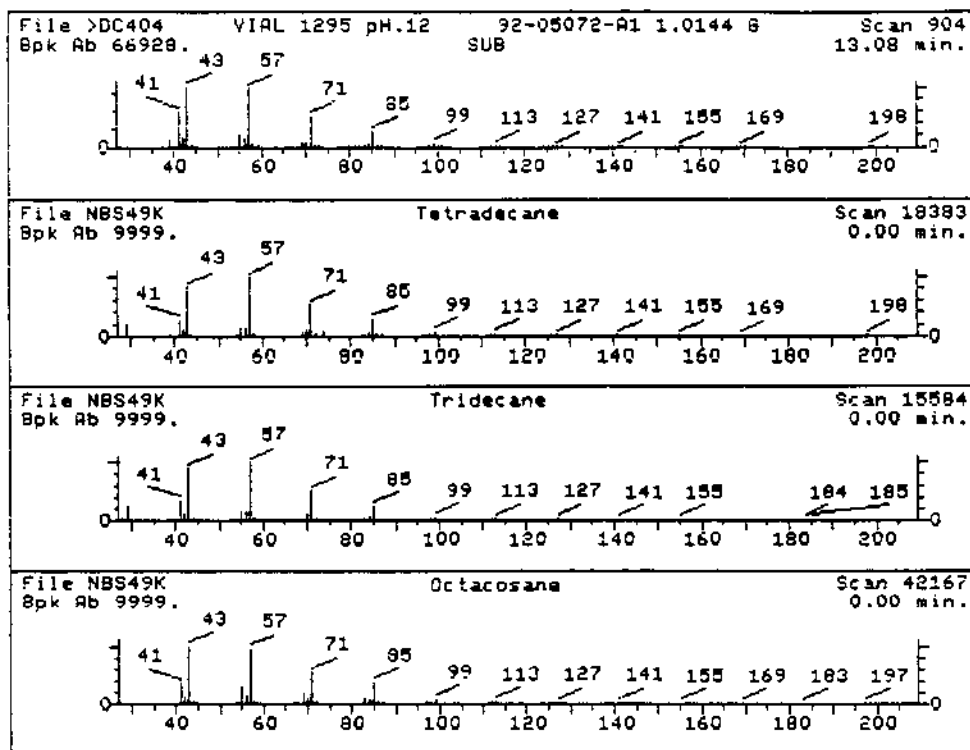


Instrument ID: BNA1 Analyzed on: 4/24/92 16:16
Result 2 in PBM results file: LOC404
Retention Time: 10.64 Area: 1536556 Tentative Conc: 310000.00
The unknown area is 788.02% of the nearest internal standard

①. Tridecane	184 C13H28
2. Dodecane	170 C12H26
3. Tetradecane	198 C14H30
4. Tetradecane, 1-iodo-	324 C14H29I
5. Decane, 6-ethyl-2-methyl-	184 C13H28
6. Nonadecane	268 C19H40

Sample file: >DC404 Spectrum #: 670
Search speed: 3 Tilting option: F No. of ion ranges searched: 61

	Prob.	CAS #	CON #	ROOT	K	DK	#FLG	TILT	%	CON	C_I	R_IV
①.	95*	629505	6761	NBS49K	77	29	0	0	65	1	72	93
2.	87	112403	6732	NBS49K	87	12	1	4	81	4	63	45
3.	86	629594	6804	NBS49K	97	11	2	3	100	1	60	32
4.	83	19218941	6889	NBS49K	100	28	1	2	69	8	54	50
5.	83	62108218	6767	NBS49K	65	34	2	0	87	5	57	23
6.	78	629925	6864	NBS49K	73	44	2	4	100	5	55	12

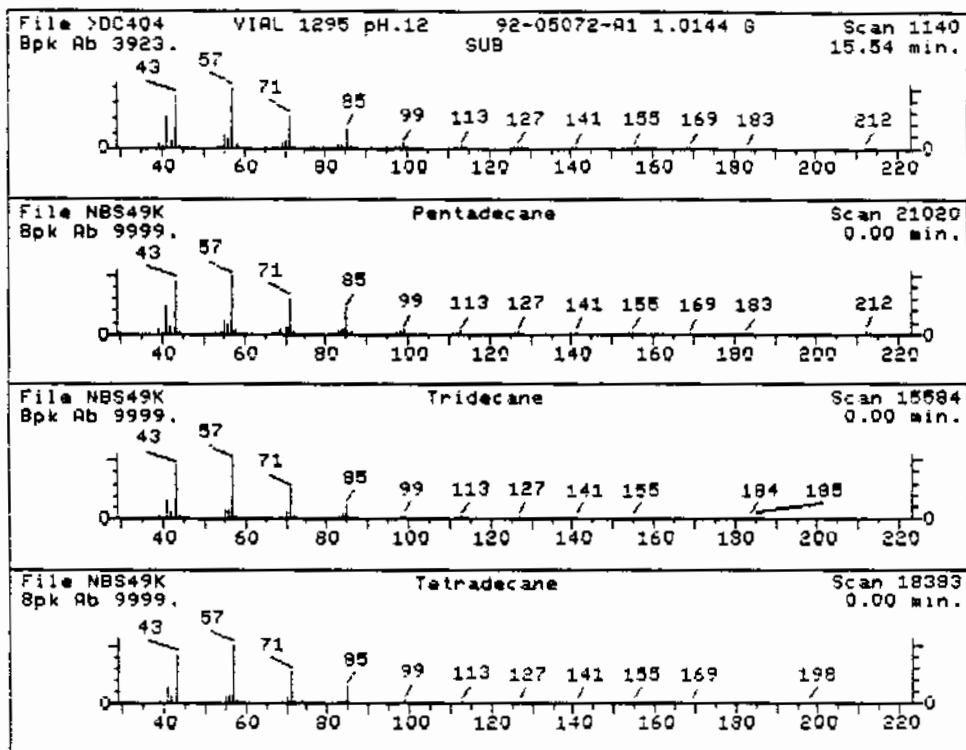


Instrument ID: BNA1 Analyzed on: 4/24/92 16:16
Result 3 in PBM results file: LDC404
Retention Time: 13.08 Area: 1293062 Tentative Conc: 240000.00
The unknown area is 612.79% of the nearest internal standard

1. Tetradecane	198 C14H30
2. Tridecane	184 C13H28
3. Octacosane	394 C28H58
4. Pentadecane	212 C15H32
5. Decane, 6-ethyl-2-methyl-	184 C13H28
6. Nonadecane	268 C19H40

Sample file: >DC404 Spectrum #: 904
Search speed: 3 Tilting option: F No. of ion ranges searched: 65

	Prob.	CAS #	CON #	ROOT	K	DK	#FLG	TILT	%	CON	C_I	R_IV
1.	93*	629594	6804	NBS49K	97	11	1	3	100	1	68	89
2.	86	629505	6761	NBS49K	93	13	2	2	100	2	60	30
3.	83	630024	6906	NBS49K	99	42	2	4	83	4	57	26
4.	83	629629	6819	NBS49K	87	33	2	4	90	4	57	23
5.	83	62108213	6767	NBS49K	68	31	2	0	98	5	57	24
6.	78	629925	6864	NBS49K	78	39	2	3	100	4	55	16

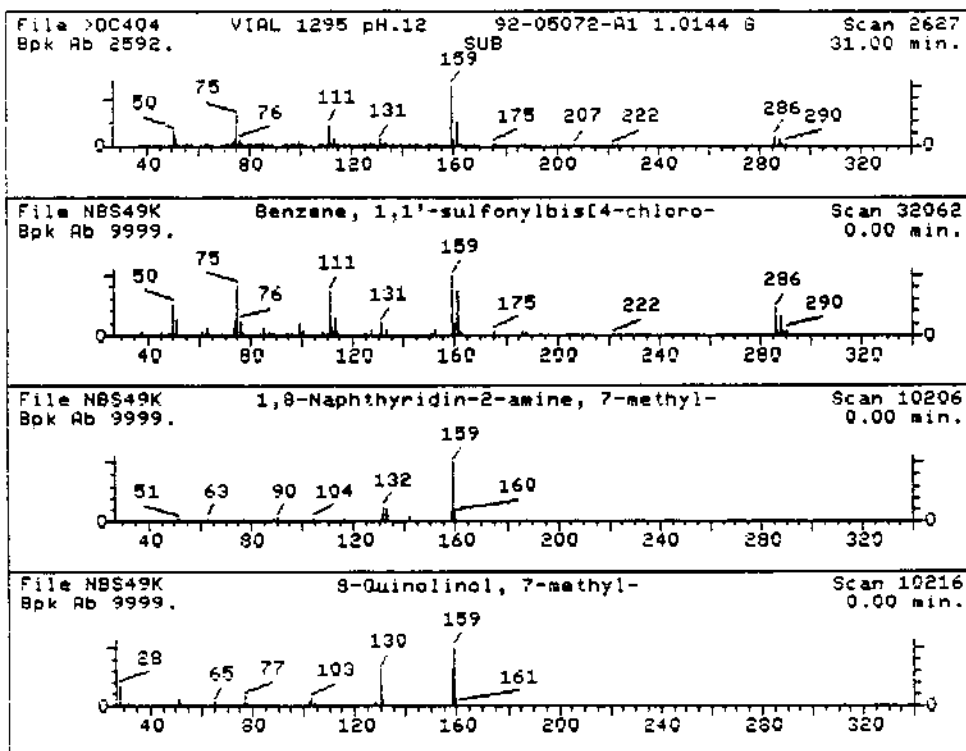


Instrument ID: BNA1 Analyzed on: 4/24/92 16:16
Result 4 in PBM results file: LOC404
Retention Time: 15.54 Area: 47120 Tentative Conc: 3800.00
The unknown area is 22.33% of the nearest internal standard

① Pentadecane	212 C15H32
2. Tridecane	184 C13H28
3. Tetradecane	198 C14H30
4. Hexadecane	226 C16H34
5. Eicosane	282 C20H42
6. Dotacosane	394 C28H58

Sample file: >DC404 Spectrum #: 1140
Search speed: 3 Tilting option: F No. of ion ranges searched: 74

	Prob.	CAS #	CON #	ROOT	K	DK	#FLG	TILT	%	CON	C_I	R_IU
①	89*	629629	6819	NBS49K	106	14	2	3	82	2	66	72
2.	88	629505	6761	NBS49K	87	19	1	0	90	4	65	53
3.	83	629594	6804	NBS49K	91	17	2	1	100	2	57	28
4.	83	544763	6835	NBS49K	91	29	2	4	93	5	57	27
5.	83	112958	6871	NBS49K	100	39	2	4	78	4	57	27
6.	83	630024	6906	NBS49K	99	42	2	2	79	1	57	26



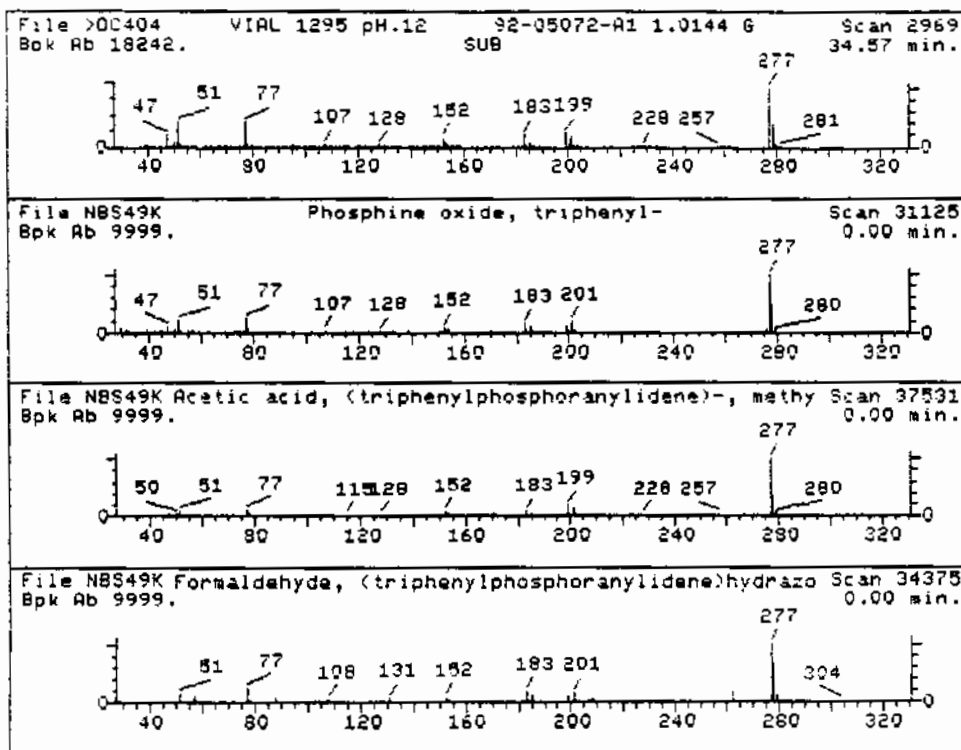
Instrument ID: BNA1 Analyzed on: 4/24/92 16:16
Result 5 in PBM results file: LDC404
Retention Time: 31.00 Area: 40944 Tentative Conc: 6600.00
The unknown area is 16.62% of the nearest internal standard

- ① Benzene, 1,1'-sulfonylbis[4-chloro- 286 C12H8Cl2O2S
2. 1,8-Naphthyridin-2-amine, 7-methyl- 159 C9H9N3
3. 8-Quinolinol, 7-methyl- 159 C10H9NO
4. Quinoline, 4-methyl-, 1-oxide 159 C10H9NO

Sample file: >OC404 Spectrum #: 2627
Search speed: 3 Tilting option: F No. of ion ranges searched: 59

Prob.	CAS #	CON #	ROOT	K	DK	#FLG	TILT	%	CON	C_I	R_IV
① 89*	80079	37916	NBS49K	129	32	0	0	36	48	40	99

? blank too



Instrument ID: BNA1 Analyzed on: 4/24/92 16:16
Result 6 in PBM results file: LDC404
Retention Time: 34.57 Area: 361016 Tentative Conc: 58000.00
The unknown area is 146.55% of the nearest internal standard

- ①. Phosphine oxide, triphenyl- 278 C18H15OP
2. Acetic acid, (triphenylphosphoranylidene)-, methyl ester 334 C21H19O2P
3. Formaldehyde, (triphenylphosphoranylidene)hydrazone 304 C19H17N2P
4. 1H-Indole-3-acetic acid, 5-[(trimethylsilyl)oxyl]-, methyl ester 277 C14H19NO3Si
5. 1,5-Dioxo-2,4,6,8-tetrasilacyclooctane, 2,2,4,4,6,6,8,8-octamethyl- 292 C10H29O2Si4

Sample file: >DC404 Spectrum #: 2969
Search speed: 3 Tilting option: F No. of ion ranges searched: 36

	Prob.	CAS #	CON #	ROOT	K	DK	#FLG	TILT	%	CON	C_I	R_IV
2.	80*	791286	37022	NBS49K	106	42	1	1	64	24	47	80
2.	75	2605676	37048	NBS49K	105	29	0	2	72	16	35	65
3.	49*	15990542	37031	NBS49K	57	94	2	1	59	30	19	27
4.	21*	72101350	37001	NBS49K	69	68	2	-1	100	60	5	31
5.	20*	15261060	37024	NBS49K	29	99	2	0	100	54	5	14

flak

QUANT REPORT

Operator ID: BOB
Output File: ^DC405::OF
Data File: >DC405::D1
Name: VIAL 1295 pH.12
Misc: 92-05072-A4 1.0126 G

Quant Rev: 7 Quant Time: 920424 18:09
 Injected at: 920424 17:17
 Dilution Factor: 1.00000
 Instrument ID: BNA1
 BTL# 3

ID File: ID1BNA::QT
Title: BNA ID QUANT FILE #1 GC/MS
Last Calibration: 911003 11:18

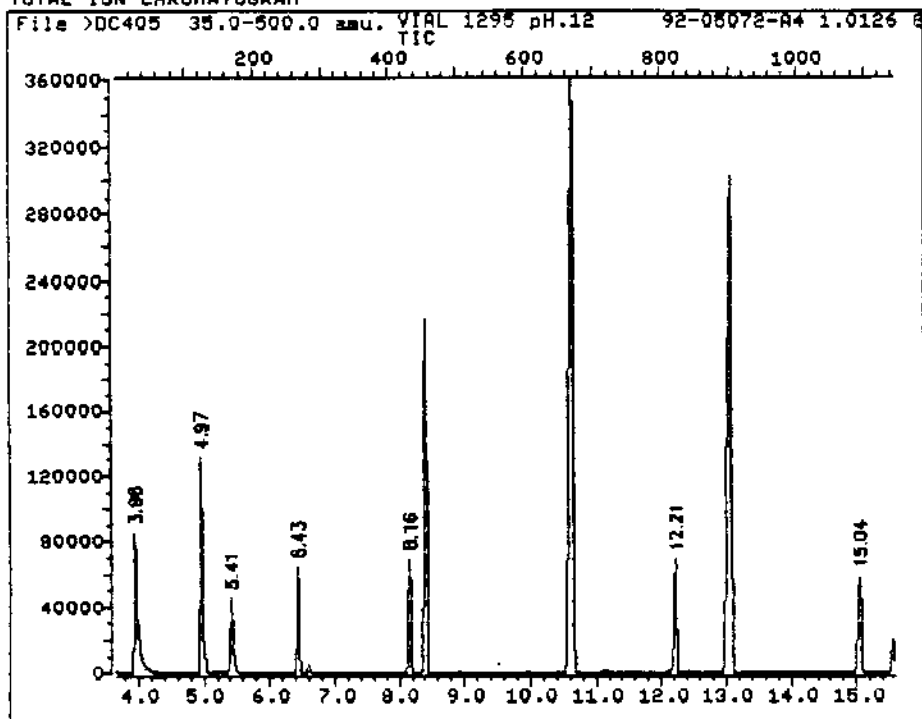
Last Qcal Date: 920424 13:55

	Compound	R.T.	Scan#	Area	Conc	Units	q
1)	*1,4-Dichlorobenzene-d4	5.41	167	19503	40.00	ng/uL	96
2)	2-Fluorophenol	3.96	27	64381	102.87	ng/uL	84
3)	Phenol-d5	4.97	124	85053	117.84	ng/uL	86
4)	Phenol	0.00	0	0	0.00	ng/uL	
5)	bis(2-Chloroethyl)ether	0.00	0	0	0.00	ng/uL	
6)	2-Chlorophenol	0.00	0	0	0.00	ng/uL	
7)	1,3-Dichlorobenzene	0.00	0	0	0.00	ng/uL	
8)	1,4-Dichlorobenzene	0.00	0	0	0.00	ng/uL	
9)	Benzyl alcohol	0.00	0	0	0.00	ng/uL	
10)	1,2-Dichlorobenzene	0.00	0	0	0.00	ng/uL	
11)	2-Methylphenol	0.00	0	0	0.00	ng/uL	
12)	bis(2-Chloroisopropyl)ether	0.00	0	0	0.00	ng/uL	
13)	4-Methylphenol	0.00	0	0	0.00	ng/uL	
14)	N-Nitroso-di-n-propylamine	0.00	265	0	0.00	ng/uL	
15)	Hexachloroethane	0.00	0	0	0.00	ng/uL	
16)	*Naphthalene-d8	8.16	431	64656	40.00	ng/uL	97
17)	Nitrobenzene-d5	6.43	265	41356	52.46	ng/uL	90
18)	Nitrobenzene	0.00	0	0	0.00	ng/uL	
19)	Isophorone	0.00	0	0	0.00	ng/uL	
20)	2-Nitrophenol	0.00	0	0	0.00	ng/uL	
21)	2,4-Dimethylphenol	0.00	0	0	0.00	ng/uL	
22)	Benzoic acid	0.00	0	0	0.00	ng/uL	
23)	bis(2-Chloroethoxy)methane	0.00	0	0	0.00	ng/uL	
24)	2,4-Dichlorophenol	0.00	0	0	0.00	ng/uL	
25)	1,2,4-Trichlorobenzene	0.00	0	0	0.00	ng/uL	
26)	Naphthalene	0.00	0	0	0.00	ng/uL	
27)	4-Chloroaniline	0.00	455	0	0.00	ng/uL	
28)	Hexachlorobutadiene	0.00	0	0	0.00	ng/uL	
29)	4-Chloro-3-methylphenol	0.00	0	0	0.00	ng/uL	
30)	2-Methylnaphthalene	0.00	0	0	0.00	ng/uL	
31)	*Acenaphthene-d10	15.04	1092	36505	40.00	ng/uL	98
32)	Hexachlorocyclopentadiene	0.00	0	0	0.00	ng/uL	
33)	2,4,6-Trichlorophenol	0.00	0	0	0.00	ng/uL	
34)	2,4,5-Trichlorophenol	0.00	0	0	0.00	ng/uL	
35)	2-Chloronaphthalene	0.00	0	0	0.00	ng/uL	
36)	2-Fluorobiphenyl	12.21	820	55520	52.35	ng/uL	96
37)	2-Nitroaniline	0.00	903	0	0.00	ng/uL	
38)	Dimethylphthalate	0.00	0	0	0.00	ng/uL	
39)	Acenaphthylene	0.00	0	0	0.00	ng/uL	
40)	2,6-Dinitrotoluene	0.00	1092	0	0.00	ng/uL	
41)	3-Nitroaniline	0.00	0	0	0.00	ng/uL	
42)	Acenaphthene	0.00	0	0	0.00	ng/uL	

43)	2,4-Dinitrophenol	0.00	0	0	0.00	ng/uL	
44)	4-Nitrophenol	0.00	0	0	0.00	ng/uL	
45)	Dibenzofuran	0.00	0	0	0.00	ng/uL	
46)	2,4-Dinitrotoluene	0.00	0	0	0.00	ng/uL	
47)	Diethylphthalate	0.00	0	0	0.00	ng/uL	
48)	4-Chlorophenyl-phenylether	0.00	0	0	0.00	ng/uL	
49)	Fluorane	0.00	0	0	0.00	ng/uL	
50)	4-Nitroaniline	0.00	0	0	0.00	ng/uL	
51)	*Phenanthrene-d10	22.36	1795	62530	40.00	ng/uL	99
52)	4,6-Dinitro-2-methylphenol	0.00	0	0	0.00	ng/uL	
53)	N-Nitrosodiphenylamine	0.00	0	0	0.00	ng/uL	
54)	2,4,6-Tribromophenol	18.97	1470	23419	99.56	ng/uL	99
55)	4-Bromophenyl-phenylether	0.00	0	0	0.00	ng/uL	
56)	Hexachlorobenzene	0.00	0	0	0.00	ng/uL	
57)	Pentachlorophenol	0.00	0	0	0.00	ng/uL	
58)	Phenanthrene	0.00	0	0	0.00	ng/uL	
59)	Anthracene	0.00	0	0	0.00	ng/uL	
60)	Di-n-butylphthalate	0.00	0	0	0.00	ng/uL	
61)	Fluoranthene	0.00	0	0	0.00	ng/uL	
62)	*Chrysene-d12	33.86	2900	65536	40.00	ng/uL	94
63)	Pyrene	0.00	0	0	0.00	ng/uL	
64)	Terphenyl-d14	30.34	2562	71352	57.92	ng/uL	92
65)	Butylbenzylphthalate	0.00	0	0	0.00	ng/uL	
66)	3,3'-Dichlorobenzidine	0.00	0	0	0.00	ng/uL	
67)	Benzo(a)anthracene	0.00	0	0	0.00	ng/uL	
68)	Chrysene	0.00	0	0	0.00	ng/uL	
69)	Bis(2-Ethylhexyl)phthalate	0.00	0	0	0.00	ng/uL	
70)	*Perylene-d12	38.22	3318	71846	40.00	ng/uL	97
71)	Di-n-octylphthalate	0.00	0	0	0.00	ng/uL	
72)	Benzo(b)fluoranthene	0.00	0	0	0.00	ng/uL	
73)	Benzo(k)fluoranthene	0.00	0	0	0.00	ng/uL	
74)	Benzo(a)pyrene	0.00	0	0	0.00	ng/uL	
75)	Indeno(1,2,3-cd)pyrene	0.00	0	0	0.00	ng/uL	
76)	Dibenz(a,h)anthracene	0.00	0	0	0.00	ng/uL	
77)	Benzo(g,h,i)perylene	0.00	0	0	0.00	ng/uL	

* Compound is ISTD

TOTAL ION CHROMATOGRAM



Data File: >DC405::D1
 Name: VIAL 1295 pH.12
 Misc: 92-05072-A4 1.0126 G

Quant Output File: ^DC405::OF
 Instrument ID: BNA1

BTL# 3

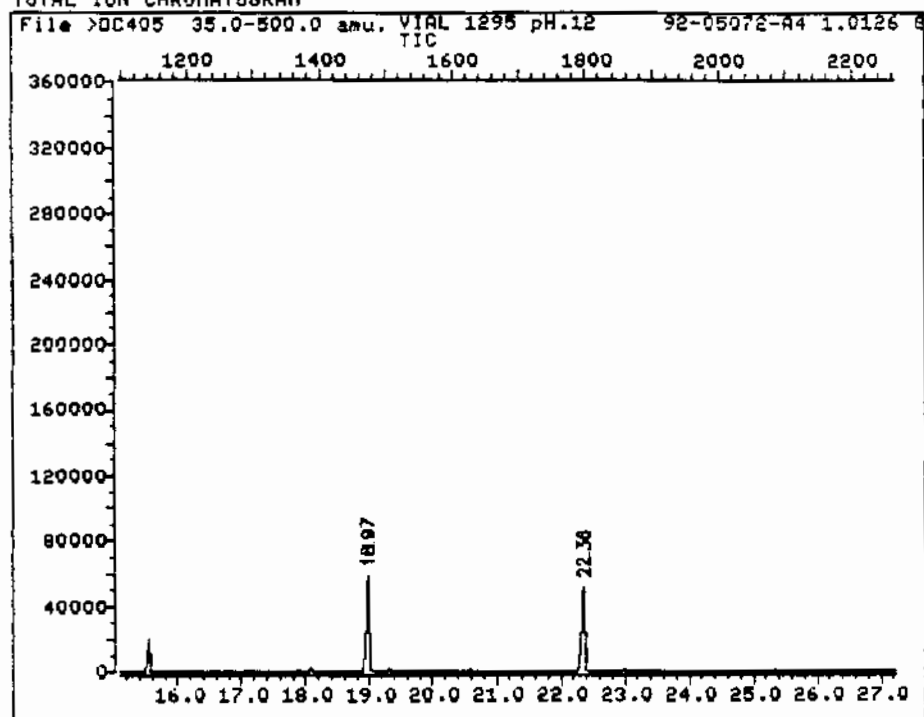
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 Title: BNA ID QUANT FILE #1 GC/MS
 Last Calibration: 911003 11:18

Last Qcal Time: 920424 13:55

Operator ID: BOB
 Quant Time : 920424 18:09
 Injected at: 920424 17:17

Page 1 of 4

TOTAL ION CHROMATOGRAM



Data File: >DC405::D1
Name: VIAL 1295 pH.12
Misc: 92-05072-A4 1.0126 G

Quant Output File: ^DC405::OF
Instrument ID: BNA1
STL# 3

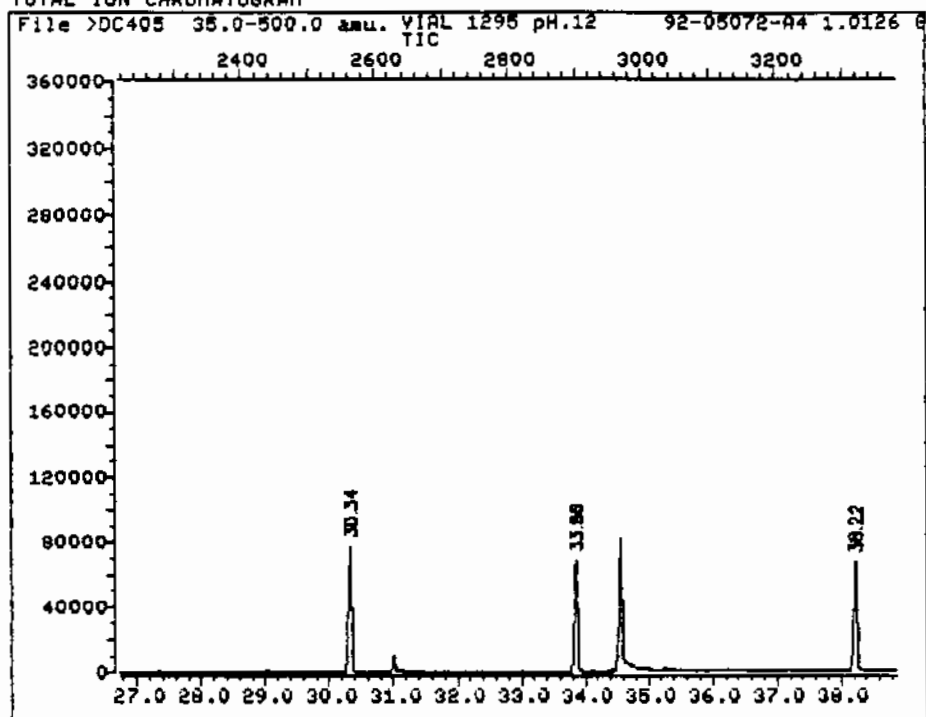
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Title: BNA ID QUANT FILE #1 GC/MS
Last Calibration: 911003 11:18

Last Qcal Time: 920424 13:55

Operator ID: BOB
Quant Time : 920424 18:09
Injected at: 920424 17:17

Page 2 of 4

TOTAL ION CHROMATOGRAM



Data File: >DC405::01
Name: UIAL 1295 pH.12
Misc: 92-05072-A4 1.0126 G

Quant Output File: ^DC405::OF
Instrument ID: BNA1

BTL# 3

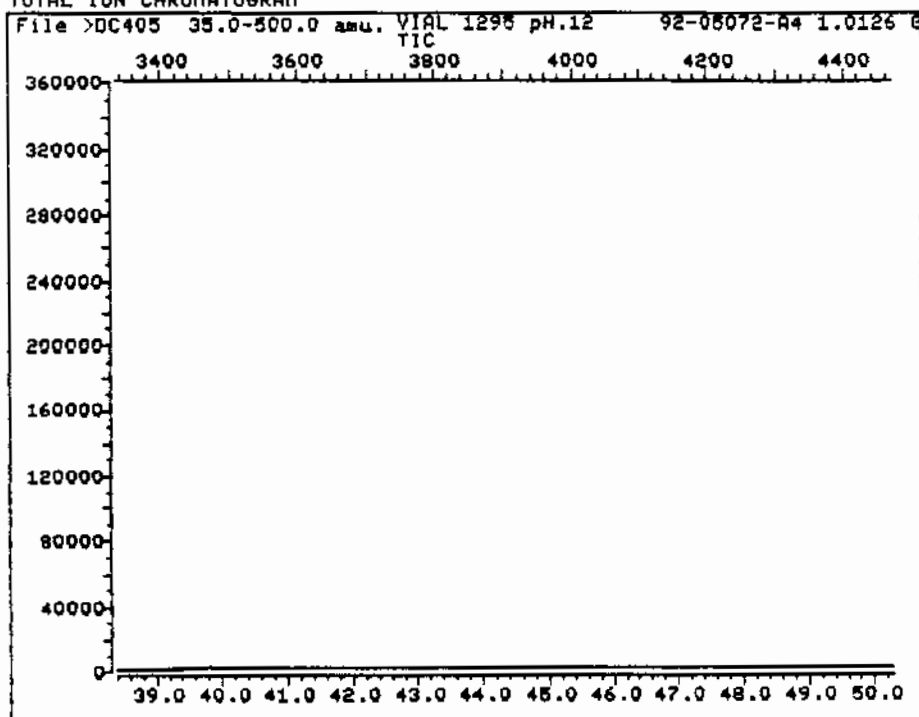
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Title: BNA ID QUANT FILE #1 GC/MS
Last Calibration: 911003 11:18

Last Qcal Time: 920424 13:55

Operator ID: BOB
Quant Time : 920424 18:09
Injected at: 920424 17:17

Page 3 of 4

TOTAL ION CHROMATOGRAM



Data File: >DC405::D1
Name: VIAL 1295 pH.12
Misc: 92-05072-A4 1.0126 G

Quant Output File: ^DC405::OF
Instrument ID: BNA1

BTL# 3

Id File: I01BNA::QT
Title: BNA 10 QUANT FILE #1 GC/MS
Last Calibration: 911003 11:18

Last Qcal Time: 920424 13:55

Operator ID: BOB
Quant Time : 920424 18:09
Injected at: 920424 17:17

Page 4 of 4

[GC/MS OPERATOR REPORT]

[GC/MS LAB SEMI VOLATILES]

[INTERNAL STANDARD CHECK REPORT]

SAMPLE FILE = >DC405
 CAL CHECK FILE = >DC402
 DATE AND TIME OF ANALYSIS = 4/24/92 17:17
 MISCELLANEOUS = 92-05072-A4 1.0126 G
 METHOD = BNAME1
 INSTRUMENT = BNA1
 OPERATOR = BOB SUPER GRP

I. Areas

Name of the BNA Internal Standard	The Sample ISTD Area	Daily Check ISTD Area	Daily Check ISTD Area / 2	Daily Check ISTD Area x 2	Status of the Sample ISTD Area Precision
1,4-Dichlorobenz-d4	19503	24890	12445	49780	OK
Naphthalene-d8	64656	87937	43969	175874	OK
Acenaphthene-d10	36505	47070	23535	94140	OK
Phenanthrene-d10	62530	81388	40694	162776	OK
Chrysene-d12	65536	81856	40928	163712	OK
Perylene-d12	71846	90335	45168	180670	OK

II. Retention Times

Name of the BNA Internal Standard	The Sample ISTD R.Time	Daily Check ISTD R.Time	Daily Check ISTD RT - 0.5	Daily Check ISTD RT + 0.5	Status of the Sample ISTD R.T. Precision
1,4-Dichlorobenz-d4	5.41	5.41	4.91	5.91	OK
Naphthalene-d8	8.16	8.17	7.67	8.67	OK
Acenaphthene-d10	15.04	15.05	14.55	15.55	OK
Phenanthrene-d10	22.35	22.38	21.88	22.88	OK
Chrysene-d12	33.86	33.88	33.38	34.38	OK
Perylene-d12	38.22	38.25	37.75	38.75	OK

[GC/MS OPERATOR REPORT]

[GC/MS LAB SEMIVOLATILES]

[Preliminary Surrogate Report]

DATA FILE NAME = >DC405::D1
 DATE AND TIME OF ANALYSIS = 4/24/92 17:17
 SAMPLE = VIAL 1295 pH.12
 MISCELLANEOUS = 92-05072-A4 1.0126 G
 METHOD = BNAME1
 INSTRUMENT = BNA1
 OPERATOR = BOB SUPER GRP

SURROGATE	AS FOUND IN SAMPLE	WAS SPIKED AT	WATER LIMITS	SOIL LIMITS	% RECOVERY
-----	-----	-----	-----	-----	-----
2-Fluorophenol	102.88	100.00	21-100	25-121	102.88
Phenol-d5	117.85	100.00	10-94	24-113	117.85
Nitrobenzene-d5	52.46	50.00	35-114	23-120	104.93
2-Fluorobiphenyl	52.35	50.00	43-116	30-115	104.70
2,4,6-tribromo- phenol	99.56	100.00	10-123	19-122	99.56
Terphenyl-d14	57.92	50.00	33-141	18-137	115.84

MS data file header from : >DC405::D1

Sample: VIAL 1295 pH.12 Operator: BOB SUPER GRP. 4/24/92 17:17
Misc : 92-05072-A4 1.0126 G BTL# 3
Sys. #: 1 MS model: 70 SW/HW rev.: LF ALS #: 3 Equip ID: BNA1
Method file: BNAME1 Tuning file: MTBNA1 No. of extra records: 2
Source temp.: N/A Analyzer temp.: N/A Transfer line temp.: 0

Chromatographic temperatures : 40. 100. 190. 300. 0.
Chromatographic times, min. : 1.5 .5 .5 12.0 0.0
Chromatographic rate, deg/min: 30.0 4.5 8.0 .5 0.0

>DC405 VIAL 1295 pH.12 92-05072-A4 1.0126 G
35.01 500.0 CLP TIC
Upslope: .2000 Area Reject: 13861. Max Peaks: 6 Bunch: -1 Valley >100 %
Dnslope: 0.0000 Results File IDC405 Sorted by Time/Area INT

Peak #	R.T. min.	first scan	max scan	last scan	peak height	raw area	corr. area	corr. % max.	% of total
1	8.41	443	455	461	216258	523970	522226	32.74	13.567
2	10.65	651	670	677	359901	1598427	1595073	100.00	41.439
3	13.08	888	903	913	301540	1330139	1326370	83.15	34.458
4	15.54	1133	1140	1146	19822	50092	49369	3.10	1.283
5	31.00	2619	2626	2642	10116	39821	34374	2.16	.893
6	34.57	2957	2968	2994	82352	344376	321829	20.16	8.361

Sum of corrected areas: 3849241.

Summary of Unknowns PBM Library Search and Quantitation

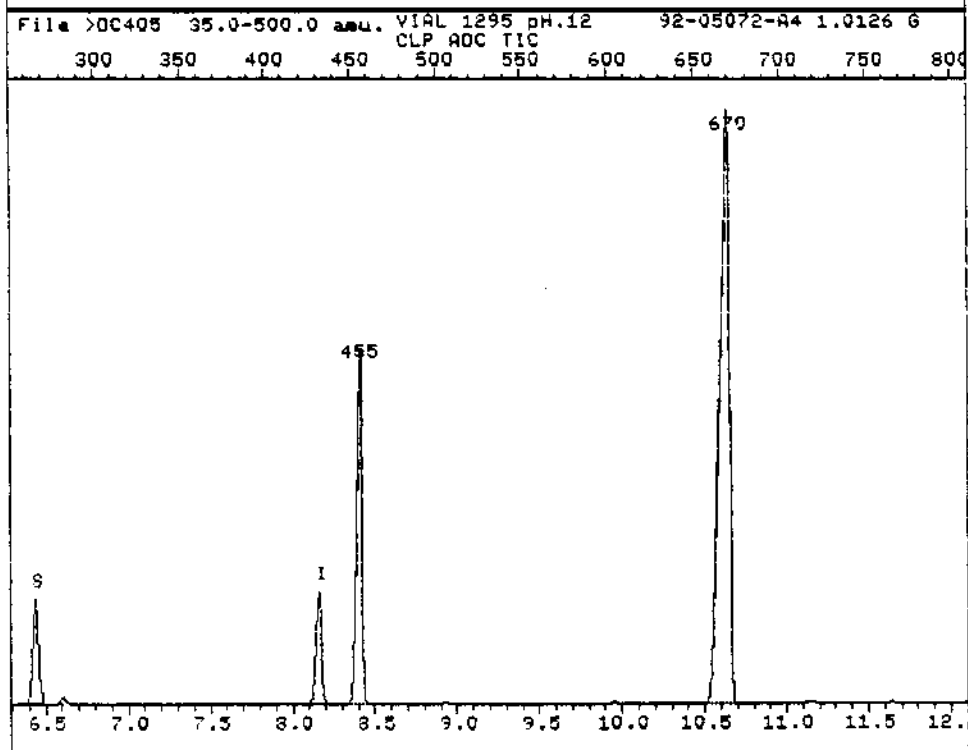
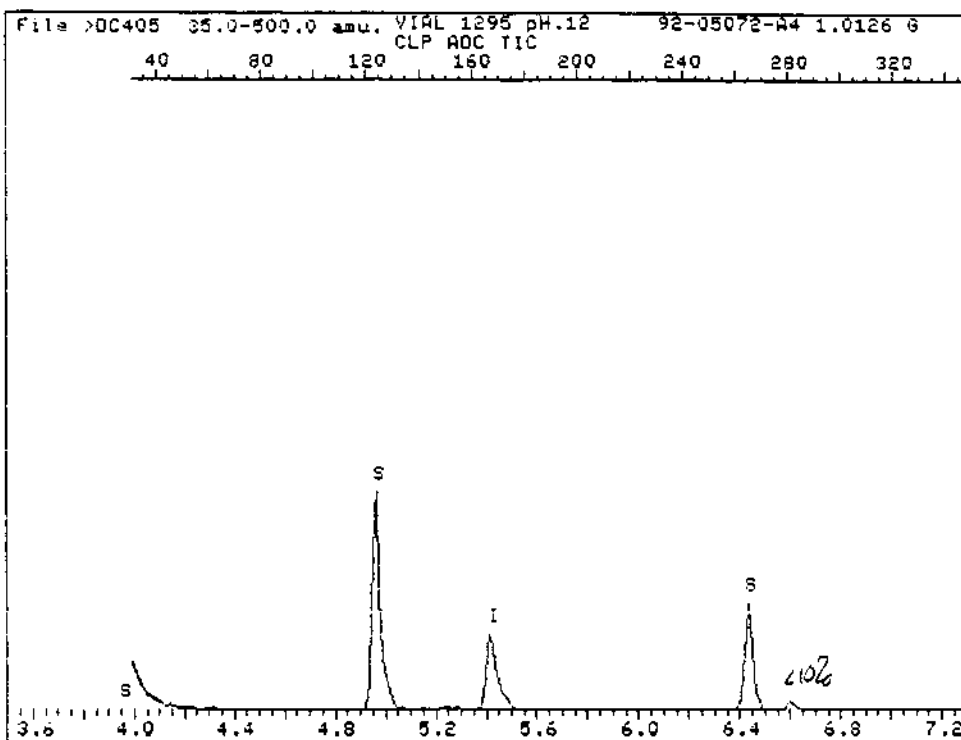
Standard	Concentration	Area	Retention Time	Unknown Window
1	40.0	138612.	5.41	4.00 - 6.79
2	40.0	165428.	8.16	6.79 - 11.60
3	40.0	185490.	15.04	11.60 - 18.70
4	40.0	194116.	22.36	18.70 - 28.11
5	40.0	216993.	33.86	28.11 - 36.04
6	40.0	229342.	38.22	36.04 - 50.28

Dilution Factor = 1.00 This sample was 1.01260 g or mL

Correction Factor = 988.55

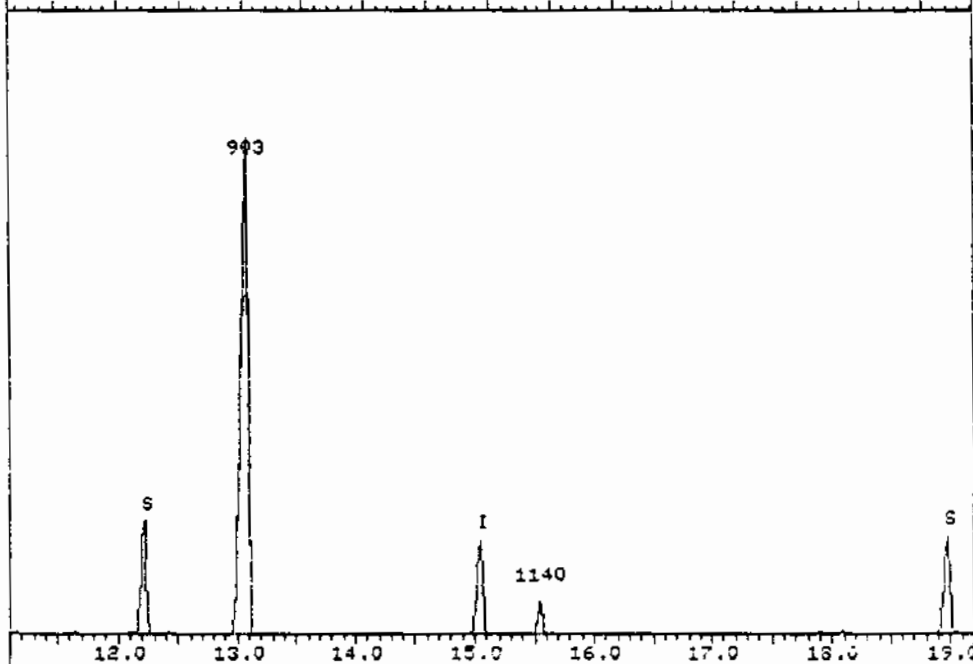
Unknown Concentration = $\frac{(\text{Conc Int Std} * \text{Area Unknown})}{(\text{Area Int Std})} * \text{Correction Factor}$

1:13 PM MON., 27 APR., 1992

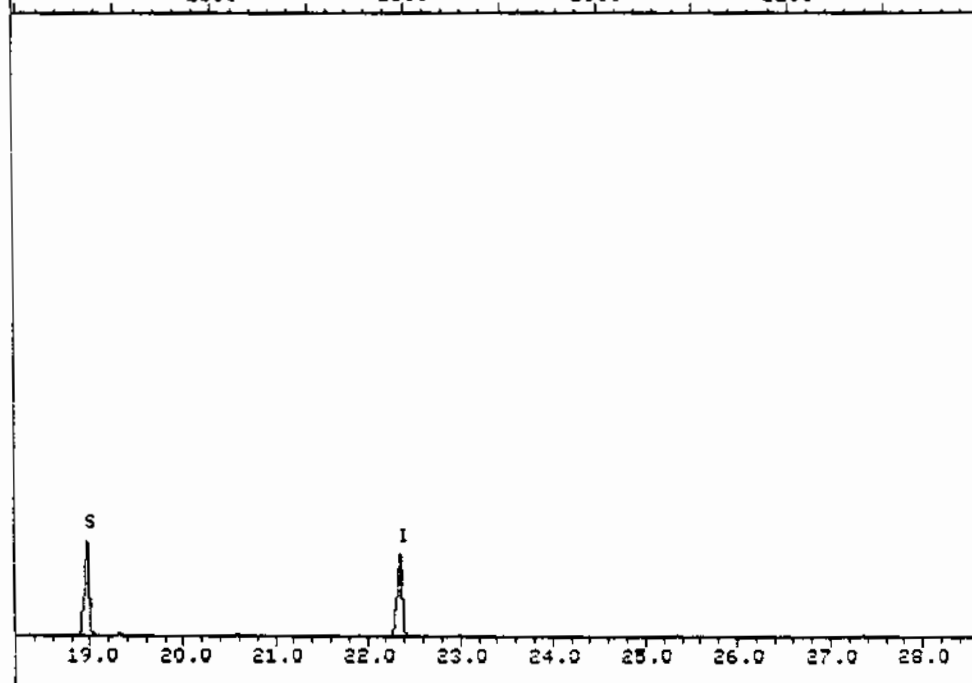


Instrument ID: BNA1 Analyzed on: 4/24/92 17:17

File >0C405 35.0-500.0 amu. VIAL 1298 pH.12 92-05072-A4 1.0126 G
CLP ADC TIC
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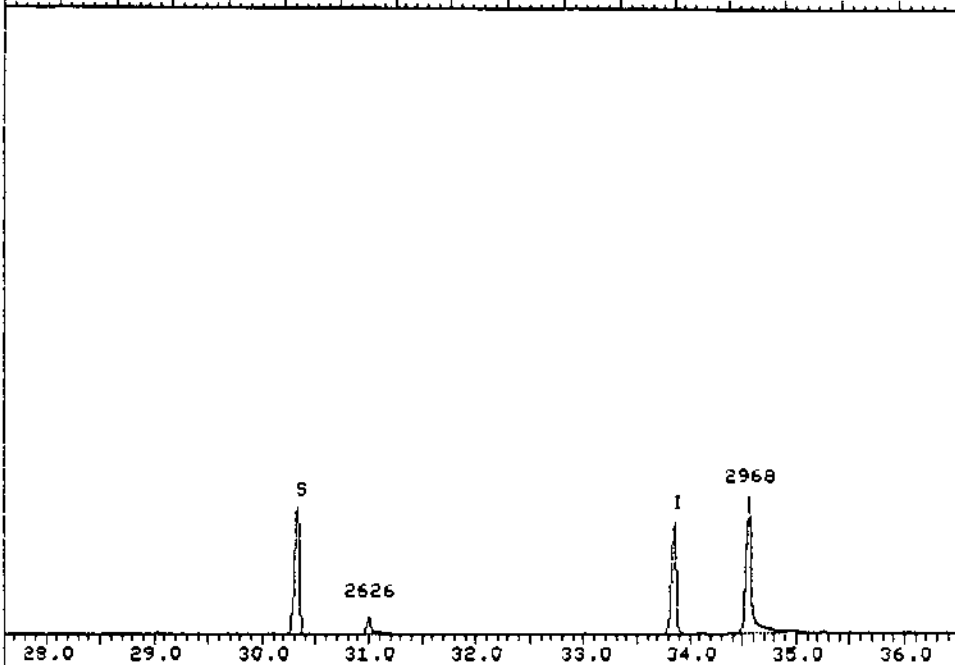


File >0C405 35.0-500.0 amu. VIAL 1298 pH.12 92-05072-A4 1.0126 G
CLP ADC TIC
1600 1800 2000 2200

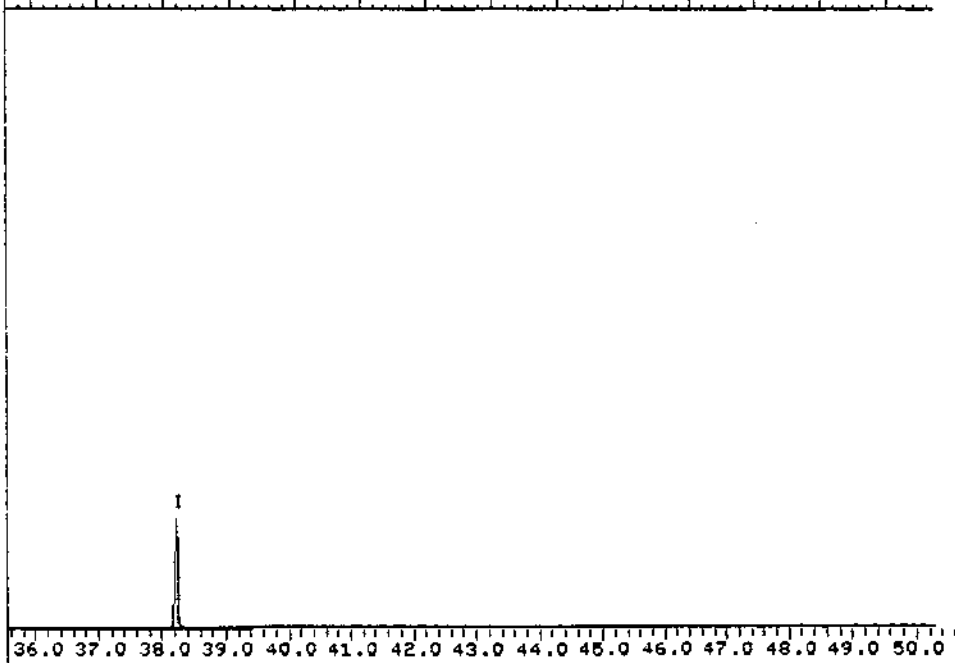


Instrument ID: BNA1 Analyzed on: 4/24/92 17:17

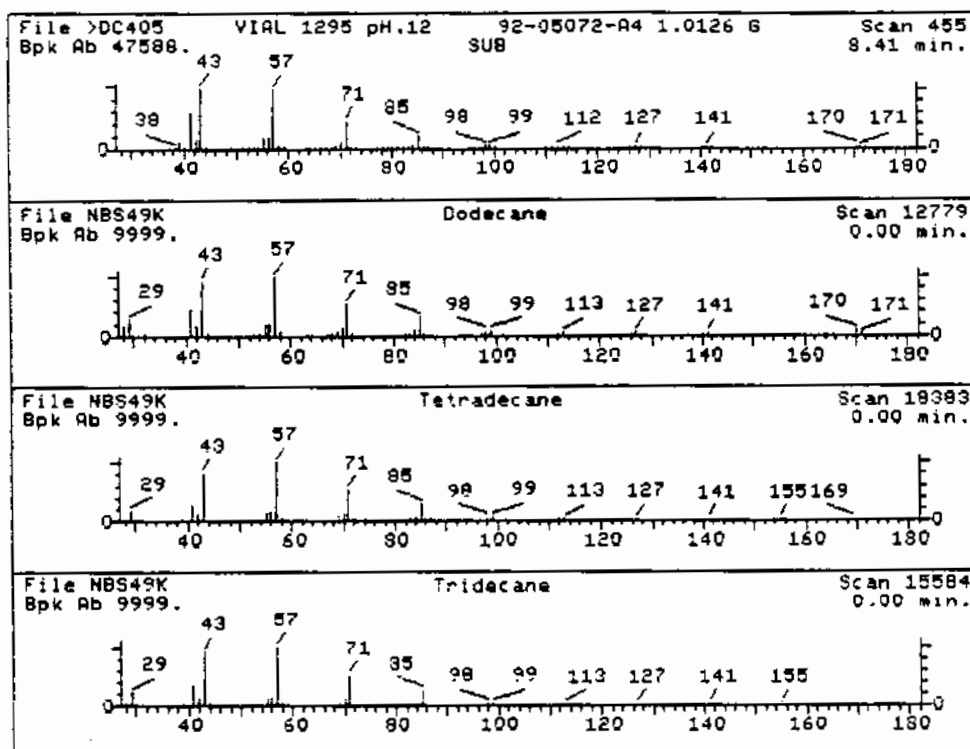
File >DC405 35.0-500.0 amu. VIAL 1295 pH.12 92-05072-A4 1.0126 6
CLP ADC TIC
2400 2500 2600 2700 2800 2900 3000 3100



File >DC405 35.0-500.0 amu. VIAL 1295 pH.12 92-05072-A4 1.0126 6
CLP ADC TIC
3200 3400 3600 3800 4000 4200 4400



Instrument ID: BNA1 Analyzed on: 4/24/92 17:17

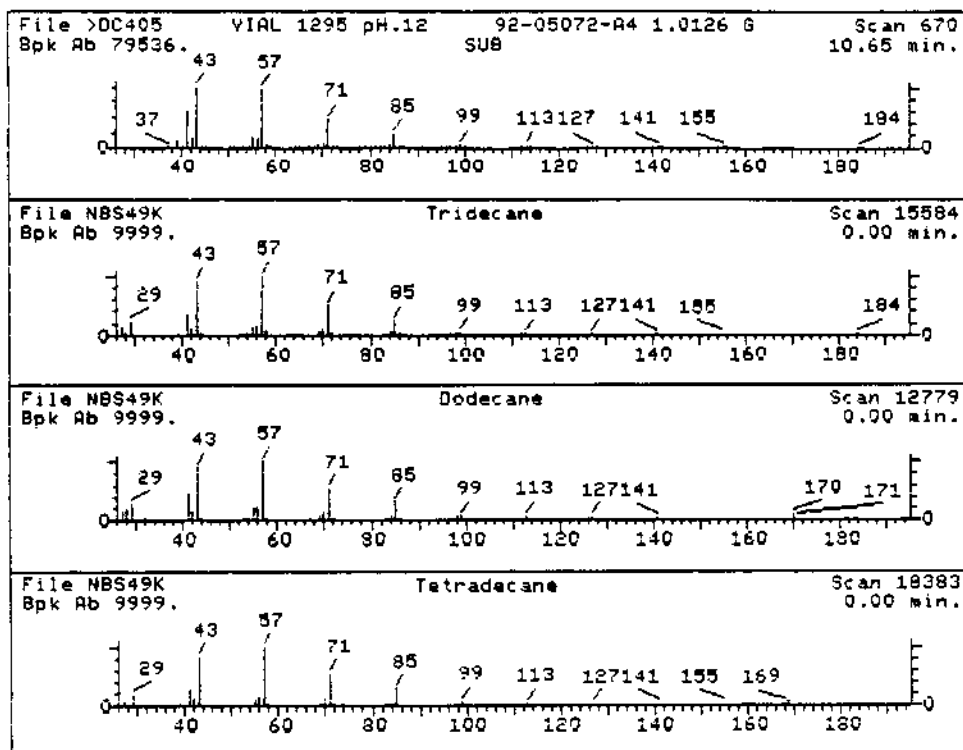


Instrument ID: BNA1 Analyzed on: 4/24/92 17:17
Result 1 in PBM results file: LDC405
Retention Time: 8.41 Area: 522226 Tentative Conc: 120000.00
The unknown area is 315.68% of the nearest internal standard

1. Dodecane	170 C12H26
2. Tetradecane	198 C14H30
3. Tridecane	184 C13H28
4. Pentadecane	212 C15H32
5. Heptadecane, 2,6,10,14-tetramethyl-	296 C21H44
6. Decane, 2,3,5-trimethyl-	184 C13H28

Sample file: >DC405 Spectrum #: 455
Search speed: 3 Tilting option: F No. of ion ranges searched: 59

	Prob.	CAS #	CON #	ROOT	K	DK	#FLG	TILT	%	CON	C_I	R_IV
1.	96*	112403	6732	NBS49K	99	0	0	4	80	0	72	94
2.	83	629594	6804	NBS49K	92	16	2	4	100	1	57	29
3.	83	629505	6761	NBS49K	87	19	2	3	95	2	57	27
4.	83	629629	6819	NBS49K	85	35	2	4	69	1	57	21
5.	78	18344371	6880	NBS49K	79	50	2	3	80	2	55	14
6.	76	62238113	6779	NBS49K	69	34	1	4	76	10	45	24

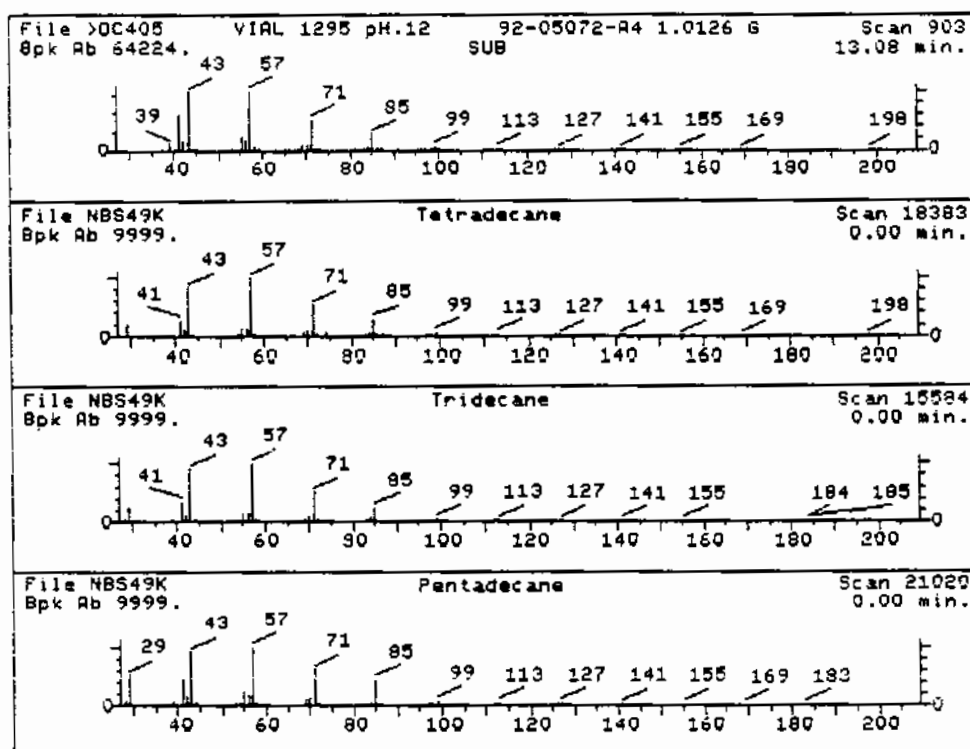


Instrument ID: BNA1 Analyzed on: 4/24/92 17:17
Result 2 in PBM results file: LDC405
Retention Time: 10.65 Area: 1595073 Tentative Conc: 380000.00
The unknown area is 964.21% of the nearest internal standard

1. Tridecane	184 C13H28
2. Dodecane	170 C12H26
3. Tetradecane	198 C14H30
4. Tetradecane, 1-iodo-	324 C14H29I
5. Decane, 6-ethyl-2-methyl-	184 C13H28
6. Octacosane	394 C28H58

Sample file: >DC405 Spectrum #: 670
Search speed: 3 Tilting option: F No. of ion ranges searched: 61

	Prob.	CAS #	CON #	ROOT	K	DK	#FLG	TILT	%	CON	C_I	R_IV
1.	95	629505	6761	NBS49K	99	7	1	2	100	1	72	93
2.	88	112403	6732	NBS49K	92	7	1	4	81	2	65	53
3.	83	629594	6804	NBS49K	92	16	2	4	100	1	57	29
4.	83	19218941	6889	NBS49K	100	28	1	2	68	8	54	50
5.	83	62108218	6767	NBS49K	65	34	2	0	87	5	57	23
6.	78	630024	6906	NBS49K	89	52	2	4	85	5	55	19

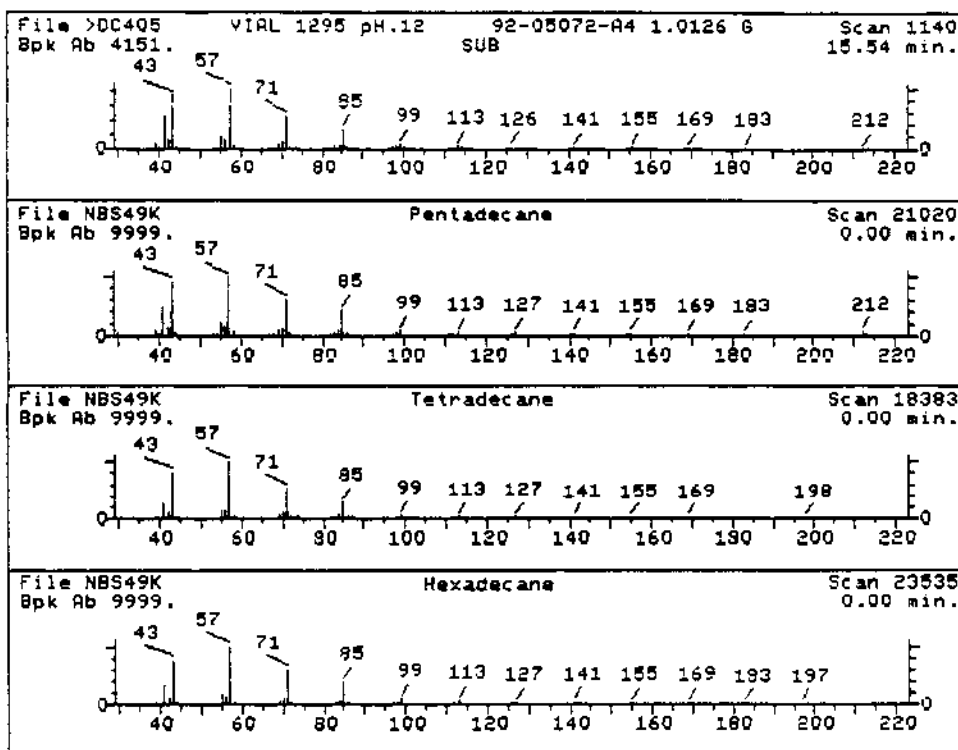


Instrument ID: BNA1 Analyzed on: 4/24/92 17:17
Result 3 in PBM results file: LDC405
Retention Time: 13.08 Area: 1326370 Tentative Conc: 280000.00
The unknown area is 715.06% of the nearest internal standard

①. Tetradecane	198 C14H30
2. Tridecane	184 C13H28
3. Pentadecane	212 C15H32
4. Decane, 6-ethyl-2-methyl-	184 C13H28
5. Eicosane	282 C20H42
6. Octacosane	394 C28H58

Sample file: >DC405 Spectrum #: 903
Search speed: 3 Tilting option: F No. of ion ranges searched: 65

	Prob.	CAS #	CON #	ROOT	K	DK	#FLG	TILT	%	CON	C_I	R_IU
①.	93*	629594	6804	NBS49K	97	11	1	3	100	1	68	89
2.	83	629505	6761	NBS49K	88	18	2	1	100	2	57	27
3.	83	629629	6819	NBS49K	87	33	2	4	88	4	57	23
4.	83	62108218	6767	NBS49K	68	31	2	0	100	5	57	24
5.	78	112958	6871	NBS49K	88	51	2	4	80	4	55	18
6.	76	630024	6906	NBS49K	94	47	2	4	80	7	45	22

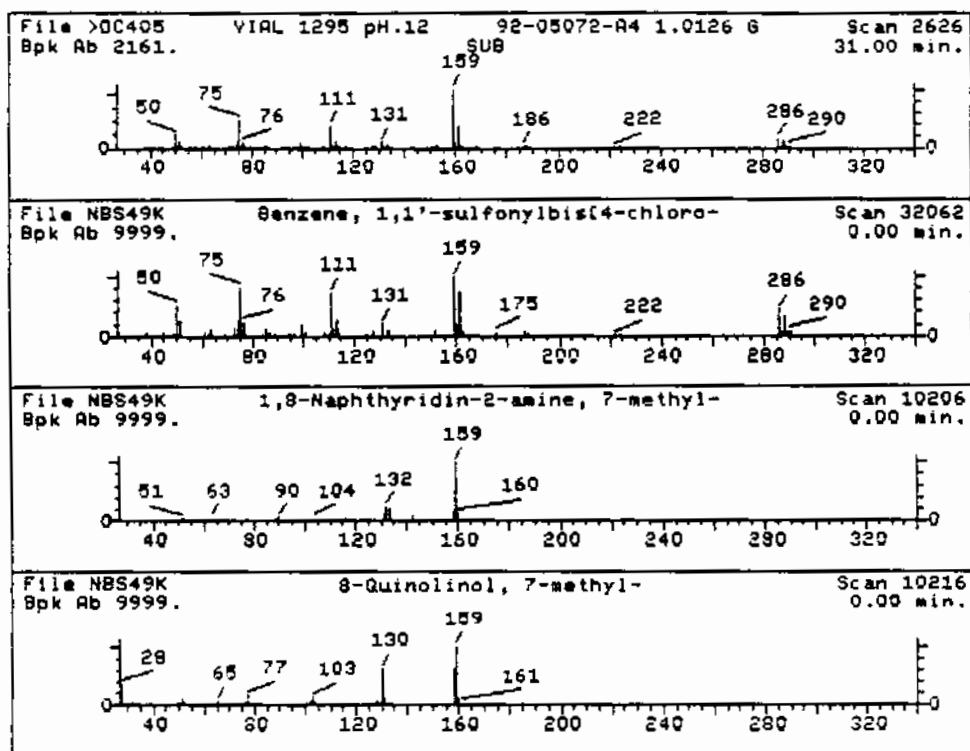


Instrument ID: BNA1 Analyzed on: 4/24/92 17:17
Result 4 in PBM results file: LDC405
Retention Time: 15.54 Area: 49369 Tentative Conc: 11000.00
The unknown area is 26.62% of the nearest internal standard

1. Pentadecane	212 C15H32
2. Tetradecane	198 C14H30
3. Hexadecane	226 C16H34
4. Tridecane	184 C13H28
5. Eicosane	282 C20H42
6. Octacosane	394 C28H58

Sample file: >DC405 Spectrum #: 1140
Search speed: 3 Tilting option: F No. of ion ranges searched: 73

	Prob.	CAS #	CON #	ROOT	K	DK	#FLG	TILT	%	CON	C_I	R_IV
①	89*	629629	6819	NBS49K	106	14	2	3	83	2	66	72
2.	86	629594	6804	NBS49K	97	11	2	1	100	2	60	32
3.	86	544763	6835	NBS49K	99	21	2	4	94	4	60	34
4.	86	629505	6761	NBS49K	82	24	2	0	97	4	60	30
5.	83	112958	6871	NBS49K	100	39	2	4	79	2	57	27
6.	83	630024	6906	NBS49K	99	42	2	3	76	1	57	26



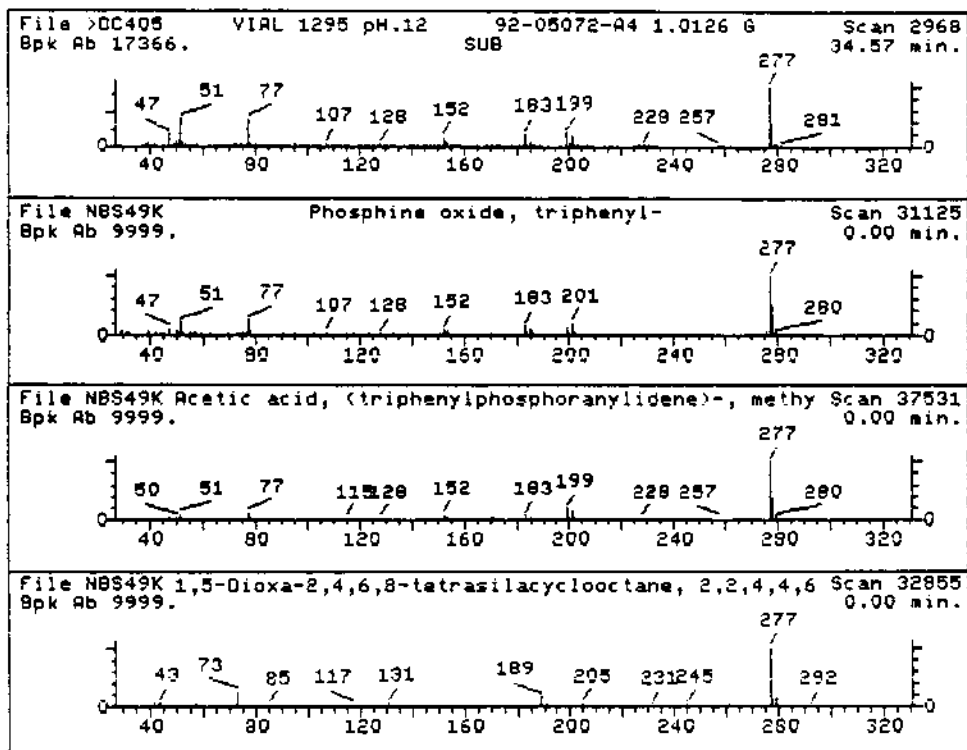
Instrument ID: BNA1 Analyzed on: 4/24/92 17:17
Result 5 in PBM results file: LDC405
Retention Time: 31.00 Area: 34374 Tentative Conc: 6300.00
The unknown area is 15.84% of the nearest internal standard

1. Benzene, 1,1'-sulfonylbis[4-chloro-	286 C12H8Cl2O2S
2. 1,8-Naphthyridin-2-amine, 7-methyl-	159 C9H9N3
3. 8-Quinolinol, 7-methyl-	159 C10H9NO
4. Quinoline, 4-methyl-, 1-oxide	159 C10H9NO

Sample file: >DC405 Spectrum #: 2626
Search speed: 3 Tilting option: F No. of ion ranges searched: 59

Prob.	CAS #	CON #	ROOT	K	OK	#FLG	TILT	%	CON	C_I	R_IV
1 93*	80079	37916	NBS49K	129	31	0	0	37	39	47	99

Blank to



Instrument ID: BNA1 Analyzed on: 4/24/92 17:17
Result 6 in PBM results file: LDC405
Retention Time: 34.57 Area: 321829 Tentative Conc: 59000.00
The unknown area is 148.31% of the nearest internal standard

- ① Phosphine oxide, triphenyl- 278 C18H15OP
2. Acetic acid, (triphenylphosphoranylidene)-, methyl ester 334 C21H19O2P
3. 1,5-Dioxo-2,4,6,8-tetrasilacyclooctane, 2,2,4,4,6,6, 8,8-octamethyl- 292 C10H28O2Si4
4. 1H-Indole-3-acetic acid, 5-[(trimethylsilyl)oxyl]-, methyl ester 277 C14H19NO3Si

Sample file: >DC405 Spectrum #: 2968
Search speed: 3 Tilting option: F No. of ion ranges searched: 36

	Prob.	CAS #	CON #	ROOT	K	DK	#FLG	TILT	%	CON	C_I	R_IV
①	82*	791286	37022	NBS49K	105	43	1	1	66	22	41	78
2.	75	2605676	37048	NBS49K	105	29	0	2	71	16	35	65
3.	20*	15261060	37024	NBS49K	29	99	2	0	100	54	5	14

Block

QUANT REPORT

Operator ID: BOB
 Output File: ^DC406::OF
 Data File: >DC406::D1
 Name: VIAL 1295 pH.12
 Misc: 92-05072-B 1.0151 G

Quant Rev: 7 Quant Time: 920424 19:09
 Injected at: 920424 18:18
 Dilution Factor: 1.00000
 Instrument ID: BNA1
 BTL# 4

ID File: ID1BNA::QT
 Title: BNA ID QUANT FILE #1 GC/MS
 Last Calibration: 911003 11:18

Last Qcal Date: 920424 13:55

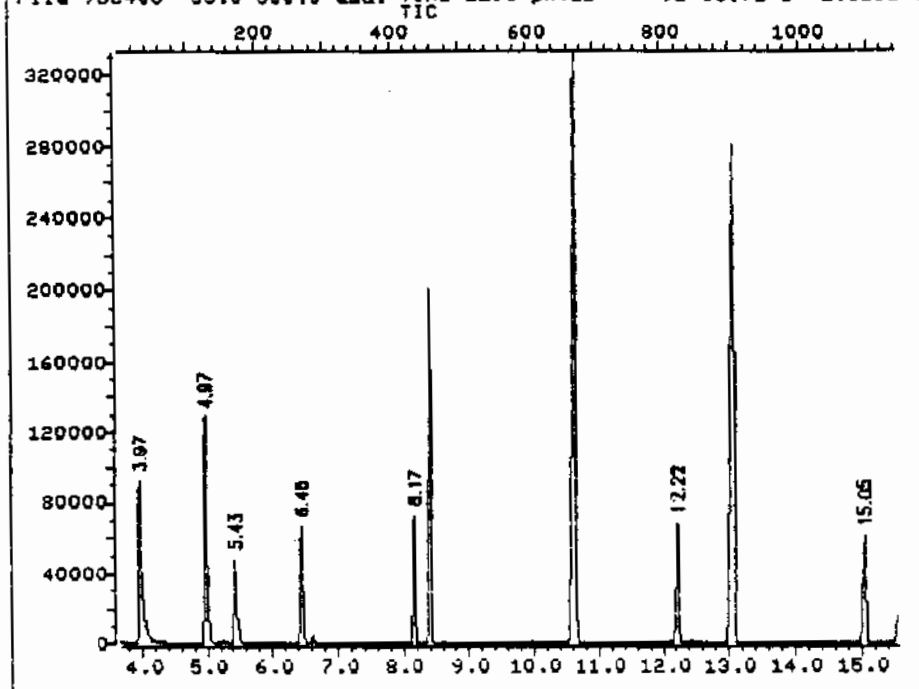
	Compound	R.T.	Scan#	Area	Conc	Units	q
1)	*1,4-Dichlorobenzene-d4	5.43	169	20661	40.00	ng/uL	97
2)	2-Fluorophenol	3.97	29	67688	102.10	ng/uL	82
3)	Phenol-d5	4.97	125	85924	112.38	ng/uL	88
4)	Phenol	0.00	0	0	0.00	ng/uL	
5)	bis(2-Chloroethyl)ether	0.00	0	0	0.00	ng/uL	
6)	2-Chlorophenol	0.00	0	0	0.00	ng/uL	
7)	1,3-Dichlorobenzene	0.00	0	0	0.00	ng/uL	
8)	1,4-Dichlorobenzene	0.00	0	0	0.00	ng/uL	
9)	Benzyl alcohol	0.00	0	0	0.00	ng/uL	
10)	1,2-Dichlorobenzene	0.00	0	0	0.00	ng/uL	
11)	2-Methylphenol	0.00	0	0	0.00	ng/uL	
12)	bis(2-Chloroisopropyl)ether	0.00	0	0	0.00	ng/uL	
13)	4-Methylphenol	0.00	0	0	0.00	ng/uL	
14)	N-Nitroso-di-n-propylamine	0.00	267	0	0.00	ng/uL	
15)	Hexachloroethane	0.00	0	0	0.00	ng/uL	
16)	*Naphthalene-d8	8.17	433	69422	40.00	ng/uL	96
17)	Nitrobenzene-d5	6.45	267	42404	50.10	ng/uL	85
18)	Nitrobenzene	0.00	0	0	0.00	ng/uL	
19)	Isophorone	0.00	0	0	0.00	ng/uL	
20)	2-Nitrophenol	0.00	0	0	0.00	ng/uL	
21)	2,4-Dimethylphenol	0.00	0	0	0.00	ng/uL	
22)	Benzoic acid	0.00	0	0	0.00	ng/uL	
23)	bis(2-Chloroethoxy)methane	0.00	0	0	0.00	ng/uL	
24)	2,4-Dichlorophenol	0.00	0	0	0.00	ng/uL	
25)	1,2,4-Trichlorobenzene	0.00	0	0	0.00	ng/uL	
26)	Naphthalene	0.00	0	0	0.00	ng/uL	
27)	4-Chloroaniline	0.00	457	0	0.00	ng/uL	
28)	Hexachlorobutadiene	0.00	0	0	0.00	ng/uL	
29)	4-Chloro-3-methylphenol	0.00	0	0	0.00	ng/uL	
30)	2-Methylnaphthalene	0.00	0	0	0.00	ng/uL	
31)	*Acenaphthene-d10	15.05	1094	38050	40.00	ng/uL	96
32)	Hexachlorocyclopentadiene	0.00	0	0	0.00	ng/uL	
33)	2,4,6-Trichlorophenol	0.00	0	0	0.00	ng/uL	
34)	2,4,5-Trichlorophenol	0.00	0	0	0.00	ng/uL	
35)	2-Chloronaphthalene	0.00	0	0	0.00	ng/uL	
36)	2-Fluorobiphenyl	12.22	822	55466	50.17	ng/uL	96
37)	2-Nitroaniline	0.00	0	0	0.00	ng/uL	
38)	Dimethylphthalate	0.00	0	0	0.00	ng/uL	
39)	Acenaphthylene	0.00	0	0	0.00	ng/uL	
40)	2,6-Dinitrotoluene	0.00	1094	0	0.00	ng/uL	
41)	3-Nitroaniline	0.00	0	0	0.00	ng/uL	
42)	Acenaphthene	0.00	0	0	0.00	ng/uL	

43)	2,4-Dinitrophenol	0.00	0	0	0.00	ng/uL	
44)	4-Nitrophenol	0.00	0	0	0.00	ng/uL	
45)	Dibenzofuran	0.00	0	0	0.00	ng/uL	
46)	2,4-Dinitrotoluene	0.00	0	0	0.00	ng/uL	
47)	Diethylphthalate	0.00	0	0	0.00	ng/uL	
48)	4-Chlorophenyl-phenylether	0.00	0	0	0.00	ng/uL	
49)	Fluorene	0.00	0	0	0.00	ng/uL	
50)	4-Nitroaniline	0.00	0	0	0.00	ng/uL	
51)	*Phenanthrene-d10	22.37	1797	64904	40.00	ng/uL	99
52)	4,6-Dinitro-2-methylphenol	0.00	0	0	0.00	ng/uL	
53)	N-Nitrosodiphenylamine	0.00	0	0	0.00	ng/uL	
54)	2,4,6-Tribromophenol	18.98	1472	23926	97.99	ng/uL	99
55)	4-Bromophenyl-phenylether	0.00	0	0	0.00	ng/uL	
56)	Hexachlorobenzene	0.00	0	0	0.00	ng/uL	
57)	Pentachlorophenol	0.00	0	0	0.00	ng/uL	
58)	Phenanthrene	0.00	0	0	0.00	ng/uL	
59)	Anthracene	0.00	0	0	0.00	ng/uL	
60)	Di-n-butylphthalate	0.00	0	0	0.00	ng/uL	
61)	Fluoranthene	0.00	0	0	0.00	ng/uL	
62)	*Chrysene-d12	33.86	2901	68471	40.00	ng/uL	93
63)	Pyrene	0.00	0	0	0.00	ng/uL	
64)	Terphenyl-d14	30.34	2563	68826	53.47	ng/uL	91
65)	Butylbenzylphthalate	0.00	0	0	0.00	ng/uL	
66)	3,3'-Dichlorobenzidine	0.00	0	0	0.00	ng/uL	
67)	Benzo(a)anthracene	0.00	0	0	0.00	ng/uL	
68)	Chrysene	0.00	0	0	0.00	ng/uL	
69)	Bis(2-Ethylhexyl)phthalate	0.00	0	0	0.00	ng/uL	
70)	*Perylene-d12	38.24	3319	74964	40.00	ng/uL	97
71)	Di-n-octylphthalate	0.00	0	0	0.00	ng/uL	
72)	Benzo(b)fluoranthene	0.00	0	0	0.00	ng/uL	
73)	Benzo(k)fluoranthene	0.00	0	0	0.00	ng/uL	
74)	Benzo(a)pyrene	0.00	0	0	0.00	ng/uL	
75)	Indeno(1,2,3-cd)pyrene	0.00	0	0	0.00	ng/uL	
76)	Dibenz(a,h)anthracene	0.00	0	0	0.00	ng/uL	
77)	Benzo(g,h,i)perylene	0.00	0	0	0.00	ng/uL	

* Compound is ISTD

TOTAL ION CHROMATOGRAM

File >DC406 35.0-500.0 amu. VIAL 1295 pH.12 92-05072-B 1.0151 G



Data File: >DC406::D1
Name: VIAL 1295 pH.12
Misc: 92-05072-B 1.0151 G

Quant Output File: ^DC406::DF
Instrument ID: BNA1

BTL# 4

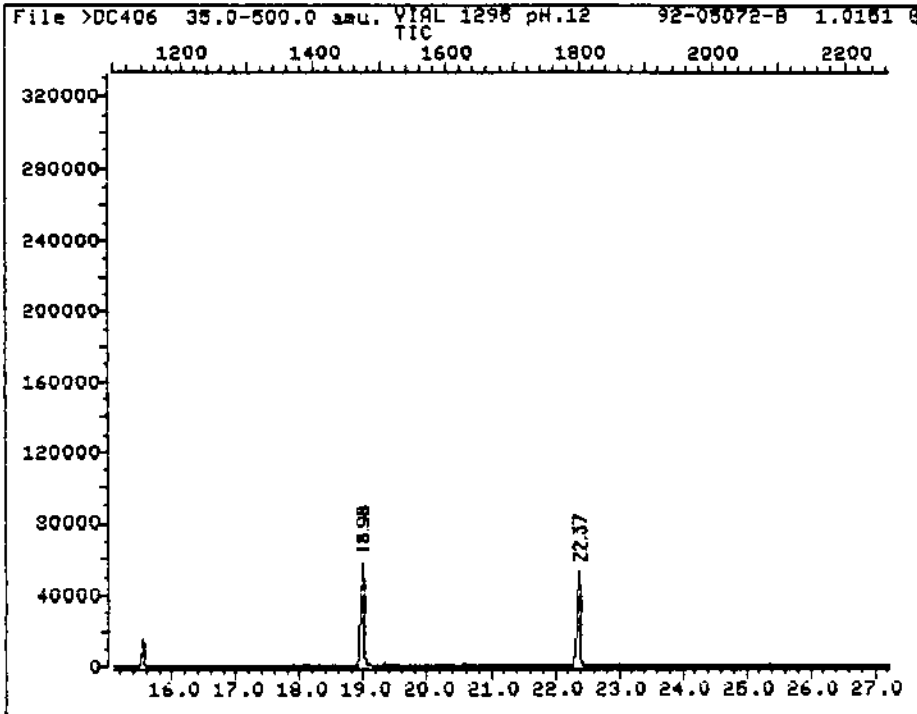
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Title: BNA ID QUANT FILE #1 GC/MS
Last Calibration: 911003 11:18

Last Qcal Time: 920424 13:55

Operator ID: BOB
Quant Time : 920424 19:09
Injected at: 920424 18:18

Page 1 of 4

TOTAL ION CHROMATOGRAM



Data File: >DC406::01
 Name: VIAL 1295 pH.12
 Misc: 92-05072-B 1.0151 G

Quant Output File: ^DC406::0F
 Instrument ID: BNA1

BTL# 4

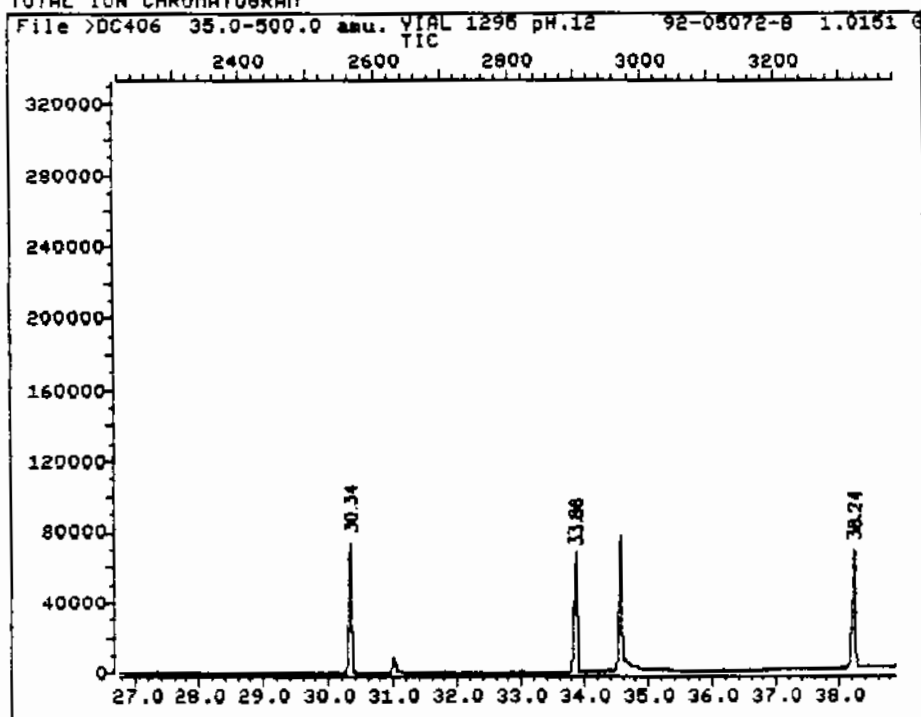
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 Title: BNA ID QUANT FILE #1 GC/MS
 Last Calibration: 911003 11:18

Last Qcal Time: 920424 13:55

Operator ID: BOB
 Quant Time : 920424 19:09
 Injected at: 920424 18:18

Page 2 of 4

TOTAL ION CHROMATOGRAM



Data File: >DC406::D1
Name: VIAL 1295 pH.12
Misc: 92-05072-B 1.0151 G

Quant Output File: ^DC406::OF
Instrument ID: BNA1

BTL# 4

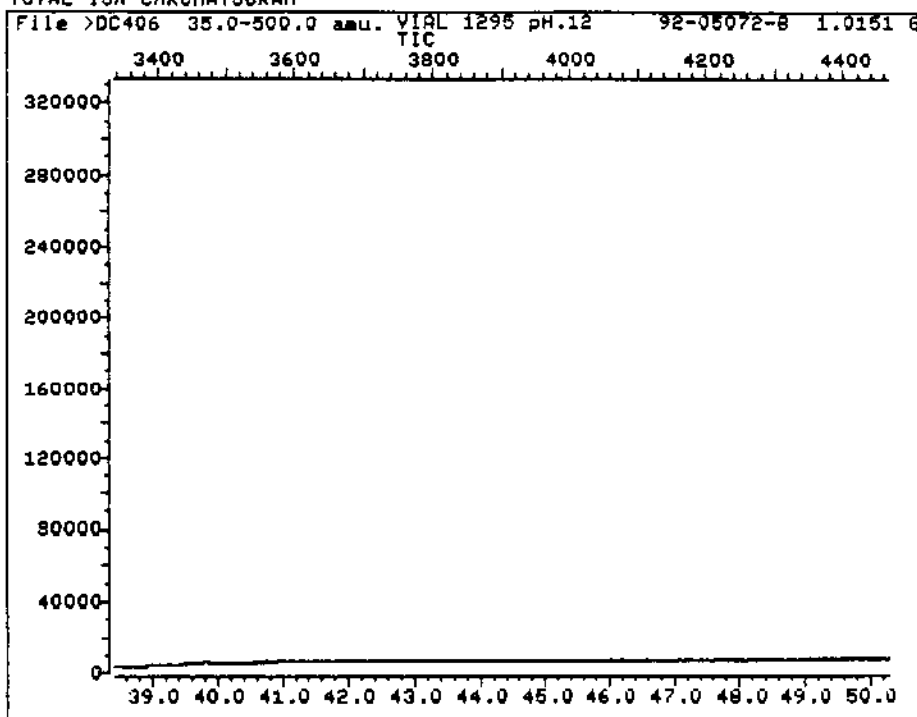
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Title: BNA 10 QUANT FILE #1 GC/MS
Last Calibration: 911003 11:18

Last Qcal Time: 920424 13:55

Operator ID: BOB
Quant Time : 920424 19:09
Injected at: 920424 18:18

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TOTAL ION CHROMATOGRAM



Data File: >DC406::D1
Name: VIAL 1295 pH.12
Misc: 92-05072-B 1.0151 G

Quant Output File: ^DC406::OF
Instrument ID: BNA1

BTL# 4

Id File: ID1BNA::QT
Title: BNA ID QUANT FILE #1 GC/MS
Last Calibration: 911003 11:18

Last Qual Time: 920424 13:55

Operator ID: BOB
Quant Time : 920424 19:09
Injected at: 920424 18:18

Page 4 of 4

[GC/MS OPERATOR REPORT]

[GC/MS LAB SEMI VOLATILES]

[INTERNAL STANDARD CHECK REPORT]

SAMPLE FILE = >DC406
 CAL CHECK FILE = >DC402
 DATE AND TIME OF ANALYSIS = 4/24/92 18:18
 MISCELLANEOUS = 92-05072-B 1.0151 G
 METHOD = BNAME1
 INSTRUMENT = BNA1
 OPERATOR = BOB SUPER GRP

I. Areas					

Name of the BNA Internal Standard	The Sample ISTD Area	Daily Check ISTD Area	Daily Check ISTD Area / 2	Daily Check ISTD Area x 2	Status of the Sample ISTD Area Precision
-----	-----	-----	-----	-----	-----
1,4-Dichlorobenz-d4	20661	24890	12445	49780	OK
Naphthalene-d8	69422	87937	43969	175874	OK
Acenaphthene-d10	38050	47070	23535	94140	OK
Phenanthrene-d10	64904	81388	40694	162776	OK
Chrysene-d12	68471	81856	40928	163712	OK
Perylene-d12	74964	90335	45168	180670	OK

II. Retention Times					

Name of the BNA Internal Standard	The Sample ISTD R.Time	Daily Check ISTD R.Time	Daily Check ISTD RT - 0.5	Daily Check ISTD RT + 0.5	Status of the Sample ISTD R.T. Precision
-----	-----	-----	-----	-----	-----
1,4-Dichlorobenz-d4	5.43	5.41	4.91	5.91	OK
Naphthalene-d8	8.17	8.17	7.67	8.67	OK
Acenaphthene-d10	15.05	15.05	14.55	15.55	OK
Phenanthrene-d10	22.37	22.38	21.88	22.88	OK
Chrysene-d12	33.86	33.88	33.38	34.38	OK
Perylene-d12	38.24	38.25	37.75	38.75	OK

[GC/MS OPERATOR REPORT]

[GC/MS LAB SEMIVOLATILES]

[Preliminary Surrogate Report]

DATA FILE NAME = >DC406::D1
 DATE AND TIME OF ANALYSIS = 4/24/92 18:18
 SAMPLE = VIAL 1295 pH.12
 MISCELLANEOUS = 92-05072-B 1.0151 G
 METHOD = BNAME1
 INSTRUMENT = BNA1
 OPERATOR = BOB SUPER GRP

SURROGATE	AS FOUND IN SAMPLE	WAS SPIKED AT	WATER LIMITS	SOIL LIMITS	% RECOVERY
-----	-----	-----	-----	-----	-----
2-Fluorophenol	102.10	100.00	21-100	25-121	102.10
Phenol-d5	112.38	100.00	10-94	24-113	112.38
Nitrobenzene-d5	50.10	50.00	35-114	23-120	100.20
2-Fluorobiphenyl	50.17	50.00	43-116	30-115	100.35
2,4,6-tribromo- phenol	97.99	100.00	10-123	19-122	97.99
Terphenyl-d14	53.47	50.00	33-141	18-137	106.95

MS data file header from : >DC406::D1

Sample: VIAL 1295 pH.12 Operator: BOB SUPER GRP. 4/24/92 18:18
Misc : 92-05072-B 1.0151 G BTL# 4
Sys. #: 1 MS model: 70 SW/HW rev.: LF ALS #: 4 Equip ID: BNA1
Method file: BNAME1 Tuning file: MTBNA1 No. of extra records: 2
Source temp.: N/A Analyzer temp.: N/A Transfer line temp.: 0

Chromatographic temperatures : 40. 100. 190. 300. 0.
Chromatographic times, min. : 1.5 .5 .5 12.0 0.0
Chromatographic rate, deg/min: 30.0 4.5 8.0 .5 0.0

>DC406 VIAL 1295 pH.12 92-05072-B 1.0151 G
35.01 500.0 CLP TIC
Upslope: .2000 Area Reject: 14753. Max Peaks: 6 Bunch: -1 Valley >100 %
Dnslope: 0.0000 Results File IDC406 Sorted by Time/Area INT

Peak #	R.T. min.	first scan	max scan	last scan	peak height	raw area	corr. area	corr. % max.	% of total
1	9.42	449	457	463	200563	447382	445955	33.36	13.679
2	10.65	652	671	678	331517	1340771	1336769	100.00	41.004
3	13.08	891	904	915	280899	1102228	1098683	82.19	33.701
4	15.55	1135	1142	1148	15171	39921	39271	2.94	1.205
5	31.01	2620	2627	2648	8412	36590	28785	2.15	.883
6	34.57	2958	2969	3002	77566	341311	310604	23.24	9.528

Sum of corrected areas: 3260067.

Summary of Unknowns PBM Library Search and Quantitation

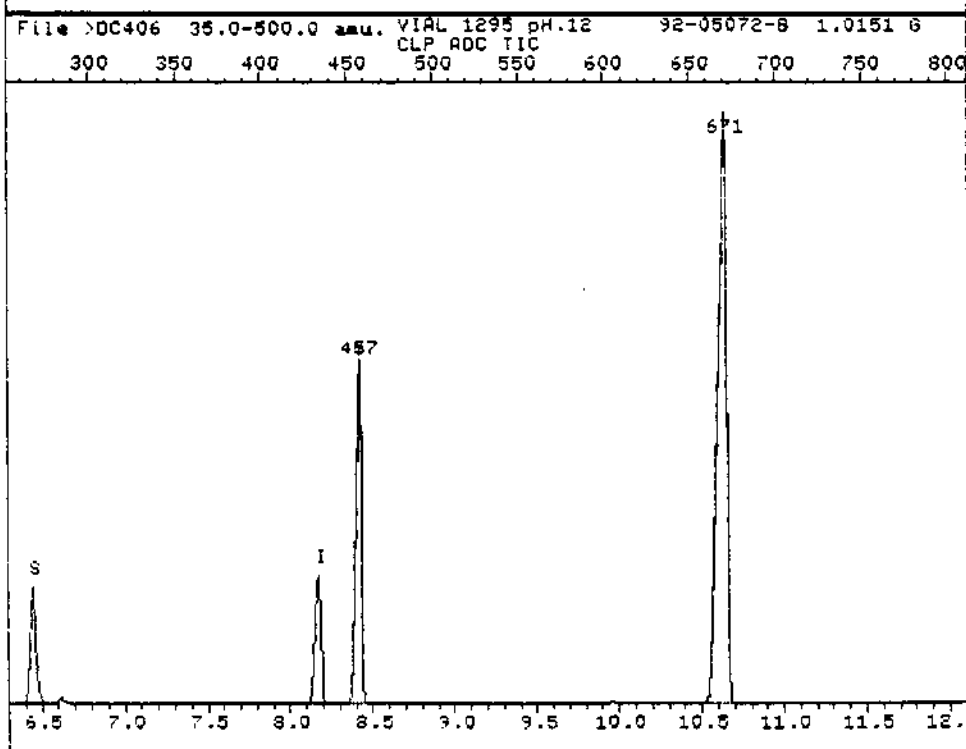
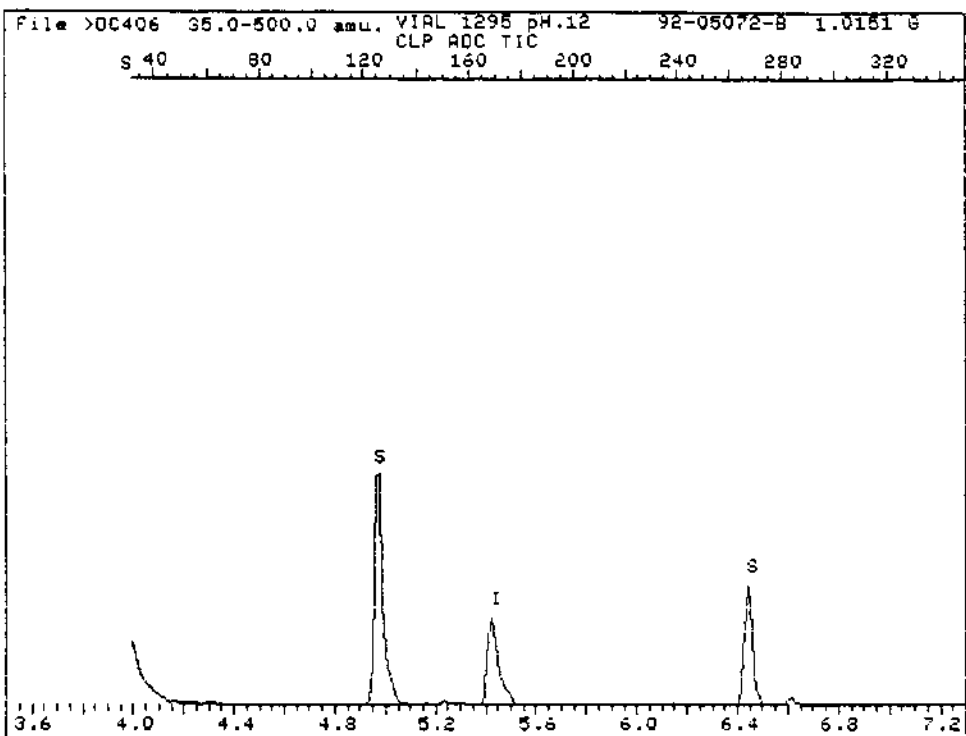
Standard	Concentration	Area	Retention Time	Unknown Window
1	40.0	147526.	5.43	4.00 - 6.80
2	40.0	177549.	8.17	6.80 - 11.61
3	40.0	192631.	15.05	11.61 - 18.71
4	40.0	201182.	22.37	18.71 - 28.11
5	40.0	225364.	33.86	28.11 - 36.05
6	40.0	237227.	38.24	36.05 - 50.30

Dilution Factor = 1.00 This sample was 1.01510 g or mL

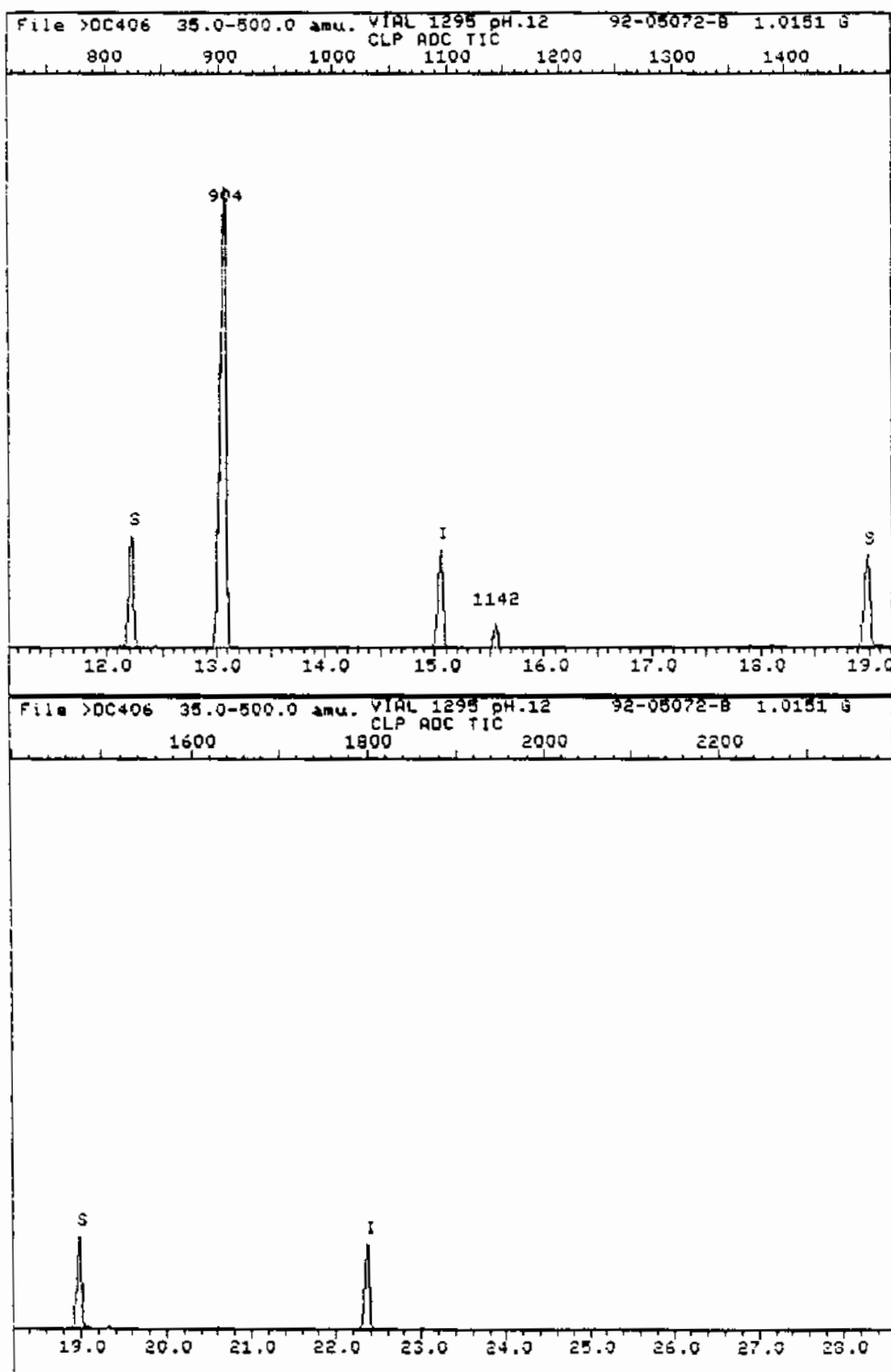
Correction Factor = 986.11

Unknown Concentration = $\frac{(\text{Conc Int Std} * \text{Area Unknown})}{(\text{Area Int Std})} * \text{Correction Factor}$

2:00 PM MON., 27 APR., 1992

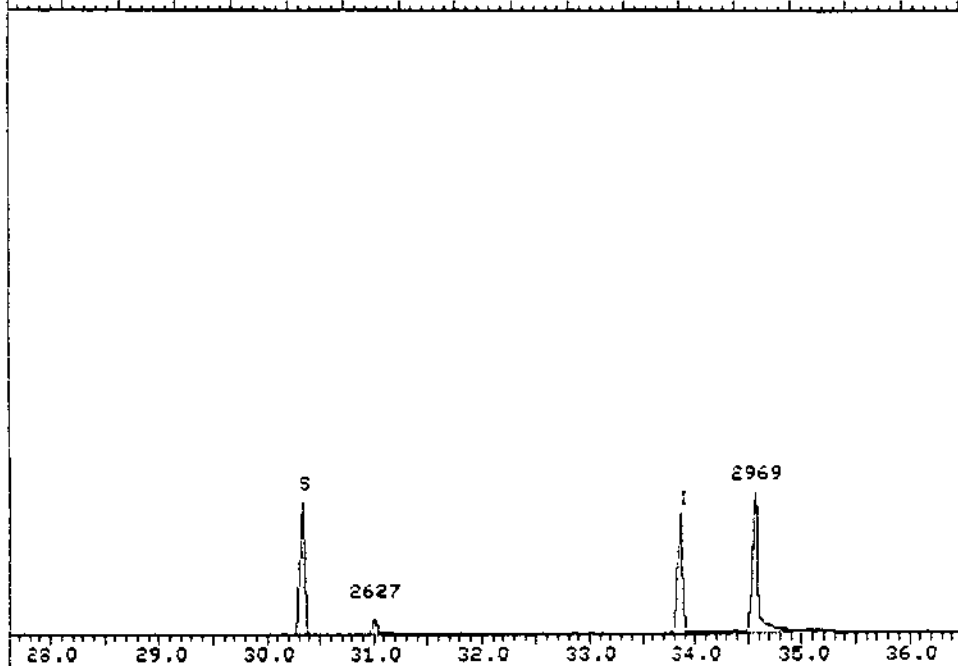


Instrument ID: BNA1 Analyzed on: 4/24/92 18:18

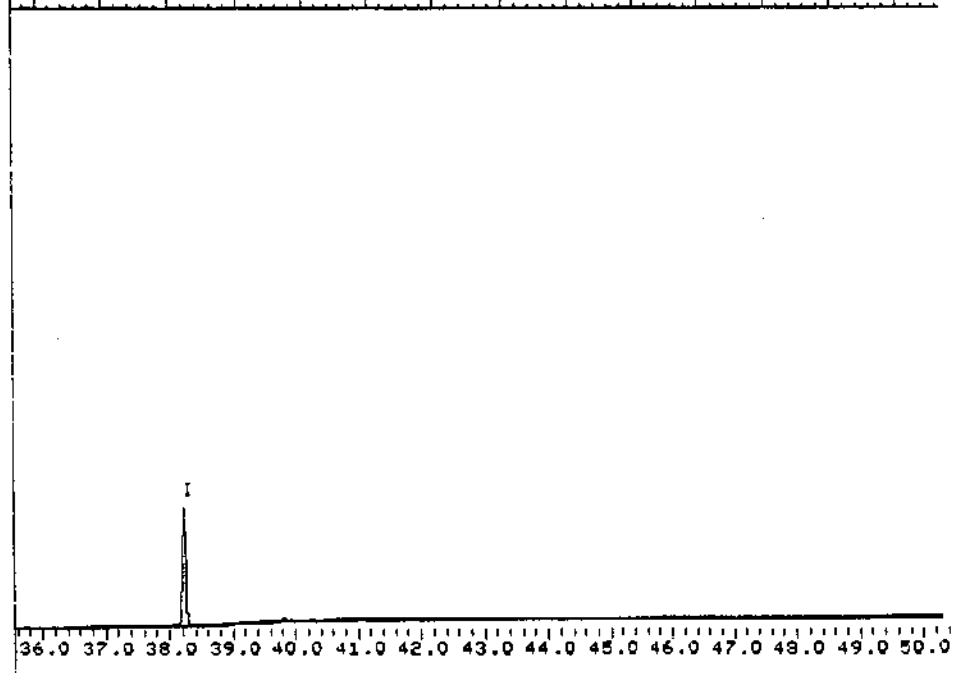


Instrument ID: BNA1 Analyzed on: 4/24/92 18:18

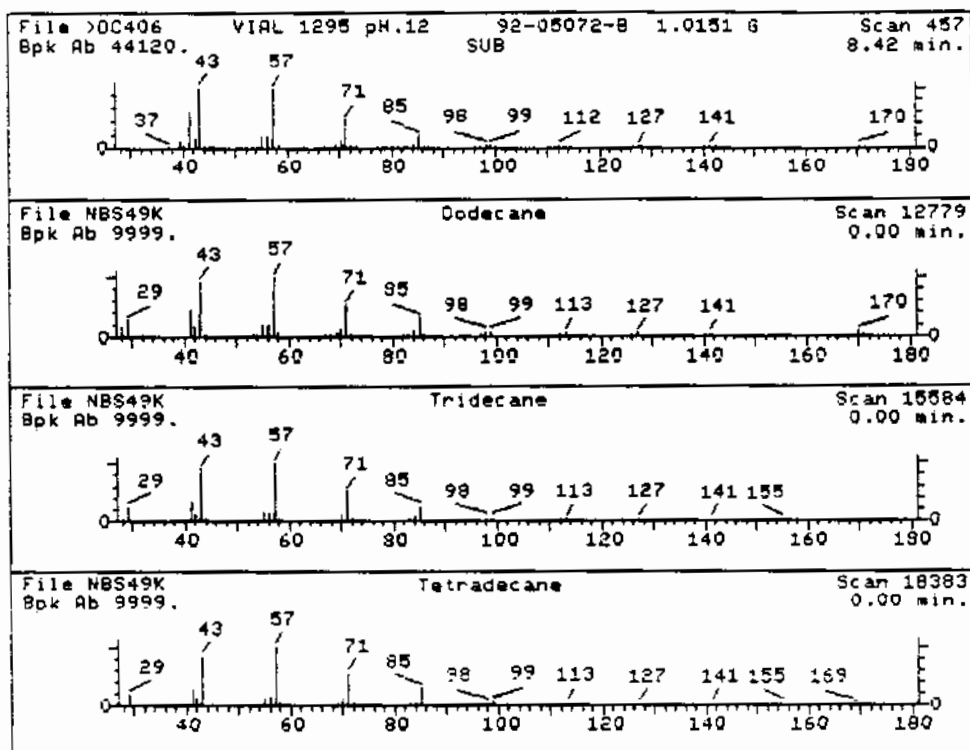
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 CLP ADC TIC
 2400 2500 2600 2700 2800 2900 3000 3100



File >DC406 35.0-500.0 auu. VIAL 1295 pH.12 92-05072-B 1.0151 G
 CLP ADC TIC
 3200 3400 3600 3800 4000 4200 4400



Instrument ID: BNA1 Analyzed on: 4/24/92 18:18

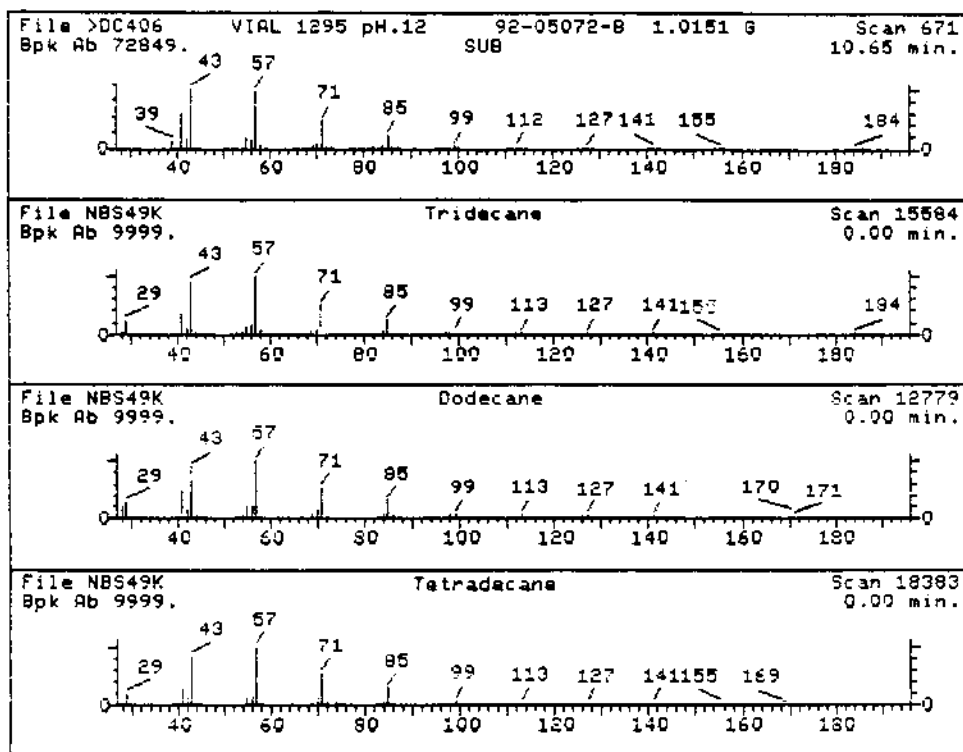


Instrument ID: BNA1 Analyzed on: 4/24/92 18:18
Result 1 in PBM results file: LDC406
Retention Time: 8.42 Area: 445955 Tentative Conc: 99000.00
The unknown area is 251.17% of the nearest internal standard

1. Dodecane	170 C12H26
2. Tridecane	184 C13H28
3. Tetradecane	198 C14H30
4. Pentadecane	212 C15H32
5. Undecane, 2-methyl-	170 C12H26
6. Heptadecane, 2,6,10,14-tetramethyl-	296 C21H44

Sample file: >DC406 Spectrum #: 457
Search speed: 3 Tilting option: F No. of ion ranges searched: 59

	Prob.	CAS #	CON #	ROOT	K	OK	#FLG	TILT	%	CON	C_I	R_IU
1.	96*	112403	6732	NBS49K	99	0	0	4	84	0	72	94
2.	83	629505	6761	NBS49K	92	14	2	3	96	1	57	29
3.	83	629594	6804	NBS49K	92	16	2	4	100	1	57	29
4.	83	629629	6819	NBS49K	85	35	2	4	72	1	57	21
5.	79*	7045718	6735	NBS49K	55	39	2	1	89	8	48	34
6.	78	18344371	6880	NBS49K	79	50	2	3	84	2	55	14

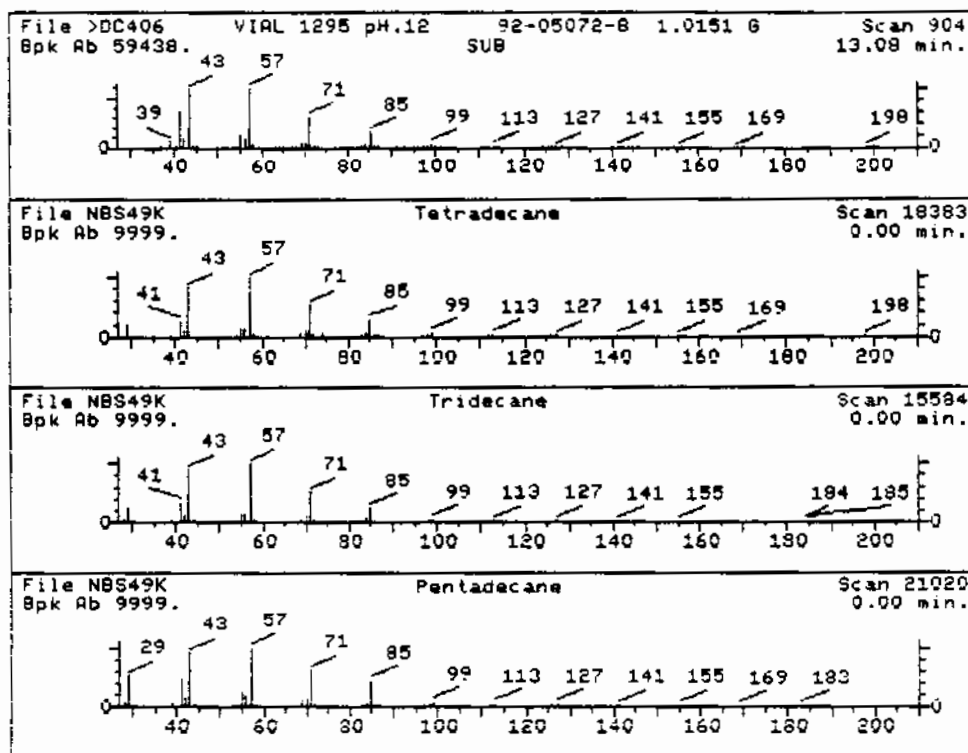


Instrument ID: BNA1 Analyzed on: 4/24/92 18:18
Result 2 in PBM results file: LDC406
Retention Time: 10.65 Area: 1336769 Tentative Conc: 300000.00
The unknown area is 752.90% of the nearest internal standard

①. Tridecane	184 C13H28
2. Dodecane	170 C12H26
3. Tetradecane	198 C14H30
4. Tetradecane, 1-iodo-	324 C14H29I
5. Decane, 6-ethyl-2-methyl-	184 C13H28
6. Dotacosane	394 C28H58

Sample file: >DC406 Spectrum #: 671
Search speed: 3 Tilting option: F No. of ion ranges searched: 61

	Prob.	CAS #	CON #	ROOT	K	DK	#FLG	TILT	%	CON	C_I	R_IU
①.	95*	629505	6761	NBS49K	99	7	1	2	100	1	72	93
2.	87	112403	6732	NBS49K	87	12	1	4	83	2	63	45
3.	83	629594	6804	NBS49K	92	16	2	4	100	1	57	29
4.	83	19218941	6889	NBS49K	100	28	1	2	68	8	54	50
5.	83	62108218	6767	NBS49K	68	31	2	0	88	5	57	24
6.	78	630024	6906	NBS49K	89	52	2	4	84	5	55	19

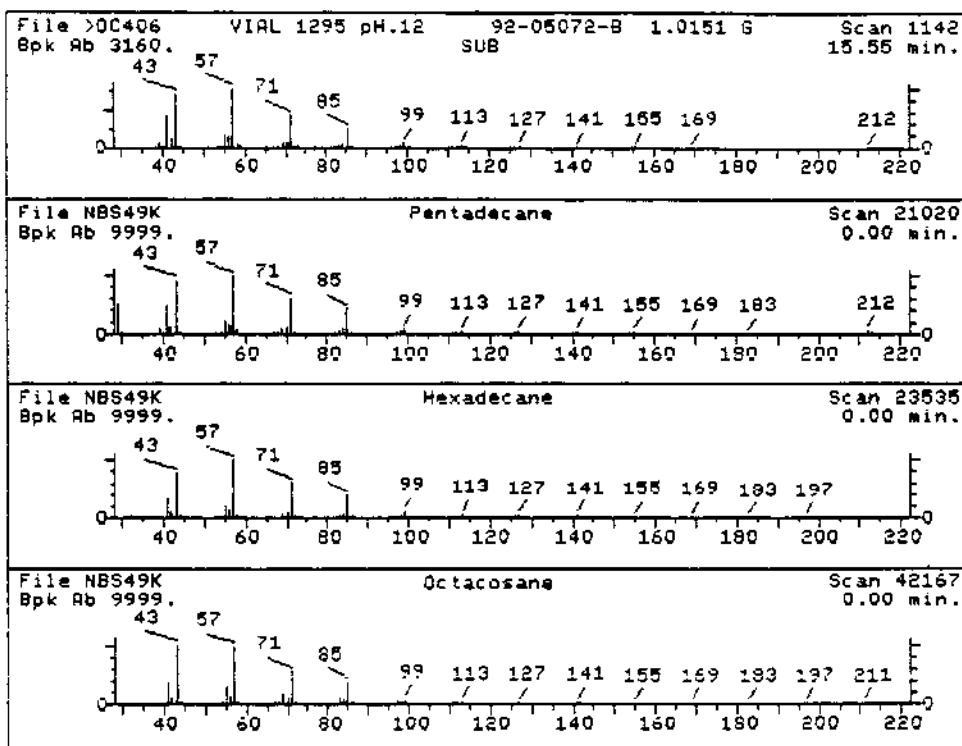


Instrument ID: BNA1 Analyzed on: 4/24/92 18:18
Result 3 in PBM results file: LDC406
Retention Time: 13.08 Area: 1098683 Tentative Conc: 220000.00
The unknown area is 570.36% of the nearest internal standard

1. Tetradecane	198 C14H30
2. Tridecane	184 C13H28
3. Pentadecane	212 C15H32
4. Decane, 6-ethyl-2-methyl-	184 C13H28
5. Hexadecane	226 C16H34
6. Eicosane	282 C20H42

Sample file: >DC406 Spectrum #: 904
Search speed: 3 Tilting option: F No. of ion ranges searched: 65

Prob.	CAS #	CON #	ROOT	K	DK	#FLG	TILT	%	CON	C_I	R_IU
1.	629594	6804	NBS49K	97	11	1	3	100	1	68	89
2.	629505	6761	NBS49K	84	22	1	0	74	2	63	48
3.	629629	6819	NBS49K	87	33	2	4	88	4	57	23
4.	62108218	6767	NBS49K	68	31	2	0	100	5	57	24
5.	544763	6835	NBS49K	81	39	2	3	89	5	55	16
6.	112958	6871	NBS49K	88	51	2	4	80	4	55	18

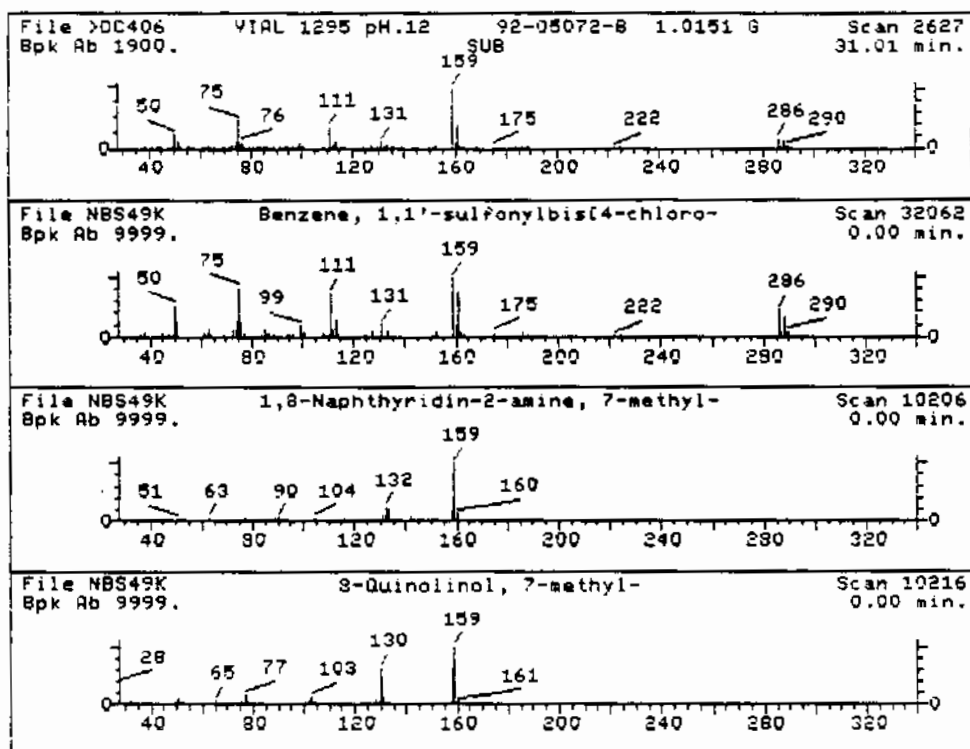


Instrument ID: BNA1 Analyzed on: 4/24/92 18:18
Result 4 in PBM results file: LDC406
Retention Time: 15.55 Area: 39271 Tentative Conc: 8000.00
The unknown area is 20.39% of the nearest internal standard

①. Pentadecane	212 C15H32
2. Hexadecane	226 C16H34
3. Octacosane	394 C28H58
4. Tridecane	184 C13H28
5. Tetradecane	198 C14H30
6. Nonadecane	268 C19H40

Sample file: >DC406 Spectrum #: 1142
Search speed: 3 Tilting option: F No. of ion ranges searched: 71

	Prob.	CAS #	CON #	ROOT	K	DK	#FLG	TILT	%	CON	C_I	R_IV
①.	89*	629629	6819	NBS49K	106	14	2	3	85	1	66	72
2.	86	544763	6835	NBS49K	94	26	2	4	96	2	60	30
3.	86	630024	6906	NBS49K	104	37	2	2	81	1	60	32
4.	86	629505	6761	NBS49K	82	24	2	0	98	4	60	30
5.	83	629594	6804	NBS49K	92	16	2	2	98	1	57	29
6.	83	629925	6864	NBS49K	89	28	2	2	100	4	57	27



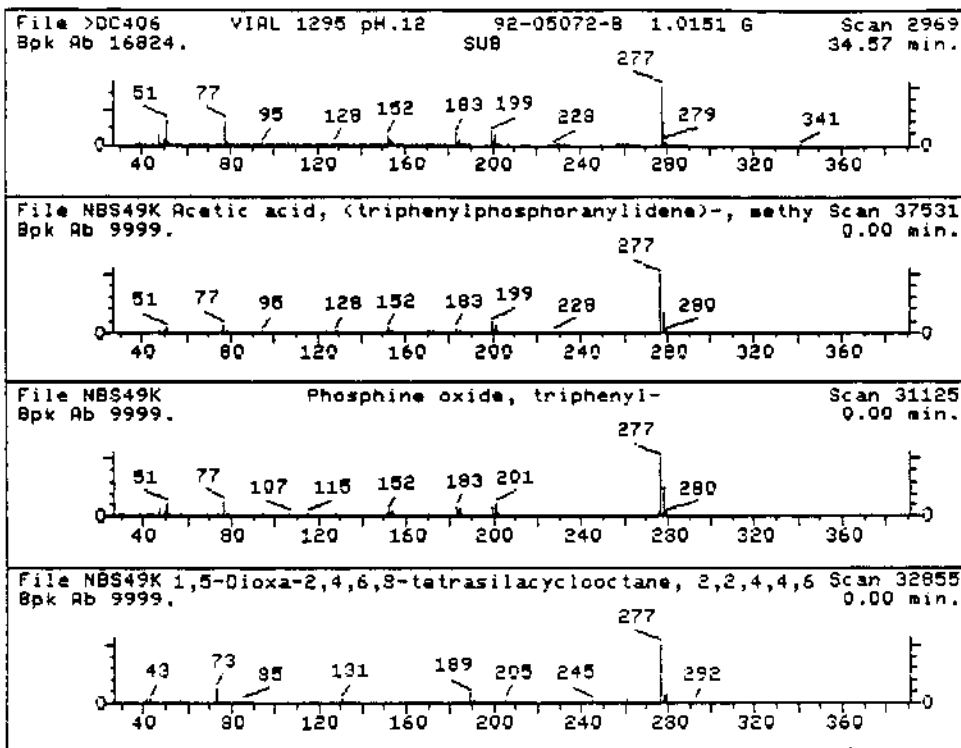
Instrument ID: BNA1 Analyzed on: 4/24/92 18:18
Result 5 in PBM results file: LDC406
Retention Time: 31.01 Area: 28785 Tentative Conc: 5000.00
The unknown area is 12.77% of the nearest internal standard

①. Benzene, 1,1'-sulfonylbis[4-chloro-	286 C12H8Cl2O2S
2. 1,8-Naphthyridin-2-amine, 7-methyl-	159 C9H9N3
3. 8-Quinololinol, 7-methyl-	159 C10H9NO
4. Quinoline, 4-methyl-, 1-oxide	159 C10H9NO

Sample file: >DC406 Spectrum #: 2627
Search speed: 3 Tilting option: F No. of ion ranges searched: 59

	Prob.	CAS #	CON #	ROOT	K	DK	#FLG	TILT	%	CON	C_I	R_IV
①.	74*	80079	37916	NBS49K	133	27	0	0	35	51	35	99
2.	20*	1568930	20926	NBS49K	25	70	2	0	99	54	5	14
3.	20*	5541684	20931	NBS49K	23	83	3	0	100	52	5	12
4.	20*	4053401	20945	NBS49K	21	81	2	0	100	54	5	13

Bl



Instrument ID: BNA1 Analyzed on: 4/24/92 18:18

Result 6 in PBM results file: LDC406

Retention Time: 34.57 Area: 310604 Tentative Conc: 54000.00

The unknown area is 137.82% of the nearest internal standard

1. Acetic acid, (triphenylphosphoranylidene)-, methyl ester 334 C21H19O2P
- ② 2. Phosphine oxide, triphenyl- 278 C18H15OP
3. 1,5-Dioxo-2,4,6,8-tetrakisilacyclooctane, 2,2,4,4,6,6, 8,8-octamethyl- 292 C10H28O2Si4
4. 1H-Indole-3-acetic acid, 5-[(trimethylsilyl)oxyl]-, methyl ester 277 C14H19NO3Si

Sample file: >DC406 Spectrum #: 2969
Search speed: 3 Tilting option: F No. of ion ranges searched: 36

	Prob.	CAS #	CON #	ROOT	K	OK	#FLG	TILT	%	CON	C_1	R_IV
1.	84	2605676	37048	NBS49K	115	19	0	2	73	7	55	69
②	79*	791286	37022	NBS49K	106	42	1	1	64	29	43	80
3.	20*	15261060	37024	NBS49K	29	99	2	0	100	54	5	14

B

R : MI,OR:2R

C407::D1 VIAL 1296 pH.12 92-05078-A2 1.0132 G

low: 34.46 Y-left: 1983. Y-right: 1983.

high: 34.94 Results File VDIR76 Sorted by Time/Area MI

ak #	R.T. min.	first scan	max scan	last scan	peak height	raw area	corr. area	corr. % max.	% of total
1	34.87	2951	2990	2997	217182	3732131	3674318	100.00	100.000

R : DR,1

orking...

raw complete...

QUANT REPORT

Operator ID: BOB
Output File: ^DC407::QF
Data File: >DC407::D1
Name: VIAL 1296 pH.12
Misc: 92-05078-A2 1.0132 G

Quant Rev: 7 Quant Time: 920425 10:01
Injected at: 920425 09:09
Dilution Factor: 1.00000
Instrument ID: BNA1
STL# 5

ID File: I01BNA:QT
Title: BNA ID QUANT FILE #1 GC/MS
Last Calibration: 911003 11:18

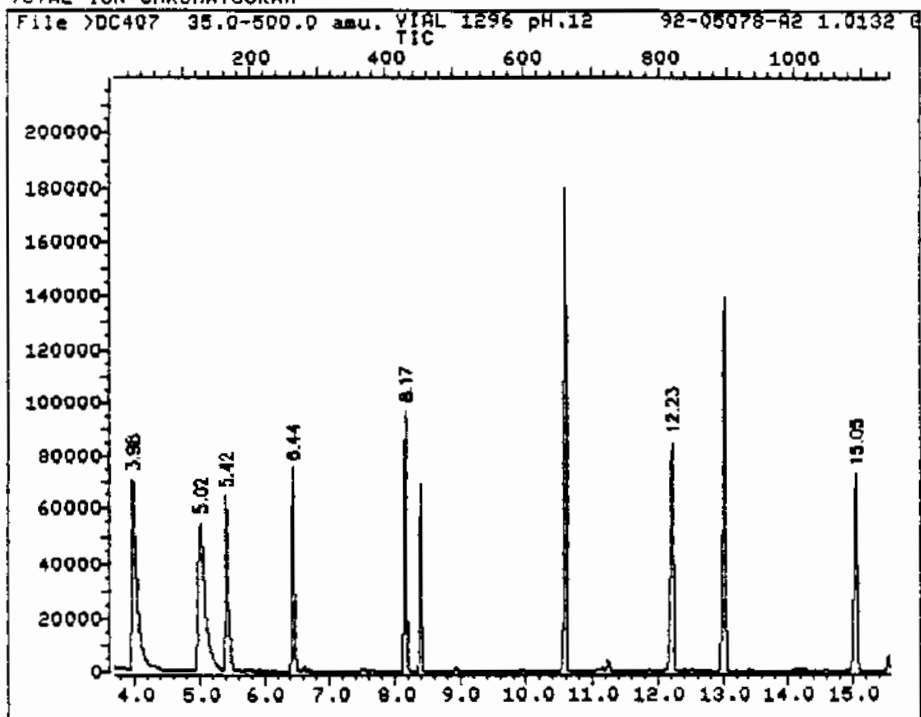
Last Qcal Date: 920424 13:55

	Compound	R.T.	Scan#	Area	Conc	Units	q
1)	*1,4-Dichlorobenzene-d4	5.42	165	27728	40.00	ng/uL	97
2)	2-Fluorophenol	3.98	27	84934	95.46	ng/uL	89
3)	Phenol-d5	5.02	127	115042	112.11	ng/uL	92
4)	Phenol	0.00	0	0	0.00	ng/uL	
5)	bis(2-Chloroethyl)ether	0.00	0	0	0.00	ng/uL	
6)	2-Chlorophenol	0.00	0	0	0.00	ng/uL	
7)	1,3-Dichlorobenzene	0.00	0	0	0.00	ng/uL	
8)	1,4-Dichlorobenzene	0.00	0	0	0.00	ng/uL	
9)	Benzyl alcohol	0.00	0	0	0.00	ng/uL	
10)	1,2-Dichlorobenzene	0.00	0	0	0.00	ng/uL	
11)	2-Methylphenol	0.00	0	0	0.00	ng/uL	
12)	bis(2-Chloroisopropyl)ether	0.00	0	0	0.00	ng/uL	
13)	4-Methylphenol	0.00	0	0	0.00	ng/uL	
14)	N-Nitroso-di-n-propylamine	0.00	264	0	0.00	ng/uL	
15)	Hexachloroethane	0.00	0	0	0.00	ng/uL	
16)	*Naphthalene-d8	8.17	429	90496	40.00	ng/uL	97
17)	Nitrobenzene-d5	6.44	263	53047	48.08	ng/uL	92
18)	Nitrobenzene	0.00	0	0	0.00	ng/uL	
19)	Isophorone	0.00	0	0	0.00	ng/uL	
20)	2-Nitrophenol	0.00	0	0	0.00	ng/uL	
21)	2,4-Dimethylphenol	0.00	0	0	0.00	ng/uL	
22)	Benzoic acid	0.00	0	0	0.00	ng/uL	
23)	bis(2-Chloroethoxy)methane	0.00	0	0	0.00	ng/uL	
24)	2,4-Dichlorophenol	0.00	0	0	0.00	ng/uL	
25)	1,2,4-Trichlorobenzene	0.00	0	0	0.00	ng/uL	
26)	Naphthalene	0.00	0	0	0.00	ng/uL	
27)	4-Chloroaniline	0.00	0	0	0.00	ng/uL	
28)	Hexachlorobutadiene	0.00	0	0	0.00	ng/uL	
29)	4-Chloro-3-methylphenol	0.00	0	0	0.00	ng/uL	
30)	2-Methylnaphthalene	0.00	0	0	0.00	ng/uL	
31)	*Acenaphthene-d10	15.05	1090	49805	40.00	ng/uL	99
32)	Hexachlorocyclopentadiene	0.00	0	0	0.00	ng/uL	
33)	2,4,6-Trichlorophenol	0.00	0	0	0.00	ng/uL	
34)	2,4,5-Trichlorophenol	0.00	0	0	0.00	ng/uL	
35)	2-Chloronaphthalene	0.00	0	0	0.00	ng/uL	
36)	2-Fluorobiphenyl	12.23	819	70222	48.53	ng/uL	96
37)	2-Nitroaniline	0.00	0	0	0.00	ng/uL	
38)	Dimethylphthalate	0.00	0	0	0.00	ng/uL	
39)	Acenaphthylene	0.00	0	0	0.00	ng/uL	
40)	2,6-Dinitrotoluene	0.00	1090	0	0.00	ng/uL	
41)	3-Nitroaniline	0.00	0	0	0.00	ng/uL	
42)	Acenaphthene	0.00	0	0	0.00	ng/uL	

43)	2,4-Dinitrophenol	0.00	0	0	0.00	ng/uL	
44)	4-Nitrophenol	0.00	0	0	0.00	ng/uL	
45)	Dibenzofuran	0.00	0	0	0.00	ng/uL	
46)	2,4-Dinitrotoluene	0.00	0	0	0.00	ng/uL	
47)	Diethylphthalate	0.00	0	0	0.00	ng/uL	
48)	4-Chlorophenyl-phenylether	0.00	0	0	0.00	ng/uL	
49)	Fluorene	0.00	0	0	0.00	ng/uL	
50)	4-Nitroaniline	0.00	0	0	0.00	ng/uL	
51)	*Phenanthrene-d10	22.38	1793	84964	40.00	ng/uL	99
52)	4,6-Dinitro-2-methylphenol	0.00	0	0	0.00	ng/uL	
53)	N-Nitrosodiphenylamine	0.00	0	0	0.00	ng/uL	
54)	2,4,6-Tribromophenol	19.06	1475	21026	65.78	ng/uL	99
55)	4-Bromophenyl-phenylether	0.00	0	0	0.00	ng/uL	
56)	Hexachlorobenzene	0.00	0	0	0.00	ng/uL	
57)	Pentachlorophenol	0.00	0	0	0.00	ng/uL	
58)	Phenanthrene	0.00	0	0	0.00	ng/uL	
59)	Anthracene	0.00	0	0	0.00	ng/uL	
60)	Di-n-butylphthalate	26.56	2195	1212	.337	ng/uL	94
61)	Fluoranthene	0.00	0	0	0.00	ng/uL	
62)	*Chrysene-d12	33.87	2895	90884	40.00	ng/uL	93
63)	Pyrene	0.00	0	0	0.00	ng/uL	
64)	Terphenyl-d14	30.34	2557	84401	49.40	ng/uL	90
65)	Butylbenzylphthalate	0.00	0	0	0.00	ng/uL	
66)	3,3'-Dichlorobenzidine	0.00	0	0	0.00	ng/uL	
67)	Benzo(a)anthracene	0.00	0	0	0.00	ng/uL	
68)	Chrysene	0.00	0	0	0.00	ng/uL	
69)	Bis(2-Ethylhexyl)phthalate	0.00	0	0	0.00	ng/uL	
70)	*Perylene-d12	38.27	3313	102521	40.00	ng/uL	98
71)	Di-n-octylphthalate	0.00	0	0	0.00	ng/uL	
72)	Benzo(b)fluoranthene	0.00	0	0	0.00	ng/uL	
73)	Benzo(k)fluoranthene	0.00	0	0	0.00	ng/uL	
74)	Benzo(a)pyrene	37.92	3280	1612	.668	ng/uL	75
75)	Indeno(1,2,3-cd)pyrene	0.00	0	0	0.00	ng/uL	
76)	Dibenz(a,h)anthracene	0.00	0	0	0.00	ng/uL	
77)	Benzo(g,h,i)perylene	42.27	3693	3827	1.56	ng/uL	95

* Compound is ISTD

TOTAL ION CHROMATOGRAM



Data File: >DC407::D1
Name: VIAL 1296 pH.12
Misc: 92-05078-A2 1.0132 G

Quant Output File: ^DC407::OF
Instrument ID: BNA1

BTL# 5

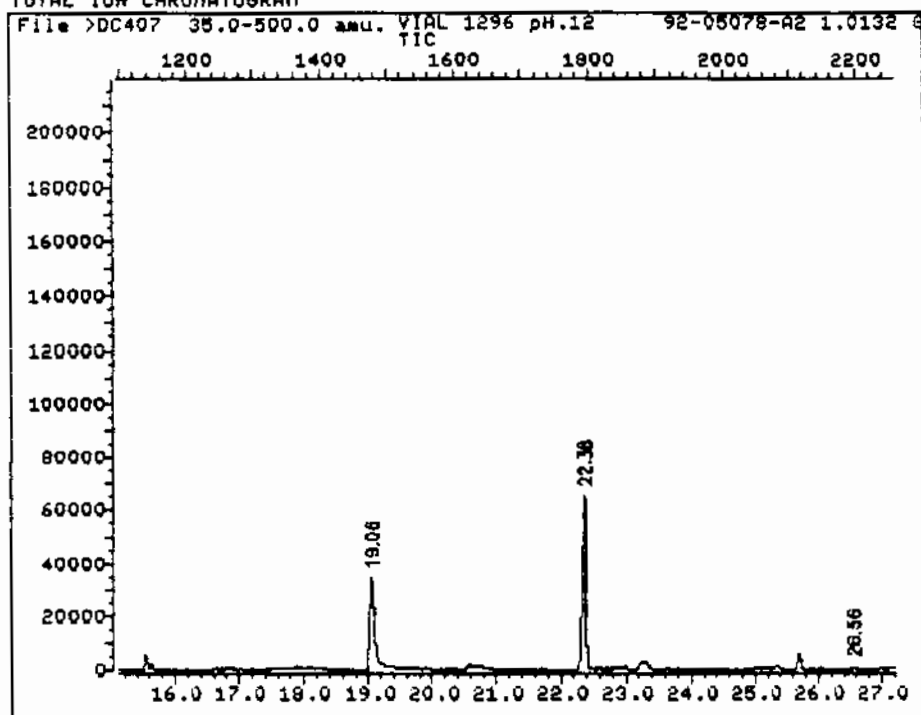
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Title: BNA ID QUANT FILE #1 GC/MS
Last Calibration: 911003 11:18

Last Qcal Time: 920424 13:55

Operator ID: BOB
Quant Time : 920425 10:01
Injected at: 920425 09:09

Page 1 of 4

TOTAL ION CHROMATOGRAM



Data File: >DC407::D1
Name: VIAL 1296 pH.12
Misc: 92-05078-A2 1.0132 G

Quant Output File: ^DC407::QF
Instrument ID: BNA1

BTL# 5

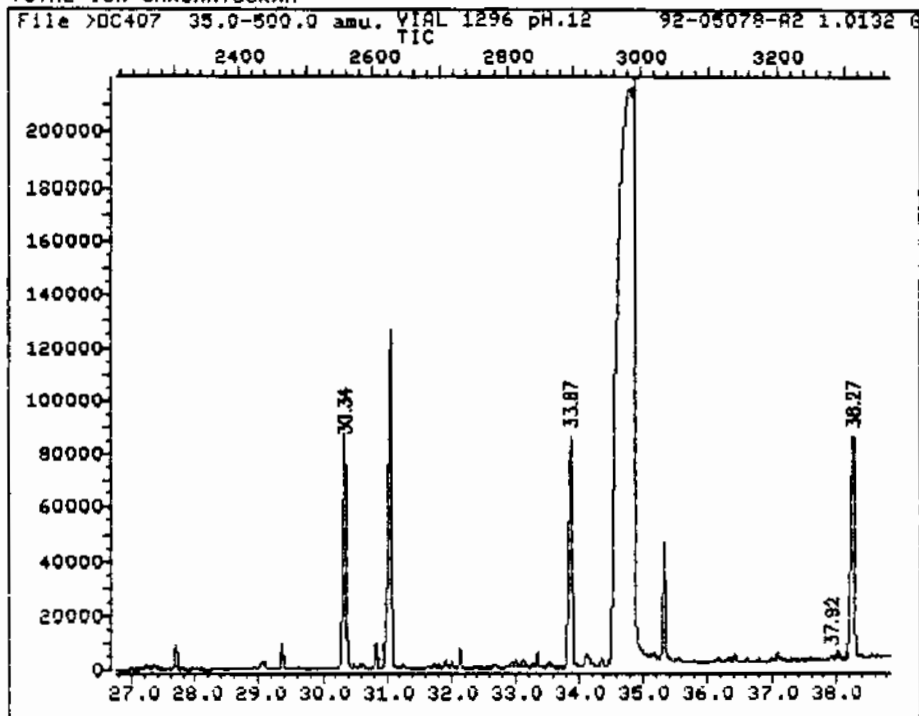
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Last Calibration: 911003 11:18

Last Qcal Time: 920424 13:55

Operator ID: BOB
Quant Time : 920425 10:01
Injected at: 920425 09:09

Page 2 of 4

TOTAL ION CHROMATOGRAM



Data File: >DC407::D1
Name: VIAL 1296 pH.12
Misc: 92-05078-A2 1.0132 G

Quant Output File: ^DC407::QF
Instrument ID: BNA1

BTL# 5

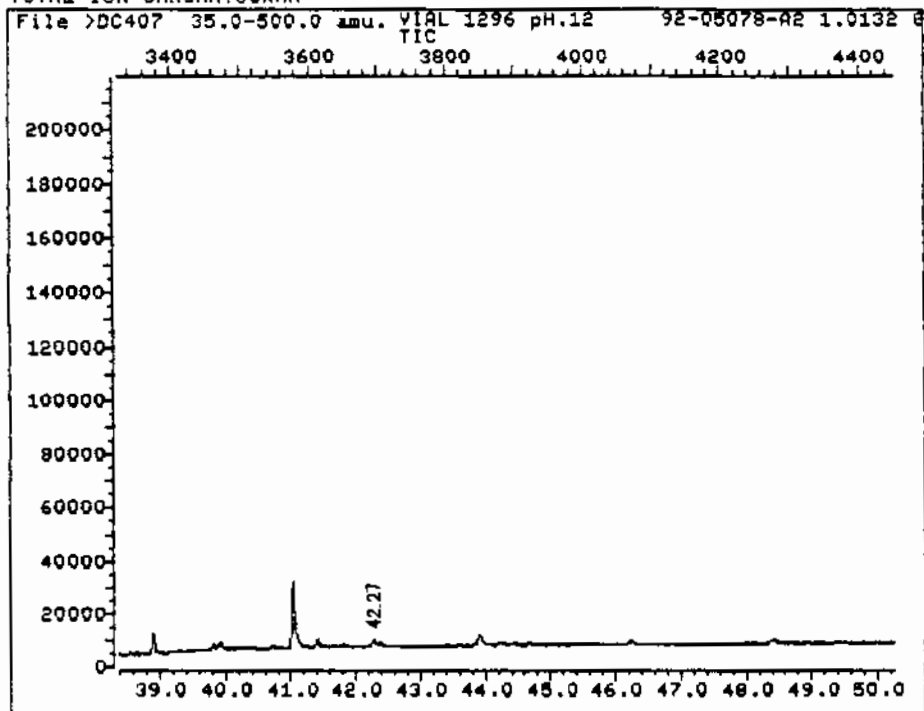
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Operator ID: 808
Quant Time : 920425 10:01
Injected at: 920425 09:09

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TOTAL ION CHROMATOGRAM



Data File: >DC407::D1
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Misc: 92-05078-A2 1.0132 G

Quant Output File: ^DC407::OF
Instrument ID: BNA1

BTL# 5

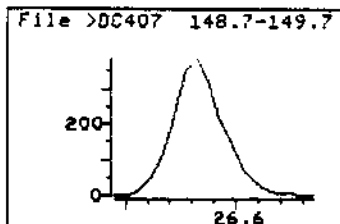
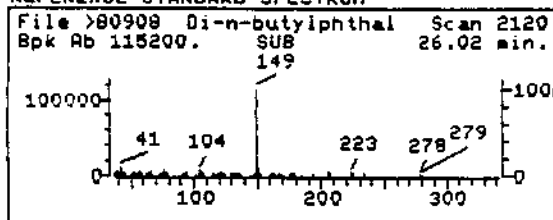
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Last Calibration: 911003 11:18

Last Qcal Time: 920424 13:55

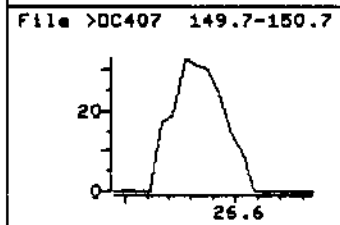
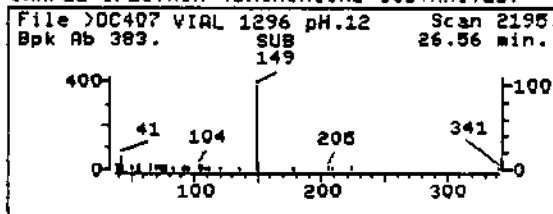
Operator ID: BOB
Quant Time : 920425 10:01
Injected at: 920425 09:09

Page 4 of 4

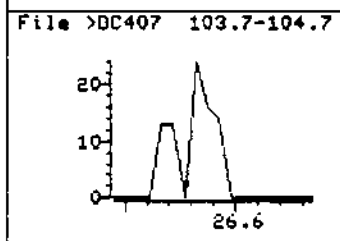
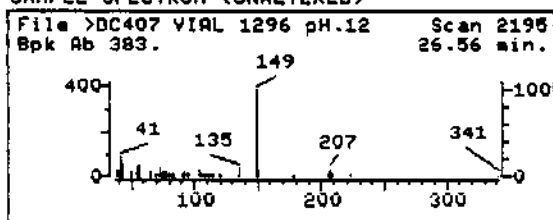
REFERENCE STANDARD SPECTRUM



SAMPLE SPECTRUM (BACKGROUND SUBTRACTED)



SAMPLE SPECTRUM (UNALTERED)



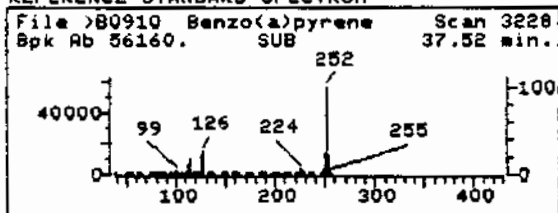
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Name: VIAL 1296 pH.12
Misc: 92-05078-A2 1.0132 G
Quant Time: 920425 10:01
Injected at: 920425 09:09
Last Qcal Time: 920424 13:55

Quant Output File: ^DC407::OF
Instrument ID: BNA1
BTL# 5
Quant ID File: ID18NA::QT
Last Calibration: 911003 11:18

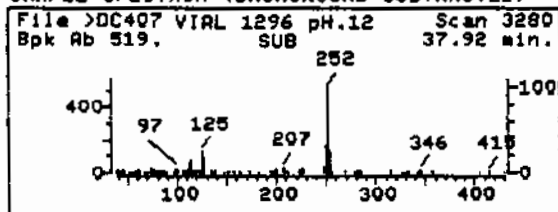
Compound No : 60
Compound Name : Di-n-butylphthalate
Scan Number : 2195
Retention Time: 26.56 min.
Quant Ion : 149.0
Area : 1212
Concentration : .337 ng/uL
q-value : 94

0 K

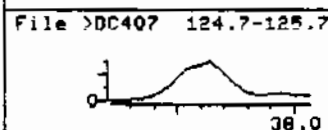
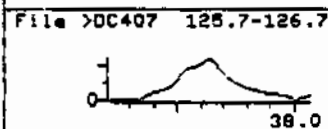
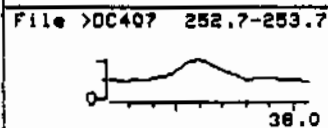
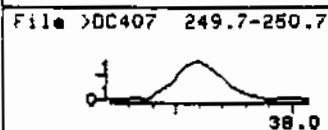
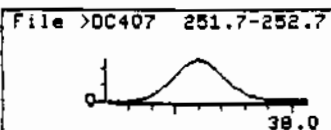
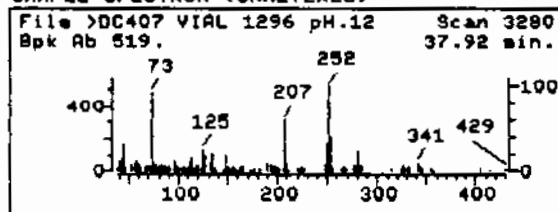
REFERENCE STANDARD SPECTRUM



SAMPLE SPECTRUM (BACKGROUND SUBTRACTED)



SAMPLE SPECTRUM (UNALTERED)



Data File: >DC407::D1
Name: VIAL 1296 pH.12
Misc: 92-05078-A2 1.0132 G
Quant Time: 920425 10:01
Injected at: 920425 09:09
Last Qcal Time: 920424 13:55

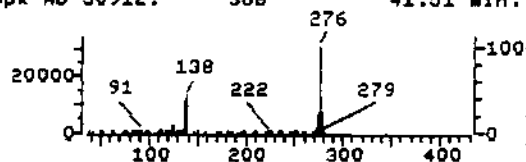
Quant Output File: ^DC407::OF
Instrument ID: BNA1
BT# 5
Quant ID File: ID1BNA::QT
Last Calibration: 911003 11:18

Compound No : 74
Compound Name : Benzo(a)pyrene
Scan Number : 3280
Retention Time: 37.92 min.
Quant Ion : 252.0
Area : 1612
Concentration : .668 ng/uL
q-value : 75

ak

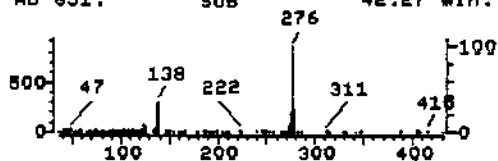
REFERENCE STANDARD SPECTRUM

File >B0910 Benzo(g,h,i)pery Scan 3611
Bpk Ab 30912. SUB 41.51 min.



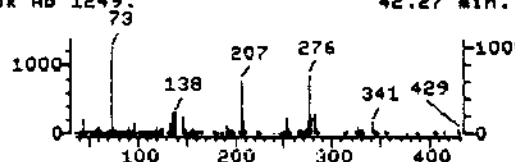
SAMPLE SPECTRUM (BACKGROUND SUBTRACTED)

File >DC407 VIAL 1296 pH.12 Scan 3693
Bpk Ab 851. SUB 42.27 min.

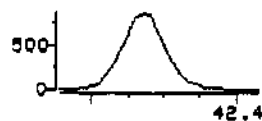


SAMPLE SPECTRUM (UNALTERED)

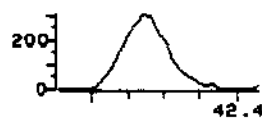
File >DC407 VIAL 1296 pH.12 Scan 3693
Bpk Ab 1249. SUB 42.27 min.



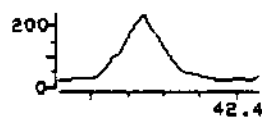
File >DC407 275.7-276.7



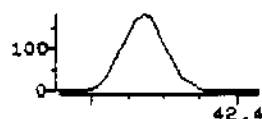
File >DC407 137.7-138.7



File >DC407 276.7-277.7



File >DC407 273.7-274.7



Data File: >DC407::D1
Name: VIAL 1296 pH.12
Misc: 92-05078-A2 1.0132 G
Quant Time: 920425 10:01
Injected at: 920425 09:09
Last Qcal Time: 920424 13:55

Quant Output File: ^DC407::OF
Instrument ID: BNA1
BTL# 5
Quant ID File: ID1BNA::QT
Last Calibration: 911003 11:18

Compound No : 77
Compound Name : Benzo(g,h,i)perylene
Scan Number : 3693
Retention Time: 42.27 min.
Quant Ion : 276.0
Area : 3827
Concentration : 1.56 ng/uL
q-value : 95

ok

[GC/MS OPERATOR REPORT]

[GC/MS LAB SEMIVOLATILES]

[INTERNAL STANDARD CHECK REPORT]

SAMPLE FILE = >DC407
 CAL CHECK FILE = >DC402
 DATE AND TIME OF ANALYSIS = 4/25/92 9:09
 MISCELLANEOUS = 92-05078-A2 1.0132 G
 METHOD = BNAME1
 INSTRUMENT = BNA1
 OPERATOR = BOB SUPER GRP

I. Areas

Name of the BNA Internal Standard	The Sample ISTD Area	Daily Check ISTD Area	Daily Check ISTD Area / 2	Daily Check ISTD Area x 2	Status of the Sample ISTD Area Precision
1,4-Dichlorobenz-d4	27728	24890	12445	49780	OK
Naphthalene-d8	90496	87937	43969	175874	OK
Acenaphthene-d10	49805	47070	23535	94140	OK
Phenanthrene-d10	84964	81388	40694	162776	OK
Chrysene-d12	90884	81856	40928	163712	OK
Perylene-d12	102521	90335	45168	180670	OK

II. Retention Times

Name of the BNA Internal Standard	The Sample ISTD R.Time	Daily Check ISTD R.Time	Daily Check ISTD RT - 0.5	Daily Check ISTD RT + 0.5	Status of the Sample ISTD R.T. Precision
1,4-Dichlorobenz-d4	5.42	5.41	4.91	5.91	OK
Naphthalene-d8	8.17	8.17	7.67	8.67	OK
Acenaphthene-d10	15.05	15.05	14.55	15.55	OK
Phenanthrene-d10	22.38	22.38	21.88	22.88	OK
Chrysene-d12	33.87	33.88	33.38	34.38	OK
Perylene-d12	38.27	38.25	37.75	38.75	OK

[GC/MS OPERATOR REPORT]

[GC/MS LAB SEMIVOLATILES]

[Preliminary Surrogate Report]

DATA FILE NAME = >OC407::D1
 DATE AND TIME OF ANALYSIS = 4/25/92 9:09
 SAMPLE = VIAL 1296 pH.12
 MISCELLANEOUS = 92-05078-A2 1.0132 G
 METHOD = BNAME1
 INSTRUMENT = BNA1
 OPERATOR = BOB SUPER GRP

SURROGATE	AS FOUND IN SAMPLE	WAS SPIKED AT	WATER LIMITS	SOIL LIMITS	% RECOVERY
-----	-----	-----	-----	-----	-----
2-Fluorophenol	95.46	100.00	21-100	25-121	95.46
Phenol-d5	112.11	100.00	10-94	24-113	112.11
Nitrobenzene-d5	48.08	50.00	35-114	23-120	96.16
2-Fluorobiphenyl	48.53	50.00	43-116	30-115	97.06
2,4,6-tribromo- phenol	65.78	100.00	10-123	19-122	65.78
Terphenyl-d14	49.40	50.00	33-141	18-137	98.81

MS data file header from : >DC407::01

Sample: VIAL 1296 pH.12 Operator: BOB SUPER GRP. 4/25/92 9:09
 Misc : 92-05078-A2 1.0132 G BTL# 5
 Sys. #: 1 MS model: 70 SW/HW rev.: LF ALS #: 5 Equip ID: BNA1
 Method file: BNAME1 Tuning file: MTBNA1 No. of extra records: 2
 Source temp.: N/A Analyzer temp.: N/A Transfer line temp.: 0

Chromatographic temperatures : 40. 100. 190. 300. 0.
 Chromatographic times, min. : 1.5 .5 .5 12.0 0.0
 Chromatographic rate, deg/min: 30.0 4.5 8.0 .5 0.0

>DC407 VIAL 1296 pH.12 92-05078-A2 1.0132 G
 35.01 500.0 CLP TIC
 Upslope: .2000 Area Reject: 19574. Max Peaks: 14 Bunch: -1 Valley >100 %
 Dnslope: 0.0000 Results File IDC407 Sorted by Time/Area INT

Peak #	R.T. min.	first scan	max scan	last scan	peak height	raw area	corr. area	corr. % max.	% of total
1	8.39	444	451	457	68369	148325	145562	4.53	2.877
2	10.60	649	663	670	179534	472198	468598	14.59	9.263
3	13.03	886	896	901	139096	384637	382111	11.89	7.553
4	25.70	2104	2112	2123	5808	27275	23079	.72	.45e
5	27.69	2296	2303	2311	8855	27588	22894	.71	.453
6	29.37	2457	2464	2478	9506	31504	23456	.73	.46e
7	30.83	2597	2604	2611	9008	27358	20286	.63	.401
8	31.06	2613	2626	2638	125664	500417	486363*	15.14	9.61e
9	34.13	2913	2919	2935	4586	40986	24500	.76	.48e
10	34.87	2950	2985	2987	213896	3255837	3212668	100.00	63.507
11	35.32	3027	3033	3049	43774	160165	119396	3.69	2.34e
12	38.90	3369	3373	3386	7447	77893	22035	.69	.43e
13	41.04	3570	3576	3592	25452	193359	87671	2.73	1.733
14	43.92	3845	3849	3869	4096	146322	21180	.66	.41e

Sum of corrected areas: 5058799.

Summary of Unknowns PBM Library Search and Quantitation

Standard	Concentration	Area	Retention Time	Unknown Window
1	40.0	195740.	5.42	4.00 - 6.79
2	40.0	228181.	8.17	6.79 - 11.61
3	40.0	251838.	15.05	11.61 - 18.71
4	40.0	268758.	22.38	18.71 - 28.13
5	40.0	300615.	33.87	28.13 - 36.07
6	40.0	324265.	38.27	36.07 - 50.26

Dilution Factor = 1.00 This sample was 1.01320 g or mL

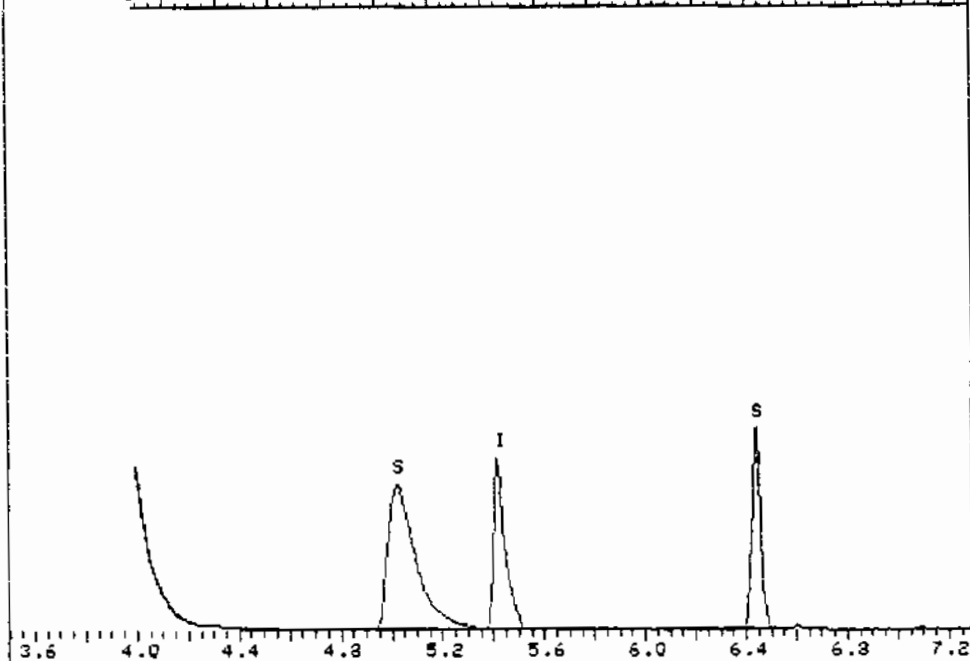
Correction Factor = 987.96

Unknown Concentration = $\frac{\text{Conc Int Std} \times \text{Area Unknown}}{\text{Area Std} \times \text{Correction Factor}}$

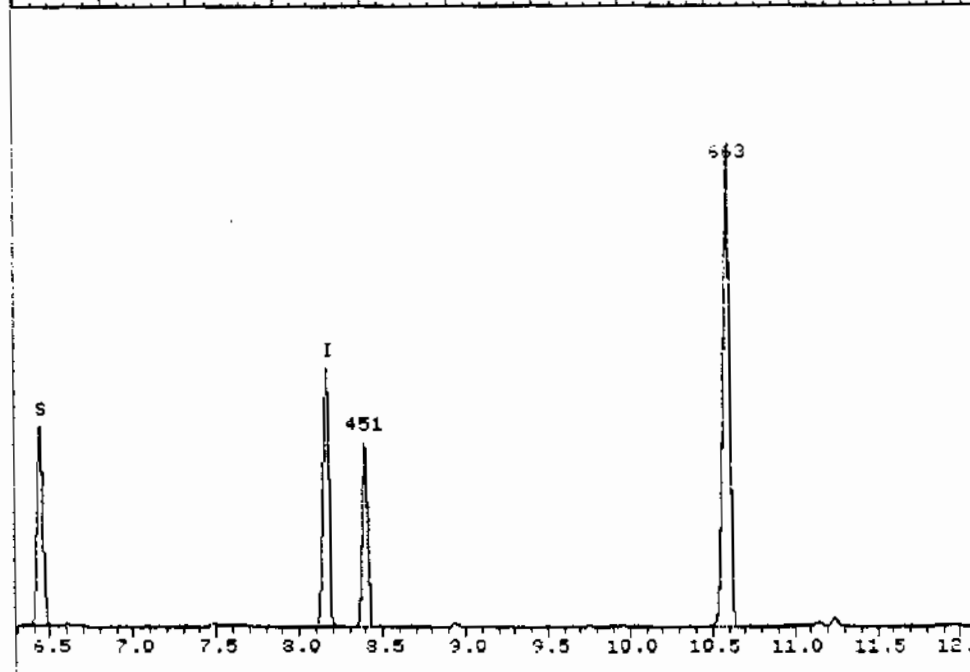
$$34.87 C = \frac{40 \times 3674318}{300615} \times 987.96 = 438,020$$

2:40 PM MON., 27 APR., 1992

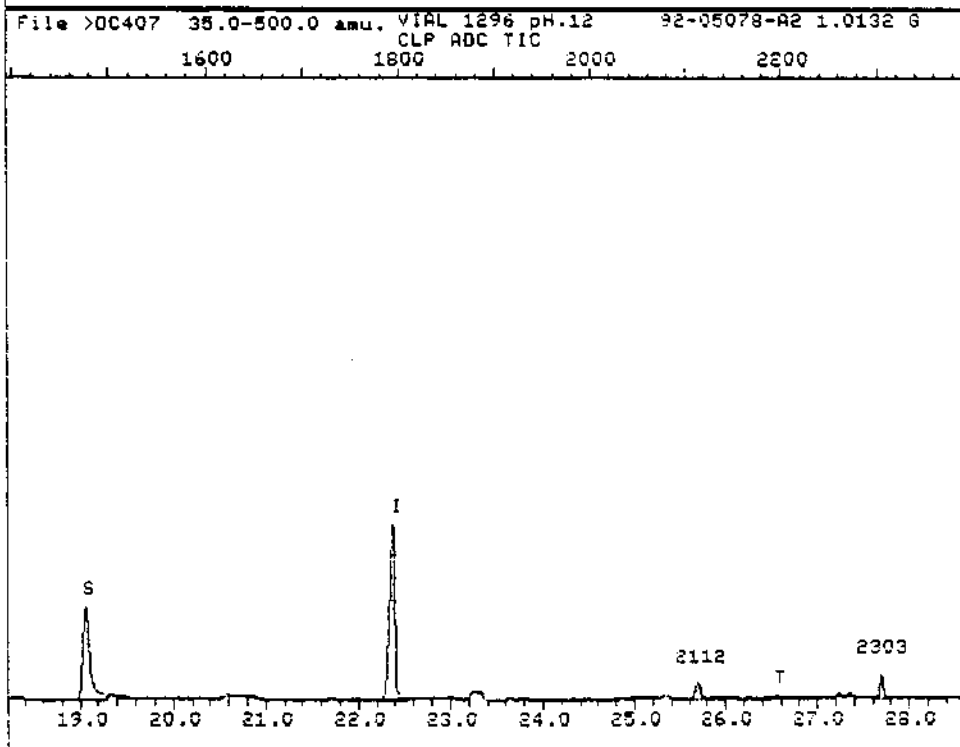
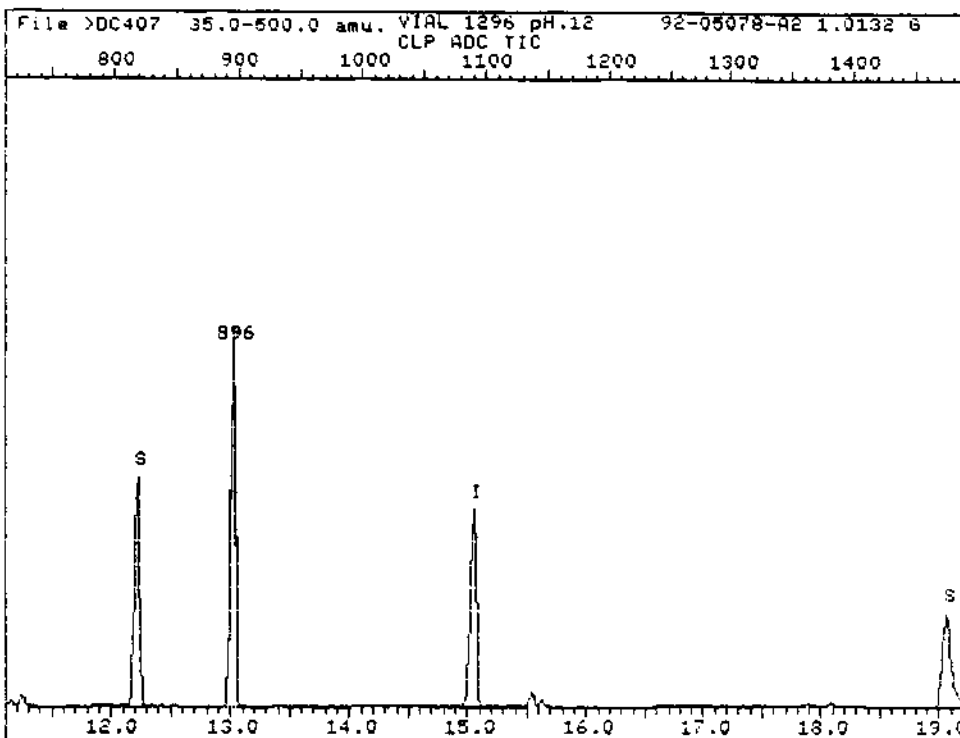
File >DC407 35.0-500.0 amu. VIAL 1296 pH.12 92-05078-A2 1.0132 G
CLP ADC TIC
S 40 80 120 160 200 240 280 320



File >DC407 35.0-500.0 amu. VIAL 1296 pH.12 92-05078-A2 1.0132 G
CLP ADC TIC
300 350 400 450 500 550 600 650 700 750 800

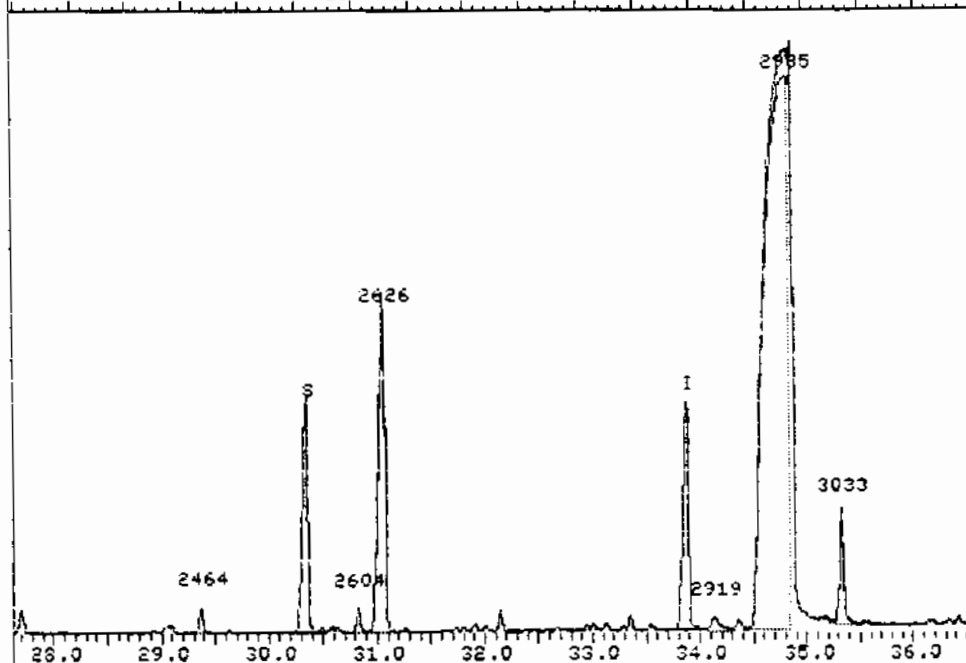


Instrument ID: BNA1 Analyzed on: 4/25/92 9:09

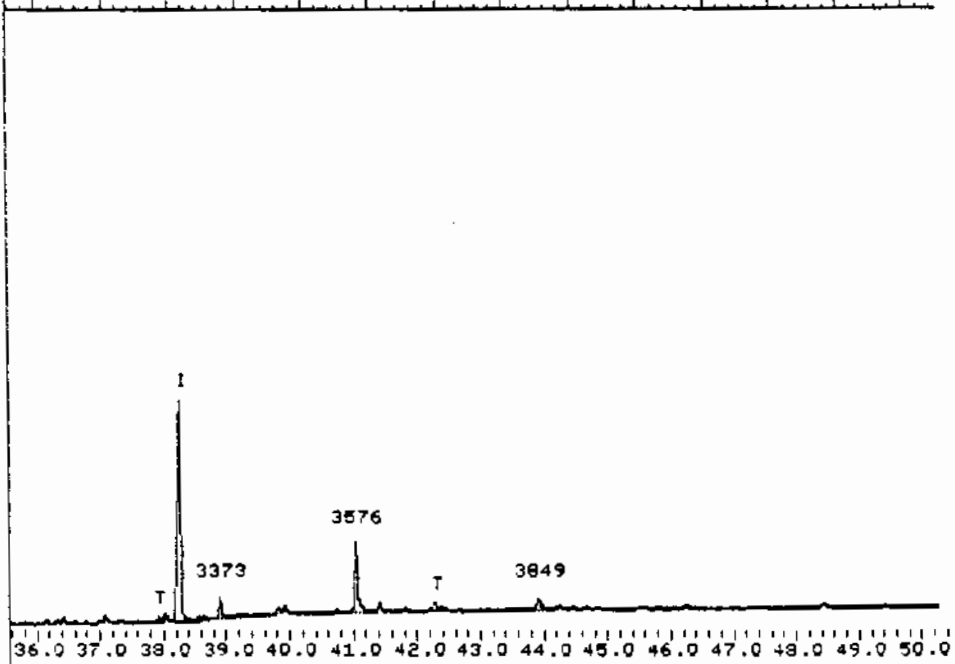


Instrument ID: BNA1 Analyzed on: 4/25/92 9:09

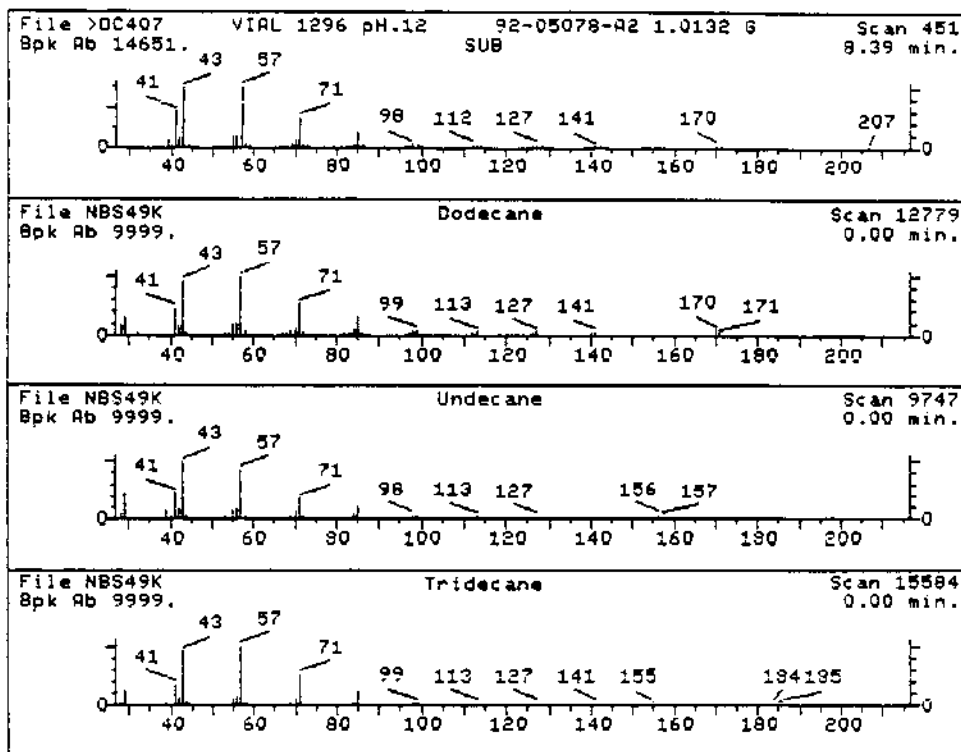
File >DC407 35.0-500.0 amu. VIAL 1296 pH.12 92-05078-A2 1.0132 G
CLP ADC TIC



File >DC407 35.0-500.0 amu. VIAL 1296 pH.12 92-05078-A2 1.0132 G
CLP ADC TIC



Instrument ID: BNA1 Analyzed on: 4/25/92 9:09



Instrument ID: BNA1 Analyzed on: 4/25/92 9:09

Result 1 in PBM results file: LDC407

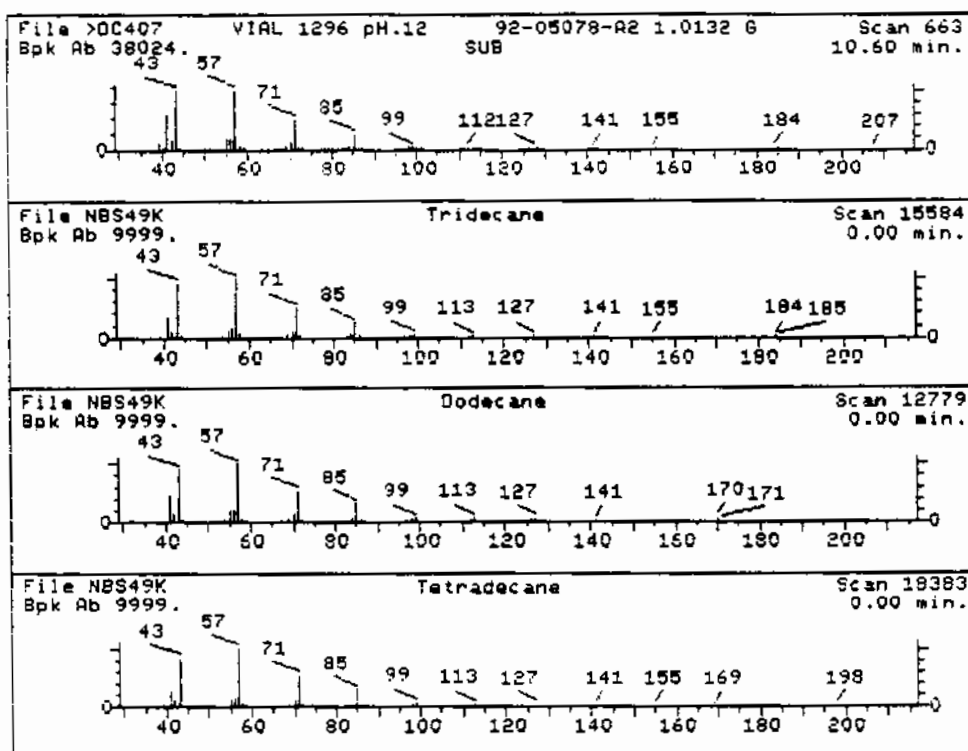
Retention Time: 8.39 Area: 145562 Tentative Conc: 25000.00

The unknown area is 63.79% of the nearest internal standard

1. Dodecane	170 C12H26
2. Undecane	156 C11H24
3. Tridecane	184 C13H28
4. Tetradecane	198 C14H30
5. Pentadecane	212 C15H32
6. Undecane, 2-methyl-	170 C12H26

Sample file: >DC407 Spectrum #: 451
Search speed: 3 Tilting option: F No. of ion ranges searched: 61

	Prob.	CAS #	CON #	ROOT	K	DK	#FLG	TILT	%	CON	C_I	R_IU
1.	96*	112403	6732	NBS49K	99	0	0	4	88	1	72	94
2.	87	1120214	6682	NBS49K	82	15	1	0	98	2	63	44
3.	86	629505	6761	NBS49K	79	27	1	0	81	2	60	38
4.	83	629594	6804	NBS49K	92	16	2	3	100	1	57	29
5.	83	629629	6819	NBS49K	87	33	2	4	78	5	57	23
6.	79*	7045718	6735	NBS49K	55	39	2	0	90	8	48	36

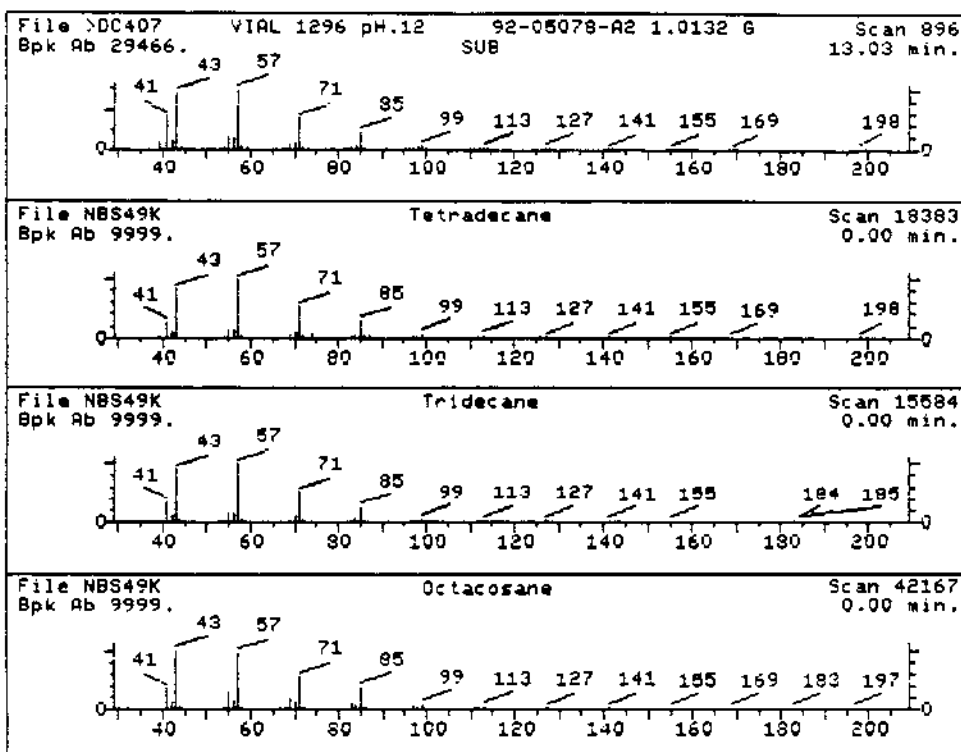


Instrument ID: BNA1 Analyzed on: 4/25/92 9:09
Result 2 in PBM results file: LDC407
Retention Time: 10.60 Area: 468598 Tentative Conc: 81000.00
The unknown area is 205.36% of the nearest internal standard

1. Tridecane	184 C13H28
2. Dodecane	170 C12H26
3. Tetradecane	198 C14H30
4. Tetradecane, 1-iodo-	324 C14H29I
5. Octacosane	394 C28H58
6. Decane, 6-ethyl-2-methyl-	184 C13H28

Sample file: >DC407 Spectrum #: 663
Search speed: 3 Tilting option: F No. of ion ranges searched: 65

	Prob.	CAS #	CON #	ROOT	K	DK	#FLG	TILT	%	CON	C_I	R_IU
1.	97*	629505	6761	NBS49K	97	9	0	0	90	1	72	97
2.	88	112403	6732	NBS49K	92	7	1	3	78	4	65	53
3.	86	629594	6804	NBS49K	97	11	2	3	100	1	60	32
4.	83	19218941	6889	NBS49K	100	28	1	1	68	7	54	50
5.	83	630024	6906	NBS49K	94	47	2	4	81	4	57	22
6.	83	62108218	6767	NBS49K	68	31	2	0	100	5	57	24



Instrument ID: BNA1 Analyzed on: 4/25/92 9:09
Result 3 in PBM results file: LDC407
Retention Time: 13.03 Area: 382111 Tentative Conc: 60000.00
The unknown area is 151.73% of the nearest internal standard

1. Tetradecane	198 C14H30
2. Tridecane	184 C13H28
3. Octacosane	394 C28H58
4. Decane, 6-ethyl-2-methyl-	184 C13H28
5. Pentadecane	212 C15H32
6. Decane, 2,3,5-trimethyl-	184 C13H28

Sample file: >DC407 Spectrum #: 896
Search speed: 3 Tilting option: F No. of ion ranges searched: 68

	Prob.	CAS #	CON #	ROOT	K	OK	#FLG	TILT	%	CON	C_I	R_IV
1.	94*	629594	6804	NBS49K	98	10	1	1	97	2	72	92
2.	89	629505	6761	NBS49K	91	15	1	0	82	5	66	60
3.	83	630024	6906	NBS49K	99	42	2	3	81	5	57	26
4.	83	62108218	6767	NBS49K	68	31	2	0	100	4	57	24
5.	79	629629	6819	NBS49K	99	21	2	4	84	7	48	34
6.	79	62238113	6779	NBS49K	80	23	1	4	77	10	48	32

Instrument ID: BNA1 Analyzed on: 4/25/92 9:09

Retention Time: 25.70 Area: 23079 Tentative Conc: 3400.00

The unknown area is 8.59% of the nearest internal standard

This peak is less than 10% of the nearest internal standard.

No library search has been performed on this peak.

Instrument ID: BNA1 Analyzed on: 4/25/92 9:09

Retention Time: 27.69 Area: 22894 Tentative Conc: 3400.00

The unknown area is 8.52% of the nearest internal standard

This peak is less than 10% of the nearest internal standard.

No library search has been performed on this peak.

Instrument ID: BNA1 Analyzed on: 4/25/92 9:09

Retention Time: 29.37 Area: 23456 Tentative Conc: 3100.00

The unknown area is 7.80% of the nearest internal standard

This peak is less than 10% of the nearest internal standard.

No library search has been performed on this peak.

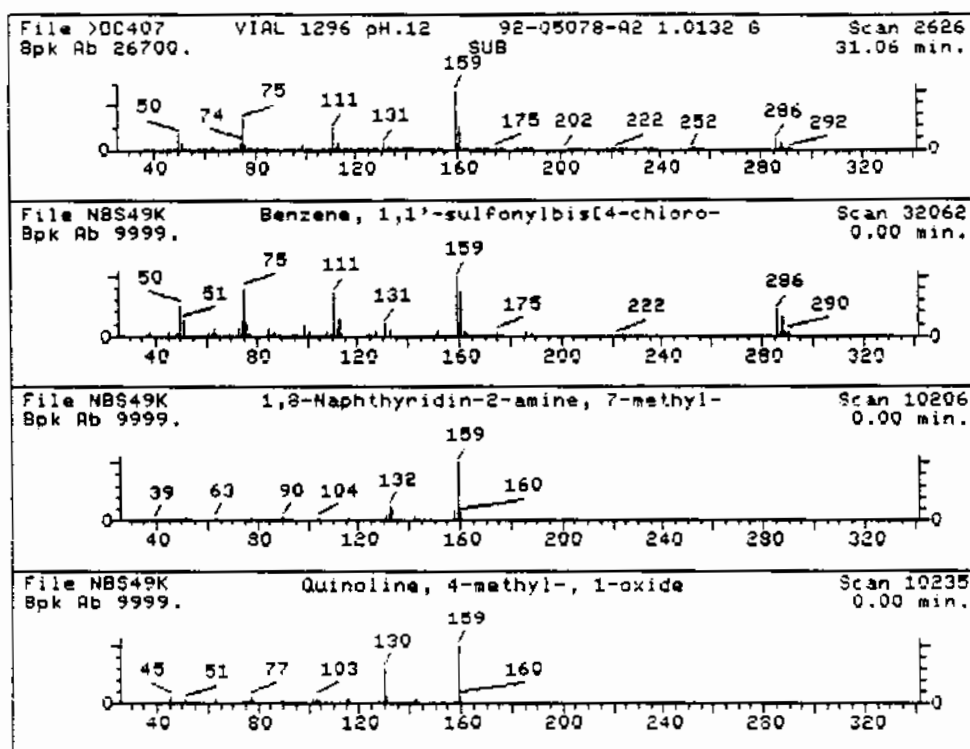
Instrument ID: BNA1 Analyzed on: 4/25/92 9:09

Retention Time: 30.83 Area: 20286 Tentative Conc: 2700.00

The unknown area is 6.75% of the nearest internal standard

This peak is less than 10% of the nearest internal standard.

No library search has been performed on this peak.



Instrument ID: BNA1 Analyzed on: 4/25/92 9:09

Result 4 in PBM results file: LDC407

Retention Time: 31.06 Area: 486363 Tentative Conc: 64000.00

The unknown area is 161.79% of the nearest internal standard

① Benzene, 1,1'-sulfonylbis[4-chloro-	286 C12H8Cl2O2S
2. 1,8-Naphthyridin-2-amine, 7-methyl-	159 C9H9N3
3. Quinoline, 4-methyl-, 1-oxide	159 C10H9NO
4. 8-Quinololinol, 7-methyl-	159 C10H9NO
5. Silane, (2-ethylbutoxy)trimethyl-	174 C9H22OSi

Sample file: >DC407 Spectrum #: 2626
Search speed: 3 Tilting option: F No. of ion ranges searched: 60

	Prob.	CAS #	CON #	ROOT	K	DK	#FLG	TILT	%	CON	C_I	R_IV
1.	93*	80079	37916	NBS49K	134	26	0	0	40	40	47	99
2.	20*	1568930	20926	NBS49K	25	70	2	0	100	54	5	14
3.	20*	4053401	20945	NBS49K	21	81	2	0	100	54	5	13
4.	20*	5541684	20931	NBS49K	23	83	3	0	100	52	5	12

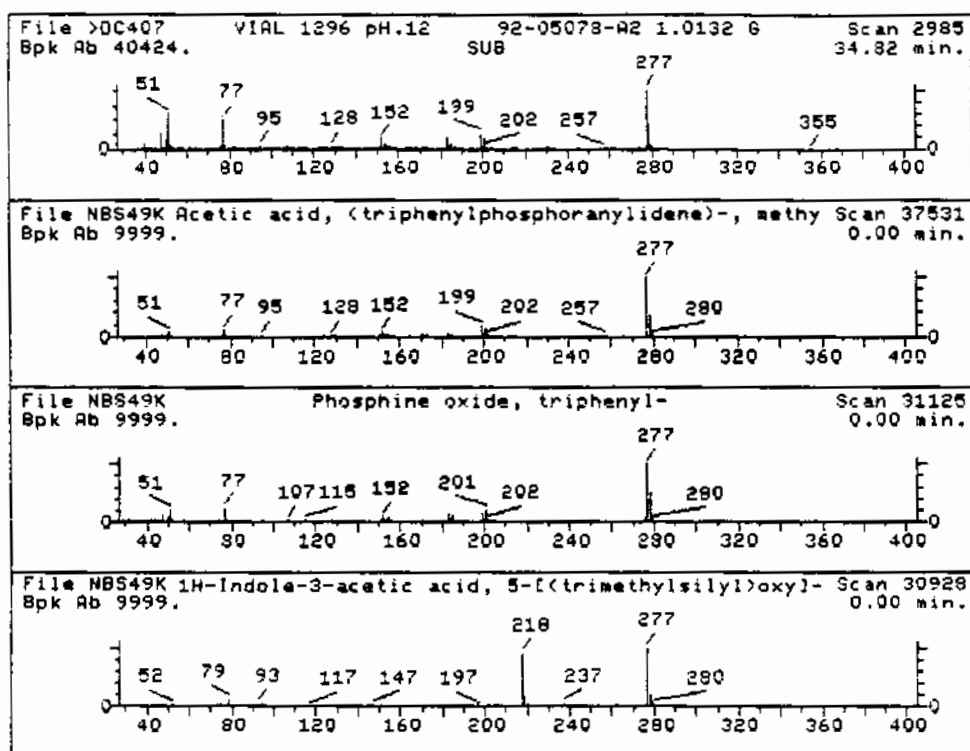
Instrument ID: BNA1 Analyzed on: 4/25/92 9:09

Retention Time: 34.13 Area: 24500 Tentative Conc: 3200.00

The unknown area is 8.15% of the nearest internal standard

This peak is less than 10% of the nearest internal standard.

No library search has been performed on this peak.



Instrument ID: BNA1 Analyzed on: 4/25/92 9:09

Result 5 in PBM results file: LDC407

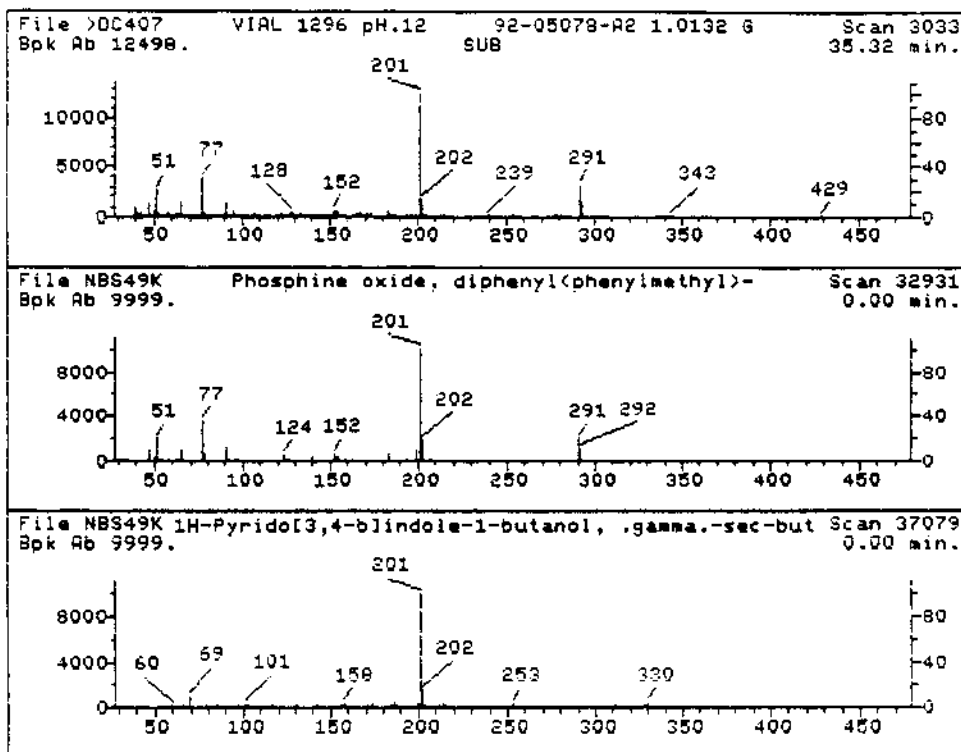
Retention Time: 34.82 Area: 3212668 Tentative Conc: 429000.00

The unknown area is 1068.7% of the nearest internal standard

1. Acetic acid, (triphenylphosphoranylidene)-, methyl ester 334 C21H19O2P
2. Phosphine oxide, triphenyl- 278 C18H15OP
3. 1H-Indole-3-acetic acid, 5-[(trimethylsilyl)oxy]-, methyl ester 277 C14H19NO3Si
4. Formaldehyde, (triphenylphosphoranylidene)hydrazone 304 C19H17N2P
5. 1,5-Dioxo-2,4,6,8-tetrasilacyclooctane, 2,2,4,4,6,6,8,8-octamethyl- 292 C10H28O2Si4

Sample file: >DC407 Spectrum #: 2985
Search speed: 3 Tilting option: F No. of ion ranges searched: 36

	Prob.	CAS #	CON #	ROOT	K	DK	#FLG	TILT	%	CON	C_I	R_IV
1.	86	2605676	37048	NBS49K	128	6	0	2	84	8	59	78
2.	83*	791286	37022	NBS49K	72	76	1	0	79	14	51	71
3.	47*	72101350	37001	NBS49K	69	68	2	-1	71	31	20	31
4.	26*	15990542	37031	NBS49K	42	109	2	1	60	40	10	12
5.	25*	15261060	37024	NBS49K	24	104	2	0	100	47	7	14



Instrument ID: BNA1 Analyzed on: 4/25/92 9:09
Result 6 in PBM results file: LDC407
Retention Time: 35.32 Area: 118396 Tentative Conc: 16000.00
The unknown area is 39.38% of the nearest internal standard

1. Phosphine oxide, diphenyl(phenylmethyl)- 292 C19H17OP
2. 1H-Pyrido[3,4-b]indole-1-butanol, .gamma.-sec-butyl- 330 C20H30N2O2
2,3,4,9-tetrahydro-6-methoxy-

Sample file: >DC407 Spectrum #: 3033
Search speed: 3 Tilting option: F No. of ion ranges searched: 123

	Prob.	CAS #	CON #	ROOT	K	DK	#FLG	TILT	%	CON	C_I	R_IV
1.	73*	2959742	27977	NBS49K	90	38	2	0	79	25	32	69
2.	29*	14426665	27990	NBS49K	40	98	2	4	97	35	12	12

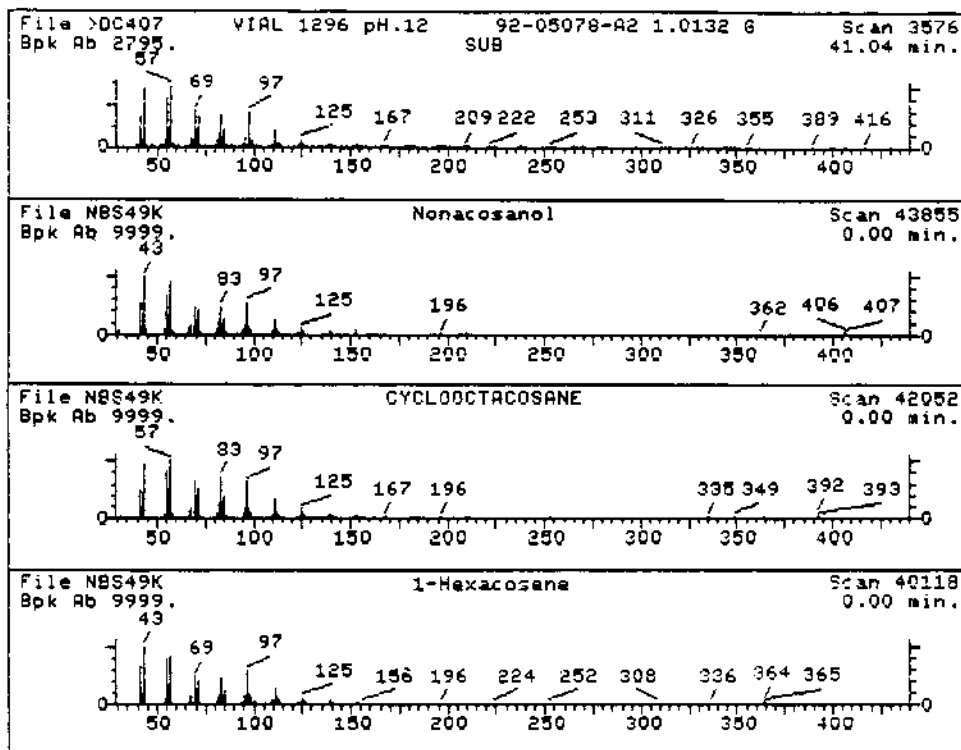
Instrument ID: BNA1 Analyzed on: 4/25/92 9:09

Retention Time: 38.90 Area: 22035 Tentative Conc: 2700.00

The unknown area is 6.80% of the nearest internal standard

This peak is less than 10% of the nearest internal standard.

No library search has been performed on this peak.



Instrument ID: BNA1 Analyzed on: 4/25/92 9:09
Result 7 in PBM results file: LDC407
Retention Time: 41.04 Area: 87671 Tentative Conc: 11000.00
The unknown area is 27.04% of the nearest internal standard

1. Nonacosanol	424 C29H600
2. CYCLOOCTACOSANE	392 C28H56
3. 1-Hexacosene	364 C26H52
4. Cyclohexane, 1-ethyl-2-propyl-	154 C11H22
5. Cyclotetradecane, 1,7,11-trimethyl-4-(1-methylethyl)	280 C20H40
6. 1-Tricosanol	340 C23H48O

Sample file: >DC407 Spectrum #: 3576
Search speed: 3 Tilting option: F No. of ion ranges searched: 118

	Prob.	CAS #	CON #	ROOT	K	DK	#FLG	TILT	%	CON	C_I	R_IU
1.	70	25154567	9375	NBS49K	116	61	2	0	78	20	32	56
2.	58	297245	9372	NBS49K	84	96	2	0	60	20	25	23
3.	58	18835331	9364	NBS49K	114	62	3	1	92	20	25	27
4.	57*	62238339	14505	NBS49K	52	50	1	4	133	22	22	29
5.	52	1786125	32676	NBS49K	83	84	2	1	70	20	20	15
6.	52	3133015	9359	NBS49K	82	87	3	0	84	20	20	15

mk alk

Instrument ID: BNA1 Analyzed on: 4/25/92 9:09

Retention Time: 43.92 Area: 21180 Tentative Conc: 2600.00

The unknown area is 6.53% of the nearest internal standard

This peak is less than 10% of the nearest internal standard.

No library search has been performed on this peak.

QUANT REPORT

Operator ID: BOB
Output File: ^DC408::OF
Data File: >DC408::D1
Name: UIAL 1296 pH.12
Misc: 92-05078-B2 1.0504 G

Quant Rev: 7 Quant Time: 920425 11:02
Injected at: 920425 10:10
Dilution Factor: 1.00000
Instrument ID: BNA1
BTL# 6

ID File: ID1BNA::QT
Title: BNA ID QUANT FILE #1 GC/MS
Last Calibration: 911003 11:18

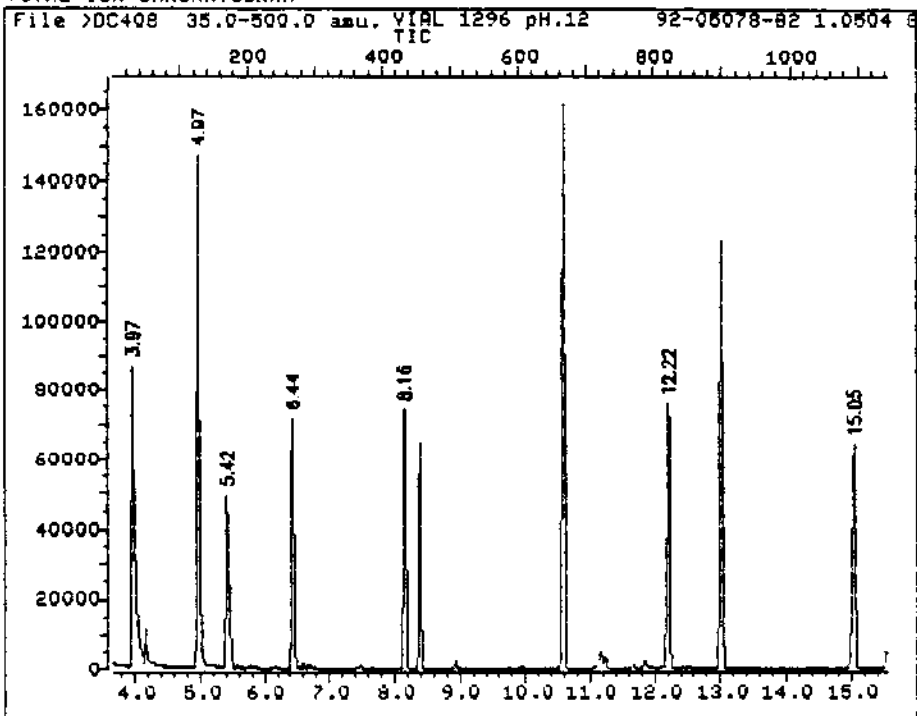
Last Qcal Date: 920424 13:55

	Compound	R.T.	Scan#	Area	Conc	Units	q
1)	*1,4-Dichlorobenzene-d4	5.42	169	21518	40.00	ng/uL	97
2)	2-Fluorophenol	3.97	30	57046	82.62	ng/uL	81
3)	Phenol-d5	4.97	126	89474	112.36	ng/uL	85
4)	Phenol	0.00	0	0	0.00	ng/uL	
5)	bis(2-Chloroethyl)ether	0.00	0	0	0.00	ng/uL	
6)	2-Chlorophenol	0.00	0	0	0.00	ng/uL	
7)	1,3-Dichlorobenzene	0.00	0	0	0.00	ng/uL	
8)	1,4-Dichlorobenzene	0.00	0	0	0.00	ng/uL	
9)	Benzyl alcohol	0.00	0	0	0.00	ng/uL	
10)	1,2-Dichlorobenzene	0.00	0	0	0.00	ng/uL	
11)	2-Methylphenol	0.00	0	0	0.00	ng/uL	
12)	bis(2-Chloroisopropyl)ether	0.00	0	0	0.00	ng/uL	
13)	4-Methylphenol	0.00	0	0	0.00	ng/uL	
14)	N-Nitroso-di-n-propylamine	0.00	267	0	0.00	ng/uL	
15)	Hexachloroethane	0.00	0	0	0.00	ng/uL	
16)	*Naphthalene-d8	8.16	432	72275	40.00	ng/uL	97
17)	Nitrobenzene-d5	6.44	267	46556	52.84	ng/uL	89
18)	Nitrobenzene	0.00	0	0	0.00	ng/uL	
19)	Isophorone	0.00	0	0	0.00	ng/uL	
20)	2-Nitrophenol	0.00	0	0	0.00	ng/uL	
21)	2,4-Dimethylphenol	0.00	0	0	0.00	ng/uL	
22)	Benzoic acid	0.00	0	0	0.00	ng/uL	
23)	bis(2-Chloroethoxy)methane	0.00	0	0	0.00	ng/uL	
24)	2,4-Dichlorophenol	0.00	0	0	0.00	ng/uL	
25)	1,2,4-Trichlorobenzene	0.00	0	0	0.00	ng/uL	
26)	Naphthalene	0.00	0	0	0.00	ng/uL	
27)	4-Chloroaniline	0.00	0	0	0.00	ng/uL	
28)	Hexachlorobutadiene	0.00	0	0	0.00	ng/uL	
29)	4-Chloro-3-methylphenol	0.00	0	0	0.00	ng/uL	
30)	2-Methylnaphthalene	0.00	0	0	0.00	ng/uL	
31)	*Acenaphthene-d10	15.05	1094	39748	40.00	ng/uL	98
32)	Hexachlorocyclopentadiene	0.00	0	0	0.00	ng/uL	
33)	2,4,6-Trichlorophenol	0.00	0	0	0.00	ng/uL	
34)	2,4,5-Trichlorophenol	0.00	0	0	0.00	ng/uL	
35)	2-Chloronaphthalene	0.00	0	0	0.00	ng/uL	
36)	2-Fluorobiphenyl	12.22	822	60437	52.33	ng/uL	98
37)	2-Nitroaniline	0.00	0	0	0.00	ng/uL	
38)	Dimethylphthalate	0.00	0	0	0.00	ng/uL	
39)	Acenaphthylene	0.00	0	0	0.00	ng/uL	
40)	2,6-Dinitrotoluene	0.00	1094	0	0.00	ng/uL	
41)	3-Nitroaniline	0.00	0	0	0.00	ng/uL	
42)	Acenaphthene	0.00	0	0	0.00	ng/uL	

43)	2,4-Dinitrophenol	0.00	0	0	0.00	ng/uL	
44)	4-Nitrophenol	0.00	0	0	0.00	ng/uL	
45)	Dibenzofuran	0.00	0	0	0.00	ng/uL	
46)	2,4-Dinitrotoluene	0.00	0	0	0.00	ng/uL	
47)	Diethylphthalate	0.00	0	0	0.00	ng/uL	
48)	4-Chlorophenyl-phenylether	0.00	0	0	0.00	ng/uL	
49)	Fluorene	0.00	0	0	0.00	ng/uL	
50)	4-Nitroaniline	0.00	0	0	0.00	ng/uL	
51)	*Phenanthrene-d10	22.36	1796	67565	40.00	ng/uL	99
52)	4,6-Dinitro-2-methylphenol	0.00	0	0	0.00	ng/uL	
53)	N-Nitrosodiphenylamine	0.00	0	0	0.00	ng/uL	
54)	2,4,6-Tribromophenol	18.97	1471	15774	62.06	ng/uL	99
55)	4-Bromophenyl-phenylether	0.00	0	0	0.00	ng/uL	
56)	Hexachlorobenzene	0.00	0	0	0.00	ng/uL	
57)	Pentachlorophenol	0.00	0	0	0.00	ng/uL	
58)	Phenanthrene	0.00	0	0	0.00	ng/uL	
59)	Anthracene	0.00	0	0	0.00	ng/uL	
60)	Di-n-butylphthalate	0.00	0	0	0.00	ng/uL	
61)	Fluoranthene	0.00	0	0	0.00	ng/uL	
62)	*Chrysene-d12	33.86	2899	72950	40.00	ng/uL	93
63)	Pyrene	0.00	0	0	0.00	ng/uL	
64)	Terphenyl-d14	30.34	2562	74150	54.07	ng/uL	91
65)	Butylbenzylphthalate	0.00	0	0	0.00	ng/uL	
66)	3,3'-Dichlorobenzidine	0.00	0	0	0.00	ng/uL	
67)	Benzo(a)anthracene	0.00	0	0	0.00	ng/uL	
68)	Chrysene	0.00	0	0	0.00	ng/uL	
69)	Bis(2-Ethylhexyl)phthalate	0.00	0	0	0.00	ng/uL	
70)	*Perylene-d12	38.24	3315	79654	40.00	ng/uL	98
71)	Di-n-octylphthalate	0.00	0	0	0.00	ng/uL	
72)	Benzo(b)fluoranthene	0.00	0	0	0.00	ng/uL	
73)	Benzo(k)fluoranthene	0.00	0	0	0.00	ng/uL	
74)	Benzo(a)pyrene	0.00	0	0	0.00	ng/uL	
75)	Indeno(1,2,3-cd)pyrene	0.00	0	0	0.00	ng/uL	
76)	Dibenz(a,h)anthracene	0.00	0	0	0.00	ng/uL	
77)	Benzo(g,h,i)perylene	0.00	0	0	0.00	ng/uL	

* Compound is ISTD

TOTAL ION CHROMATOGRAM



Data File: >DC408::D1
 Name: VIAL 1296 pH.12
 Misc: 92-05078-B2 1.0504 G

Quant Output File: ^DC408::OF
 Instrument ID: BNA1
 BTL# 6

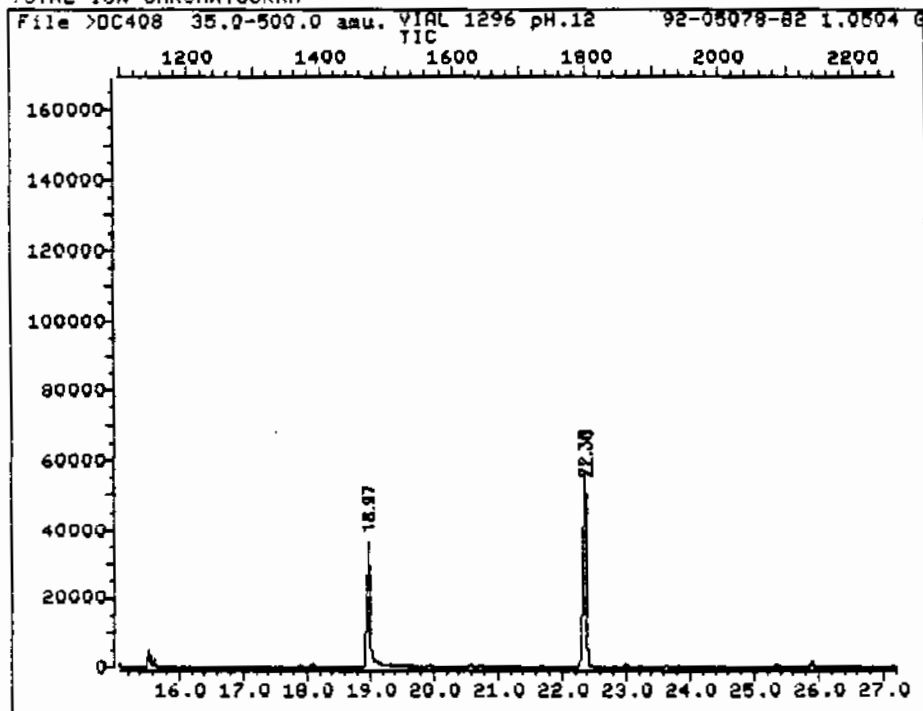
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 Title: BNA ID QUANT FILE #1 GC/MS
 Last Calibration: 911003 11:18

Last Qcal Time: 920424 13:55

Operator ID: 808
 Quant Time : 920425 11:02
 Injected at: 920425 10:10

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TOTAL ION CHROMATOGRAM



Data File: >DC408::D1
Name: VIAL 1296 pH.12
Misc: 92-05078-82 1.0504 G

Quant Output File: ^DC408::QF
Instrument ID: BNA1

BTI# 6

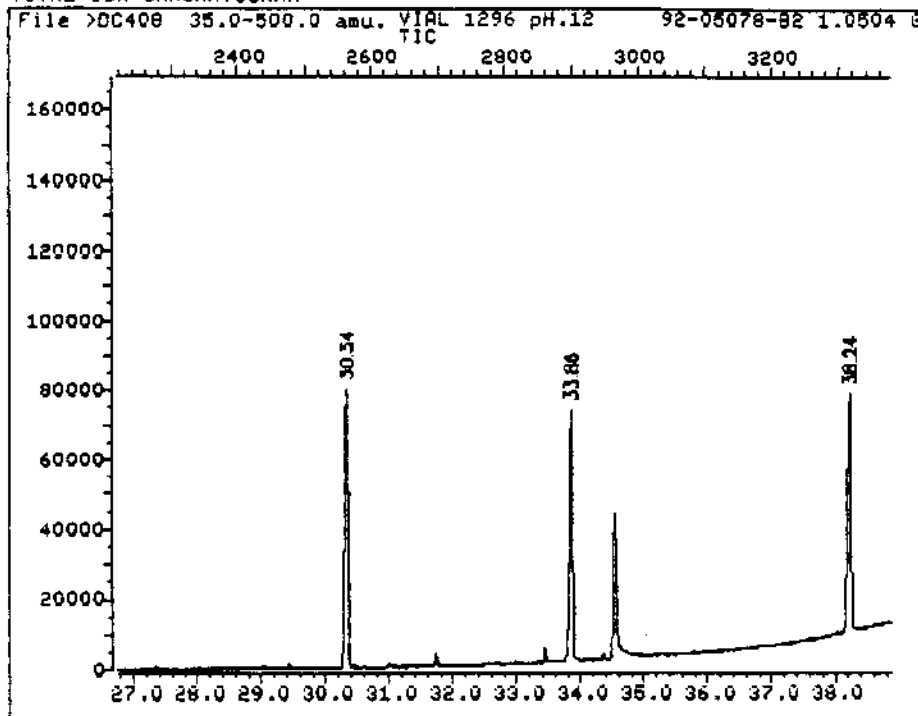
Id File: ID1BNA::QT
Title: BNA ID QUANT FILE #1 GC/MS
Last Calibration: 911003 11:19

Last Qcal Time: 920424 13:55

Operator ID: BOB
Quant Time : 920425 11:02
Injected at: 920425 10:10

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TOTAL ION CHROMATOGRAM



Data File: >DC408::D1
Name: VIAL 1296 pH.12
Misc: 92-05078-B2 1.0504 G

Quant Output File: ^DC408::OF
Instrument ID: BNA1

BTL# 6

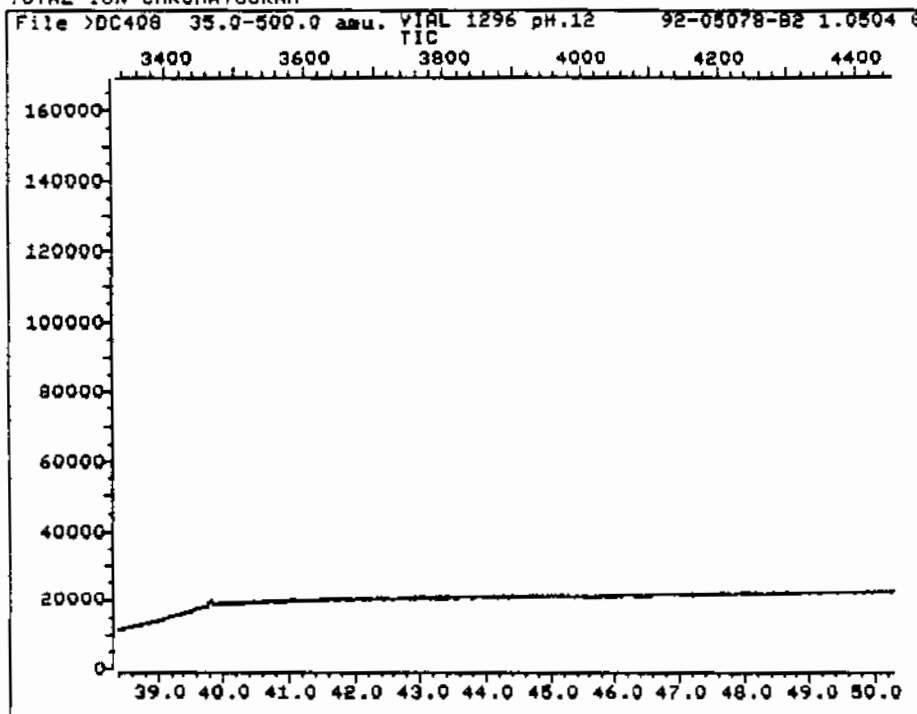
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Title: BNA ID QUANT FILE #1 GC/MS
Last Calibration: 911003 11:18

Last Qcal Time: 920424 13:55

Operator ID: BOB
Quant Time : 920425 11:02
Injected at: 920425 10:10

Page 3 of 4

TOTAL ION CHROMATOGRAM



Data File: >DC408::D1
Name: VIAL 1296 pH.12
Misc: 92-05078-B2 1.0504 G

Quant Output File: ^DC408::QF
Instrument ID: BNA1

BTL# 6

Id File: ID1BNA::QT
Title: BNA ID QUANT FILE #1 GC/MS
Last Calibration: 911003 11:18

Last Qcal Time: 920424 13:55

Operator ID: BOB
Quant Time : 920425 11:02
Injected at: 920425 10:10

Page 4 of 4

[GC/MS OPERATOR REPORT]

[GC/MS LAB SEMIVOLATILES]

[INTERNAL STANDARD CHECK REPORT]

SAMPLE FILE = >DC408
 CAL CHECK FILE = >DC402
 DATE AND TIME OF ANALYSIS = 4/25/92 10:10
 MISCELLANEOUS = 92-05078-B2 1.0504 G
 METHOD = BNAME1
 INSTRUMENT = BNA1
 OPERATOR = BOB SUPER GRP

I. Areas

Name of the BNA Internal Standard	The Sample ISTD Area	Daily Check ISTD Area	Daily Check ISTD Area / 2	Daily Check ISTD Area x 2	Status of the Sample ISTD Area Precision
1,4-Dichlorobenz-d4	21518	24890	12445	49780	OK
Naphthalene-d8	72275	87937	43969	175874	OK
Acenaphthene-d10	39748	47070	23535	94140	OK
Phenanthrene-d10	67565	81388	40694	162776	OK
Chrysene-d12	72950	81856	40928	163712	OK
Perylene-d12	79654	90335	45168	180670	OK

II. Retention Times

Name of the BNA Internal Standard	The Sample ISTD R.Time	Daily Check ISTD R.Time	Daily Check ISTD RT - 0.5	Daily Check ISTD RT + 0.5	Status of the Sample ISTD R.T. Precision
1,4-Dichlorobenz-d4	5.42	5.41	4.91	5.91	OK
Naphthalene-d8	8.16	8.17	7.67	8.67	OK
Acenaphthene-d10	15.05	15.05	14.55	15.55	OK
Phenanthrene-d10	22.36	22.38	21.88	22.88	OK
Chrysene-d12	33.86	33.88	33.38	34.38	OK
Perylene-d12	38.24	38.25	37.75	38.75	OK

[GC/MS OPERATOR REPORT]

[GC/MS LAB SEMI-VOLATILES]

[Preliminary Surrogate Report]

DATA FILE NAME = >DC408::01
 DATE AND TIME OF ANALYSIS = 4/25/92 10:10
 SAMPLE = VIAL 1296 pH.12
 MISCELLANEOUS = 92-05079-B2 1.0504 G
 METHOD = BNAME1
 INSTRUMENT = BNA1
 OPERATOR = BOB SUPER GRP

SURROGATE	AS FOUND IN SAMPLE	WAS SPIKED AT	WATER LIMITS	SOIL LIMITS	% RECOVERY
-----	-----	-----	-----	-----	-----
2-Fluorophenol	82.62	100.00	21-100	25-121	82.62
Phenol-d5	112.36	100.00	10-94	24-113	112.36
Nitrobenzene-d5	52.83	50.00	35-114	23-120	105.67
2-Fluorobiphenyl	52.33	50.00	43-116	30-115	104.67
2,4,6-tribromo- phenol	62.06	100.00	10-123	19-122	62.06
Terphenyl-d14	54.07	50.00	33-141	18-137	108.15

MS data file header from : >DC408::D1

Sample: VIAL 1296 pH.12 Operator: BOB SUPER GRP. 4/25/92 10:10
 Misc : 92-05078-B2 1.0504 G BTL# 6
 Sys. #: 1 MS model: 70 SW/HW rev.: LF ALS #: 6 Equip ID: BNA1
 Method file: BNAME1 Tuning file: MTBNA1 No. of extra records: 2
 Source temp.: N/A Analyzer temp.: N/A Transfer line temp.: 0

Chromatographic temperatures : 40. 100. 190. 300. 0.
 Chromatographic times, min. : 1.5 .5 .5 12.0 0.0
 Chromatographic rate, deg/min: 30.0 4.5 8.0 .5 0.0

>DC408 VIAL 1296 pH.12 92-05078-B2 1.0504 G
 35.01 500.0 CLP TIC
 Upslope: .2000 Area Reject: 15382. Max Peaks: 6 Bunch: -1 Valley >100 %
 Dnslope: 0.0000 Results File IDC408 Sorted by Time/Area INT

Peak #	R.T. min.	first scan	max scan	last scan	peak height	raw area	corr. area	corr. % max.	% of total
1	4.17	46	49	59	9791	30962	18398	4.39	1.71
2	8.40	446	455	462	64114	131833	130143	31.04	12.10
3	10.60	655	666	675	161758	421780	419226	100.00	39.00
4	11.17	709	721	724	4656	18843	15454	3.69	1.43
5	13.02	888	899	905	123193	339675	337919	80.61	31.43
6	34.54	2957	2964	2992	41159	222409	153785	36.68	14.30

Sum of corrected areas: 1074925.

Summary of Unknowns PBM Library Search and Quantitation

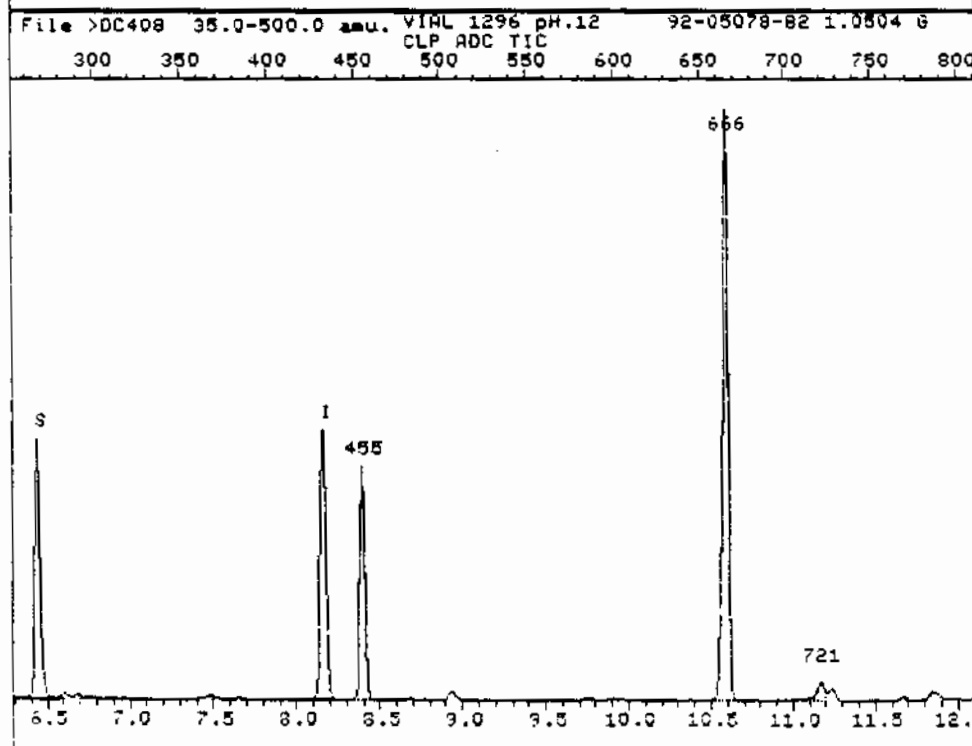
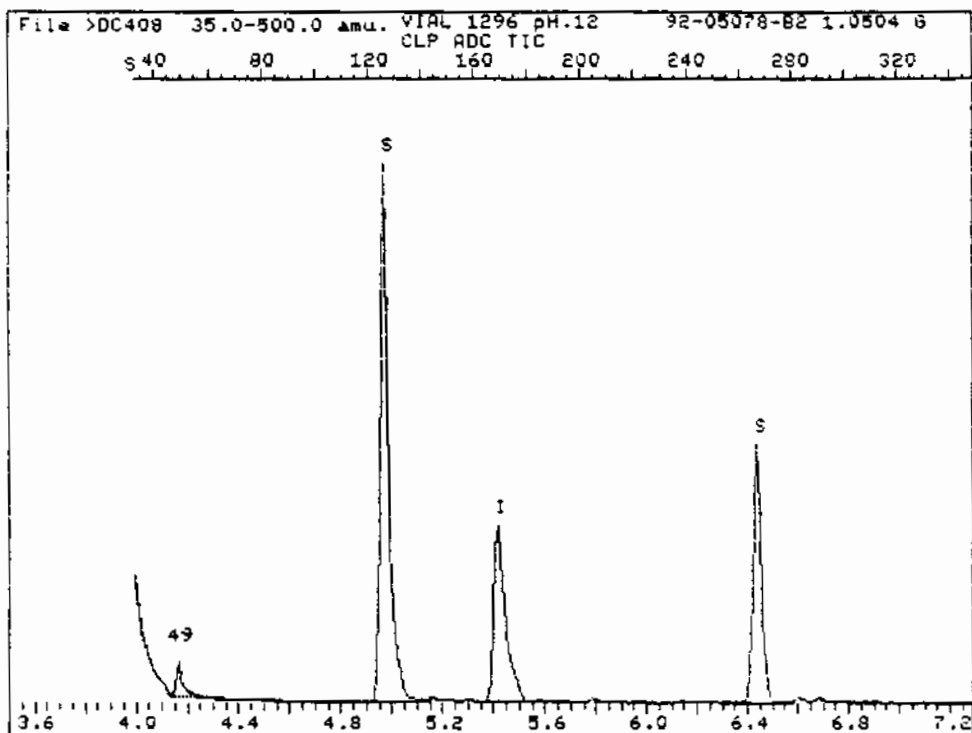
Standard	Concentration	Area	Retention Time	Unknown Window
1	40.0	153818.	5.42	4.00 - 6.79
2	40.0	184864.	8.16	6.79 - 11.61
3	40.0	211539.	15.05	11.61 - 18.71
4	40.0	212118.	22.36	18.71 - 28.11
5	40.0	243387.	33.86	28.11 - 36.05
6	40.0	240770.	38.24	36.05 - 50.29

Dilution Factor = 1.00 This sample was 1.05040 g or mL

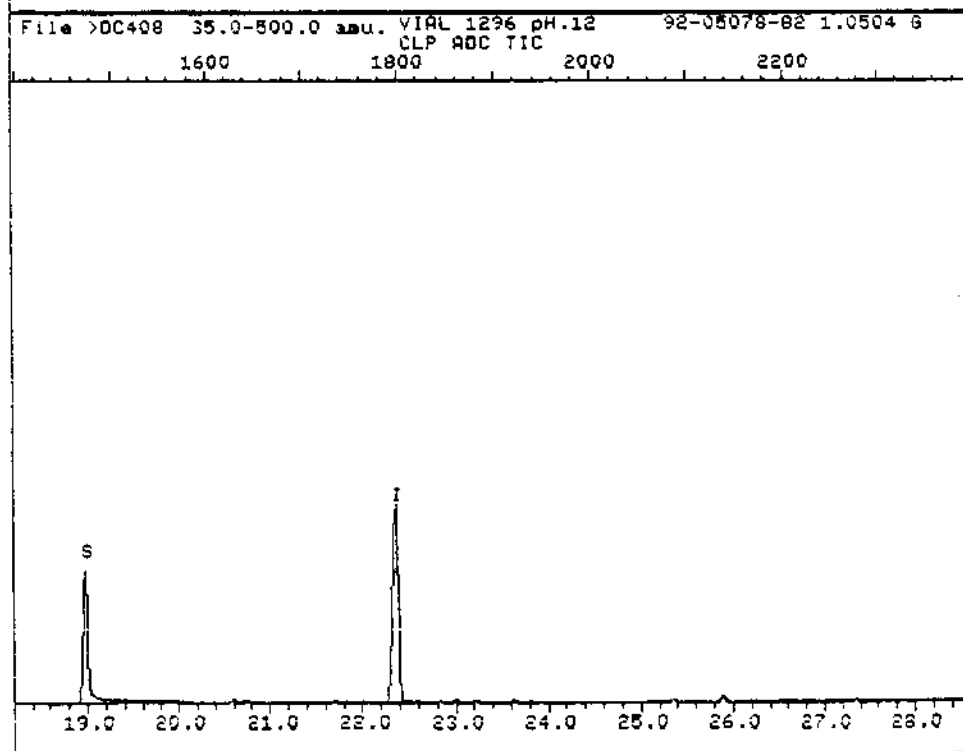
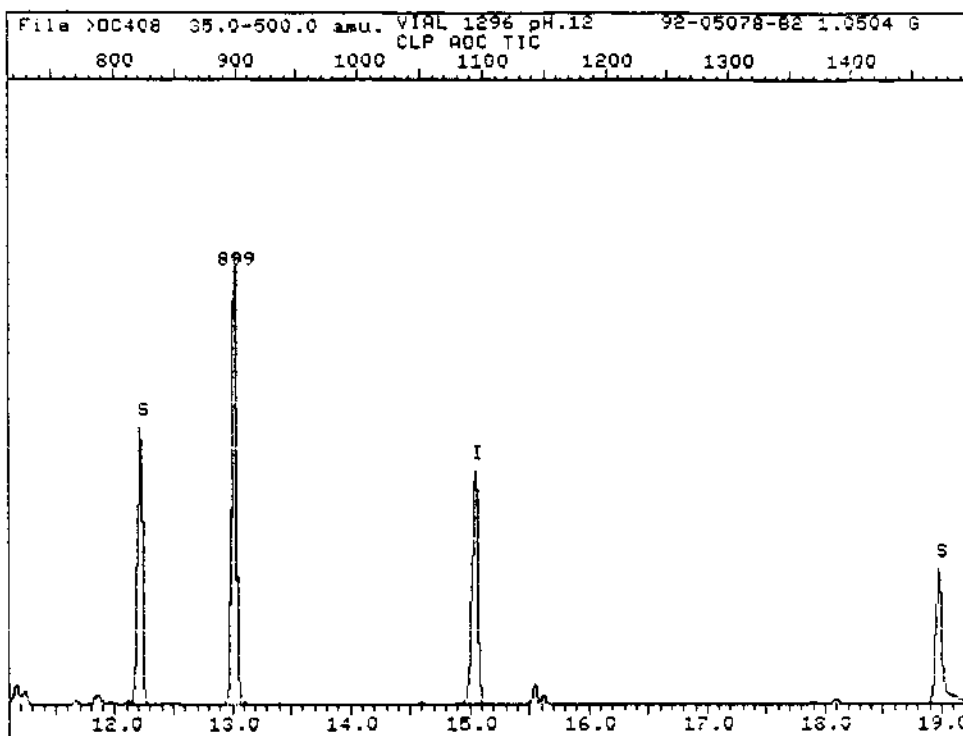
Correction Factor = 952.97

Unknown Concentration = $\frac{(\text{Conc Int Std} * \text{Area Unknown})}{(\text{Area Int Std})} * \text{Correction Factor}$

3:22 PM MON., 27 APR., 1992

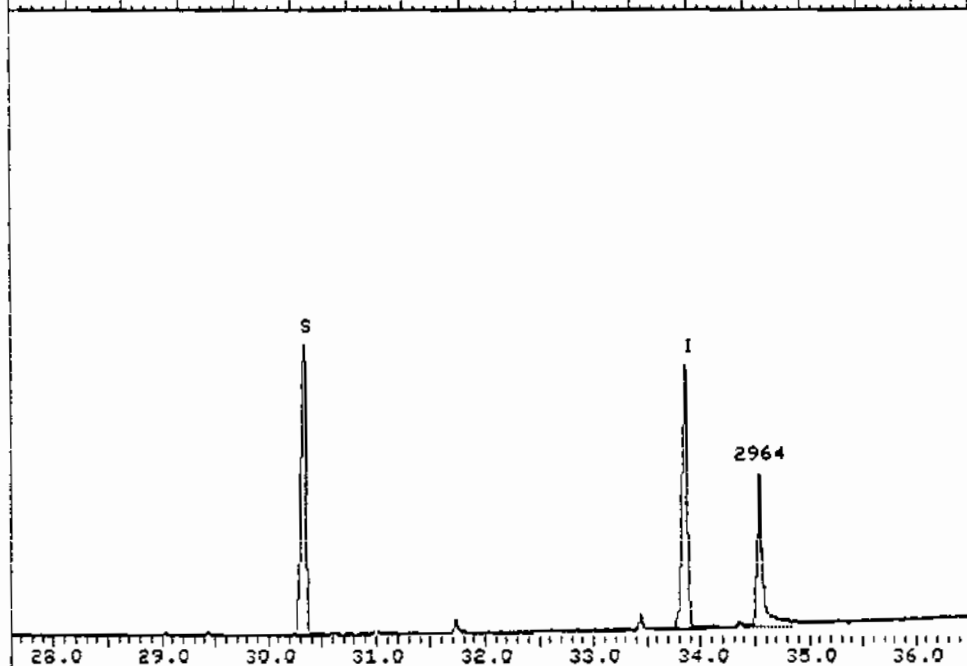


Instrument ID: BNA1 Analyzed on: 4/25/92 10:10

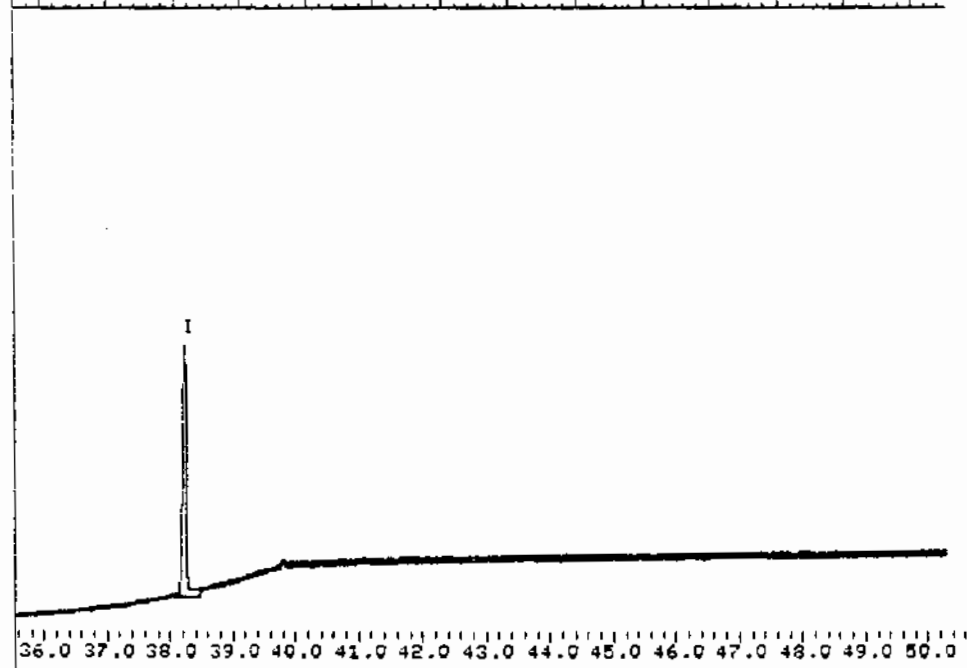


Instrument ID: BNA1 Analyzed on: 4/25/92 10:10

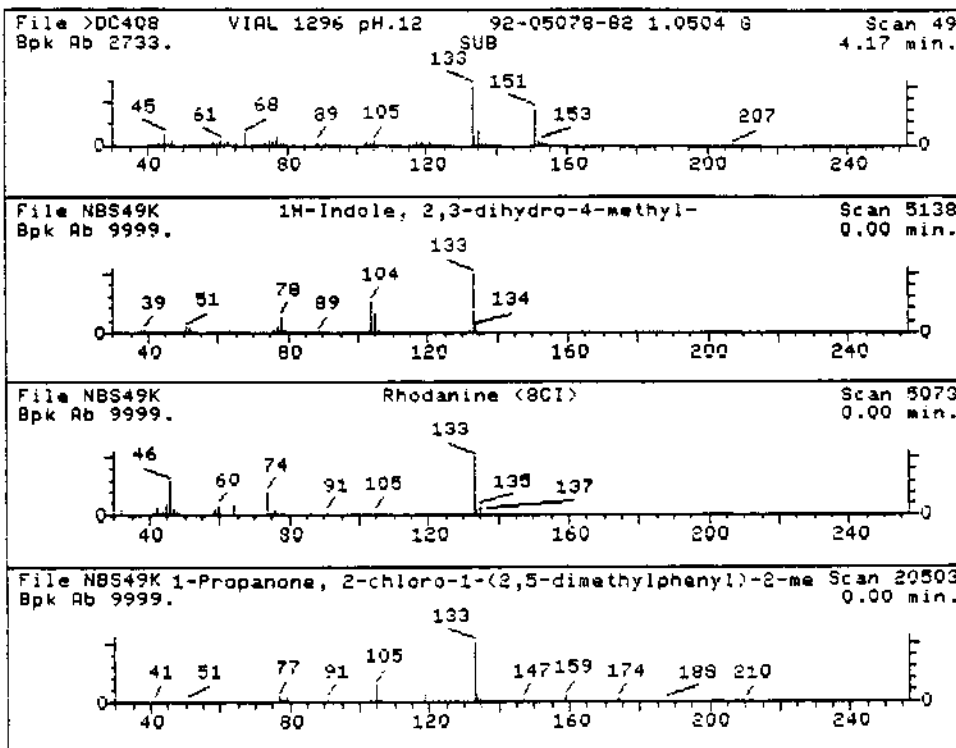
File >DC408 35.0-500.0 amu. VIAL 1296 pH.12 92-05078-B2 1.0504 B
CLP ADC TIC



File >DC408 35.0-500.0 amu. VIAL 1296 pH.12 92-05078-B2 1.0504 B
CLP ADC TIC



Instrument ID: BNA1 Analyzed on: 4/25/92 10:10



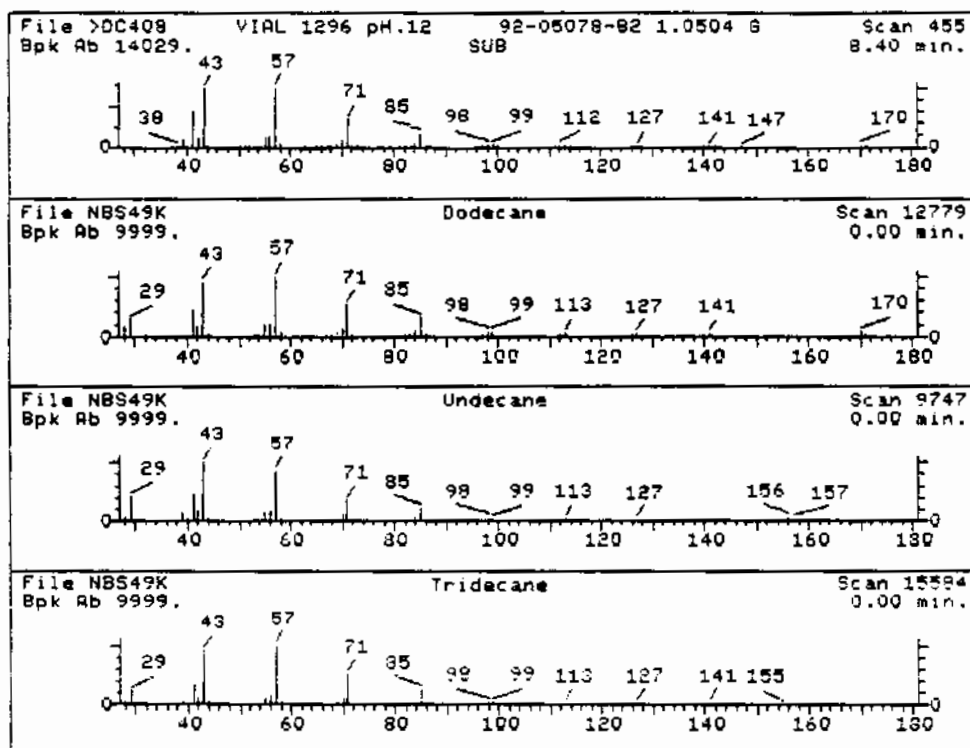
Instrument ID: BNA1 Analyzed on: 4/25/92 10:10
Result 1 in PBM results file: LOC408
Retention Time: 4.17 Area: 18398 Tentative Conc: 4600.00
The unknown area is 11.96% of the nearest internal standard

1. 1H-Indole, 2,3-dihydro-4-methyl-	133 C9H11N
2. Rhodanine (8CI)	133 C3H3NOS2
3. 1-Propanone, 2-chloro-1-(2,5-dimethylphenyl)-2-methyl-	210 C12H15ClO
4. 1-Propanone, 2-chloro-1-(4-ethylphenyl)-2-methyl-	210 C12H15ClO
5. Benzene, 1,4-dipropyl-	162 C12H18
6. 1H-Benzotriazole, 5-methyl-	133 C7H7N3

Sample file: >DC408 Spectrum #: 49
Search speed: 3 Tilting option: F No. of ion ranges searched: 53

	Prob.	CAS #	CON #	ROOT	K	DK	#FLG	TILT	%	CON	C_I	R_IU
1.	25*	62108161	16082	NBS49K	40	51	2	2	100	48	7	13
2.	25*	141844	16060	NBS49K	33	79	3	0	100	48	7	13
3.	25*	54965525	16147	NBS49K	27	85	2	0	100	50	7	14
4.	24*	55012696	16149	NBS49K	44	51	2	0	100	53	7	22
5.	20	4815570	16110	NBS49K	44	48	2	0	100	53	5	12
6.	20*	136856	16068	NBS49K	35	41	2	0	100	51	5	17

unk

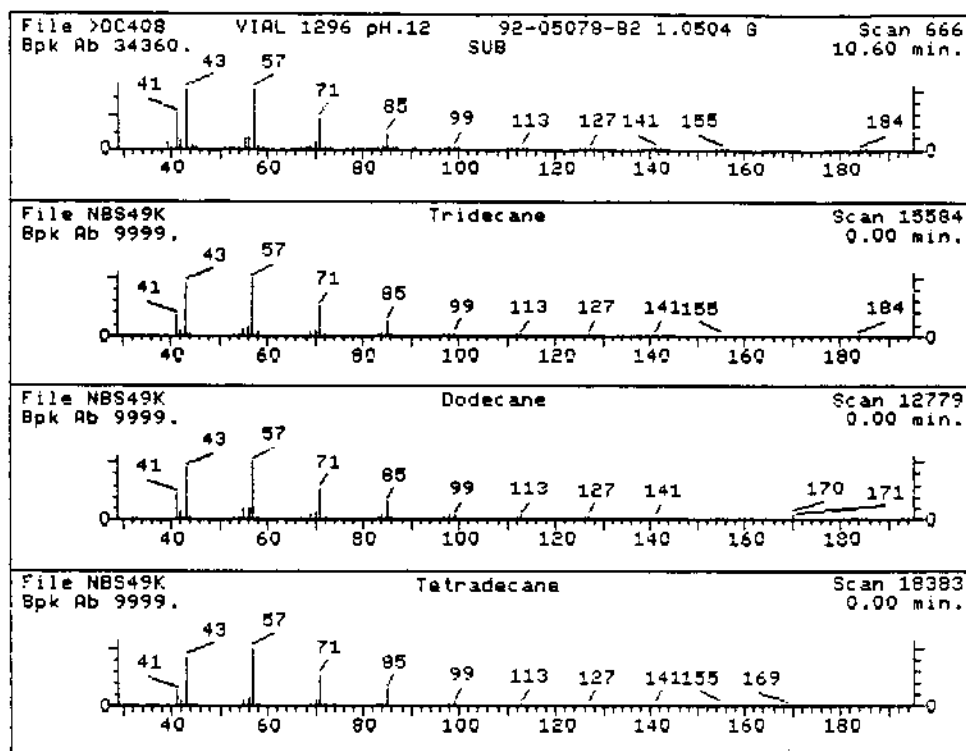


Instrument ID: BNA1 Analyzed on: 4/25/92 10:10
Result 2 in PBM results file: LDC408
Retention Time: 8.40 Area: 130143 Tentative Conc: 27000.00
The unknown area is 70.40% of the nearest internal standard

1. Dodecane	170 C12H26
2. Undecane	156 C11H24
3. Tridecane	184 C13H28
4. Tetradecane	198 C14H30
5. Pentadecane	212 C15H32
6. Heptadecane, 2,6,10,14-tetramethyl-	296 C21H44

Sample file: >DC408 Spectrum #: 455
Search speed: 3 Tilting option: F No. of ion ranges searched: 59

	Prob.	CAS #	CON #	ROOT	K	DK	#FLG	TILT	%	CON	C_I	R_IV
1.	96*	112403	6732	NBS49K	99	0	0	4	86	0	72	94
2.	87	1120214	6682	NBS49K	81	16	1	0	87	1	63	42
3.	83	629505	6761	NBS49K	87	19	2	3	92	2	57	27
4.	83	629594	6804	NBS49K	87	21	2	4	97	2	57	27
5.	83	629629	6819	NBS49K	92	28	2	4	72	4	57	27
6.	78	18344371	6880	NBS49K	68	61	2	0	73	2	55	15



Instrument ID: BNA1 Analyzed on: 4/25/92 10:10
Result 3 in PBM results file: LDC408
Retention Time: 10.60 Area: 419226 Tentative Conc: 86000.00
The unknown area is 226.78% of the nearest internal standard

1. Tridecane	184 C13H28
2. Dodecane	170 C12H26
3. Tetradecane	198 C14H30
4. Decane, 6-ethyl-2-methyl-	184 C13H28
5. Eicosane	282 C20H42
6. Heptadecane, 2,6,10,14-tetramethyl-	296 C21H44

Sample file: >DC408 Spectrum #: 666
Search speed: 3 Tilting option: F No. of ion ranges searched: 64

	Prob.	CAS #	CON #	ROOT	K	DK	#FLG	TILT	%	CON	C_I	R_IU
1.	95*	629505	6761	NBS49K	83	23	0	0	68	1	72	95
2.	88	112403	6732	NBS49K	92	7	1	4	87	4	65	53
3.	86	629594	6804	NBS49K	97	11	2	3	100	1	60	32
4.	83	62108218	6767	NBS49K	66	33	2	0	99	5	57	23
5.	78	112958	6871	NBS49K	82	57	2	4	76	4	55	14
6.	78	18344371	6880	NBS49K	68	61	2	0	79	2	55	15

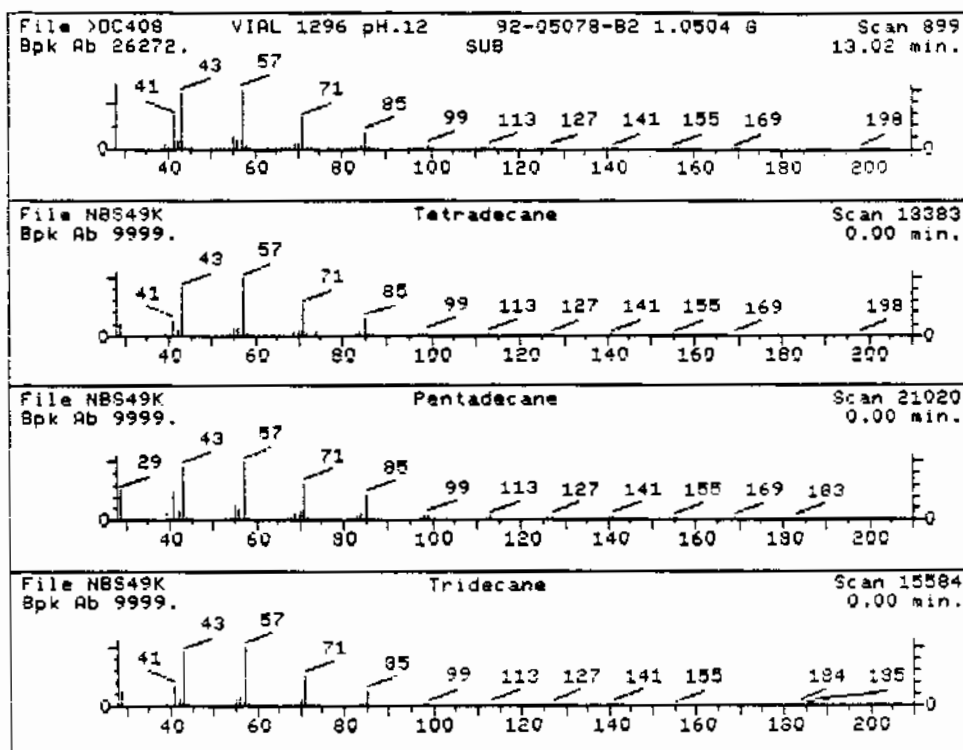
Instrument ID: BNA1 Analyzed on: 4/25/92 10:10

Retention Time: 11.17 Area: 15454 Tentative Conc: 3200.00

The unknown area is 9.36% of the nearest internal standard

This peak is less than 10% of the nearest internal standard.

No library search has been performed on this peak.

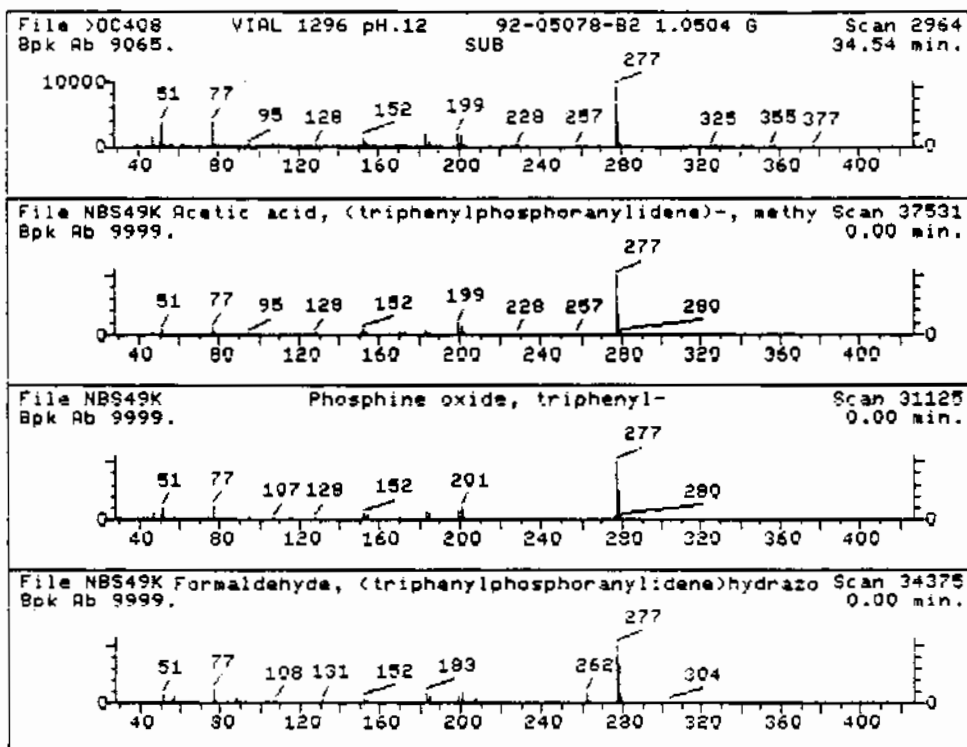


Instrument ID: BNA1 Analyzed on: 4/25/92 10:10
Result 4 in PBM results file: LDC408
Retention Time: 13.02 Area: 337919 Tentative Conc: 61000.00
The unknown area is 159.74% of the nearest internal standard

1. Tetradecane	198 C14H30
2. Pentadecane	212 C15H32
3. Tridecane	184 C13H28
4. Decane, 6-ethyl-2-methyl-	184 C13H28
5. Tritetracontane	604 C43H88
6. Eicosane	282 C20H42

Sample file: >DC408 Spectrum #: 899
Search speed: 3 Tilting option: F No. of ion ranges searched: 67

	Prob.	CAS #	CON #	ROOT	K	DK	#FLG	TILT	%	CON	C_I	R_IV
1.	94*	629594	6804	NBS49K	98	10	1	1	95	0	72	92
2.	86	629629	6819	NBS49K	98	22	2	4	85	4	60	33
3.	83	629505	6761	NBS49K	87	19	2	2	94	2	57	27
4.	83	62108218	6767	NBS49K	68	31	2	0	100	5	57	24
5.	78	7098217	6916	NBS49K	76	98	2	4	90	4	55	12
6.	78	112958	6871	NBS49K	88	51	2	4	85	4	55	18



Instrument ID: BNA1 Analyzed on: 4/25/92 10:10
Result 5 in PBM results file: LDC408
Retention Time: 34.54 Area: 153785 Tentative Conc: 24000.00
The unknown area is 63.19% of the nearest internal standard

1. Acetic acid, (triphenylphosphoranylidene)-, methyl ester 334 C21H19O2P
- ② 2. Phosphine oxide, triphenyl- 278 C19H15OP
3. Formaldehyde, (triphenylphosphoranylidene)hydrazo 304 C19H17N2P
4. 1H-Indole-3-acetic acid, 5-[(trimethylsilyl)oxyl]-, methyl ester 277 C14H19NO3Si
5. 1,5-Dioxo-2,4,6,8-tetrasilacyclooctane, 2,2,4,4,6,6,8,8-octamethyl- 292 C10H28O2Si4

Sample file: >DC408 Spectrum #: 2964
Search speed: 3 Tilting option: F No. of ion ranges searched: 37

Handwritten: NBS 4/25/92

	Prob.	CAS #	CON #	ROOT	K	DK	#FLG	TILT	%	CON	C_I	R_IV
1.	84	2605676	37048	NBS49K	110	24	0	1	97	8	55	66
② 2.	78*	791286	37022	NBS49K	113	35	1	1	62	34	40	80
3.	41*	15990542	37031	NBS49K	63	88	3	1	61	34	16	24
4.	41*	72101350	37001	NBS49K	69	68	2	-1	100	42	14	31
5.	25*	15261060	37024	NBS49K	29	99	2	0	100	47	7	14

Handwritten: B1

QUANT REPORT

Operator ID: 808
Output File: ^DC409::OF
Data File: >DC409::D1
Name: VIAL 1203 pH.12
Misc: 92-05085-2 1.0656 G

Quant Rev: 7 Quant Time: 920425 12:02
Injected at: 920425 11:10
Dilution Factor: 1.00000
Instrument ID: BNA1
BTL# 7

ID File: ID1BNA::QT
Title: BNA ID QUANT FILE #1 GC/MS
Last Calibration: 911003 11:18

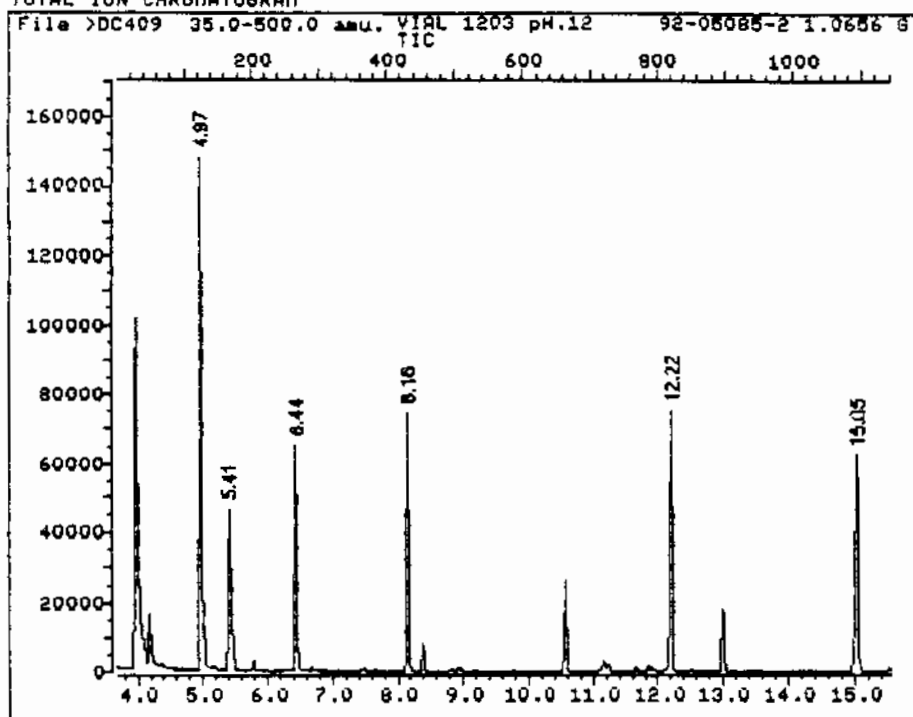
Last Qual Date: 920424 13:55

	Compound	R.T.	Scan#	Area	Conc	Units	q
1)	*1,4-Dichlorobenzene-d4	5.41	166	20866	40.00	ng/uL	97
2)	2-Fluorophenol	0.00	28	63890	8	95.12 ng/uL	
3)	Phenol-d5	4.97	124	89596	116.03	ng/uL	82
4)	Phenol	0.00	0	0	0.00	ng/uL	
5)	bis(2-Chloroethyl)ether	0.00	0	0	0.00	ng/uL	
6)	2-Chlorophenol	0.00	0	0	0.00	ng/uL	
7)	1,3-Dichlorobenzene	0.00	0	0	0.00	ng/uL	
8)	1,4-Dichlorobenzene	0.00	0	0	0.00	ng/uL	
9)	Benzyl alcohol	0.00	0	0	0.00	ng/uL	
10)	1,2-Dichlorobenzene	0.00	0	0	0.00	ng/uL	
11)	2-Methylphenol	0.00	0	0	0.00	ng/uL	
12)	bis(2-Chloroisopropyl)ether	0.00	0	0	0.00	ng/uL	
13)	4-Methylphenol	0.00	0	0	0.00	ng/uL	
14)	N-Nitroso-di-n-propylamine	0.00	265	0	0.00	ng/uL	
15)	Hexachloroethane	0.00	0	0	0.00	ng/uL	
16)	*Naphthalene-d8	8.16	430	69098	40.00	ng/uL	97
17)	Nitrobenzene-d5	6.44	265	45409	53.90	ng/uL	87
18)	Nitrobenzene	0.00	0	0	0.00	ng/uL	
19)	Isophorone	0.00	0	0	0.00	ng/uL	
20)	2-Nitrophenol	0.00	0	0	0.00	ng/uL	
21)	2,4-Dimethylphenol	0.00	0	0	0.00	ng/uL	
22)	Benzoic acid	0.00	0	0	0.00	ng/uL	
23)	bis(2-Chloroethoxy)methane	0.00	0	0	0.00	ng/uL	
24)	2,4-Dichlorophenol	0.00	0	0	0.00	ng/uL	
25)	1,2,4-Trichlorobenzene	0.00	0	0	0.00	ng/uL	
26)	Naphthalene	0.00	0	0	0.00	ng/uL	
27)	4-Chloroaniline	0.00	0	0	0.00	ng/uL	
28)	Hexachlorobutadiene	0.00	0	0	0.00	ng/uL	
29)	4-Chloro-3-methylphenol	0.00	0	0	0.00	ng/uL	
30)	2-Methylnaphthalene	0.00	0	0	0.00	ng/uL	
31)	*Acenaphthene-d10	15.05	1092	38775	40.00	ng/uL	98
32)	Hexachlorocyclopentadiene	0.00	0	0	0.00	ng/uL	
33)	2,4,6-Trichlorophenol	0.00	0	0	0.00	ng/uL	
34)	2,4,5-Trichlorophenol	0.00	0	0	0.00	ng/uL	
35)	2-Chloronaphthalene	0.00	0	0	0.00	ng/uL	
36)	2-Fluorobiphenyl	12.22	820	58949	52.33	ng/uL	99
37)	2-Nitroaniline	0.00	0	0	0.00	ng/uL	
38)	Dimethylphthalate	0.00	0	0	0.00	ng/uL	
39)	Acenaphthylene	0.00	0	0	0.00	ng/uL	
40)	2,6-Dinitrotoluene	0.00	1092	0	0.00	ng/uL	
41)	3-Nitroaniline	0.00	0	0	0.00	ng/uL	
42)	Acenaphthene	0.00	0	0	0.00	ng/uL	

43)	2,4-Dinitrophenol	0.00	0	0	0.00	ng/uL	
44)	4-Nitrophenol	0.00	0	0	0.00	ng/uL	
45)	Dibenzofuran	0.00	0	0	0.00	ng/uL	
46)	2,4-Dinitrotoluene	0.00	0	0	0.00	ng/uL	
47)	Diethylphthalate	0.00	0	0	0.00	ng/uL	
48)	4-Chlorophenyl-phenylether	0.00	0	0	0.00	ng/uL	
49)	Fluorene	0.00	0	0	0.00	ng/uL	
50)	4-Nitroaniline	0.00	0	0	0.00	ng/uL	
51)	*Phenanthrene-d10	22.36	1794	66290	40.00	ng/uL	99
52)	4,6-Dinitro-2-methylphenol	0.00	0	0	0.00	ng/uL	
53)	N-Nitrosodiphenylamine	0.00	0	0	0.00	ng/uL	
54)	2,4,6-Tribromophenol	18.96	1468	8824	35.38	ng/uL	99
55)	4-Bromophenyl-phenylether	0.00	0	0	0.00	ng/uL	
56)	Hexachlorobenzene	0.00	0	0	0.00	ng/uL	
57)	Pentachlorophenol	0.00	0	0	0.00	ng/uL	
58)	Phenanthrene	0.00	0	0	0.00	ng/uL	
59)	Anthracene	0.00	0	0	0.00	ng/uL	
60)	Di-n-butylphthalate	0.00	0	0	0.00	ng/uL	
61)	Fluoranthene	0.00	0	0	0.00	ng/uL	
62)	*Chrysene-d12	33.86	2896	70734	40.00	ng/uL	94
63)	Pyrene	0.00	0	0	0.00	ng/uL	
64)	Terphenyl-d14	30.33	2559	71989	54.14	ng/uL	90
65)	Butylbenzylphthalate	0.00	0	0	0.00	ng/uL	
66)	3,3'-Dichlorobenzidine	0.00	0	0	0.00	ng/uL	
67)	Benzo(a)anthracene	0.00	0	0	0.00	ng/uL	
68)	Chrysene	0.00	0	0	0.00	ng/uL	
69)	Bis(2-Ethylhexyl)phthalate	0.00	0	0	0.00	ng/uL	
70)	*Perylene-d12	38.23	3310	75986	40.00	ng/uL	98
71)	Di-n-octylphthalate	0.00	0	0	0.00	ng/uL	
72)	Benzo(b)fluoranthene	0.00	0	0	0.00	ng/uL	
73)	Benzo(k)fluoranthene	0.00	0	0	0.00	ng/uL	
74)	Benzo(a)pyrene	0.00	0	0	0.00	ng/uL	
75)	Indeno(1,2,3-cd)pyrene	0.00	0	0	0.00	ng/uL	
76)	Dibenz(a,h)anthracene	0.00	0	0	0.00	ng/uL	
77)	Benzo(g,h,i)perylene	0.00	0	0	0.00	ng/uL	

* Compound is ISTD

TOTAL ION CHROMATOGRAM



Data File: >DC409::D1
Name: VIAL 1203 pH.12
Misc: 92-05085-2 1.0656 G

Quant Output File: ^DC409::OF
Instrument ID: BNA1

BTL# 7

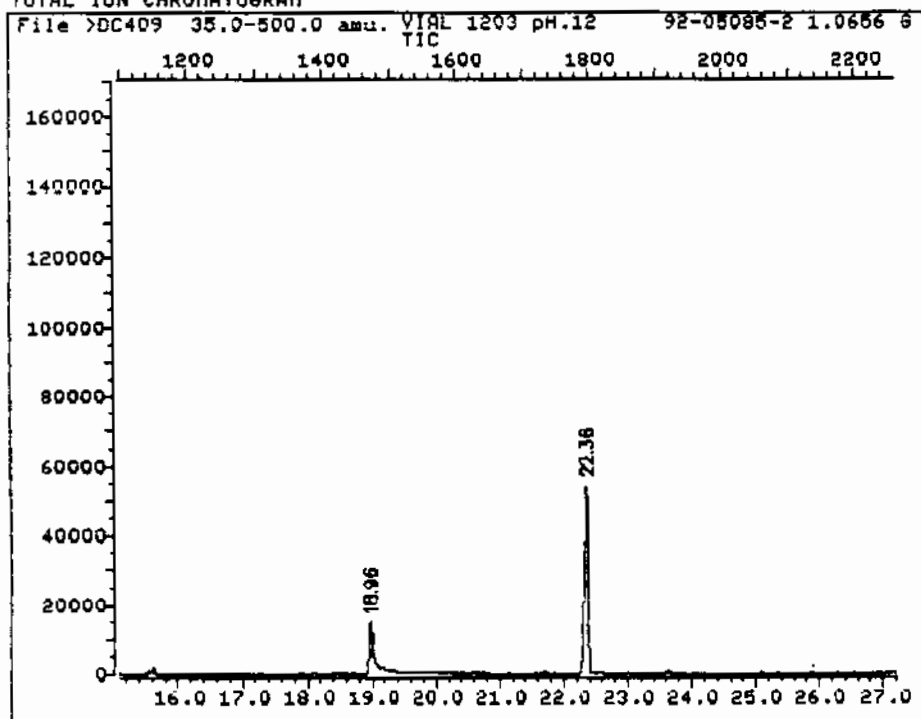
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Title: BNA ID QUANT FILE #1 GC/MS
Last Calibration: 911003 11:18

Last Qcal Time: 920424 13:55

Operator ID: BOB
Quant Time : 920425 12:02
Injected at: 920425 11:10

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TOTAL ION CHROMATOGRAM



Data File: >DC409::D1
Name: VIAL 1203 pH.12
Misc: 92-05085-2 1.0656 G

Quant Output File: ^DC409::OF
Instrument ID: BNA1

BT# 7

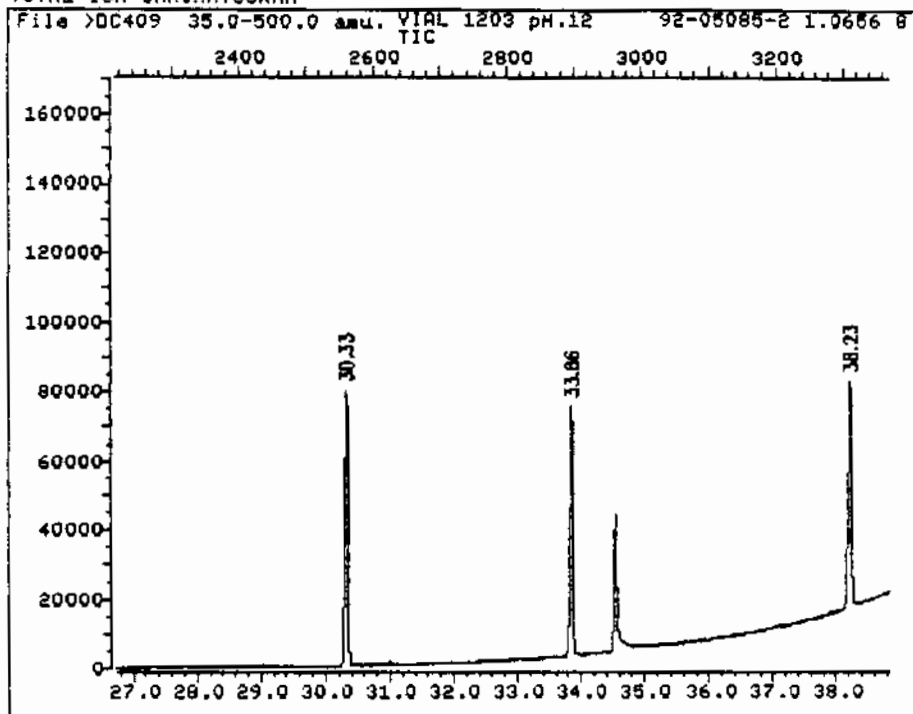
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Title: BNA ID QUANT FILE #1 GC/MS
Last Calibration: 911003 11:18

Last Qcal Time: 920424 13:55

Operator ID: BOB
Quant Time : 920425 12:02
Injected at: 920425 11:10

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TOTAL ION CHROMATOGRAM



Data File: >DC409::01
Name: VIAL 1203 pH.12
Misc: 92-05085-2 1.0656 G

Quant Output File: ^DC409::0F
Instrument ID: BNA1

STL# 7

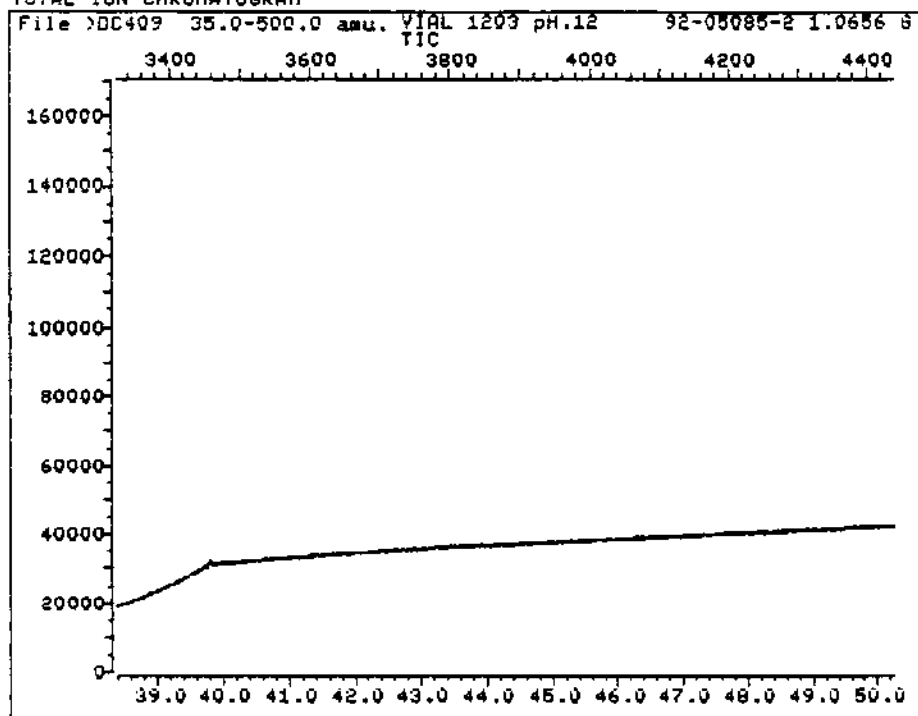
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Title: BNA ID QUANT FILE #1 GC/MS
Last Calibration: 911003 11:18

Last Qcal Time: 920424 13:55

Operator ID: BOB
Quant Time : 920425 12:02
Injected at: 920425 11:10

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TOTAL ION CHROMATOGRAM



Data File: >DC409::D1
Name: VIAL 1203 pH.12
Misc: 92-05085-2 1.0656 G

Quant Output File: ^DC409::OF
Instrument ID: BNA1

BTL# 7

Id File: ID1BNA::QT
Title: BNA ID QUANT FILE #1 GC/MS
Last Calibration: 911003 11:18

Last Qcal Time: 920424 13:55

Operator ID: BOB
Quant Time : 920425 12:02
Injected at: 920425 11:10

Page 4 of 4

[GC/MS OPERATOR REPORT]

[GC/MS LAB SEMIVOLATILES]

[INTERNAL STANDARD CHECK REPORT]

SAMPLE FILE = >DC409
 CAL CHECK FILE = >DC402
 DATE AND TIME OF ANALYSIS = 4/25/92 11:10
 MISCELLANEOUS = 92-05085-2 1.0656 G
 METHOD = BNAME1
 INSTRUMENT = BNA1
 OPERATOR = BOB SUPER GRP

I. Areas

Name of the BNA Internal Standard	The Sample ISTD Area	Daily Check ISTD Area	Daily Check ISTD Area / 2	Daily Check ISTD Area x 2	Status of the Sample ISTD Area Precision
1,4-Dichlorobenz-d4	20866	24890	12445	49780	OK
Naphthalene-d8	69098	87937	43969	175874	OK
Acenaphthene-d10	38775	47070	23535	94140	OK
Phenanthrene-d10	66290	81388	40694	162776	OK
Chrysene-d12	70734	81856	40928	163712	OK
Perylene-d12	75986	90335	45168	180670	OK

II. Retention Times

Name of the BNA Internal Standard	The Sample ISTD R.Time	Daily Check ISTD R.Time	Daily Check ISTD RT - 0.5	Daily Check ISTD RT + 0.5	Status of the Sample ISTD R.T. Precision
1,4-Dichlorobenz-d4	5.41	5.41	4.91	5.91	OK
Naphthalene-d8	8.16	8.17	7.67	8.67	OK
Acenaphthene-d10	15.05	15.05	14.55	15.55	OK
Phenanthrene-d10	22.36	22.38	21.88	22.88	OK
Chrysene-d12	33.86	33.88	33.38	34.38	OK
Perylene-d12	38.23	38.25	37.75	38.75	OK

[GC/MS OPERATOR REPORT]

[GC/MS LAB SEMIVOLATILES]

[Preliminary Surrogate Report]

DATA FILE NAME = >DC409::01
 DATE AND TIME OF ANALYSIS = 4/25/92 11:10
 SAMPLE = UIAL 1203 pH.12
 MISCELLANEOUS = 92-05085-2 1.0656 G
 METHOD = BNAME1
 INSTRUMENT = BNA1
 OPERATOR = BOB SUPER GRP

SURROGATE	AS FOUND IN SAMPLE	WAS SPIKED AT	WATER LIMITS	SOIL LIMITS	% RECOVERY
2-Fluorophenol	~~95.42~~ 0.00	100.00	21-100	25-121	~~95.42~~ 0.00
Phenol-d5	116.03	100.00	10-94	24-113	116.03
Nitrobenzene-d5	53.90	50.00	35-114	23-120	107.81
2-Fluorobiphenyl	52.33	50.00	43-116	30-115	104.65
2,4,6-tribromo- phenol	35.39	100.00	10-123	19-122	35.39
Terphenyl-d14	54.14	50.00	33-141	18-137	108.28

MS data file header from : >DC409::D1

Sample: UIAL 1203 pH.12 Operator: BOB SUPER GRP. 4/25/92 11:10
 Misc : 92-05085-2 1.0656 G BTL# 7
 Sys. #: 1 MS model: 70 SW/HW rev.: LF ALS # : 7 Equip ID: BNA1
 Method file: BNAME1 Tuning file: MTBNA1 No. of extra records: 2
 Source temp.: N/A Analyzer temp.: N/A Transfer line temp.: 0

Chromatographic temperatures : 40. 100. 190. 300. 0.
 Chromatographic times, min. : 1.5 .5 .5 12.0 0.0
 Chromatographic rate, deg/min: 30.0 4.5 8.0 .5 0.0

>DC409 UIAL 1203 pH.12 92-05085-2 1.0656 G
 35.01 500.0 CLP TIC
 Upslope: .2000 Area Reject: 15036. Max Peaks: 5 Bunch: -1 Valley >100 %
 Dnslope: 0.0000 Results File IDC409 Sorted by Time/Area INT

Peak #	R.T. min.	first scan	max scan	last scan	peak height	raw area	corr. area	corr. % max.	% of total
1	4.18	45	48	62	14504	52862	31504	22.19	10.719
2	8.39	445	452	458	8278	19909	18074	12.73	6.150
3	10.57	649	662	668	25935	61199	58635	41.31	19.951
4	13.00	887	895	904	18116	45656	43733	30.81	14.880
5	34.54	2954	2961	2978	39354	217599	141955	100.00	48.300

Sum of corrected areas: 293901.

Summary of Unknowns PBM Library Search and Quantitation

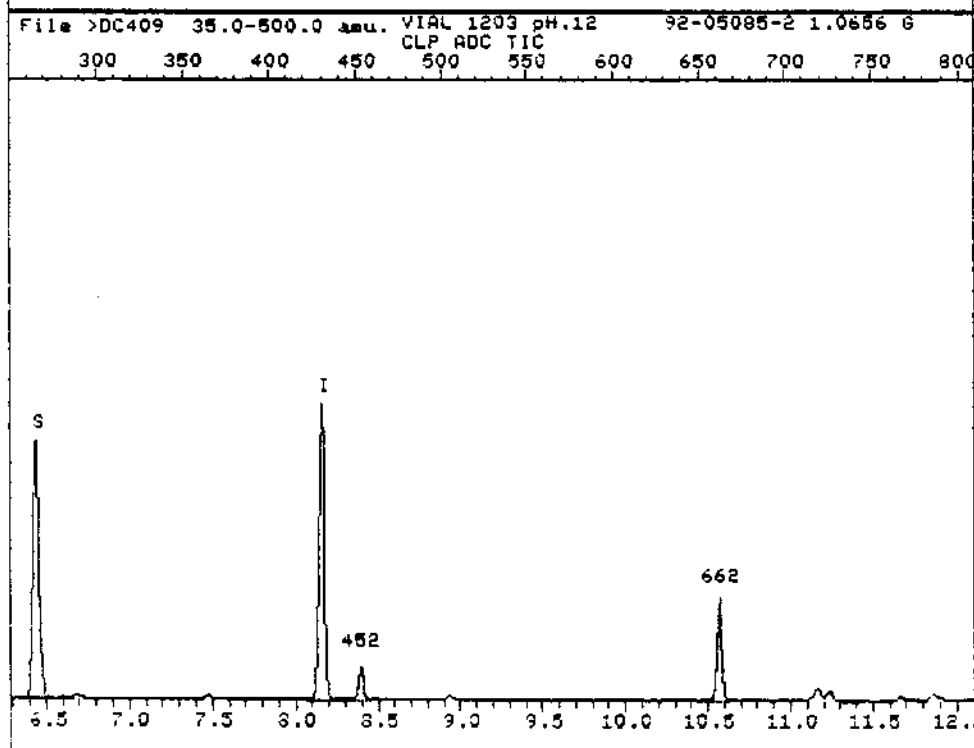
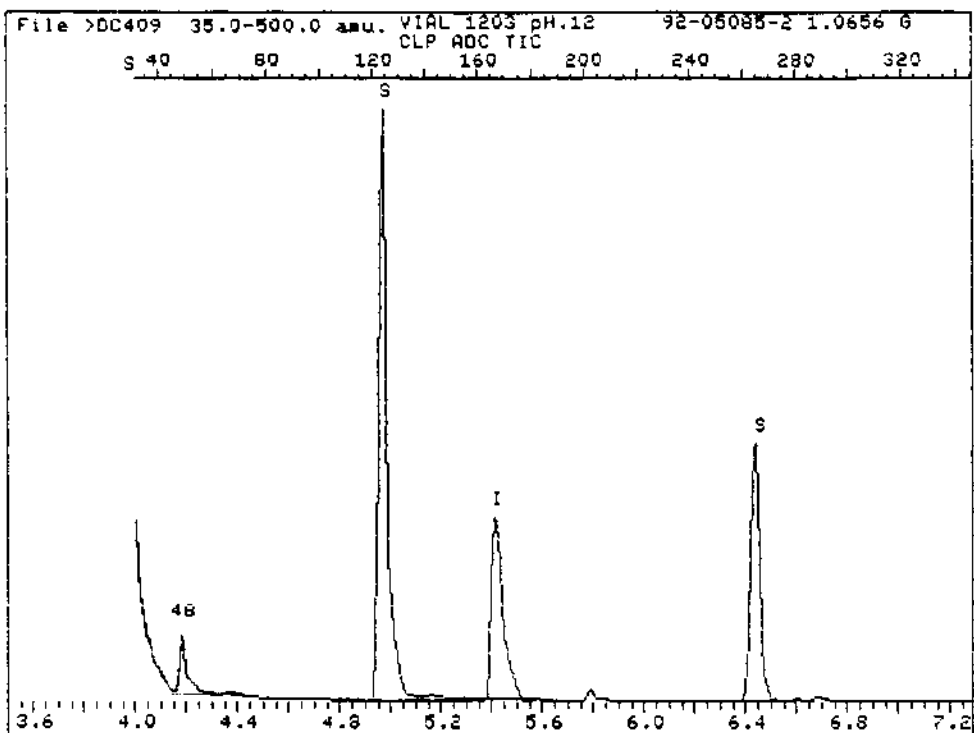
Standard	Concentration	Area	Retention Time	Unknown Window
1	40.0	150358.	5.41	4.00 - 6.78
2	40.0	177907.	8.16	6.78 - 11.60
3	40.0	203832.	15.05	11.60 - 18.71
4	40.0	207432.	22.36	18.71 - 28.11
5	40.0	232160.	33.86	28.11 - 36.04
6	40.0	228881.	38.23	36.04 - 50.25

Dilution Factor = 1.00 This sample was 1.06560 g or mL

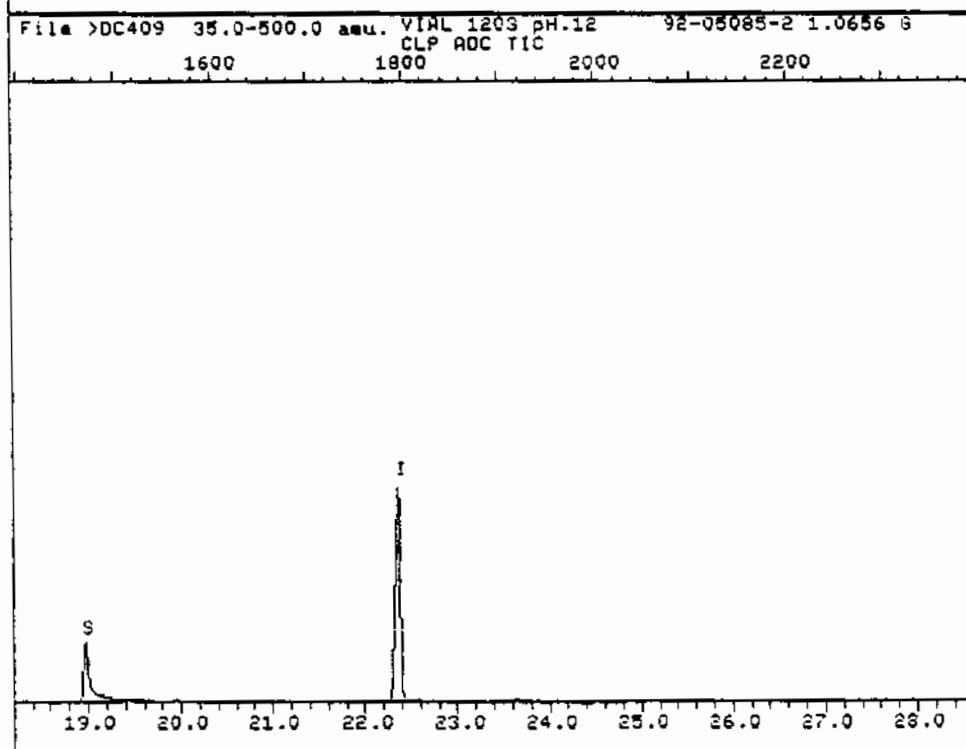
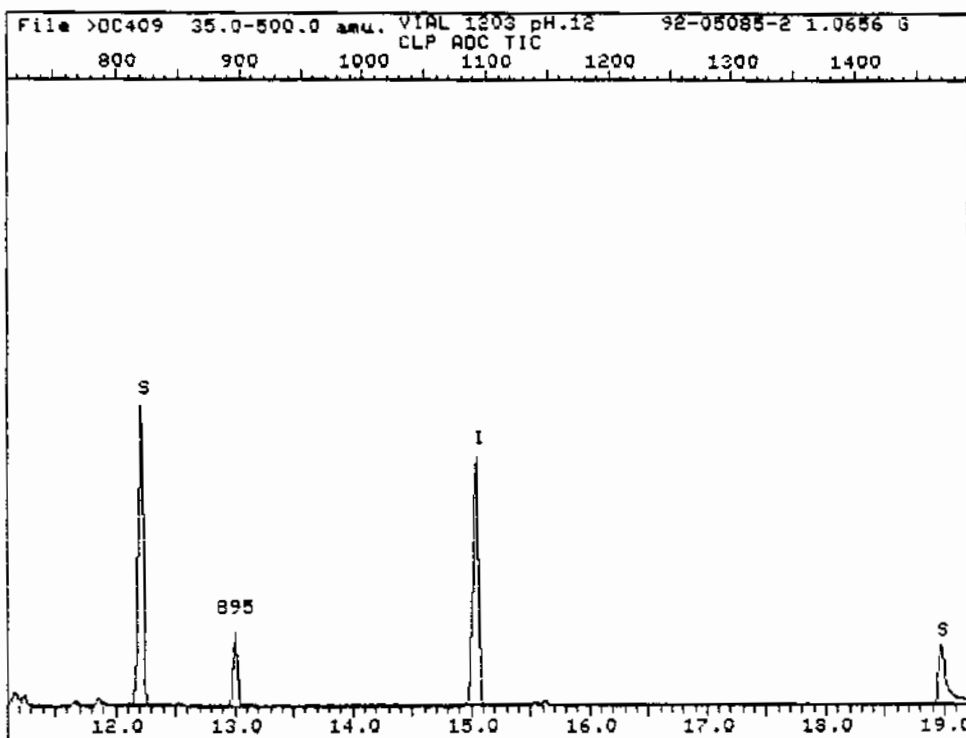
Correction Factor = 939.38

Unknown Concentration = $\frac{(\text{Conc Int Std} * \text{Area Unknown})}{(\text{Area Int Std})} * \text{Correction Factor}$

3:46 PM MON., 27 APR., 1992

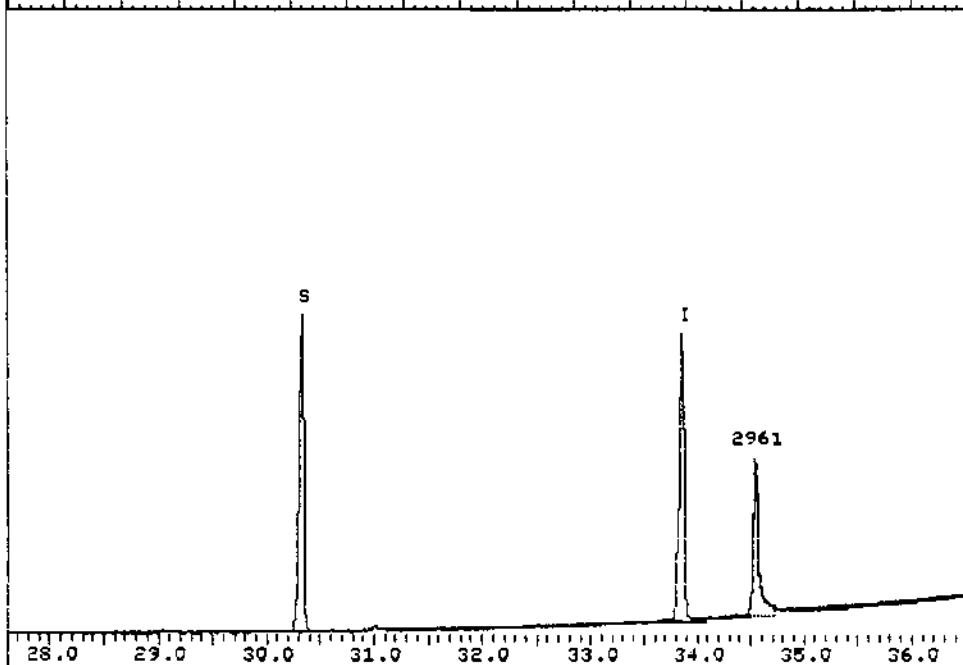


Instrument ID: BNA1 Analyzed on: 4/25/92 11:10

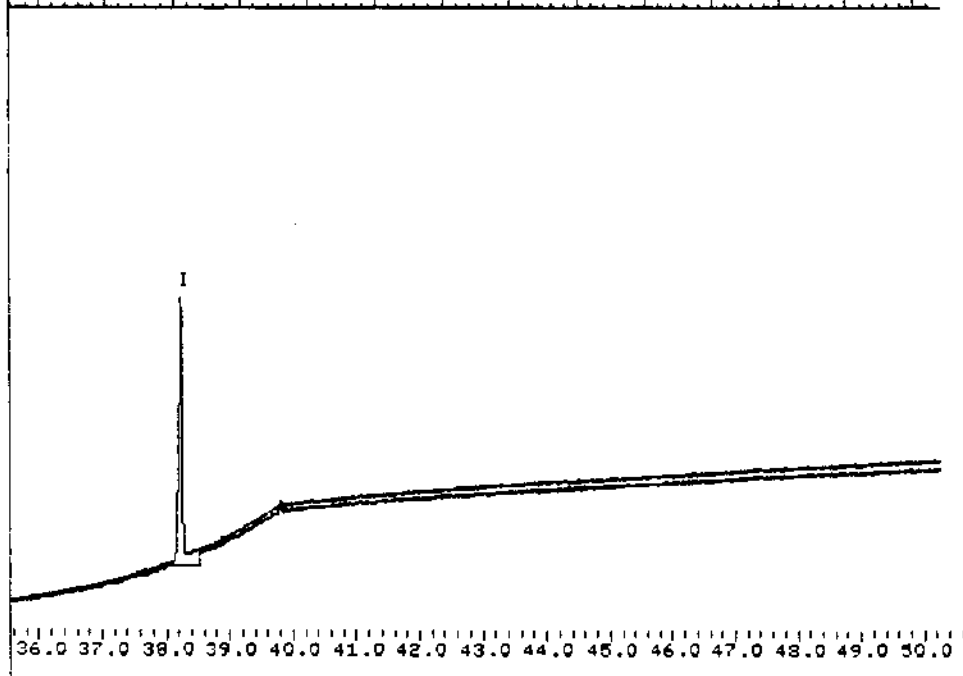


Instrument ID: BNA1 Analyzed on: 4/25/92 11:10

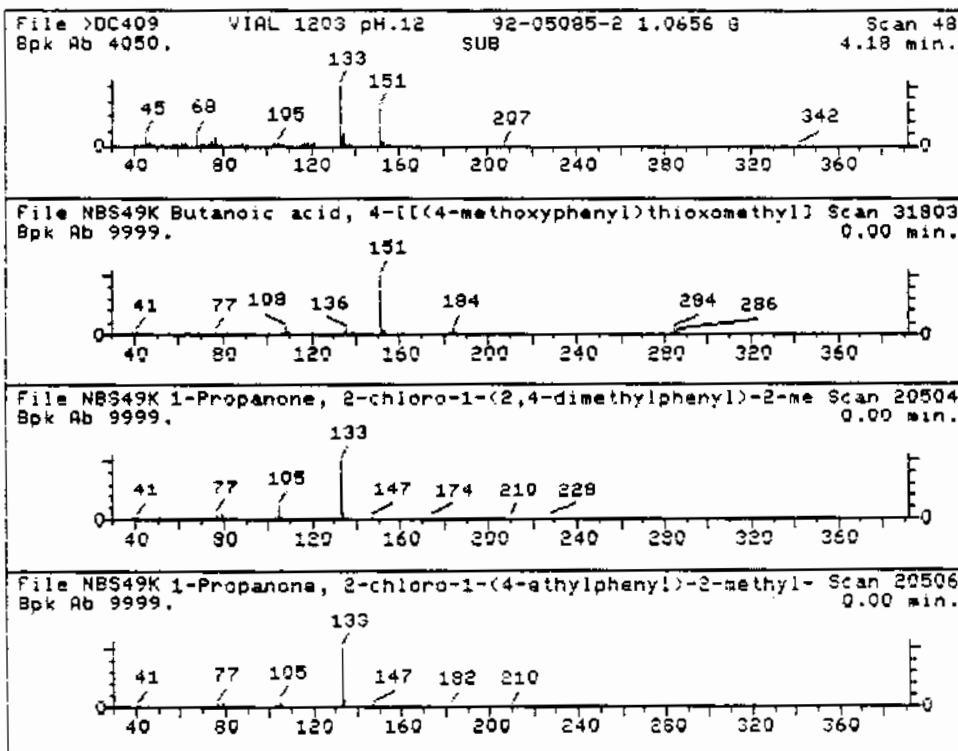
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CLP ADC TIC
2400 2500 2600 2700 2800 2900 3000 3100



File >DC409 35.0-500.0 amu. VIAL 1203 pH.12 92-05085-2 1.0656 6
CLP ADC TIC
3200 3400 3600 3800 4000 4200 4400



Instrument ID: BNA1 Analyzed on: 4/25/92 11:10



Instrument ID: BNA1 Analyzed on: 4/25/92 11:10

Result 1 in PBM results file: LDC409

Retention Time: 4.18 Area: 31504 Tentative Conc: 7900.00

The unknown area is 20.95% of the nearest internal standard

1. Butanoic acid, 4-[[[(4-methoxyphenyl)thioxomethyl]]thi	284	C13H16O3S2
ol-, methyl ester		
2. 1-Propanone, 2-chloro-1-(2,4-dimethylphenyl)-2-methyl-	210	C12H15ClO
3. 1-Propanone, 2-chloro-1-(4-ethylphenyl)-2-methyl-	210	C12H15ClO
4. 1H-Benzotriazole, 5-methyl-	133	C7H7N3
5. 2H-Benzotriazole, 2-methyl-	133	C7H7N3
6. 1H-Indol-5-ol	133	C8H7NO

Sample file: >DC409

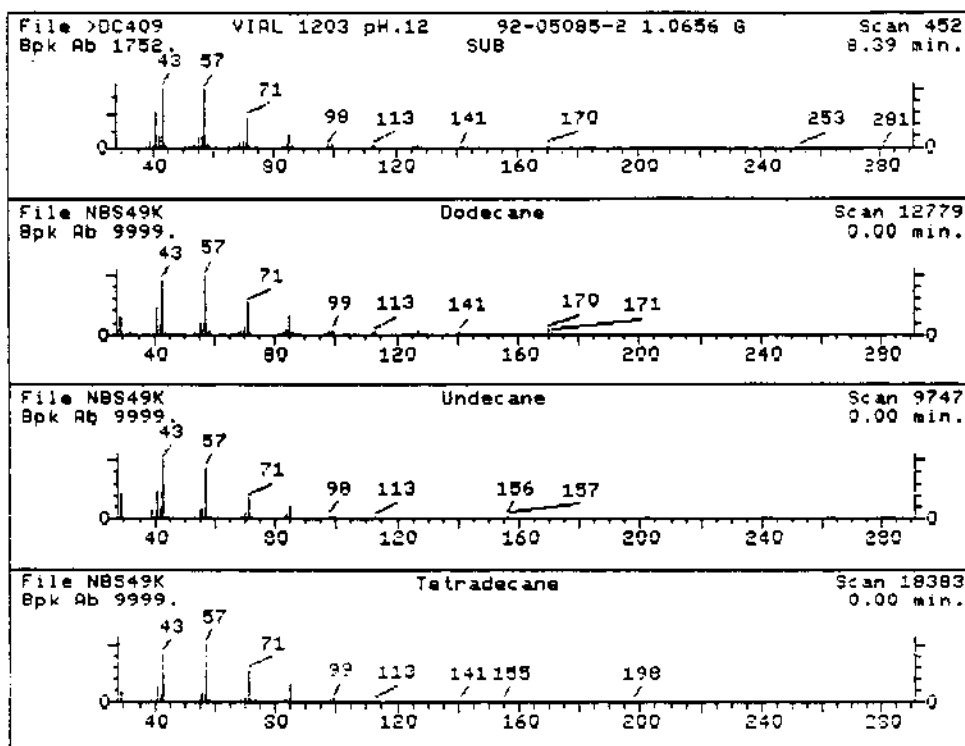
Spectrum #: 48

Search speed: 3

Tilting option: F

No. of ion ranges searched: 186

	Prob.	CAS #	CON #	ROOT	K	DK	#FLG	TILT	%	CON	C_I	R_IV
1.	39*	36122415	19704	NBS49K	53	67	2	4	78	32	16	22
2.	37*	54965536	16148	NBS49K	49	45	2	0	100	42	12	28
3.	31*	55012696	16149	NBS49K	41	54	2	0	100	42	8	19
4.	30*	136856	16068	NBS49K	36	40	2	0	100	42	8	18
5.	26*	16584002	16066	NBS49K	28	55	2	0	100	42	8	14
6.	26*	1953544	16070	NBS49K	26	60	2	0	92	42	8	14

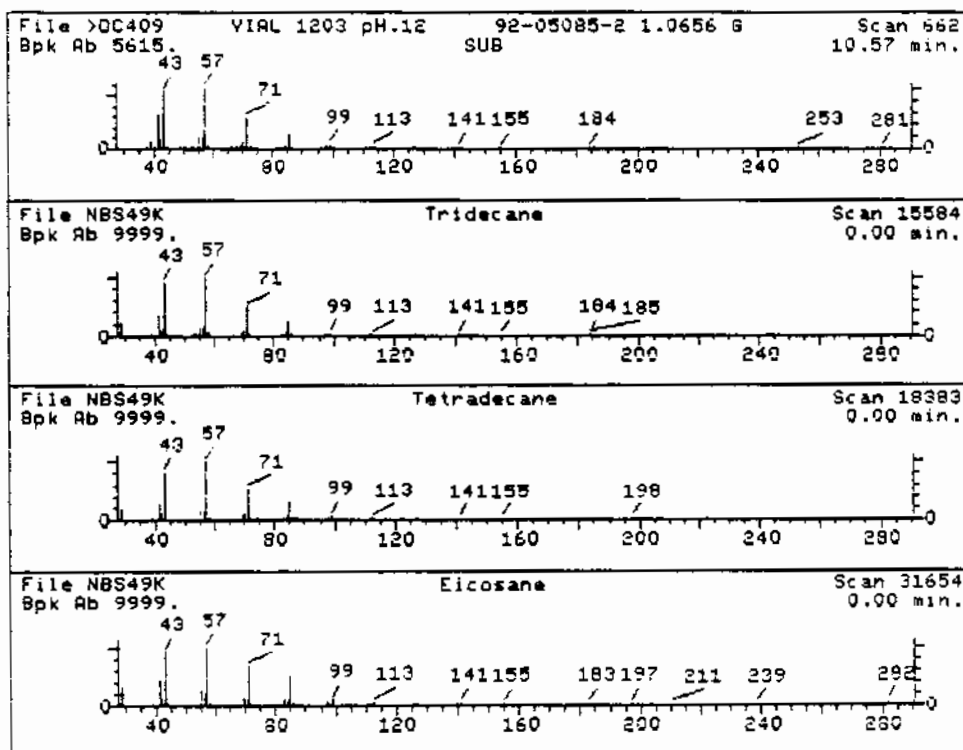


Instrument ID: BNA1 Analyzed on: 4/25/92 11:10
Result 2 in PBM results file: LDC409
Retention Time: 8.39 Area: 18074 Tentative Conc: 3800.00
The unknown area is 10.16% of the nearest internal standard

1. Dodecane	170 C12H26
2. Undecane	156 C11H24
3. Tetradecane	198 C14H30
4. Tridecane	184 C13H28
5. Pentadecane	212 C15H32
6. Undecane, 2-methyl-	170 C12H26

Sample file: >DC409 Spectrum #: 452
Search speed: 3 Tilting option: F No. of ion ranges searched: 60

	Prob.	CAS #	CON #	ROOT	K	DK	#FLG	TILT	%	CON	C_I	R_IV
1.	95*	112403	6732	NBS49K	94	5	1	4	89	4	72	93
2.	87	1120214	6682	NBS49K	82	15	1	0	95	4	63	44
3.	83	629594	6804	NBS49K	92	16	2	3	100	2	57	29
4.	83	629505	6761	NBS49K	87	19	2	3	96	4	57	27
5.	79	629629	6819	NBS49K	99	21	2	4	76	8	48	34
6.	79*	7045718	6735	NBS49K	55	39	2	1	94	8	48	34

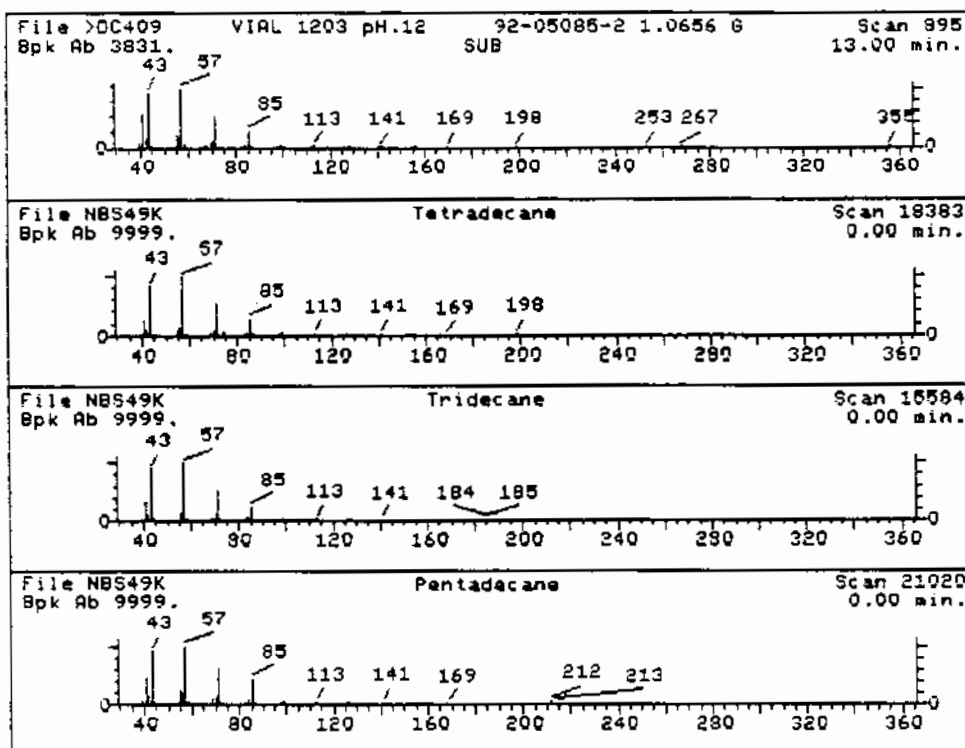


Instrument ID: BNA1 Analyzed on: 4/25/92 11:10
Result 3 in PBM results file: LDC409
Retention Time: 10.57 Area: 58635 Tentative Conc: 12000.00
The unknown area is 32.96% of the nearest internal standard

1. Tridecane	184 C13H28
2. Tetradecane	198 C14H30
3. Eicosane	282 C20H42
4. Decane, 6-ethyl-2-methyl-	184 C13H28
5. Dodecane	170 C12H26
6. Nonadecane	268 C19H40

Sample file: >DC409 Spectrum #: 662
Search speed: 3 Tilting option: F No. of ion ranges searched: 67

	Prob.	CAS #	CON #	ROOT	K	DK	#FLG	TILT	%	CON	C_I	R_IV
1.	97*	629505	6761	NBS49K	97	9	0	0	81	2	72	97
2.	86	629594	6804	NBS49K	97	11	2	3	100	2	60	32
3.	83	112958	6871	NBS49K	94	45	2	4	77	5	57	22
4.	83	62108218	6767	NBS49K	68	31	2	0	99	5	57	24
5.	81	112403	6732	NBS49K	87	12	1	4	85	7	53	45
6.	78	629925	6864	NBS49K	73	44	2	3	100	5	55	12

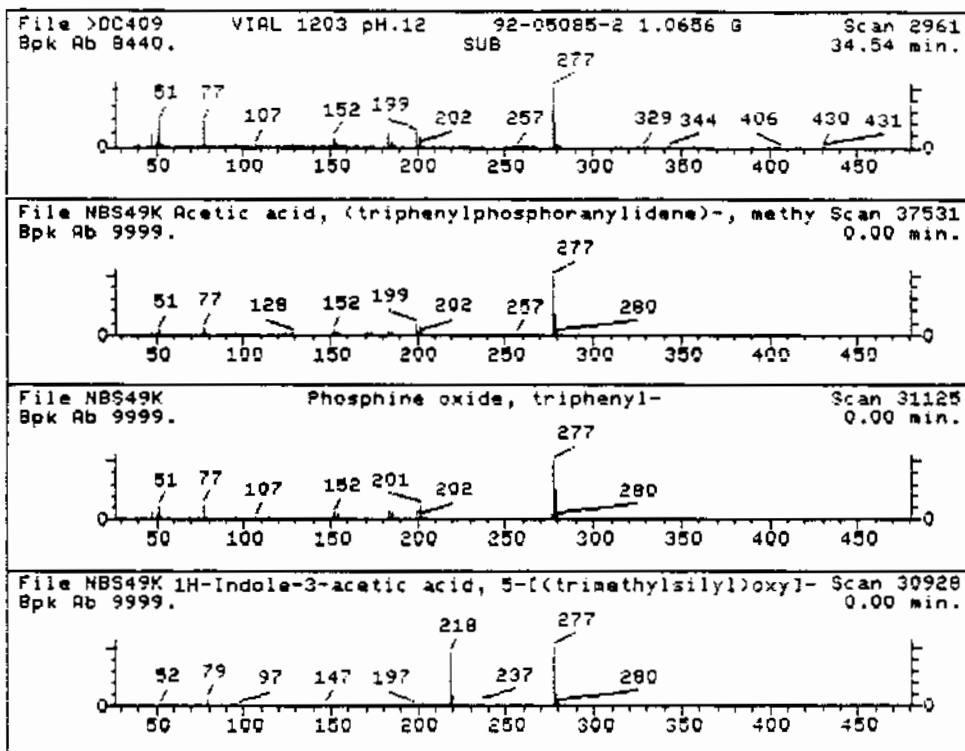


Instrument ID: BNA1 Analyzed on: 4/25/92 11:10
Result 4 in PBM results file: LOC409
Retention Time: 13.00 Area: 43733 Tentative Conc: 8100.00
The unknown area is 21.46% of the nearest internal standard

①. Tetradecane	198 C14H30
2. Tridecane	184 C13H28
3. Pentadecane	212 C15H32
4. Octacosane	394 C28H58
5. Hexadecane	226 C16H34
6. Eicosane	282 C20H42

Sample file: >DC409 Spectrum #: 895
Search speed: 3 Tilting option: F No. of ion ranges searched: 71

	Prob.	CAS #	CON #	ROOT	K	OK	#FLG	TILT	%	CON	C_I	R_IV
1.	94*	629594	6804	NBS49K	98	10	1	1	96	4	72	92
2.	88	629505	6761	NBS49K	86	20	1	0	85	5	65	50
3.	83	629629	6819	NBS49K	99	21	3	4	83	5	57	24
4.	83	630024	6906	NBS49K	99	42	2	3	80	5	57	26
5.	83	544763	6835	NBS49K	88	32	2	4	79	5	57	23
6.	83	112958	6871	NBS49K	94	45	2	4	83	5	57	22



Instrument ID: BNA1 Analyzed on: 4/25/92 11:10
Result 5 in PBM results file: LDC409
Retention Time: 34.54 Area: 141955 Tentative Conc: 23000.00
The unknown area is 61.15% of the nearest internal standard

1. Acetic acid, (triphenylphosphoranylidene)-, methyl ester 334 C21H19O2P
2. Phosphine oxide, triphenyl- 278 C18H15OP
3. 1H-Indole-3-acetic acid, 5-[(trimethylsilyl)oxyl]-, methyl ester 277 C14H19NO3Si
4. Formaldehyde, (triphenylphosphoranylidene)hydrazone 304 C19H17N2P
5. 1,5-Dioxo-2,4,6,8-tetrasilacyclooctane, 2,2,4,4,6,6,8,8-octamethyl- 292 C10H28O2Si4

Sample file: >DC409 Spectrum #: 2961
Search speed: 3 Tilting option: F No. of ion ranges searched: 63

	Prob.	CAS #	CON #	ROOT	K	DK	#FLG	TILT	%	CON	C_I	R_IV
1.	79	2605676	37048	NBS49K	110	24	0	1	100	14	43	66
2.	73*	791286	37022	NBS49K	106	42	1	1	65	42	33	80
3.	45*	72101350	37001	NBS49K	62	75	2	-1	100	28	19	23
4.	36*	15990542	37031	NBS49K	57	94	2	1	60	42	12	27
5.	31*	15261060	37024	NBS49K	29	99	2	0	100	35	12	14

QUANT REPORT

Operator ID: BOB
Output File: ^DC410::DF
Data File: >DC410::D1
Name: UIAL 1307 pH.12
Misc: 92-05091-2 1.0237 G

Quant Rev: 7 Quant Time: 920425 13:02
Injected at: 920425 12:11
Dilution Factor: 1.00000
Instrument ID: BNA1
BTL# 8

ID File: ID1BNA::QT
Title: BNA ID QUANT FILE #1 GC/MS
Last Calibration: 911003 11:18

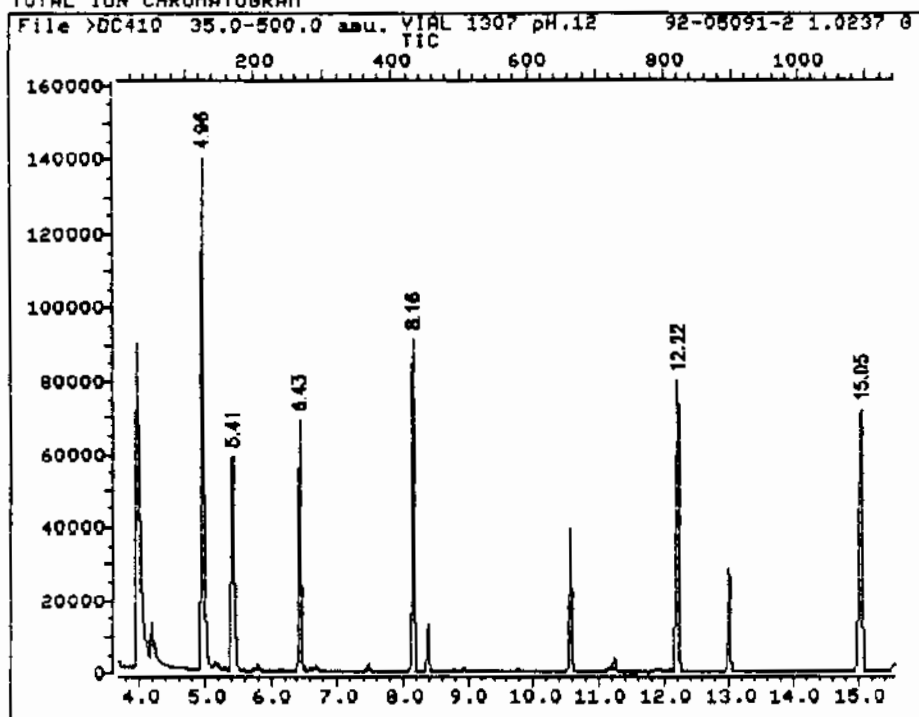
Last Cal Date: 920424 13:55

	Compound	R.T.	Scan#	Area	Conc	Units	q
1)	*1,4-Dichlorobenzene-d4	5.41	167	25475	40.00	ng/uL	97
2)	2-Fluorophenol	0.00	28	47455	82.52	ng/uL	
3)	Phenol-d5	4.96	124	92571	98.19	ng/uL	84
4)	Phenol	0.00	0	0	0.00	ng/uL	
5)	bis(2-Chloroethyl)ether	0.00	0	0	0.00	ng/uL	
6)	2-Chlorophenol	0.00	0	0	0.00	ng/uL	
7)	1,3-Dichlorobenzene	0.00	0	0	0.00	ng/uL	
8)	1,4-Dichlorobenzene	0.00	0	0	0.00	ng/uL	
9)	Benzyl alcohol	0.00	0	0	0.00	ng/uL	
10)	1,2-Dichlorobenzene	0.00	0	0	0.00	ng/uL	
11)	2-Methylphenol	0.00	0	0	0.00	ng/uL	
12)	bis(2-Chloroisopropyl)ether	0.00	0	0	0.00	ng/uL	
13)	4-Methylphenol	0.00	0	0	0.00	ng/uL	
14)	N-Nitroso-di-n-propylamine	0.00	266	0	0.00	ng/uL	
15)	Hexachloroethane	0.00	0	0	0.00	ng/uL	
16)	*Naphthalene-d8	8.16	431	83046	40.00	ng/uL	96
17)	Nitrobenzene-d5	6.43	265	46555	45.98	ng/uL	89
18)	Nitrobenzene	0.00	0	0	0.00	ng/uL	
19)	Isophorone	0.00	0	0	0.00	ng/uL	
20)	2-Nitrophenol	0.00	0	0	0.00	ng/uL	
21)	2,4-Dimethylphenol	0.00	0	0	0.00	ng/uL	
22)	Benzoic acid	0.00	0	0	0.00	ng/uL	
23)	bis(2-Chloroethoxy)methane	0.00	0	0	0.00	ng/uL	
24)	2,4-Dichlorophenol	0.00	0	0	0.00	ng/uL	
25)	1,2,4-Trichlorobenzene	0.00	0	0	0.00	ng/uL	
26)	Naphthalene	0.00	0	0	0.00	ng/uL	
27)	4-Chloroaniline	0.00	0	0	0.00	ng/uL	
28)	Hexachlorobutadiene	0.00	0	0	0.00	ng/uL	
29)	4-Chloro-3-methylphenol	0.00	0	0	0.00	ng/uL	
30)	2-Methylnaphthalene	0.00	0	0	0.00	ng/uL	
31)	*Acenaphthene-d10	15.05	1092	46186	40.00	ng/uL	98
32)	Hexachlorocyclopentadiene	0.00	0	0	0.00	ng/uL	
33)	2,4,6-Trichlorophenol	0.00	0	0	0.00	ng/uL	
34)	2,4,5-Trichlorophenol	0.00	0	0	0.00	ng/uL	
35)	2-Chloronaphthalene	0.00	0	0	0.00	ng/uL	
36)	2-Fluorobiphenyl	12.22	820	62409	46.51	ng/uL	99
37)	2-Nitroaniline	0.00	0	0	0.00	ng/uL	
38)	Dimethylphthalate	0.00	0	0	0.00	ng/uL	
39)	Acenaphthylene	0.00	0	0	0.00	ng/uL	
40)	2,6-Dinitrotoluene	0.00	1091	0	0.00	ng/uL	
41)	3-Nitroaniline	0.00	0	0	0.00	ng/uL	
42)	Acenaphthene	0.00	0	0	0.00	ng/uL	

43)	2,4-Dinitrophenol	0.00	0	0	0.00	ng/uL	
44)	4-Nitrophenol	0.00	0	0	0.00	ng/uL	
45)	Dibenzofuran	0.00	0	0	0.00	ng/uL	
46)	2,4-Dinitrotoluene	0.00	0	0	0.00	ng/uL	
47)	Diethylphthalate	0.00	0	0	0.00	ng/uL	
48)	4-Chlorophenyl-phenylether	0.00	0	0	0.00	ng/uL	
49)	Fluorene	0.00	0	0	0.00	ng/uL	
50)	4-Nitroaniline	0.00	0	0	0.00	ng/uL	
51)	*Phenanthrene-d10	22.36	1792	78309	40.00	ng/uL	99
52)	4,6-Dinitro-2-methylphenol	0.00	0	0	0.00	ng/uL	
53)	N-Nitrosodiphenylamine	0.00	0	0	0.00	ng/uL	
54)	2,4,6-Tribromophenol	0.00	0	4934	16.76	ng/uL	
55)	4-Bromophenyl-phenylether	0.00	0	0	0.00	ng/uL	
56)	Hexachlorobenzene	0.00	0	0	0.00	ng/uL	
57)	Pentachlorophenol	0.00	0	0	0.00	ng/uL	
58)	Phenanthrene	0.00	0	0	0.00	ng/uL	
59)	Anthracene	0.00	0	0	0.00	ng/uL	
60)	Di-n-butylphthalate	0.00	0	0	0.00	ng/uL	
61)	Fluoranthene	0.00	0	0	0.00	ng/uL	
62)	*Chrysene-d12	33.86	2892	81628	40.00	ng/uL	93
63)	Pyrene	0.00	0	0	0.00	ng/uL	
64)	Terphenyl-d14	30.33	2556	79401	51.75	ng/uL	92
65)	Butylbenzylphthalate	0.00	0	0	0.00	ng/uL	
66)	3,3'-Dichlorobenzidine	0.00	0	0	0.00	ng/uL	
67)	Benzo(a)anthracene	0.00	0	0	0.00	ng/uL	
68)	Chrysene	0.00	0	0	0.00	ng/uL	
69)	Bis(2-Ethylhexyl)phthalate	0.00	0	0	0.00	ng/uL	
70)	*Perylene-d12	38.24	3306	86322	40.00	ng/uL	98
71)	Di-n-octylphthalate	0.00	0	0	0.00	ng/uL	
72)	Benzo(b)fluoranthene	0.00	0	0	0.00	ng/uL	
73)	Benzo(k)fluoranthene	0.00	0	0	0.00	ng/uL	
74)	Benzo(a)pyrene	0.00	0	0	0.00	ng/uL	
75)	Indeno(1,2,3-cd)pyrene	0.00	0	0	0.00	ng/uL	
76)	Dibenz(a,h)anthracene	0.00	0	0	0.00	ng/uL	
77)	Benzo(g,h,i)perylene	0.00	0	0	0.00	ng/uL	

* Compound is ISTD

TOTAL ION CHROMATOGRAM



Data File: >DC410::D1
Name: VIAL 1307 pH.12
Misc: 92-05091-2 1.0237 G

Quant Output File: ^DC410::OF
Instrument ID: BNA1

BTL# 8

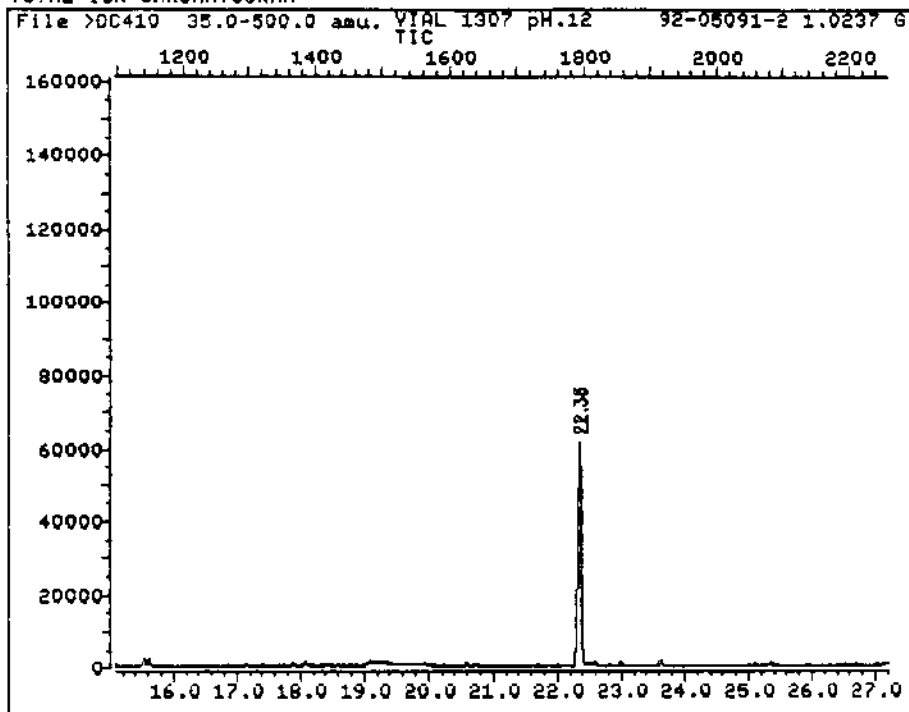
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Title: BNA ID QUANT FILE #1 GC/MS
Last Calibration: 911003 11:18

Last Qcal Time: 920424 13:55

Operator ID: BOB
Quant Time : 920425 13:02
Injected at: 920425 12:11

Page 1 of 4

TOTAL ION CHROMATOGRAM



Data File: >DC410::D1
Name: VIAL 1307 pH.12
Misc: 92-05091-2 1.0237 G

Quant Output File: ^DC410::OF
Instrument ID: BNA1

BTL# 8

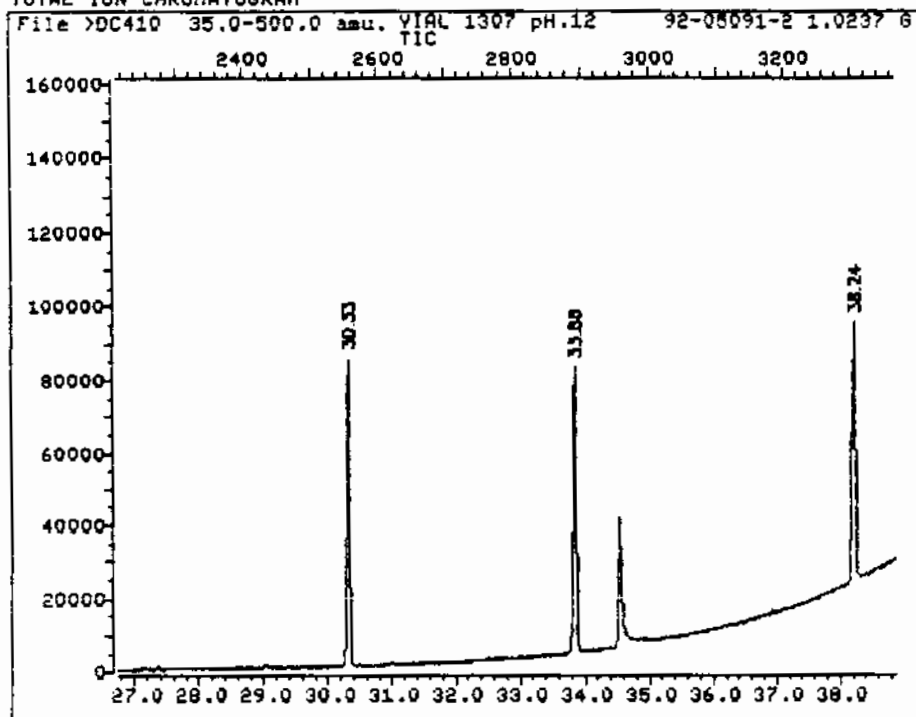
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Title: BNA ID QUANT FILE #1 GC/MS
Last Calibration: 911003 11:18

Last Qcal Time: 920424 13:55

Operator ID: BOB
Quant Time : 920425 13:02
Injected at: 920425 12:11

Page 2 of 4

TOTAL ION CHROMATOGRAM



Data File: >DC410::D1
Name: VIAL 1307 pH.12
Misc: 92-05091-2 1.0237 G

Quant Output File: ^DC410::OF
Instrument ID: BNA1
BTL# 8

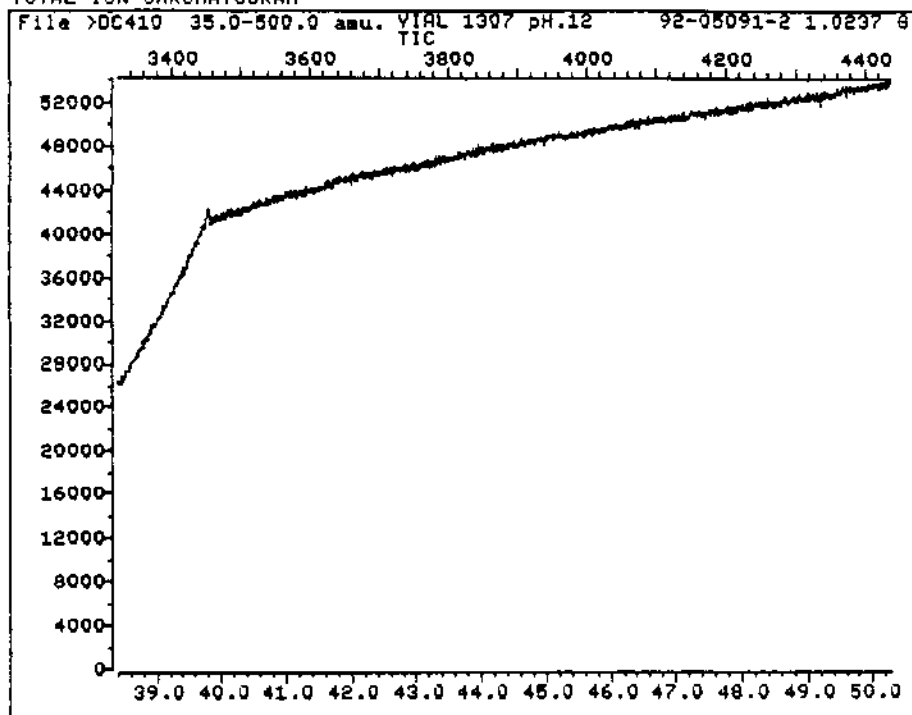
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Title: BNA ID QUANT FILE #1 GC/MS
Last Calibration: 911003 11:18

Last Qcal Time: 920424 13:55

Operator ID: 808
Quant Time : 920425 13:02
Injected at: 920425 12:11

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TOTAL ION CHROMATOGRAM



Data File: >DC410::D1
Name: VIAL 1307 pH.12
Misc: 92-05091-2 1.0237 G

Quant Output File: ^DC410::QF
Instrument ID: BNA1

BTL# 8

Id File: ID18NA::QT
Title: BNA ID QUANT FILE #1 GC/MS
Last Calibration: 911003 11:18

Last Qcal Time: 920424 13:55

Operator ID: B08
Quant Time : 920425 13:02
Injected at: 920425 12:11

Page 4 of 4

[GC/MS OPERATOR REPORT]

[GC/MS LAB SEMIVOLATILES]

[INTERNAL STANDARD CHECK REPORT]

SAMPLE FILE = >DC410
 CAL CHECK FILE = >DC402
 DATE AND TIME OF ANALYSIS = 4/25/92 12:11
 MISCELLANEOUS = 92-05091-2 1.0237 G
 METHOD = BNAME1
 INSTRUMENT = BNA1
 OPERATOR = BOB SUPER GRP

I. Areas

Name of the BNA Internal Standard	The Sample ISTD Area	Daily Check ISTD Area	Daily Check ISTD Area / 2	Daily Check ISTD Area x 2	Status of the Sample ISTD Area Precision
1,4-Dichlorobenz-d4	25475	24890	12445	49780	OK
Naphthalene-d8	83046	87937	43969	175874	OK
Acenaphthene-d10	46186	47070	23535	94140	OK
Phenanthrene-d10	78309	81388	40694	162776	OK
Chrysene-d12	81628	81856	40928	163712	OK
Perylene-d12	86322	90335	45168	180670	OK

II. Retention Times

Name of the BNA Internal Standard	The Sample ISTD R.Time	Daily Check ISTD R.Time	Daily Check ISTD RT - 0.5	Daily Check ISTD RT + 0.5	Status of the Sample ISTD R.T. Precision
1,4-Dichlorobenz-d4	5.41	5.41	4.91	5.91	OK
Naphthalene-d8	8.16	8.17	7.67	8.67	OK
Acenaphthene-d10	15.05	15.05	14.55	15.55	OK
Phenanthrene-d10	22.36	22.38	21.88	22.88	OK
Chrysene-d12	33.86	33.88	33.38	34.38	OK
Perylene-d12	38.24	38.25	37.75	38.75	OK

[GC/MS OPERATOR REPORT]

[GC/MS LAB SEMIVOLATILES]

[Preliminary Surrogate Report]

DATA FILE NAME = >DC410::D1
 DATE AND TIME OF ANALYSIS = 4/25/92 12:11
 SAMPLE = VIAL 1307 pH.12
 MISCELLANEOUS = 92-05091-2 1.0237 G
 METHOD = BNAME1
 INSTRUMENT = BNA1
 OPERATOR = BOB SUPER GRP

SURROGATE	AS FOUND IN SAMPLE	WAS SPIKED AT	WATER LIMITS	SOIL LIMITS	% RECOVERY
2-Fluorophenol	~~82.52~~ 0.00	100.00	21-100	25-121	~~82.52~~ 0.00
Phenol-d5	98.19	100.00	10-94	24-113	98.19
Nitrobenzene-d5	45.98	50.00	35-114	23-120	91.96
2-Fluorobiphenyl	46.51	50.00	43-116	30-115	93.02
2,4,6-tribromo-phenol	~~16.76~~ 0.00	100.00	10-123	19-122	~~16.76~~ 0.00
Terphenyl-d14	51.75	50.00	33-141	18-137	103.49

MS data file header from : >DC410::D1

Sample: VIAL 1307 pH.12 Operator: BOB SUPER GRP. 4/25/92 12:11
Misc : 92-05091-2 1.0237 G BTL# 8
Sys. #: 1 MS model: 70 SW/HW rev.: LF ALS #: 8 Equip ID: BNA1
Method file: BNAME1 Tuning file: MTBNA1 No. of extra records: 2
Source temp.: N/A Analyzer temp.: N/A Transfer line temp.: 0

Chromatographic temperatures : 40. 100. 190. 300. 0.
Chromatographic times, min. : 1.5 .5 .5 12.0 0.0
Chromatographic rate, deg/min: 30.0 4.5 8.0 .5 0.0

>DC410 VIAL 1307 pH.12 92-05091-2 1.0237 G
35.01 500.0 CLP TIC
Upslope: .2000 Area Reject: 18643. Max Peaks: 5 Bunch: -1 Valley >100 %
Dnslope: 0.0000 Results File IDC410 Sorted by Time/Area INT

Peak #	R.T. min.	first scan	max scan	last scan	peak height	raw area	corr. area	corr. % max.	% of total
1	4.19	47	50	77	12289	83915	53817	37.23	14.259
2	8.39	447	453	459	13168	30727	26178	18.11	6.936
3	10.57	653	662	669	39042	89661	84834	58.69	22.477
4	13.00	887	895	902	28290	71761	68068	47.09	18.035
5	34.54	2951	2957	2978	35148	261370	144535	100.00	38.294

Sum of corrected areas: 377432.

Summary of Unknowns PBM Library Search and Quantitation

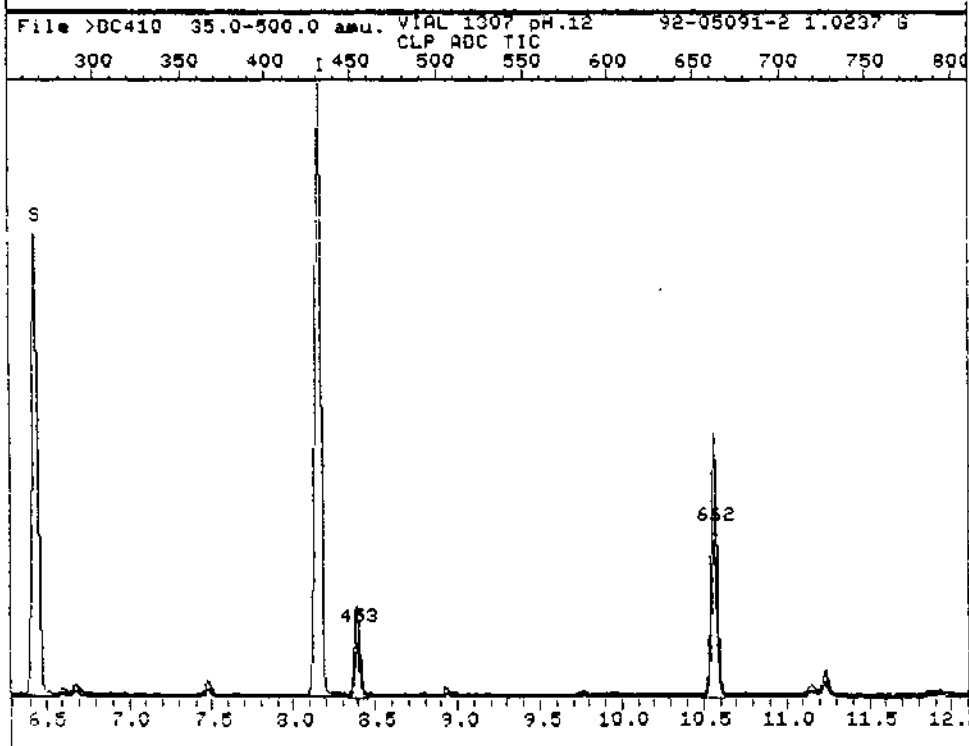
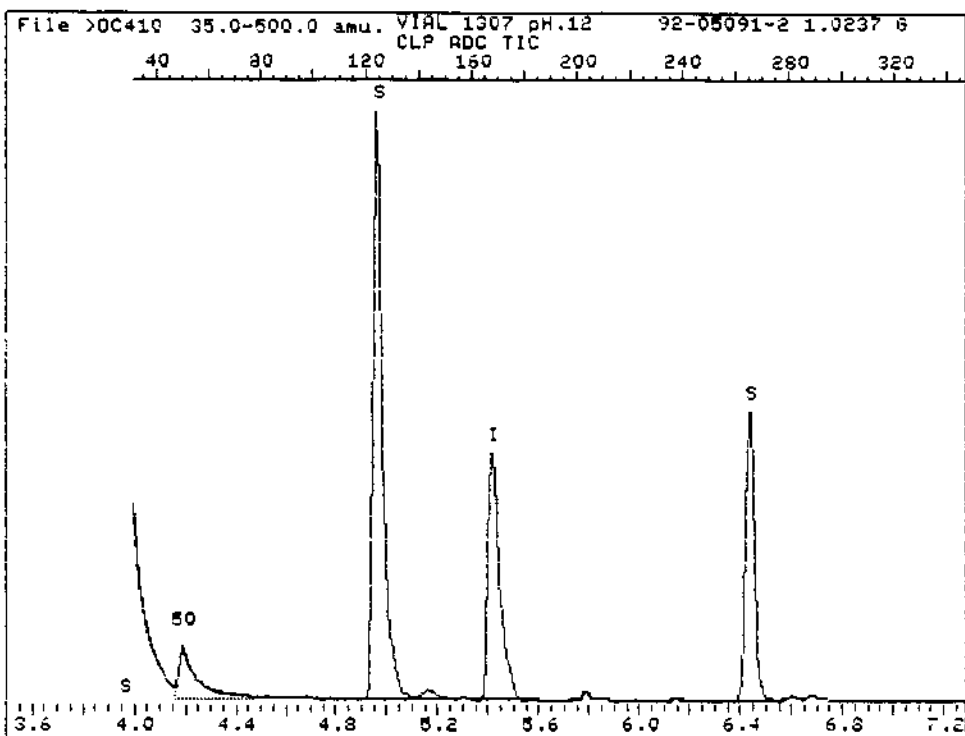
Standard	Concentration	Area	Retention Time	Unknown Window
1	40.0	186431.	5.41	4.00 - 6.79
2	40.0	214631.	8.16	6.79 - 11.61
3	40.0	240184.	15.05	11.61 - 18.71
4	40.0	247443.	22.36	18.71 - 28.11
5	40.0	269021.	33.86	28.11 - 36.05
6	40.0	255088.	38.24	36.05 - 50.28

Dilution Factor = 1.00 This sample was 1.02370 g or mL

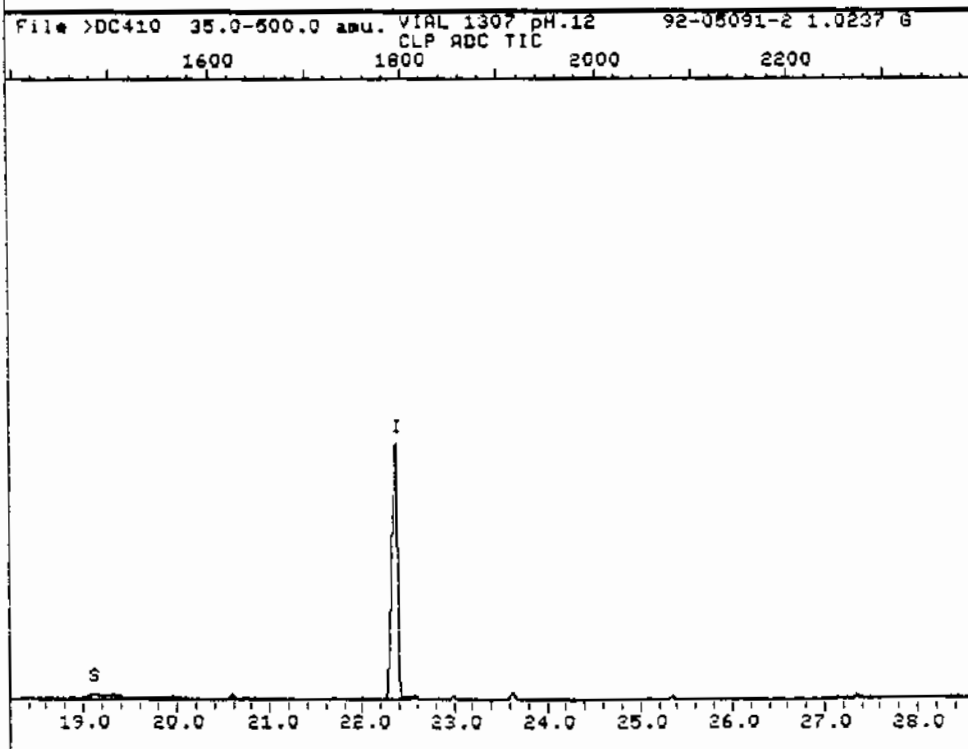
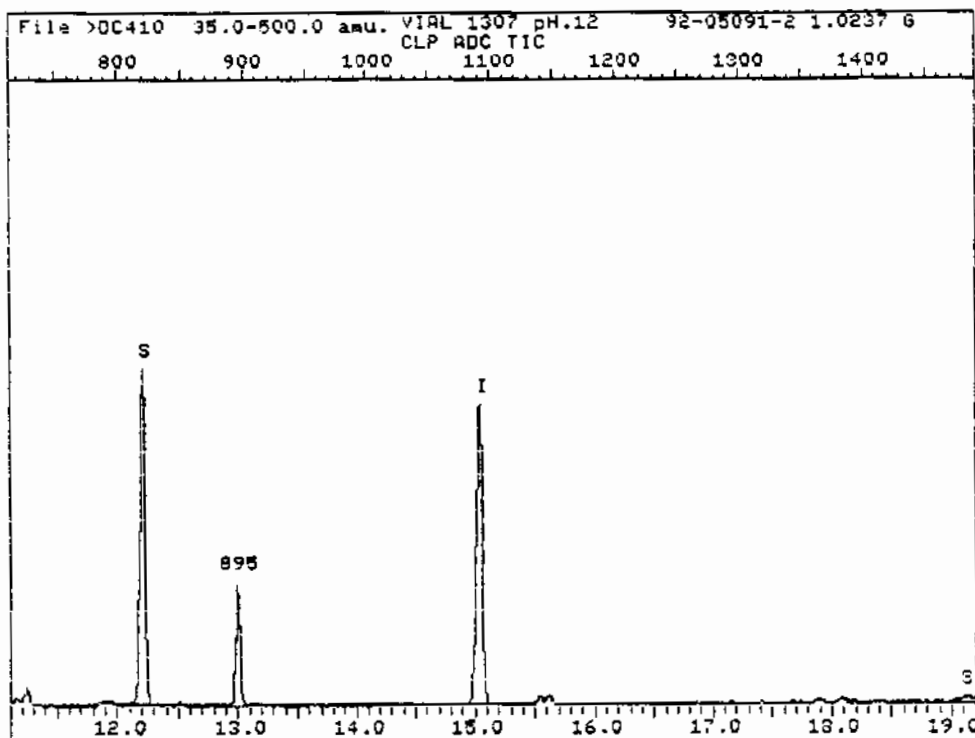
Correction Factor = 977.83

Unknown Concentration = $\frac{\text{I Conc Int Std} \times \text{Area Unknown}}{\text{Area Int Std}} \times \text{Correction Factor}$

4:10 PM MON., 27 APR., 1992

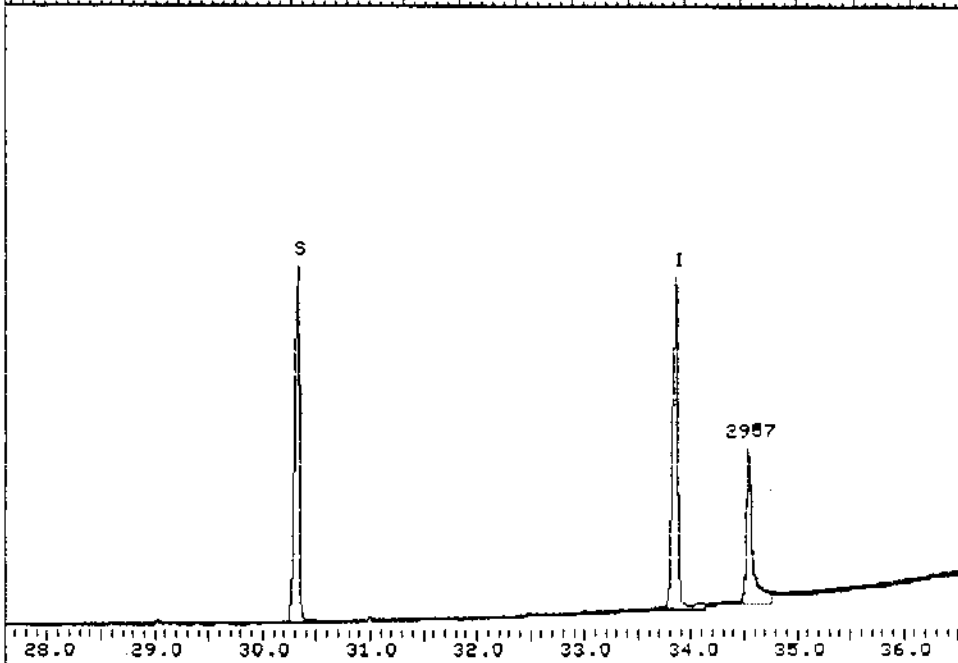


Instrument ID: BNA1 Analyzed on: 4/25/92 12:11

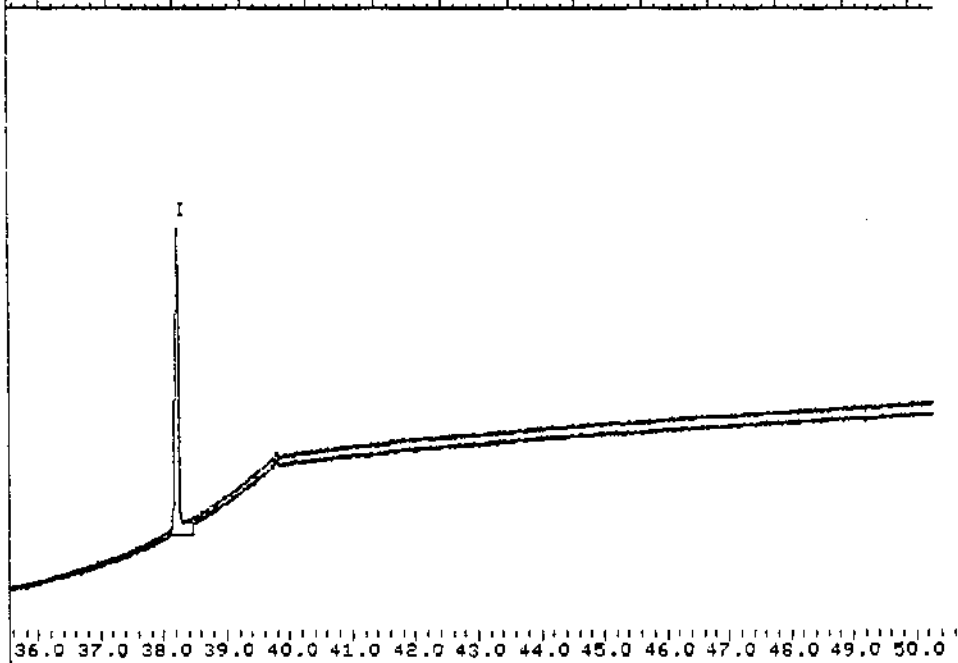


Instrument ID: BNA1 Analyzed on: 4/25/92 12:11

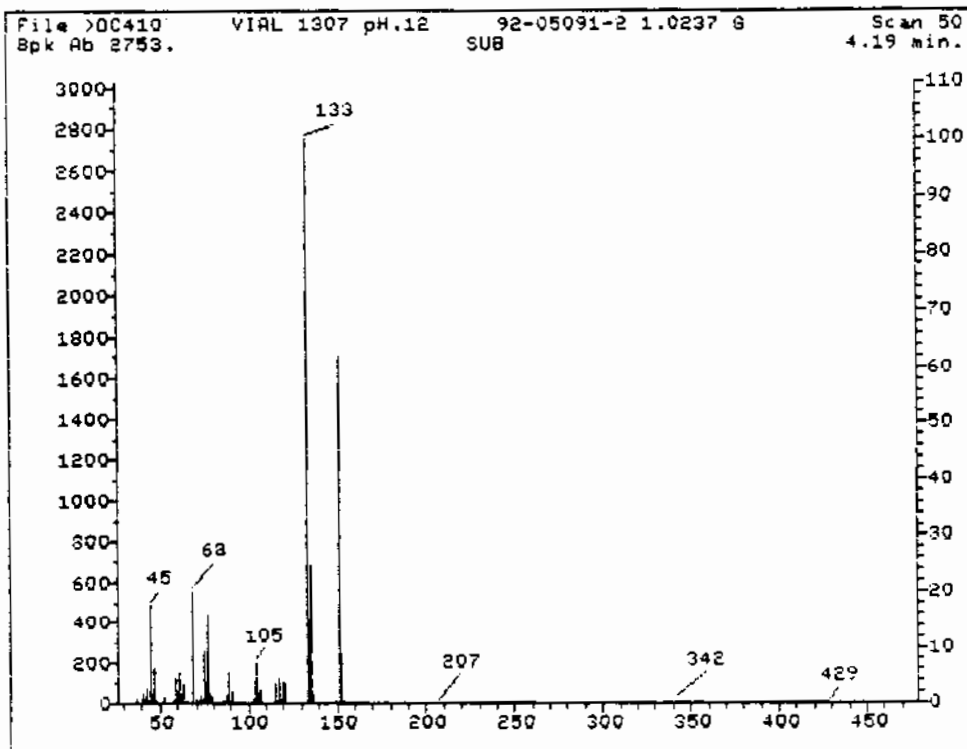
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CLP ADC TIC
2400 2500 2600 2700 2800 2900 3000 3100



File >DC410 35.0-500.0 amu. VIAL 1307 pH.12 92-05091-2 1.0237 6
CLP ADC TIC
3200 3400 3600 3800 4000 4200 4400



Instrument ID: BNA1 Analyzed on: 4/25/92 12:11

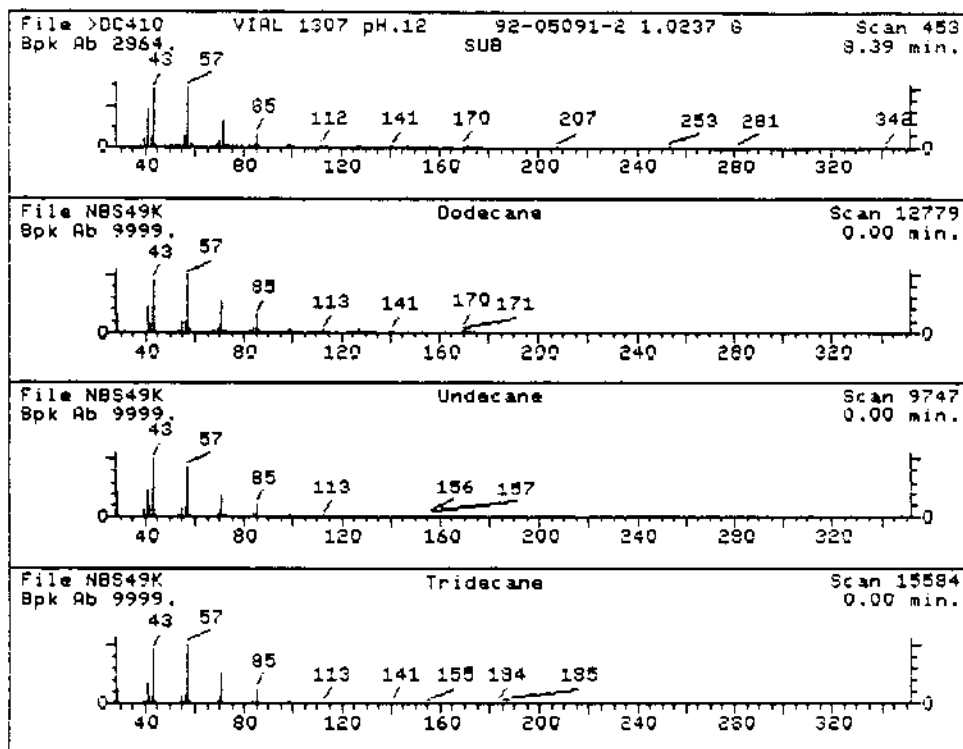


Instrument ID: BNA1 Analyzed on: 4/25/92 12:11
Result 1 in PBM results file: LDC410
Retention Time: 4.19 Area: 53817 Tentative Conc: 11000.00
The unknown area is 28.87% of the nearest internal standard

Sample file: >DC410 Spectrum #: 50

No data base entries were retrieved.

unk

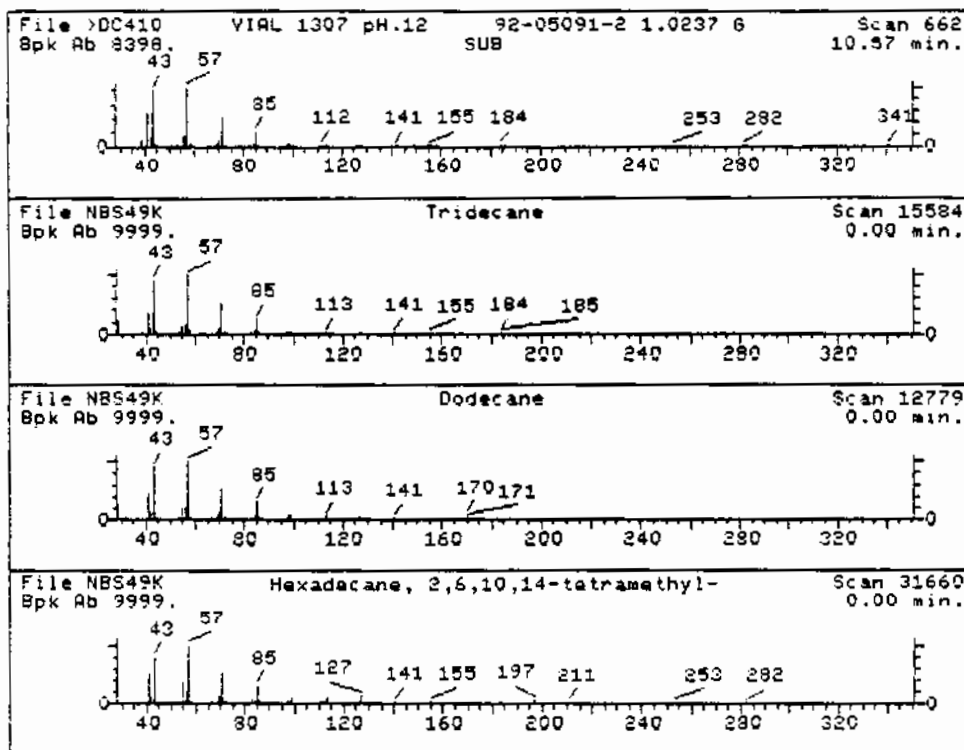


Instrument ID: BNA1 Analyzed on: 4/25/92 12:11
Result 2 in PBM results file: LDC410
Retention Time: 8.39 Area: 26178 Tentative Conc: 4800.00
The unknown area is 12.20% of the nearest internal standard

①. Dodecane	170 C12H26
2. Undecane	156 C11H24
3. Tridecane	184 C13H28
4. Tetradecane	198 C14H30
5. Heptadecane, 2,6,10,14-tetramethyl-	296 C21H44
6. Pentadecane	212 C15H32

Sample file: >DC410 Spectrum #: 453
Search speed: 3 Tilting option: F No. of ion ranges searched: 65

	Prob.	CAS #	CON #	ROOT	K	OK	#FLG	TILT	%	CON	C_I	R_IV
①.	96*	112403	6732	NBS49K	99	0	0	4	88	4	72	94
2.	87	1120214	6682	NBS49K	81	16	1	0	89	5	63	42
3.	86	629505	6761	NBS49K	79	27	1	0	75	5	60	38
4.	83	629594	6804	NBS49K	87	21	2	4	99	4	57	27
5.	78	18344371	6880	NBS49K	61	68	2	0	71	5	55	12
6.	76	629629	6819	NBS49K	92	28	2	4	72	8	45	27

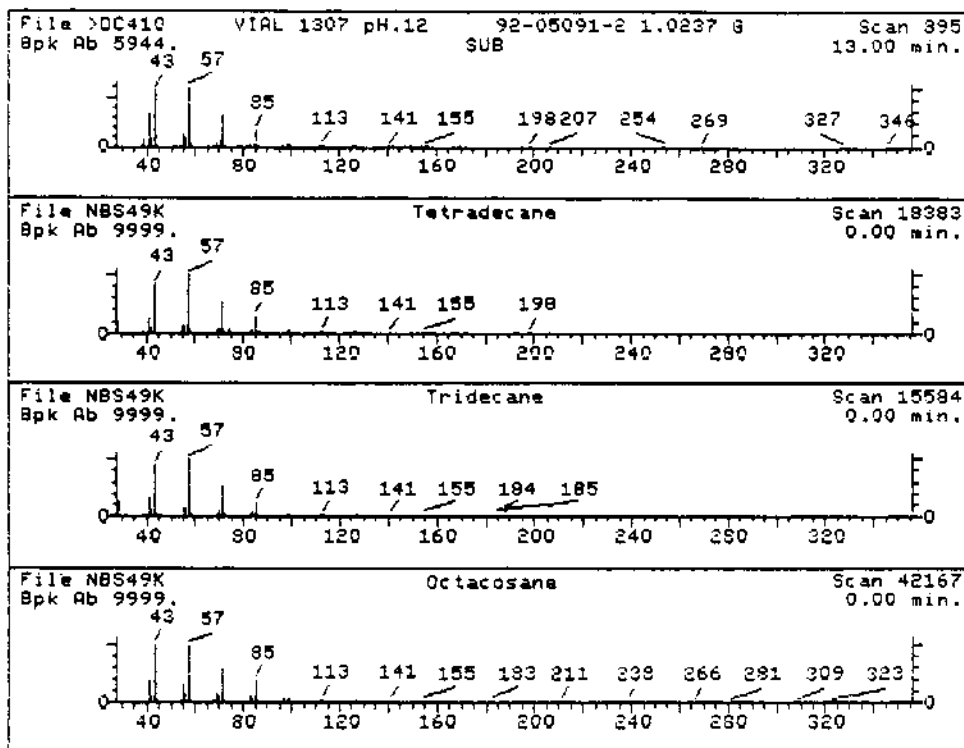


Instrument ID: BNA1 Analyzed on: 4/25/92 12:11
Result 3 in PBM results file: LDC410
Retention Time: 10.57 Area: 84834 Tentative Conc: 15000.00
The unknown area is 39.53% of the nearest internal standard

1. Tridecane	184 C13H28
2. Dodecane	170 C12H26
3. Hexadecane, 2,6,10,14-tetramethyl-	282 C20H42
4. Tetradecane	198 C14H30
5. Octacosane	394 C28H58
6. Decane, 6-ethyl-2-methyl-	184 C13H28

Sample file: >DC410 Spectrum #: 662
Search speed: 3 Tilting option: F No. of ion ranges searched: 65

	Prob.	CAS #	CON #	ROOT	K	DK	#FLG	TILT	%	CON	C_I	R_IV
1.	96*	629505	6761	NBS49K	90	16	0	0	73	1	72	96
2.	88	112403	6732	NBS49K	92	7	1	4	86	5	65	53
3.	86*	638368	15180	NBS49K	63	76	2	4	86	4	60	34
4.	83	629594	6804	NBS49K	92	16	2	3	100	1	57	29
5.	83	630024	6906	NBS49K	99	42	2	4	79	4	57	26
6.	83	62108218	6767	NBS49K	66	33	2	0	100	5	57	23

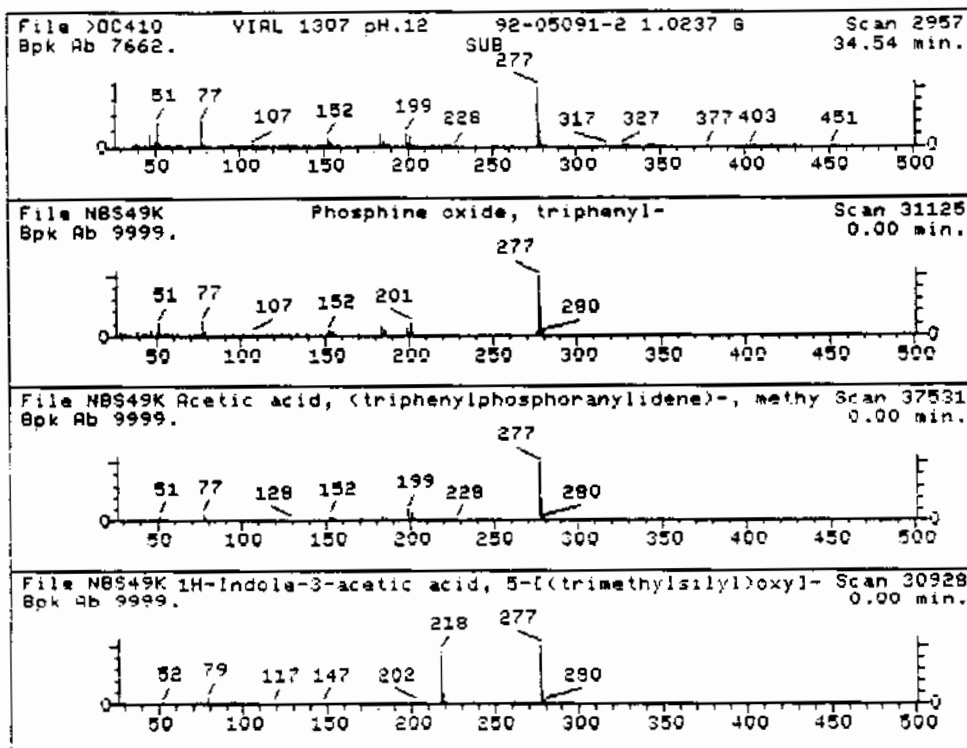


Instrument ID: BNA1 Analyzed on: 4/25/92 12:11
Result 4 in PBM results file: LDC410
Retention Time: 13.00 Area: 68068 Tentative Conc: 11000.00
The unknown area is 28.34% of the nearest internal standard

1. Tetradecane	198 C14H30
2. Tridecane	184 C13H28
3. Octacosane	394 C28H58
4. Decane, 6-ethyl-2-methyl-	184 C13H28
5. Nonane, 3-methyl-5-propyl-	184 C13H28
6. Decane, 2,3,5-trimethyl-	184 C13H28

Sample file: >DC410 Spectrum #: 895
Search speed: 3 Tilting option: F No. of ion ranges searched: 69

	Prob.	CAS #	CON #	ROOT	K	DK	#FLG	TILT	%	CON	C_I	R_IV
1.	93*	629594	6804	NBS49K	97	11	1	2	100	4	68	39
2.	88	629505	6761	NBS49K	86	20	1	0	76	5	65	50
3.	83	630024	6906	NBS49K	99	42	2	3	82	5	57	26
4.	83	62108218	6767	NBS49K	68	31	2	0	100	5	57	24
5.	79	31081182	6784	NBS49K	76	29	1	4	68	8	48	31
6.	79	62238113	6779	NBS49K	73	30	1	0	70	7	48	33



Instrument ID: BNA1 Analyzed on: 4/25/92 12:11
Result 5 in PBM results file: LDC410
Retention Time: 34.54 Area: 144535 Tentative Conc: 21000.00
The unknown area is 53.73% of the nearest internal standard

1. Phosphine oxide, triphenyl- 278 C18H15OP
2. Acetic acid, (triphenylphosphoranylidene)-, methyl ester 334 C21H19O2P
3. 1H-Indole-3-acetic acid, 5-[(trimethylsilyl)oxyl]-, methyl ester 277 C14H19NO3Si
4. 1,5-Dioxo-2,4,6,8-tetrasilacyclooctane, 2,2,4,4,6,6,8,8-octamethyl- 292 C10H28O2Si4
5. Formaldehyde, (triphenylphosphoranylidene)hydrazone 304 C19H17N2P

Sample file: >DC410 Spectrum #: 2957
Search speed: 3 Tilting option: F No. of ion ranges searched: 83

	Prob.	CAS #	CON #	ROOT	K	DK	#FLG	TILT	%	CON	C_I	R_IU
1.	73*	791286	37022	NBS49K	113	35	1	1	66	42	33	30
2.	71	2605676	37048	NBS49K	105	29	0	2	68	28	29	65
3.	50*	72101350	37001	NBS49K	53	84	2	0	100	28	19	28
4.	31*	15261060	37024	NBS49K	29	99	2	0	100	35	12	14
5.	26*	15990542	37031	NBS49K	49	102	2	1	59	42	8	14

QUANT REPORT

Operator ID: BOB
 Output File: ^DC411::DF
 Data File: >DC411::D1
 Name: UIAL 1295 pH.12
 Misc: 92-05072-MS 0.9781 G

Quant Rev: 7 Quant Time: 920425 14:03
 Injected at: 920425 13:12
 Dilution Factor: 1.00000
 Instrument ID: BNA1
 BTL# 9

ID File: ID1BNA::QT
 Title: BNA ID QUANT FILE #1 GC/MS
 Last Calibration: 911003 11:18

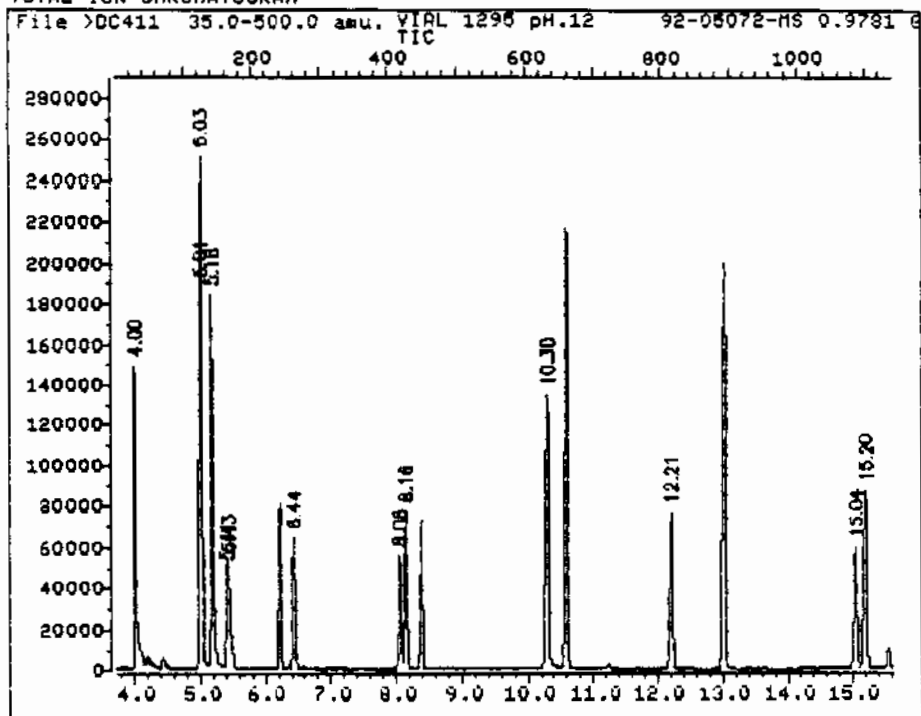
Last Qcal Date: 920424 13:55

	Compound	R.T.	Scan#	Area	Conc	Units	q
1)	*1,4-Dichlorobenzene-d4	5.41	162	19496	40.00	ng/uL	96
2)	2-Fluorophenol	4.00	27	65540	104.76	ng/uL	81
3)	Phenol-d5	5.01	123	77352	107.21	ng/uL	80
o 4)	Phenol	5.03	125	93009	107.11	ng/uL	87
5)	bis(2-Chloroethyl)ether	0.00	140	0	0.00	ng/uL	
o 6)	2-Chlorophenol	5.18	140	74516	107.62	ng/uL	96
~~7)~~	~~1,3-Dichlorobenzene~~	~~5.43~~	~~164~~	~~18191~~	~~26.72~~	~~ng/uL~~	~~95~~
x 8)	1,4-Dichlorobenzene	5.43	164	18191	24.96	ng/uL	94
9)	Benzyl alcohol	0.00	0	0	0.00	ng/uL	
~~10)~~	~~1,2-Dichlorobenzene~~	~~5.43~~	~~164~~	~~18191~~	~~25.41~~	~~ng/uL~~	~~99~~
11)	2-Methylphenol	0.00	0	0	0.00	ng/uL	
12)	bis(2-Chloroisopropyl)ether	0.00	0	0	0.00	ng/uL	
13)	4-Methylphenol	0.00	0	0	0.00	ng/uL	
x 14)	N-Nitroso-di-n-propylamine	0.00	240	25402 0	68.250.00	ng/uL	
15)	Hexachloroethane	0.00	0	0	0.00	ng/uL	
16)	*Naphthalene-d8	8.16	425	69229	40.00	ng/uL	97
17)	Nitrobenzene-d5	6.44	260	44197	52.36	ng/uL	89
18)	Nitrobenzene	0.00	0	0	0.00	ng/uL	
19)	Isophorone	0.00	0	0	0.00	ng/uL	
20)	2-Nitrophenol	0.00	0	0	0.00	ng/uL	
21)	2,4-Dimethylphenol	0.00	0	0	0.00	ng/uL	
22)	Benzoic acid	0.00	0	0	0.00	ng/uL	
23)	bis(2-Chloroethoxy)methane	0.00	0	0	0.00	ng/uL	
24)	2,4-Dichlorophenol	0.00	0	0	0.00	ng/uL	
x 25)	1,2,4-Trichlorobenzene	8.06	416	24155	42.74	ng/uL	99
26)	Naphthalene	0.00	0	0	0.00	ng/uL	
27)	4-Chloroaniline	0.00	0	0	0.00	ng/uL	
28)	Hexachlorobutadiene	0.00	0	0	0.00	ng/uL	
o 29)	4-Chloro-3-methylphenol	10.30	631	81349	128.02	ng/uL	93
30)	2-Methylnaphthalene	0.00	631	0	0.00	ng/uL	
31)	*Acenaphthene-d10	15.04	1085	39275	40.00	ng/uL	98
32)	Hexachlorocyclopentadiene	0.00	0	0	0.00	ng/uL	
33)	2,4,6-Trichlorophenol	0.00	0	0	0.00	ng/uL	
34)	2,4,5-Trichlorophenol	0.00	0	0	0.00	ng/uL	
35)	2-Chloronaphthalene	0.00	0	0	0.00	ng/uL	
36)	2-Fluorobiphenyl	12.21	814	59171	51.86	ng/uL	9E
37)	2-Nitroaniline	0.00	0	0	0.00	ng/uL	
38)	Dimethylphthalate	0.00	0	0	0.00	ng/uL	
39)	Acenaphthylene	0.00	0	0	0.00	ng/uL	
40)	2,6-Dinitrotoluene	0.00	1085	0	0.00	ng/uL	
41)	3-Nitroaniline	0.00	0	0	0.00	ng/uL	
x 42)	Acenaphthene	15.20	1100	62927	62.08	ng/uL	9E

43)	2,4-Dinitrophenol	0.00	0	0	0.00	ng/uL	
44)	4-Nitrophenol	16.37	1212	~~174 1191~~	~~8.275.63~~	ng/uL	9
45)	Dibenzofuran	0.00	0	0	0.00	ng/uL	
46)	2,4-Dinitrotoluene	16.37	1212	26815	51.03	ng/uL	97
47)	Diethylphthalate	0.00	0	0	0.00	ng/uL	
48)	4-Chlorophenyl-phenylether	0.00	0	0	0.00	ng/uL	
49)	Fluorene	0.00	0	0	0.00	ng/uL	
50)	4-Nitroaniline	0.00	0	0	0.00	ng/uL	
51)	*Phenanthrene-d10	22.35	1784	67295	40.00	ng/uL	98
52)	4,6-Dinitro-2-methylphenol	0.00	0	0	0.00	ng/uL	
53)	N-Nitrosodiphenylamine	0.00	0	0	0.00	ng/uL	
54)	2,4,6-Tribromophenol	18.97	1461	16486	65.12	ng/uL	99
55)	4-Bromophenyl-phenylether	0.00	0	0	0.00	ng/uL	
56)	Hexachlorobenzene	0.00	0	0	0.00	ng/uL	
57)	Pentachlorophenol	0.00	0	0	0.00	ng/uL	
58)	Phenanthrene	0.00	0	0	0.00	ng/uL	
59)	Anthracene	0.00	0	0	0.00	ng/uL	
60)	Di-n-butylphthalate	0.00	0	0	0.00	ng/uL	
61)	Fluoranthene	0.00	0	0	0.00	ng/uL	
62)	*Chrysene-d12	33.85	2883	73973	40.00	ng/uL	93
63)	Pyrene	29.28	2448	128387	63.13	ng/uL	92
64)	Terphenyl-d14	30.33	2548	79967	57.51	ng/uL	91
65)	Butylbenzylphthalate	0.00	0	0	0.00	ng/uL	
66)	3,3'-Dichlorobenzidine	0.00	0	0	0.00	ng/uL	
67)	Benzo(a)anthracene	0.00	0	0	0.00	ng/uL	
68)	Chrysene	0.00	0	0	0.00	ng/uL	
69)	Bis(2-Ethylhexyl)phthalate	0.00	0	0	0.00	ng/uL	
70)	*Perylene-d12	38.22	3294	72000	40.00	ng/uL	98
71)	Di-n-octylphthalate	0.00	0	0	0.00	ng/uL	
72)	Benzo(b)fluoranthene	0.00	0	0	0.00	ng/uL	
73)	Benzo(k)fluoranthene	0.00	0	0	0.00	ng/uL	
74)	Benzo(a)pyrene	0.00	0	0	0.00	ng/uL	
75)	Indeno(1,2,3-cd)pyrene	0.00	0	0	0.00	ng/uL	
76)	Dibenz(a,h)anthracene	0.00	0	0	0.00	ng/uL	
77)	Benzo(g,h,i)perylene	0.00	0	0	0.00	ng/uL	

* Compound is ISTD

TOTAL ION CHROMATOGRAM



Data File: >DC411::01
Name: VIAL 1295 pH.12
Misc: 92-05072-MS 0.9781 G

Quant Output File: ^DC411::0F
Instrument ID: BNA1

BTLE# 9

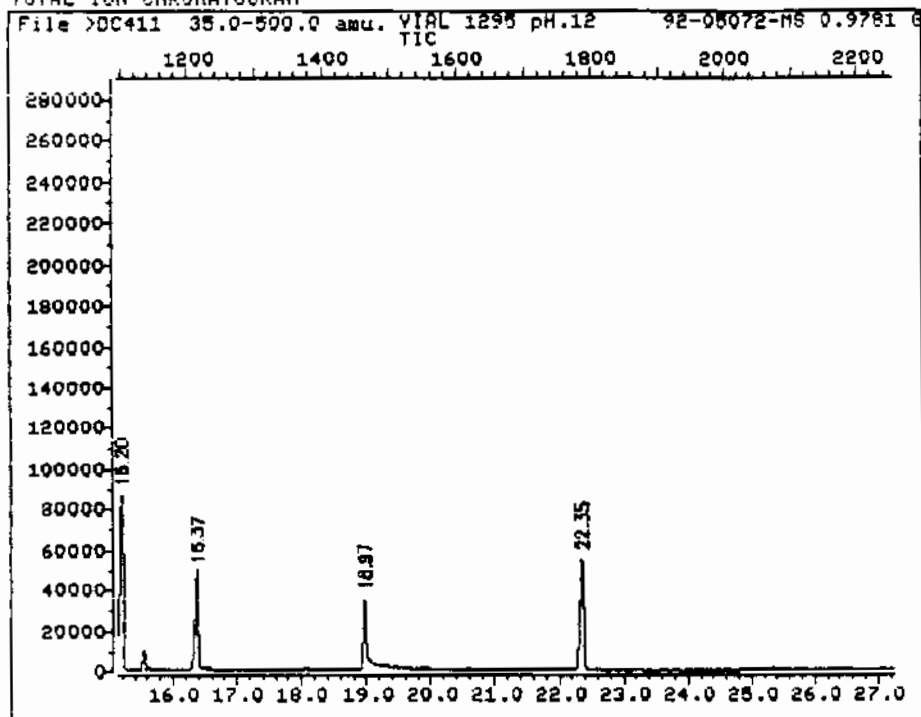
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Title: BNA ID QUANT FILE #1 GC/MS
Last Calibration: 911003 11:18

Last Qcal Time: 920424 13:55

Operator ID: BOB
Quant Time : 920425 14:03
Injected at: 920425 13:12

Page 1 of 4

TOTAL ION CHROMATOGRAM



Data File: >DC411::D1
Name: VIAL 1295 pH.12
Misc: 92-05072-MS 0.9781 G

Quant Output File: ^DC411::OF
Instrument ID: BNA1
BTL# 9

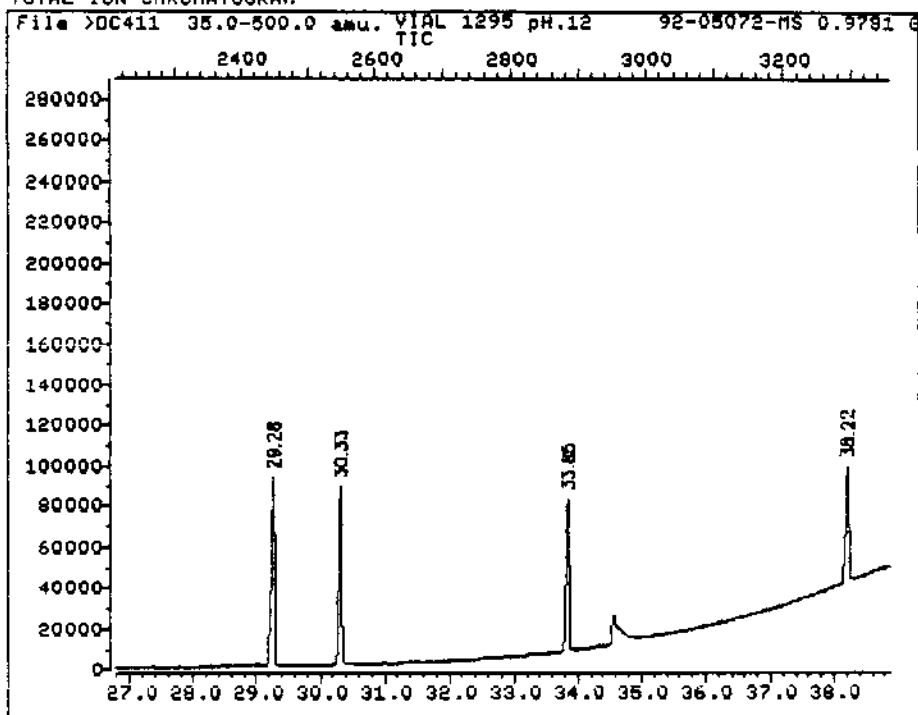
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Last Calibration: 911003 11:18

Last Qcal Time: 920424 13:55

Operator ID: BOB
Quant Time : 920425 14:03
Injected at: 920425 13:12

Page 2 of 4

TOTAL ION CHROMATOGRAM



Data File: >DC411::D1
Name: VIAL 1295 pH.12
Misc: 92-05072-MS 0.9781 G

Quant Output File: ^DC411::DF
Instrument ID: BNA1

BTL# 9

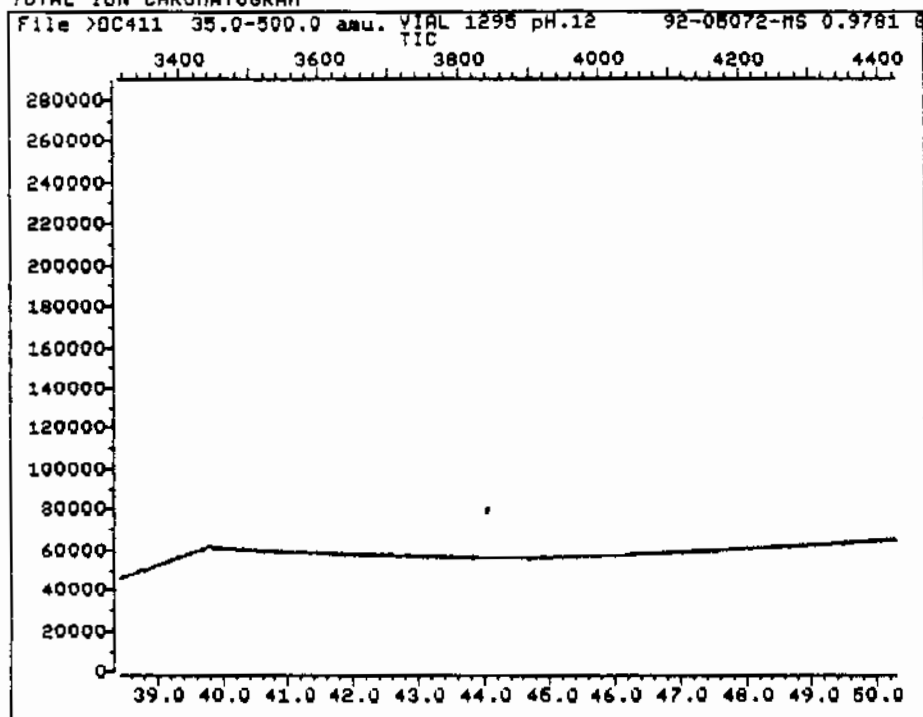
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Last Calibration: 911003 11:18

Last Qcal Time: 920424 13:55

Operator ID: BOB
Quant Time : 920425 14:03
Injected at: 920425 13:12

Page 3 of 4

TOTAL ION CHROMATOGRAM



Data File: >DC411::D1
 Name: VIAL 1295 pH.12
 Misc: 92-05072-MS 0.9781 G

Quant Output File: ^DC411::OF
 Instrument ID: BNA1
 BTL# 9

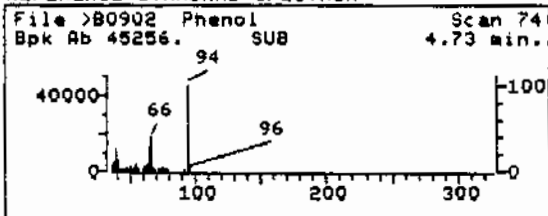
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 Last Calibration: 911003 11:18

Last Qcal Time: 920424 13:55

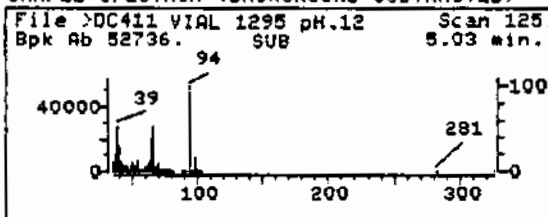
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 Injected at: 920425 13:12

Page 4 of 4

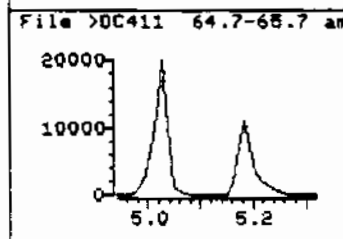
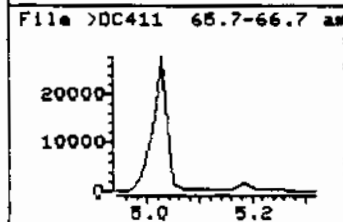
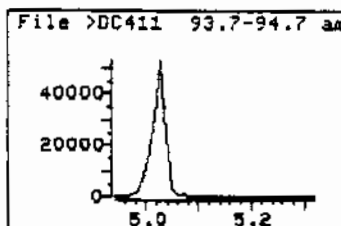
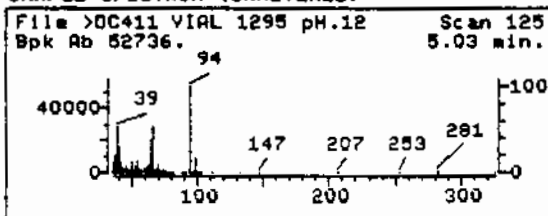
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SAMPLE SPECTRUM (BACKGROUND SUBTRACTED)



SAMPLE SPECTRUM (UNALTERED)



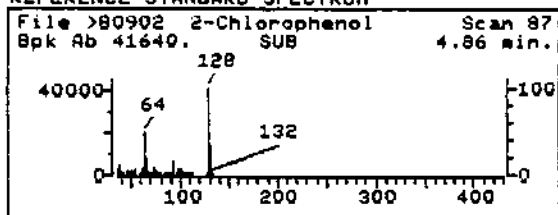
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Name: VIAL 1295 pH.12
Misc: 92-05072-MS 0.9781 G
Quant Time: 920425 14:03
Injected at: 920425 13:12
Last Qcal Time: 920424 13:55

Quant Output File: ^DC411::OF
Instrument ID: 8NA1 BTL# 9
Quant ID File: ID18NA::QT
Last Calibration: 911003 11:18

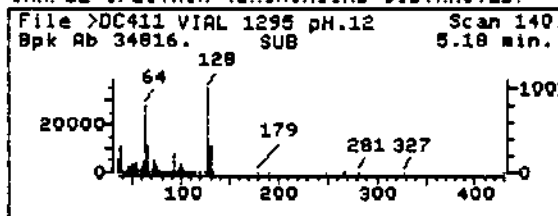
Compound No : 4
Compound Name : Phenol
Scan Number : 125
Retention Time: 5.03 min.
Quant Ion : 94.0
Area : 93009
Concentration : 107.11 ng/uL
q-value : 87

ok

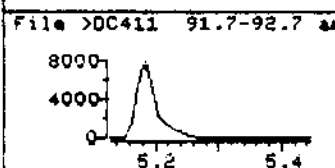
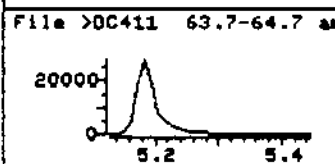
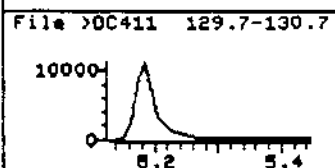
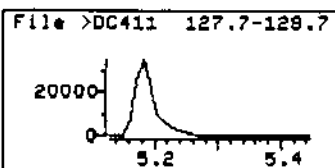
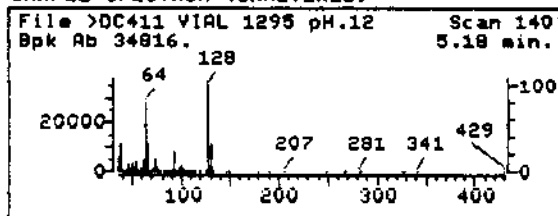
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SAMPLE SPECTRUM (UNALTERED)



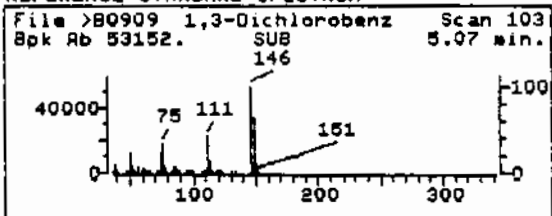
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Name: VIAL 1295 pH.12
Misc: 92-05072-MS 0.9781 G
Quant Time: 920425 14:03
Injected at: 920425 13:12
Last Qcal Time: 920424 13:55

Quant Output File: ^DC411::OF
Instrument ID: BNA1
BTL# 9
Quant ID File: ID1BNA::QT
Last Calibration: 911003 11:18

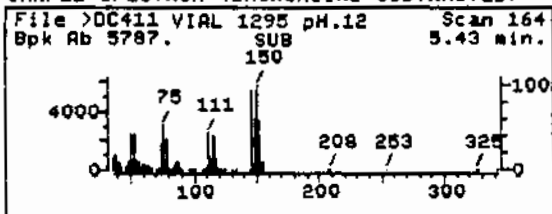
Compound No : 6
Compound Name : 2-Chlorophenol
Scan Number : 140
Retention Time: 5.18 min.
Quant Ion : 128.0
Area : 74516
Concentration : 107.62 ng/uL
q-value : 96

04

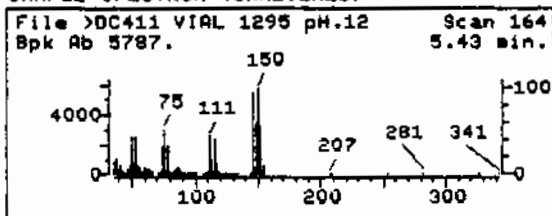
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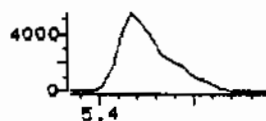
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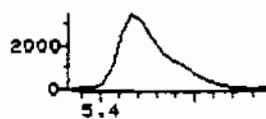
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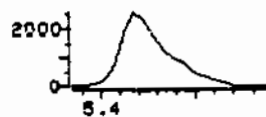
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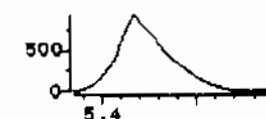
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File >DC411 110.7-111.7



File >DC411 112.7-113.7



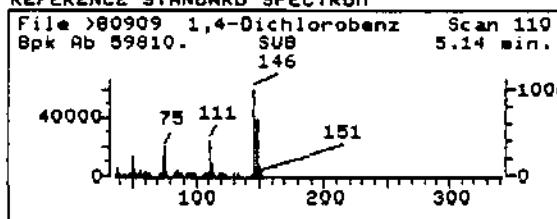
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Name: VIAL 1295 pH.12
Misc: 92-05072-MS 0.9781 G
Quant Time: 920425 14:03
Injected at: 920425 13:12
Last Qcal Time: 920424 13:55

Quant Output File: ^DC411::OF
Instrument ID: BNA1
BTL# 9
Quant ID File: ID1BNA::QT
Last Calibration: 911003 11:18

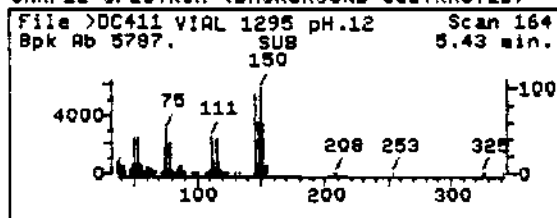
Compound No : 7
Compound Name : 1,3-Dichlorobenzene
Scan Number : 164
Retention Time: 5.43 min.
Quant Ion : 146.0
Area : 18191
Concentration : 26.72 ng/uL
q-value : 95

delits

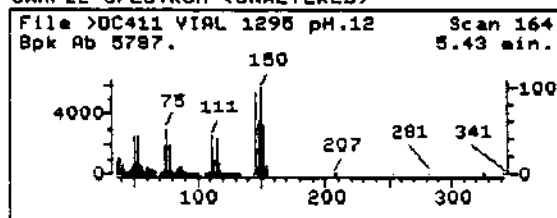
REFERENCE STANDARD SPECTRUM



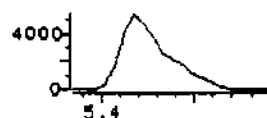
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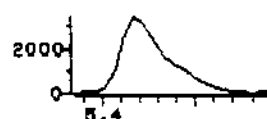
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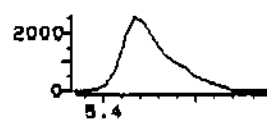
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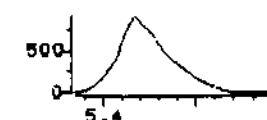
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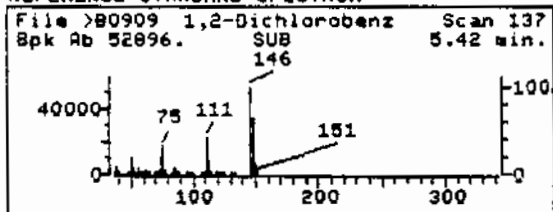
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Name: VIAL 1295 pH.12
Misc: 92-05072-MS 0.9781 G
Quant Time: 920425 14:03
Injected at: 920425 13:12
Last Qcal Time: 920424 13:55

Quant Output File: ^DC411::OF
Instrument ID: BNA1 BTL# 9
Quant ID File: ID1BNA::QT
Last Calibration: 911003 11:18

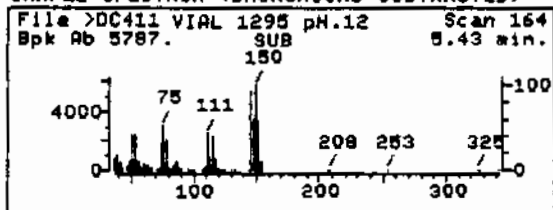
Compound No : 8
Compound Name : 1,4-Dichlorobenzene
Scan Number : 164
Retention Time: 5.43 min.
Quant Ion : 146.0
Area : 18191
Concentration : 24.96 ng/uL
q-value : 94

OK

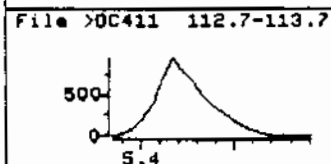
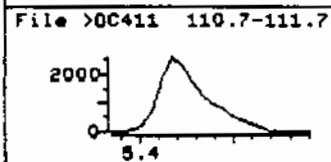
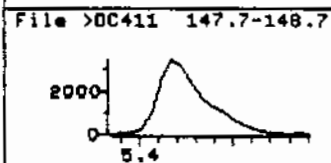
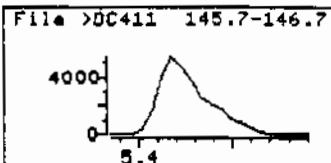
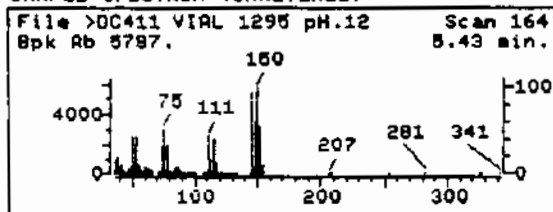
REFERENCE STANDARD SPECTRUM



SAMPLE SPECTRUM (BACKGROUND SUBTRACTED)



SAMPLE SPECTRUM (UNALTERED)



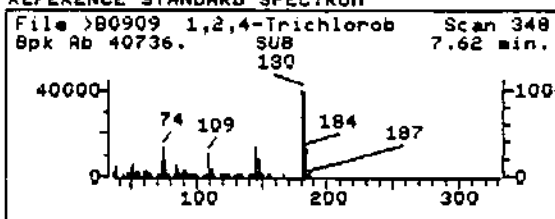
Data File: >DC411::D1
Name: VIAL 1295 pH.12
Misc: 92-05072-MS 0.9781 G
Quant Time: 920425 14:03
Injected at: 920425 13:12
Last Qcal Time: 920424 13:55

Quant Output File: ^DC411::OF
Instrument ID: BNA1
BTL# 9
Quant ID File: ID1BNA::QT
Last Calibration: 911003 11:18

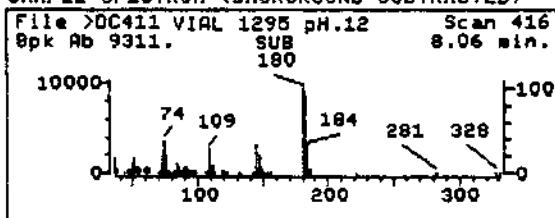
Compound No : 10
Compound Name : 1,2-Dichlorobenzene
Scan Number : 164
Retention Time: 5.43 min.
Quant Ion : 146.0
Area : 18191
Concentration : 25.41 ng/uL
q-value : 99

alch

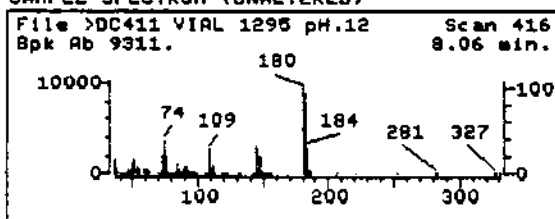
REFERENCE STANDARD SPECTRUM



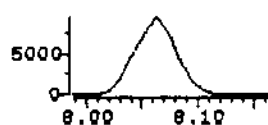
SAMPLE SPECTRUM (BACKGROUND SUBTRACTED)



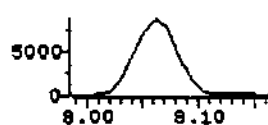
SAMPLE SPECTRUM (UNALTERED)



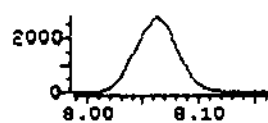
File >DC411 179.7-180.7



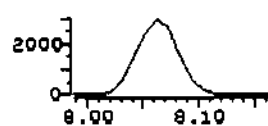
File >DC411 181.7-182.7



File >DC411 183.7-184.7



File >DC411 144.7-145.7



Data File: >DC411::D1
Name: VIAL 1295 pH.12
Misc: 92-05072-MS 0.9781 G
Quant Time: 920425 14:03
Injected at: 920425 13:12
Last Qcal Time: 920424 13:55

Quant Output File: ^DC411::OF
Instrument ID: BNA1

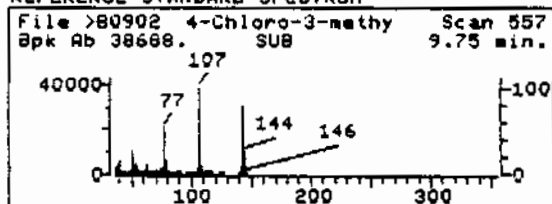
BTL# 9

Quant ID File: ID18NA::QT
Last Calibration: 911003 11:18

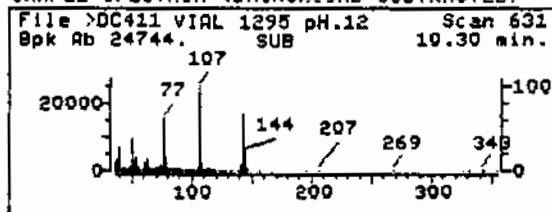
Compound No : 25
Compound Name : 1,2,4-Trichlorobenzene
Scan Number : 416
Retention Time: 8.06 min.
Quant Ion : 180.0
Area : 24155
Concentration : 42.74 ng/uL
q-value : 99

OK

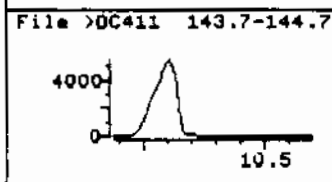
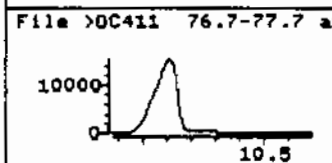
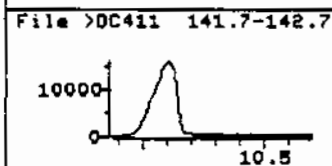
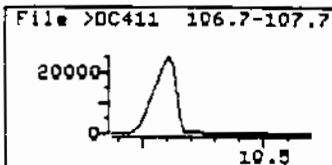
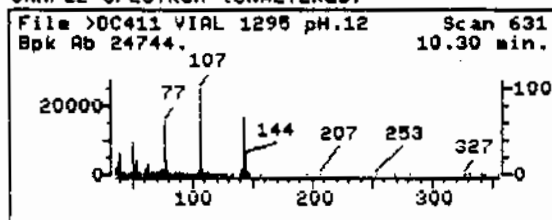
REFERENCE STANDARD SPECTRUM



SAMPLE SPECTRUM (BACKGROUND SUBTRACTED)



SAMPLE SPECTRUM (UNALTERED)



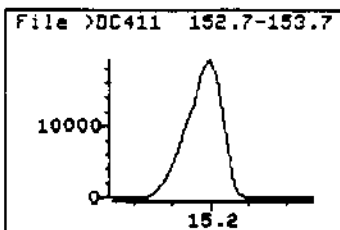
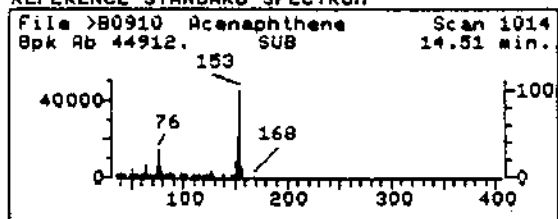
Data File: >DC411::01
Name: VIAL 1295 pH.12
Misc: 92-05072-MS 0.9781 G
Quant Time: 920425 14:03
Injected at: 920425 13:12
Last Qcal Time: 920424 13:55

Quant Output File: ^DC411::QF
Instrument ID: BNA1
BT# 9
Quant ID File: ID18NA::QT
Last Calibration: 911003 11:18

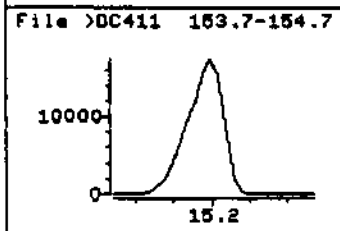
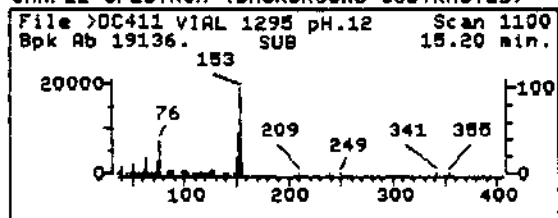
Compound No : 29
Compound Name : 4-Chloro-3-methylphenol
Scan Number : 631
Retention Time: 10.30 min.
Quant Ion : 107.0
Area : 81349
Concentration : 128.02 ng/uL
q-value : 93

ok

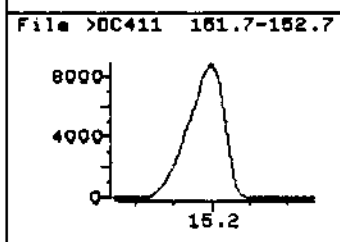
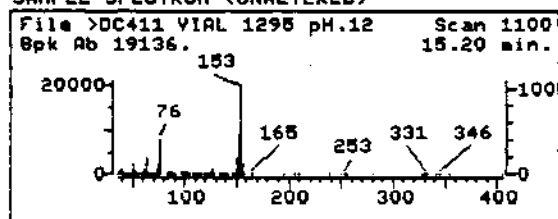
REFERENCE STANDARD SPECTRUM



SAMPLE SPECTRUM (BACKGROUND SUBTRACTED)



SAMPLE SPECTRUM (UNALTERED)



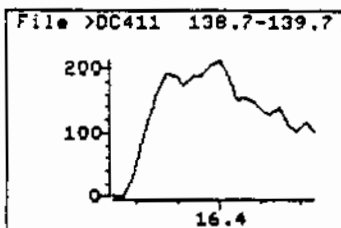
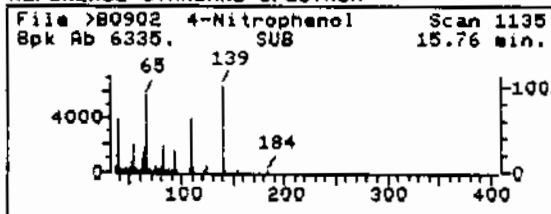
Date File: >DC411::D1
Name: VIAL 1295 pH.12
Misc: 92-05072-MS 0.9781 G
Quant Time: 920425 14:03
Injected at: 920425 13:12
Last Qcal Time: 920424 13:55

Quant Output File: ^DC411::OF
Instrument ID: BNA1
STL# 9
Quant ID File: ID1BNA::QT
Last Calibration: 911003 11:18

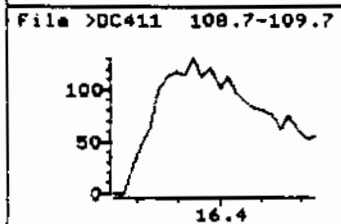
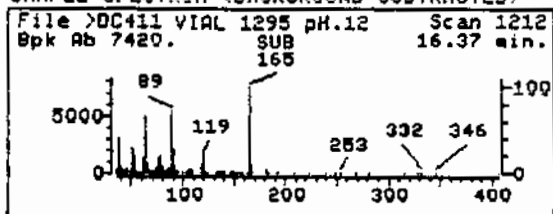
Compound No : 42
Compound Name : Acenaphthene
Scan Number : 1100
Retention Time: 15.20 min.
Quant Ion : 153.0
Area : 62927
Concentration : 62.08 ng/uL
q-value : 98

OK

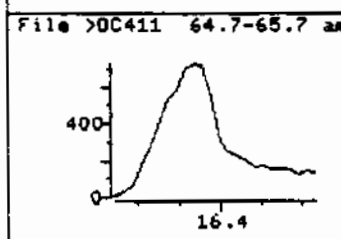
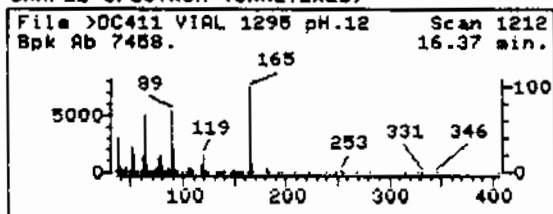
REFERENCE STANDARD SPECTRUM



SAMPLE SPECTRUM (BACKGROUND SUBTRACTED)



SAMPLE SPECTRUM (UNALTERED)



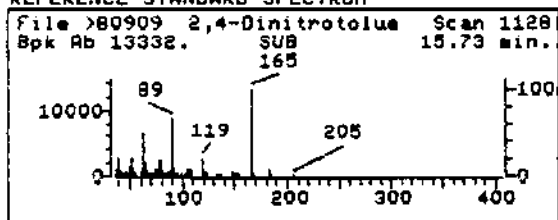
Data File: >DC411::D1
Name: VIAL 1295 pH.12
Misc: 92-05072-MS 0.9781 G
Quant Time: 920425 14:03
Injected at: 920425 13:12
Last Qcal Time: 920424 13:55

Quant Output File: ^DC411::OF
Instrument ID: BNA1 BTL# 9
Quant ID File: ID1BNA::QT
Last Calibration: 911003 11:18

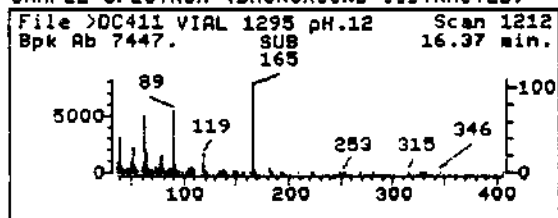
Compound No : 44
Compound Name : 4-Nitrophenol
Scan Number : 1212
Retention Time: 16.37 min.
Quant Ion : 109.0
Area : 1191
Concentration : 5.63 ng/uL
q-value : 93

ok

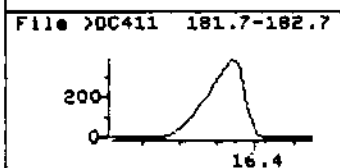
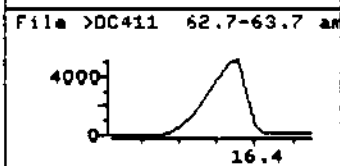
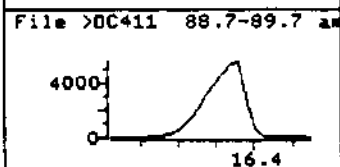
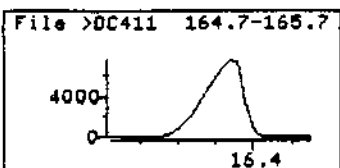
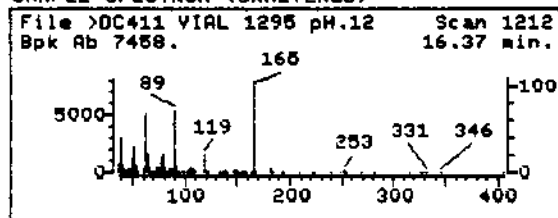
REFERENCE STANDARD SPECTRUM



SAMPLE SPECTRUM (BACKGROUND SUBTRACTED)



SAMPLE SPECTRUM (UNALTERED)



Data File: >DC411::D1
Name: VIAL 1295 pH.12
Misc: 92-05072-MS 0.9781 G
Quant Time: 920425 14:03
Injected at: 920425 13:12
Last Qcal Time: 920424 13:55

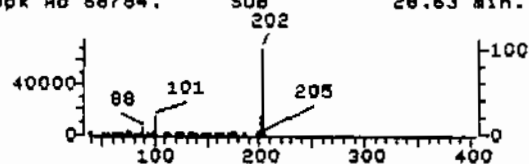
Quant Output File: ^DC411::OF
Instrument ID: BNA1 BTL# 9
Quant ID File: ID1BNA::QT
Last Calibration: 911003 11:18

Compound No : 46
Compound Name : 2,4-Dinitrotoluene
Scan Number : 1212
Retention Time: 16.37 min.
Quant Ion : 165.0
Area : 26815
Concentration : 51.03 ng/uL
q-value : 97

OK

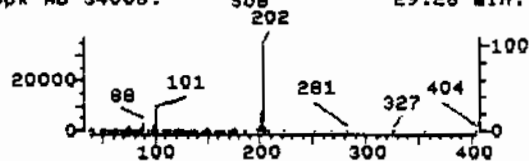
REFERENCE STANDARD SPECTRUM

File >B0910 Pyrene Scan 2373
Bpk Ab 68784. SUB 28.63 min.



SAMPLE SPECTRUM (BACKGROUND SUBTRACTED)

File >DC411 VIAL 1295 pH.12 Scan 2448
Bpk Ab 34008. SUB 29.28 min.

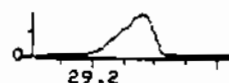


SAMPLE SPECTRUM (UNALTERED)

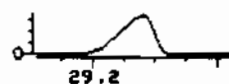
File >DC411 VIAL 1295 pH.12 Scan 2448
Bpk Ab 34008. SUB 29.28 min.



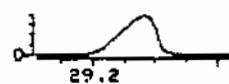
File >DC411 201.7-202.7



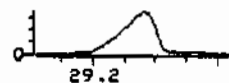
File >DC411 199.7-200.7



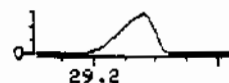
File >DC411 100.7-101.7



File >DC411 99.7-100.7



File >DC411 202.7-203.7



Data File: >DC411::D1
Name: VIAL 1295 pH.12
Misc: 92-05072-MS 0.9781 G
Quant Time: 920425 14:03
Injected at: 920425 13:12
Last Qcal Time: 920424 13:55

Quant Output File: ^DC411::QF
Instrument ID: BNA1
STL# 9
Quant ID File: ID1BNA::QT
Last Calibration: 911003 11:18

Compound No : 63
Compound Name : Pyrene
Scan Number : 2448
Retention Time: 29.28 min.
Quant Ion : 202.0
Area : 128387
Concentration : 63.13 ng/uL
q-value : 92

OK

[GC/MS OPERATOR REPORT]

[GC/MS LAB SEMI VOLATILES]

[INTERNAL STANDARD CHECK REPORT]

SAMPLE FILE = >DC411
 CAL CHECK FILE = >OC402
 DATE AND TIME OF ANALYSIS = 4/25/92 13:12
 MISCELLANEOUS = 92-05072-MS 0.9781 G
 METHOD = BNAME1
 INSTRUMENT = BNA1
 OPERATOR = BOB SUPER GRP

I. Areas

----- Name of the BNA Internal Standard -----	The Sample ISTD Area -----	Daily Check ISTD Area -----	Daily Check ISTD Area / 2 -----	Daily Check ISTD Area x 2 -----	Status of the Sample ISTD Area Precision -----
1,4-Dichlorobenz-d4	19496	24890	12445	49780	OK
Naphthalene-d8	69229	87937	43969	175874	OK
Acenaphthene-d10	39275	47070	23535	94140	OK
Phenanthrene-d10	67295	81388	40694	162776	OK
Chrysene-d12	73973	81856	40928	163712	OK
Perylene-d12	72000	90335	45168	180670	OK

II. Retention Times

----- Name of the BNA Internal Standard -----	The Sample ISTD R.Time -----	Daily Check ISTD R.Time -----	Daily Check ISTD RT - 0.5 -----	Daily Check ISTD RT + 0.5 -----	Status of the Sample ISTD R.T. Precision -----
1,4-Dichlorobenz-d4	5.41	5.41	4.91	5.91	OK
Naphthalene-d8	8.16	8.17	7.67	8.67	OK
Acenaphthene-d10	15.04	15.05	14.55	15.55	OK
Phenanthrene-d10	22.35	22.38	21.88	22.88	OK
Chrysene-d12	33.85	33.88	33.38	34.38	OK
Perylene-d12	38.22	38.25	37.75	38.75	OK

[GC/MS OPERATOR REPORT]

[GC/MS LAB SEMIVOLATILES]

[Preliminary Surrogate Report]

DATA FILE NAME = >DC411::D1
DATE AND TIME OF ANALYSIS = 4/25/92 13:12
SAMPLE = VIAL 1295 pH.12
MISCELLANEOUS = 92-05072-MS 0.9781 G
METHOD = BNAME1
INSTRUMENT = BNA1
OPERATOR = BOB SUPER GRP

SURROGATE	AS FOUND IN SAMPLE	WAS SPIKED AT	WATER LIMITS	SOIL LIMITS	% RECOVERY
-----	-----	-----	-----	-----	-----
2-Fluorophenol	104.76	100.00	21-100	25-121	104.76
Phenol-d5	107.21	100.00	10-94	24-113	107.21
Nitrobenzene-d5	52.36	50.00	35-114	23-120	104.73
2-Fluorobiphenyl	51.86	50.00	43-116	30-115	103.71
2,4,6-tribromo- phenol	65.12	100.00	10-123	19-122	65.12
Terphenyl-d14	57.51	50.00	33-141	18-137	115.02

QUANT REPORT

Operator ID: BOB
 Output File: ^DC412::OF
 Data File: >DC412::D1
 Name: UIAL 1295 pH.12
 Misc: 92-05072-MSD 0.9944 G

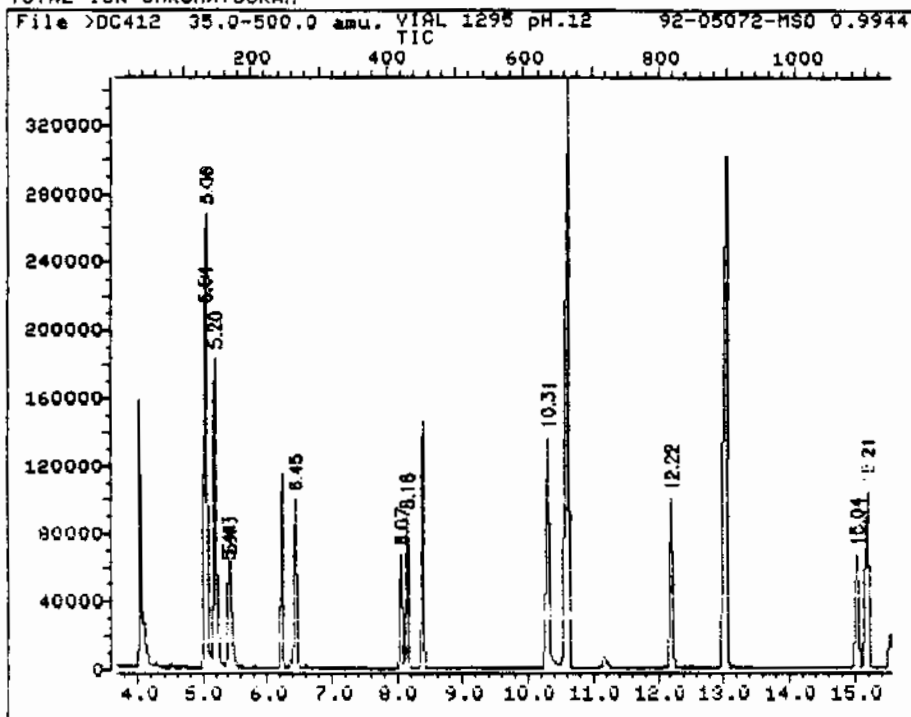
Quant Rev: 7 Quant Time: 920425 15:04
 Injected at: 920425 14:12
 Dilution Factor: 1.00000
 Instrument ID: BNA1
 BTL#10

ID File: 101BNA::QT
 Title: BNA ID QUANT FILE #1 GC/MS
 Last Calibration: 911003 11:18

Last Qcal Date: 920424 13:55

	Compound	R.T.	Scan#	Area	Conc	Units	q
1)	*1,4-Dichlorobenzene-d4	5.41	166	21129	40.00	ng/uL	9c
2)	2-Fluorophenol	~~0.00~~	35	~~76081~~ 0	112.21 0.00	ng/uL	
3)	Phenol-d5	5.04	131	95872	122.61	ng/uL	81
4)	Phenol	5.06	133	103516	109.99	ng/uL	8E
5)	bis(2-Chloroethyl)ether	0.00	146	0	0.00	ng/uL	
6)	2-Chlorophenol	5.20	146	81261	108.29	ng/uL	9c
7)	1,3-Dichlorobenzene	5.43	168	22820	30.93	ng/uL	9c
8)	1,4-Dichlorobenzene	5.43	168	22820	28.89	ng/uL	9F
9)	Benzyl alcohol	0.00	0	0	0.00	ng/uL	
10)	1,2-Dichlorobenzene	5.43	168	22820	29.42	ng/uL	9E
11)	2-Methylphenol	0.00	0	0	0.00	ng/uL	
12)	bis(2-Chloroisopropyl)ether	0.00	0	0	0.00	ng/uL	
13)	4-Methylphenol	0.00	0	0	0.00	ng/uL	
x14)	N-Nitroso-di-n-propylamine	0.00	245	4285	0.00	ng/uL	
15)	Hexachloroethane	0.00	0	0	0.00	ng/uL	
16)	*Naphthalene-d8	8.16	429	74683	40.00	ng/uL	9c
17)	Nitrobenzene-d5	6.45	265	63080	69.28	ng/uL	87
18)	Nitrobenzene	0.00	0	0	0.00	ng/uL	
19)	Isophorone	0.00	0	0	0.00	ng/uL	
20)	2-Nitrophenol	0.00	0	0	0.00	ng/uL	
21)	2,4-Dimethylphenol	0.00	0	0	0.00	ng/uL	
22)	Benzoic acid	0.00	0	0	0.00	ng/uL	
23)	bis(2-Chloroethoxy)methane	0.00	0	0	0.00	ng/uL	
24)	2,4-Dichlorophenol	0.00	0	0	0.00	ng/uL	
x25)	1,2,4-Trichlorobenzene	8.07	420	29390	48.20	ng/uL	97
26)	Naphthalene	0.00	0	0	0.00	ng/uL	
27)	4-Chloroaniline	0.00	0	0	0.00	ng/uL	
28)	Hexachlorobutadiene	0.00	0	0	0.00	ng/uL	
29)	4-Chloro-3-methylphenol	10.31	635	90882	132.58	ng/uL	97
30)	2-Methylnaphthalene	0.00	635	0	0.00	ng/uL	
31)	*Acenaphthene-d10	15.04	1087	43441	40.00	ng/uL	9c
32)	Hexachlorocyclopentadiene	0.00	0	0	0.00	ng/uL	
33)	2,4,6-Trichlorophenol	0.00	0	0	0.00	ng/uL	
34)	2,4,5-Trichlorophenol	0.00	0	0	0.00	ng/uL	
35)	2-Chloronaphthalene	0.00	0	0	0.00	ng/uL	
36)	2-Fluorobiphenyl	12.22	817	82369	65.26	ng/uL	9
37)	2-Nitroaniline	0.00	0	0	0.00	ng/uL	
38)	Dimethylphthalate	0.00	0	0	0.00	ng/uL	
39)	Acenaphthylene	0.00	0	0	0.00	ng/uL	
40)	2,6-Dinitrotoluene	0.00	1087	0	0.00	ng/uL	
41)	3-Nitroaniline	0.00	0	0	0.00	ng/uL	
x42)	Acenaphthene	15.21	1103	81099	72.33	ng/uL	9

TOTAL ION CHROMATOGRAM



Data File: >DC412::D1
Name: VIAL 1295 pH.12
Misc: 92-05072-MSD 0.9944 G

Quant Output File: ^DC412::OF
Instrument ID: BNA1
BTL#10

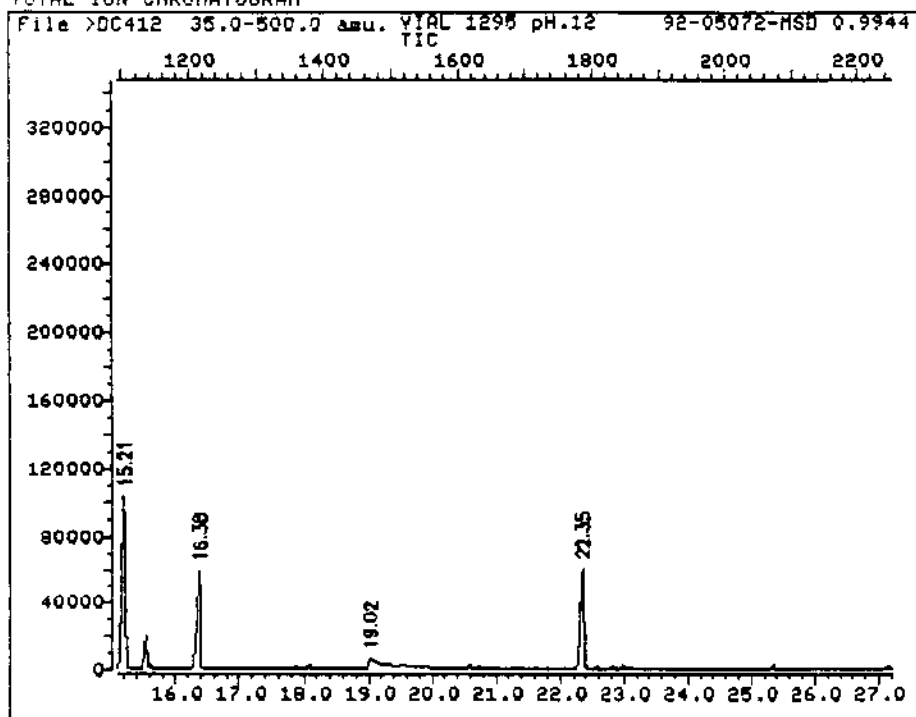
Id File: ID1BNA::QT
Title: BNA ID QUANT FILE #1 GC/MS
Last Calibration: 911003 11:18

Last Qcal Time: 920424 13:55

Operator ID: BOB
Quant Time : 920425 15:04
Injected at: 920425 14:12

Page 1 of 4

TOTAL ION CHROMATOGRAM



Data File: >DC412::01
Name: VIAL 1295 pH.12
Misc: 92-05072-MSD 0.9944 G

Quant Output File: ^DC412::0F
Instrument ID: BNA1
BTL#10

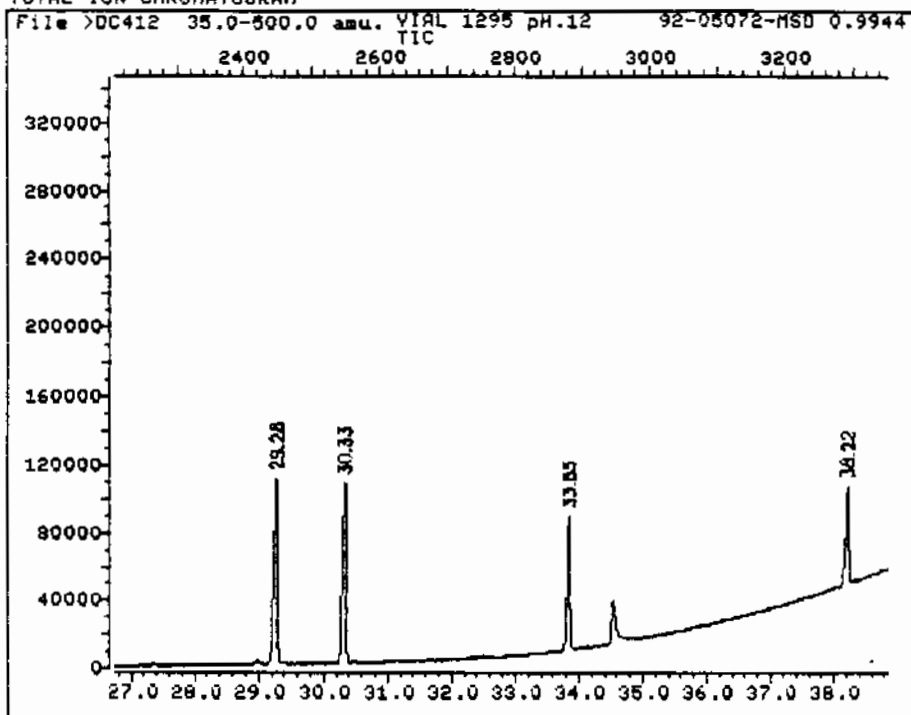
Id File: ID1BNA::QT
Title: BNA ID QUANT FILE #1 GC/MS
Last Calibration: 911003 11:18

Last Qcal Time: 920424 13:55

Operator ID: BOB
Quant Time : 920425 15:04
Injected at: 920425 14:12

Page 2 of 4

TOTAL ION CHROMATOGRAM



Data File: >DC412::D1
Name: VIAL 1295 pH.12
Misc: 92-05072-MSD 0.9944 G

Quant Output File: ^DC412::OF
Instrument ID: BNA1

BTL#10

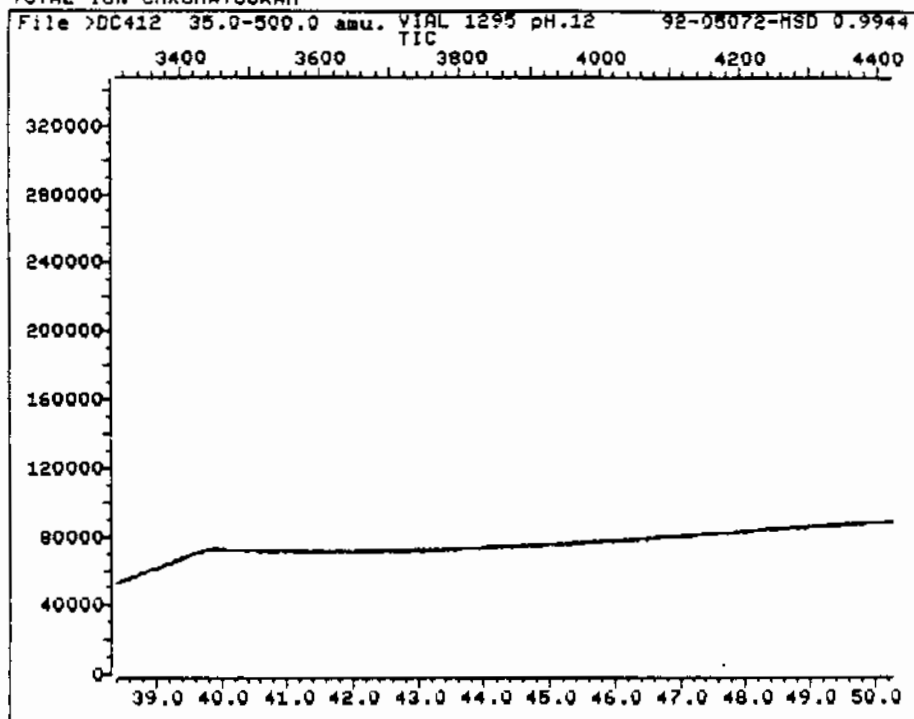
Id File: ID1BNA::QT
Title: BNA ID QUANT FILE #1 GC/MS
Last Calibration: 911003 11:18

Last Qcal Time: 920424 13:55

Operator ID: BOB
Quant Time : 920425 15:04
Injected at: 920425 14:12

Page 3 of 4

TOTAL ION CHROMATOGRAM



Data File: >DC412::D1
Name: VIAL 1295 pH.12
Misc: 92-05072-MSD 0.9944 G

Quant Output File: ^DC412::OF
Instrument ID: BNA1

BT#10

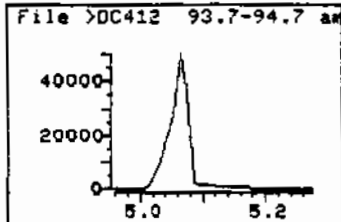
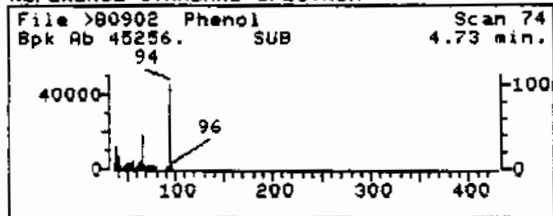
Id File: ID1BNA::QT
Title: BNA ID QUANT FILE #1 GC/MS
Last Calibration: 911003 11:18

Last Qcal Time: 920424 13:55

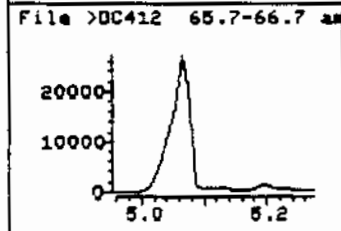
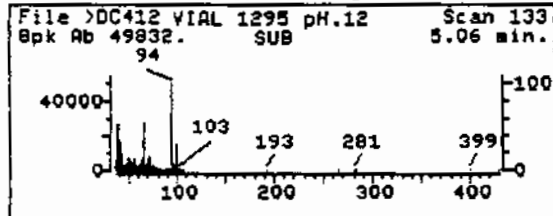
Operator ID: BOB
Quant Time : 920425 15:04
Injected at: 920425 14:12

Page 4 of 4

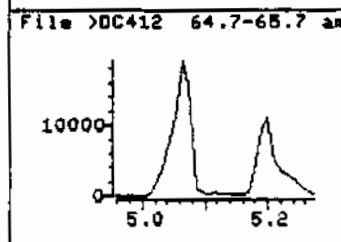
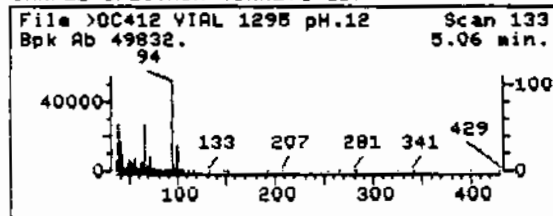
REFERENCE STANDARD SPECTRUM



SAMPLE SPECTRUM (BACKGROUND SUBTRACTED)



SAMPLE SPECTRUM (UNALTERED)



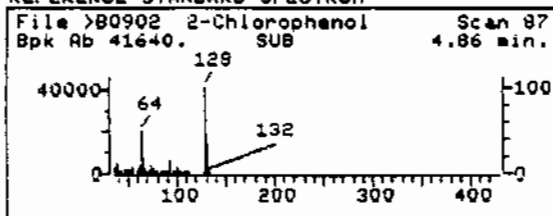
Data File: >DC412::D1
Name: VIAL 1295 pH.12
Misc: 92-05072-MSD 0.9944 G
Quant Time: 920425 15:04
Injected at: 920425 14:12
Last Qcal Time: 920424 13:55

Quant Output File: ^DC412::OF
Instrument ID: BNA1
BT1#10
Quant ID File: 101BNA::QT
Last Calibration: 911003 11:18

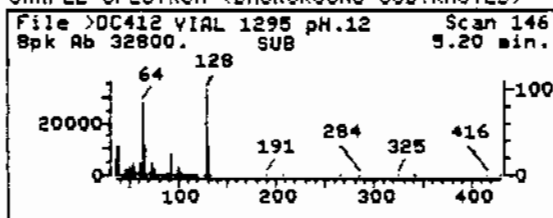
Compound No : 4
Compound Name : Phenol
Scan Number : 133
Retention Time: 5.06 min.
Quant Ion : 94.0
Area : 103516
Concentration : 109.99 ng/uL
q-value : 88

ok

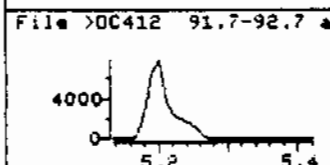
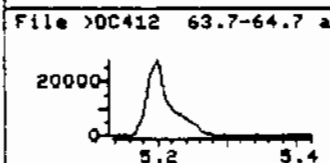
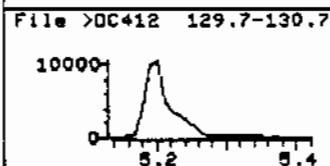
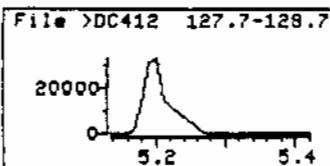
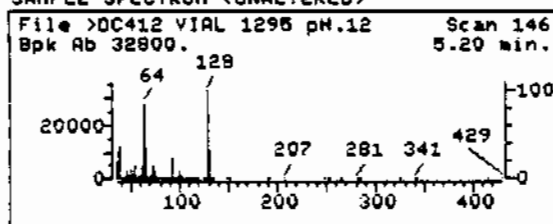
REFERENCE STANDARD SPECTRUM



SAMPLE SPECTRUM (BACKGROUND SUBTRACTED)



SAMPLE SPECTRUM (UNALTERED)



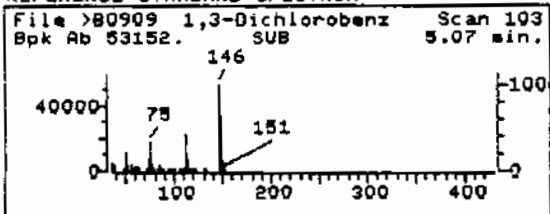
Data File: >DC412::D1
Name: VIAL 1295 pH.12
Misc: 92-05072-MSD 0.9944 G
Quant Time: 920425 15:04
Injected at: 920425 14:12
Last Qcal Time: 920424 13:55

Quant Output File: ^DC412::OF
Instrument ID: BNA1
BTB#10
Quant ID File: ID1BNA::QT
Last Calibration: 911003 11:18

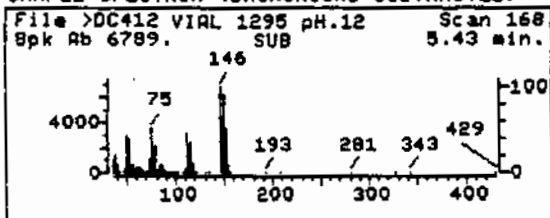
Compound No : 6
Compound Name : 2-Chlorophenol
Scan Number : 146
Retention Time: 5.20 min.
Quant Ion : 128.0
Area : 81261
Concentration : 108.29 ng/uL
q-value : 94

02

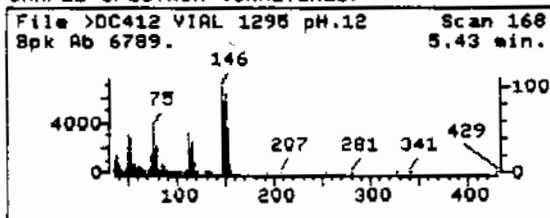
REFERENCE STANDARD SPECTRUM



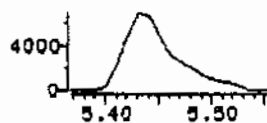
SAMPLE SPECTRUM (BACKGROUND SUBTRACTED)



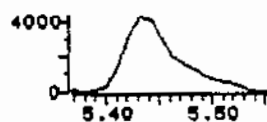
SAMPLE SPECTRUM (UNALTERED)



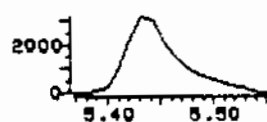
File >DC412 145.7-146.7



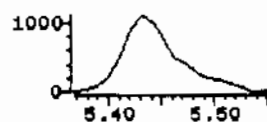
File >DC412 147.7-148.7



File >DC412 110.7-111.7



File >DC412 112.7-113.7



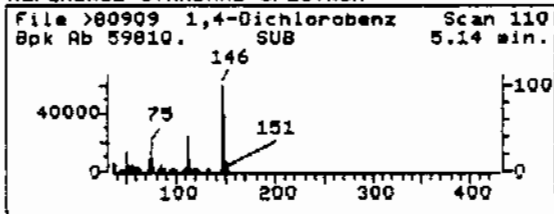
Data File: >DC412::D1
Name: VIAL 1295 pH.12
Misc: 92-05072-MSD 0.9944 G
Quant Time: 920425 15:04
Injected at: 920425 14:12
Last Qcal Time: 920424 13:55

Quant Output File: ^DC412::OF
Instrument ID: BNA1 BTL#10
Quant ID File: ID18NA::QT
Last Calibration: 911003 11:18

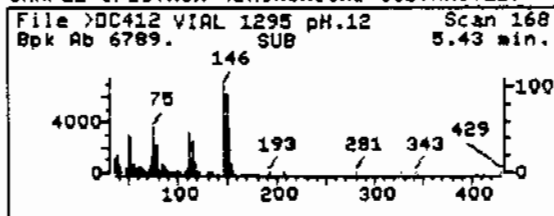
Compound No : 7
Compound Name : 1,3-Dichlorobenzene
Scan Number : 168
Retention Time: 5.43 min.
Quant Ion : 146.0
Area : 22820
Concentration : 30.93 ng/uL
q-value : 96

delet

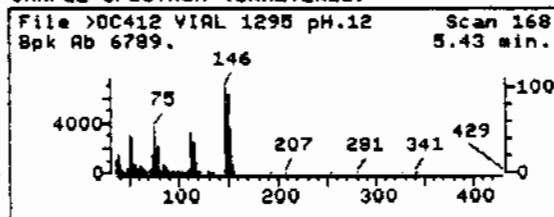
REFERENCE STANDARD SPECTRUM



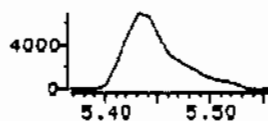
SAMPLE SPECTRUM (BACKGROUND SUBTRACTED)



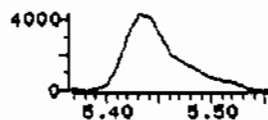
SAMPLE SPECTRUM (UNALTERED)



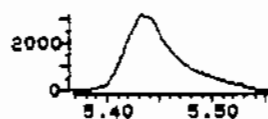
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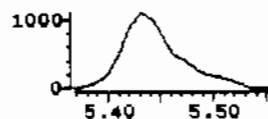
File >DC412 147.7-148.7



File >DC412 110.7-111.7



File >DC412 112.7-113.7



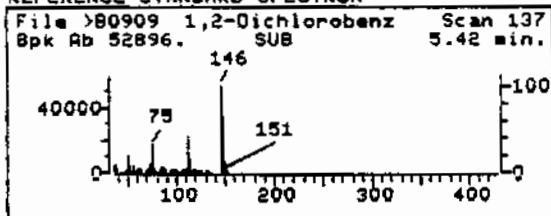
Data File: >DC412::D1
Name: VIAL 1295 pH.12
Misc: 92-05072-MSD 0.9944 G
Quant Time: 920425 15:04
Injected at: 920425 14:12
Last Qcal Time: 920424 13:55

Quant Output File: ^DC412::OF
Instrument ID: BNA1
BTL#10
Quant ID File: ID1BNA::QT
Last Calibration: 911003 11:18

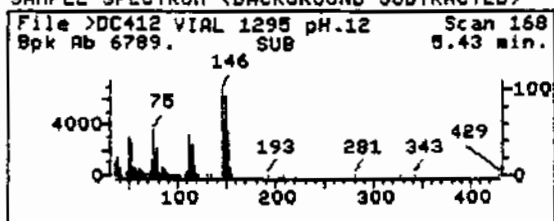
Compound No : 8
Compound Name : 1,4-Dichlorobenzene
Scan Number : 168
Retention Time: 5.43 min.
Quant Ion : 146.0
Area : 22820
Concentration : 28.89 ng/uL
q-value : 95

OK

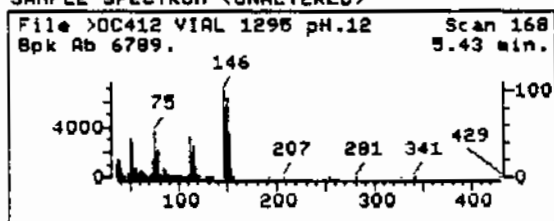
REFERENCE STANDARD SPECTRUM



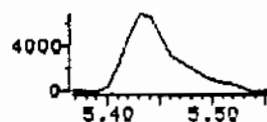
SAMPLE SPECTRUM (BACKGROUND SUBTRACTED)



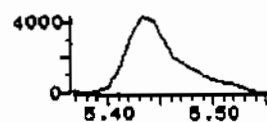
SAMPLE SPECTRUM (UNALTERED)



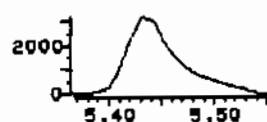
File >DC412 145.7-146.7



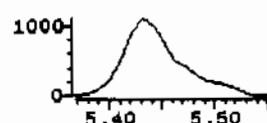
File >DC412 147.7-148.7



File >DC412 110.7-111.7



File >DC412 112.7-113.7



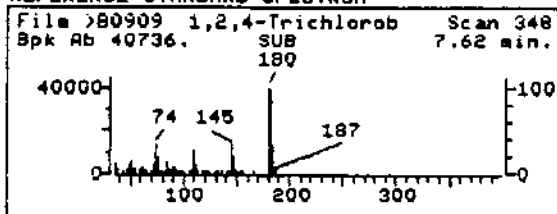
Data File: >DC412::01
Name: VIAL 1295 pH.12
Misc: 92-05072-MSO 0.9944 G
Quant Time: 920425 15:04
Injected at: 920425 14:12
Last Qcal Time: 920424 13:55

Quant Output File: ^DC412::OF
Instrument ID: BNA1
BT#10
Quant ID File: ID1BNA::QT
Last Calibration: 911003 11:18

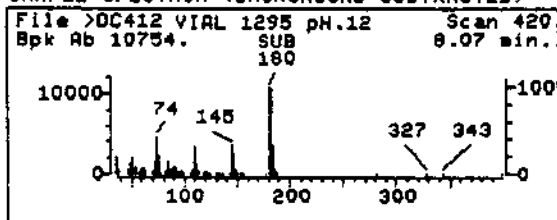
Compound No : 10
Compound Name : 1,2-Dichlorobenzene
Scan Number : 168
Retention Time: 5.43 min.
Quant Ion : 146.0
Area : 22820
Concentration : 29.42 ng/uL
q-value : 98

Delits

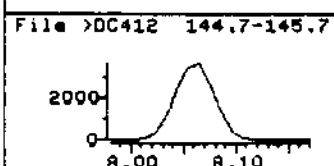
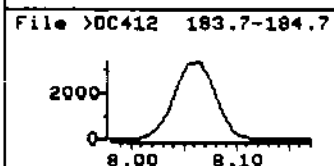
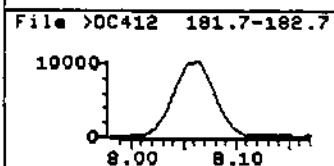
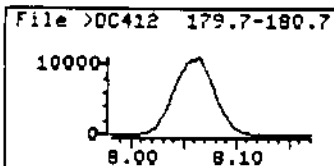
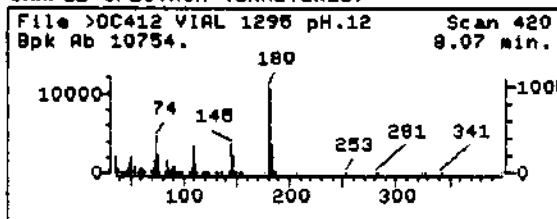
REFERENCE STANDARD SPECTRUM



SAMPLE SPECTRUM (BACKGROUND SUBTRACTED)



SAMPLE SPECTRUM (UNALTERED)



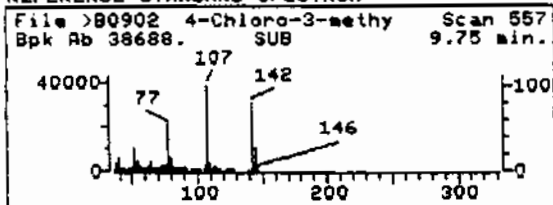
Data File: >DC412::D1
Name: VIAL 1295 pH.12
Misc: 92-05072-MSD 0.9944 G
Quant Time: 920425 15:04
Injected at: 920425 14:12
Last Qcal Time: 920424 13:55

Quant Output File: ^DC412::OF
Instrument ID: BNA1
BT1#10
Quant ID File: ID18NA::QT
Last Calibration: 911003 11:18

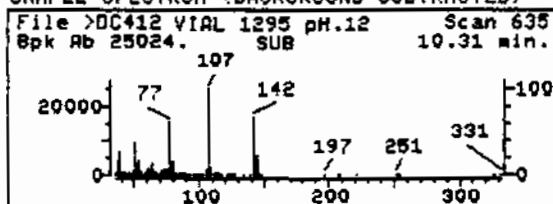
Compound No : 25
Compound Name : 1,2,4-Trichlorobenzene
Scan Number : 420
Retention Time: 8.07 min.
Quant Ion : 180.0
Area : 29390
Concentration : 48.20 ng/uL
q-value : 97

ole

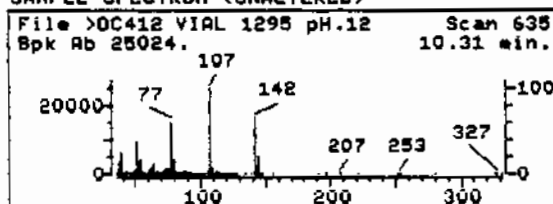
REFERENCE STANDARD SPECTRUM



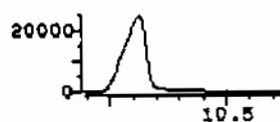
SAMPLE SPECTRUM (BACKGROUND SUBTRACTED)



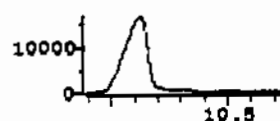
SAMPLE SPECTRUM (UNALTERED)



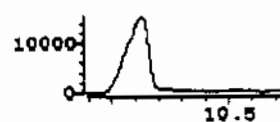
File >DC412 106.7-107.7



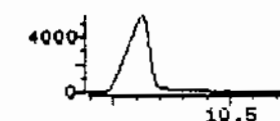
File >DC412 141.7-142.7



File >DC412 76.7-77.7



File >DC412 143.7-144.7



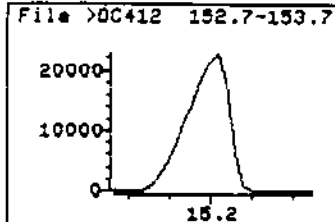
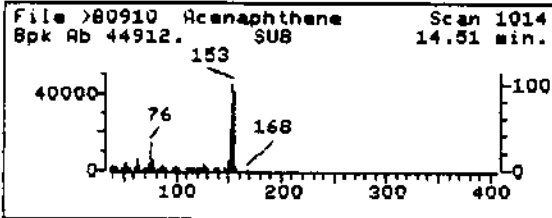
Data File: >DC412::D1
Name: VIAL 1295 pH.12
Misc: 92-05072-MSD 0.9944 G
Quant Time: 920425 15:04
Injected at: 920425 14:12
Last Qcal Time: 920424 13:55

Quant Output File: ^DC412::OF
Instrument ID: BNA1 BTL#10
Quant ID File: ID1BNA::QT
Last Calibration: 911003 11:18

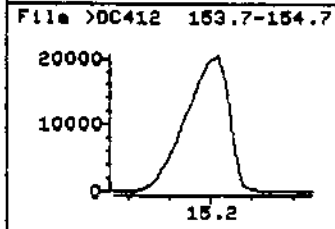
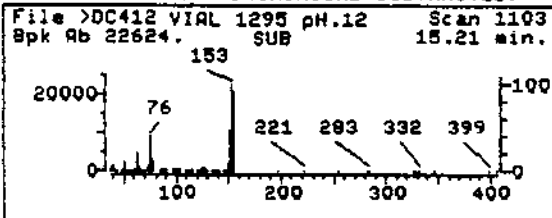
Compound No : 29
Compound Name : 4-Chloro-3-methylphenol
Scan Number : 635
Retention Time: 10.31 min.
Quant Ion : 107.0
Area : 90882
Concentration : 132.58 ng/uL
q-value : 93

OK

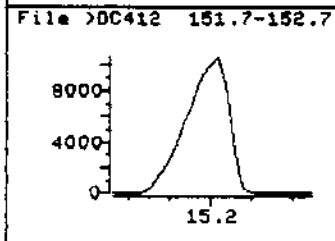
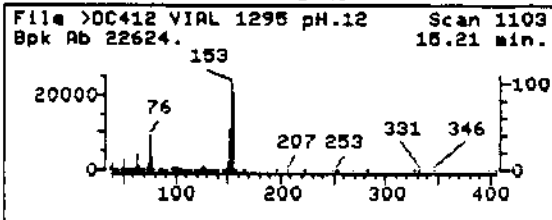
REFERENCE STANDARD SPECTRUM



SAMPLE SPECTRUM (BACKGROUND SUBTRACTED)



SAMPLE SPECTRUM (UNALTERED)



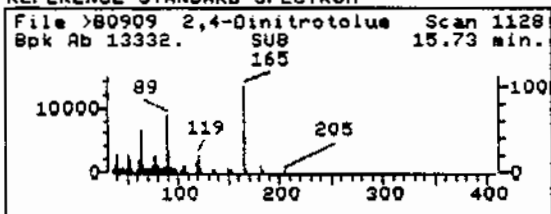
Data File: >DC412::D1
Name: VIAL 1295 pH.12
Misc: 92-05072-MSD 0.9944 G
Quant Time: 920425 15:04
Injected at: 920425 14:12
Last Qcal Time: 920424 13:55

Quant Output File: ^DC412::OF
Instrument ID: BNA1
BTI#10
Quant ID File: ID1BNA::QT
Last Calibration: 911003 11:18

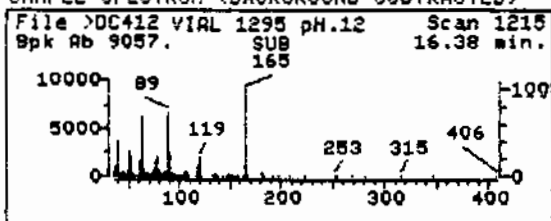
Compound No : 42
Compound Name : Acenaphthene
Scan Number : 1103
Retention Time: 15.21 min.
Quant Ion : 153.0
Area : 81099
Concentration : 72.33 ng/uL
q-value : 98

0.0

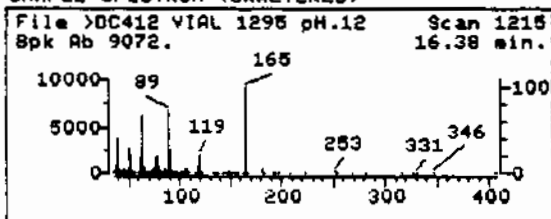
REFERENCE STANDARD SPECTRUM



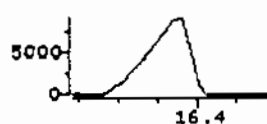
SAMPLE SPECTRUM (BACKGROUND SUBTRACTED)



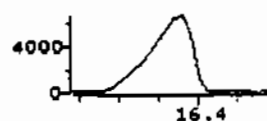
SAMPLE SPECTRUM (UNALTERED)



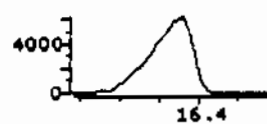
File >DC412 164.7-165.7



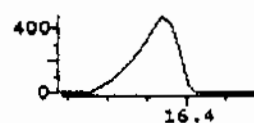
File >DC412 98.7-89.7 am



File >DC412 62.7-63.7 am



File >DC412 181.7-182.7



Data File: >DC412::D1
Name: VIAL 1295 pH.12
Misc: 92-05072-MSD 0.9944 G
Quant Time: 920425 15:04
Injected at: 920425 14:12
Last Qcal Time: 920424 13:55

Quant Output File: ^DC412::OF
Instrument ID: BNA1

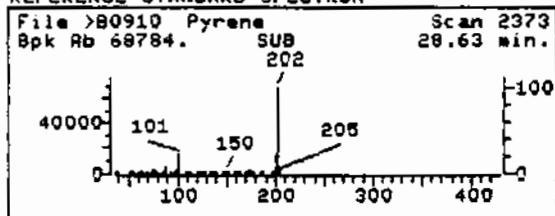
BTL#10

Quant ID File: ID1BNA::QT
Last Calibration: 911003 11:18

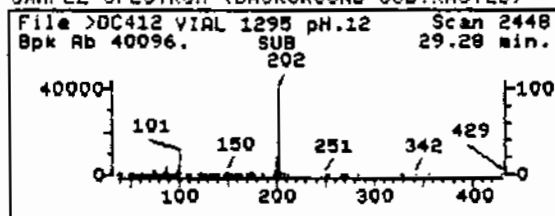
Compound No : 46
Compound Name : 2,4-Dinitrotoluene
Scan Number : 1215
Retention Time: 16.38 min.
Quant Ion : 165.0
Area : 33616
Concentration : 57.84 ng/uL
q-value : 97

OK

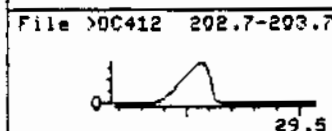
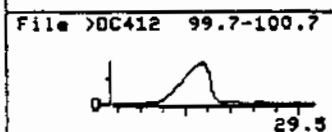
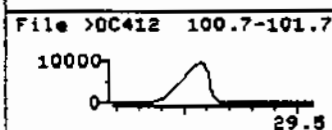
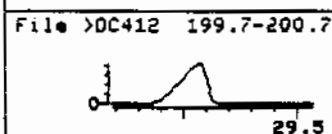
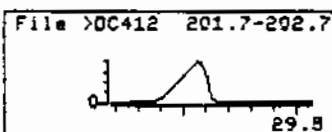
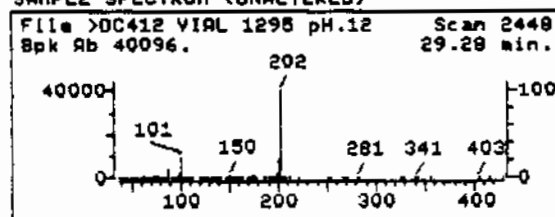
REFERENCE STANDARD SPECTRUM



SAMPLE SPECTRUM (BACKGROUND SUBTRACTED)



SAMPLE SPECTRUM (UNALTERED)



Data File: >DC412::D1
Name: VIAL 1295 pH.12
Misc: 92-05072-MSD 0.9944 G
Quant Time: 920425 15:04
Injected at: 920425 14:12
Last Qcal Time: 920424 13:55

Quant Output File: ^DC412::OF
Instrument ID: BNA1 BTL#10
Quant ID File: ID1BNA::QT
Last Calibration: 911003 11:18

Compound No : 63
Compound Name : Pyrene
Scan Number : 2448
Retention Time: 29.28 min.
Quant Ion : 202.0
Area : 168461
Concentration : 78.27 ng/uL
q-value : 92

DL

[GC/MS OPERATOR REPORT]

[GC/MS LAB SEMIVOLATILES]

[INTERNAL STANDARD CHECK REPORT]

SAMPLE FILE = >DC412
 CAL CHECK FILE = >DC402
 DATE AND TIME OF ANALYSIS = 4/25/92 14:12
 MISCELLANEOUS = 92-05072-MSD 0.9944 G
 METHOD = BNAME1
 INSTRUMENT = BNA1
 OPERATOR = 808 SUPER GRP

I. Areas

Name of the BNA Internal Standard	The Sample ISTD Area	Daily Check ISTD Area	Daily Check ISTD Area / 2	Daily Check ISTD Area x 2	Status of the Sample ISTD Area Precision
1,4-Dichlorobenz-d4	21129	24890	12445	49780	OK
Naphthalene-d8	74683	87937	43969	175874	OK
Acenaphthene-d10	43441	47070	23535	94140	OK
Phenanthrene-d10	72875	81388	40694	162776	OK
Chrysene-d12	78292	81856	40928	163712	OK
Perylene-d12	74286	90335	45168	180670	OK

II. Retention Times

Name of the BNA Internal Standard	The Sample ISTD R.Time	Daily Check ISTD R.Time	Daily Check ISTD RT - 0.5	Daily Check ISTD RT + 0.5	Status of the Sample ISTD R.T. Precision
1,4-Dichlorobenz-d4	5.41	5.41	4.91	5.91	OK
Naphthalene-d8	8.16	8.17	7.67	8.67	OK
Acenaphthene-d10	15.04	15.05	14.55	15.55	OK
Phenanthrene-d10	22.35	22.38	21.88	22.88	OK
Chrysene-d12	33.85	33.88	33.38	34.38	OK
Perylene-d12	38.22	38.25	37.75	38.75	OK

[GC/MS OPERATOR REPORT]

[GC/MS LAB SEMI-VOLATILES]

[Preliminary Surrogate Report]

DATA FILE NAME = >DC412::D1
 DATE AND TIME OF ANALYSIS = 4/25/92 14:12
 SAMPLE = UIAL 1295 pH.12
 MISCELLANEOUS = 92-05072-MSD 0.9944 G
 METHOD = BNAME1
 INSTRUMENT = BNA1
 OPERATOR = BOB SUPER GRP

SURROGATE	AS FOUND IN SAMPLE	WAS SPIKED AT	WATER LIMITS	SOIL LIMITS	% RECOVERY
-----	-----	-----	-----	-----	-----
2-Fluorophenol	112.21 ~~0-00~~	100.00	21-100	25-121	112.21 ~~0-00~~
Phenol-d5	122.61	100.00	10-94	24-113	122.61
Nitrobenzene-d5	69.28	50.00	35-114	23-120	138.56
2-Fluorobiphenyl	65.26	50.00	43-116	30-115	130.53
2,4,6-tribromo- phenol	22.85	100.00	10-123	19-122	22.85
Terphenyl-d14	77.81	50.00	33-141	18-137	155.62
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