

This document was too large to scan as a whole document,  
therefore it required breaking into smaller sections.

Document number: SD-WM-DP-178

Section 6 of 6

Title: Final Report for Tank 241AY101  
Grab Samples 1AY-96-1 Thru 1AY-96-10  
& 1AY-96-FB  
[Pgs. 977 Thru 2-135]

Date: 07/22/1996 Revision: R001

Originator: Esch, RA

Co: WHC

Recipient: \_\_\_\_\_

Co: \_\_\_\_\_

References: ECN-633305

| Raw Data Dump for AEA Spectrum: 24a2457.CNF |       |       |       |       |       |       | WHC-SD-WM-DP-178, REV. 1 |       |       |       |
|---------------------------------------------|-------|-------|-------|-------|-------|-------|--------------------------|-------|-------|-------|
| 1                                           | 0.    | 0.    | 1.    | 4.    | 1.    | 1.    | 1.                       | 0.    | 1.    | 0.    |
| 11                                          | 1.    | 2.    | 1.    | 0.    | 0.    | 4.    | 0.                       | 2.    | 2.    | 2.    |
| 21                                          | 3.    | 3.    | 1.    | 1.    | 3.    | 1.    | 2.                       | 1.    | 2.    | 3.    |
| 31                                          | 1.    | 2.    | 1.    | 1.    | 3.    | 1.    | 1.                       | 1.    | 1.    | 0.    |
| 41                                          | 1.    | 1.    | 2.    | 5.    | 4.    | 2.    | 2.                       | 2.    | 1.    | 2.    |
| 51                                          | 3.    | 4.    | 5.    | 3.    | 4.    | 4.    | 4.                       | 2.    | 1.    | 1.    |
| 61                                          | 5.    | 3.    | 6.    | 3.    | 3.    | 3.    | 4.                       | 0.    | 6.    | 3.    |
| 71                                          | 2.    | 4.    | 4.    | 4.    | 2.    | 0.    | 1.                       | 4.    | 3.    | 3.    |
| 81                                          | 5.    | 1.    | 4.    | 3.    | 5.    | 3.    | 2.                       | 4.    | 2.    | 3.    |
| 91                                          | 2.    | 3.    | 6.    | 6.    | 6.    | 4.    | 4.                       | 2.    | 4.    | 7.    |
| 101                                         | 4.    | 3.    | 2.    | 3.    | 5.    | 6.    | 9.                       | 2.    | 3.    | 9.    |
| 111                                         | 13.   | 7.    | 6.    | 6.    | 8.    | 10.   | 7.                       | 7.    | 5.    | 5.    |
| 121                                         | 12.   | 9.    | 9.    | 4.    | 8.    | 7.    | 10.                      | 8.    | 7.    | 7.    |
| 131                                         | 7.    | 7.    | 16.   | 5.    | 6.    | 11.   | 15.                      | 10.   | 11.   | 15.   |
| 141                                         | 8.    | 11.   | 11.   | 18.   | 10.   | 17.   | 13.                      | 24.   | 19.   | 21.   |
| 151                                         | 26.   | 22.   | 16.   | 24.   | 24.   | 14.   | 17.                      | 17.   | 23.   | 13.   |
| 161                                         | 15.   | 15.   | 12.   | 22.   | 31.   | 14.   | 21.                      | 16.   | 16.   | 15.   |
| 171                                         | 18.   | 24.   | 31.   | 28.   | 28.   | 26.   | 35.                      | 26.   | 36.   | 36.   |
| 181                                         | 30.   | 46.   | 41.   | 37.   | 37.   | 46.   | 48.                      | 39.   | 55.   | 55.   |
| 191                                         | 43.   | 59.   | 59.   | 77.   | 63.   | 89.   | 94.                      | 104.  | 116.  | 115.  |
| 201                                         | 164.  | 160.  | 158.  | 167.  | 183.  | 217.  | 231.                     | 286.  | 292.  | 289.  |
| 211                                         | 356.  | 376.  | 429.  | 493.  | 596.  | 697.  | 811.                     | 1001. | 1212. | 1331. |
| 221                                         | 1452. | 1586. | 1744. | 1878. | 2059. | 2487. | 2922.                    | 3454. | 4239. | 4798. |
| 231                                         | 4986. | 4587. | 3473. | 2028. | 1190. | 531.  | 177.                     | 40.   | 11.   | 4.    |
| 241                                         | 4.    | 7.    | 6.    | 5.    | 4.    | 6.    | 8.                       | 10.   | 6.    | 10.   |
| 251                                         | 11.   | 8.    | 8.    | 16.   | 9.    | 12.   | 9.                       | 4.    | 18.   | 14.   |
| 261                                         | 15.   | 9.    | 15.   | 18.   | 17.   | 22.   | 16.                      | 19.   | 30.   | 38.   |
| 271                                         | 34.   | 28.   | 35.   | 35.   | 30.   | 35.   | 36.                      | 43.   | 44.   | 46.   |
| 281                                         | 64.   | 60.   | 81.   | 73.   | 110.  | 111.  | 125.                     | 168.  | 151.  | 183.  |
| 291                                         | 205.  | 244.  | 296.  | 381.  | 448.  | 552.  | 546.                     | 541.  | 475.  | 508.  |
| 301                                         | 569.  | 654.  | 820.  | 981.  | 1127. | 1111. | 793.                     | 352.  | 93.   | 21.   |
| 311                                         | 13.   | 14.   | 11.   | 14.   | 13.   | 10.   | 14.                      | 14.   | 22.   | 19.   |
| 321                                         | 18.   | 27.   | 34.   | 20.   | 34.   | 24.   | 35.                      | 33.   | 33.   | 36.   |
| 331                                         | 34.   | 42.   | 56.   | 51.   | 48.   | 68.   | 71.                      | 75.   | 104.  | 87.   |
| 341                                         | 113.  | 126.  | 162.  | 203.  | 180.  | 223.  | 232.                     | 326.  | 392.  | 464.  |
| 351                                         | 584.  | 692.  | 801.  | 856.  | 801.  | 711.  | 687.                     | 712.  | 817.  | 1023. |
| 361                                         | 1302. | 1552. | 1846. | 1842. | 1350. | 603.  | 158.                     | 24.   | 3.    | 0.    |
| 371                                         | 0.    | 0.    | 1.    | 0.    | 0.    | 0.    | 0.                       | 0.    | 0.    | 0.    |
| 381                                         | 0.    | 0.    | 0.    | 0.    | 0.    | 0.    | 0.                       | 0.    | 0.    | 0.    |
| 391                                         | 0.    | 0.    | 0.    | 0.    | 0.    | 0.    | 0.                       | 0.    | 0.    | 0.    |
| 401                                         | 0.    | 0.    | 0.    | 0.    | 0.    | 0.    | 1.                       | 0.    | 0.    | 0.    |
| 411                                         | 0.    | 0.    | 0.    | 0.    | 0.    | 0.    | 0.                       | 0.    | 0.    | 0.    |
| 421                                         | 0.    | 1.    | 0.    | 0.    | 0.    | 0.    | 0.                       | 0.    | 0.    | 0.    |
| 431                                         | 0.    | 1.    | 0.    | 0.    | 0.    | 0.    | 0.                       | 0.    | 0.    | 0.    |
| 441                                         | 0.    | 0.    | 0.    | 0.    | 0.    | 0.    | 0.                       | 0.    | 0.    | 0.    |
| 451                                         | 0.    | 0.    | 0.    | 0.    | 0.    | 0.    | 1.                       | 0.    | 1.    | 0.    |
| 461                                         | 0.    | 0.    | 1.    | 1.    | 0.    | 0.    | 0.                       | 0.    | 2.    | 0.    |
| 471                                         | 0.    | 0.    | 2.    | 3.    | 5.    | 4.    | 6.                       | 1.    | 4.    | 0.    |
| 481                                         | 2.    | 1.    | 0.    | 0.    | 0.    | 0.    | 0.                       | 0.    | 0.    | 0.    |
| 491                                         | 0.    | 0.    | 0.    | 0.    | 0.    | 0.    | 0.                       | 0.    | 0.    | 0.    |
| 511                                         | 0.    | 0.    |       |       |       |       |                          |       |       |       |

# LABCORE Data Entry Template for Worklist# 6774

Analyst: Jmv Instrument: PU01 #18 Book# 104843

Method: LA-943-128 Rev/Mod A-1

Worklist Comment: AY-101, Determine sample size using ludlum. new

| S                                                | Type   | Sample#    | R | A | Test     | Matrix | Group#   | Project     |
|--------------------------------------------------|--------|------------|---|---|----------|--------|----------|-------------|
| 1                                                | STD    |            |   |   | @PU23901 | LIQUID |          |             |
| 2                                                | BLNK   |            |   |   | @PU23901 | LIQUID |          |             |
| 3                                                | SAMPLE | S96T001359 | 0 |   | @PU23901 | LIQUID | 96000257 | AY-101 GRAB |
| Analytes Requested: PU23901 , PU23901E, PU23901T |        |            |   |   |          |        |          |             |
| 4                                                | DUP    | S96T001359 | 0 |   | @PU23901 | LIQUID |          |             |
| 5                                                | SAMPLE | S96T001360 | 0 |   | @PU23901 | LIQUID | 96000257 | AY-101 GRAB |
| Analytes Requested: PU23901 , PU23901E, PU23901T |        |            |   |   |          |        |          |             |
| 6                                                | DUP    | S96T001360 | 0 |   | @PU23901 | LIQUID |          |             |

Final page for worklist # 6774

Jamilton 328.96  
Analyst Signature Date

Shawn L. L. L. 4-1-96  
Analyst Signature Date  
See Hogan 4/2/96

Data Entry Comments:

## LABCORE Completed Worklist Report for Worklist# 6774

Analyst: jmv

Instrument: AB18

Book# 104B43

Method: LA 943-128 Rev/Mod A-1

PU01 #18

Worklist Comment: AY-101, Determine sample size using ludlum. new

| Seq Type | Sample#    | R A | Test              | Matrix | Actual   | Found    | DL or Yield           | Unit |
|----------|------------|-----|-------------------|--------|----------|----------|-----------------------|------|
| 1 STD    |            | 0   | @PU23901 PU23901  | LIQUID | 1.28E-01 | 1.21E-1  | 94.530 % Recovery     |      |
| 1 STD    |            | 0   | @PU23901 PU23901E | LIQUID | 1.00     | 2.30E+00 | 2.300 % Ct. Error     |      |
| 1 STD    |            | 0   | @PU23901 PU23901T | LIQUID | 100      | 9.08E+01 | 90.800 % Recovery     |      |
| 2 BLNK   |            | 0   | @PU23901 PU23901  | LIQUID | 1        | <3.08E-4 | uCi/mL                |      |
| 2 BLNK   |            | 0   | @PU23901 PU23901T | LIQUID | 100      | 1.02E+02 | 102.000 % Recovery    |      |
| 2 BLNK   |            | 0   | @PU23901 PU23901E | LIQUID | 1.00     | 1.00E+02 | 100.000 % Ct. Error   |      |
| 3 SAMPLE | S96T001359 | 0   | @PU23901 PU23901  | LIQUID | N/A      | 2.64E-02 | 1.370e-003 uCi/mL     |      |
| 3 SAMPLE | S96T001359 | 0   | @PU23901 PU23901T | LIQUID | N/A      | 1.07E+02 | 1.000e-007 % Recovery |      |
| 3 SAMPLE | S96T001359 | 0   | @PU23901 PU23901E | LIQUID | N/A      | 1.81E+00 | 0.000 % Ct. Error     |      |
| 4 DUP    | S96T001359 | 0   | @PU23901 PU23901  | LIQUID | 2.64E-2  | 3.27E-2  | 21.320 RPD            |      |
| 4 DUP    | S96T001359 | 0   | @PU23901 PU23901T | LIQUID | 100      | 8.93E+01 | 89.300 % Recovery     |      |
| 4 DUP    | S96T001359 | 0   | @PU23901 PU23901E | LIQUID | 1.00     | 1.9E+00  | 1.900 % Ct. Error     |      |
| 5 SAMPLE | S96T001360 | 0   | @PU23901 PU23901  | LIQUID | N/A      | 2.71E-02 | 1.280e-003 uCi/mL     |      |
| 5 SAMPLE | S96T001360 | 0   | @PU23901 PU23901T | LIQUID | N/A      | 1.16E+02 | 1.000e-007 % Recovery |      |
| 5 SAMPLE | S96T001360 | 0   | @PU23901 PU23901E | LIQUID | N/A      | 1.61E+00 | 0.000 % Ct. Error     |      |
| 6 DUP    | S96T001360 | 0   | @PU23901 PU23901  | LIQUID | 2.71E-2  | 3.08E-2  | 12.780 RPD            |      |
| 6 DUP    | S96T001360 | 0   | @PU23901 PU23901T | LIQUID | 100      | 9.76E+01 | 97.600 % Recovery     |      |
| 6 DUP    | S96T001360 | 0   | @PU23901 PU23901E | LIQUID | 1.00     | 1.7E+00  | 1.700 % Ct. Error     |      |

Final page for worklist# 6774

Analyst Signature

Date

Analyst Signature

Date

Reviewer Signature

Date

*John Rebyen* 2 Apr 96

Units shown for QC (BLK/BKG) may not reflect the actual units.

WORKBOOK PAGE: STD1

Pu 238 and 239/240 : LA-943-128 (A-1)

LIQUID

| Type            | DATE COUNTED                                                                                                             | MAR-30-96 | PU 236 AEA FRAC (C236) | STD        |
|-----------------|--------------------------------------------------------------------------------------------------------------------------|-----------|------------------------|------------|
| STD             | SAMPLE VOLUME in mL                                                                                                      | SS        | 0.100                  | 0.149      |
| Work List       | SAMPLE DILUTION FACTOR                                                                                                   | DF        | 101.000                | 0.000      |
| 6774            | TRACER VOLUME in mL                                                                                                      | SPKV      | 0.100                  | 0.489      |
| Test Code       | DIGEST DILUTION FACTOR                                                                                                   | DDF       | 1.000                  | 3973       |
| @PU23901        | TRACER BOOK NO                                                                                                           |           | 120B43                 | 30         |
| Matrix          | DETECTOR NUMBER                                                                                                          |           | 18                     | 30         |
| LIQUID          | EFFICIENCY FACTOR                                                                                                        | EFF       | 0.269                  | 0.200      |
| Batch Number    | TRACER PREPARATION DATE                                                                                                  |           | 12/27/95               | 0.000      |
| 96002485        | TRACER PREPARATION VALUE (dpm/mL)                                                                                        |           | 2390.000               | 33.450     |
| Return          | PU-236 DECAY CORR'D VALUE (dpm/mL)                                                                                       |           | 2244.989               | 480        |
| 0               | PU-238 TRACER VALUE (dpm/mL)                                                                                             |           | 0.000                  | 3.3520E+02 |
| Sample Prep     | STANDARD BOOK NO                                                                                                         |           | 104B43                 |            |
| N/A             | STANDARD VALUE in µCi/mL                                                                                                 |           | 0.128                  |            |
| Sample #        |                                                                                                                          |           |                        |            |
| WL6774          |                                                                                                                          |           |                        |            |
| Instrument Code | Decay Time = Date Counted - Tracer Preparation Date                                                                      |           |                        |            |
| WB27809         | Pu-236 Decay Corr'd Value = Pu-236 Preparation Value * [e to the power of ((-ln2 * Decay Time/1040.95))]                 |           |                        |            |
| Prepared By     | Pu 236 Tracer Recovery = (Total AT Counts / TC - Bkg) * 1/EFF * C236 * 100 / Pu-236 Decay Corr'd Value * SPKV            |           |                        |            |
| SLH             | Pu 239/240 µCi/L = (C239)(Pu 236 Decay Corr'd Value)(SPKV)(1000mL/L)(DF)(DDF) / [(C236)(SS)(2220000 dpm/µCi)]            |           |                        |            |
| Chemist         | Pu 238 dpm = [(Total AT Counts / TC) - Bkg * 1/EFF * C238] - (Pu-238 Tracer Value * SPKV * Pu 236 Tracer Recovery / 100) |           |                        |            |
| JFR             | Pu 238 µCi/L = [(Pu 238 dpm)(DF)(DDF)(1000mL/L)] / [(Pu-236 Tracer Recovery / 100)(2220000 dpm/µCi)(D g/L)(SS)]          |           |                        |            |
| Analyst         | Relative Counting Error = Square Root of [(1/(Pu 236 cpm * min)) + (1 / (Pu 238 or 239/240 cpm * min))] * 1.96 * 100     |           |                        |            |
| JMV             |                                                                                                                          |           |                        |            |
| Date Complete   |                                                                                                                          |           |                        |            |
| 04/01/96        | Pu 239/240 µCi/mL                                                                                                        | 3.35E-01  |                        |            |
| Analysis Date   | Relative Counting Error                                                                                                  | = 3.2%    |                        |            |
| 03/28/96        |                                                                                                                          |           |                        |            |
| Analysis Time   |                                                                                                                          |           |                        |            |
| 12:00 PM        |                                                                                                                          |           |                        |            |
| Sample Point    |                                                                                                                          |           |                        |            |
| AY-101 GRAB     | Pu 236 Tracer Recovery                                                                                                   | = 32.7%   |                        |            |

0.414  
JFR  
Apr 96  
28.37

|                       |     |       |           |
|-----------------------|-----|-------|-----------|
| Analyst:              | JMV | Date: | 01-Apr-96 |
| Signature of Chemist: | JFR | Date: |           |

STANDARD.WB1 REV 1.0

943128ML

## Pu 238 and 239/240 : LA-943-128 (A-1)

## LIQUID / SOLID

| Type         | DATE COUNTED                       | MAR-30-96 | PU 236 AEA FRAC (C236)  | DUP        |
|--------------|------------------------------------|-----------|-------------------------|------------|
| DUP          | SAMPLE VOLUME in mL                | SS        | 1.000                   | 0.162      |
| Work List    | SAMPLE DILUTION FACTOR             | DF        | 101.000                 | 0.160      |
| 6774         | TRACER VOLUME in mL                | SPKV      | 0.100                   | 0.606      |
| Test Code    | DIGEST DILUTION FACTOR             | DDF       | 1.0000                  | 8551       |
| @PU23901     | TRACER BOOK NO                     | 120B43    | AT COUNT TIME (MIN)     | 30         |
| Matrix       | DETECTOR NUMBER                    | 18        | BACKGROUND in cpm (Bkg) | 0.200      |
| LIQUID       | EFFICIENCY FACTOR                  | EFF       | 0.269                   | 25.190     |
| Batch Number | TRACER PREPARATION DATE            | 12/27/95  | PU 236 cpm              | 24.890     |
| 96002485     | TRACER PREPARATION VALUE (dpm/mL)  | 2390.000  | PU 238 cpm              | 94.220     |
| Run          | PU-236 DECAY CORR'D VALUE (dpm/mL) | 2244.989  | AEA COUNT TIME          | 480        |
| 0            | PU-238 TRACER VALUE (dpm/mL)       | 0.000     | Pu 239/240 $\mu$ Ci/L   | 3.8207E+01 |

## Sample Prep

N/A

## Sample #

S96T001359

Decay Time = Date Counted - Tracer Preparation Date

Pu-236 Decay Corr'd Value = Pu-236 Preparation Value \* [e to the power of {(-ln2 \* Decay Time/1040.95)}]

## Instrument Code

WB27808

Pu 236 Tracer Recovery = (Total AT Counts / TC - Bkg) \* C236 \* 100 / (Pu-236 Decay Corr'd Value \* SPKV \* EFF)

Pu 239/240  $\mu$ Ci/L = (C239)(Pu 236 Decay Corr'd Value)(SPKV)(1000mL/L)(DF)(DDF) / [(C236)(SS)(D g/L)(2220000 dpm/ $\mu$ Ci)]

## Prepared By

SLH

Pu 238 dpm = [(Total AT Counts / TC) - Bkg \* 1/EFF \* C238] - (Pu-238 Tracer Value \* SPKV \* Pu 236 Tracer Recovery / 100)

Pu 238  $\mu$ Ci/L = [(Pu 238 dpm)(DF)(DDF)(1000mL/L)] / [(Pu-236 Tracer Recovery / 100)(2220000 dpm/ $\mu$ Ci)(D g/L)(SS)]

## Chemist

JFR

Relative Counting Error = Square Root of [(1/(Pu 236 cpm \* min)) + (1 / (Pu 238 or 239/240 cpm \* min))] \* 1.96 \* 100

## Analyst

JMV

## Date Complete

04/01/96

Pu 239/240  $\mu$ Ci/mL = 3.82E-02

Relative Counting Error = 2.0%

## DETECTION

## LEVELS

in  $\mu$ Ci/mL

Pu 239/240

2.47E-03

Pu 238

2.47E-03

|                       |     |       |           |
|-----------------------|-----|-------|-----------|
| Analyst:              | JMV | Date: | 01-Apr-96 |
| Signature of Chemist: | JFR | Date: |           |

SAMPLE.WB1 REV 1.0

943128ML

WORKBOOK PAGE: DUP6

Pu 238 and 239/240 : LA-943-128 (A-1)

LIQUID / SOLID

|              |                                    |            |                             | DUP        |
|--------------|------------------------------------|------------|-----------------------------|------------|
| Type         | DATE COUNTED                       | MAR-30-96  | PU 236 AEA FRAC (C236)      | 0.076      |
| DUP          | SAMPLE VOLUME in mL                | SS 1.000   | PU 238 AEA FRAC (C238)      | 0.170      |
| Work List    | SAMPLE DILUTION FACTOR             | DF 101.000 | PU 239 AEA FRAC (C239)      | 0.631      |
| 6774         | TRACER VOLUME in mL                | SPKV 0.100 | TOTAL AT COUNTS             | 8453       |
| Test Code    | DIGEST DILUTION FACTOR             | DDF 1.0000 | AT COUNT TIME (MIN)         | 30         |
| @PU23901     | TRACER BOOK NO                     | 120B43     | BACKGROUND in cpm (Bkg)     | 0.200      |
| Metric       | DETECTOR NUMBER                    | 18         | PU 236 cpm                  | 12.846     |
| LIQUID       | EFFICIENCY FACTOR                  | EFF 0.269  | PU 238 cpm                  | 29.060     |
| Batch Number | TRACER PREPARATION DATE            | 12/27/95   | PU 239 cpm                  | 108.060    |
| 96002485     | TRACER PREPARATION VALUE (dpm/mL)  | 2390.000   | AEA COUNT TIME              | 480        |
| Refun        | PU-236 DECAY CORR'D VALUE (dpm/mL) | 2244.989   | Pu 239/240 $\mu\text{Ci/L}$ | 8.4801E+01 |
| 0            | PU-238 TRACER VALUE (dpm/mL)       | 0.000      |                             |            |

Sample Prep

N/A

Sample #

Decay Time = Date Counted - Tracer Preparation Date

S96T001360

Pu-236 Decay Corr'd Value = Pu-236 Preparation Value \* [e to the power of  $\{(-\ln 2 * \text{Decay Time}/1040.95)\}$ ]

Instrument Code

Pu 236 Tracer Recovery = (Total AT Counts / TC - Bkg) \* C236 \* 100 / (Pu-236 Decay Corr'd Value \* SPKV \* EFF)

WB27809

Pu 239/240  $\mu\text{Ci/L}$  = (C239)(Pu 236 Decay Corr'd Value)(SPKV)(1000mL/L)(DF)(DDF) / [(C236)(SS)(D g/L)(2220000 dpm/ $\mu\text{Ci}$ )]

Prepared By

Pu 238 dpm = [(Total AT Counts / TC) - Bkg \* 1/EFF \* C238] - (Pu-238 Tracer Value \* SPKV \* Pu 236 Tracer Recovery / 100)

SLH

Pu 238  $\mu\text{Ci/L}$  = [(Pu 238 dpm)(DF)(DDF)(1000mL/L)] / [(Pu-236 Tracer Recovery / 100)(2220000 dpm/ $\mu\text{Ci}$ )(D g/L)(SS)]

Chemist

Relative Counting Error = Square Root of  $\{[1/(\text{Pu 236 cpm} * \text{min})] + [1/(\text{Pu 238 or 239/240 cpm} * \text{min})]\} * 1.96 * 100$ 

JFR

Analyst

JMV

Date Complete

04/01/96

Analysis Date

03/28/95

Analysis Time

12:00 PM

Sample Point

AY-101 GRAB

Pu 239/240  $\mu\text{Ci/mL}$  8.48E-02

Relative Counting Error = 2.6%

DETECTION

LEVELS

In  $\mu\text{Ci/mL}$ 

Pu 239/240

1.14E-02

Pu 238

1.14E-02

Pu 238  $\mu\text{Ci/mL}$  2.28E-02

Relative Counting Error = 3.0%

Pu 236 Tracer Recovery = 35.5%

Analyst:

JMV

Date:

01-Apr-96

Signature of Chemist:

JFR

Date:

SAMPLE.WB1 REV 1.0

943128ML

Pu 238 and 239/240 : LA-943-128 (A-1)

LIQUID

|                 |                                                                                                                                                      |           |                                                                 | STANDARD   |
|-----------------|------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|-----------------------------------------------------------------|------------|
| Type            | DATE COUNTED                                                                                                                                         | MAR-30-96 | PU 236 AEA FRAC (C236)                                          | 0.414      |
| STANDARD        | SAMPLE VOLUME in mL SS                                                                                                                               | 0.100     | PU 238 AEA FRAC (C238)                                          | 0.000      |
| Work List       | SAMPLE DILUTION FACTOR DF                                                                                                                            | 101.000   | PU 239 AEA FRAC (C239)                                          | 0.489      |
| 6774            | TRACER VOLUME in mL SPKV                                                                                                                             | 0.100     | TOTAL AT COUNTS                                                 | 3973       |
| Test Code       | DIGEST DILUTION FACTOR DDF                                                                                                                           | 1.000     | AT COUNT TIME (MIN)                                             | 30         |
| @PU23901        | TRACER BOOK NO                                                                                                                                       | 120B43    | BACKGROUND in cpm (Bkg)                                         | 0.200      |
| Matrix          | DETECTOR NUMBER                                                                                                                                      | 18        | PU 236 cpm                                                      | 28.370     |
| LIQUID          | EFFICIENCY FACTOR EFF                                                                                                                                | 0.269     | PU 238 cpm                                                      | 0.000      |
| Batch Number    | TRACER PREPARATION DATE                                                                                                                              | 12/27/95  | PU 239 cpm                                                      | 33.450     |
| 96002485        | TRACER PREPARATION VALUE (dpm/mL)                                                                                                                    | 2390.000  | AEA COUNT TIME                                                  | 480        |
| Rerun           | PU-236 DECAY CORR'D VALUE (dpm/mL)                                                                                                                   | 2244.989  | Pu 239/240 $\mu$ Ci/L                                           | 1.2064E+02 |
| 0               | PU-238 TRACER VALUE (dpm/mL)                                                                                                                         | 0.000     |                                                                 |            |
| Sample Prep     | STANDARD BOOK NO                                                                                                                                     | 104B43    |                                                                 |            |
| N/A             | STANDARD VALUE in $\mu$ Ci/mL                                                                                                                        | 0.128     |                                                                 |            |
| Sample #        |                                                                                                                                                      |           |                                                                 |            |
| WL6774          |                                                                                                                                                      |           |                                                                 |            |
| Instrument Code | Decay Time = Date Counted - Tracer Preparation Date                                                                                                  |           |                                                                 |            |
| WB27809         | Pu-236 Decay Corr'd Value = Pu-236 Preparation Value * [e to the power of $\{(-\ln 2 * \text{Decay Time}/1040.95)\}$ ]                               |           |                                                                 |            |
| Prepared By     | Pu 236 Tracer Recovery = (Total AT Counts / TC - Bkg) * 1/EFF * C236 * 100 / Pu-236 Decay Corr'd Value * SPKV                                        |           |                                                                 |            |
| JFR             | Pu 239/240 $\mu$ Ci/L = (C239)(Pu 236 Decay Corr'd Value)(SPKV)(1000mL/L)(DF)(DDF) / [(C236)(SS)(2220000 dpm/ $\mu$ Ci)]                             |           |                                                                 |            |
| Chemist         | Pu 238 dpm = [(Total AT Counts / TC) - Bkg * 1/EFF * C238] - (Pu-238 Tracer Value * SPKV * Pu 236 Tracer Recovery / 100)                             |           |                                                                 |            |
| JFR             | Pu 238 $\mu$ Ci/L = [(Pu 238 dpm)(DF)(DDF)(1000mL/L)] / [(Pu-236 Tracer Recovery / 100)(2220000 dpm/ $\mu$ Ci)(D g/L)(SS)]                           |           |                                                                 |            |
| Analyst         | Relative Counting Error = Square Root of $\{[(1/(\text{Pu 236 cpm} * \text{min})) + (1/(\text{Pu 238 or 239/240 cpm} * \text{min}))] * 1.96 * 100\}$ |           |                                                                 |            |
| JMV             |                                                                                                                                                      |           |                                                                 |            |
| Date Complete   |                                                                                                                                                      |           |                                                                 |            |
| 04/01/96        | Pu 239/240 $\mu$ Ci/mL                                                                                                                               | 1.21E-01  | DETECTION<br>LEVELS<br>in $\mu$ Ci/mL<br>Pu 239/240<br>8.15E-03 |            |
| Analysis Date   | Relative Counting Error                                                                                                                              | = 2.3%    |                                                                 |            |
| 03/28/96        |                                                                                                                                                      |           |                                                                 |            |
| Analysis Time   |                                                                                                                                                      |           |                                                                 |            |
| 12:00 PM        |                                                                                                                                                      |           |                                                                 |            |
| Sample Point    |                                                                                                                                                      |           |                                                                 |            |
| AY-101          | Pu 236 Tracer Recovery                                                                                                                               | = 90.8%   |                                                                 |            |

|                       |     |       |           |
|-----------------------|-----|-------|-----------|
| Analyst:              | JMV | Date: | 01-Apr-96 |
| Signature of Chemist: | JFR | Date: | 2 Apr 96  |

REV 1.0

943128\_C

PAGE 1 OF 12

983



WORKBOOK PAGE: BLANK2

**Pu 238 and 239/240 : LA-943-128 (A-1)****LIQUID / SOLID**

|              |                                    |           |                               | BLNK        |
|--------------|------------------------------------|-----------|-------------------------------|-------------|
| Type         | DATE COUNTED                       | MAR-30-96 | PU 236 AEA FRAC (C236)        | 0.994       |
| BLNK         | SAMPLE VOLUME in mL SS             | 1.000     | PU 238 AEA FRAC (C238)        | 0.000       |
| Work List    | SAMPLE DILUTION FACTOR DF          | 101.000   | PU 239 AEA FRAC (C239)        | 0.000       |
| 6774         | TRACER VOLUME in mL SPKV           | 0.100     | TOTAL AT COUNTS               | 1864        |
| Test Code    | DIGEST DILUTION FACTOR DDF         | 1.0000    | AT COUNT TIME (MIN)           | 30          |
| @PU23901     | TRACER BOOK NO                     | 120B43    | BACKGROUND in cpm (Bkg)       | 0.200       |
| Matrix       | DETECTOR NUMBER                    | 18        | PU 236 cpm                    | 29.920      |
| LIQUID       | EFFICIENCY FACTOR EFF              | 0.2686    | PU 238 cpm                    | 0.000       |
| Batch Number | TRACER PREPARATION DATE            | 12/27/95  | PU 239 cpm                    | 0.000       |
| 96002485     | TRACER PREPARATION VALUE (dpm/mL)  | 2390.00   | AEA COUNT TIME                | 480         |
| Runin        | PU-236 DECAY CORR'D VALUE (dpm/mL) | 2244.99   | Pu 239/240 $\mu\text{Ci/L}$ = | < 3.083E-01 |
| 0            | PU-238 TRACER VALUE (dpm/mL)       | 0.00      |                               |             |

|                 |                                                                                                                                                        |
|-----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|
| Sample Prep     |                                                                                                                                                        |
| N/A             |                                                                                                                                                        |
| Sample #        | Decay Time = Date Counted - Tracer Preparation Date                                                                                                    |
| WL6774          | Pu-236 Decay Corr'd Value = Pu-236 Preparation Value * [e to the power of $\{(-\ln 2 * \text{Decay Time}/1040.95)\}$ ]                                 |
| Instrument Code | Pu 236 Tracer Recovery = (Total AT Counts / TC - Bkg) * C236 * 100 / (Pu-236 Decay Corr'd Value * SPKV * EFF)                                          |
| WB27809         | Pu 239/240 $\mu\text{Ci/L}$ = (C239) (Pu 236 Decay Corr'd Value) (SPKV) (1000 mL/L) (DF) (DDF) / [(C236) (SS) (D g/L) (2220000 dpm/ $\mu\text{Ci}$ )]  |
| Prepared By     | Pu 238 dpm = [(Total AT Counts / TC) - Bkg * 1/EFF * C238] - (Pu-238 Tracer Value * SPKV * Pu 236 Tracer Recovery / 100)                               |
| SLH             | Pu 238 $\mu\text{Ci/L}$ = [(Pu 238 dpm) (DF) (DDF) (1000 mL/L)] / [(Pu-236 Tracer Recovery / 100) (2220000 dpm/ $\mu\text{Ci}$ ) (D g/L) (SS)]         |
| Chemist         | Relative Counting Error = Square Root of $\{[1 / (\text{Pu 236 cpm} * \text{min})] + [1 / (\text{Pu 238 or 239/240 cpm} * \text{min})]\} * 1.96 * 100$ |
| JFR             |                                                                                                                                                        |
| Analyst         |                                                                                                                                                        |
| JMV             |                                                                                                                                                        |
| Date Complete   |                                                                                                                                                        |
| 04/01/96        | Pu 239/240 $\mu\text{Ci/mL}$ < 3.08E-04                                                                                                                |
| Analysis Date   | Relative Counting Error = 100.0%                                                                                                                       |
| 03/28/96        |                                                                                                                                                        |
| Analysis Time   | NOTE: Pu 238 Result is a LESS THAN Value.                                                                                                              |
| 12:00 PM        | Pu 238 $\mu\text{Ci/mL}$ < 3.08E-04                                                                                                                    |
| Sample Point    | Relative Counting Error = 100.0%                                                                                                                       |
| AY-101 GRAB     | Pu 236 Tracer Recovery = 102.1%                                                                                                                        |

|                       |     |       |           |
|-----------------------|-----|-------|-----------|
| Analyst:              | JMV | Date: | 01-Apr-96 |
| Signature of Chemist: | JFR | Date: | 2 Apr 96  |

BLANK.WB1 REV 1.0 943128ML

## Pu 238 and 239/240 : LA-943-128 (A-1)

## LIQUID / SOLID

|              |                                    |            |                         | SAMPLE     |
|--------------|------------------------------------|------------|-------------------------|------------|
| Type         | DATE COUNTED                       | MAR-30-96  | PU 236 AEA FRAC (C236)  | 0.223      |
| SAMPLE       | SAMPLE VOLUME in mL                | SS 1.000   | PU 238 AEA FRAC (C238)  | 0.140      |
| Work List    | SAMPLE DILUTION FACTOR             | DF 101.000 | PU 239 AEA FRAC (C239)  | 0.576      |
| 6774         | TRACER VOLUME in mL                | SPKV 0.100 | TOTAL AT COUNTS         | 8647       |
| Test Code    | DIGEST DILUTION FACTOR             | DDF 1.0000 | AT COUNT TIME (MIN)     | 30         |
| @PU23901     | TRACER BOOK NO                     | 120B43     | BACKGROUND in cpm (Bkg) | 0.200      |
| Matrix       | DETECTOR NUMBER                    | 18         | PU 236 cpm              | 33.700     |
| LIQUID       | EFFICIENCY FACTOR                  | EFF 0.269  | PU 238 cpm              | 21.190     |
| Batch Number | TRACER PREPARATION DATE            | 12/27/95   | PU 239 cpm              | 87.090     |
| 96002485     | TRACER PREPARATION VALUE (dpm/mL)  | 2390.000   | AEA COUNT TIME          | 480        |
| Run          | PU-236 DECAY CORR'D VALUE (dpm/mL) | 2244.989   | Pu 239/240 $\mu$ Ci/L   | 2.6382E+01 |
| 0            | PU-238 TRACER VALUE (dpm/mL)       | 0.000      |                         |            |

## Sample Prep

N/A

## Sample #

S96T001359

## Instrument Code

WB27509

## Prepared By

SLH

## Chemist

JFR

## Analyst

JMV

## Date Complete

04/01/96

## Analysis Date

03/28/96

## Analysis Time

12:00 PM

## Sample Point

AY-101 GRAB

Decay Time = Date Counted - Tracer Preparation Date

Pu-236 Decay Corr'd Value = Pu-236 Preparation Value \* [e to the power of {(ln2 \* Decay Time/1040.95)}]

Pu 236 Tracer Recovery = (Total AT Counts / TC - Bkg) \* C236 \* 100 / (Pu-236 Decay Corr'd Value \* SPKV \* EFF)

Pu 239/240  $\mu$ Ci/L = (C239)(Pu 236 Decay Corr'd Value)(SPKV)(1000mL/L)(DF)(DDF) / [(C236)(SS)(D g/L)(2220000 dpm/ $\mu$ Ci)]

Pu 238 dpm = [(Total AT Counts / TC) - Bkg \* 1/EFF \* C238] - (Pu-238 Tracer Value \* SPKV \* Pu 236 Tracer Recovery / 100)

Pu 238  $\mu$ Ci/L = [(Pu 238 dpm)(DF)(DDF)(1000mL/L)] / [(Pu-236 Tracer Recovery / 100)(2220000 dpm/ $\mu$ Ci)(D g/L)(SS)]

Relative Counting Error = Square Root of [(1/(Pu 236 cpm \* min)) + (1 / (Pu 238 or 239/240 cpm \* min))] \* 1.96 \* 100

|                           |          |                                       |
|---------------------------|----------|---------------------------------------|
| Pu 239/240 $\mu$ Ci/mL    | 2.64E-02 | DETECTION<br>LEVELS<br>in $\mu$ Ci/mL |
| Relative Counting Error = | 1.8%     |                                       |
| Pu 238 $\mu$ Ci/mL        | 6.41E-03 | Pu 239/240                            |
| Relative Counting Error = | 2.5%     | 1.37E-03                              |
| Pu 236 Tracer Recovery =  | 106.5%   | Pu 238                                |
|                           |          | 1.37E-03                              |

Analyst:

JMV

Date:

01-Apr-96

Signature of Chemist:

JFR

Date:

2 Apr 96

SAMPLE.WB1 REV 1.0

943128ML

## Pu 238 and 239/240 : LA-943-128 (A-1)

## LIQUID / SOLID

|                 |                                                                                                                          |           |                                  | DUPLICATE  |
|-----------------|--------------------------------------------------------------------------------------------------------------------------|-----------|----------------------------------|------------|
| Type            | DATE COUNTED                                                                                                             | MAR-30-96 | Pu 236 AEA FRAC (C236)           | 0.189      |
| DUPLICATE       | SAMPLE VOLUME in mL SS                                                                                                   | 1.000     | Pu 238 AEA FRAC (C238)           | 0.160      |
| Work List       | SAMPLE DILUTION FACTOR DF                                                                                                | 101.000   | Pu 239 AEA FRAC (C239)           | 0.606      |
| 6774            | TRACER VOLUME in mL SPKV                                                                                                 | 0.100     | TOTAL AT COUNTS                  | 8551       |
| Test Code       | DIGEST DILUTION FACTOR DDF                                                                                               | 1.0000    | AT COUNT TIME (MIN)              | 30         |
| @PU23901        | TRACER BOOK NO                                                                                                           | 120B43    | BACKGROUND in cpm (Bkg)          | 0.200      |
| Matrix          | DETECTOR NUMBER                                                                                                          | 18        | Pu 236 cpm                       | 29.400     |
| LIQUID          | EFFICIENCY FACTOR EFF                                                                                                    | 0.269     | Pu 238 cpm                       | 24.890     |
| Batch Number    | TRACER PREPARATION DATE                                                                                                  | 12/27/95  | Pu 239 cpm                       | 94.220     |
| 96002485        | TRACER PREPARATION VALUE (dpm/mL)                                                                                        | 2390.000  | AEA COUNT TIME                   | 480        |
| Rerun           | Pu-236 DECAY CORR'D VALUE (dpm/mL)                                                                                       | 2244.989  | Pu 239/240 µCi/L                 | 3.2749E+01 |
| 0               | Pu-238 TRACER VALUE (dpm/mL)                                                                                             | 0.000     |                                  |            |
| Sample Prep     |                                                                                                                          |           |                                  |            |
| N/A             |                                                                                                                          |           |                                  |            |
| Sample #        | Decay Time = Date Counted - Tracer Preparation Date                                                                      |           |                                  |            |
| S96T001359      | Pu-236 Decay Corr'd Value = Pu-236 Preparation Value * [e to the power of {(-ln2 * Decay Time/1040.95)}]                 |           |                                  |            |
| Instrument Code | Pu 236 Tracer Recovery = (Total AT Counts / TC - Bkg) * C236 * 100 / (Pu-236 Decay Corr'd Value * SPKV * EFF)            |           |                                  |            |
| WB27809         | Pu 239/240 µCi/L = (C239)(Pu 236 Decay Corr'd Value)(SPKV)(1000mL/L)(DF)(DDF) / [(C236)(SS)(D g/L)(2220000 dpm/µCi)]     |           |                                  |            |
| Prepared By     | Pu 238 dpm = [(Total AT Counts / TC) - Bkg * 1/EFF * C238] - (Pu-238 Tracer Value * SPKV * Pu 236 Tracer Recovery / 100) |           |                                  |            |
| JFR             | Pu 238 µCi/L = [(Pu 238 dpm)(DF)(DDF)(1000mL/L)] / [(Pu-236 Tracer Recovery / 100)(2220000 dpm/µCi)(D g/L)(SS)]          |           |                                  |            |
| Chemist         | Relative Counting Error = Square Root of [(1/(Pu 236 cpm * min)) + (1 / (Pu 238 or 239/240 cpm * min))] * 1.96 * 100     |           |                                  |            |
| JFR             |                                                                                                                          |           |                                  |            |
| Analyst         |                                                                                                                          |           |                                  |            |
| JMV             |                                                                                                                          |           |                                  |            |
| Date Complete   |                                                                                                                          |           |                                  |            |
| 04/01/96        | Pu 239/240 µCi/mL                                                                                                        | 3.27E-02  | DETECTION<br>LEVELS<br>in µCi/mL |            |
| Analysis Date   | Relative Counting Error                                                                                                  | = 1.9%    |                                  |            |
| 03/28/96        |                                                                                                                          |           | Pu 239/240                       |            |
| Analysis Time   |                                                                                                                          |           | 1.82E-03                         |            |
| 12:00 PM        | Pu 238 µCi/mL                                                                                                            | 8.65E-03  | Pu 238                           |            |
| Sample Point    | Relative Counting Error                                                                                                  | = 2.4%    | 1.82E-03                         |            |
| AY-101          | Pu 236 Tracer Recovery                                                                                                   | = 89.3%   |                                  |            |

|                       |     |       |           |
|-----------------------|-----|-------|-----------|
| Analyst:              | JMV | Date: | 01-Apr-96 |
| Signature of Chemist: | JFR | Date: | 2 Apr 96  |

REV 1.0

943128\_C

PAGE 4 OF 12

986

WORKBOOK PAGE: SAM5

## Pu 238 and 239/240 : LA-943-128 (A-1)

## LIQUID / SOLID

|              |                                    |            |                         | SAMPLE     |
|--------------|------------------------------------|------------|-------------------------|------------|
| Type         | DATE COUNTED                       | MAR-30-96  | PU 236 AEA FRAC (C236)  | 0.239      |
| SAMPLE       | SAMPLE VOLUME in mL                | SS 1.000   | PU 238 AEA FRAC (C238)  | 0.145      |
| Work List    | SAMPLE DILUTION FACTOR             | DF 101.000 | PU 239 AEA FRAC (C239)  | 0.633      |
| 6774         | TRACER VOLUME in mL                | SPKV 0.100 | TOTAL AT COUNTS         | 8749       |
| Test Code    | DIGEST DILUTION FACTOR             | DDF 1.0000 | AT COUNT TIME (MIN)     | 30         |
| @PU23901     | TRACER BOOK NO                     | 120B43     | BACKGROUND in cpm (Bkg) | 0.200      |
| Matrix       | DETECTOR NUMBER                    | 18         | PU 236 cpm              | 42.400     |
| LIQUID       | EFFICIENCY FACTOR                  | EFF 0.269  | PU 238 cpm              | 25.620     |
| Batch Number | TRACER PREPARATION DATE            | 12/27/95   | PU 239 cpm              | 112.110    |
| 96002485     | TRACER PREPARATION VALUE (dpm/mL)  | 2390.000   | AEA COUNT TIME          | 480        |
| Run          | PU-236 DECAY CORR'D VALUE (dpm/mL) | 2244.989   | Pu 239/240 $\mu$ Ci/L   | 2.7051E+01 |
| 0            | PU-238 TRACER VALUE (dpm/mL)       | 0.000      |                         |            |

## Sample Prep

N/A

## Sample #

S96T001360

## Instrument Code

WB27809

## Prepared By

SLH

## Chemist

JFR

## Analyst

JMV

## Date Complete

04/01/96

## Analysis Date

03/28/96

## Analysis Time

12:00 PM

## Sample Point

AY-101 GRAB

Decay Time = Date Counted - Tracer Preparation Date

Pu-236 Decay Corr'd Value = Pu-236 Preparation Value \* [e to the power of  $\{(-\ln 2 * \text{Decay Time}) / 1040.95\}$ ]

Pu 236 Tracer Recovery = (Total AT Counts / TC - Bkg) \* C236 \* 100 / (Pu-236 Decay Corr'd Value \* SPKV \* EFF)

Pu 239/240  $\mu$ Ci/L = (C239) (Pu 236 Decay Corr'd Value) (SPKV) (1000mL/L) (DF) (DDF) / [(C236) (SS) (D g/L) (2220000 dpm/ $\mu$ Ci)]

Pu 238 dpm = [(Total AT Counts / TC) - Bkg \* 1/EFF \* C238] - (Pu-238 Tracer Value \* SPKV \* Pu 236 Tracer Recovery / 100)

Pu 238  $\mu$ Ci/L = [(Pu 238 dpm) (DF) (DDF) (1000mL/L)] / [(Pu-236 Tracer Recovery / 100) (2220000 dpm/ $\mu$ Ci) (D g/L) (SS)]Relative Counting Error = Square Root of  $\{[1 / (\text{Pu 236 cpm} * \text{min})] + [1 / (\text{Pu 238 or 239/240 cpm} * \text{min})]\} * 1.96 * 100$ 

|                           |          |                                       |
|---------------------------|----------|---------------------------------------|
| Pu 239/240 $\mu$ Ci/mL    | 2.71E-02 | DETECTION<br>LEVELS<br>in $\mu$ Ci/mL |
| Relative Counting Error = | 1.6%     |                                       |
| Pu 238 $\mu$ Ci/mL        | 6.20E-03 | Pu 239/240                            |
| Relative Counting Error = | 2.2%     | 1.28E-03                              |
| Pu 236 Tracer Recovery =  | 115.5%   | Pu 238                                |
|                           |          | 1.28E-03                              |

|                       |     |       |           |
|-----------------------|-----|-------|-----------|
| Analyst:              | JMV | Date: | 01-Apr-96 |
| Signature of Chemist: | JFR | Date: | 2 Apr 96  |

SAMPLE.WB1 REV 1.0

943128ML

Pu 238 and 239/240 : LA-943-128 (A-1)

LIQUID / SOLID

|                 |                                                                                                                          |            |                            | DUPLICATE  |
|-----------------|--------------------------------------------------------------------------------------------------------------------------|------------|----------------------------|------------|
| Type            | DATE COUNTED                                                                                                             | MAR-30-96  | PU 236 AEA FRAC (C236)     | 0.209      |
| DUPLICATE       | SAMPLE VOLUME in mL                                                                                                      | SS 1.000   | PU 238 AEA FRAC (C238)     | 0.170      |
| Work List       | SAMPLE DILUTION FACTOR                                                                                                   | DF 101.000 | PU 239 AEA FRAC (C239)     | 0.631      |
| 6774            | TRACER VOLUME in mL                                                                                                      | SPKV 0.100 | TOTAL AT COUNTS            | 8453       |
| Test Code       | DIGEST DILUTION FACTOR                                                                                                   | DDF 1.0000 | AT COUNT TIME (MIN)        | 30         |
| @PU23901        | TRACER BOOK NO                                                                                                           | 120B43     | BACKGROUND in cpm (Bkg)    | 0.200      |
| Matrix          | DETECTOR NUMBER                                                                                                          | 18         | PU 236 cpm                 | 35.680     |
| LIQUID          | EFFICIENCY FACTOR                                                                                                        | EFF 0.269  | PU 238 cpm                 | 29.060     |
| Batch Number    | TRACER PREPARATION DATE                                                                                                  | 12/27/95   | PU 239 cpm                 | 108.060    |
| 96002485        | TRACER PREPARATION VALUE (dpm/mL)                                                                                        | 2390.000   | AEA COUNT TIME             | 480        |
| Refun           | PU-236 DECAY CORR'D VALUE (dpm/mL)                                                                                       | 2244.989   | Pu 239/240 µCi/L           | 3.0837E+01 |
| 0               | PU-238 TRACER VALUE (dpm/mL)                                                                                             | 0.000      |                            |            |
| Sample Prep     |                                                                                                                          |            |                            |            |
| N/A             |                                                                                                                          |            |                            |            |
| Sample #        | Decay Time = Date Counted - Tracer Preparation Date                                                                      |            |                            |            |
| S96T001360      | Pu-236 Decay Corr'd Value = Pu-236 Preparation Value * [e to the power of {(-ln2 * Decay Time/1040.95)}]                 |            |                            |            |
| Instrument Code | Pu 236 Tracer Recovery = (Total AT Counts / TC - Bkg) * C236 * 100 / (Pu-236 Decay Corr'd Value * SPKV * EFF)            |            |                            |            |
| WB27809         | Pu 239/240 µCi/L = (C239)(Pu 236 Decay Corr'd Value)(SPKV)(1000mL/L)(DF)(DDF) / [(C236)(SS)(D g/L)(2220000 dpm/µCi)]     |            |                            |            |
| Prepared By     | Pu 238 dpm = [(Total AT Counts / TC) - Bkg * 1/EFF * C238] - (Pu-238 Tracer Value * SPKV * Pu 236 Tracer Recovery / 100) |            |                            |            |
| JFR             | Pu 238 µCi/L = [(Pu 238 dpm)(DF)(DDF)(1000mL/L)] / [(Pu-236 Tracer Recovery / 100)(2220000 dpm/µCi)(D g/L)(SS)]          |            |                            |            |
| Chemist         | Relative Counting Error = Square Root of [(1/(Pu 236 cpm * min)) + (1 / (Pu 238 or 239/240 cpm * min))] * 1.96 * 100     |            |                            |            |
| JFR             |                                                                                                                          |            |                            |            |
| Analyst         |                                                                                                                          |            |                            |            |
| JMV             |                                                                                                                          |            |                            |            |
| Date Complete   |                                                                                                                          |            |                            |            |
| 04/01/96        | Pu 239/240 µCi/mL                                                                                                        | 3.08E-02   | DETECTION LEVELS in µCi/mL |            |
| Analysis Date   | Relative Counting Error                                                                                                  | = 1.7%     |                            |            |
| 03/28/96        |                                                                                                                          |            | Pu 239/240                 |            |
| Analysis Time   |                                                                                                                          |            | 1.50E-03                   |            |
| 12:00 PM        | Pu 238 µCi/mL                                                                                                            | 8.31E-03   | Pu 238                     |            |
| Sample Point    | Relative Counting Error                                                                                                  | = 2.2%     | 1.50E-03                   |            |
| AY-101          | Pu 236 Tracer Recovery                                                                                                   | = 97.6%    |                            |            |

|                       |     |       |           |
|-----------------------|-----|-------|-----------|
| Analyst:              | JMV | Date: | 01-Apr-96 |
| Signature of Chemist: | JFR | Date: | 2 Apr 96  |

REV 1.0

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PAGE 7 OF 12

988.

Westinghouse Hanford Co.

*ALJ* 3-30-96

GENERAL ALPHA ENERGY ANALYSIS

Rev. 2.01

WHC-SD-WM-DP-178 REV 1

DATA REDUCTION REPORT

SAMPLE

WL6774-STD

File ID: 13a1302.CNF

Counted on: 3/30/96 @ 7:40  
 Detector: AEA13  
 Geometry number: 1  
 Count time: 28806. Sec

PEAK ANALYSIS

| Peak ID | Peak height |       | Peak center |         | FWHM    |        | Tau     |        |
|---------|-------------|-------|-------------|---------|---------|--------|---------|--------|
|         | Initial     | Final | Initial     | Final   | Initial | Final  | Initial | Final  |
| 1       | 455.8       | 455.8 | 360.163     | 360.163 | 12.000  | 4.866  | 6.000   | 6.209  |
| 2       | 303.0       | 303.0 | 352.501     | 350.003 | 12.000  | 3.750  | 6.000   | 0.569  |
| 3       | 621.9       | 621.9 | 226.363     | 226.361 | 10.000  | 4.504  | 5.000   | 0.802  |
| 4       | 9.8         | 9.8   | 79.306      | 79.277  | 24.000  | 98.635 | 12.000  | 12.331 |

PEAK RESULTS

Peak Error Limit: 30%

| Peak ID | Isotope | AEA Frac | Exp.                   | Obs.  | Diff.  | FWHM  | Count Rate c/m | %err @95 | d/m   | Activity uCi/ea |
|---------|---------|----------|------------------------|-------|--------|-------|----------------|----------|-------|-----------------|
| 1       | Pu236   | 0.149    | 5.755                  | 5.734 | 0.021  | 10.02 | 10.20          | 2.8      | 128.6 | 0.579E-04       |
| 2       | Ra224   | 0.265    | 5.686                  | 5.688 | -0.002 | 0.02  | 18.17          | 2.5      | 238.9 | 0.108E-03       |
| 3       | Pu239   | 0.489    | 5.147                  | 5.131 | 0.016  | 0.02  | 33.45          | 1.6      | 413.5 | 0.186E-03       |
|         | Pu240   |          | 5.144                  | 5.131 | 0.013  |       |                |          | 413.5 | 0.186E-03       |
| 4       | U 235   | 0.017    | 4.386                  | 4.470 | -0.084 | 0.44  | 1.15           | 9.5      | 24.9  | 0.112E-04       |
| Totals: |         | 0.920    | <--valid peaks only--> |       |        |       | 62.97          |          |       |                 |

DETECTOR CALIBRATION

Energy(MEV) = 4.113 + (0.0045)\*Channel  
 Energy range (MeV): 4.113 TO 6.417  
 Efficiency = 0.0809 CPM/DPM

TOTAL COUNT DATA:

| Item          | Total   | % Recovery |
|---------------|---------|------------|
| Raw spectrum  | 32857.0 | 100.000    |
| Smoothed      | 32859.6 | 100.008    |
| Composite fit | 30230.4 | 92.006     |
| Residuals     | 2626.6  | 7.994      |

Analyzed by: ALJ

Display Max.:

3819.8

[illegible]

| Raw Data Dump for AEA Spectrum: 13a1302.CNF |      |      |      |      | WHC-SD-WM-DP-178 REV.1 |      |      |      |      |      |
|---------------------------------------------|------|------|------|------|------------------------|------|------|------|------|------|
| 1                                           | 0.   | 0.   | 3.   | 3.   | 1.                     | 1.   | 1.   | 4.   | 5.   | 6.   |
| 11                                          | 5.   | 4.   | 3.   | 4.   | 2.                     | 3.   | 2.   | 1.   | 2.   | 5.   |
| 21                                          | 5.   | 4.   | 4.   | 3.   | 7.                     | 2.   | 2.   | 6.   | 3.   | 8.   |
| 31                                          | 4.   | 2.   | 3.   | 4.   | 6.                     | 3.   | 5.   | 7.   | 1.   | 2.   |
| 41                                          | 5.   | 2.   | 3.   | 4.   | 2.                     | 7.   | 9.   | 4.   | 5.   | 4.   |
| 51                                          | 6.   | 6.   | 2.   | 5.   | 6.                     | 2.   | 4.   | 2.   | 8.   | 13.  |
| 61                                          | 6.   | 5.   | 4.   | 12.  | 5.                     | 5.   | 4.   | 9.   | 9.   | 4.   |
| 71                                          | 4.   | 6.   | 12.  | 2.   | 8.                     | 4.   | 4.   | 13.  | 14.  | 12.  |
| 81                                          | 8.   | 7.   | 8.   | 2.   | 6.                     | 4.   | 6.   | 7.   | 8.   | 4.   |
| 91                                          | 7.   | 2.   | 6.   | 6.   | 8.                     | 5.   | 9.   | 11.  | 5.   | 7.   |
| 101                                         | 14.  | 11.  | 8.   | 6.   | 14.                    | 13.  | 13.  | 12.  | 13.  | 14.  |
| 111                                         | 17.  | 13.  | 8.   | 8.   | 19.                    | 13.  | 12.  | 19.  | 16.  | 17.  |
| 121                                         | 13.  | 15.  | 19.  | 18.  | 17.                    | 23.  | 21.  | 19.  | 19.  | 16.  |
| 131                                         | 21.  | 23.  | 25.  | 13.  | 17.                    | 26.  | 23.  | 21.  | 24.  | 20.  |
| 141                                         | 22.  | 26.  | 22.  | 25.  | 29.                    | 27.  | 26.  | 29.  | 40.  | 31.  |
| 151                                         | 29.  | 36.  | 26.  | 35.  | 46.                    | 50.  | 44.  | 46.  | 54.  | 49.  |
| 161                                         | 49.  | 59.  | 60.  | 49.  | 57.                    | 65.  | 70.  | 62.  | 51.  | 63.  |
| 171                                         | 70.  | 59.  | 83.  | 79.  | 64.                    | 71.  | 82.  | 85.  | 93.  | 103. |
| 181                                         | 95.  | 105. | 88.  | 117. | 113.                   | 120. | 107. | 139. | 137. | 144. |
| 191                                         | 126. | 167. | 134. | 158. | 174.                   | 188. | 166. | 180. | 184. | 195. |
| 201                                         | 194. | 226. | 211. | 221. | 266.                   | 254. | 267. | 297. | 277. | 289. |
| 211                                         | 348. | 312. | 313. | 386. | 380.                   | 417. | 446. | 407. | 425. | 462. |
| 221                                         | 481. | 479. | 497. | 562. | 645.                   | 650. | 707. | 675. | 535. | 326. |
| 231                                         | 169. | 106. | 59.  | 45.  | 32.                    | 20.  | 28.  | 22.  | 14.  | 22.  |
| 241                                         | 21.  | 19.  | 24.  | 16.  | 20.                    | 18.  | 16.  | 17.  | 16.  | 10.  |
| 251                                         | 12.  | 11.  | 10.  | 14.  | 12.                    | 14.  | 17.  | 12.  | 26.  | 20.  |
| 261                                         | 19.  | 7.   | 27.  | 23.  | 22.                    | 27.  | 21.  | 26.  | 15.  | 23.  |
| 271                                         | 22.  | 21.  | 26.  | 18.  | 19.                    | 25.  | 27.  | 28.  | 22.  | 29.  |
| 281                                         | 25.  | 31.  | 30.  | 35.  | 42.                    | 29.  | 38.  | 44.  | 39.  | 33.  |
| 291                                         | 22.  | 36.  | 27.  | 36.  | 44.                    | 39.  | 38.  | 34.  | 38.  | 42.  |
| 301                                         | 61.  | 40.  | 46.  | 45.  | 58.                    | 67.  | 49.  | 48.  | 45.  | 56.  |
| 311                                         | 56.  | 60.  | 77.  | 69.  | 73.                    | 80.  | 80.  | 75.  | 107. | 85.  |
| 321                                         | 95.  | 77.  | 110. | 109. | 115.                   | 112. | 120. | 120. | 136. | 148. |
| 331                                         | 142. | 146. | 143. | 157. | 182.                   | 180. | 176. | 195. | 186. | 203. |
| 341                                         | 260. | 209. | 258. | 273. | 237.                   | 258. | 322. | 315. | 351. | 361. |
| 351                                         | 372. | 394. | 371. | 393. | 305.                   | 324. | 337. | 387. | 443. | 510. |
| 361                                         | 549. | 476. | 304. | 149. | 68.                    | 43.  | 32.  | 28.  | 18.  | 13.  |
| 371                                         | 8.   | 8.   | 8.   | 2.   | 5.                     | 7.   | 8.   | 7.   | 9.   | 2.   |
| 381                                         | 6.   | 2.   | 5.   | 4.   | 2.                     | 9.   | 5.   | 3.   | 5.   | 4.   |
| 391                                         | 2.   | 5.   | 5.   | 3.   | 2.                     | 1.   | 4.   | 1.   | 2.   | 5.   |
| 401                                         | 3.   | 4.   | 0.   | 1.   | 2.                     | 1.   | 2.   | 5.   | 3.   | 2.   |
| 411                                         | 1.   | 6.   | 4.   | 0.   | 3.                     | 5.   | 2.   | 0.   | 1.   | 1.   |
| 421                                         | 2.   | 0.   | 1.   | 1.   | 2.                     | 5.   | 5.   | 1.   | 2.   | 2.   |
| 431                                         | 2.   | 1.   | 2.   | 1.   | 5.                     | 3.   | 2.   | 1.   | 0.   | 4.   |
| 441                                         | 1.   | 3.   | 0.   | 2.   | 1.                     | 1.   | 2.   | 2.   | 1.   | 2.   |
| 451                                         | 4.   | 2.   | 2.   | 0.   | 5.                     | 1.   | 3.   | 4.   | 1.   | 3.   |
| 461                                         | 1.   | 5.   | 1.   | 2.   | 3.                     | 1.   | 1.   | 3.   | 1.   | 0.   |
| 471                                         | 0.   | 1.   | 1.   | 5.   | 4.                     | 5.   | 3.   | 2.   | 3.   | 1.   |
| 481                                         | 3.   | 2.   | 6.   | 1.   | 1.                     | 2.   | 4.   | 4.   | 2.   | 0.   |
| 491                                         | 2.   | 2.   | 2.   | 0.   | 2.                     | 0.   | 0.   | 2.   | 1.   | 1.   |
| 511                                         | 1.   | 0.   |      |      |                        |      |      |      |      |      |



Westinghouse Hanford Co.

3-30-96

GENERAL ALPHA ENERGY ANALYSIS

Rev. 2.01

WHC-SD-WM-DP-178, REV. /

DATA REDUCTION REPORT

SAMPLE

WL6774-BLK

File ID: 14a1406.CNF

Counted on: 3/30/96 @ 7:40

Detector: AEA14

Geometry number: 1

Count time: 28806. Sec

PEAK ANALYSIS

| Peak ID | Peak height |       | Peak center |         | FWHM    |       | Tau     |       |
|---------|-------------|-------|-------------|---------|---------|-------|---------|-------|
|         | Initial     | Final | Initial     | Final   | Initial | Final | Initial | Final |
| 1       | 464.3       | 464.3 | 362.794     | 362.794 | 10.000  | 3.739 | 5.000   | 0.520 |
| 2?      | 3.0         | 3.0   | 291.607     | 290.422 | 16.000  | 0.052 | 8.000   | 0.005 |

PEAK RESULTS

Peak Error Limit: 30%

| Peak ID | Isotope | AEA Frac | Peak Centroid Exp.     | Obs.  | Diff. | FWHM | Count Rate c/m | %err @95 | d/m    | Activity uCi/ea |  |
|---------|---------|----------|------------------------|-------|-------|------|----------------|----------|--------|-----------------|--|
| 1       |         | 0.994    |                        | 5.727 |       | 0.02 | 29.92          | 1.6      | 2122.1 | 0.956E-03       |  |
| 2       |         | ????     |                        | 5.401 |       |      | 0.25           | 49.5     |        |                 |  |
| Totals: |         | 0.994    | <--valid peaks only--> |       |       |      | 29.92          |          |        |                 |  |

DETECTOR CALIBRATION

Energy(MEV) = 4.094 + (0.0045)\*Channel

Energy range (MeV): 4.094 TO 6.398

Efficiency = 0.0141 CPM/DPM

TOTAL COUNT DATA:

| Item          | Total   | % Recovery |
|---------------|---------|------------|
| Raw spectrum  | 14455.0 | 100.000    |
| Smoothed      | 14454.3 | 99.995     |
| Composite fit | 14486.9 | 100.221    |
| Residuals     | -31.9   | -0.221     |

Analyzed by:

ALJ

1 Legend: Raw = .... Modeled Peaks = 1,2,..., etc      Display Max.: 3002.4

Display Max.: 3002.4

WHC-SD-WM-DP-178, REV. 1

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| Raw Data Dump for AEA Spectrum: | 14a1406.CNF | WHC-SD-WM-DP-178 REV. 1 |
|---------------------------------|-------------|-------------------------|
| 1                               | 0.          | 0.                      |
| 11                              | 2.          | 0.                      |
| 21                              | 0.          | 3.                      |
| 31                              | 1.          | 0.                      |
| 41                              | 0.          | 0.                      |
| 51                              | 0.          | 0.                      |
| 61                              | 2.          | 1.                      |
| 71                              | 4.          | 2.                      |
| 81                              | 1.          | 0.                      |
| 91                              | 0.          | 1.                      |
| 101                             | 4.          | 0.                      |
| 111                             | 0.          | 2.                      |
| 121                             | 1.          | 1.                      |
| 131                             | 2.          | 2.                      |
| 141                             | 4.          | 5.                      |
| 151                             | 2.          | 2.                      |
| 161                             | 3.          | 2.                      |
| 171                             | 1.          | 5.                      |
| 181                             | 1.          | 1.                      |
| 191                             | 6.          | 3.                      |
| 201                             | 3.          | 4.                      |
| 211                             | 6.          | 3.                      |
| 221                             | 7.          | 6.                      |
| 231                             | 7.          | 3.                      |
| 241                             | 2.          | 4.                      |
| 251                             | 8.          | 16.                     |
| 261                             | 6.          | 11.                     |
| 271                             | 14.         | 13.                     |
| 281                             | 28.         | 23.                     |
| 291                             | 41.         | 27.                     |
| 301                             | 36.         | 37.                     |
| 311                             | 52.         | 54.                     |
| 321                             | 77.         | 67.                     |
| 331                             | 118.        | 99.                     |
| 341                             | 184.        | 198.                    |
| 351                             | 326.        | 366.                    |
| 361                             | 400.        | 473.                    |
| 371                             | 26.         | 14.                     |
| 381                             | 4.          | 5.                      |
| 391                             | 3.          | 5.                      |
| 401                             | 3.          | 1.                      |
| 411                             | 1.          | 0.                      |
| 421                             | 0.          | 0.                      |
| 431                             | 1.          | 0.                      |
| 441                             | 1.          | 0.                      |
| 451                             | 0.          | 0.                      |
| 461                             | 3.          | 0.                      |
| 471                             | 0.          | 0.                      |
| 481                             | 1.          | 0.                      |
| 491                             | 2.          | 0.                      |
| 511                             | 1.          | 0.                      |

Westinghouse Hanford Co.

3-30-96

GENERAL ALPHA ENERGY ANALYSIS  
Rev. 2.01

DATA REDUCTION REPORT

WHC-SD-WM-DP-178, REV. 1

SAMPLE  
S96T001359-SAM  
File ID: 15a1586.CNF

Counted on: 3/30/96 @ 7:41  
Detector: AEA15  
Geometry number: 1  
Count time: 28804. Sec

PEAK ANALYSIS

| Peak ID | Peak height |        | Peak center |         | FWHM    |       | Tau     |       |
|---------|-------------|--------|-------------|---------|---------|-------|---------|-------|
|         | Initial     | Final  | Initial     | Final   | Initial | Final | Initial | Final |
| 1       | 574.8       | 574.8  | 363.458     | 363.458 | 10.000  | 3.864 | 5.000   | 0.605 |
| 2       | 370.1       | 370.1  | 304.351     | 304.270 | 10.000  | 3.475 | 5.000   | 0.553 |
| 3       | 1839.0      | 1839.0 | 228.490     | 228.483 | 12.000  | 4.836 | 6.000   | 1.032 |
| 4?      | 13.2        | 13.2   | 82.131      | 82.086  | 242.000 | 1.000 | 121.000 | 0.100 |

PEAK RESULTS  
Peak Error Limit: 30%

| Peak ID | Isotope | AEA Frac | Peak Centroid Exp.     | Obs.  | Diff. | FWHM | Count Rate c/m | %err @95 | d/m    | Activity uCi/ea |
|---------|---------|----------|------------------------|-------|-------|------|----------------|----------|--------|-----------------|
| 1       | Pu236   | 0.223    | 5.755                  | 5.752 | 0.003 | 0.02 | 33.70          | 1.5      | 2162.5 | 0.974E-03       |
| 2       | Pu238   | 0.140    | 5.487                  | 5.486 | 0.001 | 0.02 | 21.19          | 2.1      | 1851.1 | 0.834E-03       |
|         | Am241   |          | 5.479                  | 5.486 | -.007 |      |                |          | 1417.9 | 0.639E-03       |
| 3       | Pu239   | 0.576    | 5.147                  | 5.144 | 0.003 | 0.02 | 87.09          | 1.0      | 5477.1 | 0.247E-02       |
|         | Pu240   |          | 5.144                  | 5.144 | 0.000 |      |                |          | 5477.1 | 0.247E-02       |
| 4       |         | ????     |                        | 4.486 |       |      | 0.96           | 9.2      |        |                 |
| Totals: |         | 0.939    | <--valid peaks only--> |       |       |      | 141.97         |          |        |                 |

DETECTOR CALIBRATION  
Energy(MEV) = 4.116 + (0.0045)\*Channel  
Energy range (MeV): 4.116 TO 6.420  
Efficiency = 0.0159 CPM/DPM

TOTAL COUNT DATA:

| Item          | Total   | % Recovery |
|---------------|---------|------------|
| Raw spectrum  | 72570.0 | 100.000    |
| Smoothed      | 72570.7 | 100.001    |
| Composite fit | 68615.5 | 94.551     |
| Residuals     | 3954.5  | 5.449      |

Analyzed by:

ALJ

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[illegible]

| Raw Data Dump for AEA Spectrum: 15a1586.CNF |       |       |       |       |       |       |       |       |       | WHC-SD-WM-DP-178, REV. I |  |
|---------------------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------------------------|--|
| 1                                           | 0.    | 0.    | 1.    | 7.    | 6.    | 8.    | 4.    | 8.    | 5.    | 9.                       |  |
| 11                                          | 7.    | 5.    | 6.    | 6.    | 3.    | 6.    | 3.    | 10.   | 9.    | 5.                       |  |
| 21                                          | 6.    | 3.    | 1.    | 7.    | 9.    | 5.    | 6.    | 1.    | 4.    | 6.                       |  |
| 31                                          | 9.    | 7.    | 4.    | 8.    | 11.   | 4.    | 8.    | 8.    | 5.    | 2.                       |  |
| 41                                          | 4.    | 6.    | 6.    | 13.   | 2.    | 11.   | 13.   | 7.    | 9.    | 9.                       |  |
| 51                                          | 12.   | 10.   | 5.    | 8.    | 3.    | 5.    | 8.    | 8.    | 10.   | 6.                       |  |
| 61                                          | 5.    | 11.   | 12.   | 8.    | 4.    | 13.   | 11.   | 8.    | 9.    | 9.                       |  |
| 71                                          | 3.    | 15.   | 13.   | 9.    | 16.   | 11.   | 5.    | 10.   | 14.   | 11.                      |  |
| 81                                          | 11.   | 15.   | 14.   | 12.   | 8.    | 11.   | 10.   | 10.   | 19.   | 9.                       |  |
| 91                                          | 15.   | 17.   | 12.   | 13.   | 9.    | 20.   | 16.   | 10.   | 12.   | 18.                      |  |
| 101                                         | 10.   | 17.   | 15.   | 16.   | 26.   | 22.   | 13.   | 20.   | 21.   | 21.                      |  |
| 111                                         | 14.   | 12.   | 26.   | 18.   | 22.   | 17.   | 18.   | 13.   | 21.   | 29.                      |  |
| 121                                         | 27.   | 22.   | 20.   | 21.   | 35.   | 26.   | 23.   | 22.   | 35.   | 24.                      |  |
| 131                                         | 27.   | 28.   | 34.   | 37.   | 35.   | 30.   | 32.   | 38.   | 27.   | 39.                      |  |
| 141                                         | 45.   | 38.   | 36.   | 43.   | 50.   | 52.   | 61.   | 65.   | 45.   | 58.                      |  |
| 151                                         | 75.   | 69.   | 57.   | 59.   | 60.   | 72.   | 65.   | 71.   | 62.   | 77.                      |  |
| 161                                         | 59.   | 85.   | 87.   | 75.   | 87.   | 98.   | 84.   | 101.  | 95.   | 93.                      |  |
| 171                                         | 117.  | 119.  | 112.  | 122.  | 135.  | 126.  | 126.  | 149.  | 140.  | 163.                     |  |
| 181                                         | 182.  | 163.  | 203.  | 180.  | 205.  | 225.  | 237.  | 246.  | 257.  | 292.                     |  |
| 191                                         | 268.  | 301.  | 295.  | 314.  | 298.  | 348.  | 368.  | 367.  | 411.  | 387.                     |  |
| 201                                         | 446.  | 479.  | 498.  | 486.  | 580.  | 566.  | 576.  | 655.  | 654.  | 670.                     |  |
| 211                                         | 708.  | 750.  | 762.  | 820.  | 900.  | 981.  | 1048. | 1140. | 1192. | 1173.                    |  |
| 221                                         | 1235. | 1270. | 1304. | 1459. | 1509. | 1644. | 1811. | 1999. | 2146. | 1967.                    |  |
| 231                                         | 1580. | 1121. | 725.  | 437.  | 254.  | 155.  | 89.   | 77.   | 55.   | 62.                      |  |
| 241                                         | 71.   | 74.   | 52.   | 52.   | 44.   | 66.   | 49.   | 46.   | 49.   | 46.                      |  |
| 251                                         | 45.   | 60.   | 43.   | 45.   | 50.   | 59.   | 51.   | 59.   | 53.   | 64.                      |  |
| 261                                         | 58.   | 54.   | 65.   | 60.   | 82.   | 82.   | 81.   | 90.   | 86.   | 82.                      |  |
| 271                                         | 87.   | 73.   | 84.   | 100.  | 122.  | 136.  | 101.  | 129.  | 135.  | 144.                     |  |
| 281                                         | 139.  | 140.  | 157.  | 161.  | 176.  | 182.  | 190.  | 193.  | 201.  | 253.                     |  |
| 291                                         | 257.  | 280.  | 274.  | 300.  | 328.  | 347.  | 375.  | 340.  | 320.  | 303.                     |  |
| 301                                         | 320.  | 349.  | 421.  | 443.  | 474.  | 463.  | 333.  | 195.  | 119.  | 76.                      |  |
| 311                                         | 69.   | 53.   | 70.   | 63.   | 65.   | 73.   | 70.   | 81.   | 65.   | 76.                      |  |
| 321                                         | 77.   | 90.   | 87.   | 89.   | 87.   | 78.   | 118.  | 108.  | 132.  | 89.                      |  |
| 331                                         | 109.  | 126.  | 127.  | 135.  | 161.  | 164.  | 176.  | 160.  | 176.  | 210.                     |  |
| 341                                         | 216.  | 214.  | 216.  | 208.  | 274.  | 274.  | 288.  | 286.  | 335.  | 346.                     |  |
| 351                                         | 380.  | 401.  | 445.  | 513.  | 475.  | 450.  | 445.  | 428.  | 420.  | 444.                     |  |
| 361                                         | 498.  | 503.  | 612.  | 671.  | 650.  | 452.  | 265.  | 116.  | 55.   | 42.                      |  |
| 371                                         | 36.   | 34.   | 27.   | 16.   | 19.   | 9.    | 12.   | 10.   | 7.    | 6.                       |  |
| 381                                         | 15.   | 10.   | 11.   | 8.    | 2.    | 7.    | 4.    | 6.    | 5.    | 7.                       |  |
| 391                                         | 10.   | 3.    | 4.    | 5.    | 7.    | 8.    | 2.    | 7.    | 7.    | 10.                      |  |
| 401                                         | 3.    | 8.    | 7.    | 7.    | 3.    | 6.    | 3.    | 4.    | 3.    | 5.                       |  |
| 411                                         | 4.    | 5.    | 6.    | 4.    | 6.    | 7.    | 3.    | 2.    | 2.    | 7.                       |  |
| 421                                         | 4.    | 8.    | 5.    | 4.    | 2.    | 2.    | 6.    | 5.    | 6.    | 8.                       |  |
| 431                                         | 3.    | 5.    | 4.    | 5.    | 5.    | 5.    | 6.    | 0.    | 3.    | 4.                       |  |
| 441                                         | 2.    | 2.    | 5.    | 4.    | 5.    | 2.    | 5.    | 2.    | 1.    | 4.                       |  |
| 451                                         | 4.    | 3.    | 5.    | 5.    | 4.    | 1.    | 3.    | 8.    | 3.    | 3.                       |  |
| 461                                         | 7.    | 3.    | 4.    | 1.    | 2.    | 2.    | 4.    | 5.    | 5.    | 4.                       |  |
| 471                                         | 2.    | 3.    | 4.    | 5.    | 9.    | 3.    | 3.    | 7.    | 4.    | 7.                       |  |
| 481                                         | 5.    | 5.    | 5.    | 8.    | 5.    | 1.    | 0.    | 4.    | 2.    | 4.                       |  |
| 491                                         | 2.    | 2.    | 7.    | 6.    | 3.    | 5.    | 3.    | 7.    | 2.    | 4.                       |  |
| 511                                         | 2.    | 0.    |       |       |       |       |       |       |       |                          |  |

Westinghouse Hanford Co.

*AD 3-30-96*

GENERAL ALPHA ENERGY ANALYSIS

Rev. 2.01

WHC-SD-WM-DP-178, REV. 1

DATA REDUCTION REPORT

SAMPLE

S96T001359-DUP

File ID: 16a1668.CNF

Counted on: 3/30/96 @ 7:41  
 Detector: AEA16  
 Geometry number: 1  
 Count time: 28805. Sec

PEAK ANALYSIS

| Peak ID | Peak height |        | Peak center |         | FWHM    |        | Tau     |        |
|---------|-------------|--------|-------------|---------|---------|--------|---------|--------|
|         | Initial     | Final  | Initial     | Final   | Initial | Final  | Initial | Final  |
| 1       | 455.4       | 455.4  | 358.302     | 358.302 | 10.000  | 3.966  | 5.000   | 0.669  |
| 2       | 102.4       | 102.4  | 349.844     | 347.941 | 10.000  | 2.277  | 5.000   | 0.519  |
| 3       | 339.6       | 339.6  | 299.838     | 299.722 | 12.000  | 4.896  | 6.000   | 0.599  |
| 4       | 1441.2      | 1441.2 | 224.761     | 224.744 | 12.000  | 5.079  | 6.000   | 0.717  |
| 5?      | 13.4        | 13.4   | 69.746      | 69.554  | 180.000 | 1.000  | 90.000  | 0.100  |
| 6?      | 6.0         | 6.0    | 33.935      | 33.420  | 22.000  | 12.321 | 11.000  | 11.364 |
| 7?      | 6.9         | 6.9    | 16.066      | 15.210  | 12.000  | 7.469  | 6.000   | 5.673  |

PEAK RESULTS

Peak Error Limit: 30%

| Peak ID | Isotope | AEA<br>Frac | Peak Centroid          |       |            | Count<br>Rate c/m | %err<br>@95 | d/m    | Activity<br>uCi/ea |
|---------|---------|-------------|------------------------|-------|------------|-------------------|-------------|--------|--------------------|
|         |         |             | Exp.                   | Obs.  | Diff. FWHM |                   |             |        |                    |
| 1       |         | 0.162       |                        | 5.727 | 0.02       | 25.19             | 1.8         | 2290.4 | 0.103E-02          |
| 2       | Ra224   | 0.027       | 5.686                  | 5.681 | 0.0050.012 | 4.21              | 10.4        | 407.2  | 0.183E-03          |
| 3       | Am241   | 0.160       | 5.479                  | 5.464 | 0.0150.02  | 24.89             | 1.9         | 2407.0 | 0.108E-02          |
| 4       | Pu239   | 0.606       | 5.147                  | 5.126 | 0.0210.02  | 94.22             | 0.9         | 8565.1 | 0.386E-02          |
|         | Pu240   |             | 5.144                  | 5.126 | 0.018      |                   |             | 8565.1 | 0.386E-02          |
| 5       |         | ????        |                        | 4.428 |            | 0.92              | 10.4        |        |                    |
| 6       |         | ????        |                        | 4.265 |            | 0.21              | 38.3        |        |                    |
| 7       |         | ????        |                        | 4.184 |            | 0.19              | 33.0        |        |                    |
| Totals: |         | 0.956       | <--valid peaks only--> |       |            | 148.51            |             |        |                    |

DETECTOR CALIBRATION

Energy(MEV) = 4.115 + (0.0045)\*Channel

Energy range (MeV): 4.115 TO 6.419

Efficiency = 0.0110 CPM/DPM

TOTAL COUNT DATA:

| Item          | Total   | % Recovery |
|---------------|---------|------------|
| Raw spectrum  | 74583.0 | 100.000    |
| Smoothed      | 74581.2 | 99.998     |
| Composite fit | 71933.6 | 96.448     |
| Residuals     | 2649.4  | 3.552      |

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Raw Data Dump for AEA Spectrum:

16a1668.CNF

WHC-SD-WM-DP-178, REV. 1

|     |       |       |       |       |       |       |       |       |       |       |
|-----|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1   | 0.    | 0.    | 11.   | 3.    | 4.    | 10.   | 8.    | 5.    | 5.    | 8.    |
| 11  | 8.    | 11.   | 11.   | 11.   | 9.    | 13.   | 11.   | 8.    | 12.   | 9.    |
| 21  | 6.    | 5.    | 7.    | 11.   | 12.   | 4.    | 16.   | 9.    | 10.   | 9.    |
| 31  | 6.    | 12.   | 11.   | 9.    | 13.   | 10.   | 8.    | 10.   | 9.    | 6.    |
| 41  | 5.    | 5.    | 13.   | 9.    | 16.   | 8.    | 13.   | 10.   | 9.    | 8.    |
| 51  | 15.   | 13.   | 13.   | 12.   | 11.   | 16.   | 17.   | 11.   | 10.   | 14.   |
| 61  | 14.   | 14.   | 22.   | 9.    | 16.   | 13.   | 17.   | 11.   | 21.   | 15.   |
| 71  | 24.   | 11.   | 9.    | 18.   | 15.   | 14.   | 18.   | 16.   | 14.   | 19.   |
| 81  | 18.   | 13.   | 14.   | 19.   | 18.   | 21.   | 22.   | 13.   | 25.   | 29.   |
| 91  | 15.   | 25.   | 27.   | 20.   | 16.   | 18.   | 22.   | 30.   | 27.   | 19.   |
| 101 | 18.   | 29.   | 23.   | 25.   | 28.   | 36.   | 36.   | 37.   | 32.   | 28.   |
| 111 | 36.   | 38.   | 35.   | 30.   | 31.   | 31.   | 33.   | 58.   | 45.   | 46.   |
| 121 | 38.   | 35.   | 50.   | 55.   | 43.   | 43.   | 50.   | 64.   | 55.   | 41.   |
| 131 | 63.   | 55.   | 53.   | 58.   | 58.   | 60.   | 72.   | 66.   | 71.   | 76.   |
| 141 | 81.   | 84.   | 94.   | 101.  | 103.  | 95.   | 103.  | 90.   | 89.   | 110.  |
| 151 | 110.  | 123.  | 99.   | 105.  | 121.  | 119.  | 119.  | 104.  | 127.  | 129.  |
| 161 | 132.  | 122.  | 140.  | 156.  | 157.  | 148.  | 169.  | 180.  | 184.  | 169.  |
| 171 | 215.  | 197.  | 216.  | 212.  | 197.  | 238.  | 226.  | 258.  | 272.  | 244.  |
| 181 | 270.  | 325.  | 318.  | 317.  | 356.  | 373.  | 344.  | 369.  | 441.  | 392.  |
| 191 | 376.  | 419.  | 448.  | 471.  | 473.  | 526.  | 548.  | 522.  | 523.  | 570.  |
| 201 | 633.  | 605.  | 693.  | 676.  | 700.  | 730.  | 810.  | 822.  | 865.  | 873.  |
| 211 | 931.  | 909.  | 976.  | 1059. | 1061. | 1222. | 1131. | 1124. | 1179. | 1204. |
| 221 | 1172. | 1241. | 1437. | 1505. | 1606. | 1657. | 1374. | 1038. | 670.  | 446.  |
| 231 | 267.  | 175.  | 105.  | 81.   | 84.   | 70.   | 70.   | 74.   | 61.   | 67.   |
| 241 | 63.   | 58.   | 69.   | 71.   | 72.   | 64.   | 63.   | 61.   | 85.   | 74.   |
| 251 | 86.   | 76.   | 60.   | 81.   | 80.   | 75.   | 93.   | 80.   | 86.   | 105.  |
| 261 | 90.   | 100.  | 111.  | 110.  | 120.  | 113.  | 120.  | 140.  | 129.  | 159.  |
| 271 | 135.  | 146.  | 139.  | 154.  | 145.  | 167.  | 191.  | 175.  | 162.  | 184.  |
| 281 | 209.  | 205.  | 229.  | 213.  | 251.  | 245.  | 252.  | 243.  | 257.  | 320.  |
| 291 | 294.  | 361.  | 352.  | 315.  | 315.  | 292.  | 295.  | 353.  | 364.  | 420.  |
| 301 | 420.  | 362.  | 250.  | 157.  | 112.  | 104.  | 92.   | 78.   | 94.   | 96.   |
| 311 | 87.   | 93.   | 107.  | 105.  | 104.  | 119.  | 112.  | 113.  | 104.  | 120.  |
| 321 | 135.  | 140.  | 141.  | 146.  | 149.  | 142.  | 167.  | 181.  | 156.  | 175.  |
| 331 | 173.  | 168.  | 188.  | 200.  | 219.  | 218.  | 223.  | 242.  | 242.  | 285.  |
| 341 | 272.  | 306.  | 302.  | 316.  | 357.  | 360.  | 392.  | 419.  | 420.  | 429.  |
| 351 | 418.  | 378.  | 354.  | 381.  | 359.  | 377.  | 449.  | 467.  | 505.  | 534.  |
| 361 | 345.  | 198.  | 73.   | 48.   | 30.   | 24.   | 17.   | 20.   | 15.   | 15.   |
| 371 | 13.   | 13.   | 8.    | 9.    | 6.    | 10.   | 14.   | 8.    | 4.    | 10.   |
| 381 | 5.    | 8.    | 4.    | 4.    | 7.    | 3.    | 9.    | 6.    | 4.    | 8.    |
| 391 | 1.    | 5.    | 7.    | 5.    | 11.   | 1.    | 5.    | 2.    | 7.    | 4.    |
| 401 | 4.    | 4.    | 1.    | 3.    | 4.    | 6.    | 3.    | 4.    | 8.    | 2.    |
| 411 | 2.    | 1.    | 8.    | 1.    | 5.    | 8.    | 3.    | 2.    | 5.    | 3.    |
| 421 | 4.    | 1.    | 6.    | 3.    | 4.    | 0.    | 4.    | 5.    | 5.    | 4.    |
| 431 | 3.    | 3.    | 2.    | 2.    | 4.    | 4.    | 5.    | 1.    | 2.    | 5.    |
| 441 | 3.    | 1.    | 2.    | 4.    | 5.    | 3.    | 1.    | 6.    | 0.    | 1.    |
| 451 | 4.    | 7.    | 4.    | 7.    | 3.    | 2.    | 6.    | 2.    | 4.    | 5.    |
| 461 | 4.    | 4.    | 5.    | 6.    | 5.    | 4.    | 7.    | 5.    | 1.    | 10.   |
| 471 | 5.    | 3.    | 11.   | 7.    | 4.    | 3.    | 2.    | 7.    | 2.    | 5.    |
| 481 | 4.    | 4.    | 7.    | 3.    | 5.    | 2.    | 2.    | 0.    | 3.    | 2.    |
| 491 | 1.    | 5.    | 3.    | 4.    | 5.    | 1.    | 4.    | 5.    | 3.    | 3.    |
| 511 | 3.    | 0.    |       |       |       |       |       |       |       |       |

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*Handwritten:* 3-30-96

GENERAL ALPHA ENERGY ANALYSIS  
Rev. 2.01 WHC-SD-WM-DP-178, REV. 1

DATA REDUCTION REPORT

SAMPLE  
S96T001360-SAM  
File ID: 17a1760.CNF

Counted on: 3/30/96 @ 7:42  
Detector: AEA17  
Geometry number: 1  
Count time: 28803. Sec

PEAK ANALYSIS

| Peak ID | Peak height |        | Peak center |         | FWHM    |        | Tau     |        |
|---------|-------------|--------|-------------|---------|---------|--------|---------|--------|
|         | Initial     | Final  | Initial     | Final   | Initial | Final  | Initial | Final  |
| 1       | 639.1       | 639.1  | 361.487     | 361.487 | 10.000  | 3.373  | 5.000   | 0.449  |
| 2?      | 70.3        | 70.3   | 353.456     | 352.284 | 8.000   | 0.846  | 4.000   | 5.153  |
| 3       | 392.5       | 392.5  | 303.632     | 303.512 | 10.000  | 2.584  | 5.000   | 0.343  |
| 4       | 1919.0      | 1919.0 | 229.206     | 229.194 | 12.000  | 4.404  | 6.000   | 0.703  |
| 5?      | 14.7        | 14.7   | 117.225     | 116.233 | 12.000  | 22.229 | 6.000   | 10.873 |
| 6?      | 10.1        | 10.1   | 99.787      | 98.665  | 26.000  | 1.408  | 13.000  | 0.091  |

PEAK RESULTS

Peak Error Limit: 30%

| Peak    |         | AEA   |                        | Peak Centroid |           |      | Count  |     | %err | d/m     | Activity<br>uCi/ea |
|---------|---------|-------|------------------------|---------------|-----------|------|--------|-----|------|---------|--------------------|
| ID      | Isotope | Frac  | Exp.                   | Obs.          | Diff.     | FWHM | Rate   | c/m |      |         |                    |
| 1       | Pu236   | 0.239 | 5.755                  | 5.750         | 0.0050.02 |      | 42.40  |     | 1.4  | 5408.3  | 0.244E-02          |
| 2       |         | ????  |                        | 5.707         |           |      | 0.64   |     | 80.4 |         |                    |
| 3       | Pu238   | 0.145 | 5.487                  | 5.483         | 0.0040.01 |      | 25.62  |     | 2.0  | 4447.7  | 0.200E-02          |
|         | Am241   |       | 5.479                  | 5.483         | -.004     |      |        |     |      | 3406.8  | 0.153E-02          |
| 4       | Pu239   | 0.633 | 5.147                  | 5.141         | 0.0060.02 |      | 112.11 |     | 0.9  | 14013.8 | 0.631E-02          |
|         | Pu240   |       | 5.144                  | 5.141         | 0.003     |      |        |     |      | 14013.8 | 0.631E-02          |
| 5       |         | ????  |                        | 4.621         |           |      | 0.72   |     | 21.5 |         |                    |
| 6       |         | ????  |                        | 4.541         |           |      | 1.02   |     | 11.0 |         |                    |
| Totals: |         | 1.017 | <--valid peaks only--> |               |           |      | 180.13 |     |      |         |                    |

DETECTOR CALIBRATION

Energy(MEV) = 4.087 + (0.0046)\*Channel  
Energy range (MeV): 4.087 TO 6.442  
Efficiency = 0.0080 CPM/DPM

TOTAL COUNT DATA:

| Item          | Total   | % Recovery |
|---------------|---------|------------|
| Raw spectrum  | 85003.0 | 100.000    |
| Smoothed      | 85009.2 | 100.007    |
| Composite fit | 87617.5 | 103.076    |
| Residuals     | -2614.5 | -3.076     |

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| Raw Data Dump for AEA Spectrum: | 17a1760.CNF | WHC-SD-WM-DP-178 REV. I |
|---------------------------------|-------------|-------------------------|
| 1                               | 0.          | 0.                      |
| 11                              | 3.          | 4.                      |
| 21                              | 5.          | 8.                      |
| 31                              | 7.          | 9.                      |
| 41                              | 5.          | 9.                      |
| 51                              | 7.          | 9.                      |
| 61                              | 6.          | 8.                      |
| 71                              | 10.         | 6.                      |
| 81                              | 7.          | 8.                      |
| 91                              | 15.         | 11.                     |
| 101                             | 13.         | 14.                     |
| 111                             | 26.         | 26.                     |
| 121                             | 19.         | 20.                     |
| 131                             | 25.         | 30.                     |
| 141                             | 64.         | 55.                     |
| 151                             | 64.         | 82.                     |
| 161                             | 102.        | 89.                     |
| 171                             | 118.        | 172.                    |
| 181                             | 243.        | 228.                    |
| 191                             | 358.        | 356.                    |
| 201                             | 578.        | 584.                    |
| 211                             | 917.        | 917.                    |
| 221                             | 1501.       | 1530.                   |
| 231                             | 2058.       | 1608.                   |
| 241                             | 36.         | 33.                     |
| 251                             | 57.         | 34.                     |
| 261                             | 73.         | 77.                     |
| 271                             | 113.        | 126.                    |
| 281                             | 190.        | 190.                    |
| 291                             | 358.        | 321.                    |
| 301                             | 390.        | 442.                    |
| 311                             | 68.         | 64.                     |
| 321                             | 110.        | 127.                    |
| 331                             | 171.        | 181.                    |
| 341                             | 277.        | 291.                    |
| 351                             | 506.        | 576.                    |
| 361                             | 644.        | 742.                    |
| 371                             | 0.          | 1.                      |
| 381                             | 0.          | 0.                      |
| 391                             | 0.          | 0.                      |
| 401                             | 0.          | 1.                      |
| 411                             | 0.          | 0.                      |
| 421                             | 1.          | 0.                      |
| 431                             | 2.          | 0.                      |
| 441                             | 0.          | 0.                      |
| 451                             | 1.          | 0.                      |
| 461                             | 1.          | 0.                      |
| 471                             | 3.          | 1.                      |
| 481                             | 0.          | 0.                      |
| 491                             | 0.          | 0.                      |
| 511                             | 0.          | 0.                      |

Westinghouse Hanford Co.

3-30-96

GENERAL ALPHA ENERGY ANALYSIS  
Rev. 2.01WHC-SD-WM-DP-178, REV. 1  
DATA REDUCTION REPORTSAMPLE  
S96T001360-DUP  
File ID: 18a1839.CNFCounted on: 3/30/96 @ 7:43  
Detector: AEA18  
Geometry number: 1  
Count time: 28801. Sec

## PEAK ANALYSIS

| Peak<br>ID | Peak height |        | Peak center |         | FWHM    |       | Tau     |       |
|------------|-------------|--------|-------------|---------|---------|-------|---------|-------|
|            | Initial     | Final  | Initial     | Final   | Initial | Final | Initial | Final |
| 1          | 627.5       | 627.5  | 362.322     | 362.322 | 10.000  | 4.053 | 5.000   | 5.169 |
| 2          | 469.6       | 469.6  | 354.014     | 352.600 | 12.000  | 3.614 | 6.000   | 0.713 |
| 3          | 422.2       | 422.2  | 304.455     | 304.385 | 10.000  | 3.132 | 5.000   | 0.397 |
| 4          | 1987.8      | 1987.8 | 230.018     | 230.007 | 12.000  | 4.218 | 6.000   | 0.734 |
| 5?         | 12.6        | 12.6   | 110.689     | 110.219 | 98.000  | 1.000 | 49.000  | 0.100 |
| 6?         | 3.7         | 3.7    | 95.380      | 94.710  | 8.000   | 0.624 | 4.000   | 0.145 |

## PEAK RESULTS

Peak Error Limit: 30%

| Peak<br>ID | Isotope | AEA<br>Frac | Peak Centroid<br>Exp.  | Obs.  | Diff.  | FWHM | Count<br>Rate c/m | %err<br>@95 | d/m    | Activity<br>uCi/ea |
|------------|---------|-------------|------------------------|-------|--------|------|-------------------|-------------|--------|--------------------|
| 1          | Pu236   | 0.076       | 5.755                  | 5.752 | 0.003  | 0.02 | 12.94             | 2.5         | 1015.5 | 0.457E-03          |
| 2          | Ra224   | 0.133       | 5.686                  | 5.708 | -0.022 | 0.02 | 22.74             | 2.2         | 1861.1 | 0.838E-03          |
| 3          | Pu238   | 0.170       | 5.487                  | 5.486 | 0.001  | 0.01 | 29.06             | 1.7         | 3104.3 | 0.140E-02          |
|            | Am241   |             | 5.479                  | 5.486 | -0.007 |      |                   |             | 2377.8 | 0.107E-02          |
| 4          | Pu239   | 0.631       | 5.147                  | 5.144 | 0.003  | 0.02 | 108.06            | 0.9         | 8312.3 | 0.374E-02          |
|            | Pu240   |             | 5.144                  | 5.144 | 0.000  |      |                   |             | 8312.3 | 0.374E-02          |
| 5          |         | ????        |                        | 4.593 |        |      | 0.97              | 10.9        |        |                    |
| 6          |         | ????        |                        | 4.521 |        |      | 0.13              | 67.3        |        |                    |
| Totals:    |         | 1.009       | <--valid peaks only--> |       |        |      | 172.80            |             |        |                    |

## DETECTOR CALIBRATION

Energy(MEV) = 4.086 + (0.0046)\*Channel  
Energy range (MeV): 4.086 TO 6.441  
Efficiency = 0.0130 CPM/DPM

## TOTAL COUNT DATA:

| Item          | Total   | % Recovery |
|---------------|---------|------------|
| Raw spectrum  | 82206.0 | 100.000    |
| Smoothed      | 82206.4 | 100.001    |
| Composite fit | 83472.6 | 101.541    |
| Residuals     | -1266.6 | -1.541     |

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Display Max.: 14514.0

5  
5  
5  
5  
6  
6  
6  
6  
5  
5

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|     |       |       |       |       |       |       |       |       |       |       |
|-----|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1   | 0.    | 0.    | 4.    | 3.    | 2.    | 6.    | 3.    | 5.    | 4.    | 3.    |
| 11  | 2.    | 2.    | 7.    | 4.    | 5.    | 8.    | 2.    | 1.    | 4.    | 4.    |
| 21  | 4.    | 5.    | 4.    | 8.    | 1.    | 1.    | 2.    | 6.    | 4.    | 5.    |
| 31  | 7.    | 0.    | 6.    | 2.    | 3.    | 5.    | 4.    | 3.    | 6.    | 4.    |
| 41  | 7.    | 5.    | 0.    | 4.    | 3.    | 2.    | 6.    | 3.    | 5.    | 3.    |
| 51  | 2.    | 9.    | 5.    | 6.    | 7.    | 11.   | 8.    | 4.    | 5.    | 7.    |
| 61  | 6.    | 3.    | 8.    | 11.   | 7.    | 2.    | 5.    | 7.    | 9.    | 11.   |
| 71  | 7.    | 12.   | 9.    | 6.    | 6.    | 5.    | 7.    | 7.    | 12.   | 14.   |
| 81  | 10.   | 4.    | 6.    | 8.    | 16.   | 14.   | 17.   | 6.    | 9.    | 15.   |
| 91  | 12.   | 13.   | 13.   | 12.   | 18.   | 18.   | 15.   | 9.    | 11.   | 15.   |
| 101 | 17.   | 12.   | 21.   | 16.   | 19.   | 8.    | 15.   | 16.   | 16.   | 27.   |
| 111 | 16.   | 22.   | 14.   | 16.   | 22.   | 15.   | 11.   | 27.   | 18.   | 24.   |
| 121 | 20.   | 26.   | 26.   | 27.   | 29.   | 25.   | 29.   | 32.   | 26.   | 32.   |
| 131 | 41.   | 49.   | 32.   | 24.   | 27.   | 35.   | 35.   | 31.   | 45.   | 50.   |
| 141 | 41.   | 42.   | 43.   | 52.   | 51.   | 55.   | 63.   | 59.   | 68.   | 62.   |
| 151 | 67.   | 49.   | 68.   | 68.   | 66.   | 78.   | 71.   | 70.   | 74.   | 89.   |
| 161 | 77.   | 86.   | 79.   | 92.   | 100.  | 89.   | 95.   | 113.  | 114.  | 117.  |
| 171 | 113.  | 130.  | 127.  | 140.  | 156.  | 156.  | 154.  | 149.  | 186.  | 184.  |
| 181 | 177.  | 177.  | 182.  | 247.  | 206.  | 245.  | 238.  | 260.  | 264.  | 317.  |
| 191 | 302.  | 324.  | 358.  | 360.  | 370.  | 424.  | 418.  | 392.  | 446.  | 512.  |
| 201 | 447.  | 530.  | 561.  | 644.  | 656.  | 645.  | 693.  | 766.  | 713.  | 808.  |
| 211 | 854.  | 896.  | 961.  | 1017. | 1048. | 1117. | 1166. | 1311. | 1356. | 1325. |
| 221 | 1462. | 1467. | 1510. | 1528. | 1589. | 1650. | 1769. | 1932. | 2001. | 2202. |
| 231 | 2306. | 2010. | 1515. | 919.  | 512.  | 278.  | 81.   | 41.   | 25.   | 27.   |
| 241 | 32.   | 27.   | 35.   | 37.   | 37.   | 36.   | 23.   | 35.   | 42.   | 35.   |
| 251 | 43.   | 43.   | 48.   | 56.   | 46.   | 49.   | 63.   | 59.   | 60.   | 59.   |
| 261 | 66.   | 64.   | 75.   | 76.   | 69.   | 80.   | 81.   | 98.   | 87.   | 119.  |
| 271 | 115.  | 90.   | 131.  | 127.  | 140.  | 147.  | 147.  | 135.  | 165.  | 150.  |
| 281 | 178.  | 160.  | 205.  | 167.  | 218.  | 235.  | 230.  | 264.  | 298.  | 270.  |
| 291 | 286.  | 327.  | 322.  | 377.  | 385.  | 384.  | 469.  | 369.  | 391.  | 379.  |
| 301 | 366.  | 340.  | 430.  | 458.  | 531.  | 514.  | 390.  | 184.  | 82.   | 56.   |
| 311 | 65.   | 43.   | 55.   | 51.   | 56.   | 65.   | 81.   | 72.   | 90.   | 85.   |
| 321 | 72.   | 93.   | 108.  | 116.  | 95.   | 138.  | 130.  | 120.  | 162.  | 157.  |
| 331 | 159.  | 166.  | 174.  | 181.  | 191.  | 213.  | 222.  | 207.  | 243.  | 264.  |
| 341 | 279.  | 264.  | 286.  | 295.  | 343.  | 362.  | 360.  | 373.  | 422.  | 461.  |
| 351 | 482.  | 521.  | 596.  | 589.  | 550.  | 486.  | 493.  | 443.  | 479.  | 524.  |
| 361 | 609.  | 666.  | 712.  | 725.  | 480.  | 235.  | 66.   | 8.    | 0.    | 0.    |
| 371 | 0.    | 0.    | 0.    | 0.    | 0.    | 0.    | 0.    | 0.    | 0.    | 0.    |
| 381 | 1.    | 0.    | 0.    | 0.    | 0.    | 0.    | 0.    | 0.    | 0.    | 0.    |
| 391 | 0.    | 0.    | 0.    | 0.    | 0.    | 0.    | 0.    | 1.    | 0.    | 0.    |
| 401 | 1.    | 0.    | 1.    | 0.    | 0.    | 1.    | 0.    | 0.    | 0.    | 0.    |
| 411 | 0.    | 0.    | 0.    | 0.    | 0.    | 0.    | 1.    | 0.    | 0.    | 0.    |
| 421 | 0.    | 1.    | 0.    | 0.    | 0.    | 0.    | 0.    | 1.    | 0.    | 0.    |
| 431 | 0.    | 1.    | 0.    | 0.    | 0.    | 0.    | 0.    | 0.    | 0.    | 0.    |
| 441 | 0.    | 0.    | 0.    | 1.    | 0.    | 0.    | 0.    | 0.    | 0.    | 0.    |
| 451 | 1.    | 0.    | 1.    | 0.    | 0.    | 0.    | 0.    | 1.    | 1.    | 1.    |
| 461 | 0.    | 0.    | 0.    | 0.    | 1.    | 2.    | 2.    | 1.    | 1.    | 0.    |
| 471 | 1.    | 3.    | 3.    | 2.    | 0.    | 1.    | 6.    | 0.    | 0.    | 0.    |
| 481 | 0.    | 1.    | 1.    | 1.    | 0.    | 0.    | 0.    | 0.    | 0.    | 0.    |
| 491 | 0.    | 0.    | 0.    | 0.    | 0.    | 0.    | 0.    | 0.    | 0.    | 0.    |
| 511 | 1.    | 0.    |       |       |       |       |       |       |       |       |

## LABCORE Data Entry Template for Worklist# 7123

Analyst: Jmw Instrument: PU01 \_\_\_\_\_ Book# 104843

Method: LA-943-128 Rev/Mod A1

Worklist Comment: AY-101.Determine sample size using ludlum. new

| S                                                | Type   | Sample#      | R | A | Test     | Matrix | Group#   | Project     |
|--------------------------------------------------|--------|--------------|---|---|----------|--------|----------|-------------|
| 1                                                | STD    |              |   |   | @PU23901 | LIQUID |          |             |
| 2                                                | BLNK   |              |   |   | @PU23901 | LIQUID |          |             |
| 3                                                | SAMPLE | S96T001361 0 |   |   | @PU23901 | LIQUID | 96000257 | AY-101 GRAB |
| Analytes Requested: PU23901 , PU23901E, PU23901T |        |              |   |   |          |        |          |             |
| 4                                                | DUP    | S96T001361 0 |   |   | @PU23901 | LIQUID |          |             |

### Final page for worklist # 7123

Jmw 4-2-96  
Analyst Signature Date

Sharon L. LaLonde 4-5-96  
Analyst Signature Date

C.J. Opinen 4/5/96  
Lee Hogan 4/5/96

Data Entry Comments:



## LABCORE Completed Worklist Report for Worklist# 7123

Analyst: jmv

Instrument: AB18

Book# 104 B43

Method: LA-943-128 Rev/Mod A-1

Worklist Comment: AY-101. Determine sample size using ludlum. new

| Seq | Type   | Sample#    | R | A | Test              | Matrix | Actual   | Found    | DL or Yield | Unit       |
|-----|--------|------------|---|---|-------------------|--------|----------|----------|-------------|------------|
| 1   | STD    |            | 0 |   | @PU23901 PU23901  | LIQUID | 1.28E-01 | 1.19E-1  | 92.970 %    | Recovery   |
| 1   | STD    |            | 0 |   | @PU23901 PU23901E | LIQUID | 1.00     | 2.36E+00 | 2.360 %     | Ct. Error  |
| 1   | STD    |            | 0 |   | @PU23901 PU23901T | LIQUID | 100      | 9.59E+01 | 95.900 %    | Recovery   |
| 2   | BLNK   |            | 0 |   | @PU23901 PU23901  | LIQUID | 1        | <3.28E-4 |             | uCi/mL     |
| 2   | BLNK   |            | 0 |   | @PU23901 PU23901T | LIQUID | 100      | 9.90E+01 | 99.000 %    | Recovery   |
| 2   | BLNK   |            | 0 |   | @PU23901 PU23901E | LIQUID | 1.00     | 1.00E+02 | 100.000 %   | Ct. Error  |
| 3   | SAMPLE | S96T001361 | 0 |   | @PU23901 PU23901  | LIQUID | N/A      | 2.97E-02 | 1.600e-003  | uCi/mL     |
| 3   | SAMPLE | S96T001361 | 0 |   | @PU23901 PU23901T | LIQUID | N/A      | 9.62E+01 | 1.000e-007  | % Recovery |
| 3   | SAMPLE | S96T001361 | 0 |   | @PU23901 PU23901E | LIQUID | N/A      | 1.95E+00 | 0.000 %     | Ct. Error  |
| 4   | DUP    | S96T001361 | 0 |   | @PU23901 PU23901  | LIQUID | 2.97E-2  | 2.95E-2  | 0.680       | RPD        |
| 4   | DUP    | S96T001361 | 0 |   | @PU23901 PU23901T | LIQUID | 100      | 9.62E+01 | 96.200 %    | Recovery   |
| 4   | DUP    | S96T001361 | 0 |   | @PU23901 PU23901E | LIQUID | 1.00     | 1.91E+00 | 1.910 %     | Ct. Error  |

Final page for worklist# 7123

Analyst Signature \_\_\_\_\_ Date \_\_\_\_\_

Analyst Signature \_\_\_\_\_ Date \_\_\_\_\_

John Rebyea 5 Apr 96  
Reviewer Signature \_\_\_\_\_ Date \_\_\_\_\_

Units shown for QC (BLK/BKG) may not reflect the actual units.

WORKBOOK PAGE: STD1

## Pu 238 and 239/240 : LA-943-128 (A-1)

## LIQUID

|                 |                                                                                                                            |           |                                                                                                | STD                    |       |
|-----------------|----------------------------------------------------------------------------------------------------------------------------|-----------|------------------------------------------------------------------------------------------------|------------------------|-------|
| Type            | DATE COUNTED                                                                                                               | APR-03-96 | PU 236 AEA FRAC (C236)                                                                         | 0.407                  |       |
| STD             | SAMPLE VOLUME in mL                                                                                                        | SS        | 0.100                                                                                          | PU 238 AEA FRAC (C238) | 0.039 |
| Work List       | SAMPLE DILUTION FACTOR                                                                                                     | DF        | 101.000                                                                                        | PU 239 AEA FRAC (C239) | 0.475 |
| 7123            | TRACER VOLUME in mL                                                                                                        | SPKV      | 0.100                                                                                          | TOTAL AT COUNTS        | 4252  |
| Tail Code       | DIGEST DILUTION FACTOR                                                                                                     | DDF       | 1.000                                                                                          | AT COUNT TIME (MIN)    | 30    |
| @PU23901        | TRACER BOOK NO                                                                                                             | 120B43    | BACKGROUND in cpm (Bkg)                                                                        | 0.070                  |       |
| Yair            | DETECTOR NUMBER                                                                                                            | 18        | PU 236 cpm                                                                                     | 26.640                 |       |
| LIQUID          | EFFICIENCY FACTOR                                                                                                          | EFF       | 0.269                                                                                          | PU 238 cpm             | 2.530 |
| Batch Number    | TRACER PREPARATION DATE                                                                                                    | 12/27/95  | PU 239 cpm                                                                                     | 31.150                 |       |
| 96002812        | TRACER PREPARATION VALUE (dpm/mL)                                                                                          | 2390.000  | AEA COUNT TIME                                                                                 | 480                    |       |
| Ref             | PU-236 DECAY CORR'D VALUE (dpm/mL)                                                                                         | 2239.018  | Pu 239/240 $\mu$ Ci/L                                                                          | 1.1888E+02             |       |
| 0               | PU-238 TRACER VALUE (dpm/mL)                                                                                               | 0.000     |                                                                                                |                        |       |
| Sample Prep     | STANDARD BOOK NO                                                                                                           | 104B43    |                                                                                                |                        |       |
| N/A             | STANDARD VALUE in $\mu$ Ci/mL                                                                                              | 0.128     |                                                                                                |                        |       |
| Sample          |                                                                                                                            |           |                                                                                                |                        |       |
| WL7123          |                                                                                                                            |           |                                                                                                |                        |       |
| Instrument Code | Decay Time = Date Counted - Tracer Preparation Date                                                                        |           |                                                                                                |                        |       |
| WB27809         | Pu-236 Decay Corr'd Value = Pu-236 Preparation Value * [e to the power of {(-ln2 * Decay Time/1040.95)}]                   |           |                                                                                                |                        |       |
| Prepared By     | Pu 236 Tracer Recovery = (Total AT Counts / TC - Bkg) * 1/EFF * C236 * 100 / Pu-236 Decay Corr'd Value * SPKV              |           |                                                                                                |                        |       |
| SLH             | Pu 239/240 $\mu$ Ci/L = (C239)(Pu 236 Decay Corr'd Value)(SPKV)(1000mL/L)(DF)(DDF) / [(C236)(SS)(2220000 dpm/ $\mu$ Ci)]   |           |                                                                                                |                        |       |
| Chemist         | Pu 238 dpm = [(Total AT Counts / TC) - Bkg * 1/EFF * C238] - (Pu-238 Tracer Value * SPKV * Pu 236 Tracer Recovery / 100)   |           |                                                                                                |                        |       |
| JFR             | Pu 238 $\mu$ Ci/L = [(Pu 238 dpm)(DF)(DDF)(1000mL/L)] / [(Pu-236 Tracer Recovery / 100)(2220000 dpm/ $\mu$ Ci)(D g/L)(SS)] |           |                                                                                                |                        |       |
| Analyst         | Relative Counting Error = Square Root of [(1/(Pu 236 cpm * min)) + (1 / (Pu 238 or 239/240 cpm * min))] * 1.96 * 100       |           |                                                                                                |                        |       |
| JMV             |                                                                                                                            |           |                                                                                                |                        |       |
| Date Complete   |                                                                                                                            |           |                                                                                                |                        |       |
| 04/05/96        | Pu 239/240 $\mu$ Ci/mL                                                                                                     | 1.19E-01  | <b>DETECTION<br/>LEVELS<br/>in <math>\mu</math>Ci/mL</b><br><br><b>Pu 239/240<br/>7.83E-03</b> |                        |       |
| Analysis Date   | Relative Counting Error                                                                                                    | = 2.4%    |                                                                                                |                        |       |
| 04/02/96        |                                                                                                                            |           |                                                                                                |                        |       |
| Analysis Time   |                                                                                                                            |           |                                                                                                |                        |       |
| 12:00 PM        |                                                                                                                            |           |                                                                                                |                        |       |
| Sample Point    |                                                                                                                            |           |                                                                                                |                        |       |
| AY-101 GRAB     | Pu 236 Tracer Recovery                                                                                                     | = 95.9%   |                                                                                                |                        |       |

|                       |     |       |           |
|-----------------------|-----|-------|-----------|
| Analyst:              | JMV | Date: | 05-Apr-96 |
| Signature of Chemist: | JFR | Date: | 5 Apr 96  |

STANDARD.WB1 REV 1.0

943128ML

WORKBOOK PAGE: BLANK2

## Pu 238 and 239/240 : LA-943-128 (A-1)

## LIQUID / SOLID

|                 |                                                                                                                                 |            |                                       | BLNK        |
|-----------------|---------------------------------------------------------------------------------------------------------------------------------|------------|---------------------------------------|-------------|
| Type            | DATE COUNTED                                                                                                                    | APR-03-96  | PU 236 AEA FRAC (C236)                | 0.942       |
| BLNK            | SAMPLE VOLUME in mL SS                                                                                                          | 1.000      | PU 238 AEA FRAC (C238)                | 0.000       |
| Work List       | SAMPLE DILUTION FACTOR DF                                                                                                       | 101.000    | PU 239 AEA FRAC (C239)                | 0.000       |
| 7123            | TRACER VOLUME in mL SPKV                                                                                                        | 0.100      | TOTAL AT COUNTS                       | 1898        |
| Test Code       | DIGEST DILUTION FACTOR DDF                                                                                                      | 1.0000     | AT COUNT TIME (MIN)                   | 30          |
| @PU23901        | TRACER BOOK NO                                                                                                                  | 120B43     | BACKGROUND in cp (Bkg)                | 0.070       |
| Matrix          | DETECTOR NUMBER                                                                                                                 | 18         | PU 236 cpm                            | 27.020      |
| LIQUID          | EFFICIENCY FACTOR EFF                                                                                                           | 0.2686     | PU 238 cpm                            | 0.000       |
| Batch Number    | TRACER PREPARATION DATE                                                                                                         | 12/27/95   | PU 239 cpm                            | 0.000       |
| 96002812        | TRACER PREPARATION VALUE (dpm/mL)                                                                                               | 2390.00    | AEA COUNT TIME                        | 480         |
| Refin           | PU-236 DECAY CORR'D VALUE (dpm/mL)                                                                                              | 2239.02    | Pu 239/240 $\mu$ Ci/L =               | < 3.277E-01 |
| 0               | PU-238 TRACER VALUE (dpm/m)                                                                                                     | 0.00       |                                       |             |
| Sample Prep     |                                                                                                                                 |            |                                       |             |
| N/A             |                                                                                                                                 |            |                                       |             |
| Sample #        | Decay Time = Date Counted - Tracer Preparation Date                                                                             |            |                                       |             |
| WL7123          | Pu-236 Decay Corr'd Value = Pu-236 Preparation Value * [e to the power of {(-ln2 * Decay Time/1040.95)}]                        |            |                                       |             |
| Instrument Code | Pu 236 Tracer Recovery = (Total AT Counts / TC - Bkg) * C236 * 100 / (Pu-236 Decay Corr'd Value * SPKV * EFF)                   |            |                                       |             |
| WB27809         | Pu 239/240 $\mu$ Ci/L = (C239)(Pu 236 Decay Corr'd Value)(SPKV)(1000mL/L)(DF)(DDF) / [(C236)(SS)(D g/L)(2220000 dpm/ $\mu$ Ci)] |            |                                       |             |
| Prepared By     | Pu 238 dpm = [(Total AT Counts / TC) - Bkg * 1/EFF * C238] - (Pu-238 Tracer Value * SPKV * Pu 236 Tracer Recovery / 100)        |            |                                       |             |
| SLH             | Pu 238 $\mu$ Ci/L = [(Pu 238 dpm)(DF)(DDF)(1000mL/L)] / [(Pu-236 Tracer Recovery / 100)(2220000 dpm/ $\mu$ Ci)(D g/L)(SS)]      |            |                                       |             |
| Chemist         | Relative Counting Error = Square Root of [(1/(Pu 236 cpm * min)) + (1 / (Pu 238 or 239/240 cpm * min))] * 1.96 * 100            |            |                                       |             |
| JFR             |                                                                                                                                 |            |                                       |             |
| Analyst         |                                                                                                                                 |            |                                       |             |
| JMV             |                                                                                                                                 |            |                                       |             |
| Date Complete   |                                                                                                                                 |            |                                       |             |
| 04/05/96        | Pu 239/240 $\mu$ Ci/mL                                                                                                          | < 3.28E-04 | DETECTION<br>LEVELS<br>in $\mu$ Ci/mL |             |
| Analysis Date   | Relative Counting Error                                                                                                         | = 100.0%   |                                       |             |
| 04/02/96        |                                                                                                                                 |            | Pu 239/240<br>3.28E-04                |             |
| Analysis Time   | NOTE: Pu 238 Result is a LESS THAN Value.                                                                                       |            |                                       |             |
| 12:00 PM        | Pu 238 $\mu$ Ci/mL                                                                                                              | < 3.28E-04 | Pu 238<br>3.28E-04                    |             |
| Sample Point    | Relative Counting Error                                                                                                         | = 100.0%   |                                       |             |
| AY-101 GRAB     | Pu 236 Tracer Recovery                                                                                                          | = 99.0%    |                                       |             |

|                       |                    |       |           |
|-----------------------|--------------------|-------|-----------|
| Analyst:              | JMV                | Date: | 05-Apr-96 |
| Signature of Chemist: | <i>John Reizer</i> | Date: | 5 Apr 96  |

BLANK.WB1 REV 1.0 943128ML

1010

WORKBOOK PAGE: SAM3

**Pu 238 and 239/240 : LA-943-128 (A-1)**

**LIQUID / SOLID**

|                                    |                                            |                         |  | SAMPLE     |
|------------------------------------|--------------------------------------------|-------------------------|--|------------|
| DATE COUNTED                       | APR-03-96                                  | PU 236 AEA FRAC (C236)  |  | 0.198      |
| SAMPLE                             | SAMPLE VOLUME in mL SS 1.000               | PU 238 AEA FRAC (C238)  |  | 0.141      |
| Work List                          | SAMPLE DILUTION FACTOR DF 101.000          | PU 239 AEA FRAC (C239)  |  | 0.577      |
| 7123                               | TRACER VOLUME in mL SPKV 0.100             | TOTAL AT COUNTS         |  | 8765       |
| 7123 CODE                          | DIGEST DILUTION FACTOR DDF 1.0000          | AT COUNT TIME (MIN)     |  | 30         |
| @PU23901                           | TRACER BOOK NO 120B43                      | BACKGROUND in cpm (Bkg) |  | 0.070      |
| DETECTOR NUMBER                    | 18                                         | PU 236 cpm              |  | 28.190     |
| LIQUID                             | EFFICIENCY FACTOR EFF 0.269                | PU 238 cpm              |  | 20.150     |
| TRACER PREPARATION DATE            | 12/27/95                                   | PU 239 cpm              |  | 82.280     |
| 96002812                           | TRACER PREPARATION VALUE (dpm/mL) 2390.000 | AEA COUNT TIME          |  | 480        |
| PU-236 DECAY CORR'D VALUE (dpm/mL) | 2239.018                                   | Pu 239/240 µCi/L        |  | 2.9685E+01 |
| 0                                  | PU-238 TRACER VALUE (dpm/mL) 0.000         |                         |  |            |

Sample Prep

N/A

Sample #

S96T001361

Prepment Code

WB27809

Prepared By

SLH

Chemist

JFR

Analyst

JMV

Data Complete

04/05/96

Analysis Date

04/02/96

Analysis Time

12:00 PM

Sample Point

AY-101 GRAB

Decay Time = Date Counted - Tracer Preparation Date

Pu-236 Decay Corr'd Value = Pu-236 Preparation Value \* [e to the power of {(-ln2 \* Decay Time/1040.95)}]

Pu 236 Tracer Recovery = (Total AT Counts / TC - Bkg) \* C236 \* 100 / (Pu-236 Decay Corr'd Value \* SPKV \* EFF)

Pu 239/240 µCi/L = (C239)(Pu 236 Decay Corr'd Value)(SPKV)(1000mL/L)(DF)(DDF) / [(C236)(SS)(D g/L)(2220000 dpm/µCi)]

Pu 238 dpm = [(Total AT Counts / TC) - Bkg \* 1/EFF \* C238] - (Pu-238 Tracer Value \* SPKV \* Pu 236 Tracer Recovery / 100)

Pu 238 µCi/L = [(Pu 238 dpm)(DF)(DDF)(1000mL/L)] / [(Pu-236 Tracer Recovery / 100)(2220000 dpm/µCi)(D g/L)(SS)]

Relative Counting Error = Square Root of [(1/(Pu 236 cpm \* min)) + (1 / (Pu 238 or 239/240 cpm \* min))] \* 1.96 \* 100

|               |                         |          |                                  |
|---------------|-------------------------|----------|----------------------------------|
| 04/05/96      | Pu 239/240 µCi/mL       | 2.97E-02 | DETECTION<br>LEVELS<br>in µCi/mL |
| Analysis Date | Relative Counting Error | = 2.0%   |                                  |
| 04/02/96      |                         |          | Pu 239/240                       |
| Analysis Time | Pu 238 µCi/mL           | 7.25E-03 | 1.60E-03                         |
| 12:00 PM      | Relative Counting Error | = 2.6%   | Pu 238                           |
| Sample Point  | Pu 236 Tracer Recovery  | = 96.2%  | 1.60E-03                         |
| AY-101 GRAB   |                         |          |                                  |

|                       |                    |       |           |
|-----------------------|--------------------|-------|-----------|
| Analyst:              | JMV                | Date: | 05-Apr-96 |
| Signature of Chemist: | <i>John Relyea</i> | Date: | 5 Apr 96  |
| SAMPLE.WB1 REV 1.0    | 943128ML           |       |           |

Pu 238 and 239/240 : LA-943-128 (A-1)

LIQUID / SOLID

|          |                                    |            |                         | DUP        |
|----------|------------------------------------|------------|-------------------------|------------|
| Type     | DATE COUNTED                       | APR-03-96  | PU 236 AEA FRAC (C236)  | 0.203      |
| DUP      | SAMPLE VOLUME in mL                | SS 1.000   | PU 238 AEA FRAC (C238)  | 0.146      |
| Work Log | SAMPLE DILUTION FACTOR             | DF 101.000 | PU 239 AEA FRAC (C239)  | 0.588      |
| 7123     | TRACER VOLUME in mL                | SPKV 0.100 | TOTAL AT COUNTS         | 8548       |
| Code     | DIGEST DILUTION FACTOR             | DDF 1.0000 | AT COUNT TIME (MIN)     | 30         |
| @PU23901 | TRACER BOOK NO                     | 120B43     | BACKGROUND in cpm (Bkg) | 0.070      |
| Main     | DETECTOR NUMBER                    | 18         | PU 236 cpm              | 29.580     |
| LIQUID   | EFFICIENCY FACTOR                  | EFF 0.269  | PU 238 cpm              | 21.230     |
| Isotopes | TRACER PREPARATION DATE            | 12/27/95   | PU 239 cpm              | 85.660     |
| 96002812 | TRACER PREPARATION VALUE (dpm/mL)  | 2390.000   | AEA COUNT TIME          | 480        |
| Run      | PU-236 DECAY CORR'D VALUE (dpm/mL) | 2239.018   | Pu 239/240 $\mu$ Ci/L   | 2.9506E+01 |
| 0        | PU-238 TRACER VALUE (dpm/mL)       | 0.000      |                         |            |

Sample Prep

N/A

Sample Prep

S96T001361

Instrument Code

WB27809

Prepared By

SLH

Chemist

JFR

Analyst

JMV

Date Complete

04/05/96

Analysis Date

04/02/96

Analysis Time

12:00 PM

Sample Point

AY-101 GRAB

Decay Time = Date Counted - Tracer Preparation Date

Pu-236 Decay Corr'd Value = Pu-236 Preparation Value \* [e to the power of  $\{-\ln 2 * \text{Decay Time} / 1040.95\}$ ]

Pu 236 Tracer Recovery = (Total AT Counts / TC - Bkg) \* C236 \* 100 / (Pu-236 Decay Corr'd Value \* SPKV \* EFF)

Pu 239/240  $\mu$ Ci/L = (C239)(Pu 236 Decay Corr'd Value)(SPKV)(1000mL/L)(DF)(DDF) / [(C236)(SS)(D g/L)(2220000 dpm/ $\mu$ Ci)]

Pu 238 dpm = [(Total AT Counts / TC) - Bkg \* 1/EFF \* C238] - (Pu-238 Tracer Value \* SPKV \* Pu 236 Tracer Recovery / 100)

Pu 238  $\mu$ Ci/L = [(Pu 238 dpm)(DF)(DDF)(1000mL/L)] / [(Pu-236 Tracer Recovery / 100)(2220000 dpm/ $\mu$ Ci)(D g/L)(SS)]

Relative Counting Error = Square Root of  $\{[1 / (\text{Pu 236 cpm} * \text{min})] + [1 / (\text{Pu 238 or 239/240 cpm} * \text{min})]\} * 1.96 * 100$

|                           |          |                                       |
|---------------------------|----------|---------------------------------------|
| Pu 239/240 $\mu$ Ci/mL    | 2.95E-02 | DETECTION<br>LEVELS<br>in $\mu$ Ci/mL |
| Relative Counting Error = | 1.9%     |                                       |
| Pu 238 $\mu$ Ci/mL        | 7.33E-03 | Pu 239/240                            |
| Relative Counting Error = | 2.5%     | 1.57E-03                              |
| Pu 236 Tracer Recovery =  | 96.2%    | Pu 238                                |
|                           |          | 1.57E-03                              |

|                       |          |       |           |
|-----------------------|----------|-------|-----------|
| Analyst:              | JMV      | Date: | 05-Apr-96 |
| Signature of Chemist: | JFR      | Date: | 5 Apr 96  |
| SAMPLE.WB1 REV 1.0    | 943128ML |       |           |

1012

7-3-96

Westinghouse Hanford Co.

GENERAL ALPHA ENERGY ANALYSIS  
Rev. 2.01

## DATA REDUCTION REPORT

SAMPLE  
WL7123-STD  
File ID: 13a1309.CNFCounted on: 4/ 3/96 @ 9: 9  
Detector: AEA13  
Geometry number: 1  
Count time: 28805. Sec

## PEAK ANALYSIS

| Peak<br>ID | Peak height |       | Peak center |         | FWHM    |       | Tau     |        |
|------------|-------------|-------|-------------|---------|---------|-------|---------|--------|
|            | Initial     | Final | Initial     | Final   | Initial | Final | Initial | Final  |
| 1          | 652.6       | 652.6 | 361.463     | 361.463 | 10.000  | 3.090 | 5.000   | 0.745  |
| 2          | 17.8        | 17.8  | 303.395     | 302.332 | 12.000  | 5.786 | 6.000   | 0.333  |
| 3?         | 25.9        | 25.9  | 270.311     | 270.161 | 12.000  | 4.514 | 6.000   | 12.555 |
| 4          | 913.3       | 913.3 | 227.487     | 227.485 | 10.000  | 3.686 | 5.000   | 1.192  |
| 5?         | 12.9        | 12.9  | 27.302      | 27.298  | 12.000  | 5.999 | 6.000   | 1.568  |

## PEAK RESULTS

Peak Error Limit: 30%

| Peak<br>ID | Isotope | AEA<br>Frac | Peak Centroid<br>Exp.  | Obs.  | Diff. | FWHM | Count<br>Rate c/m | %err<br>@95 | d/m    | Activity<br>uCi/ea |
|------------|---------|-------------|------------------------|-------|-------|------|-------------------|-------------|--------|--------------------|
| 1          | Pu-236  | 0.407       |                        | 5.731 |       | 0.01 | 26.64             | 1.7         | 2638.1 | 0.119E-02          |
| 2          | Pu238   | 0.039       | 5.487                  | 5.465 | 0.022 | 0.03 | 2.53              | 6.8         | 347.3  | 0.156E-03          |
|            | Am241   |             | 5.479                  | 5.465 | 0.014 |      |                   |             | 266.0  | 0.120E-03          |
| 3          |         | ????        |                        | 5.321 |       |      | 0.55              | 25.2        |        |                    |
| 4          | Pu239   | 0.475       | 5.147                  | 5.129 | 0.018 | 0.02 | 31.15             | 1.6         | 3084.0 | 0.139E-02          |
|            | Pu240   |             | 5.144                  | 5.129 | 0.015 |      |                   |             | 3084.0 | 0.139E-02          |
| 5          |         | ????        |                        | 4.228 |       |      | 0.48              | 13.1        |        |                    |
| Totals:    |         | 0.920       | <--valid peaks only--> |       |       |      | 60.32             |             |        |                    |

## DETECTOR CALIBRATION

Energy(MEV) = 4.105 + (0.0045)\*Channel  
Energy range (MeV): 4.105 TO 6.409  
Efficiency = 0.0101 CPM/DPM

## TOTAL COUNT DATA:

| Item          | Total   | % Recovery |
|---------------|---------|------------|
| Raw spectrum  | 31465.0 | 100.000    |
| Smoothed      | 31463.6 | 99.996     |
| Composite fit | 29453.1 | 93.606     |
| Residuals     | 2011.9  | 6.394      |

Analyzed by: \_\_\_\_\_

55555

[illegible]

|     |      |      |      |      |      |      |       |       |      |      |
|-----|------|------|------|------|------|------|-------|-------|------|------|
| 1   | 0.   | 0.   | 2.   | 0.   | 0.   | 3.   | 0.    | 1.    | 5.   | 4.   |
| 11  | 9.   | 3.   | 2.   | 10.  | 8.   | 13.  | 5.    | 7.    | 9.   | 5.   |
| 21  | 9.   | 8.   | 4.   | 9.   | 14.  | 13.  | 13.   | 17.   | 15.  | 5.   |
| 31  | 8.   | 8.   | 3.   | 0.   | 5.   | 2.   | 2.    | 2.    | 2.   | 2.   |
| 41  | 3.   | 2.   | 3.   | 4.   | 0.   | 1.   | 2.    | 2.    | 2.   | 1.   |
| 51  | 3.   | 0.   | 4.   | 2.   | 2.   | 2.   | 3.    | 3.    | 4.   | 0.   |
| 61  | 3.   | 0.   | 2.   | 4.   | 0.   | 6.   | 4.    | 4.    | 7.   | 1.   |
| 71  | 5.   | 2.   | 3.   | 4.   | 3.   | 3.   | 5.    | 4.    | 1.   | 1.   |
| 81  | 2.   | 3.   | 7.   | 0.   | 3.   | 2.   | 2.    | 2.    | 3.   | 0.   |
| 91  | 4.   | 5.   | 4.   | 4.   | 4.   | 5.   | 2.    | 2.    | 2.   | 3.   |
| 101 | 2.   | 6.   | 8.   | 3.   | 5.   | 2.   | 8.    | 3.    | 6.   | 4.   |
| 111 | 8.   | 6.   | 6.   | 5.   | 4.   | 6.   | 4.    | 8.    | 6.   | 5.   |
| 121 | 8.   | 6.   | 7.   | 5.   | 11.  | 8.   | 10.   | 9.    | 8.   | 9.   |
| 131 | 4.   | 10.  | 10.  | 11.  | 9.   | 8.   | 8.    | 9.    | 14.  | 9.   |
| 141 | 9.   | 8.   | 11.  | 14.  | 12.  | 10.  | 7.    | 10.   | 10.  | 14.  |
| 151 | 19.  | 17.  | 13.  | 14.  | 15.  | 19.  | 14.   | 17.   | 16.  | 20.  |
| 161 | 23.  | 23.  | 16.  | 18.  | 24.  | 23.  | 31.   | 26.   | 27.  | 18.  |
| 171 | 23.  | 25.  | 31.  | 36.  | 22.  | 35.  | 50.   | 38.   | 34.  | 49.  |
| 181 | 38.  | 48.  | 41.  | 53.  | 64.  | 58.  | 68.   | 68.   | 55.  | 74.  |
| 191 | 82.  | 84.  | 104. | 96.  | 98.  | 102. | 126.  | 100.  | 128. | 128. |
| 201 | 143. | 146. | 158. | 171. | 164. | 194. | 205.  | 211.  | 217. | 238. |
| 211 | 235. | 280. | 318. | 324. | 365. | 389. | 454.  | 440.  | 452. | 515. |
| 221 | 457. | 571. | 582. | 673. | 776. | 899. | 1076. | 1103. | 987. | 749. |
| 231 | 386. | 245. | 125. | 44.  | 39.  | 24.  | 19.   | 16.   | 10.  | 9.   |
| 241 | 15.  | 13.  | 14.  | 9.   | 12.  | 10.  | 10.   | 6.    | 8.   | 8.   |
| 251 | 7.   | 10.  | 10.  | 5.   | 9.   | 9.   | 10.   | 6.    | 11.  | 4.   |
| 261 | 7.   | 5.   | 5.   | 9.   | 23.  | 35.  | 35.   | 39.   | 41.  | 46.  |
| 271 | 38.  | 42.  | 30.  | 25.  | 11.  | 34.  | 24.   | 19.   | 25.  | 25.  |
| 281 | 15.  | 27.  | 19.  | 23.  | 18.  | 15.  | 26.   | 25.   | 21.  | 22.  |
| 291 | 17.  | 18.  | 20.  | 25.  | 15.  | 22.  | 29.   | 20.   | 27.  | 28.  |
| 301 | 29.  | 33.  | 34.  | 38.  | 25.  | 27.  | 36.   | 26.   | 26.  | 21.  |
| 311 | 27.  | 31.  | 15.  | 24.  | 23.  | 48.  | 25.   | 36.   | 42.  | 50.  |
| 321 | 55.  | 47.  | 49.  | 73.  | 63.  | 66.  | 78.   | 66.   | 94.  | 92.  |
| 331 | 102. | 81.  | 91.  | 105. | 108. | 121. | 126.  | 112.  | 162. | 140. |
| 341 | 169. | 177. | 185. | 187. | 186. | 245. | 251.  | 314.  | 345. | 391. |
| 351 | 464. | 470. | 508. | 425. | 391. | 390. | 420.  | 470.  | 497. | 587. |
| 361 | 721. | 821. | 723. | 454. | 237. | 75.  | 36.   | 19.   | 17.  | 11.  |
| 371 | 9.   | 6.   | 6.   | 12.  | 3.   | 4.   | 5.    | 4.    | 3.   | 2.   |
| 381 | 3.   | 5.   | 5.   | 2.   | 2.   | 4.   | 2.    | 2.    | 1.   | 1.   |
| 391 | 0.   | 0.   | 2.   | 3.   | 2.   | 0.   | 2.    | 2.    | 2.   | 0.   |
| 401 | 1.   | 1.   | 0.   | 0.   | 0.   | 0.   | 0.    | 1.    | 2.   | 0.   |
| 411 | 0.   | 0.   | 0.   | 1.   | 3.   | 2.   | 2.    | 0.    | 0.   | 1.   |
| 421 | 3.   | 1.   | 0.   | 0.   | 0.   | 0.   | 2.    | 1.    | 0.   | 1.   |
| 431 | 1.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.    | 0.    | 0.   | 0.   |
| 441 | 1.   | 0.   | 0.   | 0.   | 0.   | 1.   | 0.    | 0.    | 0.   | 0.   |
| 451 | 1.   | 0.   | 0.   | 0.   | 1.   | 2.   | 0.    | 1.    | 0.   | 0.   |
| 461 | 1.   | 0.   | 1.   | 3.   | 1.   | 1.   | 1.    | 0.    | 1.   | 0.   |
| 471 | 1.   | 0.   | 0.   | 5.   | 1.   | 3.   | 1.    | 3.    | 1.   | 1.   |
| 481 | 1.   | 1.   | 1.   | 0.   | 0.   | 1.   | 1.    | 0.    | 0.   | 2.   |
| 491 | 1.   | 0.   | 0.   | 0.   | 1.   | 0.   | 0.    | 0.    | 0.   | 0.   |
| 511 | 0.   | 0.   |      |      |      |      |       |       |      |      |



Westinghouse Hanford Co.

GENERAL ALPHA ENERGY ANALYSIS  
Rev. 2.01

## DATA REDUCTION REPORT

SAMPLE  
WL7123-BLK  
File ID: 14a1413.CNFCounted on: 4/ 3/96 @ 9:10  
Detector: AEA14  
Geometry number: 1  
Count time: 28801. Sec

## PEAK ANALYSIS

| Peak ID | Peak height |       | Peak center |         | FWHM    |        | Tau     |        |
|---------|-------------|-------|-------------|---------|---------|--------|---------|--------|
|         | Initial     | Final | Initial     | Final   | Initial | Final  | Initial | Final  |
| 1       | 609.8       | 609.8 | 364.079     | 364.079 | 10.000  | 3.180  | 5.000   | 0.691  |
| 2       | 12.4        | 12.4  | 292.363     | 292.363 | 26.000  | 23.601 | 13.000  | 13.275 |
| 3       | 21.5        | 21.5  | 270.745     | 270.542 | 14.000  | 5.511  | 7.000   | 3.318  |

## PEAK RESULTS

Peak Error Limit: 30%

| Peak ID | Isotope | AEA Frac | Peak Centroid Exp.     | Obs.  | Diff. | FWHM  | Count Rate c/m | %err @95 | d/m    | Activity uCi/ea |
|---------|---------|----------|------------------------|-------|-------|-------|----------------|----------|--------|-----------------|
| 1       | Pu236   | 0.942    | 5.755                  | 5.741 | 0.014 | 40.01 | 27.02          | 1.7      | 1875.6 | 0.845E-03       |
| 2       | Th228   | 0.021    | 5.400                  | 5.418 | -.018 | 80.11 | 0.61           | 22.2     | 58.5   | 0.264E-04       |
|         | Am241   |          | 5.479                  | 5.418 | 0.061 |       |                |          | 44.2   | 0.199E-04       |
| 3       |         | 0.021    |                        | 5.320 |       | 0.02  | 0.59           | 14.6     | 40.2   | 0.181E-04       |
| Totals: |         | 0.983    | <--valid peaks only--> |       |       |       | 28.22          |          |        |                 |

## DETECTOR CALIBRATION

Energy(MEV) = 4.103 + (0.0045)\*Channel  
 Energy range (MeV): 4.103 TO 6.407  
 Efficiency = 0.0147 CPM/DPM

## TOTAL COUNT DATA:

| Item          | Total   | % Recovery |
|---------------|---------|------------|
| Raw spectrum  | 13776.0 | 100.000    |
| Smoothed      | 13775.5 | 99.996     |
| Composite fit | 13547.0 | 98.338     |
| Residuals     | 229.0   | 1.662      |

Analyzed by:

VR

1 Legend: Raw = .... Modeled Peaks = 1,2,..., etc

Display Max.:

3914.6

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Raw Data Dump for AEA Spectrum: 14a1413.CNF

WHC-SD-WM-DP-178, REV 1

|     |      |      |      |      |      |      |      |      |      |      |
|-----|------|------|------|------|------|------|------|------|------|------|
| 1   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 1.   | 0.   | 1.   | 3.   |
| 11  | 1.   | 2.   | 4.   | 2.   | 0.   | 3.   | 3.   | 4.   | 1.   | 6.   |
| 21  | 3.   | 10.  | 5.   | 5.   | 0.   | 3.   | 11.  | 3.   | 4.   | 0.   |
| 31  | 2.   | 3.   | 0.   | 0.   | 3.   | 2.   | 0.   | 0.   | 1.   | 0.   |
| 41  | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 1.   | 0.   | 0.   |
| 51  | 0.   | 1.   | 1.   | 1.   | 0.   | 0.   | 2.   | 1.   | 0.   | 1.   |
| 61  | 0.   | 1.   | 0.   | 1.   | 1.   | 0.   | 2.   | 1.   | 3.   | 0.   |
| 71  | 0.   | 0.   | 2.   | 2.   | 0.   | 2.   | 1.   | 0.   | 1.   | 1.   |
| 81  | 2.   | 1.   | 0.   | 1.   | 1.   | 3.   | 0.   | 0.   | 0.   | 2.   |
| 91  | 0.   | 0.   | 2.   | 0.   | 0.   | 1.   | 3.   | 0.   | 0.   | 0.   |
| 101 | 0.   | 1.   | 0.   | 0.   | 0.   | 2.   | 1.   | 2.   | 2.   | 0.   |
| 111 | 0.   | 0.   | 1.   | 1.   | 2.   | 2.   | 0.   | 0.   | 0.   | 0.   |
| 121 | 1.   | 1.   | 4.   | 2.   | 0.   | 1.   | 0.   | 0.   | 3.   | 1.   |
| 131 | 1.   | 0.   | 1.   | 0.   | 3.   | 1.   | 2.   | 3.   | 0.   | 2.   |
| 141 | 0.   | 1.   | 0.   | 2.   | 2.   | 0.   | 1.   | 1.   | 1.   | 1.   |
| 151 | 2.   | 3.   | 0.   | 0.   | 0.   | 2.   | 1.   | 0.   | 0.   | 0.   |
| 161 | 1.   | 2.   | 1.   | 2.   | 0.   | 0.   | 0.   | 1.   | 1.   | 1.   |
| 171 | 1.   | 1.   | 1.   | 2.   | 1.   | 1.   | 0.   | 1.   | 0.   | 4.   |
| 181 | 1.   | 1.   | 3.   | 1.   | 0.   | 1.   | 0.   | 4.   | 3.   | 2.   |
| 191 | 2.   | 1.   | 2.   | 2.   | 4.   | 1.   | 2.   | 2.   | 1.   | 2.   |
| 201 | 3.   | 1.   | 0.   | 2.   | 2.   | 2.   | 2.   | 2.   | 0.   | 1.   |
| 211 | 3.   | 3.   | 5.   | 2.   | 2.   | 1.   | 2.   | 3.   | 3.   | 2.   |
| 221 | 7.   | 1.   | 9.   | 4.   | 5.   | 2.   | 3.   | 6.   | 5.   | 3.   |
| 231 | 3.   | 6.   | 2.   | 6.   | 5.   | 5.   | 5.   | 7.   | 4.   | 1.   |
| 241 | 3.   | 6.   | 2.   | 6.   | 6.   | 2.   | 4.   | 4.   | 3.   | 5.   |
| 251 | 4.   | 3.   | 5.   | 4.   | 4.   | 5.   | 9.   | 2.   | 3.   | 6.   |
| 261 | 6.   | 4.   | 6.   | 9.   | 17.  | 16.  | 11.  | 26.  | 20.  | 32.  |
| 271 | 29.  | 30.  | 17.  | 14.  | 16.  | 10.  | 6.   | 16.  | 21.  | 14.  |
| 281 | 15.  | 17.  | 16.  | 15.  | 23.  | 17.  | 10.  | 18.  | 20.  | 17.  |
| 291 | 16.  | 20.  | 19.  | 18.  | 16.  | 15.  | 20.  | 10.  | 26.  | 19.  |
| 301 | 18.  | 14.  | 26.  | 24.  | 25.  | 20.  | 29.  | 20.  | 24.  | 29.  |
| 311 | 35.  | 27.  | 33.  | 23.  | 31.  | 39.  | 32.  | 38.  | 34.  | 41.  |
| 321 | 55.  | 44.  | 65.  | 58.  | 54.  | 61.  | 70.  | 63.  | 75.  | 79.  |
| 331 | 68.  | 93.  | 73.  | 111. | 94.  | 93.  | 114. | 115. | 127. | 149. |
| 341 | 125. | 154. | 160. | 187. | 213. | 183. | 210. | 226. | 284. | 281. |
| 351 | 285. | 407. | 381. | 454. | 465. | 440. | 405. | 399. | 356. | 408. |
| 361 | 429. | 495. | 637. | 724. | 720. | 625. | 328. | 141. | 67.  | 36.  |
| 371 | 14.  | 20.  | 12.  | 12.  | 4.   | 10.  | 2.   | 5.   | 9.   | 5.   |
| 381 | 7.   | 4.   | 4.   | 4.   | 6.   | 3.   | 1.   | 4.   | 2.   | 0.   |
| 391 | 1.   | 1.   | 0.   | 1.   | 1.   | 2.   | 1.   | 0.   | 1.   | 1.   |
| 401 | 0.   | 1.   | 2.   | 1.   | 3.   | 1.   | 1.   | 2.   | 1.   | 2.   |
| 411 | 2.   | 0.   | 3.   | 1.   | 2.   | 0.   | 0.   | 0.   | 0.   | 1.   |
| 421 | 0.   | 0.   | 0.   | 0.   | 0.   | 1.   | 2.   | 0.   | 0.   | 0.   |
| 431 | 0.   | 0.   | 1.   | 0.   | 0.   | 0.   | 0.   | 1.   | 0.   | 0.   |
| 441 | 1.   | 1.   | 0.   | 2.   | 0.   | 1.   | 0.   | 0.   | 1.   | 2.   |
| 451 | 0.   | 0.   | 1.   | 0.   | 1.   | 0.   | 1.   | 0.   | 0.   | 1.   |
| 461 | 1.   | 1.   | 0.   | 0.   | 0.   | 1.   | 1.   | 1.   | 1.   | 1.   |
| 471 | 0.   | 1.   | 4.   | 0.   | 2.   | 1.   | 0.   | 0.   | 3.   | 0.   |
| 481 | 2.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 1.   | 0.   | 0.   |
| 491 | 1.   | 0.   | 0.   | 1.   | 1.   | 0.   | 1.   | 0.   | 0.   | 0.   |
| 511 | 1.   | 0.   |      |      |      |      |      |      |      |      |

4-3-96

Westinghouse Hanford Co.

GENERAL ALPHA ENERGY ANALYSIS  
Rev. 2.01

## DATA REDUCTION REPORT

SAMPLE  
S96T1361-SAM  
File ID: 15a1592.CNFCounted on: 4/ 3/96 @ 9:10  
Detector: AEA15  
Geometry number: 1  
Count time: 28802. Sec

## PEAK ANALYSIS

| Peak<br>ID | Peak height |        | Peak center |         | FWHM    |       | Tau     |       |
|------------|-------------|--------|-------------|---------|---------|-------|---------|-------|
|            | Initial     | Final  | Initial     | Final   | Initial | Final | Initial | Final |
| 1          | 639.2       | 639.2  | 364.418     | 364.418 | 10.000  | 3.433 | 5.000   | 0.760 |
| 2          | 469.8       | 469.8  | 305.185     | 305.154 | 8.000   | 3.245 | 4.000   | 0.738 |
| 3          | 2202.3      | 2202.3 | 229.414     | 229.412 | 10.000  | 4.469 | 5.000   | 1.323 |
| 4?         | 15.1        | 15.1   | 117.137     | 117.099 | 178.000 | 1.000 | 89.000  | 0.100 |
| 5?         | 2.1         | 2.1    | 104.290     | 104.342 | 6.000   | 0.000 | 3.000   | 2.765 |
| 6?         | 29.9        | 29.9   | 26.125      | 26.105  | 14.000  | 7.866 | 7.000   | 1.962 |

## PEAK RESULTS

Peak Error Limit: 30%

| Peak<br>ID | Isotope | AEA   |                        | Peak Centroid |       |       | Count  |       | %err<br>@95 | d/m    | Activity<br>uCi/ea |
|------------|---------|-------|------------------------|---------------|-------|-------|--------|-------|-------------|--------|--------------------|
|            |         | Frac  | Exp.                   | Obs.          | Diff. | FWHM  | Rate   | c/m   |             |        |                    |
| 1          | Pu236   | 0.198 | 5.755                  | 5.744         | 0.011 | 10.02 | 28.19  | 1.7   |             | 1917.8 | 0.864E-03          |
| 2          | Pu238   | 0.141 | 5.487                  | 5.477         | 0.010 | 10.01 | 20.15  | 2.1   |             | 1866.1 | 0.841E-03          |
|            | Am241   |       | 5.479                  | 5.477         | 0.002 |       |        |       |             | 1429.3 | 0.644E-03          |
| 3          | Pu239   | 0.577 | 5.147                  | 5.136         | 0.011 | 10.02 | 82.28  | 1.0   |             | 5485.4 | 0.247E-02          |
|            | Pu240   |       | 5.144                  | 5.136         | 0.008 |       |        |       |             | 5485.4 | 0.247E-02          |
| 4          |         | ????  |                        | 4.631         |       |       | 1.17   | 8.3   |             |        |                    |
| 5          |         | ????  |                        | 4.574         |       |       | 0.00   | 1000. |             |        |                    |
| 6          |         | ????  |                        | 4.221         |       |       | 1.19   | 8.5   |             |        |                    |
| Totals:    |         | 0.916 | <--valid peaks only--> |               |       |       | 130.63 |       |             |        |                    |

## DETECTOR CALIBRATION

Energy(MEV) = 4.104 + (0.0045)\*Channel  
Energy range (MeV): 4.104 TO 6.408  
Efficiency = 0.0150 CPM/DPM

## TOTAL COUNT DATA:

| Item          | Total   | % Recovery |
|---------------|---------|------------|
| Raw spectrum  | 68490.0 | 100.000    |
| Smoothed      | 68491.6 | 100.002    |
| Composite fit | 63837.0 | 93.206     |
| Residuals     | 4653.0  | 6.794      |

ANALYZED BY:

VR

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| Raw Data Dump for AEA Spectrum: 15a1592.CNF |       |       |       |       |       | WHC-SD-WM-DP-178, REV. / |       |       |       |       |
|---------------------------------------------|-------|-------|-------|-------|-------|--------------------------|-------|-------|-------|-------|
| 1                                           | 0.    | 0.    | 4.    | 3.    | 4.    | 5.                       | 6.    | 6.    | 10.   | 11.   |
| 11                                          | 12.   | 10.   | 18.   | 25.   | 21.   | 18.                      | 19.   | 14.   | 25.   | 22.   |
| 21                                          | 20.   | 23.   | 28.   | 26.   | 33.   | 37.                      | 33.   | 31.   | 24.   | 11.   |
| 31                                          | 24.   | 11.   | 14.   | 7.    | 5.    | 6.                       | 5.    | 2.    | 5.    | 9.    |
| 41                                          | 5.    | 5.    | 2.    | 5.    | 1.    | 4.                       | 5.    | 5.    | 6.    | 4.    |
| 51                                          | 4.    | 3.    | 4.    | 5.    | 4.    | 9.                       | 7.    | 6.    | 5.    | 1.    |
| 61                                          | 3.    | 3.    | 2.    | 3.    | 7.    | 5.                       | 6.    | 5.    | 4.    | 3.    |
| 71                                          | 6.    | 11.   | 5.    | 11.   | 4.    | 7.                       | 8.    | 4.    | 6.    | 7.    |
| 81                                          | 6.    | 5.    | 5.    | 11.   | 7.    | 6.                       | 6.    | 6.    | 5.    | 11.   |
| 91                                          | 6.    | 7.    | 7.    | 12.   | 15.   | 8.                       | 7.    | 10.   | 10.   | 8.    |
| 101                                         | 10.   | 11.   | 7.    | 14.   | 16.   | 9.                       | 7.    | 9.    | 9.    | 13.   |
| 111                                         | 13.   | 17.   | 7.    | 13.   | 9.    | 14.                      | 16.   | 12.   | 14.   | 9.    |
| 121                                         | 10.   | 11.   | 15.   | 19.   | 12.   | 15.                      | 16.   | 20.   | 12.   | 15.   |
| 131                                         | 20.   | 16.   | 21.   | 17.   | 28.   | 25.                      | 25.   | 20.   | 25.   | 20.   |
| 141                                         | 22.   | 28.   | 18.   | 30.   | 26.   | 36.                      | 24.   | 36.   | 31.   | 31.   |
| 151                                         | 28.   | 49.   | 36.   | 37.   | 34.   | 38.                      | 38.   | 38.   | 44.   | 41.   |
| 161                                         | 55.   | 50.   | 50.   | 59.   | 56.   | 50.                      | 41.   | 62.   | 69.   | 65.   |
| 171                                         | 71.   | 69.   | 61.   | 67.   | 69.   | 80.                      | 77.   | 94.   | 87.   | 84.   |
| 181                                         | 103.  | 120.  | 125.  | 135.  | 115.  | 149.                     | 139.  | 144.  | 146.  | 178.  |
| 191                                         | 184.  | 183.  | 191.  | 200.  | 209.  | 210.                     | 235.  | 268.  | 273.  | 274.  |
| 201                                         | 310.  | 314.  | 341.  | 406.  | 400.  | 422.                     | 435.  | 482.  | 502.  | 526.  |
| 211                                         | 585.  | 622.  | 641.  | 726.  | 718.  | 849.                     | 963.  | 1042. | 1110. | 1147. |
| 221                                         | 1205. | 1248. | 1363. | 1477. | 1545. | 1752.                    | 1968. | 2285. | 2532. | 2505. |
| 231                                         | 2433. | 1727. | 1268. | 740.  | 396.  | 195.                     | 112.  | 70.   | 58.   | 51.   |
| 241                                         | 45.   | 37.   | 33.   | 38.   | 27.   | 32.                      | 36.   | 24.   | 29.   | 31.   |
| 251                                         | 33.   | 33.   | 23.   | 21.   | 32.   | 30.                      | 37.   | 31.   | 35.   | 36.   |
| 261                                         | 31.   | 39.   | 52.   | 38.   | 72.   | 109.                     | 104.  | 115.  | 129.  | 130.  |
| 271                                         | 107.  | 154.  | 97.   | 86.   | 96.   | 115.                     | 100.  | 101.  | 98.   | 111.  |
| 281                                         | 106.  | 139.  | 139.  | 132.  | 150.  | 155.                     | 165.  | 186.  | 172.  | 191.  |
| 291                                         | 197.  | 258.  | 225.  | 269.  | 306.  | 325.                     | 384.  | 367.  | 310.  | 337.  |
| 301                                         | 338.  | 354.  | 422.  | 489.  | 536.  | 615.                     | 499.  | 312.  | 167.  | 69.   |
| 311                                         | 51.   | 37.   | 32.   | 38.   | 37.   | 35.                      | 37.   | 43.   | 39.   | 43.   |
| 321                                         | 37.   | 49.   | 47.   | 50.   | 52.   | 58.                      | 78.   | 68.   | 60.   | 76.   |
| 331                                         | 63.   | 69.   | 83.   | 86.   | 79.   | 101.                     | 116.  | 108.  | 109.  | 140.  |
| 341                                         | 154.  | 154.  | 168.  | 179.  | 201.  | 186.                     | 214.  | 248.  | 261.  | 279.  |
| 351                                         | 314.  | 372.  | 348.  | 454.  | 488.  | 459.                     | 472.  | 397.  | 415.  | 439.  |
| 361                                         | 466.  | 531.  | 611.  | 715.  | 752.  | 721.                     | 496.  | 231.  | 99.   | 50.   |
| 371                                         | 28.   | 21.   | 9.    | 7.    | 11.   | 8.                       | 9.    | 9.    | 3.    | 2.    |
| 381                                         | 8.    | 3.    | 2.    | 7.    | 7.    | 1.                       | 1.    | 3.    | 2.    | 1.    |
| 391                                         | 3.    | 1.    | 1.    | 3.    | 4.    | 3.                       | 0.    | 2.    | 2.    | 0.    |
| 401                                         | 1.    | 3.    | 0.    | 3.    | 3.    | 0.                       | 1.    | 3.    | 1.    | 2.    |
| 411                                         | 3.    | 2.    | 3.    | 0.    | 0.    | 1.                       | 1.    | 1.    | 1.    | 2.    |
| 421                                         | 0.    | 1.    | 3.    | 0.    | 0.    | 1.                       | 2.    | 1.    | 1.    | 2.    |
| 431                                         | 2.    | 0.    | 1.    | 0.    | 2.    | 0.                       | 0.    | 2.    | 0.    | 0.    |
| 441                                         | 2.    | 1.    | 1.    | 2.    | 1.    | 1.                       | 1.    | 1.    | 1.    | 0.    |
| 451                                         | 0.    | 0.    | 0.    | 0.    | 0.    | 1.                       | 4.    | 1.    | 1.    | 2.    |
| 461                                         | 0.    | 0.    | 0.    | 1.    | 0.    | 1.                       | 2.    | 3.    | 1.    | 3.    |
| 471                                         | 1.    | 2.    | 0.    | 2.    | 2.    | 3.                       | 2.    | 2.    | 3.    | 1.    |
| 481                                         | 1.    | 5.    | 0.    | 2.    | 0.    | 1.                       | 1.    | 1.    | 1.    | 1.    |
| 491                                         | 1.    | 2.    | 0.    | 0.    | 0.    | 1.                       | 0.    | 1.    | 2.    | 1.    |
| 511                                         | 2.    | 0.    |       |       |       |                          |       |       |       |       |

Westinghouse Hanford Co.

GENERAL ALPHA ENERGY ANALYSIS  
Rev. 2.01

## DATA REDUCTION REPORT

SAMPLE  
S96T1361-DUP  
File ID: 16a1674.CNFCounted on: 4/ 3/96 @ 9:11  
Detector: AEA16  
Geometry number: 1  
Count time: 28800. Sec

## PEAK ANALYSIS

| Peak<br>ID | Peak height |        | Peak center |         | FWHM    |       | Tau     |       |
|------------|-------------|--------|-------------|---------|---------|-------|---------|-------|
|            | Initial     | Final  | Initial     | Final   | Initial | Final | Initial | Final |
| 1          | 654.5       | 654.5  | 359.530     | 359.530 | 10.000  | 3.337 | 5.000   | 0.712 |
| 2          | 450.9       | 450.9  | 300.757     | 300.709 | 10.000  | 3.666 | 5.000   | 0.752 |
| 3          | 2169.8      | 2169.8 | 225.933     | 225.930 | 12.000  | 4.363 | 6.000   | 1.182 |
| 4          | 31.5        | 31.5   | 144.139     | 143.856 | 130.000 | 1.000 | 65.000  | 0.100 |
| 5?         | 1.5         | 1.5    | 106.683     | 105.946 | 4.000   | 0.349 | 2.000   | 2.690 |
| 6?         | 30.3        | 30.3   | 26.658      | 26.636  | 14.000  | 6.883 | 7.000   | 1.225 |

## PEAK RESULTS

Peak Error Limit: 30%

| Peak<br>ID | Isotope | AEA<br>Frac | Peak Centroid          |       |            | Count<br>Rate c/m | %err<br>@95 | d/m     | Activity<br>uCi/ea |
|------------|---------|-------------|------------------------|-------|------------|-------------------|-------------|---------|--------------------|
|            |         |             | Exp.                   | Obs.  | Diff. FWHM |                   |             |         |                    |
| 1          | Pu-236  | 0.203       |                        | 5.730 | 0.02       | 29.58             | 1.6         | 4350.2  | 0.196E-02          |
| 2          | Am241   | 0.146       | 5.479                  | 5.465 | 0.0140.02  | 21.23             | 2.0         | 3322.0  | 0.150E-02          |
| 3          | Pu239   | 0.588       | 5.147                  | 5.128 | 0.0190.02  | 85.66             | 1.0         | 12597.7 | 0.567E-02          |
|            | Pu240   |             | 5.144                  | 5.128 | 0.016      |                   |             | 12597.7 | 0.567E-02          |
| 4          | Np237   | 0.017       | 4.769                  | 4.759 | 0.0100.00  | 2.49              | 5.9         | 420.4   | 0.189E-03          |
| 5          |         | ????        |                        | 4.588 |            | 0.01              | 953.        |         |                    |
| 6          |         | ????        |                        | 4.232 |            | 1.31              | 8.1         |         |                    |
| Totals:    |         | 0.954       | <--valid peaks only--> |       |            | 138.97            |             |         |                    |

## DETECTOR CALIBRATION

Energy(MEV) = 4.112 + (0.0045)\*Channel  
Energy range (MeV): 4.112 TO 6.416  
Efficiency = 0.0068 CPM/DPM

## TOTAL COUNT DATA:

| Item          | Total   | % Recovery |
|---------------|---------|------------|
| Raw spectrum  | 69956.0 | 100.000    |
| Smoothed      | 69959.8 | 100.005    |
| Composite fit | 67338.4 | 96.258     |
| Residuals     | 2617.6  | 3.742      |

ANALYZED BY: VR

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| Raw Data Dump for AEA Spectrum: 16a1674.CNF |       |       |       |       |       |       | WHC-SD-WM-DP-178 REV 1 |       |       |       |
|---------------------------------------------|-------|-------|-------|-------|-------|-------|------------------------|-------|-------|-------|
| 1                                           | 0.    | 0.    | 7.    | 4.    | 4.    | 3.    | 2.                     | 2.    | 7.    | 16.   |
| 11                                          | 8.    | 9.    | 21.   | 31.   | 22.   | 32.   | 12.                    | 22.   | 18.   | 11.   |
| 21                                          | 22.   | 44.   | 21.   | 26.   | 29.   | 33.   | 34.                    | 40.   | 22.   | 22.   |
| 31                                          | 16.   | 22.   | 2.    | 8.    | 5.    | 6.    | 5.                     | 6.    | 6.    | 4.    |
| 41                                          | 4.    | 3.    | 4.    | 4.    | 6.    | 6.    | 5.                     | 5.    | 10.   | 6.    |
| 51                                          | 3.    | 1.    | 4.    | 9.    | 4.    | 8.    | 2.                     | 5.    | 3.    | 9.    |
| 61                                          | 12.   | 9.    | 3.    | 3.    | 9.    | 4.    | 10.                    | 6.    | 2.    | 8.    |
| 71                                          | 6.    | 6.    | 6.    | 11.   | 6.    | 4.    | 4.                     | 3.    | 5.    | 4.    |
| 81                                          | 6.    | 7.    | 8.    | 7.    | 4.    | 10.   | 7.                     | 7.    | 4.    | 8.    |
| 91                                          | 10.   | 9.    | 11.   | 11.   | 9.    | 7.    | 7.                     | 14.   | 8.    | 7.    |
| 101                                         | 7.    | 10.   | 11.   | 5.    | 19.   | 10.   | 17.                    | 13.   | 9.    | 11.   |
| 111                                         | 16.   | 10.   | 8.    | 11.   | 16.   | 11.   | 20.                    | 20.   | 11.   | 10.   |
| 121                                         | 11.   | 20.   | 18.   | 18.   | 17.   | 18.   | 19.                    | 22.   | 12.   | 16.   |
| 131                                         | 21.   | 17.   | 21.   | 25.   | 22.   | 24.   | 24.                    | 23.   | 26.   | 32.   |
| 141                                         | 30.   | 28.   | 43.   | 45.   | 34.   | 35.   | 28.                    | 34.   | 23.   | 28.   |
| 151                                         | 21.   | 31.   | 42.   | 44.   | 42.   | 36.   | 37.                    | 51.   | 51.   | 42.   |
| 161                                         | 55.   | 52.   | 56.   | 65.   | 59.   | 51.   | 61.                    | 58.   | 74.   | 83.   |
| 171                                         | 76.   | 92.   | 94.   | 74.   | 102.  | 94.   | 102.                   | 104.  | 109.  | 88.   |
| 181                                         | 136.  | 129.  | 133.  | 160.  | 185.  | 192.  | 207.                   | 171.  | 190.  | 207.  |
| 191                                         | 263.  | 229.  | 227.  | 261.  | 253.  | 304.  | 281.                   | 314.  | 345.  | 405.  |
| 201                                         | 415.  | 421.  | 424.  | 508.  | 566.  | 597.  | 568.                   | 624.  | 713.  | 723.  |
| 211                                         | 752.  | 851.  | 929.  | 1013. | 1088. | 1221. | 1248.                  | 1273. | 1355. | 1439. |
| 221                                         | 1516. | 1616. | 1847. | 2010. | 2382. | 2458. | 2497.                  | 2075. | 1435. | 908.  |
| 231                                         | 554.  | 292.  | 148.  | 86.   | 47.   | 55.   | 50.                    | 50.   | 49.   | 38.   |
| 241                                         | 22.   | 28.   | 34.   | 36.   | 39.   | 33.   | 29.                    | 35.   | 36.   | 38.   |
| 251                                         | 35.   | 33.   | 38.   | 50.   | 36.   | 52.   | 38.                    | 43.   | 46.   | 53.   |
| 261                                         | 50.   | 44.   | 56.   | 65.   | 99.   | 94.   | 123.                   | 137.  | 130.  | 163.  |
| 271                                         | 140.  | 153.  | 125.  | 120.  | 137.  | 160.  | 128.                   | 127.  | 165.  | 163.  |
| 281                                         | 148.  | 155.  | 179.  | 200.  | 181.  | 197.  | 249.                   | 263.  | 245.  | 282.  |
| 291                                         | 327.  | 374.  | 375.  | 352.  | 328.  | 330.  | 326.                   | 375.  | 450.  | 518.  |
| 301                                         | 523.  | 560.  | 420.  | 294.  | 141.  | 74.   | 53.                    | 45.   | 42.   | 37.   |
| 311                                         | 33.   | 46.   | 39.   | 34.   | 38.   | 48.   | 51.                    | 52.   | 58.   | 59.   |
| 321                                         | 60.   | 66.   | 88.   | 80.   | 81.   | 87.   | 85.                    | 101.  | 91.   | 99.   |
| 331                                         | 115.  | 110.  | 144.  | 128.  | 138.  | 158.  | 160.                   | 182.  | 193.  | 202.  |
| 341                                         | 235.  | 216.  | 257.  | 278.  | 254.  | 321.  | 380.                   | 399.  | 468.  | 524.  |
| 351                                         | 526.  | 457.  | 406.  | 396.  | 451.  | 443.  | 514.                   | 600.  | 733.  | 780.  |
| 361                                         | 750.  | 511.  | 265.  | 102.  | 45.   | 26.   | 25.                    | 25.   | 9.    | 8.    |
| 371                                         | 10.   | 6.    | 3.    | 4.    | 6.    | 4.    | 2.                     | 2.    | 1.    | 4.    |
| 381                                         | 4.    | 1.    | 4.    | 3.    | 4.    | 1.    | 2.                     | 4.    | 1.    | 4.    |
| 391                                         | 2.    | 2.    | 0.    | 2.    | 1.    | 2.    | 2.                     | 1.    | 1.    | 0.    |
| 401                                         | 1.    | 0.    | 2.    | 0.    | 0.    | 0.    | 0.                     | 3.    | 0.    | 2.    |
| 411                                         | 1.    | 1.    | 0.    | 1.    | 4.    | 2.    | 1.                     | 1.    | 0.    | 2.    |
| 421                                         | 1.    | 2.    | 3.    | 0.    | 0.    | 1.    | 0.                     | 1.    | 1.    | 1.    |
| 431                                         | 4.    | 0.    | 2.    | 0.    | 0.    | 2.    | 2.                     | 0.    | 0.    | 2.    |
| 441                                         | 1.    | 1.    | 0.    | 3.    | 0.    | 0.    | 0.                     | 0.    | 1.    | 2.    |
| 451                                         | 0.    | 0.    | 0.    | 0.    | 0.    | 1.    | 3.                     | 0.    | 0.    | 1.    |
| 461                                         | 2.    | 2.    | 3.    | 1.    | 2.    | 0.    | 3.                     | 1.    | 1.    | 5.    |
| 471                                         | 2.    | 0.    | 0.    | 0.    | 1.    | 0.    | 3.                     | 0.    | 0.    | 1.    |
| 481                                         | 4.    | 1.    | 2.    | 0.    | 1.    | 2.    | 1.                     | 1.    | 1.    | 0.    |
| 491                                         | 3.    | 1.    | 1.    | 0.    | 0.    | 3.    | 3.                     | 1.    | 0.    | 1.    |
| 511                                         | 2.    | 0.    |       |       |       |       |                        |       |       |       |

04/01/96 10:09  
A-0004-1

Page: 1

**LABCORE Data Entry Template for Worklist# 7168**Analyst: Jmv Instrument: PU01 14 Book# 104 B 43Method: LA-943-128 Rev/Mod A1

Worklist Comment: AY-101 Grab. Determine sample size using ludlum. new

| S                                                | Type   | Sample#      | R | A | Test     | Matrix | Group#   | Project     |
|--------------------------------------------------|--------|--------------|---|---|----------|--------|----------|-------------|
| 1                                                | STD    |              |   |   | @PU23901 | LIQUID |          |             |
| 2                                                | BLNK   |              |   |   | @PU23901 | LIQUID |          |             |
| 3                                                | SAMPLE | S96T001521 0 |   |   | @PU23901 | LIQUID | 96000257 | AY-101 GRAB |
| Analytes Requested: PU23901 , PU23901E, PU23901T |        |              |   |   |          |        |          |             |
| 4                                                | DUP    | S96T001521 0 |   |   | @PU23901 | LIQUID |          |             |
| 5                                                | SAMPLE | S96T001522 0 |   |   | @PU23901 | LIQUID | 96000257 | AY-101 GRAB |
| Analytes Requested: PU23901 , PU23901E, PU23901T |        |              |   |   |          |        |          |             |
| 6                                                | DUP    | S96T001522 0 |   |   | @PU23901 | LIQUID |          |             |

**Final page for worklist # 7168**Jae M. Van Sant 4-3-96  
Analyst Signature DateLee Hagan 4/5/96  
Analyst Signature Date  
C.J. Opina 4/5/96

Data Entry Comments:

S = Worklist Slot Number, R = Replicate Number, A = Aliquot Code.

# LABCORE Completed Worklist Report for Worklist# 7168

Analyst: jmv

Instrument: AB14

Book# 101B43

Method: LA-943-128 Rev/Mod A-1

Worklist Comment: AY-101 Grab. Determine sample size using ludlum. new

| Seq | Type   | Sample#    | R | A | Test              | Matrix | Actual   | Found    | DL or Yield | Unit       |
|-----|--------|------------|---|---|-------------------|--------|----------|----------|-------------|------------|
| 1   | STD    |            | 0 |   | @PU23901 PU23901  | LIQUID | 1.28E-01 | 1.22E-1  | 95.310 %    | Recovery   |
| 1   | STD    |            | 0 |   | @PU23901 PU23901E | LIQUID | 1.00     | 2.32E+00 | 2.320 %     | Ct. Error  |
| 1   | STD    |            | 0 |   | @PU23901 PU23901T | LIQUID | 100      | 9.06E+01 | 90.600 %    | Recovery   |
| 2   | BLNK   |            | 0 |   | @PU23901 PU23901  | LIQUID | 1        | <3.22E-4 |             | uCi/mL     |
| 2   | BLNK   |            | 0 |   | @PU23901 PU23901T | LIQUID | 100      | 1.01E+02 | 101.000 %   | Recovery   |
| 2   | BLNK   |            | 0 |   | @PU23901 PU23901E | LIQUID | 1.00     | 1.00E+02 | 100.000 %   | Ct. Error  |
| 3   | SAMPLE | S96T001521 | 0 |   | @PU23901 PU23901  | LIQUID | N/A      | 6.29E-02 | 3.430e-003  | uCi/mL     |
| 3   | SAMPLE | S96T001521 | 0 |   | @PU23901 PU23901T | LIQUID | N/A      | 8.40E+01 | 1.000e-007  | % Recovery |
| 3   | SAMPLE | S96T001521 | 0 |   | @PU23901 PU23901E | LIQUID | N/A      | 1.85E+00 | 0.000 %     | Ct. Error  |
| 4   | DUP    | S96T001521 | 0 |   | @PU23901 PU23901  | LIQUID | 6.29E-2  | 5.93E-2  | 5.890       | RPD        |
| 4   | DUP    | S96T001521 | 0 |   | @PU23901 PU23901T | LIQUID | 100      | 8.91E+01 | 89.100 %    | Recovery   |
| 4   | DUP    | S96T001521 | 0 |   | @PU23901 PU23901E | LIQUID | 1.00     | 1.79E+00 | 1.790 %     | Ct. Error  |
| 5   | SAMPLE | S96T001522 | 0 |   | @PU23901 PU23901  | LIQUID | N/A      | 5.95E-02 | 2.980e-003  | uCi/mL     |
| 5   | SAMPLE | S96T001522 | 0 |   | @PU23901 PU23901T | LIQUID | N/A      | 9.06E+01 | 1.000e-007  | % Recovery |
| 5   | SAMPLE | S96T001522 | 0 |   | @PU23901 PU23901E | LIQUID | N/A      | 1.61E+00 | 0.000 %     | Ct. Error  |
| 6   | DUP    | S96T001522 | 0 |   | @PU23901 PU23901  | LIQUID | 5.95E-2  | 5.98E-2  | 0.500       | RPD        |
| 6   | DUP    | S96T001522 | 0 |   | @PU23901 PU23901T | LIQUID | 100      | 8.84E+01 | 88.400 %    | Recovery   |
| 6   | DUP    | S96T001522 | 0 |   | @PU23901 PU23901E | LIQUID | 1.00     | 1.58E+00 | 1.580 %     | Ct. Error  |

Final page for worklist# 7168

Analyst Signature \_\_\_\_\_ Date \_\_\_\_\_

Analyst Signature \_\_\_\_\_ Date \_\_\_\_\_

Reviewer Signature Jarlin Reljea Date 5 Apr 96

Units shown for QC (BLK/BKG) may not reflect the actual units.

WORKBOOK PAGE: STD1

Pu 238 and 239/240 : LA-943-128 (A-1)

LIQUID

|                 |                                                                                                                          |           |                                                                 | STD        |
|-----------------|--------------------------------------------------------------------------------------------------------------------------|-----------|-----------------------------------------------------------------|------------|
| Type            | DATE COUNTED                                                                                                             | APR-04-96 | PU 236 AEA FRAC (C236)                                          | 0.415      |
| STD             | SAMPLE VOLUME in mL SS                                                                                                   | 0.100     | PU 238 AEA FRAC (C238)                                          | 0.035      |
| Work List       | SAMPLE DILUTION FACTOR DF                                                                                                | 101.000   | PU 239 AEA FRAC (C239)                                          | 0.497      |
| 7168            | TRACER VOLUME in mL SPKV                                                                                                 | 0.100     | TOTAL AT COUNTS                                                 | 4273       |
| Test Code       | DIGEST DILUTION FACTOR DDF                                                                                               | 1.000     | AT COUNT TIME (MIN)                                             | 30         |
| @PU23901        | TRACER BOOK NO                                                                                                           | 120B43    | BACKGROUND in cpm (Bkg)                                         | 0.300      |
| Matrix          | DETECTOR NUMBER                                                                                                          | 14        | PU 236 cpm                                                      | 27.390     |
| LIQUID          | EFFICIENCY FACTOR EFF                                                                                                    | 0.291     | PU 238 cpm                                                      | 2.330      |
| Batch Number    | TRACER PREPARATION DATE                                                                                                  | 12/27/95  | PU 239 cpm                                                      | 32.760     |
| 96002886        | TRACER PREPARATION VALUE (dpm/mL)                                                                                        | 2390.000  | AEA COUNT TIME                                                  | 480        |
| Rerun           | PU-236 DECAY CORR'D VALUE (dpm/mL)                                                                                       | 2237.527  | Pu 239/240 µCi/L                                                | 1.2191E+02 |
| 0               | PU-238 TRACER VALUE (dpm/mL)                                                                                             | 0.000     |                                                                 |            |
| Sample Prep     | STANDARD BOOK NO                                                                                                         | 104B43    |                                                                 |            |
| N/A             | STANDARD VALUE in µCi/mL                                                                                                 | 0.128     |                                                                 |            |
| Sample #        |                                                                                                                          |           |                                                                 |            |
| WL#7168         |                                                                                                                          |           |                                                                 |            |
| Instrument Code | Decay Time = Date Counted - Tracer Preparation Date                                                                      |           |                                                                 |            |
| WB27807         | Pu-236 Decay Corr'd Value = Pu-236 Preparation Value * [e to the power of {(-ln2 * Decay Time/1040.95)}]                 |           |                                                                 |            |
| Prepared By     | Pu 236 Tracer Recovery = (Total AT Counts / TC - Bkg) * 1/EFF * C236 * 100 / Pu-236 Decay Corr'd Value * SPKV            |           |                                                                 |            |
| SEH             | Pu 239/240 µCi/L = (C239)(Pu 236 Decay Corr'd Value)(SPKV)(1000mL/L)(DF)(DDF) / [(C236)(SS)(2220000 dpm/µCi)]            |           |                                                                 |            |
| Chemist         | Pu 238 dpm = [(Total AT Counts / TC) - Bkg * 1/EFF * C238] - (Pu-238 Tracer Value * SPKV * Pu 236 Tracer Recovery / 100) |           |                                                                 |            |
| JFR             | Pu 238 µCi/L = [(Pu 238 dpm)(DF)(DDF)(1000mL/L)] / [(Pu-236 Tracer Recovery / 100)(2220000 dpm/µCi)(D g/L)(SS)]          |           |                                                                 |            |
| Analyst         | Relative Counting Error = Square Root of [(1/(Pu 236 cpm * min)) + (1 / (Pu 238 or 239/240 cpm * min))] * 1.96 * 100     |           |                                                                 |            |
| JMV             |                                                                                                                          |           |                                                                 |            |
| Date Complete   |                                                                                                                          |           |                                                                 |            |
| 04/05/96        | Pu 239/240 µCi/mL                                                                                                        | 1.22E-01  | <b>DETECTION LEVELS in µCi/mL</b><br><b>Pu 239/240 8.12E-03</b> |            |
| Analysis Date   | Relative Counting Error =                                                                                                | 2.3%      |                                                                 |            |
| 04/03/96        |                                                                                                                          |           |                                                                 |            |
| Analysis Time   |                                                                                                                          |           |                                                                 |            |
| 02:00 PM        |                                                                                                                          |           |                                                                 |            |
| Sample Point    |                                                                                                                          |           |                                                                 |            |
| AY-101          | Pu 236 Tracer Recovery =                                                                                                 | 90.6%     |                                                                 |            |

|                       |     |       |           |
|-----------------------|-----|-------|-----------|
| Analyst:              | JMV | Date: | 05-Apr-96 |
| Signature of Chemist: | JFR | Date: | 5 Apr 96  |

STANDARD WB1 REV 1.0 943128ML

WORKBOOK PAGE: BLANK2

**Pu 238 and 239/240 : LA-943-128 (A-1)****LIQUID / SOLID**

|                 |                                                                                                                                              |            |                                       | BLNK        |
|-----------------|----------------------------------------------------------------------------------------------------------------------------------------------|------------|---------------------------------------|-------------|
| Type            | DATE COUNTED                                                                                                                                 | APR-04-96  | PU 236 AEA FRAC (C236)                | 0.948       |
| BLNK            | SAMPLE VOLUME in mL SS                                                                                                                       | 1.000      | PU 238 AEA FRAC (C238)                | 0.000       |
| Work List       | SAMPLE DILUTION FACTOR DF                                                                                                                    | 101.000    | PU 239 AEA FRAC (C239)                | 0.000       |
| 7168            | TRACER VOLUME in mL SPKV                                                                                                                     | 0.100      | TOTAL AT COUNTS                       | 2098        |
| Test Code       | DIGEST DILUTION FACTOR DDF                                                                                                                   | 1.0000     | AT COUNT TIME (MIN)                   | 30          |
| @PU23901        | TRACER BOOK NO                                                                                                                               | 120B43     | BACKGROUND in cpm (Bkg)               | 0.300       |
| Matrix          | DETECTOR NUMBER                                                                                                                              | 14         | PU 236 cpm                            | 26.220      |
| LIQUID          | EFFICIENCY FACTOR EFF                                                                                                                        | 0.2910     | PU 238 cpm                            | 0.000       |
| Batch Number    | TRACER PREPARATION DATE                                                                                                                      | 12/27/95   | PU 239 cpm                            | 0.000       |
| 96002886        | TRACER PREPARATION VALUE (dpm/mL)                                                                                                            | 2390.00    | AEA COUNT TIME                        | 480         |
| Rerun           | PU-236 DECAY CORR'D VALUE (dpm/mL)                                                                                                           | 2237.53    | Pu 239/240 $\mu\text{Ci/L}$ =         | < 3.221E-01 |
| 0               | PU-238 TRACER VALUE (dpm/mL)                                                                                                                 | 0.00       |                                       |             |
| Sample Prep     |                                                                                                                                              |            |                                       |             |
| N/A             |                                                                                                                                              |            |                                       |             |
| Sample #        | Decay Time = Date Counted - Tracer Preparation Date                                                                                          |            |                                       |             |
| WL#7168         | Pu-236 Decay Corr'd Value = Pu-236 Preparation Value * [e to the power of {(-ln2 * Decay Time/1040.95)}]                                     |            |                                       |             |
| Instrument Code | Pu 236 Tracer Recovery = (Total AT Counts / TC - Bkg) * C236 * 100 / (Pu-236 Decay Corr'd Value * SPKV * EFF)                                |            |                                       |             |
| WB27807         | Pu 239/240 $\mu\text{Ci/L}$ = (C239)(Pu 236 Decay Corr'd Value)(SPKV)(1000mL/L)(DF)(DDF) / [(C236)(SS)(D g/L)(2220000 dpm/ $\mu\text{Ci}$ )] |            |                                       |             |
| Prepared By     | Pu 238 dpm = [(Total AT Counts / TC) - Bkg * 1/EFF * C238] - (Pu-238 Tracer Value * SPKV * Pu 236 Tracer Recovery / 100)                     |            |                                       |             |
| SEH             | Pu 238 $\mu\text{Ci/L}$ = [(Pu 238 dpm)(DF)(DDF)(1000mL/L)] / [(Pu-236 Tracer Recovery / 100)(2220000 dpm/ $\mu\text{Ci}$ )(D g/L)(SS)]      |            |                                       |             |
| Chemist         | Relative Counting Error = Square Root of [(1/(Pu 236 cpm * min)) + (1 / (Pu 238 or 239/240 cpm * min))] * 1.96 * 100                         |            |                                       |             |
| JFR             |                                                                                                                                              |            |                                       |             |
| Analyst         |                                                                                                                                              |            |                                       |             |
| JMV             |                                                                                                                                              |            |                                       |             |
| Date Complete   |                                                                                                                                              |            |                                       |             |
| 04/05/96        | Pu 239/240 $\mu\text{Ci/mL}$                                                                                                                 | < 3.22E-04 | DETECTION LEVELS in $\mu\text{Ci/mL}$ |             |
| Analysis Date   | Relative Counting Error                                                                                                                      | = 100.0%   |                                       |             |
| 04/03/96        |                                                                                                                                              |            |                                       |             |
| Analysis Time   | NOTE: Pu 238 Result is a LESS THAN Value.                                                                                                    |            | Pu 239/240                            |             |
| 02:00 PM        | Pu 238 $\mu\text{Ci/mL}$                                                                                                                     | < 3.22E-04 | 3.22E-04                              |             |
| Sample Point    | Relative Counting Error                                                                                                                      | = 100.0%   | Pu 238                                |             |
| AY-101          | Pu 236 Tracer Recovery                                                                                                                       | = 101.4%   | 3.22E-04                              |             |

|                       |     |       |           |
|-----------------------|-----|-------|-----------|
| Analyst:              | JMV | Date: | 05-Apr-96 |
| Signature of Chemist: | JFR | Date: | 5 Apr 96  |

BLANK.WB1 REV 1.0

943128ML

1028

WORKBOOK PAGE: SAM3

Pu 238 and 239/240 : LA-943-128 (A-1)

LIQUID / SOLID

|              |                                    |      |           | SAMPLE                  |            |
|--------------|------------------------------------|------|-----------|-------------------------|------------|
| Type         | DATE COUNTED                       |      | APR-04-96 | PU 236 AEA FRAC (C236)  | 0.106      |
| SAMPLE       | SAMPLE VOLUME in mL                | SS   | 1.000     | PU 238 AEA FRAC (C238)  | 0.158      |
| Work List    | SAMPLE DILUTION FACTOR             | DF   | 101.000   | PU 239 AEA FRAC (C239)  | 0.655      |
| 7168         | TRACER VOLUME in mL                | SPKV | 0.100     | TOTAL AT COUNTS         | 15482      |
| Test Code    | DIGEST DILUTION FACTOR             | DDF  | 1.0000    | AT COUNT TIME (MIN)     | 30         |
| @PU23901     | TRACER BOOK NO                     |      | 120B43    | BACKGROUND in cpm (Bkg) | 0.300      |
| Matrix       | DETECTOR NUMBER                    |      | 14        | PU 236 cpm              | 27.110     |
| LIQUID       | EFFICIENCY FACTOR                  | EFF  | 0.291     | PU 238 cpm              | 40.530     |
| Batch Number | TRACER PREPARATION DATE            |      | 12/27/95  | PU 239 cpm              | 168.180    |
| 96002886     | TRACER PREPARATION VALUE (dpm/mL)  |      | 2390.000  | AEA COUNT TIME          | 480        |
| Rerun        | PU-236 DECAY CORR'D VALUE (dpm/mL) |      | 2237.527  | Pu 239/240 µCi/L        | 6.2903E+01 |
| 0            | PU-238 TRACER VALUE (dpm/mL)       |      | 0.000     |                         |            |

Sample Prep

N/A

Sample #

S96T001521

Instrument Code

WB27807

Prepared By

SEH

Chemist

JFR

Analyst

JMV

Date Complete

04/05/96

Analysis Date

04/03/96

Analysis Time

02:00 PM

Sample Point

AY-101

Decay Time = Date Counted - Tracer Preparation Date

Pu-236 Decay Corr'd Value = Pu-236 Preparation Value \* [e to the power of {(-ln2 \* Decay Time/1040.95)}]

Pu 236 Tracer Recovery = (Total AT Counts / TC - Bkg) \* C236 \* 100 / (Pu-236 Decay Corr'd Value \* SPKV \* EFF)

Pu 239/240 µCi/L = (C239)(Pu 236 Decay Corr'd Value)(SPKV)(1000mL/L)(DF)(DDF) / [(C236)(SS)(D g/L)(2220000 dpm/µCi)]

Pu 238 dpm = [(Total AT Counts / TC) - Bkg \* 1/EFF \* C238] - (Pu-238 Tracer Value \* SPKV \* Pu 236 Tracer Recovery / 100)

Pu 238 µCi/L = [(Pu 238 dpm)(DF)(DDF)(1000mL/L)] / [(Pu-236 Tracer Recovery / 100)(2220000 dpm/µCi)(D g/L)(SS)]

Relative Counting Error = Square Root of [(1/(Pu 236 cpm \* min)) + (1 / (Pu 238 or 239/240 cpm \* min))] \* 1.96 \* 100

|               |                         |          |                                  |
|---------------|-------------------------|----------|----------------------------------|
| 04/05/96      | Pu 239/240 µCi/mL       | 6.29E-02 | DETECTION<br>LEVELS<br>in µCi/mL |
| Analysis Date | Relative Counting Error | = 1.9%   |                                  |
| 04/03/96      |                         |          | Pu 239/240                       |
| Analysis Time |                         |          | 3.43E-03                         |
| 02:00 PM      | Pu 238 µCi/mL           | 1.52E-02 | Pu 238                           |
| Sample Point  | Relative Counting Error | = 2.2%   | 3.43E-03                         |
| AY-101        | Pu 236 Tracer Recovery  | = 84.0%  |                                  |

|                       |     |       |           |
|-----------------------|-----|-------|-----------|
| Analyst:              | JMV | Date: | 05-Apr-96 |
| Signature of Chemist: | JFR | Date: | 5 Apr 96  |

SAMPLE.WB1 REV 1.0

943128ML

WORKBOOK PAGE: DUP4

Pu 238 and 239/240 : LA-943-128 (A-1)

LIQUID / SOLID

|              |                                    |            |                         | DUP        |
|--------------|------------------------------------|------------|-------------------------|------------|
| Type         | DATE COUNTED                       | APR-04-96  | PU 236 AEA FRAC (C236)  | 0.110      |
| DUP          | SAMPLE VOLUME in mL                | SS 1.000   | PU 238 AEA FRAC (C238)  | 0.179      |
| Work List    | SAMPLE DILUTION FACTOR             | DF 101.000 | PU 239 AEA FRAC (C239)  | 0.641      |
| 7168         | TRACER VOLUME in mL                | SPKV 0.100 | TOTAL AT COUNTS         | 15830      |
| Test Code    | DIGEST DILUTION FACTOR             | DDF 1.0000 | AT COUNT TIME (MIN)     | 30         |
| @PU23901     | TRACER BOOK NO                     | 120B43     | BACKGROUND in cpm (Bkg) | 0.300      |
| Matrix       | DETECTOR NUMBER                    | 14         | PU 236 cpm              | 29.230     |
| LIQUID       | EFFICIENCY FACTOR                  | EFF 0.291  | PU 238 cpm              | 47.500     |
| Batch Number | TRACER PREPARATION DATE            | 12/27/95   | PU 239 cpm              | 169.740    |
| 96002886     | TRACER PREPARATION VALUE (dpm/mL)  | 2390.000   | AEA COUNT TIME          | 480        |
| Re-run       | PU-236 DECAY CORR'D VALUE (dpm/mL) | 2237.527   | Pu 239/240 µCi/L        | 5.9320E+01 |
| 0            | PU-238 TRACER VALUE (dpm/mL)       | 0.000      |                         |            |

Sample Prep  
N/A

|                 |                                                                                                                          |
|-----------------|--------------------------------------------------------------------------------------------------------------------------|
| Sample #        | Decay Time = Date Counted - Tracer Preparation Date                                                                      |
| S96T001521      | Pu-236 Decay Corr'd Value = Pu-236 Preparation Value * [e to the power of {(-ln2 * Decay Time/1040.95)}]                 |
| Instrument Code | Pu 236 Tracer Recovery = (Total AT Counts / TC - Bkg) * C236 * 100 / (Pu-236 Decay Corr'd Value * SPKV * EFF)            |
| WB27807         | Pu 239/240 µCi/L = (C239)(Pu 236 Decay Corr'd Value)(SPKV)(1000mL/L)(DF)(DDF) / [(C236)(SS)(D g/L)(2220000 dpm/µCi)]     |
| Prepared By     | Pu 238 dpm = [(Total AT Counts / TC) - Bkg * 1/EFF * C238] - (Pu-238 Tracer Value * SPKV * Pu 236 Tracer Recovery / 100) |
| SEH             | Pu 238 µCi/L = [(Pu 238 dpm)(DF)(DDF)(1000mL/L)] / [(Pu-236 Tracer Recovery / 100)(2220000 dpm/µCi)(D g/L)(SS)]          |
| Chemist         | Relative Counting Error = Square Root of [(1/(Pu 236 cpm * min)) + (1 / (Pu 238 or 239/240 cpm * min))] * 1.96 * 100     |
| JFR             |                                                                                                                          |
| Analyst         |                                                                                                                          |
| JMV             |                                                                                                                          |

|               |                         |          |                                  |
|---------------|-------------------------|----------|----------------------------------|
| Date Complete | Pu 239/240 µCi/mL       | 5.93E-02 | DETECTION<br>LEVELS<br>in µCi/mL |
| 04/05/96      | Relative Counting Error | = 1.8%   |                                  |
| Analysis Date |                         |          |                                  |
| 04/03/96      |                         |          |                                  |
| Analysis Time |                         |          | Pu 239/240                       |
| 02:00 PM      | Pu 238 µCi/mL           | 1.66E-02 | 3.12E-03                         |
| Sample Point  | Relative Counting Error | = 2.1%   | Pu 238                           |
| AY-101        | Pu 236 Tracer Recovery  | = 89.1%  | 3.12E-03                         |

|                       |     |       |           |
|-----------------------|-----|-------|-----------|
| Analyst:              | JMV | Date: | 05-Apr-96 |
| Signature of Chemist: | JFR | Date: | 5 Apr 96  |

SAMPLE.WB1 REV 1.0

943128ML

1030

WORKBOOK PAGE: SAM5

Pu 238 and 239/240 : LA-943-128 (A-1)

LIQUID / SOLID

|              |                                    |            |                         | SAMPLE     |
|--------------|------------------------------------|------------|-------------------------|------------|
| Type         | DATE COUNTED                       | APR-04-96  | PU 236 AEA FRAC (C236)  | 0.113      |
| SAMPLE       | SAMPLE VOLUME in mL                | SS 1.000   | PU 238 AEA FRAC (C238)  | 0.159      |
| Work List    | SAMPLE DILUTION FACTOR             | DF 101.000 | PU 239 AEA FRAC (C239)  | 0.660      |
| 7168         | TRACER VOLUME in mL                | SPKV 0.100 | TOTAL AT COUNTS         | 15677      |
| Test Code    | DIGEST DILUTION FACTOR             | DDF 1.0000 | AT COUNT TIME (MIN)     | 30         |
| @PU23901     | TRACER BOOK NO                     | 120B43     | BACKGROUND in cpm (Bkg) | 0.300      |
| Matrix       | DETECTOR NUMBER                    | 14         | PU 236 cpm              | 36.320     |
| LIQUID       | EFFICIENCY FACTOR                  | EFF 0.291  | PU 238 cpm              | 51.050     |
| Batch Number | TRACER PREPARATION DATE            | 12/27/95   | PU 239 cpm              | 211.710    |
| 96002886     | TRACER PREPARATION VALUE (dpm/mL)  | 2390.000   | AEA COUNT TIME          | 480        |
| Result       | PU-236 DECAY CORR'D VALUE (dpm/mL) | 2237.527   | Pu 239/240 µCi/L        | 5.9457E+01 |
| 0            | PU-238 TRACER VALUE (dpm/mL)       | 0.000      |                         |            |

|                 |                                                                                                                          |          |                            |  |
|-----------------|--------------------------------------------------------------------------------------------------------------------------|----------|----------------------------|--|
| Sample Prep     |                                                                                                                          |          |                            |  |
| N/A             |                                                                                                                          |          |                            |  |
| Sample #        | Decay Time = Date Counted - Tracer Preparation Date                                                                      |          |                            |  |
| S96T001522      | Pu-236 Decay Corr'd Value = Pu-236 Preparation Value * [e to the power of {(-ln2 * Decay Time/1040.95)}]                 |          |                            |  |
| Instrument Code | Pu 236 Tracer Recovery = (Total AT Counts / TC - Bkg) * C236 * 100 / (Pu-236 Decay Corr'd Value * SPKV * EFF)            |          |                            |  |
| WB27807         | Pu 239/240 µCi/L = (C239)(Pu 236 Decay Corr'd Value)(SPKV)(1000mL/L)(DF)(DDF) / [(C236)(SS)(D g/L)(2220000 dpm/µCi)]     |          |                            |  |
| Prepared By     | Pu 238 dpm = [(Total AT Counts / TC) - Bkg * 1/EFF * C238] - (Pu-238 Tracer Value * SPKV * Pu 236 Tracer Recovery / 100) |          |                            |  |
| SEH             | Pu 238 µCi/L = [(Pu 238 dpm)(DF)(DDF)(1000mL/L)] / [(Pu-236 Tracer Recovery / 100)(2220000 dpm/µCi)(D g/L)(SS)]          |          |                            |  |
| Chemist         | Relative Counting Error = Square Root of [(1/(Pu 236 cpm * min)) + (1 / (Pu 238 or 239/240 cpm * min))] * 1.96 * 100     |          |                            |  |
| JFR             |                                                                                                                          |          |                            |  |
| Analyst         |                                                                                                                          |          |                            |  |
| JMV             |                                                                                                                          |          |                            |  |
| Date Complete   |                                                                                                                          |          |                            |  |
| 04/05/96        | Pu 239/240 µCi/mL                                                                                                        | 5.95E-02 | DETECTION LEVELS in µCi/mL |  |
| Analysis Date   | Relative Counting Error                                                                                                  | = 1.6%   |                            |  |
| 04/03/96        |                                                                                                                          |          | Pu 239/240                 |  |
| Analysis Time   | Pu 238 µCi/mL                                                                                                            | 1.43E-02 | 2.98E-03                   |  |
| 02:00 PM        | Relative Counting Error                                                                                                  | = 1.9%   | Pu 238                     |  |
| Sample Point    | Pu 236 Tracer Recovery                                                                                                   | = 90.6%  | 2.98E-03                   |  |
| AY-101          |                                                                                                                          |          |                            |  |

|                       |                    |       |                |
|-----------------------|--------------------|-------|----------------|
| Analyst:              | JMV                | Date: | 05-Apr-96      |
| Signature of Chemist: | <i>John Relyea</i> | JFR   | Date: 5 Apr 96 |

SAMPLE.WB1 REV 1.0

943128ML

1031



WORKBOOK PAGE: DUP6

Pu 238 and 239/240 : LA-943-128 (A-1)

LIQUID / SOLID

|              |                                    |           |                                | DUP        |
|--------------|------------------------------------|-----------|--------------------------------|------------|
| Type         | DATE COUNTED                       | APR-04-96 | PU 236 AEA FRAC (C236)         | 0.111      |
| DUP          | SAMPLE VOLUME in mL                | SS        | 1.000 PU 238 AEA FRAC (C238)   | 0.174      |
| Work List    | SAMPLE DILUTION FACTOR             | DF        | 101.000 PU 239 AEA FRAC (C239) | 0.652      |
| 7168         | TRACER VOLUME in mL                | SPKV      | 0.100 TOTAL AT COUNTS          | 15570      |
| Test Code    | DIGEST DILUTION FACTOR             | DDF       | 1.0000 AT COUNT TIME (MIN)     | 30         |
| @PU23901     | TRACER BOOK NO                     | 120B43    | BACKGROUND in cpm (Bkg)        | 0.300      |
| Matrix       | DETECTOR NUMBER                    | 14        | PU 236 cpm                     | 37.350     |
| LIQUID       | EFFICIENCY FACTOR                  | EFF       | 0.291 PU 238 cpm               | 58.340     |
| Batch Number | TRACER PREPARATION DATE            | 12/27/95  | PU 239 cpm                     | 218.560    |
| 96002886     | TRACER PREPARATION VALUE (dpm/mL)  | 2390.000  | AEA COUNT TIME                 | 480        |
| Re-run       | PU-236 DECAY CORR'D VALUE (dpm/mL) | 2237.527  | Pu 239/240 $\mu$ Ci/L          | 5.9795E+01 |
| 0            | PU-238 TRACER VALUE (dpm/mL)       | 0.000     |                                |            |

Sample Prep

N/A

Sample #

S96T001522

Instrument Code

WB27807

Prepared By

SEH

Chemist

JFR

Analyst

JMV

Date Complete

04/05/96

Analysis Date

04/03/96

Analysis Time

02:00 PM

Sample Point

AY-101

Decay Time = Date Counted - Tracer Preparation Date

Pu-236 Decay Corr'd Value = Pu-236 Preparation Value \* [e to the power of  $\{-\ln 2 * \text{Decay Time}/1040.95\}$ ]

Pu 236 Tracer Recovery = (Total AT Counts / TC - Bkg) \* C236 \* 100 / (Pu-236 Decay Corr'd Value \* SPKV \* EFF)

Pu 239/240  $\mu$ Ci/L = (C239)(Pu 236 Decay Corr'd Value)(SPKV)(1000mL/L)(DF)(DDF) / [(C236)(SS)(D g/L)(2220000 dpm/ $\mu$ Ci)]

Pu 238 dpm = [(Total AT Counts / TC) - Bkg \* 1/EFF \* C238] - (Pu-238 Tracer Value \* SPKV \* Pu 236 Tracer Recovery / 100)

Pu 238  $\mu$ Ci/L = [(Pu 238 dpm)(DF)(DDF)(1000mL/L)] / [(Pu-236 Tracer Recovery / 100)(2220000 dpm/ $\mu$ Ci)(D g/L)(SS)]

Relative Counting Error = Square Root of  $\{[1 / (\text{Pu 236 cpm} * \text{min})] + [1 / (\text{Pu 238 or 239/240 cpm} * \text{min})]\} * 1.96 * 100$

|               |                         |          |                                                                                               |
|---------------|-------------------------|----------|-----------------------------------------------------------------------------------------------|
| 04/05/96      | Pu 239/240 $\mu$ Ci/mL  | 5.98E-02 | DETECTION<br>LEVELS<br>in $\mu$ Ci/mL<br><br>Pu 239/240<br>3.11E-03<br><br>Pu 238<br>3.11E-03 |
| Analysis Date | Relative Counting Error | = 1.6%   |                                                                                               |
| 04/03/96      |                         |          |                                                                                               |
| Analysis Time |                         |          |                                                                                               |
| 02:00 PM      | Pu 238 $\mu$ Ci/mL      | 1.60E-02 |                                                                                               |
| Sample Point  | Relative Counting Error | = 1.9%   |                                                                                               |
| AY-101        | Pu 236 Tracer Recovery  | = 88.4%  |                                                                                               |

|                       |                    |       |           |
|-----------------------|--------------------|-------|-----------|
| Analyst:              | JMV                | Date: | 05-Apr-96 |
| Signature of Chemist: | <i>John Relyea</i> | Date: | 5 Apr 96  |
| SAMPLE.WB1 REV 1.0    | 943128ML           |       |           |

*Raymond*  
4/4/96

Westinghouse Hanford Co.

GENERAL ALPHA ENERGY ANALYSIS  
Rev. 2.01

## DATA REDUCTION REPORT

SAMPLE  
WL7168-STD  
File ID: 13a1311.CNFCounted on: 4/ 4/96 @ 4:29  
Detector: AEA13  
Geometry number: 1  
Count time: 28800. Sec

## PEAK ANALYSIS

| Peak ID | Peak height |        | Peak center |         | FWHM    |       | Tau     |       |
|---------|-------------|--------|-------------|---------|---------|-------|---------|-------|
|         | Initial     | Final  | Initial     | Final   | Initial | Final | Initial | Final |
| 1       | 1105.9      | 1105.9 | 362.061     | 362.061 | 10.000  | 2.688 | 5.000   | 1.330 |
| 2       | 85.4        | 85.4   | 301.313     | 301.307 | 12.000  | 3.980 | 6.000   | 1.957 |
| 3       | 35.5        | 35.5   | 270.763     | 270.682 | 16.000  | 9.401 | 8.000   | 8.199 |
| 4       | 1518.6      | 1518.6 | 228.166     | 228.166 | 10.000  | 3.199 | 5.000   | 2.335 |
| 5?      | 16.8        | 16.8   | 26.488      | 26.488  | 12.000  | 4.694 | 6.000   | 1.800 |

## PEAK RESULTS

Peak Error Limit: 30%

| Peak ID | Isotope | AEA Frac | Peak Centroid          |            | FWHM | Count Rate c/m | %err @95 | d/m    | Activity uCi/ea |
|---------|---------|----------|------------------------|------------|------|----------------|----------|--------|-----------------|
|         |         |          | Exp.                   | Obs. Diff. |      |                |          |        |                 |
| 1       |         | 0.415    |                        | *****      | 1.66 | 27.39          | 1.7      | 1942.8 | 0.875E-03       |
| 2       |         | 0.035    |                        | 62.933     | 2.46 | 2.33           | 5.9      | 165.2  | 0.744E-04       |
| 3       |         | 0.017    |                        | 43.992     | 5.81 | 1.11           | 9.6      | 78.7   | 0.354E-04       |
| 4       |         | 0.497    |                        | 17.695     | 1.98 | 32.76          | 1.6      | 2323.3 | 0.105E-02       |
| 5       |         | ????     |                        | *****      |      | 0.51           | 12.5     |        |                 |
| Totals: |         | 0.964    | <--valid peaks only--> |            |      | 63.59          |          |        |                 |

## DETECTOR CALIBRATION

Energy(MEV) = \*\*\*\*\* + (0.6185)\*Channel

Energy range (MeV): \*\*\*\*\* TO \*\*\*\*\*

Efficiency = 0.0141 CPM/DPM

## TOTAL COUNT DATA:

| Item          | Total   | % Recovery |
|---------------|---------|------------|
| Raw spectrum  | 31656.0 | 100.000    |
| Smoothed      | 31656.2 | 100.001    |
| Composite fit | 30770.0 | 97.201     |
| Residuals     | 886.0   | 2.799      |

Analyzed by:

ALJ

1 Legend: Raw = .... Modeled Peaks = 1,2,..., etc

Display Max.:

9576.4

WHC-SD-WM-DP-178 REV. 1

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| Raw Data Dump for AEA Spectrum: 13a1311.CNF |       |       |       |       |       |       | WHC-SD-WM-DP-178, REV. I |       |       |       |
|---------------------------------------------|-------|-------|-------|-------|-------|-------|--------------------------|-------|-------|-------|
| 1                                           | 0.    | 0.    | 0.    | 0.    | 1.    | 0.    | 1.                       | 0.    | 6.    | 4.    |
| 11                                          | 5.    | 4.    | 13.   | 2.    | 7.    | 9.    | 5.                       | 4.    | 4.    | 4.    |
| 21                                          | 22.   | 11.   | 12.   | 13.   | 18.   | 16.   | 22.                      | 17.   | 11.   | 12.   |
| 31                                          | 7.    | 3.    | 3.    | 2.    | 0.    | 0.    | 0.                       | 0.    | 0.    | 1.    |
| 41                                          | 0.    | 0.    | 0.    | 0.    | 0.    | 0.    | 0.                       | 0.    | 0.    | 1.    |
| 51                                          | 1.    | 1.    | 1.    | 2.    | 1.    | 1.    | 0.                       | 0.    | 0.    | 0.    |
| 61                                          | 0.    | 1.    | 1.    | 0.    | 0.    | 0.    | 2.                       | 2.    | 1.    | 2.    |
| 71                                          | 3.    | 1.    | 1.    | 2.    | 2.    | 1.    | 1.                       | 0.    | 0.    | 0.    |
| 81                                          | 1.    | 1.    | 1.    | 0.    | 0.    | 1.    | 0.                       | 1.    | 0.    | 1.    |
| 91                                          | 2.    | 0.    | 1.    | 1.    | 0.    | 0.    | 1.                       | 1.    | 0.    | 1.    |
| 101                                         | 1.    | 1.    | 2.    | 0.    | 1.    | 0.    | 2.                       | 1.    | 0.    | 0.    |
| 111                                         | 0.    | 1.    | 0.    | 0.    | 1.    | 2.    | 0.                       | 0.    | 1.    | 0.    |
| 121                                         | 0.    | 1.    | 0.    | 2.    | 2.    | 1.    | 2.                       | 2.    | 0.    | 0.    |
| 131                                         | 0.    | 1.    | 1.    | 2.    | 2.    | 0.    | 0.                       | 2.    | 1.    | 0.    |
| 141                                         | 0.    | 1.    | 1.    | 0.    | 0.    | 3.    | 0.                       | 1.    | 1.    | 2.    |
| 151                                         | 3.    | 1.    | 2.    | 1.    | 0.    | 0.    | 1.                       | 1.    | 0.    | 3.    |
| 161                                         | 1.    | 1.    | 2.    | 2.    | 2.    | 2.    | 1.                       | 2.    | 2.    | 1.    |
| 171                                         | 4.    | 2.    | 1.    | 0.    | 1.    | 0.    | 1.                       | 3.    | 3.    | 4.    |
| 181                                         | 2.    | 4.    | 4.    | 6.    | 3.    | 5.    | 6.                       | 7.    | 4.    | 11.   |
| 191                                         | 4.    | 12.   | 6.    | 13.   | 9.    | 14.   | 15.                      | 20.   | 18.   | 20.   |
| 201                                         | 19.   | 24.   | 25.   | 21.   | 32.   | 31.   | 28.                      | 47.   | 59.   | 62.   |
| 211                                         | 68.   | 94.   | 130.  | 135.  | 194.  | 270.  | 327.                     | 359.  | 369.  | 381.  |
| 221                                         | 394.  | 514.  | 592.  | 783.  | 1070. | 1375. | 1667.                    | 1915. | 1868. | 1427. |
| 231                                         | 889.  | 461.  | 243.  | 124.  | 68.   | 30.   | 33.                      | 12.   | 25.   | 18.   |
| 241                                         | 13.   | 13.   | 10.   | 6.    | 7.    | 12.   | 6.                       | 6.    | 2.    | 9.    |
| 251                                         | 5.    | 2.    | 3.    | 4.    | 5.    | 1.    | 6.                       | 3.    | 2.    | 3.    |
| 261                                         | 1.    | 3.    | 4.    | 6.    | 34.   | 28.   | 27.                      | 26.   | 40.   | 38.   |
| 271                                         | 44.   | 46.   | 29.   | 16.   | 19.   | 19.   | 30.                      | 18.   | 12.   | 29.   |
| 281                                         | 19.   | 22.   | 23.   | 23.   | 23.   | 25.   | 24.                      | 24.   | 20.   | 22.   |
| 291                                         | 28.   | 28.   | 24.   | 30.   | 45.   | 30.   | 40.                      | 58.   | 59.   | 89.   |
| 301                                         | 128.  | 83.   | 79.   | 64.   | 35.   | 26.   | 19.                      | 11.   | 5.    | 10.   |
| 311                                         | 10.   | 6.    | 8.    | 6.    | 5.    | 6.    | 5.                       | 4.    | 3.    | 3.    |
| 321                                         | 6.    | 6.    | 5.    | 6.    | 5.    | 7.    | 11.                      | 4.    | 9.    | 19.   |
| 331                                         | 15.   | 13.   | 14.   | 15.   | 12.   | 18.   | 15.                      | 30.   | 30.   | 35.   |
| 341                                         | 38.   | 32.   | 69.   | 78.   | 84.   | 116.  | 128.                     | 160.  | 274.  | 385.  |
| 351                                         | 460.  | 528.  | 605.  | 505.  | 405.  | 375.  | 420.                     | 558.  | 684.  | 892.  |
| 361                                         | 1264. | 1411. | 1374. | 1009. | 494.  | 201.  | 81.                      | 40.   | 33.   | 16.   |
| 371                                         | 17.   | 20.   | 4.    | 7.    | 10.   | 4.    | 9.                       | 1.    | 7.    | 1.    |
| 381                                         | 2.    | 4.    | 6.    | 1.    | 4.    | 3.    | 3.                       | 4.    | 2.    | 2.    |
| 391                                         | 0.    | 1.    | 2.    | 0.    | 2.    | 1.    | 0.                       | 1.    | 1.    | 2.    |
| 401                                         | 1.    | 0.    | 0.    | 1.    | 2.    | 0.    | 2.                       | 0.    | 0.    | 0.    |
| 411                                         | 1.    | 0.    | 1.    | 0.    | 0.    | 0.    | 0.                       | 0.    | 0.    | 0.    |
| 421                                         | 1.    | 1.    | 0.    | 2.    | 0.    | 1.    | 1.                       | 0.    | 0.    | 1.    |
| 431                                         | 1.    | 0.    | 2.    | 0.    | 0.    | 0.    | 0.                       | 1.    | 0.    | 0.    |
| 441                                         | 1.    | 1.    | 1.    | 0.    | 0.    | 0.    | 0.                       | 0.    | 0.    | 0.    |
| 451                                         | 0.    | 0.    | 0.    | 0.    | 0.    | 0.    | 0.                       | 0.    | 0.    | 0.    |
| 461                                         | 0.    | 0.    | 0.    | 0.    | 0.    | 0.    | 2.                       | 1.    | 0.    | 1.    |
| 471                                         | 0.    | 1.    | 2.    | 0.    | 1.    | 2.    | 1.                       | 1.    | 1.    | 2.    |
| 481                                         | 0.    | 0.    | 1.    | 1.    | 0.    | 1.    | 0.                       | 0.    | 1.    | 0.    |
| 491                                         | 0.    | 0.    | 0.    | 0.    | 0.    | 1.    | 0.                       | 0.    | 1.    | 0.    |
| 511                                         | 0.    | 0.    |       |       |       |       |                          |       |       |       |

Westinghouse Hanford Co.

GENERAL ALPHA ENERGY ANALYSIS  
Rev. 2.01

## DATA REDUCTION REPORT

SAMPLE  
WL7168-BLK  
File ID: 14a1415.CNFCounted on: 4/ 4/96 @ 4:29  
Detector: AEA14  
Geometry number: 1  
Count time: 28804. Sec

## PEAK ANALYSIS

| Peak ID | Peak height |        | Peak center |         | FWHM    |       | Tau     |        |
|---------|-------------|--------|-------------|---------|---------|-------|---------|--------|
|         | Initial     | Final  | Initial     | Final   | Initial | Final | Initial | Final  |
| 1       | 1046.3      | 1046.3 | 364.378     | 364.378 | 8.000   | 2.706 | 4.000   | 1.314  |
| 2       | 12.9        | 12.9   | 288.358     | 288.351 | 12.000  | 7.288 | 6.000   | 1.132  |
| 3?      | 10.7        | 10.7   | 269.534     | 269.241 | 12.000  | 3.368 | 6.000   | 13.148 |

## PEAK RESULTS

Peak Error Limit: 30%

| Peak ID | Isotope | AEA Frac | Exp.                   | Peak Centroid Obs. | Diff. | FWHM | Count Rate | %err c/m @95 | d/m    | Activity uCi/ea |
|---------|---------|----------|------------------------|--------------------|-------|------|------------|--------------|--------|-----------------|
| 1       | Pu236   | 0.948    | 5.755                  | 5.737              | 0.018 | 0.01 | 26.22      | 1.7          | 4386.7 | 0.198E-02       |
| 2       | Th228   | 0.029    | 5.400                  | 5.395              | 0.005 | 0.03 | 0.82       | 9.9          | 188.3  | 0.848E-04       |
| 3       |         | ????     |                        | 5.309              |       |      | 0.20       | 37.1         |        |                 |
| Totals: |         | 0.978    | <--valid peaks only--> |                    |       |      | 27.04      |              |        |                 |

## DETECTOR CALIBRATION

Energy(MEV) = 4.097 + (0.0045)\*Channel  
Energy range (MeV): 4.097 TO 6.401  
Efficiency = 0.0061 CPM/DPM

## TOTAL COUNT DATA:

| Item          | Total   | % Recovery |
|---------------|---------|------------|
| Raw spectrum  | 13277.0 | 100.000    |
| Smoothed      | 13277.0 | 100.000    |
| Composite fit | 13074.3 | 98.473     |
| Residuals     | 202.7   | 1.527      |

Analyzed by:

ALJ

1 Legend: Raw = ..... Modeled Peaks = 1,2,..., etc

Display Max.:

6448.2

WHC-SD-WM-DP-178, REV. 1

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Raw Data Dump for AEA Spectrum: 14a1415.CNF

WHC-SD-WM-DP-178, REV.

|     |      |      |       |       |       |       |      |      |      |      |
|-----|------|------|-------|-------|-------|-------|------|------|------|------|
| 1   | 0.   | 0.   | 2.    | 0.    | 0.    | 1.    | 0.   | 0.   | 0.   | 2.   |
| 11  | 5.   | 3.   | 3.    | 4.    | 4.    | 1.    | 2.   | 2.   | 2.   | 1.   |
| 21  | 8.   | 5.   | 4.    | 8.    | 5.    | 6.    | 6.   | 6.   | 4.   | 3.   |
| 31  | 4.   | 1.   | 1.    | 0.    | 0.    | 1.    | 0.   | 0.   | 0.   | 0.   |
| 41  | 0.   | 0.   | 0.    | 0.    | 1.    | 0.    | 0.   | 0.   | 0.   | 0.   |
| 51  | 0.   | 0.   | 0.    | 0.    | 1.    | 0.    | 0.   | 0.   | 0.   | 0.   |
| 61  | 0.   | 1.   | 0.    | 1.    | 0.    | 0.    | 1.   | 0.   | 0.   | 0.   |
| 71  | 1.   | 3.   | 0.    | 1.    | 4.    | 1.    | 0.   | 1.   | 1.   | 0.   |
| 81  | 0.   | 0.   | 0.    | 0.    | 0.    | 0.    | 1.   | 0.   | 0.   | 0.   |
| 91  | 0.   | 0.   | 2.    | 0.    | 1.    | 0.    | 0.   | 1.   | 0.   | 1.   |
| 101 | 0.   | 0.   | 0.    | 1.    | 1.    | 1.    | 0.   | 0.   | 0.   | 0.   |
| 111 | 1.   | 0.   | 0.    | 0.    | 0.    | 0.    | 1.   | 0.   | 0.   | 0.   |
| 121 | 0.   | 0.   | 0.    | 0.    | 1.    | 0.    | 1.   | 0.   | 0.   | 0.   |
| 131 | 1.   | 0.   | 0.    | 0.    | 0.    | 0.    | 0.   | 1.   | 0.   | 0.   |
| 141 | 0.   | 0.   | 1.    | 0.    | 1.    | 1.    | 0.   | 1.   | 0.   | 0.   |
| 151 | 0.   | 0.   | 0.    | 0.    | 0.    | 0.    | 1.   | 0.   | 0.   | 0.   |
| 161 | 0.   | 0.   | 1.    | 0.    | 0.    | 1.    | 0.   | 0.   | 0.   | 0.   |
| 171 | 0.   | 1.   | 0.    | 0.    | 0.    | 1.    | 0.   | 0.   | 2.   | 0.   |
| 181 | 2.   | 0.   | 1.    | 0.    | 0.    | 0.    | 1.   | 1.   | 0.   | 0.   |
| 191 | 0.   | 1.   | 0.    | 0.    | 0.    | 1.    | 0.   | 0.   | 0.   | 1.   |
| 201 | 0.   | 0.   | 0.    | 0.    | 0.    | 1.    | 0.   | 2.   | 0.   | 4.   |
| 211 | 1.   | 0.   | 0.    | 2.    | 0.    | 0.    | 3.   | 1.   | 2.   | 4.   |
| 221 | 0.   | 2.   | 1.    | 1.    | 3.    | 0.    | 1.   | 6.   | 3.   | 5.   |
| 231 | 0.   | 2.   | 3.    | 2.    | 2.    | 0.    | 1.   | 1.   | 0.   | 0.   |
| 241 | 0.   | 2.   | 0.    | 2.    | 0.    | 3.    | 1.   | 1.   | 0.   | 2.   |
| 251 | 0.   | 1.   | 0.    | 2.    | 1.    | 1.    | 3.   | 0.   | 0.   | 1.   |
| 261 | 2.   | 0.   | 2.    | 2.    | 13.   | 17.   | 16.  | 21.  | 19.  | 18.  |
| 271 | 19.  | 12.  | 14.   | 10.   | 12.   | 8.    | 12.  | 12.  | 6.   | 11.  |
| 281 | 5.   | 10.  | 9.    | 14.   | 8.    | 10.   | 11.  | 15.  | 16.  | 14.  |
| 291 | 7.   | 9.   | 2.    | 2.    | 5.    | 2.    | 3.   | 5.   | 2.   | 4.   |
| 301 | 4.   | 3.   | 7.    | 3.    | 9.    | 7.    | 2.   | 7.   | 2.   | 0.   |
| 311 | 1.   | 3.   | 2.    | 2.    | 2.    | 5.    | 3.   | 2.   | 1.   | 3.   |
| 321 | 4.   | 5.   | 8.    | 4.    | 10.   | 8.    | 9.   | 3.   | 9.   | 11.  |
| 331 | 12.  | 10.  | 10.   | 15.   | 16.   | 15.   | 17.  | 11.  | 22.  | 32.  |
| 341 | 34.  | 41.  | 42.   | 49.   | 46.   | 65.   | 87.  | 115. | 137. | 181. |
| 351 | 211. | 303. | 393.  | 503.  | 531.  | 472.  | 438. | 384. | 369. | 450. |
| 361 | 622. | 768. | 1094. | 1291. | 1409. | 1083. | 622. | 227. | 98.  | 64.  |
| 371 | 41.  | 23.  | 21.   | 18.   | 9.    | 5.    | 9.   | 6.   | 7.   | 9.   |
| 381 | 3.   | 3.   | 4.    | 5.    | 8.    | 2.    | 1.   | 2.   | 0.   | 3.   |
| 391 | 4.   | 1.   | 1.    | 0.    | 1.    | 1.    | 4.   | 0.   | 3.   | 0.   |
| 401 | 2.   | 0.   | 2.    | 1.    | 0.    | 3.    | 1.   | 1.   | 3.   | 2.   |
| 411 | 1.   | 0.   | 0.    | 1.    | 0.    | 2.    | 2.   | 0.   | 1.   | 0.   |
| 421 | 0.   | 1.   | 0.    | 1.    | 0.    | 0.    | 2.   | 0.   | 0.   | 0.   |
| 431 | 0.   | 1.   | 1.    | 1.    | 1.    | 1.    | 0.   | 1.   | 0.   | 0.   |
| 441 | 0.   | 1.   | 3.    | 0.    | 0.    | 0.    | 0.   | 0.   | 1.   | 0.   |
| 451 | 0.   | 1.   | 0.    | 0.    | 0.    | 0.    | 0.   | 0.   | 1.   | 0.   |
| 461 | 0.   | 0.   | 0.    | 0.    | 0.    | 0.    | 0.   | 0.   | 1.   | 0.   |
| 471 | 0.   | 0.   | 2.    | 0.    | 2.    | 0.    | 0.   | 2.   | 3.   | 3.   |
| 481 | 0.   | 1.   | 0.    | 0.    | 0.    | 0.    | 0.   | 0.   | 0.   | 0.   |
| 491 | 0.   | 1.   | 0.    | 0.    | 0.    | 1.    | 1.   | 0.   | 0.   | 0.   |
| 511 | 0.   | 0.   |       |       |       |       |      |      |      |      |

Westinghouse Hanford Co.

GENERAL ALPHA ENERGY ANALYSIS  
Rev. 2.01

## DATA REDUCTION REPORT

SAMPLE  
S96T001521-SAM  
File ID: 15a1594.CNFCounted on: 4/ 4/96 @ 4:34  
Detector: AEA15  
Geometry number: 1  
Count time: 28802. Sec

## PEAK ANALYSIS

| Peak<br>ID | Peak height |        | Peak center |         | FWHM    |       | Tau     |       |
|------------|-------------|--------|-------------|---------|---------|-------|---------|-------|
|            | Initial     | Final  | Initial     | Final   | Initial | Final | Initial | Final |
| 1          | 698.6       | 698.6  | 364.711     | 364.711 | 10.000  | 3.198 | 5.000   | 0.831 |
| 2          | 1041.0      | 1041.0 | 305.414     | 305.404 | 10.000  | 3.399 | 5.000   | 0.889 |
| 3          | 4580.8      | 4580.8 | 229.646     | 229.645 | 12.000  | 4.464 | 6.000   | 1.358 |
| 4?         | 14.2        | 14.2   | 97.115      | 97.099  | 236.000 | 1.000 | 118.000 | 0.100 |
| 5?         | 68.0        | 68.0   | 26.057      | 26.045  | 12.000  | 4.671 | 6.000   | 2.022 |

## PEAK RESULTS

Peak Error Limit: 30%

| Peak    |         | AEA   |                        | Peak Centroid |        |       | Count  |     | %err | d/m     | Activity<br>uCi/ea |
|---------|---------|-------|------------------------|---------------|--------|-------|--------|-----|------|---------|--------------------|
| ID      | Isotope | Frac  | Exp.                   | Obs.          | Diff.  | FWHM  | Rate   | c/m |      |         |                    |
| 1       | Pu236   | 0.106 | 5.755                  | 5.754         | 0.001  | 10.01 | 27.11  | 1.7 |      | 1894.6  | 0.853E-03          |
| 2       | Pu238   | 0.158 | 5.487                  | 5.487         | 0.000  | 0.02  | 40.53  | 1.4 |      | 3855.9  | 0.174E-02          |
|         | Am241   |       | 5.479                  | 5.487         | -0.008 |       |        |     |      | 2953.5  | 0.133E-02          |
| 3       | Pu239   | 0.655 | 5.147                  | 5.146         | 0.001  | 10.02 | 168.18 | 0.7 |      | 11519.2 | 0.519E-02          |
|         | Pu240   |       | 5.144                  | 5.146         | -0.002 |       |        |     |      | 11519.2 | 0.519E-02          |
| 4       | ????    |       |                        | 4.550         |        |       | 1.06   | 8.7 |      |         |                    |
| 5       | ????    |       |                        | 4.230         |        |       | 1.98   | 6.6 |      |         |                    |
| Totals: |         | 0.918 | <--valid peaks only--> |               |        |       | 235.82 |     |      |         |                    |

## DETECTOR CALIBRATION

Energy(MEV) = 4.113 + (0.0045)\*Channel

Energy range (MeV): 4.113 TO 6.417

Efficiency = 0.0146 CPM/DPM

## TOTAL COUNT DATA:

| Item          | Total    | % Recovery |
|---------------|----------|------------|
| Raw spectrum  | 123300.0 | 100.000    |
| Smoothed      | 123303.7 | 100.003    |
| Composite fit | 114660.1 | 92.993     |
| Residuals     | 8639.9   | 7.007      |

Analyzed by: \_\_\_\_\_

ALJ



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| Raw Data Dump for AEA Spectrum: 15a1594.CNF |       |       |       |       |       |       | WHC-SD-WM-DP-178, REV. 1 |       |       |       |
|---------------------------------------------|-------|-------|-------|-------|-------|-------|--------------------------|-------|-------|-------|
| 1                                           | 0.    | 0.    | 3.    | 6.    | 3.    | 4.    | 4.                       | 1.    | 19.   | 11.   |
| 11                                          | 20.   | 11.   | 42.   | 27.   | 38.   | 27.   | 20.                      | 21.   | 27.   | 21.   |
| 21                                          | 36.   | 74.   | 68.   | 62.   | 68.   | 86.   | 73.                      | 75.   | 38.   | 24.   |
| 31                                          | 24.   | 20.   | 16.   | 7.    | 8.    | 3.    | 7.                       | 6.    | 6.    | 7.    |
| 41                                          | 10.   | 8.    | 5.    | 6.    | 6.    | 9.    | 3.                       | 7.    | 6.    | 3.    |
| 51                                          | 3.    | 8.    | 9.    | 6.    | 9.    | 7.    | 1.                       | 8.    | 3.    | 4.    |
| 61                                          | 10.   | 5.    | 4.    | 9.    | 3.    | 8.    | 8.                       | 9.    | 7.    | 9.    |
| 71                                          | 9.    | 7.    | 7.    | 4.    | 8.    | 7.    | 9.                       | 5.    | 9.    | 10.   |
| 81                                          | 13.   | 7.    | 4.    | 8.    | 5.    | 9.    | 12.                      | 6.    | 11.   | 15.   |
| 91                                          | 8.    | 10.   | 10.   | 12.   | 13.   | 15.   | 15.                      | 12.   | 15.   | 11.   |
| 101                                         | 8.    | 15.   | 9.    | 17.   | 16.   | 15.   | 11.                      | 20.   | 12.   | 14.   |
| 111                                         | 10.   | 22.   | 24.   | 17.   | 22.   | 22.   | 25.                      | 17.   | 18.   | 23.   |
| 121                                         | 20.   | 22.   | 22.   | 24.   | 22.   | 27.   | 19.                      | 23.   | 17.   | 25.   |
| 131                                         | 31.   | 37.   | 24.   | 28.   | 28.   | 43.   | 45.                      | 39.   | 34.   | 46.   |
| 141                                         | 40.   | 44.   | 41.   | 48.   | 57.   | 36.   | 50.                      | 57.   | 51.   | 53.   |
| 151                                         | 60.   | 43.   | 64.   | 66.   | 46.   | 73.   | 71.                      | 57.   | 64.   | 79.   |
| 161                                         | 60.   | 62.   | 65.   | 73.   | 76.   | 85.   | 89.                      | 88.   | 97.   | 100.  |
| 171                                         | 105.  | 110.  | 116.  | 136.  | 145.  | 130.  | 142.                     | 153.  | 163.  | 159.  |
| 181                                         | 149.  | 210.  | 235.  | 228.  | 219.  | 235.  | 214.                     | 269.  | 261.  | 272.  |
| 191                                         | 298.  | 346.  | 360.  | 372.  | 384.  | 446.  | 448.                     | 453.  | 504.  | 557.  |
| 201                                         | 560.  | 608.  | 594.  | 689.  | 709.  | 836.  | 807.                     | 929.  | 923.  | 1044. |
| 211                                         | 1082. | 1149. | 1269. | 1413. | 1506. | 1646. | 1858.                    | 1964. | 2309. | 2398. |
| 221                                         | 2419. | 2502. | 2739. | 2981. | 3133. | 3584. | 3936.                    | 4586. | 5131. | 5208. |
| 231                                         | 5130. | 4030. | 2740. | 1742. | 996.  | 487.  | 250.                     | 192.  | 120.  | 90.   |
| 241                                         | 89.   | 57.   | 69.   | 65.   | 68.   | 60.   | 44.                      | 49.   | 46.   | 45.   |
| 251                                         | 42.   | 55.   | 62.   | 46.   | 41.   | 53.   | 56.                      | 56.   | 52.   | 64.   |
| 261                                         | 67.   | 54.   | 77.   | 85.   | 160.  | 193.  | 183.                     | 201.  | 219.  | 201.  |
| 271                                         | 235.  | 257.  | 229.  | 190.  | 201.  | 209.  | 201.                     | 238.  | 199.  | 250.  |
| 281                                         | 240.  | 217.  | 253.  | 280.  | 274.  | 253.  | 266.                     | 281.  | 343.  | 353.  |
| 291                                         | 381.  | 431.  | 479.  | 515.  | 599.  | 723.  | 699.                     | 784.  | 689.  | 672.  |
| 301                                         | 677.  | 777.  | 843.  | 975.  | 1138. | 1330. | 1123.                    | 742.  | 404.  | 192.  |
| 311                                         | 111.  | 61.   | 57.   | 52.   | 43.   | 43.   | 33.                      | 45.   | 32.   | 30.   |
| 321                                         | 45.   | 56.   | 33.   | 38.   | 48.   | 42.   | 46.                      | 48.   | 56.   | 62.   |
| 331                                         | 76.   | 62.   | 69.   | 91.   | 77.   | 91.   | 108.                     | 111.  | 133.  | 121.  |
| 341                                         | 150.  | 118.  | 160.  | 167.  | 161.  | 185.  | 205.                     | 218.  | 233.  | 286.  |
| 351                                         | 295.  | 353.  | 377.  | 424.  | 461.  | 497.  | 424.                     | 432.  | 386.  | 403.  |
| 361                                         | 444.  | 530.  | 606.  | 776.  | 868.  | 788.  | 581.                     | 313.  | 120.  | 55.   |
| 371                                         | 47.   | 19.   | 14.   | 7.    | 14.   | 8.    | 11.                      | 7.    | 6.    | 4.    |
| 381                                         | 1.    | 4.    | 3.    | 1.    | 5.    | 3.    | 2.                       | 2.    | 2.    | 0.    |
| 391                                         | 6.    | 3.    | 1.    | 3.    | 3.    | 0.    | 2.                       | 2.    | 0.    | 0.    |
| 401                                         | 1.    | 4.    | 3.    | 1.    | 1.    | 0.    | 1.                       | 0.    | 0.    | 1.    |
| 411                                         | 1.    | 0.    | 0.    | 1.    | 0.    | 0.    | 0.                       | 0.    | 2.    | 0.    |
| 421                                         | 1.    | 1.    | 0.    | 0.    | 0.    | 0.    | 1.                       | 2.    | 1.    | 0.    |
| 431                                         | 2.    | 0.    | 0.    | 0.    | 2.    | 1.    | 1.                       | 1.    | 0.    | 0.    |
| 441                                         | 0.    | 0.    | 0.    | 0.    | 0.    | 1.    | 1.                       | 0.    | 0.    | 1.    |
| 451                                         | 1.    | 0.    | 0.    | 0.    | 1.    | 1.    | 0.                       | 0.    | 0.    | 0.    |
| 461                                         | 0.    | 0.    | 0.    | 1.    | 0.    | 1.    | 2.                       | 1.    | 4.    | 6.    |
| 471                                         | 1.    | 0.    | 2.    | 2.    | 1.    | 0.    | 0.                       | 1.    | 1.    | 0.    |
| 481                                         | 0.    | 3.    | 2.    | 2.    | 1.    | 2.    | 0.                       | 2.    | 0.    | 0.    |
| 491                                         | 0.    | 0.    | 0.    | 1.    | 0.    | 0.    | 1.                       | 1.    | 0.    | 1.    |
| 511                                         | 0.    | 0.    |       |       |       |       |                          |       |       |       |

Westinghouse Hanford Co.

GENERAL ALPHA ENERGY ANALYSIS  
Rev. 2.01

## DATA REDUCTION REPORT

SAMPLE  
S96T001521-DUP  
File ID: 16a1676.CNFCounted on: 4/ 4/96 @ 4:35  
Detector: AEA16  
Geometry number: 1  
Count time: 28802. Sec

## PEAK ANALYSIS

| Peak<br>ID | Peak height |        | Peak center |         | FWHM    |       | Tau     |       |
|------------|-------------|--------|-------------|---------|---------|-------|---------|-------|
|            | Initial     | Final  | Initial     | Final   | Initial | Final | Initial | Final |
| 1          | 639.6       | 639.6  | 359.866     | 359.866 | 10.000  | 3.402 | 5.000   | 0.717 |
| 2          | 978.7       | 978.7  | 300.997     | 300.969 | 10.000  | 3.724 | 5.000   | 0.736 |
| 3          | 4294.4      | 4294.4 | 226.184     | 226.181 | 12.000  | 4.503 | 6.000   | 1.227 |
| 4?         | 15.0        | 15.0   | 84.592      | 84.569  | 248.000 | 1.000 | 124.000 | 0.100 |
| 5?         | 66.2        | 66.2   | 26.144      | 26.123  | 14.000  | 5.174 | 7.000   | 2.199 |

## PEAK RESULTS

Peak Error Limit: 30%

| Peak<br>ID | Isotope | AEA<br>Frac | Peak Centroid<br>Exp.  | Obs.  | Diff. | FWHM | Count<br>Rate | %err<br>c/m @95 | d/m     | Activity<br>uCi/ea |
|------------|---------|-------------|------------------------|-------|-------|------|---------------|-----------------|---------|--------------------|
| 1          |         | 0.110       |                        | 5.732 |       | 0.02 | 29.23         | 1.7             | 2866.1  | 0.129E-02          |
| 2          | Am241   | 0.179       | 5.479                  | 5.467 | 0.012 | 0.02 | 47.50         | 1.3             | 4954.6  | 0.223E-02          |
| 3          | Pu239   | 0.641       | 5.147                  | 5.130 | 0.017 | 0.02 | 169.74        | 0.7             | 16641.2 | 0.750E-02          |
|            | Pu240   |             | 5.144                  | 5.130 | 0.014 |      |               |                 | 16641.2 | 0.750E-02          |
| 4          |         | ????        |                        | 4.493 |       |      | 1.09          | 8.6             |         |                    |
| 5          |         | ????        |                        | 4.230 |       |      | 1.99          | 6.7             |         |                    |
| Totals:    |         | 0.930       | <--valid peaks only--> |       |       |      | 246.48        |                 |         |                    |

## DETECTOR CALIBRATION

Energy(MEV) = 4.112 + (0.0045)\*Channel  
Energy range (MeV): 4.112 TO 6.416  
Efficiency = 0.0102 CPM/DPM

## TOTAL COUNT DATA:

| Item          | Total    | % Recovery |
|---------------|----------|------------|
| Raw spectrum  | 127156.0 | 100.000    |
| Smoothed      | 127161.6 | 100.004    |
| Composite fit | 119794.6 | 94.211     |
| Residuals     | 7361.4   | 5.789      |

Analyzed by:

ALJ

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Raw Data Dump for AEA Spectrum: 16a1676.CNF WHC-SD-WM-DP-178, REV. I

|     |       |       |       |       |       |       |       |       |       |       |
|-----|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1   | 0.    | 0.    | 5.    | 4.    | 5.    | 3.    | 4.    | 4.    | 19.   | 14.   |
| 11  | 12.   | 15.   | 40.   | 29.   | 36.   | 23.   | 32.   | 25.   | 23.   | 24.   |
| 21  | 45.   | 58.   | 70.   | 66.   | 69.   | 87.   | 63.   | 76.   | 59.   | 16.   |
| 31  | 26.   | 31.   | 14.   | 6.    | 10.   | 9.    | 5.    | 10.   | 9.    | 9.    |
| 41  | 8.    | 6.    | 8.    | 10.   | 9.    | 9.    | 9.    | 9.    | 4.    | 7.    |
| 51  | 6.    | 9.    | 10.   | 11.   | 7.    | 10.   | 5.    | 11.   | 6.    | 4.    |
| 61  | 11.   | 12.   | 9.    | 5.    | 11.   | 5.    | 8.    | 9.    | 19.   | 7.    |
| 71  | 6.    | 7.    | 9.    | 14.   | 16.   | 13.   | 10.   | 9.    | 6.    | 18.   |
| 81  | 17.   | 12.   | 18.   | 13.   | 16.   | 17.   | 12.   | 14.   | 14.   | 14.   |
| 91  | 16.   | 7.    | 10.   | 17.   | 18.   | 19.   | 15.   | 16.   | 21.   | 19.   |
| 101 | 13.   | 18.   | 29.   | 16.   | 20.   | 19.   | 21.   | 32.   | 22.   | 21.   |
| 111 | 17.   | 24.   | 21.   | 28.   | 31.   | 25.   | 27.   | 21.   | 26.   | 31.   |
| 121 | 33.   | 25.   | 35.   | 36.   | 42.   | 33.   | 34.   | 26.   | 40.   | 41.   |
| 131 | 46.   | 42.   | 51.   | 35.   | 37.   | 49.   | 47.   | 51.   | 38.   | 55.   |
| 141 | 72.   | 54.   | 67.   | 63.   | 73.   | 69.   | 72.   | 69.   | 68.   | 59.   |
| 151 | 81.   | 62.   | 88.   | 85.   | 88.   | 90.   | 72.   | 89.   | 97.   | 96.   |
| 161 | 130.  | 116.  | 108.  | 102.  | 123.  | 143.  | 151.  | 153.  | 145.  | 166.  |
| 171 | 164.  | 173.  | 163.  | 177.  | 191.  | 201.  | 211.  | 204.  | 216.  | 261.  |
| 181 | 255.  | 267.  | 271.  | 294.  | 308.  | 335.  | 371.  | 374.  | 372.  | 421.  |
| 191 | 464.  | 493.  | 491.  | 567.  | 556.  | 629.  | 591.  | 670.  | 650.  | 742.  |
| 201 | 819.  | 854.  | 854.  | 936.  | 1057. | 1015. | 1176. | 1176. | 1294. | 1374. |
| 211 | 1550. | 1663. | 1832. | 1986. | 2211. | 2301. | 2381. | 2536. | 2549. | 2910. |
| 221 | 3007. | 3194. | 3624. | 3930. | 4538. | 4885. | 4900. | 4440. | 3221. | 2154. |
| 231 | 1308. | 708.  | 343.  | 213.  | 148.  | 115.  | 104.  | 81.   | 83.   | 78.   |
| 241 | 74.   | 70.   | 57.   | 55.   | 55.   | 71.   | 55.   | 63.   | 50.   | 48.   |
| 251 | 60.   | 67.   | 60.   | 65.   | 72.   | 79.   | 87.   | 70.   | 89.   | 106.  |
| 261 | 83.   | 100.  | 116.  | 88.   | 222.  | 196.  | 240.  | 232.  | 314.  | 275.  |
| 271 | 311.  | 292.  | 292.  | 266.  | 267.  | 290.  | 297.  | 315.  | 350.  | 348.  |
| 281 | 358.  | 381.  | 406.  | 381.  | 405.  | 420.  | 498.  | 467.  | 551.  | 593.  |
| 291 | 666.  | 780.  | 804.  | 785.  | 738.  | 719.  | 792.  | 800.  | 928.  | 992.  |
| 301 | 1117. | 1155. | 1017. | 641.  | 322.  | 157.  | 107.  | 87.   | 63.   | 58.   |
| 311 | 43.   | 40.   | 55.   | 54.   | 43.   | 59.   | 38.   | 54.   | 52.   | 49.   |
| 321 | 71.   | 61.   | 76.   | 73.   | 92.   | 86.   | 95.   | 94.   | 92.   | 85.   |
| 331 | 92.   | 108.  | 118.  | 120.  | 157.  | 138.  | 147.  | 191.  | 177.  | 191.  |
| 341 | 213.  | 253.  | 233.  | 255.  | 246.  | 307.  | 366.  | 407.  | 426.  | 465.  |
| 351 | 471.  | 503.  | 453.  | 409.  | 380.  | 450.  | 530.  | 575.  | 644.  | 747.  |
| 361 | 743.  | 611.  | 335.  | 147.  | 60.   | 38.   | 21.   | 17.   | 18.   | 11.   |
| 371 | 4.    | 8.    | 7.    | 7.    | 7.    | 7.    | 3.    | 5.    | 5.    | 1.    |
| 381 | 5.    | 6.    | 5.    | 3.    | 3.    | 0.    | 2.    | 1.    | 1.    | 1.    |
| 391 | 2.    | 1.    | 3.    | 0.    | 5.    | 1.    | 1.    | 1.    | 1.    | 2.    |
| 401 | 0.    | 2.    | 1.    | 1.    | 0.    | 0.    | 0.    | 0.    | 1.    | 1.    |
| 411 | 0.    | 1.    | 1.    | 0.    | 2.    | 1.    | 0.    | 3.    | 1.    | 3.    |
| 421 | 4.    | 1.    | 0.    | 0.    | 0.    | 1.    | 2.    | 1.    | 2.    | 2.    |
| 431 | 0.    | 1.    | 1.    | 2.    | 2.    | 0.    | 0.    | 1.    | 2.    | 1.    |
| 441 | 0.    | 1.    | 0.    | 0.    | 0.    | 0.    | 0.    | 0.    | 0.    | 1.    |
| 451 | 0.    | 1.    | 1.    | 0.    | 0.    | 0.    | 0.    | 0.    | 2.    | 1.    |
| 461 | 1.    | 0.    | 0.    | 1.    | 0.    | 0.    | 0.    | 0.    | 1.    | 2.    |
| 471 | 0.    | 0.    | 2.    | 1.    | 1.    | 2.    | 1.    | 0.    | 2.    | 2.    |
| 481 | 1.    | 0.    | 0.    | 3.    | 0.    | 0.    | 0.    | 0.    | 1.    | 1.    |
| 491 | 0.    | 0.    | 0.    | 0.    | 0.    | 0.    | 0.    | 0.    | 0.    | 1.    |
| 511 | 1.    | 0.    |       |       |       |       |       |       |       |       |

*Waymond*  
4/4/96

GENERAL ALPHA ENERGY ANALYSIS  
Rev. 2.01

DATA REDUCTION REPORT

SAMPLE  
A96T001522-SAM  
File ID: 17a1770.CNF

Counted on: 4/ 4/96 @ 4:31  
Detector: AEA17  
Geometry number: 1  
Count time: 28800. Sec

PEAK ANALYSIS

| Peak<br>ID | Peak height |        | Peak center |         | FWHM    |       | Tau     |       |
|------------|-------------|--------|-------------|---------|---------|-------|---------|-------|
|            | Initial     | Final  | Initial     | Final   | Initial | Final | Initial | Final |
| 1          | 861.7       | 861.7  | 355.652     | 355.652 | 10.000  | 2.811 | 5.000   | 0.640 |
| 2          | 1249.9      | 1249.9 | 297.561     | 297.545 | 10.000  | 2.848 | 5.000   | 0.677 |
| 3          | 5720.7      | 5720.7 | 223.408     | 223.406 | 10.000  | 3.843 | 5.000   | 1.111 |
| 4?         | 12.5        | 12.5   | 65.163      | 65.160  | 302.000 | 1.000 | 151.000 | 0.100 |
| 5?         | 2.3         | 2.3    | 49.279      | 48.865  | 4.000   | 0.204 | 2.000   | 1.068 |

PEAK RESULTS

Peak Error Limit: 30%

| Peak<br>ID | Isotope | AEA<br>Frac | Peak Centroid<br>Exp.  | Obs.  | Diff. | FWHM | Count<br>Rate c/m | %err<br>@95 | d/m     | Activity<br>uCi/ea |
|------------|---------|-------------|------------------------|-------|-------|------|-------------------|-------------|---------|--------------------|
| 1          | Pu236   | 0.113       | 5.755                  | 5.745 | 0.010 | 0.01 | 36.32             | 1.5         | 2047.3  | 0.922E-03          |
| 2          | Pu238   | 0.159       | 5.487                  | 5.477 | 0.010 | 0.01 | 51.05             | 1.3         | 3917.3  | 0.176E-02          |
|            | Am241   |             | 5.479                  | 5.477 | 0.002 |      |                   |             | 3000.5  | 0.135E-02          |
| 3          | Pu239   | 0.660       | 5.147                  | 5.136 | 0.011 | 0.02 | 211.71            | 0.6         | 11696.7 | 0.527E-02          |
|            | Pu240   |             | 5.144                  | 5.136 | 0.008 |      |                   |             | 11696.7 | 0.527E-02          |
| 4          |         | ????        |                        | 4.408 |       |      | 0.84              | 9.8         |         |                    |
| 5          |         | ????        |                        | 4.333 |       |      | 0.01              | 602.        |         |                    |
| -----      |         |             |                        |       |       |      |                   |             |         |                    |
| Totals:    |         | 0.933       | <--valid peaks only--> |       |       |      | 299.08            |             |         |                    |

DETECTOR CALIBRATION

Energy(MEV) = 4.109 + (0.0046)\*Channel  
Energy range (MeV): 4.109 TO 6.464  
Efficiency = 0.0181 CPM/DPM

TOTAL COUNT DATA:

| Item          | Total    | % Recovery |
|---------------|----------|------------|
| Raw spectrum  | 153857.0 | 100.000    |
| Smoothed      | 153856.2 | 99.999     |
| Composite fit | 143965.7 | 93.571     |
| Residuals     | 9891.3   | 6.429      |

Analyzed by:

ALJ

1 Legend: Raw = ..... Modeled Peaks = 1,2,..., etc Display Max.: 36700.1

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Raw Data Dump for AEA Spectrum: 17a1770.CNF

WHC-SD-WM-DP-178, REV. 1

|     |       |       |       |       |       |       |       |       |       |       |
|-----|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1   | 0.    | 0.    | 6.    | 2.    | 5.    | 8.    | 6.    | 4.    | 3.    | 3.    |
| 11  | 9.    | 4.    | 7.    | 7.    | 9.    | 5.    | 2.    | 9.    | 8.    | 3.    |
| 21  | 3.    | 3.    | 9.    | 4.    | 8.    | 10.   | 7.    | 5.    | 13.   | 3.    |
| 31  | 6.    | 7.    | 11.   | 6.    | 5.    | 4.    | 14.   | 9.    | 9.    | 8.    |
| 41  | 4.    | 5.    | 8.    | 3.    | 8.    | 9.    | 7.    | 8.    | 15.   | 10.   |
| 51  | 9.    | 7.    | 5.    | 8.    | 8.    | 9.    | 10.   | 8.    | 14.   | 8.    |
| 61  | 14.   | 5.    | 11.   | 13.   | 14.   | 16.   | 10.   | 9.    | 12.   | 7.    |
| 71  | 13.   | 9.    | 10.   | 7.    | 13.   | 14.   | 15.   | 13.   | 18.   | 18.   |
| 81  | 11.   | 17.   | 12.   | 13.   | 16.   | 18.   | 14.   | 20.   | 22.   | 20.   |
| 91  | 16.   | 11.   | 20.   | 19.   | 12.   | 24.   | 23.   | 28.   | 24.   | 17.   |
| 101 | 28.   | 25.   | 25.   | 22.   | 25.   | 30.   | 36.   | 28.   | 26.   | 33.   |
| 111 | 31.   | 25.   | 31.   | 25.   | 33.   | 31.   | 37.   | 39.   | 33.   | 29.   |
| 121 | 32.   | 35.   | 34.   | 54.   | 40.   | 44.   | 35.   | 42.   | 38.   | 41.   |
| 131 | 46.   | 51.   | 43.   | 51.   | 51.   | 71.   | 50.   | 69.   | 64.   | 78.   |
| 141 | 64.   | 86.   | 85.   | 88.   | 103.  | 87.   | 76.   | 68.   | 93.   | 83.   |
| 151 | 109.  | 73.   | 104.  | 90.   | 113.  | 109.  | 99.   | 115.  | 121.  | 144.  |
| 161 | 146.  | 136.  | 129.  | 173.  | 171.  | 187.  | 156.  | 176.  | 231.  | 211.  |
| 171 | 233.  | 242.  | 251.  | 236.  | 257.  | 296.  | 282.  | 316.  | 310.  | 365.  |
| 181 | 386.  | 392.  | 421.  | 434.  | 480.  | 469.  | 478.  | 562.  | 582.  | 600.  |
| 191 | 625.  | 690.  | 689.  | 785.  | 805.  | 845.  | 946.  | 959.  | 1082. | 1113. |
| 201 | 1246. | 1288. | 1364. | 1425. | 1505. | 1638. | 1832. | 1892. | 2111. | 2197. |
| 211 | 2403. | 2674. | 2925. | 3153. | 3108. | 3240. | 3387. | 3785. | 4116. | 4405. |
| 221 | 5025. | 5813. | 6447. | 6691. | 6244. | 4555. | 2726. | 1480. | 750.  | 254.  |
| 231 | 58.   | 25.   | 28.   | 29.   | 34.   | 33.   | 42.   | 32.   | 29.   | 42.   |
| 241 | 46.   | 64.   | 45.   | 47.   | 46.   | 54.   | 57.   | 50.   | 74.   | 51.   |
| 251 | 71.   | 69.   | 93.   | 75.   | 80.   | 110.  | 105.  | 102.  | 116.  | 128.  |
| 261 | 115.  | 110.  | 140.  | 165.  | 150.  | 174.  | 150.  | 191.  | 194.  | 219.  |
| 271 | 220.  | 236.  | 254.  | 245.  | 271.  | 310.  | 313.  | 362.  | 409.  | 402.  |
| 281 | 407.  | 488.  | 524.  | 590.  | 539.  | 670.  | 764.  | 868.  | 978.  | 1001. |
| 291 | 864.  | 856.  | 841.  | 905.  | 1008. | 1126. | 1350. | 1542. | 1460. | 1026. |
| 301 | 466.  | 136.  | 40.   | 33.   | 30.   | 32.   | 26.   | 59.   | 44.   | 31.   |
| 311 | 41.   | 56.   | 47.   | 69.   | 58.   | 84.   | 78.   | 74.   | 87.   | 80.   |
| 321 | 101.  | 113.  | 100.  | 95.   | 148.  | 139.  | 132.  | 154.  | 138.  | 165.  |
| 331 | 161.  | 178.  | 198.  | 206.  | 226.  | 286.  | 228.  | 269.  | 301.  | 328.  |
| 341 | 357.  | 392.  | 442.  | 536.  | 598.  | 641.  | 683.  | 620.  | 528.  | 508.  |
| 351 | 558.  | 545.  | 656.  | 771.  | 903.  | 1052. | 1004. | 719.  | 311.  | 93.   |
| 361 | 7.    | 1.    | 1.    | 0.    | 4.    | 2.    | 4.    | 2.    | 1.    | 2.    |
| 371 | 1.    | 1.    | 0.    | 1.    | 4.    | 4.    | 1.    | 2.    | 3.    | 1.    |
| 381 | 1.    | 1.    | 0.    | 2.    | 0.    | 1.    | 4.    | 1.    | 1.    | 2.    |
| 391 | 1.    | 3.    | 0.    | 1.    | 1.    | 2.    | 3.    | 3.    | 1.    | 0.    |
| 401 | 0.    | 3.    | 2.    | 0.    | 3.    | 3.    | 3.    | 0.    | 0.    | 1.    |
| 411 | 0.    | 2.    | 3.    | 2.    | 3.    | 2.    | 2.    | 6.    | 3.    | 2.    |
| 421 | 3.    | 2.    | 1.    | 1.    | 0.    | 3.    | 2.    | 1.    | 5.    | 6.    |
| 431 | 5.    | 2.    | 0.    | 4.    | 1.    | 4.    | 2.    | 1.    | 3.    | 0.    |
| 441 | 2.    | 0.    | 5.    | 3.    | 5.    | 2.    | 1.    | 7.    | 1.    | 2.    |
| 451 | 2.    | 4.    | 1.    | 3.    | 2.    | 0.    | 5.    | 0.    | 2.    | 7.    |
| 461 | 4.    | 4.    | 1.    | 4.    | 2.    | 4.    | 2.    | 3.    | 3.    | 4.    |
| 471 | 4.    | 6.    | 3.    | 4.    | 3.    | 6.    | 2.    | 1.    | 4.    | 1.    |
| 481 | 8.    | 6.    | 5.    | 4.    | 7.    | 4.    | 5.    | 2.    | 7.    | 3.    |
| 491 | 7.    | 5.    | 8.    | 6.    | 8.    | 5.    | 5.    | 7.    | 7.    | 3.    |
| 511 | 4.    | 0.    |       |       |       |       |       |       |       |       |



*Keymond*  
4/4/96

GENERAL ALPHA ENERGY ANALYSIS  
Rev. 2.01

DATA REDUCTION REPORT

SAMPLE  
S96T001522-DUP  
File ID: 18a1848.CNF

Counted on: 4/ 4/96 @ 4:32  
Detector: AEA18  
Geometry number: 1  
Count time: 28802. Sec

PEAK ANALYSIS

| Peak<br>ID | Peak height |        | Peak center |         | FWHM    |       | Tau     |       |
|------------|-------------|--------|-------------|---------|---------|-------|---------|-------|
|            | Initial     | Final  | Initial     | Final   | Initial | Final | Initial | Final |
| 1          | 894.0       | 894.0  | 362.097     | 362.097 | 10.000  | 2.755 | 5.000   | 0.632 |
| 2          | 1359.1      | 1359.1 | 303.894     | 303.874 | 10.000  | 3.226 | 5.000   | 0.733 |
| 3          | 5804.0      | 5804.0 | 229.883     | 229.880 | 12.000  | 3.813 | 6.000   | 1.071 |
| 4?         | 22.5        | 22.5   | 99.021      | 98.992  | 246.000 | 1.000 | 123.000 | 0.100 |
| 5?         | 3.8         | 3.8    | 77.954      | 76.863  | 10.000  | 1.657 | 5.000   | 4.916 |
| 6?         | 4.2         | 4.2    | 67.578      | 66.862  | 6.000   | 1.704 | 3.000   | 0.367 |

PEAK RESULTS  
Peak Error Limit: 30%

| Peak<br>ID | Isotope | AEA<br>Frac | Peak Centroid<br>Exp.  | Obs.  | Diff.  | FWHM | Count<br>Rate c/m | %err<br>@95 | d/m     | Activity<br>uCi/ea |
|------------|---------|-------------|------------------------|-------|--------|------|-------------------|-------------|---------|--------------------|
| 1          | Pu236   | 0.111       | 5.755                  | 5.748 | 0.007  | 0.01 | 37.35             | 1.5         | 4484.0  | 0.202E-02          |
| 2          | Pu238   | 0.174       | 5.487                  | 5.480 | 0.007  | 0.01 | 58.34             | 1.2         | 9533.1  | 0.429E-02          |
|            | Am241   |             | 5.479                  | 5.480 | -0.001 |      |                   |             | 7301.9  | 0.329E-02          |
| 3          | Pu239   | 0.652       | 5.147                  | 5.140 | 0.007  | 0.02 | 218.66            | 0.6         | 25724.1 | 0.116E-01          |
|            | Pu240   |             | 5.144                  | 5.140 | 0.004  |      |                   |             | 25724.1 | 0.116E-01          |
| 4          |         | ????        |                        | 4.538 |        |      | 1.69              | 6.9         |         |                    |
| 5          |         | ????        |                        | 4.436 |        |      | 0.05              | 192.        |         |                    |
| 6          |         | ????        |                        | 4.390 |        |      | 0.17              | 50.2        |         |                    |
| Totals:    |         | 0.938       | <--valid peaks only--> |       |        |      | 314.35            |             |         |                    |

DETECTOR CALIBRATION  
Energy(MEV) = 4.082 + (0.0046)\*Channel  
Energy range (MeV): 4.082 TO 6.437  
Efficiency = 0.0085 CPM/DPM

TOTAL COUNT DATA:

| Item          | Total    | % Recovery |
|---------------|----------|------------|
| Raw spectrum  | 160892.0 | 100.000    |
| Smoothed      | 160891.1 | 99.999     |
| Composite fit | 151818.7 | 94.361     |
| Residuals     | 9073.3   | 5.639      |

1 Legend: Raw = ..... Modeled Peaks = 1,2,..., etc Display Max.: 39685.8

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Raw Data Dump for AEA Spectrum: 18a1848.CNF

WHC-SD-WM-DP-178, REV. 1

|     |       |       |       |       |       |       |       |       |       |       |
|-----|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1   | 0.    | 0.    | 3.    | 4.    | 7.    | 8.    | 6.    | 3.    | 3.    | 1.    |
| 11  | 7.    | 6.    | 5.    | 4.    | 5.    | 2.    | 3.    | 6.    | 4.    | 5.    |
| 21  | 5.    | 11.   | 6.    | 7.    | 6.    | 5.    | 7.    | 7.    | 9.    | 8.    |
| 31  | 10.   | 7.    | 6.    | 6.    | 12.   | 6.    | 7.    | 12.   | 5.    | 7.    |
| 41  | 11.   | 8.    | 6.    | 8.    | 8.    | 9.    | 7.    | 13.   | 8.    | 7.    |
| 51  | 10.   | 10.   | 15.   | 6.    | 7.    | 14.   | 5.    | 12.   | 11.   | 15.   |
| 61  | 14.   | 6.    | 8.    | 6.    | 12.   | 17.   | 15.   | 14.   | 12.   | 14.   |
| 71  | 12.   | 9.    | 9.    | 17.   | 13.   | 18.   | 18.   | 14.   | 17.   | 17.   |
| 81  | 13.   | 13.   | 14.   | 16.   | 12.   | 19.   | 21.   | 19.   | 17.   | 12.   |
| 91  | 15.   | 22.   | 15.   | 23.   | 16.   | 19.   | 21.   | 23.   | 25.   | 27.   |
| 101 | 19.   | 17.   | 19.   | 25.   | 19.   | 21.   | 25.   | 17.   | 25.   | 20.   |
| 111 | 24.   | 22.   | 26.   | 28.   | 35.   | 36.   | 30.   | 32.   | 36.   | 36.   |
| 121 | 32.   | 41.   | 35.   | 30.   | 37.   | 38.   | 45.   | 43.   | 32.   | 37.   |
| 131 | 42.   | 27.   | 53.   | 47.   | 49.   | 54.   | 53.   | 53.   | 48.   | 49.   |
| 141 | 41.   | 78.   | 72.   | 66.   | 68.   | 60.   | 55.   | 77.   | 84.   | 79.   |
| 151 | 81.   | 106.  | 109.  | 80.   | 101.  | 85.   | 106.  | 105.  | 104.  | 123.  |
| 161 | 111.  | 105.  | 115.  | 148.  | 139.  | 135.  | 140.  | 141.  | 170.  | 165.  |
| 171 | 173.  | 178.  | 195.  | 195.  | 217.  | 206.  | 224.  | 244.  | 271.  | 270.  |
| 181 | 285.  | 278.  | 299.  | 305.  | 307.  | 369.  | 412.  | 404.  | 431.  | 448.  |
| 191 | 455.  | 472.  | 536.  | 540.  | 556.  | 659.  | 694.  | 671.  | 740.  | 775.  |
| 201 | 858.  | 855.  | 963.  | 1016. | 1047. | 1124. | 1184. | 1317. | 1277. | 1496. |
| 211 | 1458. | 1678. | 1793. | 1911. | 2059. | 2164. | 2483. | 2596. | 2918. | 3113. |
| 221 | 3278. | 3173. | 3417. | 3584. | 3972. | 4256. | 4794. | 5497. | 6272. | 6645. |
| 231 | 6783. | 5370. | 3655. | 2076. | 1071. | 385.  | 129.  | 45.   | 36.   | 35.   |
| 241 | 47.   | 37.   | 46.   | 44.   | 47.   | 40.   | 44.   | 56.   | 56.   | 60.   |
| 251 | 54.   | 56.   | 84.   | 78.   | 78.   | 74.   | 75.   | 82.   | 98.   | 105.  |
| 261 | 85.   | 111.  | 115.  | 113.  | 129.  | 133.  | 139.  | 143.  | 153.  | 175.  |
| 271 | 183.  | 199.  | 211.  | 226.  | 236.  | 231.  | 278.  | 255.  | 307.  | 296.  |
| 281 | 362.  | 345.  | 386.  | 396.  | 411.  | 439.  | 467.  | 494.  | 577.  | 620.  |
| 291 | 650.  | 707.  | 805.  | 877.  | 1056. | 1059. | 1036. | 1030. | 980.  | 1029. |
| 301 | 1101. | 1278. | 1442. | 1508. | 1666. | 1382. | 784.  | 281.  | 92.   | 59.   |
| 311 | 55.   | 59.   | 53.   | 47.   | 41.   | 52.   | 50.   | 50.   | 58.   | 56.   |
| 321 | 61.   | 72.   | 69.   | 84.   | 91.   | 79.   | 88.   | 101.  | 121.  | 131.  |
| 331 | 123.  | 137.  | 114.  | 142.  | 159.  | 152.  | 175.  | 188.  | 185.  | 228.  |
| 341 | 244.  | 261.  | 283.  | 280.  | 279.  | 342.  | 327.  | 404.  | 443.  | 481.  |
| 351 | 583.  | 623.  | 676.  | 686.  | 570.  | 532.  | 534.  | 564.  | 625.  | 743.  |
| 361 | 900.  | 1035. | 1135. | 903.  | 454.  | 158.  | 33.   | 5.    | 2.    | 1.    |
| 371 | 3.    | 1.    | 0.    | 2.    | 1.    | 2.    | 2.    | 2.    | 3.    | 4.    |
| 381 | 1.    | 3.    | 3.    | 3.    | 1.    | 2.    | 3.    | 3.    | 5.    | 1.    |
| 391 | 0.    | 1.    | 1.    | 2.    | 3.    | 1.    | 5.    | 3.    | 2.    | 3.    |
| 401 | 2.    | 3.    | 2.    | 0.    | 5.    | 3.    | 3.    | 1.    | 2.    | 3.    |
| 411 | 5.    | 3.    | 3.    | 6.    | 2.    | 1.    | 4.    | 5.    | 2.    | 0.    |
| 421 | 2.    | 0.    | 2.    | 2.    | 3.    | 1.    | 4.    | 1.    | 0.    | 2.    |
| 431 | 3.    | 1.    | 1.    | 1.    | 2.    | 0.    | 4.    | 3.    | 6.    | 4.    |
| 441 | 4.    | 5.    | 3.    | 0.    | 3.    | 3.    | 2.    | 3.    | 2.    | 5.    |
| 451 | 8.    | 2.    | 3.    | 7.    | 2.    | 5.    | 2.    | 6.    | 4.    | 2.    |
| 461 | 4.    | 2.    | 5.    | 11.   | 4.    | 0.    | 3.    | 2.    | 4.    | 3.    |
| 471 | 4.    | 4.    | 4.    | 4.    | 4.    | 2.    | 3.    | 1.    | 3.    | 4.    |
| 481 | 3.    | 2.    | 3.    | 4.    | 2.    | 2.    | 7.    | 4.    | 6.    | 4.    |
| 491 | 4.    | 1.    | 4.    | 4.    | 3.    | 2.    | 7.    | 3.    | 1.    | 3.    |
| 511 | 3.    | 0.    |       |       |       |       |       |       |       |       |

# LABCORE Data Entry Template for Worklist# 8218

Analyst: Jmw Instrument: PU01 Book# 124843

Method: LA-943-128 Rev/Mod A-1

Worklist Comment: AY-101. Determine sample size using ludlum. new

| S                                                | Type   | Sample#    | R | A              | Test     | Matrix | Group#   | Project     |
|--------------------------------------------------|--------|------------|---|----------------|----------|--------|----------|-------------|
| 1                                                | STD    |            |   |                | @PU23901 | LIQUID |          |             |
| 2                                                | BLNK   |            |   |                | @PU23901 | LIQUID |          |             |
| 3                                                | SAMPLE | S96T001208 | 0 | <sup>S12</sup> | @PU23901 | LIQUID | 96000210 | AY-101 GRAB |
| Analytes Requested: PU23901 , PU23901E, PU23901T |        |            |   |                |          |        |          |             |
| 4                                                | DUP    | S96T001208 | 0 |                | @PU23901 | LIQUID |          |             |
| 5                                                | SAMPLE | S96T002014 | 0 |                | @PU23901 | LIQUID | 96000459 | A-101 GRAB  |
| Analytes Requested: PU23901 , PU23901E, PU23901T |        |            |   |                |          |        |          |             |
| 6                                                | DUP    | S96T002014 | 0 |                | @PU23901 | LIQUID |          |             |

Final page for worklist # 8218

Jmw 5/7/96  
Analyst Signature Date

Shane H. H. H. 5-7-96  
Analyst Signature Date  
Sup E. Hogan 5-8-96

Data Entry Comments:

WHC-SD-WM-DP-178, REV. 1

# LABCORE Completed Worklist Report for Worklist# 8218

Analyst: sel Smv

Instrument: AB16

Book# \_\_\_\_\_

Method: \_\_\_\_\_ Rev/Mod \_\_\_\_\_

Worklist Comment: AY-101. Determine sample size using ludlum. new

| Seq Type | Sample#    | R A | Test              | Matrix | Actual   | Found      | DL or Yield         | Unit  |
|----------|------------|-----|-------------------|--------|----------|------------|---------------------|-------|
| 1 STD    |            | 0   | @PU23901 PU23901  | LIQUID | 3.81E-02 | 4.08E-2    | 107.087 % Recovery  |       |
| 1 STD    |            | 0   | @PU23901 PU23901E | LIQUID | 1.00     | 2.82E+00   | 2.820 % Ct. Error   |       |
| 1 STD    |            | 0   | @PU23901 PU23901T | LIQUID | 100      | 1.02E+02   | 102.000 % Recovery  |       |
| 2 BLNK   |            | 0   | @PU23901 PU23901  | LIQUID | 1        | <7.55E-6   | uCi/mL              |       |
| 2 BLNK   |            | 0   | @PU23901 PU23901T | LIQUID | 100      | 4.05E+01   | 40.500 % Recovery   |       |
| 2 BLNK   |            | 0   | @PU23901 PU23901E | LIQUID | 1.00     | 1.00E+02   | 100.000 % Ct. Error |       |
| 3 SAMPLE | S96T001208 | 0   | @PU23901 PU23901  | LIQUID | N/A      | < 7.59E-06 | 0.000 uCi/mL        |       |
| 3 SAMPLE | S96T001208 | 0   | @PU23901 PU23901T | LIQUID | N/A      | 4.03E+01   | 0.000 % Recovery    |       |
| 3 SAMPLE | S96T001208 | 0   | @PU23901 PU23901E | LIQUID | N/A      | 1.00E+02   | 0.000 % Ct. Error   |       |
| 4 DUP    | S96T001208 | 0   | @PU23901 PU23901  | LIQUID | <7.59E-6 | <7.34E-6   | RPD                 |       |
| 4 DUP    | S96T001208 | 0   | @PU23901 PU23901T | LIQUID | 100      | 4.09E+01   | 40.900 % Recovery   |       |
| 4 DUP    | S96T001208 | 0   | @PU23901 PU23901E | LIQUID | 1.00     | 1.00E+02   | 100.000 % Ct. Error |       |
| 5 SAMPLE | S96T002014 | 0   | @PU23901 PU23901  | LIQUID | N/A      | 1.35E-04   | 0.000 uCi/mL        |       |
| 5 SAMPLE | S96T002014 | 0   | @PU23901 PU23901T | LIQUID | N/A      | 6.57E+01   | 0.000 % Recovery    |       |
| 5 SAMPLE | S96T002014 | 0   | @PU23901 PU23901E | LIQUID | N/A      | 2.25E+00   | 0.000 % Ct. Error   |       |
| 6 DUP    | S96T002014 | 0   | @PU23901 PU23901  | LIQUID | 1.35E-4  | 3.30E-6    | RPD                 | Verun |
| 6 DUP    | S96T002014 | 0   | @PU23901 PU23901T | LIQUID | 100      | 9.42E+01   | 94.200 % Recovery   |       |
| 6 DUP    | S96T002014 | 0   | @PU23901 PU23901E | LIQUID | 1.00     | 1.05E+01   | 10.500 % Ct. Error  |       |

Final page for worklist# 8218

Analyst Signature \_\_\_\_\_ Date \_\_\_\_\_

Analyst Signature \_\_\_\_\_ Date \_\_\_\_\_

Reviewer Signature \_\_\_\_\_ Date \_\_\_\_\_

# LABCORE Completed RadChem Report for Worklist#: 8218

Analyst: jmv

Instrument: AB16

Book# 124B43

Method: LA-943-128 Rev/Mod A-1

Worklist Comment: AY-101. Determine sample size using ludlum. new

| Seq Type | Sample#    | R A | Test              | Matrix | Actual   | Found     | DL or Yield | Unit        |
|----------|------------|-----|-------------------|--------|----------|-----------|-------------|-------------|
| 1 STD    |            | 0   | @PU23901 PU23901  | LIQUID | 3.81E-02 | 4.08E-2   | 107.087     | % Recovery  |
| 1 STD    |            | 0   | @PU23901 PU23901E | LIQUID | 1.00     | 2.82E+00  | 2.820       | % Ct Error  |
| 1 STD    |            | 0   | @PU23901 PU23901T | LIQUID | 100      | 1.02E+02  | 102.000     | % Recovery  |
| 2 BLNK   |            | 0   | @PU23901 PU23901  | LIQUID | 1        | <7.55E-6  |             | uCi/mL      |
| 2 BLNK   |            | 0   | @PU23901 PU23901T | LIQUID | 100      | 4.05E+01  | 40.500      | % Recovery  |
| 2 BLNK   |            | 0   | @PU23901 PU23901E | LIQUID | 1.00     | 1.00E+02  | 100.000     | uCi/mL      |
| 3 SAMPLE | S96T001208 | 0   | @PU23901 PU23901  | LIQUID | N/A      | <7.59E-06 | 759.0e-008  | uCi/mL      |
| 3 SAMPLE | S96T001208 | 0   | @PU23901 PU23901T | LIQUID | N/A      | 4.03E+01  | 0.0e+000    | % Recovery  |
| 3 SAMPLE | S96T001208 | 0   | @PU23901 PU23901E | LIQUID | N/A      | 1.00E+02  | 0.0e+000    | % Ct. Error |
| 4 DUP    | S96T001208 | 0   | @PU23901 PU23901  | LIQUID | <7.59E-6 | <7.34E-6  |             | RPD         |
| 4 DUP    | S96T001208 | 0   | @PU23901 PU23901T | LIQUID | 100      | 4.09E+01  | 40.900      | % Recovery  |
| 4 DUP    | S96T001208 | 0   | @PU23901 PU23901E | LIQUID | 1.00     | 1.00E+02  | 100.000     | % Ct Error  |
| 6 DUP    | S96T002014 | 0   | @PU23901 PU23901  | LIQUID | 1.35E-4  | <3.30E-6  |             | RPD         |
| 6 DUP    | S96T002014 | 0   | @PU23901 PU23901T | LIQUID | 100      | 9.42E+01  | 94.200      | % Recovery  |
| 6 DUP    | S96T002014 | 0   | @PU23901 PU23901E | LIQUID | 1.00     | 1.05E+01  | 10.500      | % Ct Error  |

Final page for worklist# 8218

Analyst Signature

Date

Analyst Signature

Date

Reviewer Signature

Date

Sample S96T002014 was rejected and  
will be rerun on Worklist 8511.

JFR  
5/9/96

WORKBOOK PAGE: STD1

## Pu 238 and 239/240 : LA-943-128 (A-1)

## LIQUID

|                 |                                                                                                                                                        |           | STD                                                             |
|-----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|-----------------------------------------------------------------|
| Type            | DATE COUNTED                                                                                                                                           | MAY-07-96 | Pu 236 AEA FRAC (C236)                                          |
| STD             | SAMPLE VOLUME in mL                                                                                                                                    | 0.100     | Pu 238 AEA FRAC (C238)                                          |
| Work List       | SAMPLE DILUTION FACTOR                                                                                                                                 | 101.000   | Pu 239 AEA FRAC (C239)                                          |
| 8218            | TRACER VOLUME in mL                                                                                                                                    | 0.100     | TOTAL AT COUNTS                                                 |
| Test Code       | DIGEST DILUTION FACTOR                                                                                                                                 | 1.000     | AT COUNT TIME (MIN)                                             |
| @PU23901        | TRACER BOOK NO                                                                                                                                         | 120B43    | BACKGROUND in cpm (Bkg)                                         |
| Matrix          | DETECTOR NUMBER                                                                                                                                        | 16        | Pu 236 cpm                                                      |
| LIQUID          | EFFICIENCY FACTOR                                                                                                                                      | 0.272     | Pu 238 cpm                                                      |
| Batch Number    | TRACER PREPARATION DATE                                                                                                                                | 12/27/95  | Pu 239 cpm                                                      |
| 96004092        | TRACER PREPARATION VALUE (dpm/mL)                                                                                                                      | 2390.000  | AEA COUNT TIME                                                  |
| Rerun           | PU-236 DECAY CORR'D VALUE (dpm/mL)                                                                                                                     | 2188.896  | Pu 239/240 $\mu$ Ci/L                                           |
| 0               | PU-238 TRACER VALUE (dpm/mL)                                                                                                                           | 0.000     |                                                                 |
| Sample Prep     | STANDARD BOOK NO                                                                                                                                       | 124B43    |                                                                 |
| N/A             | STANDARD VALUE in $\mu$ Ci/mL                                                                                                                          | 0.038     |                                                                 |
| Sample #        |                                                                                                                                                        |           |                                                                 |
| WL8218          |                                                                                                                                                        |           |                                                                 |
| Instrument Code | Decay Time = Date Counted - Tracer Preparation Date                                                                                                    |           |                                                                 |
| WB27806         | Pu-236 Decay Corr'd Value = Pu-236 Preparation Value * [e to the power of $\{(-\ln 2 * \text{Decay Time})/1040.95\}$ ]                                 |           |                                                                 |
| Prepared By     | Pu 236 Tracer Recovery = (Total AT Counts / TC - Bkg) * 1/EFF * C236 * 100 / Pu-236 Decay Corr'd Value * SPKV                                          |           |                                                                 |
| SLH2            | Pu 239/240 $\mu$ Ci/L = (C239) * (Pu 236 Decay Corr'd Value) * (SPKV) * (1000 mL/L) * (DF) * (DDF) / [(C236) * (SS) * (2220000 dpm/ $\mu$ Ci)]         |           |                                                                 |
| Chemist         | Pu 238 dpm = [(Total AT Counts / TC) - Bkg * 1/EFF * C238] - (Pu-238 Tracer Value * SPKV * Pu 236 Tracer Recovery / 100)                               |           |                                                                 |
| JFR             | Pu 238 $\mu$ Ci/L = [(Pu 238 dpm) * (DF) * (DDF) * (1000 mL/L)] / [(Pu-236 Tracer Recovery / 100) * (2220000 dpm/ $\mu$ Ci) * (D g/L) * (SS)]          |           |                                                                 |
| Analyst         | Relative Counting Error = Square Root of $\{[1 / (\text{Pu 236 cpm} * \text{min})] + [1 / (\text{Pu 238 or 239/240 cpm} * \text{min})]\} * 1.96 * 100$ |           |                                                                 |
| JMV             |                                                                                                                                                        |           |                                                                 |
| Date Complete   |                                                                                                                                                        |           |                                                                 |
| 05/08/96        | Pu 239/240 $\mu$ Ci/mL                                                                                                                                 | 4.08E-02  | DETECTION<br>LEVELS<br>in $\mu$ Ci/mL<br>Pu 239/240<br>5.42E-03 |
| Analysis Date   | Relative Counting Error                                                                                                                                | = 2.8%    |                                                                 |
| 05/07/96        |                                                                                                                                                        |           |                                                                 |
| Analysis Time   |                                                                                                                                                        |           |                                                                 |
| 12:00 PM        |                                                                                                                                                        |           |                                                                 |
| Sample Point    |                                                                                                                                                        |           |                                                                 |
| AY-101 GRAB     | Pu 236 Tracer Recovery                                                                                                                                 | = 101.5%  |                                                                 |

|                       |     |       |           |
|-----------------------|-----|-------|-----------|
| Analyst:              | JMV | Date: | 08-May-96 |
| Signature of Chemist: | JFR | Date: | 9 May 96  |

STANDARD WB1 REV 1.0

943128ML

WORKBOOK PAGE: BLANK2

## Pu 238 and 239/240 : LA-943-128 (A-1)

## LIQUID / SOLID

|              |                                    |           |                               | BLNK        |
|--------------|------------------------------------|-----------|-------------------------------|-------------|
| Type         | DATE COUNTED                       | MAY-07-96 | PU 236 AEA FRAC (C236)        | 0.967       |
| BLNK         | SAMPLE VOLUME in mL SS             | 1.000     | PU 238 AEA FRAC (C238)        | 0.000       |
| Work List    | SAMPLE DILUTION FACTOR DF          | 1.000     | PU 239 AEA FRAC (C239)        | 0.000       |
| 8218         | TRACER VOLUME in mL SPKV           | 0.100     | TOTAL AT COUNTS               | 757         |
| Test Code    | DIGEST DILUTION FACTOR DDF         | 1.0000    | AT COUNT TIME (MIN)           | 30          |
| @PU23901     | TRACER BOOK NO                     | 120B43    | BACKGROUND in cpm (Bkg)       | 0.300       |
| Matrix       | DETECTOR NUMBER                    | 16        | PU 236 cpm                    | 14.230      |
| LIQUID       | EFFICIENCY FACTOR EFF              | 0.2717    | PU 238 cpm                    | 0.000       |
| Batch Number | TRACER PREPARATION DATE            | 12/27/95  | PU 239 cpm                    | 0.000       |
| 96004092     | TRACER PREPARATION VALUE (dpm/mL)  | 2390.00   | AEA COUNT TIME                | 480         |
| Retain       | PU-236 DECAY CORR'D VALUE (dpm/mL) | 2188.90   | Pu 239/240 $\mu\text{Ci/L}$ = | < 7.545E-03 |
| 0            | PU-238 TRACER VALUE (dpm/mL)       | 0.00      |                               |             |

|                 |                                                                                                                                              |
|-----------------|----------------------------------------------------------------------------------------------------------------------------------------------|
| Sample Prep     |                                                                                                                                              |
| N/A             |                                                                                                                                              |
| Sample #        | Decay Time = Date Counted - Tracer Preparation Date                                                                                          |
| WL8218          | Pu-236 Decay Corr'd Value = Pu-236 Preparation Value * [e to the power of {(-ln2 * Decay Time/1040.95)}]                                     |
| Instrument Code | Pu 236 Tracer Recovery = (Total AT Counts / TC - Bkg) * C236 * 100 / (Pu-236 Decay Corr'd Value * SPKV * EFF)                                |
| WB27806         | Pu 239/240 $\mu\text{Ci/L}$ = (C239)(Pu 236 Decay Corr'd Value)(SPKV)(1000mL/L)(DF)(DDF) / [(C236)(SS)(D g/L)(2220000 dpm/ $\mu\text{Ci}$ )] |
| Prepared By     | Pu 238 dpm = [(Total AT Counts / TC) - Bkg * 1/EFF * C238] - (Pu-238 Tracer Value * SPKV * Pu 236 Tracer Recovery / 100)                     |
| SLH2            | Pu 238 $\mu\text{Ci/L}$ = [(Pu 238 dpm)(DF)(DDF)(1000mL/L)] / [(Pu-236 Tracer Recovery / 100)(2220000 dpm/ $\mu\text{Ci}$ )(D g/L)(SS)]      |
| Chemist         | Relative Counting Error = Square Root of [(1/(Pu 236 cpm * min)) + (1 / (Pu 238 or 239/240 cpm * min))] * 1.96 * 100                         |
| JFR             |                                                                                                                                              |
| Analyst         |                                                                                                                                              |
| JMV             |                                                                                                                                              |
| Date Complete   |                                                                                                                                              |
| 05/08/96        | Pu 239/240 $\mu\text{Ci/mL}$ < 7.55E-06                                                                                                      |
| Analysis Date   | Relative Counting Error = 100.0%                                                                                                             |
| 05/07/96        |                                                                                                                                              |
| Analysis Time   | NOTE: Pu 238 Result is a LESS THAN Value.                                                                                                    |
| 12:00 PM        | Pu 238 $\mu\text{Ci/mL}$ < 7.55E-06                                                                                                          |
| Sample Point    | Relative Counting Error = 100.0%                                                                                                             |
| AY-101 GRAB     | Pu 236 Tracer Recovery = 40.5%                                                                                                               |

|                       |     |       |           |
|-----------------------|-----|-------|-----------|
| Analyst:              | JMV | Date: | 08-May-96 |
| Signature of Chemist: | JFR | Date: | 9 May 96  |

BLANK.WB1 REV 1.0

943128ML



WORKBOOK PAGE: SAM3

Pu 238 and 239/240 : LA-943-128 (A-1)

LIQUID / SOLID

|                 |                                                                                                                                                    |            |                                 | SAMPLE |            |
|-----------------|----------------------------------------------------------------------------------------------------------------------------------------------------|------------|---------------------------------|--------|------------|
| Type            | DATE COUNTED                                                                                                                                       | MAY-07-96  | PU 236 AEA FRAC (C236)          |        | 0.968      |
| SAMPLE          | SAMPLE VOLUME in mL                                                                                                                                | SS 1.000   | PU 238 AEA FRAC (C238)          |        | 0.000      |
| Work List       | SAMPLE DILUTION FACTOR                                                                                                                             | DF 1.000   | PU 239 AEA FRAC (C239)          |        | 0.000      |
| 8218            | TRACER VOLUME in mL                                                                                                                                | SPKV 0.100 | TOTAL AT COUNTS                 |        | 751        |
| Test Code       | DIGEST DILUTION FACTOR                                                                                                                             | DDF 1.0000 | AT COUNT TIME (MIN)             |        | 30         |
| @PU23901        | TRACER BOOK NO                                                                                                                                     | 120B43     | BACKGROUND in cpm (Bkg)         |        | 0.300      |
| Marta           | DETECTOR NUMBER                                                                                                                                    | 16         | PU 236 cpm                      |        | 13.920     |
| LIQUID          | EFFICIENCY FACTOR                                                                                                                                  | EFF 0.272  | PU 238 cpm                      |        | 0.000      |
| Batch Number    | TRACER PREPARATION DATE                                                                                                                            | 12/27/95   | PU 239 cpm                      |        | 0.000      |
| 96004092        | TRACER PREPARATION VALUE (dpm/mL)                                                                                                                  | 2390.000   | AEA COUNT TIME                  |        | 480        |
| Run             | PU-236 DECAY CORR'D VALUE (dpm/mL)                                                                                                                 | 2188.896   | Pu 239/240 $\mu$ Ci/L =         | <      | 7.5906E-03 |
| 0               | PU-238 TRACER VALUE (dpm/mL)                                                                                                                       | 0.000      |                                 |        |            |
| Sample Prep     |                                                                                                                                                    |            |                                 |        |            |
| N/A             |                                                                                                                                                    |            |                                 |        |            |
| Sample #        | Decay Time = Date Counted - Tracer Preparation Date                                                                                                |            |                                 |        |            |
| S96T001208      | Pu-236 Decay Corr'd Value = Pu-236 Preparation Value * [e to the power of $\{(-\ln 2 * \text{Decay Time})/1040.95\}$ ]                             |            |                                 |        |            |
| Instrument Code | Pu 236 Tracer Recovery = (Total AT Counts / TC - Bkg) * C236 * 100 / (Pu-236 Decay Corr'd Value * SPKV * EFF)                                      |            |                                 |        |            |
| WB27806         | Pu 239/240 $\mu$ Ci/L = (C239)(Pu 236 Decay Corr'd Value)(SPKV)(1000mL/L)(DF)(DDF) / [(C236)(SS)(D g/L)(2220000 dpm/ $\mu$ Ci)]                    |            |                                 |        |            |
| Prepared By     | Pu 238 dpm = [(Total AT Counts / TC) - Bkg * 1/EFF * C238] - (Pu-238 Tracer Value * SPKV * Pu 236 Tracer Recovery / 100)                           |            |                                 |        |            |
| SLH2            | Pu 238 $\mu$ Ci/L = [(Pu 238 dpm)(DF)(DDF)(1000mL/L)] / [(Pu-236 Tracer Recovery / 100)(2220000 dpm/ $\mu$ Ci)(D g/L)(SS)]                         |            |                                 |        |            |
| Chemist         | Relative Counting Error = Square Root of $\{[1/(\text{Pu 236 cpm} * \text{min})] + [1/(\text{Pu 238 or 239/240 cpm} * \text{min})]\} * 1.96 * 100$ |            |                                 |        |            |
| JFR             |                                                                                                                                                    |            |                                 |        |            |
| Analyst         |                                                                                                                                                    |            |                                 |        |            |
| JMV             |                                                                                                                                                    |            |                                 |        |            |
| Date Complete   |                                                                                                                                                    |            |                                 |        |            |
| 05/08/96        | Pu 239/240 $\mu$ Ci/mL                                                                                                                             | < 7.59E-06 | DETECTION LEVELS in $\mu$ Ci/mL |        |            |
| Analysis Date   | Relative Counting Error                                                                                                                            | = 100.0%   |                                 |        |            |
| 05/07/96        |                                                                                                                                                    |            | Pu 239/240                      |        |            |
| Analysis Time   | NOTE: Pu 238 Result is a LESS THAN Value.                                                                                                          |            |                                 |        |            |
| 12:00 PM        | Pu 238 $\mu$ Ci/mL                                                                                                                                 | < 7.59E-06 | 7.59E-06                        |        |            |
| Sample Point    | Relative Counting Error                                                                                                                            | = 100.0%   | Pu 238                          |        |            |
| AY-101 GRAB     | Pu 236 Tracer Recovery                                                                                                                             | = 40.3%    | 7.59E-06                        |        |            |

|                       |          |       |           |
|-----------------------|----------|-------|-----------|
| Analyst:              | JMV      | Date: | 08-May-96 |
| Signature of Chemist: | JFR      | Date: | 9 May 96  |
| SAMPLE.WB1 REV 1.0    | 943128ML |       |           |

WORKBOOK PAGE: DUP4

Pu 238 and 239/240 : LA-943-128 (A-1)

LIQUID / SOLID

| Type         | DATE COUNTED                       | MAY-07-96 | PU 236 AEA FRAC (C236)  | DUP          |
|--------------|------------------------------------|-----------|-------------------------|--------------|
| DUP          | SAMPLE VOLUME in mL                | SS        | 1.000                   | 0.986        |
| Work List    | SAMPLE DILUTION FACTOR             | DF        | 1.000                   | 0.000        |
| 8218         | TRACER VOLUME in mL                | SPKV      | 0.100                   | 0.000        |
| Test Code    | DIGEST DILUTION FACTOR             | DDF       | 1.0000                  | 749          |
| @PU23901     | TRACER BOOK NO                     | 120B43    | AT COUNT TIME (MIN)     | 30           |
| Matrix       | DETECTOR NUMBER                    | 16        | BACKGROUND in cpm (Bkg) | 0.300        |
| LIQUID       | EFFICIENCY FACTOR                  | EFF       | PU 236 cpm              | 14.790       |
| Batch Number | TRACER PREPARATION DATE            | 12/27/95  | PU 238 cpm              | 0.000        |
| 96004092     | TRACER PREPARATION VALUE (dpm/mL)  | 2390.000  | PU 239 cpm              | 0.000        |
| Rerun        | PU-236 DECAY CORR'D VALUE (dpm/mL) | 2188.896  | AEA COUNT TIME          | 480          |
| 0            | PU-238 TRACER VALUE (dpm/mL)       | 0.000     | Pu 239/240 $\mu$ Ci/L = | < 7.3357E-03 |

Sample Prep

N/A

Sample #

S96T001208

Instrument Code

WB27806

Prepared By

SLH2

Chemist

JFR

Analyst

JMV

Date Complete

05/06/96

Analysis Date

05/07/96

Analysis Time

12:00 PM

Sample Point

AY-101 GRAB

Decay Time = Date Counted - Tracer Preparation Date

Pu-236 Decay Corr'd Value = Pu-236 Preparation Value \* [e to the power of {(-ln2 \* Decay Time/1040.95)}]

Pu 236 Tracer Recovery = (Total AT Counts / TC - Bkg) \* C236 \* 100 / (Pu-236 Decay Corr'd Value \* SPKV \* EFF)

Pu 239/240  $\mu$ Ci/L = (C239) (Pu 236 Decay Corr'd Value) (SPKV) (1000 mL/L) (DF) (DDF) / [(C236) (SS) (D g/L) (2220000 dpm/ $\mu$ Ci)]

Pu 238 dpm = [(Total AT Counts / TC) - Bkg \* 1/EFF \* C238] - (Pu-238 Tracer Value \* SPKV \* Pu 236 Tracer Recovery / 100)

Pu 238  $\mu$ Ci/L = [(Pu 238 dpm) (DF) (DDF) (1000 mL/L)] / [(Pu-236 Tracer Recovery / 100) (2220000 dpm/ $\mu$ Ci) (D g/L) (SS)]

Relative Counting Error = Square Root of [(1 / (Pu 236 cpm \* min)) + (1 / (Pu 238 or 239/240 cpm \* min))] \* 1.96 \* 100

Pu 239/240  $\mu$ Ci/mL < 7.34E-06

Relative Counting Error = 100.0%

NOTE: Pu 238 Result is a LESS THAN Value.

Pu 238  $\mu$ Ci/mL < 7.34E-06

Relative Counting Error = 100.0%

Pu 236 Tracer Recovery = 40.9%

DETECTION

LEVELS

in  $\mu$ Ci/mL

Pu 239/240

7.34E-06

Pu 238

7.34E-06

Analyst

JMV

Date

08-May-96

Signature of Chemist:

*John Rebyca*

JFR

Date:

9 May 96

SAMPLE.WB1 REV 1.0

943128ML

D.H. Milicia

Westinghouse Hanford Co.  
GENERAL ALPHA ENERGY ANALYSIS  
Rev. 2.02

WHC-SD-WM-DP-178, REV. 1  
DATA REDUCTION REPORT

SAMPLE  
WL8218-STD  
File ID: 19a1959.CNF

Counted on: 5/ 7/96 @18:53  
Detector: AEA19  
Geometry number: 1  
Count time: 28801. Sec

PEAK ANALYSIS

| Peak<br>ID | Peak height |       | Peak center |         | FWHM    |        | Tau     |       |
|------------|-------------|-------|-------------|---------|---------|--------|---------|-------|
|            | Initial     | Final | Initial     | Final   | Initial | Final  | Initial | Final |
| 1          | 579.5       | 579.5 | 350.866     | 350.866 | 26.000  | 24.894 | 13.000  | 6.622 |
| 2          | 231.3       | 231.3 | 298.257     | 297.986 | 24.000  | 7.610  | 12.000  | 1.127 |
| 3          | 56.9        | 56.9  | 293.053     | 293.053 | 18.000  | 0.189  | 9.000   | 0.058 |
| 4          | 214.1       | 214.1 | 224.694     | 224.435 | 18.000  | 9.614  | 9.000   | 1.469 |

PEAK RESULTS

Peak Error Limit: 30%

| Peak    |         | AEA   |                        | Peak Centroid |       |      | Count |      | %err | Activity |           |
|---------|---------|-------|------------------------|---------------|-------|------|-------|------|------|----------|-----------|
| ID      | Isotope | Frac  | Exp.                   | Obs.          | Diff. | FWHM | Rate  | c/m  |      | d/m      | uCi/ea    |
| 1       | Ra224   | 0.551 | 5.686                  | 5.700         | -.014 | 0.11 | 34.66 | 1.5  |      | 234.8    | 0.106E-03 |
|         | Pu236   |       | 5.755                  | 5.700         | 0.055 |      |       |      |      | 225.3    | 0.101E-03 |
| 2       | Am241   | 0.242 | 5.479                  | 5.457         | 0.022 | 0.04 | 15.22 | 2.4  |      | 103.2    | 0.465E-04 |
|         | Pu238   |       | 5.487                  | 5.457         | 0.030 |      |       |      |      | 134.7    | 0.607E-04 |
| 3       | Th228   | 0.024 | 5.400                  | 5.434         | -.034 | 0.00 | 1.52  | 21.5 |      | 13.6     | 0.612E-05 |
| 4       | Pu239   | 0.226 | 5.147                  | 5.118         | 0.029 | 0.04 | 14.20 | 2.5  |      | 90.4     | 0.407E-04 |
|         | Pu240   |       | 5.144                  | 5.118         | 0.026 |      |       |      |      | 90.4     | 0.407E-04 |
| -----   |         |       |                        |               |       |      |       |      |      |          |           |
| Totals: |         | 1.042 | <--valid peaks only--> |               |       |      | 65.60 |      |      |          |           |

DETECTOR CALIBRATION

Energy(MEV) = 4.086 + (0.0046)\*Channel  
Energy range (MeV): 4.086 TO 6.441  
Efficiency = 0.1570 CPM/DPM

TOTAL COUNT DATA:

| Item          | Total   | % Recovery |
|---------------|---------|------------|
| Raw spectrum  | 30206.0 | 100.000    |
| Smoothed      | 30206.3 | 100.001    |
| Composite fit | 31487.5 | 104.243    |
| Residuals     | -1281.5 | -4.243     |

Analyzed by: \_\_\_\_\_

DM

WHC-SD-WM-DP-178, REV. /

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| Raw Data Dump for AEA Spectrum: 19a1959.CNF |      |      |      |      |      |      | WHC-SD-WM-DP-178, REV. / |      |      |      |
|---------------------------------------------|------|------|------|------|------|------|--------------------------|------|------|------|
| 1                                           | 0.   | 0.   | 0.   | 1.   | 0.   | 1.   | 0.                       | 0.   | 1.   | 0.   |
| 11                                          | 1.   | 0.   | 0.   | 0.   | 0.   | 0.   | 1.                       | 0.   | 0.   | 1.   |
| 21                                          | 0.   | 0.   | 1.   | 0.   | 2.   | 0.   | 0.                       | 2.   | 0.   | 0.   |
| 31                                          | 0.   | 0.   | 2.   | 0.   | 0.   | 0.   | 2.                       | 0.   | 1.   | 0.   |
| 41                                          | 0.   | 0.   | 0.   | 0.   | 1.   | 0.   | 0.                       | 0.   | 1.   | 1.   |
| 51                                          | 0.   | 0.   | 0.   | 0.   | 0.   | 2.   | 1.                       | 1.   | 2.   | 1.   |
| 61                                          | 0.   | 2.   | 0.   | 1.   | 0.   | 1.   | 0.                       | 3.   | 1.   | 0.   |
| 71                                          | 0.   | 0.   | 0.   | 1.   | 0.   | 0.   | 0.                       | 2.   | 2.   | 1.   |
| 81                                          | 1.   | 1.   | 3.   | 0.   | 1.   | 1.   | 0.                       | 0.   | 2.   | 0.   |
| 91                                          | 0.   | 0.   | 0.   | 1.   | 1.   | 0.   | 0.                       | 1.   | 0.   | 1.   |
| 101                                         | 0.   | 1.   | 0.   | 2.   | 0.   | 0.   | 2.                       | 1.   | 3.   | 0.   |
| 111                                         | 1.   | 0.   | 1.   | 1.   | 0.   | 2.   | 2.                       | 4.   | 0.   | 2.   |
| 121                                         | 2.   | 1.   | 2.   | 1.   | 2.   | 1.   | 2.                       | 1.   | 1.   | 3.   |
| 131                                         | 1.   | 3.   | 2.   | 1.   | 2.   | 4.   | 0.                       | 2.   | 0.   | 2.   |
| 141                                         | 0.   | 1.   | 1.   | 3.   | 3.   | 3.   | 1.                       | 3.   | 4.   | 1.   |
| 151                                         | 4.   | 1.   | 7.   | 3.   | 4.   | 5.   | 4.                       | 6.   | 3.   | 3.   |
| 161                                         | 8.   | 5.   | 5.   | 4.   | 7.   | 6.   | 12.                      | 3.   | 11.  | 9.   |
| 171                                         | 14.  | 9.   | 7.   | 10.  | 9.   | 8.   | 13.                      | 16.  | 14.  | 18.  |
| 181                                         | 15.  | 27.  | 23.  | 19.  | 23.  | 25.  | 24.                      | 26.  | 23.  | 28.  |
| 191                                         | 33.  | 36.  | 45.  | 49.  | 45.  | 49.  | 57.                      | 66.  | 71.  | 85.  |
| 201                                         | 87.  | 95.  | 90.  | 111. | 137. | 115. | 142.                     | 136. | 132. | 164. |
| 211                                         | 159. | 166. | 191. | 195. | 204. | 209. | 215.                     | 229. | 211. | 216. |
| 221                                         | 215. | 220. | 214. | 240. | 230. | 221. | 227.                     | 208. | 202. | 181. |
| 231                                         | 142. | 88.  | 37.  | 21.  | 16.  | 5.   | 3.                       | 8.   | 5.   | 7.   |
| 241                                         | 8.   | 6.   | 12.  | 9.   | 10.  | 9.   | 19.                      | 17.  | 15.  | 20.  |
| 251                                         | 16.  | 16.  | 20.  | 21.  | 19.  | 18.  | 25.                      | 23.  | 30.  | 39.  |
| 261                                         | 27.  | 44.  | 38.  | 29.  | 34.  | 55.  | 52.                      | 61.  | 62.  | 55.  |
| 271                                         | 66.  | 71.  | 81.  | 91.  | 102. | 124. | 87.                      | 125. | 138. | 157. |
| 281                                         | 168. | 166. | 163. | 221. | 185. | 241. | 225.                     | 203. | 226. | 226. |
| 291                                         | 233. | 242. | 253. | 274. | 204. | 227. | 234.                     | 231. | 246. | 255. |
| 301                                         | 231. | 186. | 155. | 99.  | 69.  | 64.  | 67.                      | 53.  | 49.  | 48.  |
| 311                                         | 31.  | 33.  | 41.  | 42.  | 51.  | 43.  | 43.                      | 45.  | 65.  | 56.  |
| 321                                         | 66.  | 94.  | 104. | 102. | 126. | 124. | 117.                     | 137. | 158. | 190. |
| 331                                         | 194. | 189. | 199. | 227. | 263. | 280. | 287.                     | 325. | 357. | 395. |
| 341                                         | 391. | 430. | 453. | 425. | 525. | 492. | 543.                     | 562. | 614. | 605. |
| 351                                         | 599. | 607. | 571. | 506. | 534. | 478. | 525.                     | 484. | 480. | 485. |
| 361                                         | 443. | 356. | 246. | 123. | 54.  | 5.   | 3.                       | 0.   | 0.   | 0.   |
| 371                                         | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 1.                       | 0.   | 0.   | 0.   |
| 381                                         | 0.   | 0.   | 0.   | 0.   | 0.   | 1.   | 1.                       | 1.   | 1.   | 0.   |
| 391                                         | 0.   | 2.   | 1.   | 0.   | 0.   | 0.   | 1.                       | 0.   | 1.   | 0.   |
| 401                                         | 0.   | 0.   | 0.   | 0.   | 3.   | 1.   | 2.                       | 1.   | 3.   | 5.   |
| 411                                         | 3.   | 1.   | 1.   | 1.   | 3.   | 3.   | 0.                       | 4.   | 0.   | 1.   |
| 421                                         | 3.   | 2.   | 2.   | 3.   | 3.   | 1.   | 1.                       | 0.   | 0.   | 0.   |
| 431                                         | 1.   | 1.   | 2.   | 0.   | 0.   | 2.   | 0.                       | 1.   | 1.   | 1.   |
| 441                                         | 2.   | 1.   | 0.   | 0.   | 0.   | 1.   | 0.                       | 1.   | 2.   | 1.   |
| 451                                         | 0.   | 1.   | 1.   | 2.   | 3.   | 3.   | 6.                       | 1.   | 4.   | 3.   |
| 461                                         | 2.   | 3.   | 3.   | 7.   | 2.   | 4.   | 4.                       | 5.   | 7.   | 3.   |
| 471                                         | 5.   | 4.   | 2.   | 2.   | 3.   | 7.   | 0.                       | 1.   | 2.   | 0.   |
| 481                                         | 1.   | 0.   | 0.   | 1.   | 0.   | 0.   | 0.                       | 0.   | 0.   | 1.   |
| 491                                         | 0.   | 0.   | 1.   | 0.   | 0.   | 0.   | 0.                       | 0.   | 0.   | 0.   |
| 511                                         | 0.   | 0.   |      |      |      |      |                          |      |      |      |

*D. H. Miller*

Westinghouse Hanford Co.  
 G E N E R A L   A L P H A   E N E R G Y   A N A L Y S I S  
 Rev. 2.02

DATA REDUCTION REPORT

SAMPLE      WHC-SD-WM-DP-178, REV. 1  
 WL8218-BLK  
 File ID: 20a2090.CNF

Counted on:            5/ 7/96 @18:53  
 Detector:            AEA20  
 Geometry number: 1  
 Count time:                    28802. Sec

PEAK ANALYSIS

| Peak<br>ID | Peak height |       | Peak center |         | FWHM    |       | Tau     |       |
|------------|-------------|-------|-------------|---------|---------|-------|---------|-------|
|            | Initial     | Final | Initial     | Final   | Initial | Final | Initial | Final |
| 1          | 391.0       | 391.0 | 362.235     | 362.235 | 8.000   | 2.923 | 4.000   | 0.816 |
| 2          | 9.9         | 9.9   | 288.168     | 288.047 | 12.000  | 7.180 | 6.000   | 1.563 |

PEAK RESULTS  
 Peak Error Limit: 30%

| Peak<br>ID | Isotope | AEA<br>Frac | Peak Centroid<br>Exp.    Obs.    Diff. | FWHM  | Count<br>Rate c/m | %err<br>@95 | d/m   | Activity<br>uCi/ea |
|------------|---------|-------------|----------------------------------------|-------|-------------------|-------------|-------|--------------------|
| 1          | Pu236   | 0.967       | 5.755   5.756   -.001                  | 10.01 | 14.23             | 2.4         | 441.4 | 0.199E-03          |
| 2          | Th228   | 0.034       | 5.400   5.414   -.014                  | 10.03 | 0.49              | 14.3        | 21.1  | 0.951E-05          |
| Totals:    |         | 1.001       | <--valid peaks only-->                 |       | 14.72             |             |       |                    |

DETECTOR CALIBRATION  
 Energy(MEV) = 4.089 + (0.0046)\*Channel  
 Energy range (MeV): 4.089 TO 6.445  
 Efficiency = 0.0329 CPM/DPM

TOTAL COUNT DATA:

| Item          | Total  | % Recovery |
|---------------|--------|------------|
| Raw spectrum  | 7064.0 | 100.000    |
| Smoothed      | 7064.0 | 100.000    |
| Composite fit | 7067.9 | 100.056    |
| Residuals     | -3.9   | -0.056     |

Analyzed by: \_\_\_\_\_  
 DM

[illegible]

|     |      |      |      |      |      |      |      |      |      |      |
|-----|------|------|------|------|------|------|------|------|------|------|
| 1   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 1.   | 0.   |
| 11  | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 1.   | 0.   |
| 21  | 1.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   |
| 31  | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 1.   |
| 41  | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   |
| 51  | 1.   | 0.   | 1.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   |
| 61  | 0.   | 0.   | 0.   | 1.   | 0.   | 0.   | 0.   | 1.   | 0.   | 0.   |
| 71  | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   |
| 81  | 0.   | 1.   | 0.   | 0.   | 0.   | 1.   | 0.   | 0.   | 0.   | 0.   |
| 91  | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   |
| 101 | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 1.   | 0.   | 0.   |
| 111 | 0.   | 0.   | 2.   | 0.   | 0.   | 0.   | 0.   | 0.   | 1.   | 0.   |
| 121 | 0.   | 0.   | 0.   | 1.   | 0.   | 0.   | 0.   | 1.   | 0.   | 0.   |
| 131 | 1.   | 0.   | 0.   | 0.   | 0.   | 1.   | 0.   | 0.   | 1.   | 0.   |
| 141 | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 1.   | 0.   | 0.   |
| 151 | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 1.   | 0.   | 0.   | 0.   |
| 161 | 0.   | 0.   | 0.   | 0.   | 1.   | 0.   | 0.   | 0.   | 0.   | 1.   |
| 171 | 0.   | 0.   | 0.   | 0.   | 0.   | 1.   | 1.   | 1.   | 0.   | 0.   |
| 181 | 1.   | 0.   | 1.   | 0.   | 0.   | 0.   | 0.   | 1.   | 0.   | 0.   |
| 191 | 0.   | 0.   | 0.   | 0.   | 1.   | 1.   | 1.   | 0.   | 0.   | 0.   |
| 201 | 1.   | 0.   | 0.   | 3.   | 0.   | 0.   | 0.   | 1.   | 1.   | 0.   |
| 211 | 0.   | 3.   | 0.   | 0.   | 1.   | 1.   | 0.   | 1.   | 1.   | 0.   |
| 221 | 1.   | 1.   | 1.   | 0.   | 2.   | 2.   | 1.   | 3.   | 3.   | 0.   |
| 231 | 0.   | 1.   | 1.   | 0.   | 2.   | 1.   | 3.   | 1.   | 0.   | 1.   |
| 241 | 2.   | 0.   | 1.   | 3.   | 1.   | 0.   | 1.   | 2.   | 1.   | 2.   |
| 251 | 1.   | 1.   | 0.   | 2.   | 1.   | 0.   | 2.   | 5.   | 1.   | 6.   |
| 261 | 4.   | 2.   | 3.   | 3.   | 3.   | 2.   | 5.   | 4.   | 6.   | 5.   |
| 271 | 6.   | 9.   | 3.   | 4.   | 6.   | 4.   | 2.   | 8.   | 2.   | 7.   |
| 281 | 11.  | 10.  | 7.   | 6.   | 3.   | 10.  | 13.  | 13.  | 15.  | 11.  |
| 291 | 5.   | 6.   | 6.   | 3.   | 6.   | 9.   | 4.   | 5.   | 5.   | 6.   |
| 301 | 6.   | 3.   | 7.   | 8.   | 9.   | 6.   | 9.   | 10.  | 9.   | 9.   |
| 311 | 11.  | 7.   | 5.   | 18.  | 10.  | 16.  | 17.  | 21.  | 23.  | 19.  |
| 321 | 27.  | 17.  | 19.  | 24.  | 32.  | 33.  | 31.  | 34.  | 30.  | 23.  |
| 331 | 40.  | 40.  | 51.  | 43.  | 39.  | 43.  | 52.  | 53.  | 58.  | 60.  |
| 341 | 67.  | 55.  | 76.  | 79.  | 111. | 97.  | 104. | 132. | 149. | 195. |
| 351 | 200. | 267. | 284. | 257. | 241. | 210. | 218. | 253. | 297. | 331. |
| 361 | 400. | 426. | 497. | 404. | 266. | 92.  | 28.  | 1.   | 0.   | 0.   |
| 371 | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   |
| 381 | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   |
| 391 | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 1.   | 0.   |
| 401 | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 1.   | 0.   | 0.   | 0.   |
| 411 | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   |
| 421 | 0.   | 0.   | 0.   | 1.   | 0.   | 0.   | 1.   | 0.   | 0.   | 0.   |
| 431 | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   |
| 441 | 0.   | 0.   | 0.   | 0.   | 0.   | 1.   | 1.   | 0.   | 0.   | 0.   |
| 451 | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   |
| 461 | 1.   | 0.   | 1.   | 0.   | 1.   | 0.   | 0.   | 0.   | 0.   | 0.   |
| 471 | 0.   | 1.   | 0.   | 0.   | 0.   | 0.   | 1.   | 0.   | 0.   | 0.   |
| 481 | 0.   | 0.   | 0.   | 0.   | 0.   | 1.   | 0.   | 0.   | 0.   | 0.   |
| 491 | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   |
| 511 | 0.   | 0.   |      |      |      |      |      |      |      |      |



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 G E N E R A L    A L P H A    E N E R G Y    A N A L Y S I S  
 Rev. 2.02

WHC-SD-WM-DP-178, REV. 1

DATA REDUCTION REPORT

SAMPLE  
 S96T1208-SAM  
 File ID: 21a2194.CNF

Counted on:            5/ 7/96 @18:54  
 Detector:            AEA21  
 Geometry number: 1  
 Count time:                    28803. Sec

PEAK ANALYSIS

| Peak<br>ID | Peak height |       | Peak center |         | FWHM    |       | Tau     |       |
|------------|-------------|-------|-------------|---------|---------|-------|---------|-------|
|            | Initial     | Final | Initial     | Final   | Initial | Final | Initial | Final |
| 1          | 354.8       | 354.8 | 360.027     | 360.027 | 14.000  | 6.797 | 7.000   | 2.129 |

PEAK RESULTS

Peak Error Limit: 30%

| Peak<br>ID | Isotope | AEA<br>Frac | Peak Centroid<br>Exp. Obs. Diff. | FWHM | Count<br>Rate c/m | %err<br>@95 | d/m   | Activity<br>uCi/ea |
|------------|---------|-------------|----------------------------------|------|-------------------|-------------|-------|--------------------|
| 1          | Ra224   | 0.968       | 5.686 5.734 -.048                | 0.03 | 13.92             | 2.4         | 736.9 | 0.332E-03          |
|            | Pu236   |             | 5.755 5.734 0.021                |      |                   |             | 706.8 | 0.318E-03          |
| Totals:    |         | 0.968       | <--valid peaks only-->           |      | 13.92             |             |       |                    |

DETECTOR CALIBRATION

Energy(MEV) = 4.078 + (0.0046)\*Channel  
 Energy range (MeV): 4.078 TO 6.433  
 Efficiency = 0.0201 CPM/DPM

TOTAL COUNT DATA:

| Item          | Total  | % Recovery |
|---------------|--------|------------|
| Raw spectrum  | 6904.0 | 100.000    |
| Smoothed      | 6903.9 | 99.999     |
| Composite fit | 6683.8 | 96.810     |
| Residuals     | 220.2  | 3.190      |

Analyzed by: \_\_\_\_\_

DM

1 Legend: Raw = .... Modeled Peaks = 1,2,..., etc

Display Max.: 2358.6

WHC-SD-WM-DP-178, REV. 1

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.....1  
.....1

|     |      |      |      |      |      |      |      |      |      |      |
|-----|------|------|------|------|------|------|------|------|------|------|
| 1   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   |
| 11  | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   |
| 21  | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   |
| 31  | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   |
| 41  | 0.   | 1.   | 0.   | 0.   | 1.   | 0.   | 0.   | 0.   | 0.   | 0.   |
| 51  | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 1.   | 0.   | 0.   | 0.   |
| 61  | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   |
| 71  | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   |
| 81  | 0.   | 1.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   |
| 91  | 0.   | 0.   | 0.   | 0.   | 0.   | 1.   | 0.   | 0.   | 0.   | 0.   |
| 101 | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   |
| 111 | 0.   | 0.   | 1.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   |
| 121 | 1.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   |
| 131 | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 1.   | 0.   |
| 141 | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 1.   | 0.   | 0.   | 0.   |
| 151 | 2.   | 0.   | 1.   | 1.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   |
| 161 | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   |
| 171 | 0.   | 0.   | 0.   | 1.   | 0.   | 1.   | 0.   | 0.   | 0.   | 0.   |
| 181 | 1.   | 0.   | 0.   | 1.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   |
| 191 | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   |
| 201 | 0.   | 0.   | 1.   | 1.   | 1.   | 2.   | 0.   | 1.   | 0.   | 0.   |
| 211 | 0.   | 2.   | 0.   | 0.   | 0.   | 1.   | 1.   | 1.   | 0.   | 0.   |
| 221 | 3.   | 1.   | 1.   | 0.   | 1.   | 2.   | 1.   | 3.   | 0.   | 1.   |
| 231 | 2.   | 1.   | 4.   | 0.   | 1.   | 0.   | 2.   | 1.   | 1.   | 0.   |
| 241 | 0.   | 0.   | 0.   | 0.   | 1.   | 1.   | 0.   | 0.   | 0.   | 0.   |
| 251 | 1.   | 2.   | 0.   | 0.   | 3.   | 2.   | 1.   | 0.   | 0.   | 1.   |
| 261 | 0.   | 0.   | 3.   | 2.   | 4.   | 4.   | 1.   | 1.   | 4.   | 8.   |
| 271 | 1.   | 1.   | 2.   | 2.   | 6.   | 3.   | 2.   | 3.   | 4.   | 3.   |
| 281 | 4.   | 1.   | 4.   | 4.   | 5.   | 4.   | 8.   | 7.   | 2.   | 1.   |
| 291 | 5.   | 7.   | 3.   | 3.   | 6.   | 2.   | 5.   | 4.   | 2.   | 3.   |
| 301 | 5.   | 3.   | 6.   | 6.   | 3.   | 6.   | 7.   | 4.   | 6.   | 6.   |
| 311 | 9.   | 8.   | 5.   | 7.   | 7.   | 11.  | 8.   | 20.  | 17.  | 14.  |
| 321 | 7.   | 16.  | 15.  | 19.  | 14.  | 19.  | 17.  | 23.  | 27.  | 24.  |
| 331 | 23.  | 42.  | 31.  | 35.  | 37.  | 35.  | 44.  | 60.  | 58.  | 62.  |
| 341 | 61.  | 78.  | 69.  | 98.  | 116. | 118. | 138. | 156. | 170. | 222. |
| 351 | 222. | 229. | 258. | 244. | 277. | 292. | 305. | 368. | 397. | 385. |
| 361 | 376. | 341. | 344. | 226. | 167. | 127. | 78.  | 31.  | 20.  | 5.   |
| 371 | 3.   | 1.   | 0.   | 1.   | 1.   | 0.   | 0.   | 0.   | 0.   | 0.   |
| 381 | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   |
| 391 | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   |
| 401 | 1.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   |
| 411 | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   |
| 421 | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   |
| 431 | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 1.   | 0.   | 0.   | 0.   |
| 441 | 1.   | 0.   | 0.   | 0.   | 1.   | 0.   | 0.   | 0.   | 0.   | 0.   |
| 451 | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 1.   | 0.   | 0.   | 0.   |
| 461 | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   |
| 471 | 0.   | 1.   | 1.   | 1.   | 2.   | 0.   | 0.   | 0.   | 1.   | 0.   |
| 481 | 0.   | 0.   | 0.   | 0.   | 0.   | 1.   | 0.   | 0.   | 0.   | 0.   |
| 491 | 0.   | 0.   | 0.   | 1.   | 1.   | 0.   | 0.   | 0.   | 0.   | 0.   |
| 511 | 0.   | 0.   |      |      |      |      |      |      |      |      |

*D. H 921 ilcia*

Westinghouse Hanford Co.  
GENERAL ALPHA ENERGY ANALYSIS  
Rev. 2.02

DATA REDUCTION REPORT

SAMPLE  
S96T1208-DUP  
File ID: 22a2288.CNF

WHC-SD-WM-DP-178, REV. 1

Counted on: 5/ 7/96 @18:55  
Detector: AEA22  
Geometry number: 1  
Count time: 28802. Sec

PEAK ANALYSIS

| Peak ID | Peak height |       | Peak center |         | FWHM    |       | Tau     |       |
|---------|-------------|-------|-------------|---------|---------|-------|---------|-------|
|         | Initial     | Final | Initial     | Final   | Initial | Final | Initial | Final |
| 1       | 430.0       | 430.0 | 360.432     | 360.432 | 10.000  | 3.184 | 5.000   | 0.980 |

PEAK RESULTS

Peak Error Limit: 30%

| Peak ID | Isotope | AEA Frac | Peak Centroid Exp.     | Obs.  | Diff. | FWHM  | Count Rate c/m | %err @95 | d/m   | Activity uCi/ea |  |
|---------|---------|----------|------------------------|-------|-------|-------|----------------|----------|-------|-----------------|--|
| 1       | Pu236   | 0.986    | 5.755                  | 5.756 | -.001 | 10.01 | 14.79          | 2.3      | 510.0 | 0.230E-03       |  |
| Totals: |         | 0.986    | <--valid peaks only--> |       |       |       | 14.79          |          |       |                 |  |

DETECTOR CALIBRATION

Energy(MEV) = 4.098 + (0.0046)\*Channel  
Energy range (MeV): 4.098 TO 6.454  
Efficiency = 0.0296 CPM/DPM

TOTAL COUNT DATA:

| Item          | Total  | % Recovery |
|---------------|--------|------------|
| Raw spectrum  | 7205.0 | 100.000    |
| Smoothed      | 7206.0 | 100.013    |
| Composite fit | 7101.5 | 98.564     |
| Residuals     | 103.5  | 1.436      |

Analyzed by: \_\_\_\_\_

DM

1 Legend: Raw = .... Modeled Peaks = 1,2,..., etc

Display Max.:

2480.0

WHC-SD-WM-DP-178, REV. /

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1  
.1  
...1  
..... 1  
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.....1.

Raw Data Dump for AEA Spectrum: 22a2288.CNF

WHC-SD-WM-DP-178, REV. 1

|     |      |      |      |      |      |      |      |      |      |      |
|-----|------|------|------|------|------|------|------|------|------|------|
| 1   | 0.   | 0.   | 0.   | 0.   | 1.   | 0.   | 0.   | 0.   | 0.   | 0.   |
| 11  | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 1.   | 1.   | 1.   | 0.   |
| 21  | 0.   | 0.   | 0.   | 0.   | 0.   | 1.   | 0.   | 1.   | 2.   | 0.   |
| 31  | 0.   | 0.   | 0.   | 1.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   |
| 41  | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   |
| 51  | 0.   | 0.   | 1.   | 0.   | 0.   | 1.   | 0.   | 1.   | 0.   | 0.   |
| 61  | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   |
| 71  | 0.   | 0.   | 1.   | 0.   | 0.   | 0.   | 0.   | 1.   | 0.   | 0.   |
| 81  | 0.   | 0.   | 1.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   |
| 91  | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 1.   | 0.   |
| 101 | 0.   | 0.   | 0.   | 0.   | 0.   | 2.   | 1.   | 0.   | 0.   | 0.   |
| 111 | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   |
| 121 | 1.   | 0.   | 1.   | 0.   | 0.   | 1.   | 0.   | 1.   | 0.   | 0.   |
| 131 | 0.   | 0.   | 0.   | 1.   | 0.   | 0.   | 0.   | 0.   | 0.   | 1.   |
| 141 | 0.   | 0.   | 0.   | 1.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   |
| 151 | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   |
| 161 | 0.   | 0.   | 0.   | 0.   | 0.   | 1.   | 0.   | 0.   | 1.   | 0.   |
| 171 | 0.   | 1.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   |
| 181 | 0.   | 2.   | 0.   | 0.   | 1.   | 0.   | 1.   | 0.   | 1.   | 1.   |
| 191 | 0.   | 2.   | 0.   | 0.   | 2.   | 0.   | 0.   | 0.   | 0.   | 1.   |
| 201 | 0.   | 0.   | 1.   | 1.   | 1.   | 0.   | 0.   | 0.   | 0.   | 2.   |
| 211 | 0.   | 0.   | 1.   | 0.   | 2.   | 1.   | 0.   | 2.   | 0.   | 1.   |
| 221 | 0.   | 3.   | 3.   | 2.   | 1.   | 1.   | 2.   | 0.   | 1.   | 2.   |
| 231 | 2.   | 1.   | 0.   | 1.   | 0.   | 0.   | 3.   | 0.   | 1.   | 0.   |
| 241 | 0.   | 2.   | 0.   | 1.   | 1.   | 0.   | 0.   | 0.   | 0.   | 0.   |
| 251 | 0.   | 0.   | 0.   | 1.   | 0.   | 2.   | 1.   | 1.   | 1.   | 1.   |
| 261 | 3.   | 0.   | 1.   | 0.   | 2.   | 2.   | 2.   | 1.   | 1.   | 1.   |
| 271 | 3.   | 2.   | 0.   | 0.   | 3.   | 1.   | 2.   | 2.   | 1.   | 2.   |
| 281 | 0.   | 0.   | 3.   | 1.   | 3.   | 2.   | 1.   | 4.   | 1.   | 3.   |
| 291 | 4.   | 2.   | 5.   | 3.   | 1.   | 4.   | 4.   | 8.   | 10.  | 4.   |
| 301 | 7.   | 6.   | 6.   | 8.   | 6.   | 6.   | 5.   | 6.   | 6.   | 12.  |
| 311 | 11.  | 8.   | 7.   | 10.  | 13.  | 14.  | 15.  | 15.  | 9.   | 8.   |
| 321 | 20.  | 21.  | 17.  | 22.  | 17.  | 22.  | 28.  | 22.  | 21.  | 39.  |
| 331 | 26.  | 36.  | 30.  | 41.  | 46.  | 46.  | 54.  | 57.  | 70.  | 77.  |
| 341 | 76.  | 79.  | 84.  | 103. | 123. | 140. | 166. | 184. | 204. | 249. |
| 351 | 289. | 285. | 263. | 227. | 243. | 240. | 334. | 342. | 428. | 513. |
| 361 | 532. | 417. | 388. | 161. | 49.  | 9.   | 0.   | 0.   | 0.   | 0.   |
| 371 | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   |
| 381 | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   |
| 391 | 0.   | 0.   | 0.   | 1.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   |
| 401 | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   |
| 411 | 0.   | 0.   | 0.   | 0.   | 1.   | 0.   | 0.   | 0.   | 0.   | 0.   |
| 421 | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   |
| 431 | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   |
| 441 | 0.   | 0.   | 0.   | 0.   | 0.   | 1.   | 1.   | 0.   | 0.   | 0.   |
| 451 | 0.   | 0.   | 0.   | 0.   | 1.   | 0.   | 0.   | 0.   | 0.   | 0.   |
| 461 | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   |
| 471 | 0.   | 0.   | 0.   | 0.   | 0.   | 1.   | 0.   | 0.   | 0.   | 0.   |
| 481 | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   |
| 491 | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   |
| 511 | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   | 0.   |



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PART II

WHC-SD-WM-DP-178, REV. 0

**ANALYTICAL SERVICES**

**45-DAY SAFETY SCREENING RESULTS  
FOR TANK 241-AY-101, GRAB SAMPLES  
1AY-96-1 THROUGH 1AY-96-10 AND 1AY-96-FB**

**Project Coordinator: MICHELLE D. ROLLISON**

**Prepared for the U.S. Department of Energy  
Office of Environmental Restoration  
and Waste Management**

**by**

**Westinghouse Hanford Company  
Box 1970  
Richland, Washington**

**2-1**

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TABLE OF CONTENTS

|                                                                                                  |       |
|--------------------------------------------------------------------------------------------------|-------|
| Narrative . . . . .                                                                              | 2-4   |
| AY-101 Grab Sample Breakdown (Attachment 1) . . . . .                                            | 2-14  |
| Sample Data Summary . . . . .                                                                    | 2-20  |
| Inorganic Analyses . . . . .                                                                     | 2-33  |
| Differential Scanning Calorimetry (DSC)                                                          |       |
| DSC Worklist # 6619 (1275) . . . . .                                                             | 2-35  |
| DSC Worklist # 6623 (1317) . . . . .                                                             | 2-40  |
| DSC Worklist # 6744 (1318) . . . . .                                                             | 2-45  |
| DSC Worklist # 6746 (1201, 1202) . . . . .                                                       | 2-50  |
| DSC Worklist # 6748 (1203, 1356) . . . . .                                                       | 2-56  |
| DSC Worklist # 6751 (1357, 1358) . . . . .                                                       | 2-62  |
| DSC Worklist # 7206 (1519, 1520) . . . . .                                                       | 2-70  |
| DSC Worklist # 7618 (1208) . . . . .                                                             | 2-79  |
| DSC Worklist # 7686 (1208, 1317, 1318, 1201, 1202, 1203, 1356, 1357, 1358, 1519, 1520) . . . . . | 2-84  |
| DSC Worklist # 7689 (1275) . . . . .                                                             | 2-86  |
| Thermogravimetric Analysis (TGA)                                                                 |       |
| TGA Worklist # 6653 (1317) . . . . .                                                             | 2-88  |
| TGA Worklist # 6657 (1275) . . . . .                                                             | 2-93  |
| TGA Worklist # 6754 (1201, 1202) . . . . .                                                       | 2-98  |
| TGA Worklist # 6755 (1203, 1356) . . . . .                                                       | 2-104 |
| TGA Worklist # 6756 (1357, 1358) . . . . .                                                       | 2-110 |
| TGA Worklist # 6764 (1318) . . . . .                                                             | 2-118 |
| TGA Worklist # 7258 (1519, 1520) . . . . .                                                       | 2-123 |
| TGA Worklist # 7619 (1208) . . . . .                                                             | 2-131 |

This Document consists of pages 2-1 through 2-135, and pages 2-2, 2-5, 2-15, 2-21, and 2-34 were intentionally left blank.

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NARRATIVE

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45 DAY SAFETY SCREENING RESULTS FOR TANK 241-AY-101  
GRAB SAMPLES 1AY-96-1 THROUGH 1AY-96-10 AND 1AY-96-FB

SUMMARY

Ten grab samples (1AY-96-1 through 1AY-96-10) and one field blank (1AY-96-FB) were taken from tank 241-AY-101 on February 20, 21 and 28, 1996. The samples consist of three supernates and two sludge samples from Riser 15K and five supernate samples from Riser 15S. The numbers and locations of the samples differ from those specified in the tank 241-AY-101 Grab Sampling and Analysis Plan (TSAP). Safety screening tests specified in the TSAP, namely differential scanning calorimetry (DSC), thermogravimetric analysis (TGA), bulk density and total alpha activity (AT) were performed. The upper limit to a one-sided 95% confidence interval was computed for DSC and AT for comparison to the safety screening limits.

Vapor in the tank dome space was monitored prior to sampling. The result was a measurement of 0% of lower flammability limit and no organic carbon vapor content was found. One of the subsamples had a DSC exotherm exceeding the action limit of 480 joules/g (dry weight basis) stated in the TSAP and the Safety Screening Data Quality Objective (DQO) (references 1 and 2). Appropriate notifications were made and total organic carbon (TOC) and reactive system screening tool (RSST) adiabatic calorimetry (AC) analyses will be performed at the request of the Organic Safety Program. Except for the energetics result, none of the results from the tests exceeded action levels as listed in the Safety Screening DQO.

According to the Safety Screening DQO the tank may be considered "conditionally safe". Even though the dry weight basis energy content exceeds the 480 joules/g limit, the water content was in excess of 80%.

SCOPE

This document is the 45-day report deliverable for the 241-AY-101 grab samples. The samples were subsampled and analyzed in accordance with the TSAP (reference 1). The analytical results are included in Table 1 (pages 18 to 28).

Attachment 1 (pages 12 to 15) is a cross reference to relate the tank farm identification numbers to the 222-S Laboratory LABCORE sample numbers. The samples are arranged in accordance with the sampling event in which they were collected. The subsamples generated in the Laboratory for analysis are identified in these diagrams with their sources shown.

Dome space flammability screening results, primary safety screening results and the raw data from DSC and TGA tests are included in this report. Secondary analyses results will be performed because the energetics limits were exceeded. The results of these analyses will be reported in a revision to this document after testing is completed.

**TANK DOME SPACE FLAMMABILITY SCREENING**

The dome space was sampled and analyzed for the presence of flammable gases prior to sampling tank 241-AY-101. The results of the combustible gas monitoring inside risers 15K and 15S are presented in Table 2. Although the TSAP indicates that the results shall be reported as a percentage of the lower flammability limit (%LFL), the instrumentation used to collect the data reports as a percentage of the lower explosive limit (%LEL). For the purpose of screening the tank dome space, the %LEL is an acceptable substitute for %LFL, since the two values are used interchangeably in reference to the physical properties of chemical hazards (reference 3).

Table 2: Characteristics of Vapor Space as Determined by Combustible Gas Monitoring  
Tank 241-AY-101, Dome Space

| Vapor Characteristic Measured                                           | Results   |           |
|-------------------------------------------------------------------------|-----------|-----------|
|                                                                         | Riser 15K | Riser 15S |
| Flammable vapor concentration as percent of lower explosion limit (LEL) | 0.0%      | 0.0%      |
| Volume percent oxygen gas                                               | 20.0%     | 21.0%     |
| Concentration of ammonia gas                                            | 5 ppm     | 0 ppm     |
| Concentration of total organic carbon vapor                             | 0 ppm     | 0 ppm     |

ppm = parts per million

**APPEARANCE AND SAMPLE HANDLING**

Three supernate grab samples (1AY-96-1, 1AY-96-2 and 1AY-96-3) and two sludge grab samples (1AY-96-4 and 1AY-96-5) were removed from tank 241-AY-101 riser 15K on February 20 and 21, 1996. Riser 15K samples were received at the 222-S Laboratory on February 21 and 22, 1996. Five grab samples (1AY-96-6, 1AY-96-7, 1AY-96-8, 1AY-96-9 and 1AY-96-10) were removed from tank 241-AY-101 riser 15S on February 28, 1996. Riser 15S samples were received at the 222-S Laboratory on February 29, 1996. Note that the two riser numbers differ from those indicated in the TSAP. This change was documented in process memo CFE-96-003. The TSAP stated three supernate and two sludge samples would be taken from Riser 15S. Upon visual inspection of the five samples the laboratory found two of the samples designated as sludge contained less than 1% settled solids as indicated in Table 3. As a result of this observation, the Tank Waste Remediation System program contact directed the laboratory to breakdown and analyze these two samples using the analysis scheme for supernate samples.

Table 3 summarizes appearance information. The reported sampling depths were recorded from the tank farm process memo. Changes in sampling depths were recorded in the work package.

Table 3: Appearance for Tank 241-AY-101 Grab Samples

| CUSTOMER ID | LABORATORY ID | SAM DEPTH(IN,)* | SAM ELEV(IN)** | COLOR  | CLARITY | ORG LAYER | SOLIDS     |
|-------------|---------------|-----------------|----------------|--------|---------|-----------|------------|
| 1AY-96-1    | S96T001205    | 354             | 33             | yellow | Clear   | None      | None       |
| 1AY-96-2    | S96T001206    | 529             | 155            | yellow | Clear   | None      | None       |
| 1AY-96-3    | S96T001207    | 644             | 40             | yellow | Clear   | None      | None       |
| 1AY-96-4    | S96T001271    | 659             | 25             | brown  | Opaque  | None      | ~80%       |
| 1AY-96-5    | S96T001272    | 651             | 33             | brown  | Opaque  | None      | ~80%       |
| 1AY-96-6    | S96T001353    | 354             | 330            | yellow | Clear   | None      | None       |
| 1AY-96-7    | S96T001354    | 529             | 155            | yellow | Clear   | None      | None       |
| 1AY-96-8    | S96T001355    | 644             | 40             | yellow | Clear   | None      | None       |
| 1AY-96-9    | S96T001365    | 659             | 25             | yellow | Clear   | None      | <1% solids |
| 1AY-96-10   | S96T001366    | 674             | 10             | yellow | Clear   | None      | <1% solids |
| 1AY-96-FB   | S96T001208    | 240             | N/A            | None   | Clear   | None      | None       |

\* Sample depth is measured from the top of the riser to the mouth of the sample bottle

\*\* Sample elevation is measured from tank bottom to mouth of the sample bottle

**Subsampling**

For the eight supernate samples, two 20 mL unfiltered subsamples were recovered for safety screening and compatibility analyses and 60 mL were archived. For the sludge samples the supernate was too dark to perform the percent settled solids measurement. Therefore, the results listed in Table 3 for percent settled solids are approximations. To separate the solids and liquids the entire sample was shaken to suspend the solids and poured into centrifuge cones. Bulk densities of the wet sludge, the centrifuged solid and the decanted liquid were determined. Volume percent solids of the wet sludges was also determined. Subsamples for analysis and archive were created from both the centrifuged solid and decanted liquid portions. Identical analyses were performed on each sample portion.

After transferring the suspended solids to centrifuge cones, some solid pieces remained

For sludge sample 1AY-96-4 (S96T001271) about 39 grams of the material described above did not pour out of the original sample bottle. This material was saved in a separate jar for possible future analysis. For sample 1AY-96-5 (S96T001272) the material that remained in the jar was not enough to be saved.

Radiological requirements prohibited the removal of the centrifuged sludge portion of sample 1AY-96-5 (S96T001272) from the hot cell due to the high dose rate (a 9.6 gram sample produced a dose rate of 190 Rad/hr). A smaller portion of the sample was taken (1.8 grams) and the dose rate was still too high to allow removal from the hot cell (65 Rad/hr). A decision regarding analysis of this sample is pending and is likely to involve special procedures.

## ANALYTICAL RESULTS

### Differential Scanning Calorimetry

Energetics determination was performed by DSC using procedures LA-514-113, Rev. C-1 (Mettler instrument) and LA-514-114, Rev. C-1 (Perkin-Elmer instrument). Since both instruments were used during the DSC analysis, it must be noted that the two instruments produce raw data scans which present exotherms differently. On the Mettler instrument, an exotherm is represented by a peak, while the Perkin-Elmer instrument shows an exotherm as a valley. For each subsample, analyses were performed in duplicate on direct samples. The exothermic energy based on a dry weight of sample was calculated for all samples which exhibited any exotherms. The average of each subsample's two TGA results (sample and duplicate) was used in the dry weight calculation.

Eleven subsamples were submitted for DSC analysis, four subsamples exhibited exotherms. Two supernates exhibited exotherms ranging from 47.06 to 80.21 J/g on a dry weight basis (7.6 to 12.20 J/g wet weight). One decanted supernate subsample 1AY-96-4 (S96T001317) exhibited exotherms ranging from 642.40 to 761.10 J/g on a dry weight basis (121.80 to 144.00 J/g wet weight). Although these results exceeded the action limit of 480 J/g, it is important to remember that there is an inherently large error associated with this calculation due to the high water content in this sample. One centrifuged solid subsample exhibited exotherms ranging from 194.80 to 196.30 J/g on a dry weight basis (104.30 to 105.00 J/g wet weight). The relative percent difference (RPD) between the sample and duplicate results was 200% for the decanted supernate 1AY-96-10 (S96T001520). Due to a high

RPD value a triplicate sample was analyzed and no exotherm was exhibited. Due to the interpretive nature of the DSC analysis it is sometimes difficult to clearly distinguish a very small exotherm. In this case the rise in the baseline for the duplicate analysis was large enough to integrate as an exotherm. The change in baseline for the sample and triplicate analyses was not large enough to distinguish any exotherms.

The one-sided upper 95% confidence limit was calculated for each sample. The upper limit for one sample was greater than the action limit of 480 J/g. The results are presented in Table 4.

Table 4: Comparison of Dry Weight DSC Results at a Confidence Level of 95%

| CUSTOMER ID         | SAMPLE RESULT | DUPLICATE RESULT       | MEAN   | STANDARD DEVIATION | 95% UPPER CONFIDENCE LIMIT (MEAN) |
|---------------------|---------------|------------------------|--------|--------------------|-----------------------------------|
| <b>SUPERNATES</b>   | J/g           | J/g                    | J/g    |                    | J/g                               |
| 1AY-96-1            | 0.00          | 0.00                   | 0.00   | 0.00               | 0.00                              |
| 1AY-96-2            | 0.00          | 0.00                   | 0.00   | 0.00               | 0.00                              |
| 1AY-96-3            | 0.00          | 0.00                   | 0.00   | 0.00               | 0.00                              |
| 1AY-96-6            | 0.00          | 0.00                   | 0.00   | 0.00               | 0.00                              |
| 1AY-96-7            | 0.00          | 0.00                   | 0.00   | 0.00               | 0.00                              |
| 1AY-96-8            | 0.00          | 0.00                   | 0.00   | 0.00               | 0.00                              |
| 1AY-96-9            | 47.06         | 47.06                  | 47.06  | 0.00               | 47.06                             |
| 1AY-96-10           | 0.00          | 80.21 dup<br>0.00 trip | 26.7*  | 46.3               | 104.8                             |
| <b>SLUDGES</b>      |               |                        |        |                    |                                   |
| Decanted Supernates | J/g           | J/g                    | J/g    |                    | J/g                               |
| 1AY-96-4            | 761.10        | 642.40                 | 701.75 | 83.9               | 1076.5                            |
| 1AY-96-5            | 0.00          | 0.00                   | 0.00   | 0.00               | 0.00                              |
| Centrifuged Solids  | J/g           | J/g                    | J/g    |                    | J/g                               |
| 1AY-96-4            | 196.30        | 194.80                 | 195.55 | 1.1                | 200.3                             |

\* This mean is based on three results (sample, duplicate and triplicate)



### Thermogravimetric Analysis

The percent moisture content was determined by TGA using procedures LA-560-112 Rev. B-1 and LA-514-114 Rev. C-1. The analysis was performed in duplicate on direct samples.

Results for the supernates and decanted supernates ranged from 80.65 to 85.27 percent moisture. The results for the centrifuged solid were 45.21 and 47.73 percent moisture. The field blank gave an average result of 99.79 percent moisture. The solid portion of sample 1AY-96-4 (S96T001275) had one additional weight loss step between 140° C and 340° C. This step represented an average weight loss of 14.8%.

The RPD between the supernate samples and duplicates was less than 2.0%. The RPD between the centrifuged solid sample and duplicate was 5.42%.

### Density

The density measurement obtained for the centrifuged solid sample 1AY-96-4 (S96T001275) was determined by performing a bulk density analysis during subsampling using procedure LO-160-103 Rev. B-0. The result was 1.450 g/mL.

### Total Alpha

The AT determination was performed using procedure LA-508-101 Rev. D-2. The analysis was performed in duplicate on direct samples for the supernates. The solid portion of the sludge was prepared for analysis, in duplicate, using a fusion digest following procedure LA-549-141 Rev. D-0. The fusion digest is indicated with an "F" in the aliquot class (A#) column in Table 1.

The maximum result for the supernate samples was 0.053  $\mu\text{Ci/mL}$ . The maximum result for the decanted supernates was 0.201  $\mu\text{Ci/mL}$ . The result for the field blank was 4.81e-7  $\mu\text{Ci/mL}$ . All of the supernate results were well below the action limit of 61.5  $\mu\text{Ci/mL}$ . The RPDs for all supernate samples were less than 13%, with the exception of sample 1AY-96-7 (S96T001360) with an RPD of 27.2%. No rerun was requested because the sample result was significantly below the action limit and historically additional analyses on low activity samples have not improved the RPDs.

The average result for the centrifuged solid was 4.12  $\mu\text{Ci/g}$ . The RPD for the solid was 17.5%.

The 95% upper confidence limits were calculated for each sample, and are presented in Table 5. The maximum liquid result was 0.081  $\mu\text{Ci/mL}$  for the supernate from sample 1AY-96-7 (S96T001360), the maximum result for the decanted supernate sample 1AY-96-5 (S96T001318) was 0.2  $\mu\text{Ci/mL}$ . Both results were well below the action limit of 61.5  $\mu\text{Ci/mL}$ . The result for the centrifuged solid sample was 6.4  $\mu\text{Ci/g}$  for sample 1AY-96-4 (S96T001313). This result was below the action limit of 41.0  $\mu\text{Ci/g}$  for the solids.

Table 5: Comparison of Total Alpha Results at a Confidence Level of 95%

| CUSTOMER ID         | SAMPLE RESULT     | DUPLICATE RESULT  | MEAN              | STANDARD DEVIATION | 95% UPPER CONFIDENCE LIMIT (MEAN) |
|---------------------|-------------------|-------------------|-------------------|--------------------|-----------------------------------|
| <b>SUPERNATES</b>   | $\mu\text{Ci/mL}$ | $\mu\text{Ci/mL}$ | $\mu\text{Ci/mL}$ |                    | $\mu\text{Ci/mL}$                 |
| 1AY-96-1            | 0.037             | 0.036             | 0.037             | 0.001              | 0.040                             |
| 1AY-96-2            | 0.043             | 0.043             | 0.043             | 0.00               | 0.043                             |
| 1AY-96-3            | 0.040             | 0.045             | 0.043             | 0.004              | 0.058                             |
| 1AY-96-6            | 0.039             | 0.040             | 0.040             | 0.001              | 0.043                             |
| 1AY-96-7            | 0.037             | 0.049             | 0.043             | 0.008              | 0.081                             |
| 1AY-96-8            | 0.047             | 0.047             | 0.047             | 0.00               | 0.047                             |
| 1AY-96-9            | 0.047             | 0.051             | 0.049             | 0.003              | 0.062                             |
| 1AY-96-10           | 0.051             | 0.053             | 0.052             | 0.001              | 0.058                             |
| <b>SLUDGES</b>      |                   |                   |                   |                    |                                   |
| Decanted Supernates | $\mu\text{Ci/mL}$ | $\mu\text{Ci/mL}$ | $\mu\text{Ci/mL}$ |                    | $\mu\text{Ci/mL}$                 |
| 1AY-96-4            | 0.138             | 0.137             | 0.138             | 0.00               | 0.14                              |
| 1AY-96-5            | 0.197             | 0.201             | 0.199             | 0.00               | 0.2                               |
| Centrifuged Solids  | $\mu\text{Ci/g}$  | $\mu\text{Ci/g}$  | $\mu\text{Ci/g}$  |                    | $\mu\text{Ci/g}$                  |
| 1AY-96-4            | 4.480             | 3.760             | 4.12              | 0.5                | 6.4                               |

References

1. WHC-SD-WM-TSAP-066, REV. 2, "Tank 241-AY-101 Grab Sampling and Analysis Plan," Raphael, G. F., dated March 12, 1996, Westinghouse Hanford Company, Richland, WA 99352.
2. WHC-SD-WM-SP-004, Rev. 2, "Tank Safety Screening Data Quality Objective," Dukelow, G. T., et al., dated August 31, 1995, Westinghouse Hanford Company, Richland, WA 99352.
3. NIOSH Pocket Guide to Chemical Hazards, 1994 edition.

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ATTACHMENT 1

AY-101 GRAB SAMPLE BREAKDOWN

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# Attachment 1 (1 of 4)

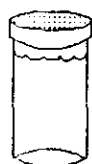
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Riser 15K

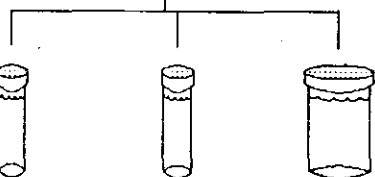
354 in.

1AY-96-1

S96T001205



PCREVIEW  
@APPEAR1



S96T001201

DSC  
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TOC  
TIC  
ICP: Al, Fe, Na, Mn,  
U, Cr, Ni, Si  
IC: anions  
pH  
OH  
Sp.G  
NH3  
DOSE-01

S96T001263

GEA: Cs-137  
Pu-239/240  
Sr-90  
Am-241  
AT  
DOSE-01

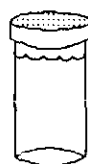
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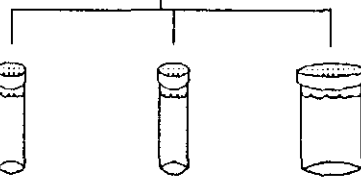
529 in.

1AY-96-2

S96T001206



PCREVIEW  
@APPEAR1



S96T001202

DSC  
TGA  
TOC  
TIC  
ICP: Al, Fe, Na, Mn,  
U, Cr, Ni, Si  
IC: anions  
pH  
OH  
Sp.G  
NH3  
DOSE-01

S96T001264

GEA: Cs-137  
Pu-239/240  
Sr-90  
Am-241  
AT  
DOSE-01

S96T001268

ARCHIVE

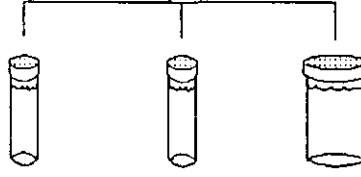
644 in.

1AY-96-3

S96T001207



PCREVIEW  
@APPEAR1



S96T001203

DSC  
TGA  
TOC  
TIC  
ICP: Al, Fe, Na, Mn,  
U, Cr, Ni, Si  
IC: anions  
pH  
OH  
Sp.G  
NH3  
DOSE-01

S96T001265

GEA: Cs-137  
Pu-239/240  
Sr-90  
Am-241  
AT  
DOSE-01

S96T001269

ARCHIVE

240 in.

1AY-96-FB

S96T001208



PCREVIEW  
@APPEAR1

DSC  
TGA  
TOC  
TIC  
ICP: Al, Fe, Na, Mn,  
U, Cr, Ni, Si  
IC: anions  
pH  
OH  
Sp.G  
NH3  
DOSE-01  
GEA: Cs-137  
Pu-239/240  
Sr-90  
Am-241  
AT  
ARCHIVE

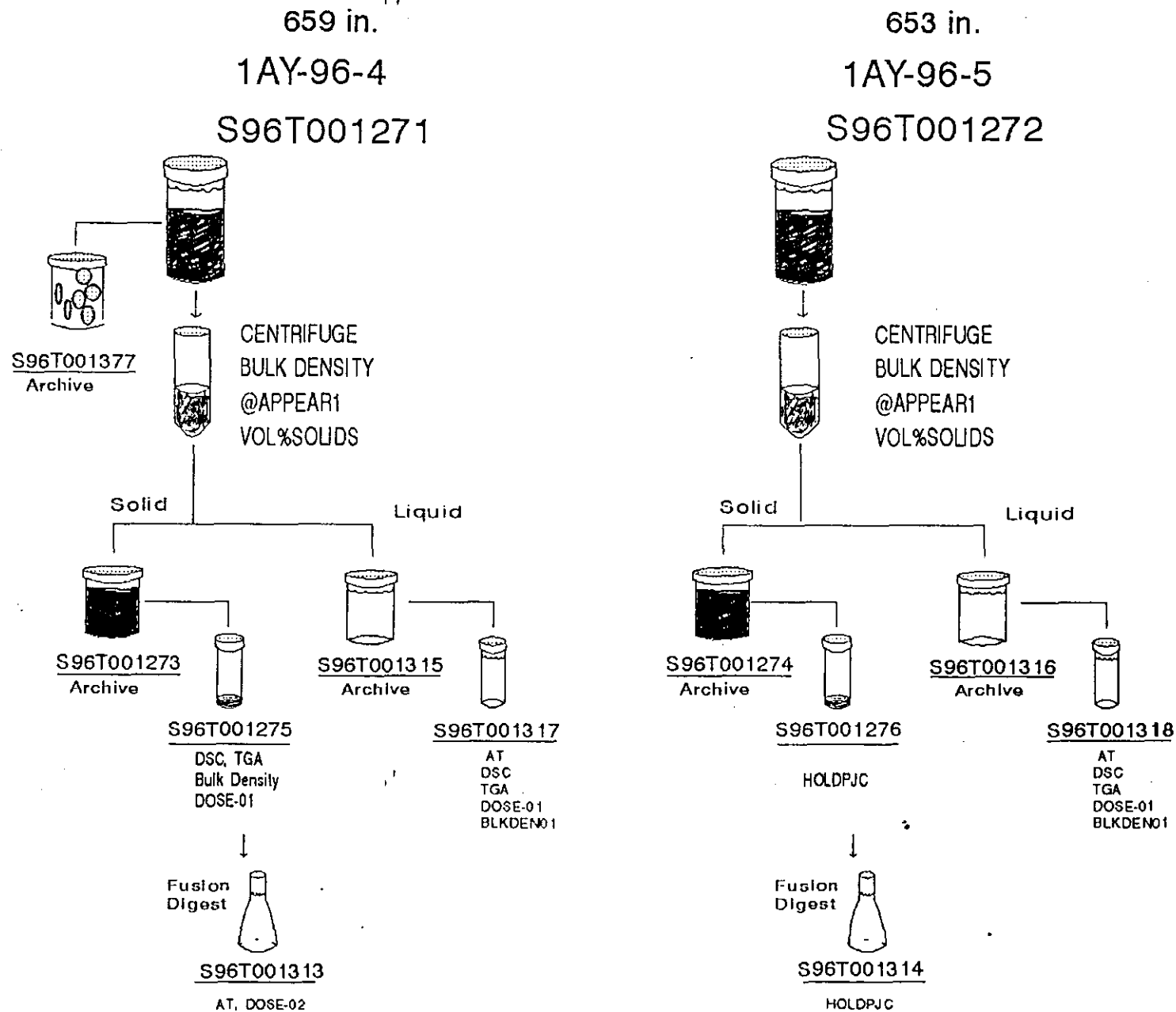
WHC-SD-WM-DP-178, REV. 0

WHC-SD-WM-DP-178, REV. 1

# Attachment 1 (2 of 4)

## AY-101 GRAB SAMPLE BREAKDOWN

Riser 15K



WHC-SD-WM-DP-178, REV. 0A

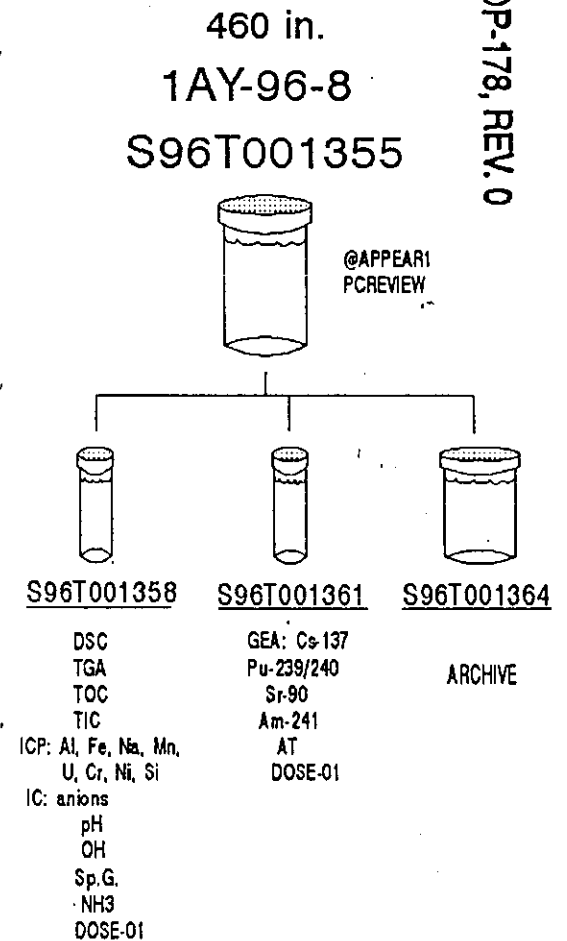
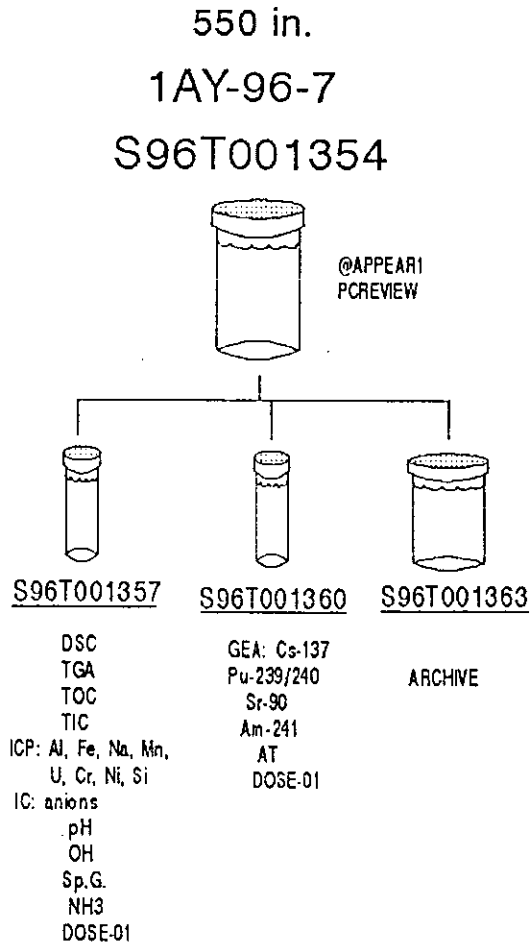
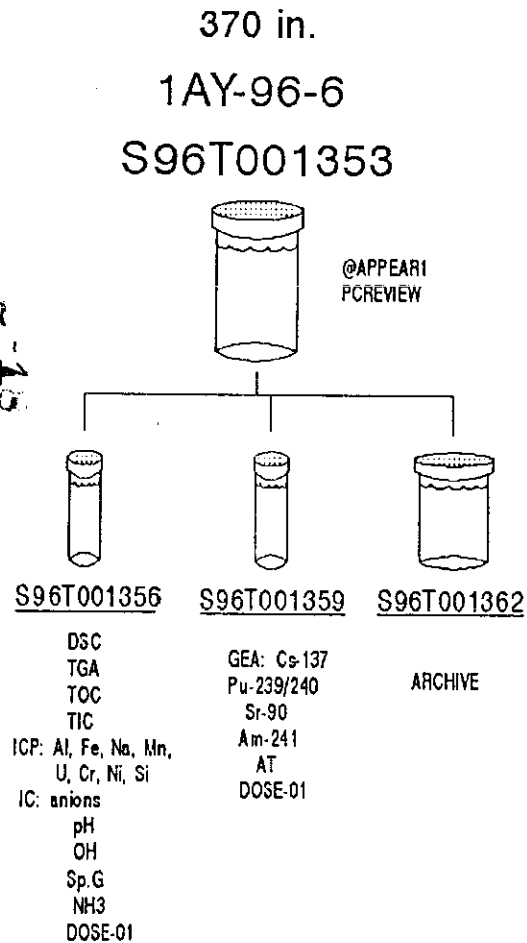
WHC-SD-WM-DP-178, REV. 1

# Attachment 1 (3 of 4)

## AY-101 GRAB SAMPLE BREAKDOWN

Riser 15S

WHC-SD-WM-DP-178, REV. 0



WHC-SD-WM-DP-178, REV. 1

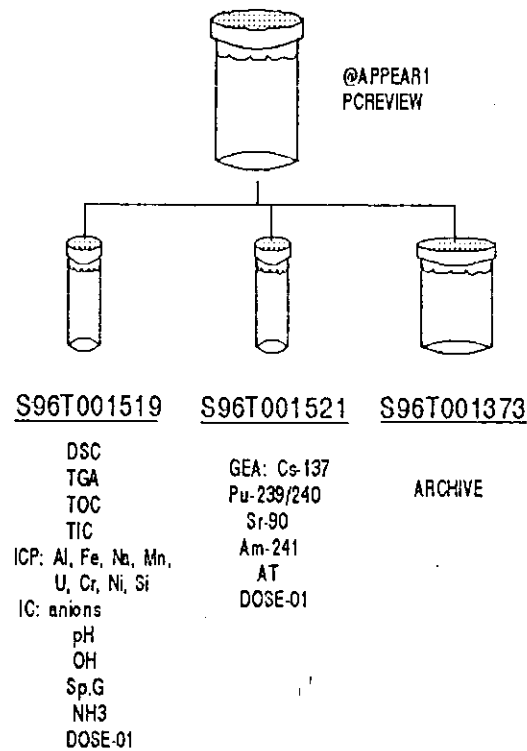


# Attachment 1 (4 of 4)

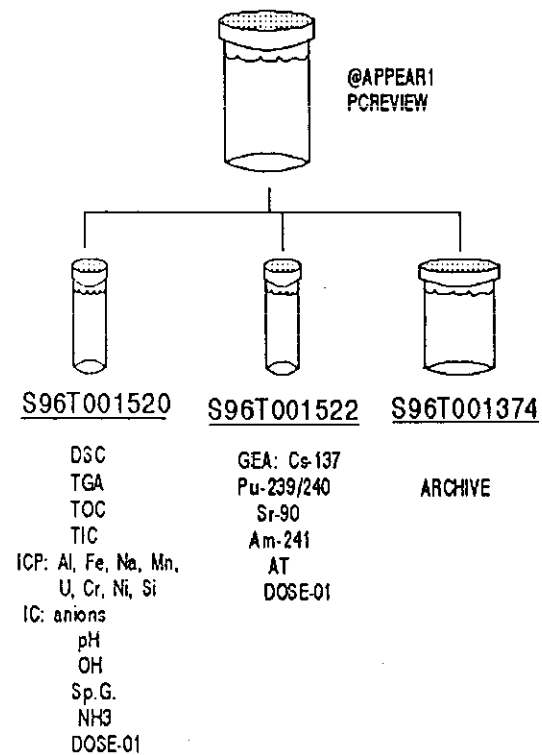
## AY-101 GRAB SAMPLE BREAKDOWN

Riser 15S

659 in.  
1AY-96-9  
S96T001365



674 in.  
1AY-96-10  
S96T001366



WHC-SD-WM-DP-178, REV.0

WHC-SD-WM-DP-178, REV. /

WHC-SD-WM-DP-178, REV. 1

WHC-SD-WM-DP-178, REV. 0

#### SAMPLE DATA SUMMARY

WHC-SD-WM-DP-178, REV. /

WHC-SD-WM-DP-178, REV. 1

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# INTERIM

Table 1: 45 DAY SAFETY SCREENING REPORT FOR AY-101  
AY-101 GRAB

RISER: 15K  
SEGMENT #: 1AY-96-1

SEGMENT PORTION: Supernate

| Sample#    | R | A# | Analyte                      | Unit         | Action Limits |        | Standard % | Blank     | Result   | Duplicate | Average  | RPD % | Spk Rec % | Det Limit | Count Err% |
|------------|---|----|------------------------------|--------------|---------------|--------|------------|-----------|----------|-----------|----------|-------|-----------|-----------|------------|
|            |   |    |                              |              | Lower         | Upper  |            |           |          |           |          |       |           |           |            |
| S96T001201 |   |    | % Water by TGA using Mettler | %            | None          | None   | 102.7      | n/a       | 84.28    | 8.437e1   | 8.433e1  | 0.11  | n/a       | n/a       | n/a        |
| S96T001201 |   |    | DSC Exotherm Dry Calculated  | Joules/g Dry | -1.0e+00      | 481.20 | n/a        | n/a       | 0.00e+00 | 0.000e0   | 0.000e0  | 0.00  | n/a       | n/a       | n/a        |
| S96T001201 |   |    | DSC Exotherm using Mettler   | Joules/g     | None          | None   | 93.15      | n/a       | 0.00e+00 | 0.000e0   | 0.000e0  | 0.00  | n/a       | n/a       | n/a        |
| S96T001263 |   |    | Alpha in Liquid Samples      | uCi/mL       | -1.0e+00      | 61.28  | 102.0      | <2.620e-3 | 3.72e-02 | 3.580e-2  | 3.650e-2 | 3.84  | 101.9     | 6.000e-3  | 2.14E+01   |

=> Limit violated

=> Selected Limit

WHC-SD-WM-DP-178, REV. 1  
WHC-SD-WM-DP-178, REV. 0

22

# INTERIM

Table 1: 45 DAY SAFETY SCREENING REPORT FOR AY-101  
AY-101 GRAB

RISER: 15K  
SEGMENT #: 1AY-96-2

SEGMENT PORTION: Supernate

| Sample#    | R | A# | Analyte                      | Unit         | Action Limits |       | Standard % | Blank     | Result   | Duplicate | Average  | RPD % | Spk Rec % | Det Limit | Count Err% |
|------------|---|----|------------------------------|--------------|---------------|-------|------------|-----------|----------|-----------|----------|-------|-----------|-----------|------------|
|            |   |    |                              |              | Lower         | Upper |            |           |          |           |          |       |           |           |            |
| S96T001202 |   |    | % Water by TGA using Mettler | %            | None          | None  | 102.7      | n/a       | 84.21    | 8.422e1   | 8.422e1  | 0.01  | n/a       | n/a       | n/a        |
| S96T001202 |   |    | DSC Exotherm Dry Calculated  | Joules/g Dry | -1.0e+00      | 484.0 | n/a        | n/a       | 0.00e+00 | 0.000e0   | 0.000e0  | 0.00  | n/a       | n/a       | n/a        |
| S96T001202 |   |    | DSC Exotherm using Mettler   | Joules/g     | None          | None  | 93.15      | n/a       | 0.00e+00 | 0.000e0   | 0.000e0  | 0.00  | n/a       | n/a       | n/a        |
| S96T001264 |   |    | Alpha in Liquid Samples      | uCi/mL       | -1.0e+00      | 61.20 | 102.0      | <2.620e-3 | 4.27e-02 | 4.290e-2  | 4.280e-2 | 0.47  | 104.5     | 6.000e-3  | 1.97E+01   |

=> Limit violated  
=> Selected Limit

WHC-SD-WM-DP-178, REV. 1  
WHC-SD-WM-DP-178, REV. 0

12-23

# INTERIM

Table 1: 45 DAY SAFETY SCREENING REPORT FOR AY-101  
AY-101 GRAB

RISER: 15K  
SEGMENT #: 1AY-96-3

SEGMENT PORTION: Supernate

| Sample#    | R | A# | Analyte                      | Unit         | Action Limits |       | Standard % | Blank     | Result   | Duplicate | Average  | RPD % | Spk Rec % | Det Limit | Count Err% |
|------------|---|----|------------------------------|--------------|---------------|-------|------------|-----------|----------|-----------|----------|-------|-----------|-----------|------------|
|            |   |    |                              |              | Lower         | Upper |            |           |          |           |          |       |           |           |            |
| S96T001203 |   |    | % Water by TGA using Mettler | %            | None          | None  | 99.44      | n/a       | 84.17    | 8.408e1   | 8.412e1  | 0.11  | n/a       | n/a       | n/a        |
| S96T001203 |   |    | DSC Exotherm Dry Calculated  | Joules/g Dry | -1.0e+00      | 483.0 | n/a        | n/a       | 0.00e+00 | 0.000e0   | 0.000e0  | 0.00  | n/a       | n/a       | n/a        |
| S96T001203 |   |    | DSC Exotherm using Mettler   | Joules/g     | None          | None  | 100.9      | n/a       | 0.00e+00 | 0.000e0   | 0.000e0  | 0.00  | n/a       | n/a       | n/a        |
| S96T001265 |   |    | Alpha in Liquid Samples      | uCi/mL       | -1.0e+00      | 61.20 | 102.0      | <2.620e-3 | 4.00e-02 | 4.540e-2  | 4.270e-2 | 12.6  | 104.5     | 6.000e-3  | 2.02E+01   |

=> Limit violated

=> Selected Limit

WHC-SD-WM-DP-178, REV. 1  
WHC-SD-WM-DP-178, REV. 0

Fr2-21

# INTERIM

Table 1: 45 DAY SAFETY SCREENING REPORT FOR AY-101  
AY-101 GRAB

RISER: 15K  
SEGMENT #: 1AY-96-4

SEGMENT PORTION: Centrifuged Solids (Grab Sample)

| Sample#    | R | A# | Analyte                      | Unit         | Action Limits |       | Standard % | Blank     | Result   | Duplicate | Average | RPD % | Spk Rec % | Det Limit | Count Err% |
|------------|---|----|------------------------------|--------------|---------------|-------|------------|-----------|----------|-----------|---------|-------|-----------|-----------|------------|
|            |   |    |                              |              | Lower         | Upper |            |           |          |           |         |       |           |           |            |
| S96T001275 |   |    | % Water by TGA using Mettler | %            | None          | None  | 103.1      | n/a       | 45.21    | 4.773e1   | 4.647e1 | 5.42  | n/a       | n/a       | n/a        |
| S96T001275 |   |    | DSC Exotherm Dry Calculated  | Joules/g Dry | -1.0e+00      | 481.0 | n/a        | n/a       | 1.96e+02 | 1.948e2   | 1.956e2 | 0.77  | n/a       | n/a       | n/a        |
| S96T001275 |   |    | DSC Exotherm using Mettler   | Joules/g     | None          | None  | 112.5      | n/a       | 1.05e+02 | 1.043e2   | 1.047e2 | 0.76  | n/a       | n/a       | n/a        |
| S96T001275 |   |    | Bulk Density of Sample       | g/mL         | None          | None  | n/a        | n/a       | 1.450    | n/a       | n/a     | n/a   | n/a       | 5.000e-1  | n/a        |
| S96T001313 | F |    | Alpha of Digested Solid      | uCi/g        | -1.0e+00      | 41.00 | 116.4      | <5.010e-1 | 4.480    | 3.760e0   | 4.120e0 | 17.5  | 101.4     | 6.430e-1  | 2.15E+01   |

Decanted Supernate (Liquid Grab Sludge): Decanted Supernate (Liquid Grab Sludge)

| Sample#    | R | A# | Analyte                      | Unit         | Action Limits |       | Standard % | Blank     | Result   | Duplicate | Average  | RPD % | Spk Rec % | Det Limit | Count Err% |
|------------|---|----|------------------------------|--------------|---------------|-------|------------|-----------|----------|-----------|----------|-------|-----------|-----------|------------|
|            |   |    |                              |              | Lower         | Upper |            |           |          |           |          |       |           |           |            |
| S96T001317 |   |    | % Water by TGA using Mettler | %            | None          | None  | 101.1      | n/a       | 81.43    | 8.065e1   | 8.104e1  | 0.96  | n/a       | n/a       | n/a        |
| S96T001317 |   |    | DSC Exotherm Dry Calculated  | Joules/g Dry | -1.0e+00      | 481.0 | n/a        | n/a       | 7.61e+02 | 6.424e2   | 7.018e2  | 16.9  | n/a       | n/a       | n/a        |
| S96T001317 |   |    | DSC Exotherm using Mettler   | Joules/g     | None          | None  | 104.7      | n/a       | 1.44e+02 | 1.218e2   | 1.331e2  | 16.9  | n/a       | n/a       | n/a        |
| S96T001317 |   |    | Alpha in Liquid Samples      | uCi/mL       | -1.0e+00      | 61.20 | 97.39      | <3.280e-3 | 1.38e-01 | 1.370e-1  | 1.380e-1 | 0.73  | 97.45     | 4.000e-3  | 9.63E+00   |

Sludge (from Liquid Grab Sample): Sludge (from Liquid Grab Sample)

| Sample#    | R | A# | Analyte                | Unit | Action Limits |       | Standard % | Blank | Result | Duplicate | Average | RPD % | Spk Rec % | Det Limit | Count Err% |
|------------|---|----|------------------------|------|---------------|-------|------------|-------|--------|-----------|---------|-------|-----------|-----------|------------|
|            |   |    |                        |      | Lower         | Upper |            |       |        |           |         |       |           |           |            |
| S96T001271 |   |    | Bulk Density of Sample | g/mL | None          | None  | n/a        | n/a   | 1.310  | n/a       | n/a     | n/a   | n/a       | 5.000e-1  | n/a        |

=> Limit violated  
=> Selected Limit

WHC-SD-WM-DP-178, REV. 1  
WHC-SD-WM-DP-178, REV. 0

# INTERIM

Table 1: 45 DAY SAFETY SCREENING REPORT FOR AY-101  
AY-101 GRAB

RISER: 15K  
SEGMENT #: 1AY-96-5

SEGMENT PORTION: Decanted Supernate (Liquid Grab Sludge)

| Sample#    | R | A# | Analyte                      | Unit         | Action Limits |       | Standard % | Blank     | Result   | Duplicate | Average  | RPD % | Spk Rec % | Det Limit | Count | Err%     |
|------------|---|----|------------------------------|--------------|---------------|-------|------------|-----------|----------|-----------|----------|-------|-----------|-----------|-------|----------|
|            |   |    |                              |              | Lower         | Upper |            |           |          |           |          |       |           |           |       |          |
| S96T001318 |   |    | % Water by TGA using Mettler | %            | None          | None  | 103.2      | n/a       | 84.70    | 8.497e1   | 8.484e1  | 0.32  | n/a       | n/a       |       | n/a      |
| S96T001318 |   |    | DSC Exotherm Dry Calculated  | Joules/g Dry | -1.0e+00      | 481.6 | n/a        | n/a       | 0.00e+00 | 0.000e0   | 0.000e0  | 0.00  | n/a       | n/a       |       | n/a      |
| S96T001318 |   |    | DSC Exotherm using Mettler   | Joules/g     | None          | None  | 112.5      | n/a       | 0.00e+00 | 0.000e0   | 0.000e0  | 0.00  | n/a       | n/a       |       | n/a      |
| S96T001318 |   |    | Alpha in Liquid Samples      | uCi/mL       | -1.0e+00      | 61.20 | 102.6      | <3.070e-3 | 1.97e-01 | 2.010e-1  | 1.990e-1 | 2.01  | 98.89     | 7.000e-3  |       | 8.71E+00 |

Sludge (from Liquid Grab Sample): Sludge (from Liquid Grab Sample)

| Sample#    | R | A# | Analyte                | Unit | Action Limits |       | Standard % | Blank | Result | Duplicate | Average | RPD % | Spk Rec % | Det Limit | Count | Err% |
|------------|---|----|------------------------|------|---------------|-------|------------|-------|--------|-----------|---------|-------|-----------|-----------|-------|------|
|            |   |    |                        |      | Lower         | Upper |            |       |        |           |         |       |           |           |       |      |
| S96T001272 |   |    | Bulk Density of Sample | g/mL | None          | None  | n/a        | n/a   | 1.280  | n/a       | n/a     | n/a   | n/a       | 5.000e-1  |       | n/a  |

=> Limit violated  
=> Selected Limit



# INTERIM

Table 1: 45 DAY SAFETY SCREENING REPORT FOR AY-101  
AY-101 GRAB

RISER: 15K  
SEGMENT #: 1AY-96-FB

SEGMENT PORTION: Field Blank

| Sample#    | R | A# | Analyte                        | Unit         | Action Limits |       | Standard % | Blank     | Result   | Duplicate | Average  | RPD % | Spk Rec % | Det Limit | Count Err% |
|------------|---|----|--------------------------------|--------------|---------------|-------|------------|-----------|----------|-----------|----------|-------|-----------|-----------|------------|
|            |   |    |                                |              | Lower         | Upper |            |           |          |           |          |       |           |           |            |
| S96T001208 |   |    | % Water by TGA on Perkin Elmer | %            | None          | None  | 98.46      | n/a       | 99.79    | 9.979e1   | 9.979e1  | 0.00  | n/a       | n/a       | n/a        |
| S96T001208 |   |    | DSC Exotherm on Perkin Elmer   | Joules/g     | None          | None  | 100.1      | n/a       | 0.00e+00 | 0.000e0   | 0.000e0  | 0.00  | n/a       | n/a       | n/a        |
| S96T001208 |   |    | DSC Exotherm Dry Calculated    | Joules/g Dry | -1.0e+00      | 481.0 | n/a        | n/a       | 0.00e+00 | 0.000e0   | 0.000e0  | 0.00  | n/a       | n/a       | n/a        |
| S96T001208 |   |    | Alpha in Liquid Samples        | uCi/mL       | -1.0e+00      | 81.20 | 101.6      | <1.020e-7 | 4.81e-07 | 7.320e-7  | 6.070e-7 | 41.4  | 100.8     | 2.110e-7  | 4.26E+01   |

=> Limit violated  
=> Selected Limit

WHC-SD-WM-DP-178, REV 1  
WHC-SD-WM-DP-178, REV. 0

# INTERIM

Table 1: 45 DAY SAFETY SCREENING REPORT FOR AY-101  
AY-101 GRAB

RISER: 15S  
SEGMENT #: 1AY-96-10

SEGMENT PORTION: Supernate

| Sample#    | R | A# | Analyte                      | Unit         | Action Limits |       | Standard % | Blank     | Result   | Duplicate | Average  | RPD % | Spk Rec % | Det Limit | Count Err% |
|------------|---|----|------------------------------|--------------|---------------|-------|------------|-----------|----------|-----------|----------|-------|-----------|-----------|------------|
|            |   |    |                              |              | Lower         | Upper |            |           |          |           |          |       |           |           |            |
| S96T001520 |   |    | % Water by TGA using Mettler | %            | None          | None  | 102.1      | n/a       | 84.30    | 8.527e1   | 8.478e1  | 1.14  | n/a       | n/a       | n/a        |
| S96T001520 |   |    | DSC Exotherm Dry Calculated  | Joules/g Dry | -1.0e+00      | 481.0 | n/a        | n/a       | 0.00e+00 | 8.021e1   | 4.010e1  | 200   | n/a       | n/a       | n/a        |
| S96T001520 |   |    | DSC Exotherm using Mettler   | Joules/g     | None          | None  | 99.47      | n/a       | 0.00e+00 | 1.220e1   | 6.100e0  | 200   | n/a       | n/a       | n/a        |
| S96T001522 |   |    | Alpha in Liquid Samples      | uCi/mL       | -1.0e+00      | 61.20 | 105.2      | <4.470e-4 | 5.08e-02 | 5.330e-2  | 5.200e-2 | 4.80  | n/a       | 1.000e-3  | 1.08E+01   |

=> Limit violated  
=> Selected Limit

WHC-SD-WM-DP-178, REV. 1  
WHC-SD-WM-DP-178, REV. 0

# INTERIM

Table 1: 45 DAY SAFETY SCREENING REPORT FOR AY-101  
AY-101 GRAB

RISER: 15S  
SEGMENT #: 1AY-96-6

SEGMENT PORTION: Supernate

| Sample#    | R | A# | Analyte                      | Unit         | Action Limits |       | Standard % | Blank     | Result   | Duplicate | Average  | RPD % | Spk Rec % | Det Limit | Count Err% |
|------------|---|----|------------------------------|--------------|---------------|-------|------------|-----------|----------|-----------|----------|-------|-----------|-----------|------------|
|            |   |    |                              |              | Lower         | Upper |            |           |          |           |          |       |           |           |            |
| S96T001356 |   |    | % Water by TGA using Mettler | %            | None          | None  | 99.44      | n/a       | 84.40    | 8.415e1   | 8.428e1  | 0.30  | n/a       | n/a       | n/a        |
| S96T001356 |   |    | DSC Exotherm Dry Calculated  | Joules/g Dry | -1.0e+00      | 481.0 | n/a        | n/a       | 0.00e+00 | 0.000e0   | 0.000e0  | 0.00  | n/a       | n/a       | n/a        |
| S96T001356 |   |    | DSC Exotherm using Mettler   | Joules/g     | None          | None  | 100.9      | n/a       | 0.00e+00 | 0.000e0   | 0.000e0  | 0.00  | n/a       | n/a       | n/a        |
| S96T001359 |   |    | Alpha in Liquid Samples      | uCi/mL       | -1.0e+00      | 61.20 | 102.6      | <3.070e-3 | 3.85e-02 | 4.040e-2  | 3.940e-2 | 4.82  | 100.3     | 7.000e-3  | 2.22E+01   |

=> Limit violated  
=> Selected Limit

02-0

WHC-SD-WM-DP-178, REV. 1  
WHC-SD-WM-DP-178, REV. 0

# INTERIM

Table 1: 45 DAY SAFETY SCREENING REPORT FOR AY-101  
AY-101 GRAB

RISER: 15S  
SEGMENT #: 1AY-96-7

SEGMENT PORTION: Supernate

| Sample#    | R | A# | Analyte                        | Unit         | Action Limits |       | Standard % | Blank     | Result   | Duplicate | Average  | RPD % | Spk Rec % | Det Limit | Count Err% |
|------------|---|----|--------------------------------|--------------|---------------|-------|------------|-----------|----------|-----------|----------|-------|-----------|-----------|------------|
|            |   |    |                                |              | Lower         | Upper |            |           |          |           |          |       |           |           |            |
| S96T001357 |   |    | % Water by TGA on Perkin Elmer | %            | None          | None  | 99.49      | n/a       | 84.93    | 8.483e1   | 8.488e1  | 0.12  | n/a       | n/a       | n/a        |
| S96T001357 |   |    | DSC Exotherm on Perkin Elmer   | Joules/g     | None          | None  | 98.56      | n/a       | 0.00e+00 | 0.000e0   | 0.000e0  | 0.00  | n/a       | n/a       | n/a        |
| S96T001357 |   |    | DSC Exotherm Dry Calculated    | Joules/g Dry | -1.0e+00      | 481.0 | n/a        | n/a       | 0.00e+00 | 0.000e0   | 0.000e0  | 0.00  | n/a       | n/a       | n/a        |
| S96T001360 |   |    | Alpha in Liquid Samples        | uCi/mL       | -1.0e+00      | 61.20 | 102.6      | <3.070e-3 | 3.71e-02 | 4.880e-2  | 4.300e-2 | 27.2  | 99.16     | 7.000e-3  | 2.20E+01   |

=> Limit violated  
=> Selected Limit

# INTERIM

Table 1: 45 DAY SAFETY SCREENING REPORT FOR AY-101  
AY-101 GRAB

RISER: 15S  
SEGMENT #: 1AY-96-8

SEGMENT PORTION: Supernate

| Sample#    | R | A# | Analyte                        | Unit         | Action Limits |       | Standard % | Blank     | Result   | Duplicate | Average  | RPD % | Spk Rec % | Det Limit | Count Err% |
|------------|---|----|--------------------------------|--------------|---------------|-------|------------|-----------|----------|-----------|----------|-------|-----------|-----------|------------|
|            |   |    |                                |              | Lower         | Upper |            |           |          |           |          |       |           |           |            |
| S96T001358 |   |    | % Water by TGA on Perkin Elmer | %            | None          | None  | 102.0      | n/a       | 83.87    | 8.484e1   | 8.436e1  | 1.15  | n/a       | n/a       | n/a        |
| S96T001358 |   |    | DSC Exotherm on Perkin Elmer   | Joules/g     | None          | None  | 98.91      | n/a       | 0.00e+00 | 0.000e0   | 0.000e0  | 0.00  | n/a       | n/a       | n/a        |
| S96T001358 |   |    | DSC Exotherm Dry Calculated    | Joules/g Dry | -1.0e+00      | 481.0 | n/a        | n/a       | 0.00e+00 | 0.000e0   | 0.000e0  | 0.00  | n/a       | n/a       | n/a        |
| S96T001361 |   |    | Alpha in Liquid Samples        | uCi/mL       | -1.0e+00      | 61.20 | 121.1      | <2.430e-3 | 4.71e-02 | 4.740e-2  | 4.730e-2 | 0.63  | 108.9     | 3.000e-3  | 1.19E+01   |

=> Limit violated  
=> Selected Limit

2-31

WHC-SD-WM-DP-178, REV. 1  
WHC-SD-WM-DP-178, REV. 0

# INTERIM

Table 1: 45 DAY SAFETY SCREENING REPORT FOR AY-101  
AY-101 GRAB

RISER: 15S  
SEGMENT #: 1AY-96-9

SEGMENT PORTION: Supernate

| Sample#    | R | A# | Analyte                      | Unit         | Action Limits |       | Standard % | Blank     | Result   | Duplicate | Average  | RPD % | Spk Rec % | Det Limit | Count Err% |
|------------|---|----|------------------------------|--------------|---------------|-------|------------|-----------|----------|-----------|----------|-------|-----------|-----------|------------|
|            |   |    |                              |              | Lower         | Upper |            |           |          |           |          |       |           |           |            |
| S96T001519 |   |    | % Water by TGA using Mettler | %            | None          | None  | 102.5      | n/a       | 83.91    | 8.378e1   | 8.384e1  | 0.16  | n/a       | n/a       | n/a        |
| S96T001519 |   |    | DSC Exotherm Dry Calculated  | Joules/g Dry | -1.0e+00      | 481.0 | n/a        | n/a       | 47.06    | 4.706e1   | 4.706e1  | 0.00  | n/a       | n/a       | n/a        |
| S96T001519 |   |    | DSC Exotherm using Mettler   | Joules/g     | None          | None  | 108.6      | n/a       | 7.600    | 7.600e0   | 7.600e0  | 0.00  | n/a       | n/a       | n/a        |
| S96T001521 |   |    | Alpha in Liquid Samples      | uCi/mL       | -1.0e+00      | 61.20 | 105.2      | <4.470e-4 | 4.72e-02 | 5.120e-2  | 4.920e-2 | 8.13  | 112.3     | 1.000e-3  | 1.13E+01   |

=> Limit violated

=> Selected Limit

WHC-SD-WM-DP-178, REV. 1  
WHC-SD-WM-DP-178, REV. 0

~32

WHC-SD-WM-DP-178, REV. /

WHC-SD-WM-DP-178, REV. 0

# INORGANIC ANALYSES

WHC-SD-WM-DP-178, REV. 1

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## LABCORE Data Entry Template for Worklist#

6619

Analyst: SMF Instrument: DSC01 Book # 12N14BMethod: LA-514-113 Rev/Mod C-1Worklist Comment: AY-101 DSC RUN UNDER N2. RCJ

| GROUP    | PROJECT     | S TYPE   | SAMPLE#    | R A | TEST   | MATRIX | ACTUAL       | FOUND        | DL         | UNIT     |
|----------|-------------|----------|------------|-----|--------|--------|--------------|--------------|------------|----------|
|          |             | 1 STD    |            |     | DSC-01 | SOLID  | <u>28.45</u> | <u>32.0</u>  | <u>*</u>   | Joules/g |
| 96000210 | AY-101 GRAB | 2 SAMPLE | S96T001275 | 0   | DSC-01 | SOLID  | <u>N/A</u>   | <u>105.1</u> |            | Joules/g |
| 96000210 | AY-101 GRAB | 3 DUP    | S96T001275 | 0   | DSC-01 | SOLID  | <u>105.1</u> | <u>104.3</u> | <u>N/A</u> | Joules/g |

Final page for worklist # 6619

See attached for signatures

Analyst Signature Date 4-3-96

Analyst Signature Date

Verified by Blandina  
Valenzuela  
4-9-96

Data Entry Comments:

Sample produced two endotherms one at 101.3°C with a delta H of 766.1 J/g and second at 267.2°C with a delta H of 174.8 J/g.

Units shown for QC (SPK & STD) may not reflect the actual units. DL = Detection Limit, S = Worklist Slot Number, R = Replicate Number, A = Aliquot Code.

**LABCORE Data Entry Template for Worklist#**

**6619**

Analyst: SMF Instrument: DSC01 Book # 12N14B

Method: LA-514-114 Rev/Mod \_\_\_\_\_

Worklist Comment: AY-101 DSC RUN UNDER N2. RCJ

| GROUP    | PROJECT     | S TYPE   | SAMPLE#    | R A | TEST   | MATRIX | ACTUAL | FOUND | DL  | UNIT     |
|----------|-------------|----------|------------|-----|--------|--------|--------|-------|-----|----------|
|          |             | 1 STD    |            |     | DSC-03 | SOLID  |        |       | N/A | Joules/g |
| 96000210 | AY-101 GRAB | 2 SAMPLE | S96T001275 | 0   | DSC-03 | SOLID  | N/A    |       |     | Joules/g |
| 96000210 | AY-101 GRAB | 3 DUP    | S96T001275 | 0   | DSC-03 | SOLID  |        |       | N/A | Joules/g |

**Final page for worklist # 6619**

Susan M. Fulton 3-29-98  
Analyst Signature Date

NE Wright 4/5/96  
Analyst Signature Date

Data Entry Comments:

Units shown for QC (SPK & STD) may not reflect the actual units. DL = Detection Limit, S = Worklist Slot Number,  
R = Replicate Number, A = Aliquot Code.

SIGNATURE BELOW REPRESENTS CHEMICAL TECHNOLOGIST/CHEMIST THAT  
COMPLETED/VERIFIED THE CALIBRATION/ANALYSIS ON PAGES 237 TO 238.

DSC STD 12N14-B

9.010 mg

Rate: 10.0 °C/min

File: 00079.001

DSC METTLER 29-Mar-96

Ident: 0.0

222-S Laboratory

exo>

10. mW

Integration  
Delta H 288 mJ  
32.0 J/g  
Peak 158.5°C  
-20.7 mW

120.

140.

160.

180.

°C

*Intuition 3-29-96*

WHC-SD-WM-DP-178, REV. 1

S96T001275 N2

40.134 mg

Rate: 10.0 °C/min

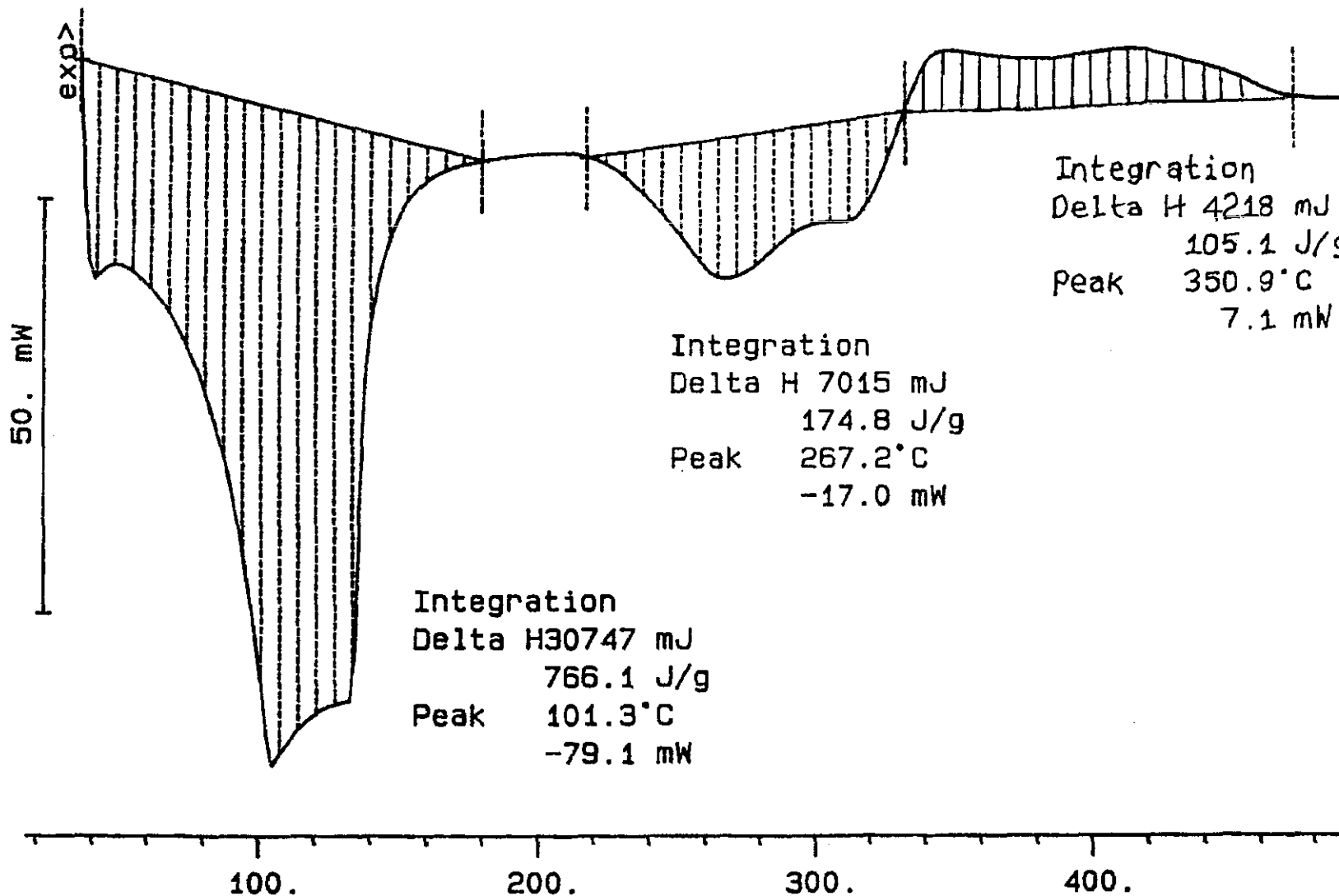
File: 00090.001

DSC METTLER

30-Mar-96

Ident: 0.0

222-S Laboratory



WHC-SD-WM-DP-178, REV. 1

S96T001275 DUP N2

31.234 mg

Rate: 10.0 °C/min

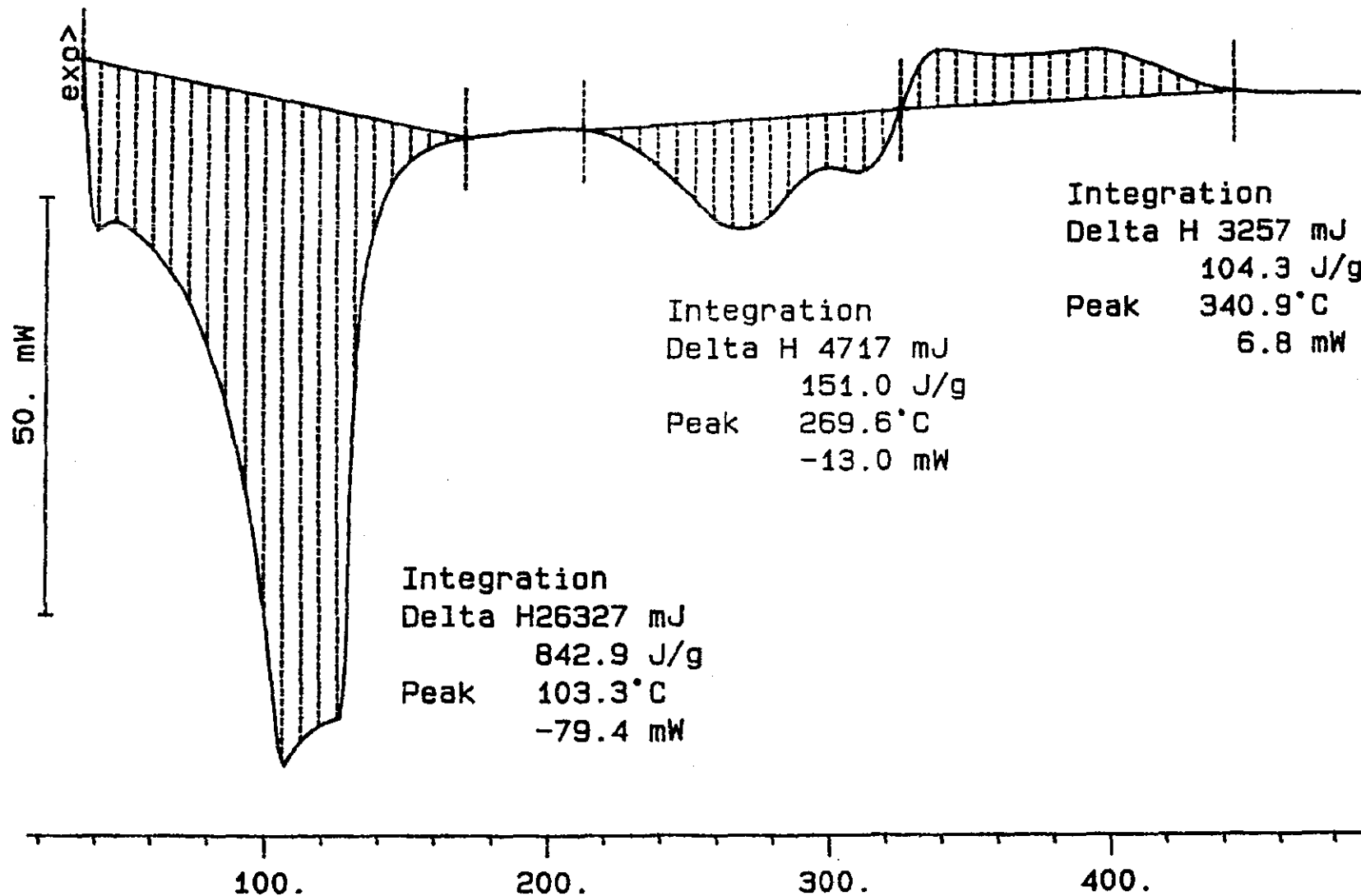
File: 00092.001

DSC METTLER

30-Mar-96

Ident: 0.0

222-S Laboratory



WHC-SD-WM-DP-178, REV. /

worklistrpt Version 2.1 05/15/95  
04/03/96 16:03

WHC-SD-WM-DP-178, REV. 1

Page: 1

## LABCORE Data Entry Template for Worklist#

6623

Analyst: RK Instrument: DSC01 Book # 12N14BMethod: LA-514-113 Rev/Mod C-1

Worklist Comment: AY-101 DSC RUN UNDER N2. RCJ

| GROUP    | PROJECT     | S TYPE   | SAMPLE#      | R A | TEST   | MATRIX | ACTUAL       | FOUND        | DL         | UNIT     |
|----------|-------------|----------|--------------|-----|--------|--------|--------------|--------------|------------|----------|
|          |             | 1 STD    |              |     | DSC-01 | LIQUID | <u>28.45</u> | <u>29.8</u>  | <u>N/A</u> | Joules/g |
| 96000210 | AY-101 GRAB | 2 SAMPLE | S96T001317 0 |     | DSC-01 | LIQUID | <u>N/A</u>   | <u>144.3</u> |            | Joules/g |
| 96000210 | AY-101 GRAB | 3 DUP    | S96T001317 0 |     | DSC-01 | LIQUID | <u>144.3</u> | <u>121.8</u> | <u>N/A</u> | Joules/g |

Final page for worklist #

6623

See attached for signatures

Analyst Signature Date 4-3-96

Analyst Signature Date

Verified by Blandina Valenzuela  
4-9-96

Data Entry Comments:

Sample produced an endotherm at <sup>4/3/96 PRW</sup> ~~1050.4~~ 105.3°C  
with a delta H of 1050.4 J/gUnits shown for QC (SPK & STD) may not reflect the actual units. DL = Detection Limit, S = Worklist Slot Number,  
R = Replicate Number, A = Aliquot Code.

worklistrpt Version 2.1 05/15/95  
03/18/96 13:26

WHC-SD-WM-DF-178 REV. 1

Page: 1

## LABCORE Data Entry Template for Worklist#

6623

Analyst: NK Instrument: DSC01 Book # 12114-BMethod: LA-514-114 Rev/Mod C-1

Worklist Comment: AY-101 DSC RUN UNDER N2. RCJ

| GROUP    | PROJECT     | S TYPE   | SAMPLE#    | R A | TEST   | MATRIX | ACTUAL | FOUND | DL  | UNIT     |
|----------|-------------|----------|------------|-----|--------|--------|--------|-------|-----|----------|
|          |             | 1 STD    |            |     | DSC-03 | LIQUID |        |       | N/A | Joules/g |
| 96000210 | AY-101 GRAB | 2 SAMPLE | S96T001317 | 0   | DSC-03 | LIQUID | N/A    |       |     | Joules/g |
| 96000210 | AY-101 GRAB | 3 DUP    | S96T001317 | 0   | DSC-03 | LIQUID |        |       | N/A | Joules/g |

Final page for worklist #

6623

Analyst Signature: Nob Kim Date: 3/26/96Analyst Signature: New Date: 5/4/96  
new  
4/5/96

Data Entry Comments:

Units shown for QC (SPK & STD) may not reflect the actual units. DL = Detection Limit, S = Worklist Slot Number,  
R = Replicate Number, A = Aliquot Code.

SIGNATURE BELOW REPRESENTS CHEMICAL TECHNOLOGIST/CHEMIST THAT  
COMPLETED/VERIFIED THE CALIBRATION/ANALYSIS ON PAGES 242 TO 244.

DSC STD 12N14-A N2

9.010 mg

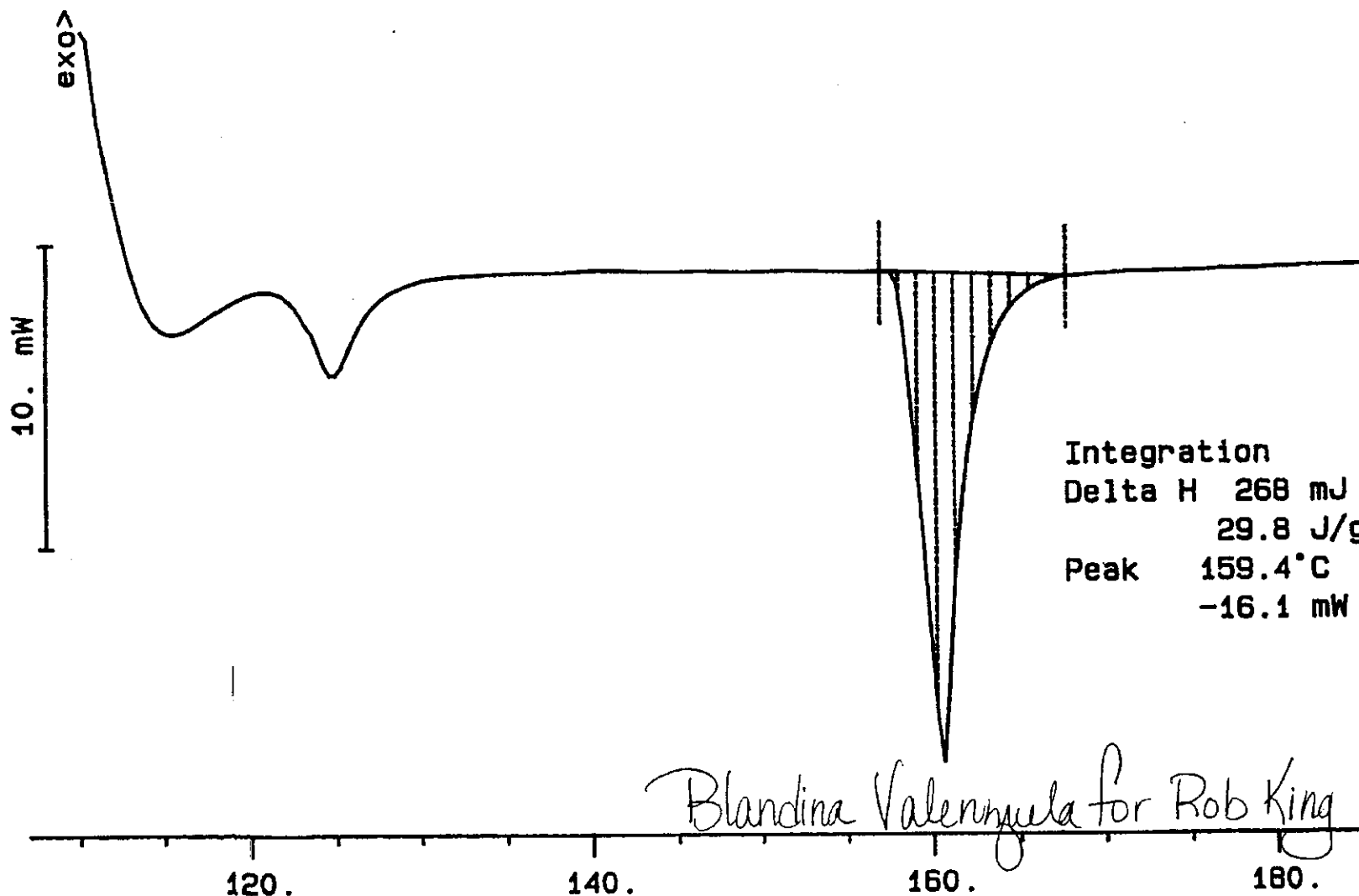
Rate: 10.0 °C/min

File: 00033.001

Ident: 0.0

DSC METTLER 26-Mar-96

222-S Laboratory



WHC-SD-WM-DP-178, REV. 1



S96T001317 N2

12.433 mg

Rate: 10.0 °C/min

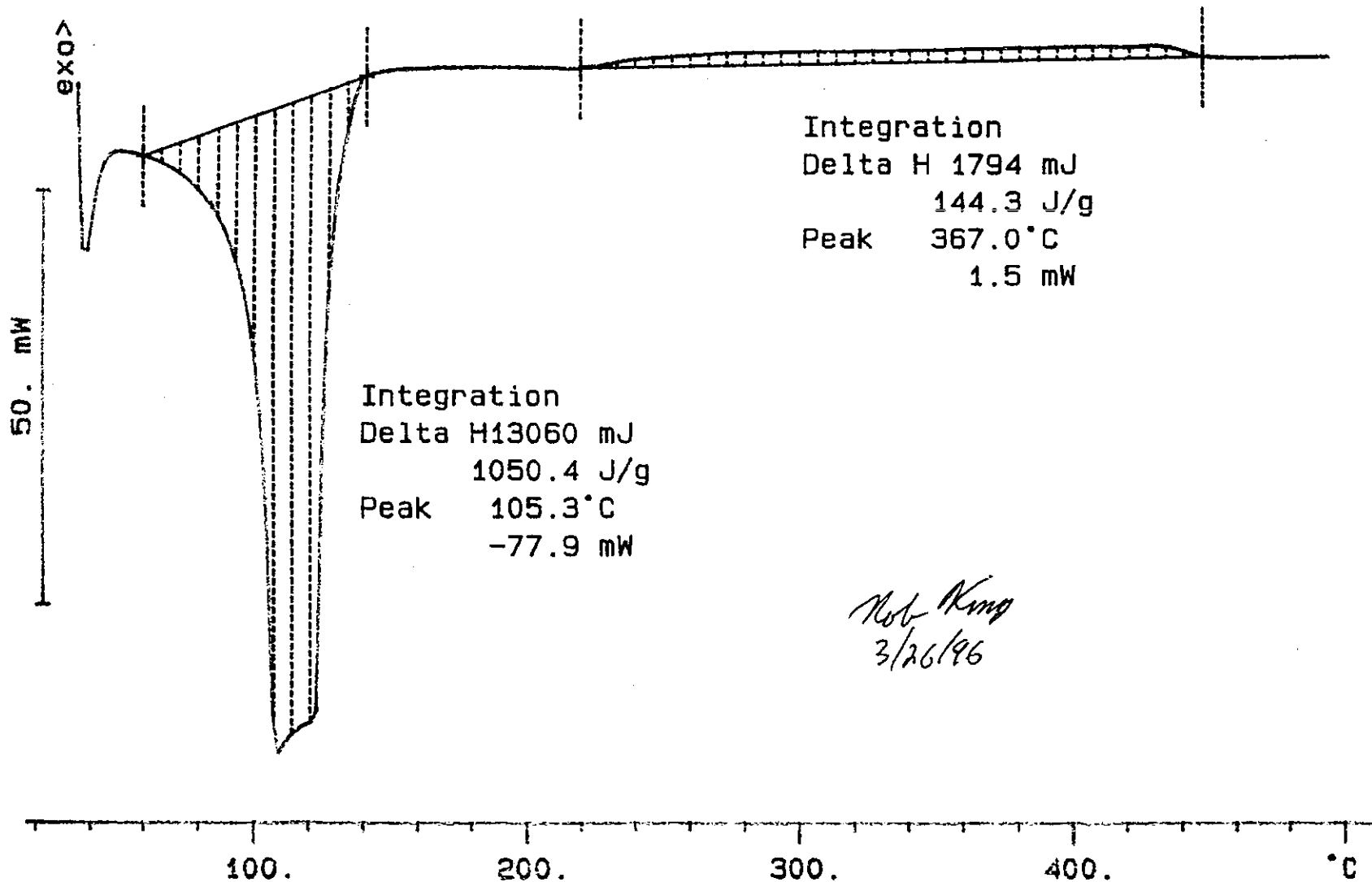
File: 00035.001

DSC METTLER

26-Mar-96

Ident: 0.0

222-S Laboratory



*Rob Kemp*  
3/26/96

WHC-SD-WM-DP-178, REV. 1

S96T001317 DUP N2

11.239 mg

Rate: 10.0 °C/min

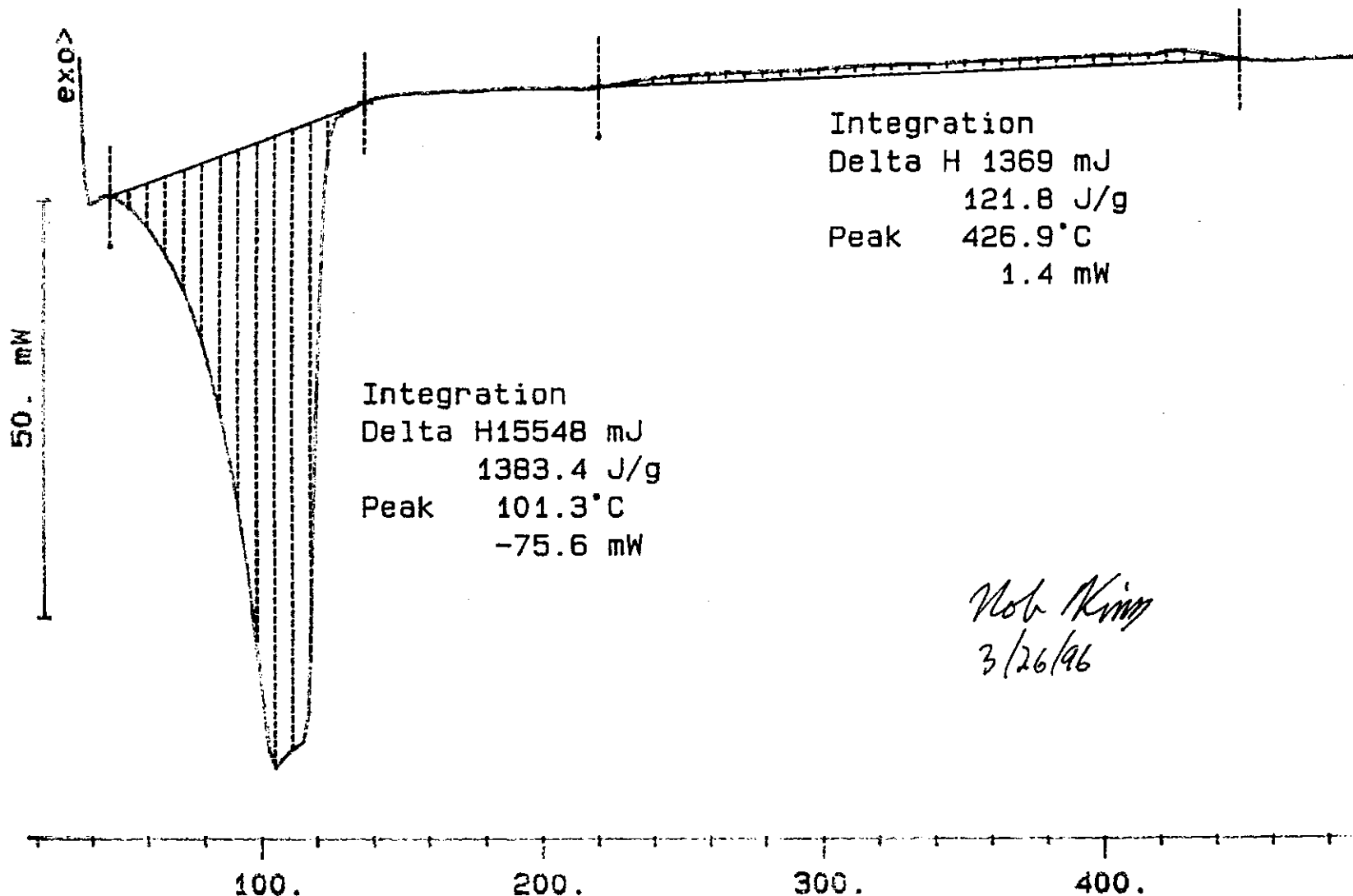
File: 00037.001

DSC METTLER

25-Mar-96

Ident: 0.0

222-S Laboratory



*Rob King*  
3/26/96

# LABCORE Data Entry Template for Worklist#

6744

Analyst: SMF Instrument: DSC01 Book # 12N14B

Method: LA-514-113 Rev/Mod C-1

Worklist Comment: AY-101 FOR DSC-03 PLEASE RUN UNDER N2

| GROUP    | PROJECT     | S TYPE   | SAMPLE#    | R A | -----TEST----- | MATRIX | ACTUAL | FOUND | DL  | UNIT     |
|----------|-------------|----------|------------|-----|----------------|--------|--------|-------|-----|----------|
|          |             | 1 STD    |            |     | DSC-01         | LIQUID | 28.45  | 32.0* | N/A | Joules/g |
| 96000210 | AY-101 GRAB | 2 SAMPLE | S96T001318 | 0   | DSC-01         | LIQUID | N/A    | Ø     |     | Joules/g |
| 96000210 | AY-101 GRAB | 3 DUP    | S96T001318 | 0   | DSC-01         | LIQUID | Ø      | Ø     | N/A | Joules/g |

Final page for worklist # 6744

See Attached for Signatures.  
Analyst Signature Date

  
Analyst Signature Date 4-6-96  
Verified by  
H Anastas 4-9-96

The sample produced an endotherm at  
103.3°C with a delta H of 1916.9 J/g.

Data Entry Comments:

# LABCORE Data Entry Template for Worklist#

6744

Analyst:

SMF

Instrument: DSC01

Book # 12N14B

Method: LA-514-114 Rev/Mod

Worklist Comment: AY-101 FOR DSC-03 PLEASE RUN UNDER N2

| GROUP    | PROJECT     | S TYPE   | SAMPLE#    | R A | TEST   | MATRIX | ACTUAL | FOUND | DL  | UNIT     |
|----------|-------------|----------|------------|-----|--------|--------|--------|-------|-----|----------|
|          |             | 1 STD    |            |     | DSC-03 | LIQUID |        |       | N/A | Joules/g |
| 96000210 | AY-101 GRAB | 2 SAMPLE | S96T001318 | 0   | DSC-03 | LIQUID | N/A    |       |     | Joules/g |
| 96000210 | AY-101 GRAB | 3 DUP    | S96T001318 | 0   | DSC-03 | LIQUID |        |       | N/A | Joules/g |

Final page for worklist #

6744

Lucie M. Fulton 3-29-96  
Analyst Signature Date

Analyst Signature Date

Data Entry Comments:

Units shown for QC (SPK & STD) may not reflect the actual units. DL = Detection Limit, S = Worklist Slot Number, R = Replicate Number, A = Aliquot Code.

-46

SIGNATURE BELOW REPRESENTS CHEMICAL TECHNOLOGIST/CHEMIST THAT  
COMPLETED/VERIFIED THE CALIBRATION/ANALYSIS ON PAGES 247 TO 249.

DSC STD 12N14-B

9.010 mg

Rate: 10.0 °C/min

File: 00079.001

Ident: 0.0

DSC METTLER

29-Mar-96

222-S Laboratory

exo>

10. mW

Integration

Delta H 288 mJ

32.0 J/g

Peak 158.5 °C

-20.7 mW

120.

140.

160.

180.

°C

*Imbulton* 3-29-96

WHC-SD-WM-DP-178, REV. 1

S96T001318 N2

10.731 mg

Rate: 10.0 °C/min

File: 00086.001

DSC METTLER

29-Mar-96

Ident: 0.0

222-S Laboratory

exo>

50. mW

Integration

Delta H20570 mJ

1916.9 J/g

Peak 103.3°C

-82.5 mW

100.

200.

300.

400.

°C

S96T001318 DUP N2  
10.367 mg

Rate: 10.0 °C/min

File: 00088.001 DSC METTLER 30-Mar-96  
Ident: 0.0 222-S Laboratory

exo>

50. mW

100.

200.

300.

400.

°C

Integration  
Delta H19915 mJ  
1921.0 J/g  
Peak 101.3°C  
-83.5 mW

# LABCORE Data Entry Template for Worklist#

6746

Analyst: SMF Instrument: DSC0 1 Book # 12N14B

Method: LA-514-113 Rev/Mod C-1

Worklist Comment: AY-101 FOR DSC-01 PLEASE RUN UNDER N2

| GROUP    | PROJECT     | S TYPE   | SAMPLE#    | R A | TEST   | MATRIX | ACTUAL | FOUND | DL  | UNIT     |
|----------|-------------|----------|------------|-----|--------|--------|--------|-------|-----|----------|
|          |             | 1 STD    |            |     | DSC-01 | LIQUID | 28.45  | 26.5* | N/A | Joules/g |
| 96000210 | AY-101 GRAB | 2 SAMPLE | S96T001201 | 0   | DSC-01 | LIQUID | N/A    | 0     |     | Joules/g |
| 96000210 | AY-101 GRAB | 3 DUP    | S96T001201 | 0   | DSC-01 | LIQUID | 0      | 0     | N/A | Joules/g |
| 96000210 | AY-101 GRAB | 4 SAMPLE | S96T001202 | 0   | DSC-01 | LIQUID | N/A    | 0     |     | Joules/g |
| 96000210 | AY-101 GRAB | 5 DUP    | S96T001202 | 0   | DSC-01 | LIQUID | 0      | 0     | N/A | Joules/g |

Final page for worklist #

6746

Susie M. Jultor 3-31-96  
Analyst Signature Date

[Signature] 4/5/96  
Analyst Signature Date

Verified by H Anastro  
4-9-96

S96T001201 produced two endotherms, one at 103.3°C with a delta H of <sup>1789.3</sup>1570.3 J/g and second at 214.8°C with a delta H of <sup>415.96</sup>5.9 J/g. <sup>BDV</sup>

Data Entry Comments: S96T001202 produced two endotherms, one at 103.3°C with a delta H of 2000.3 J/g and second at 214.8°C with a delta H of 7.3 J/g.

Units shown for QC (SPK & STD) may not reflect the actual units. DL = Detection Limit, S = Worklist Slot Number, R = Replicate Number, A = Aliquot Code.



SIGNATURE BELOW REPRESENTS CHEMICAL TECHNOLOGIST/CHEMIST THAT  
COMPLETED/VERIFIED THE CALIBRATION/ANALYSIS ON PAGES 251 TO 255.

DSC STD 12N14-B

9.010 mg

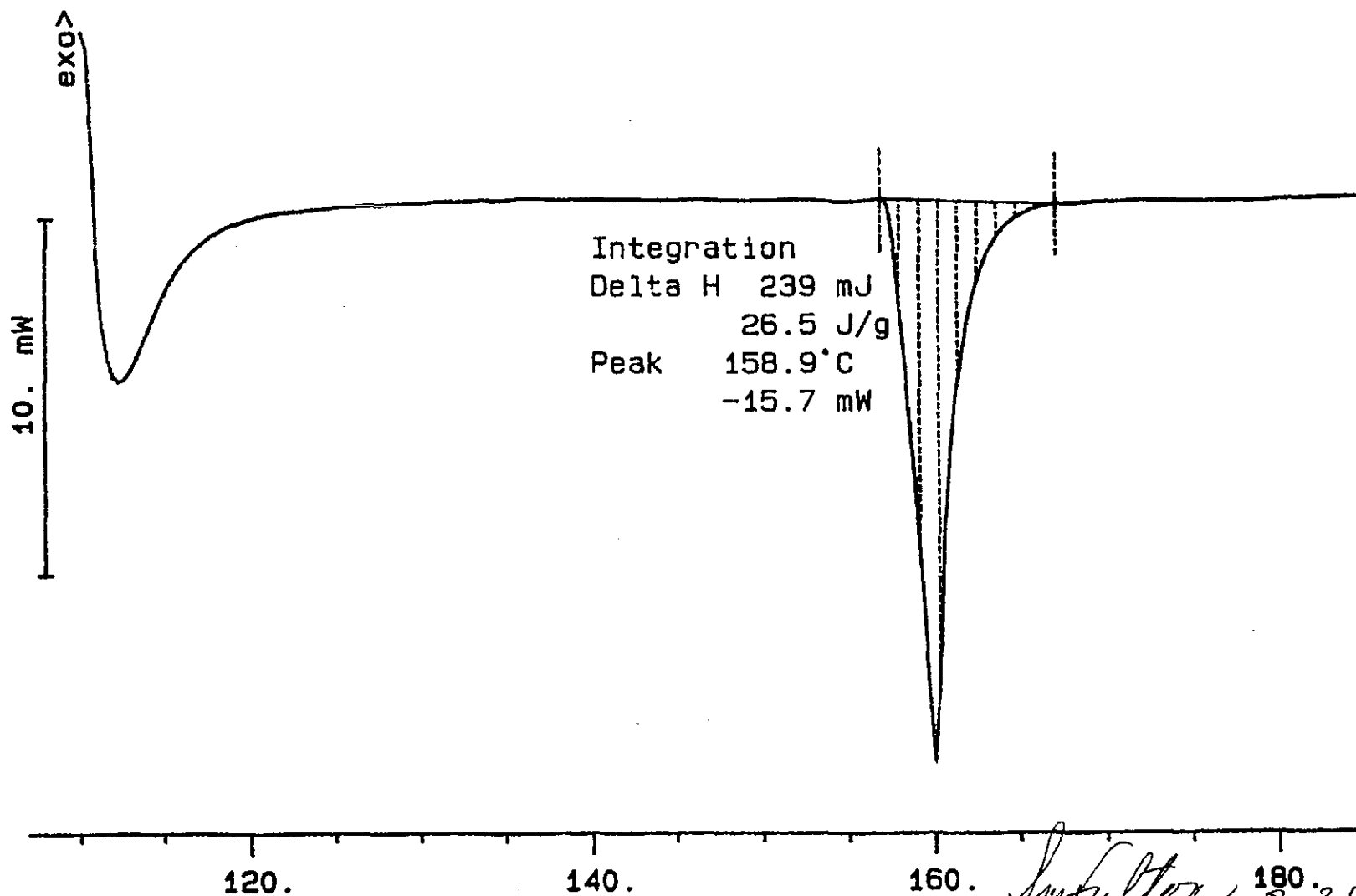
Rate: 10.0 °C/min

File: 00004.001

Ident: 0.0

DSC METTLER 31-Mar-96

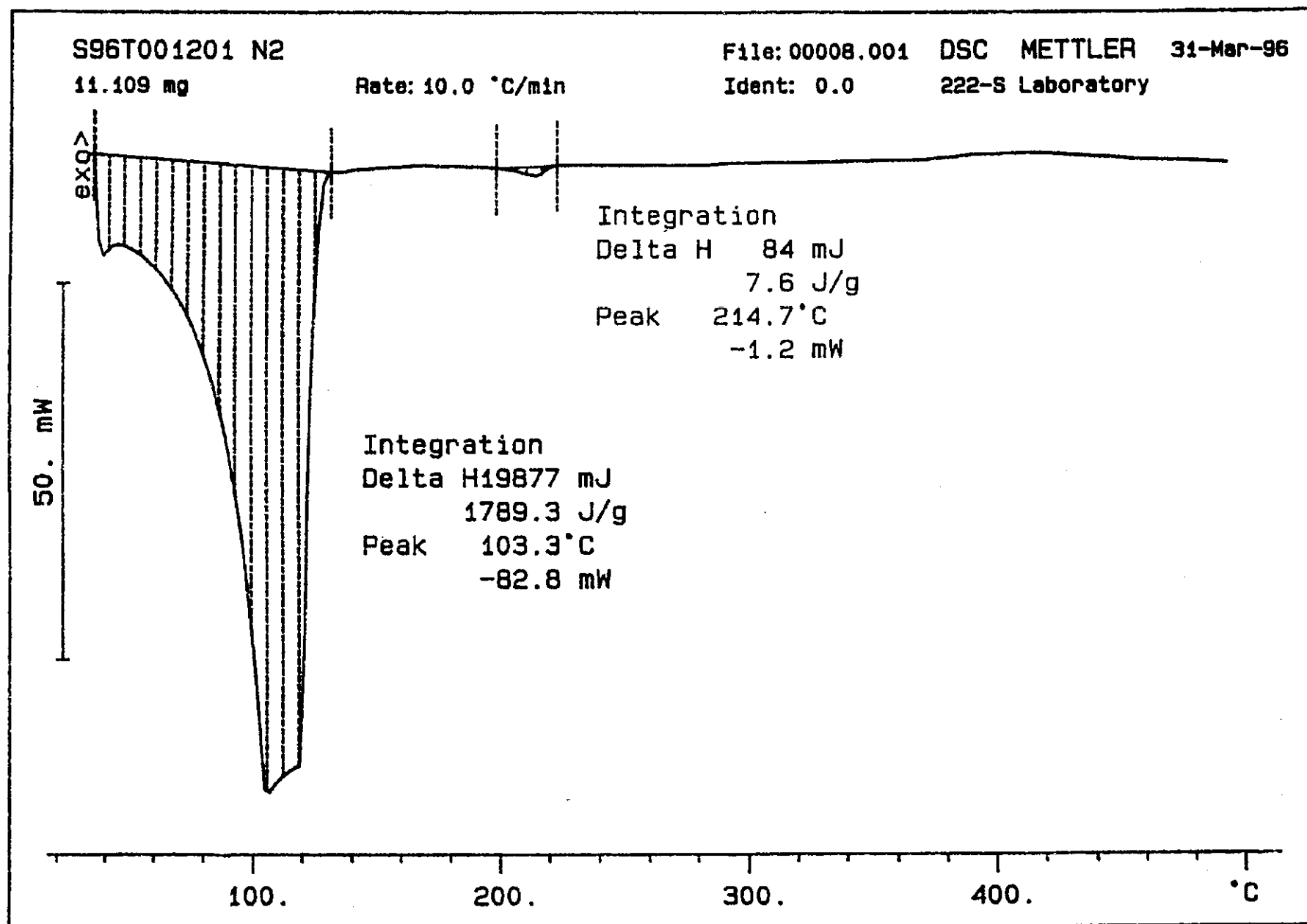
222-S Laboratory

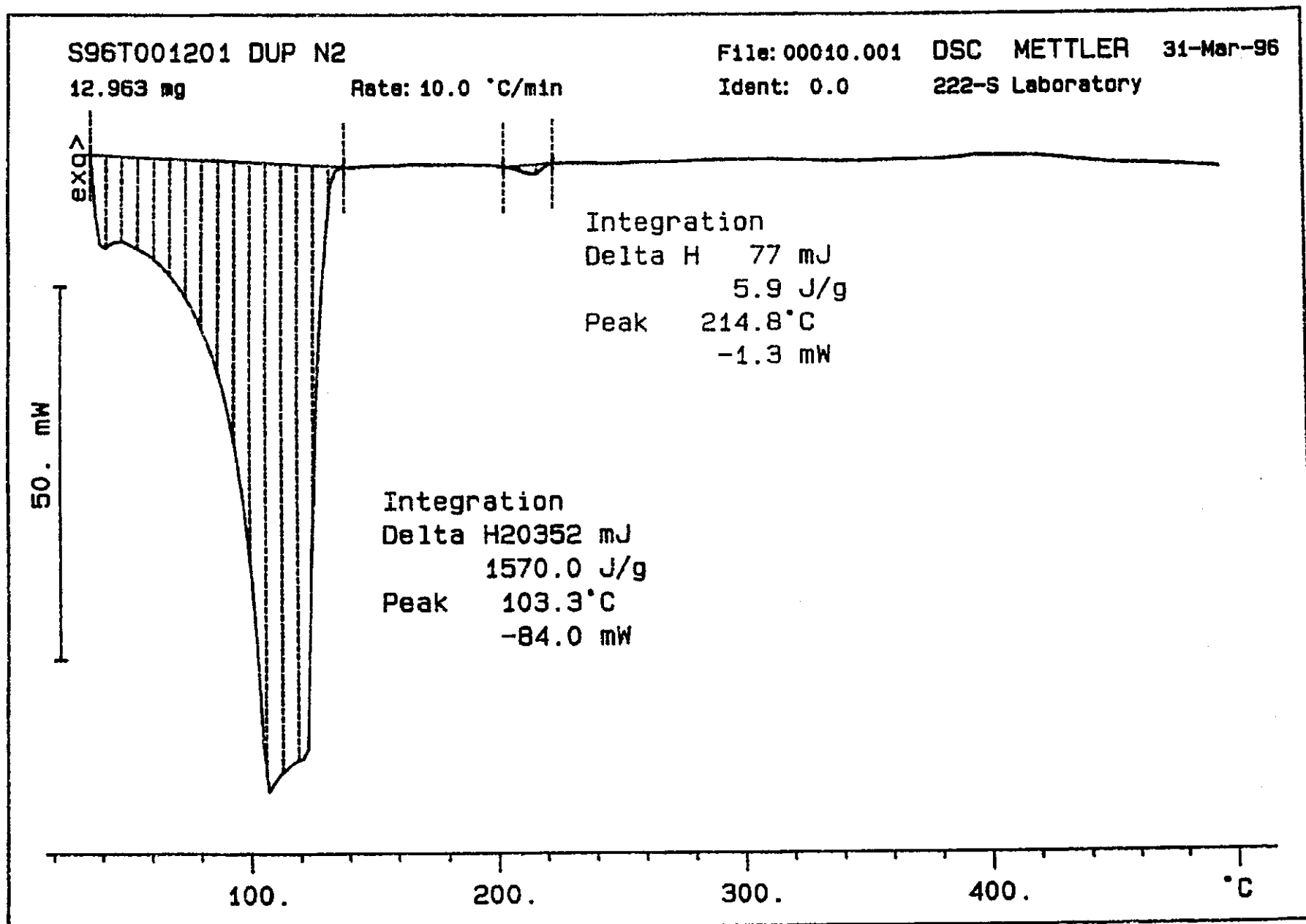


WHC-SD-WM-DP-178, REV. 1

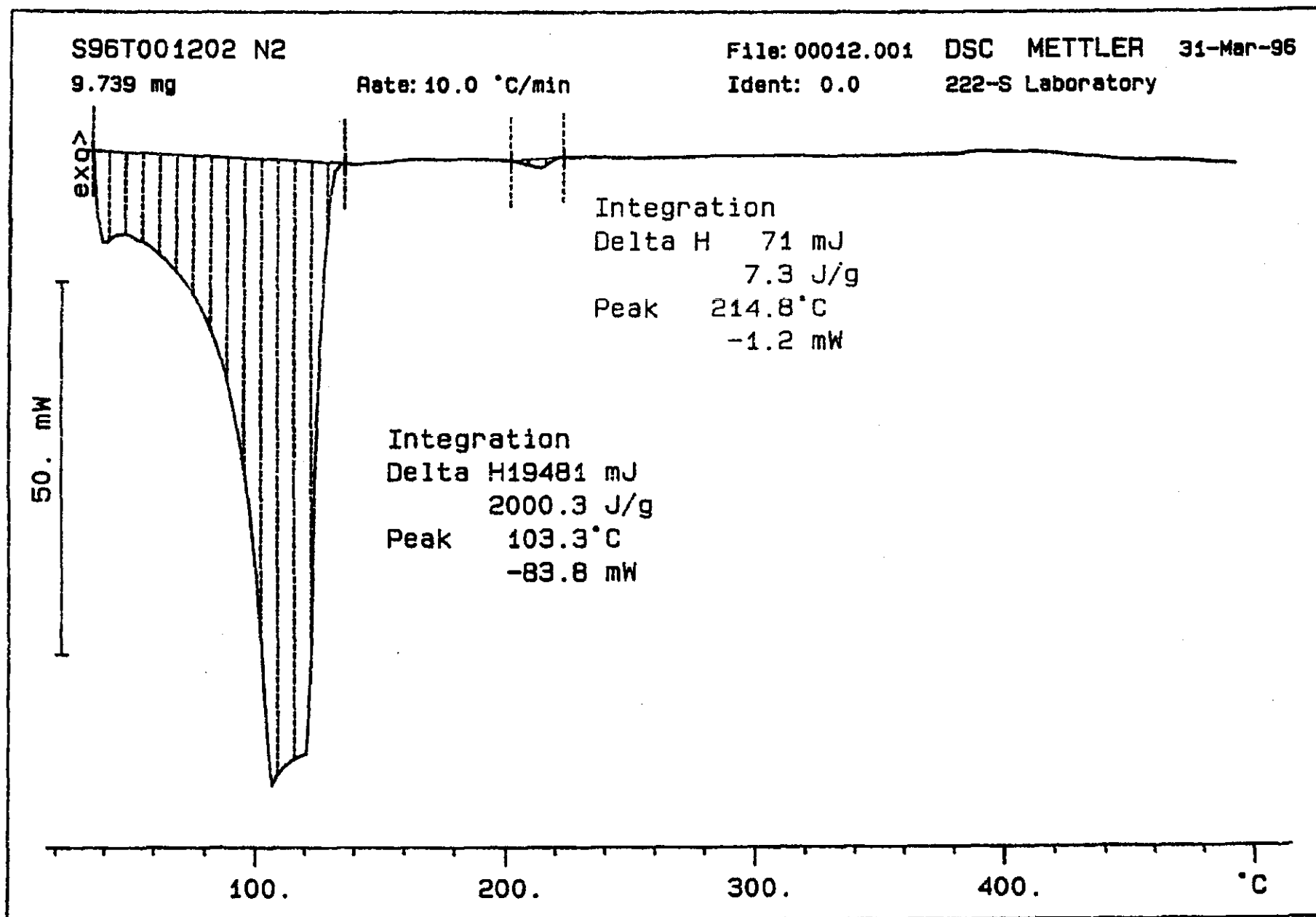
*Intuition* 3-31-96

25-2





PS-1



WHC-SD-WM-DP-178, REV 1

S96T001202 DUP N2

14.434 mg

Rate: 10.0 °C/min

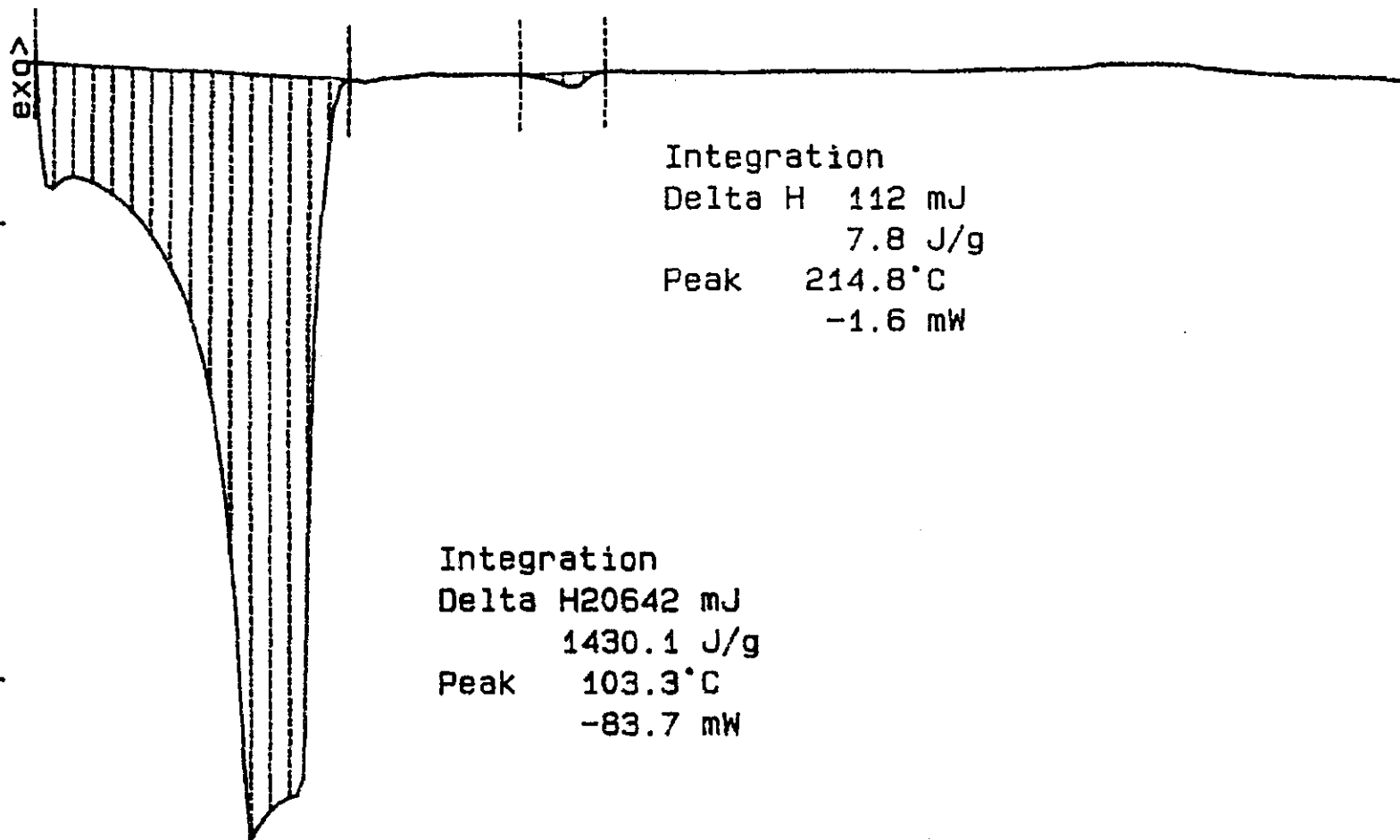
File: 00014.001

DSC METTLER

31-Mar-96

Ident: 0.0

222-S Laboratory



100.

200.

300.

400.

°C

WHC-SD-WM-DP-178, REV.1

worklistrpt Version 2.1 05/15/95  
03/20/96 11:01

WHC-SD-WM-DP-178 REV. 1

Page: 1

## LABCORE Data Entry Template for Worklist#

6748

Analyst: SMF Instrument: DSC01 Book # 12N14BMethod: LA-514-113 Rev/Mod C-1

Worklist Comment: AY-101 FOR DSC-01 PLEASE RUN UNDER N2 RTS!

| GROUP    | PROJECT     | S TYPE   | SAMPLE#    | R A | TEST   | MATRIX | ACTUAL | FOUND | DL  | UNIT     |
|----------|-------------|----------|------------|-----|--------|--------|--------|-------|-----|----------|
|          |             | 1 STD    |            |     | DSC-01 | LIQUID | 28.45  | 28.7* | N/A | Joules/g |
| 96000210 | AY-101 GRAB | 2 SAMPLE | S96T001203 | 0   | DSC-01 | LIQUID | N/A    | Ø     |     | Joules/g |
| 96000210 | AY-101 GRAB | 3 DUP    | S96T001203 | 0   | DSC-01 | LIQUID | Ø      | Ø     | N/A | Joules/g |
| 96000257 | AY-101 GRAB | 4 SAMPLE | S96T001356 | 0   | DSC-01 | LIQUID | N/A    | Ø     |     | Joules/g |
| 96000257 | AY-101 GRAB | 5 DUP    | S96T001356 | 0   | DSC-01 | LIQUID | Ø      | Ø     | N/A | Joules/g |

Final page for worklist # 6748

Susie M. Fulton 4-1-96  
Analyst Signature Date

David Hammons 4/5/96  
Analyst Signature Date

Verified by Nanastin 4-9-96

S96T001203 produced two endotherms. One at 103.3°C with a delta H of 1706.5 J/g and another at 214.8°C with a delta H of 7.8 J/g.

S96T001356 produced two endotherms. One at 105.3°C with a delta H of 1498.4 J/g and another at 214.8°C with a delta H of 5.7 J/g.

Data Entry Comments:

Units shown for QC (SPK & STD) may not reflect the actual units. DL = Detection Limit, S = Worklist Slot Number, R = Replicate Number, A = Aliquot Code.

SIGNATURE BELOW REPRESENTS CHEMICAL TECHNOLOGIST/CHEMIST THAT  
COMPLETED/VERIFIED THE CALIBRATION/ANALYSIS ON PAGES 257 TO 261.

DSC STD 12N14B

9.010 mg

Rate: 10.0 °C/min

File: 00016.001

DSC METTLER

01-Apr-96

Ident: 0.0

222-S Laboratory

exo >

10. mW

Integration

Delta H 259 mJ

28.7 J/g

Peak 159.3 °C

-16.4 mW

120.

140.

160.

180.

°C

*Susie M. Johnson* 4-19-96

WHC-SD-WM-DP-178, REV. 1

S96T001203 N2

11.567 mg

Rate: 10.0 °C/min

File: 00026.001 DSC METTLER 01-Apr-96

Ident: 0.0

222-S Laboratory



Integration

Delta H 90 mJ

74.8 J/g

Peak 214.8°C

-1.2 mW

Integration

Delta H 19739 mJ

1706.5 J/g

Peak 103.3°C

-84.0 mW

50. mW

100.

200.

300.

400.

°C

WHC-SD-WM-DP-178, REV. 1



S96T001203 DUP N2

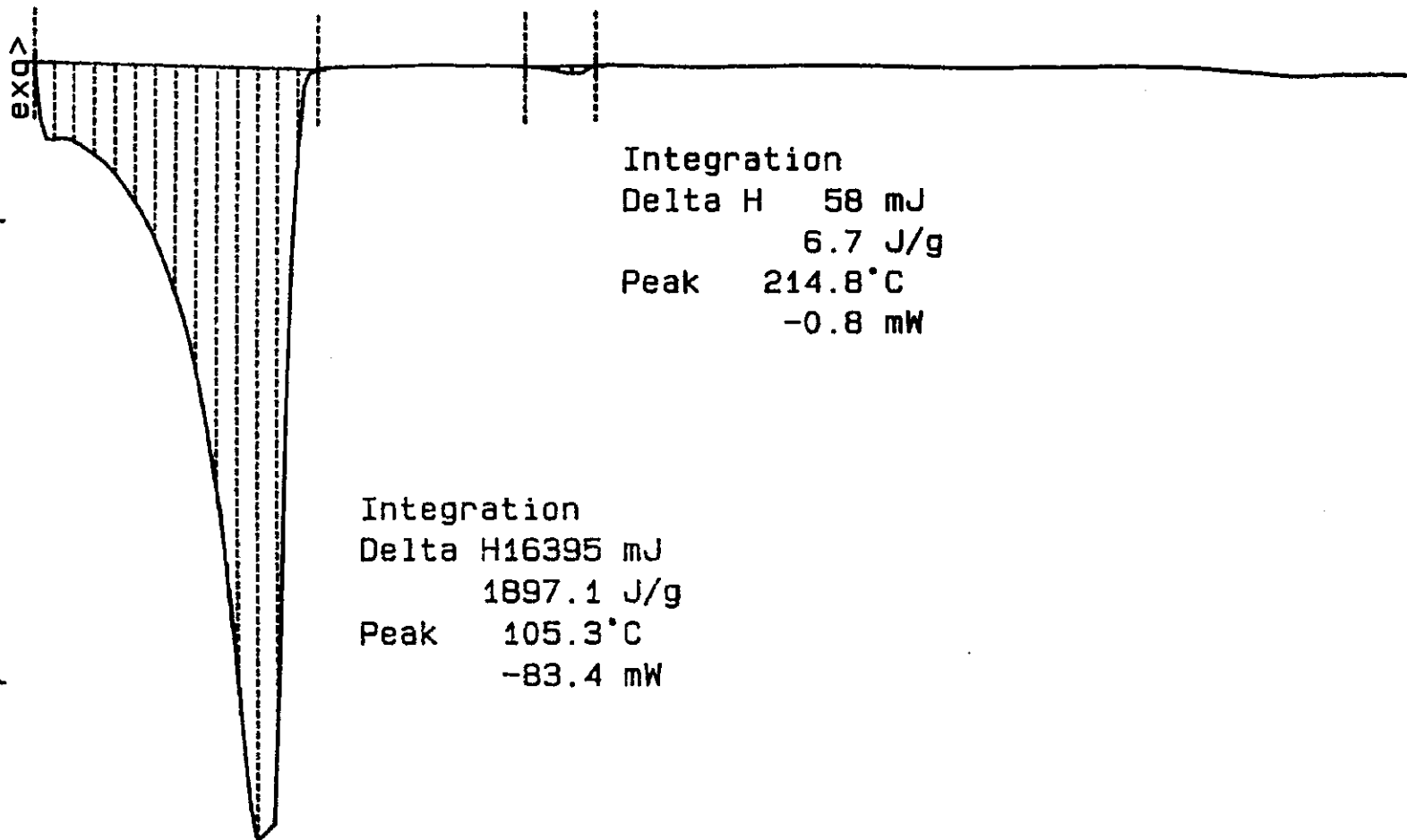
8.642 mg

Rate: 10.0 °C/min

File: 00028.001 DSC METTLER 01-Apr-96

Ident: 0.0

222-S Laboratory



WHC-SD-MM-OP-178, REV. 1

S96T001356 N2

11.587 mg

Rate: 10.0 °C/min

File: 00030.001

DSC METTLER

01-Apr-96

Ident: 0.0

222-S Laboratory

exo>

50. mW

Integration

Delta H 66 mJ  
5.7 J/g

Peak 214.8°C  
-1.1 mW

Integration

Delta H 17362 mJ  
1498.4 J/g

Peak 105.3°C  
-82.0 mW

100.

200.

300.

400.

°C

WHC-SD-MM-DP-178, REV. 1

S96T001356 DUP N2

11.918 mg

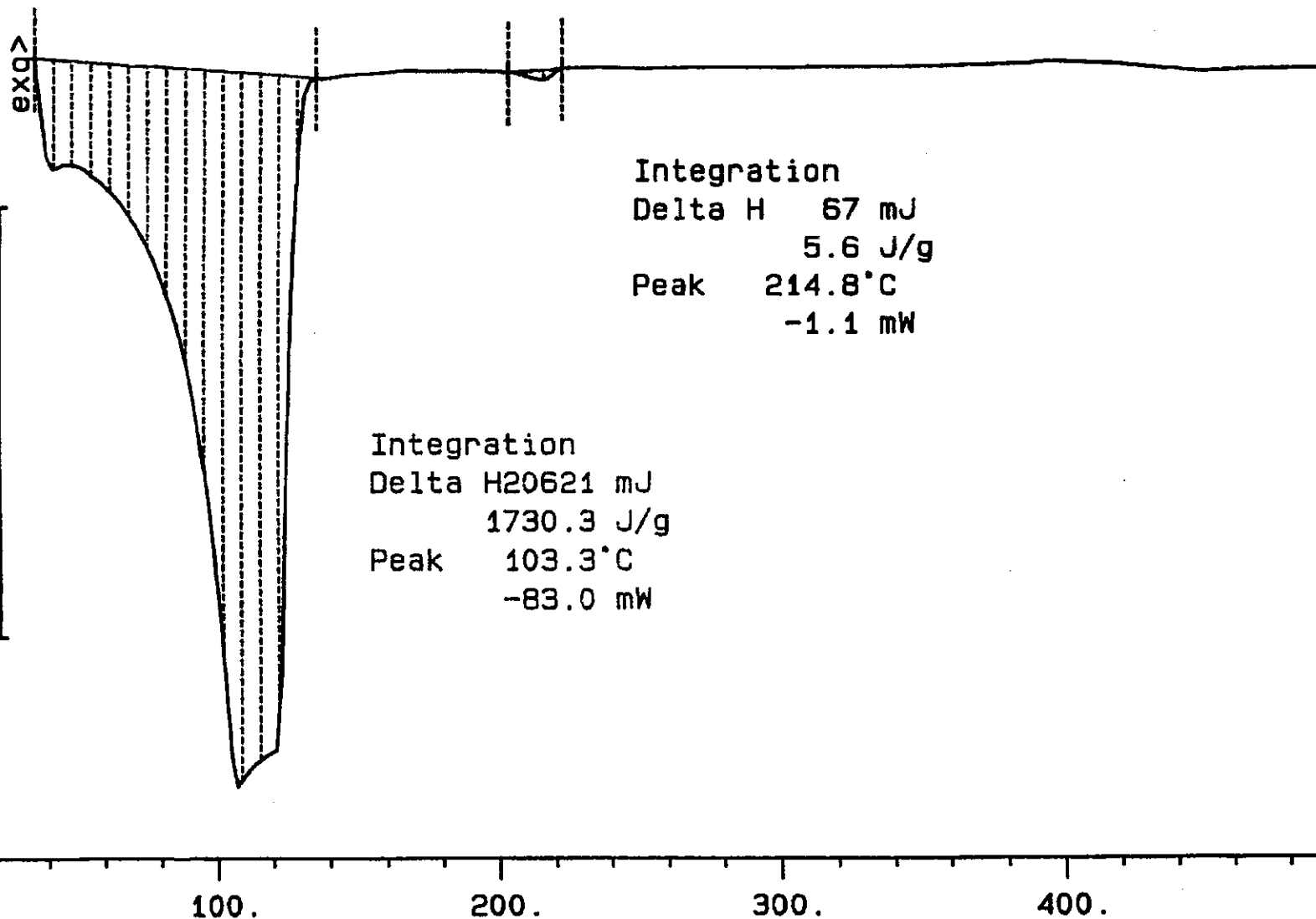
Rate: 10.0 °C/min

File: 00032.001

DSC METTLER 02-Apr-96

Ident: 0.0

222-S Laboratory



WHC-SD-WM-DP-178, REV. 1

worklistrpt Version 2.1 05/15/95

04/08/96 11:14

WHC-SD-WM-OP-178, REV 1

Page: 1

## LABCORE Data Entry Template for Worklist#

6751

Analyst: PJMInstrument: DSC0 3Book # 12N14BMethod: LA-514-114 Rev/Mod C-1

Worklist Comment: AY-101 FOR DSC-01 PLEASE RUN UNDER N2 RTS!

| GROUP    | PROJECT     | S TYPE   | SAMPLE#    | R A | TEST   | MATRIX | ACTUAL       | FOUND        | DL         | UNIT     |
|----------|-------------|----------|------------|-----|--------|--------|--------------|--------------|------------|----------|
|          |             | 1 STD    |            |     | DSC-03 | LIQUID | <u>28.45</u> | <u>28.04</u> | <u>N/A</u> | Joules/g |
| 96000257 | AY-101 GRAB | 2 SAMPLE | S96T001357 | 0   | DSC-03 | LIQUID | <u>N/A</u>   | <u>Ø</u>     |            | Joules/g |
| 96000257 | AY-101 GRAB | 3 DUP    | S96T001357 | 0   | DSC-03 | LIQUID | <u>Ø</u>     | <u>Ø</u>     | <u>N/A</u> | Joules/g |
|          |             | 4 STD    |            |     | DSC-03 | LIQUID | <u>28.45</u> | <u>28.14</u> | <u>N/A</u> | Joules/g |
| 96000257 | AY-101 GRAB | 5 SAMPLE | S96T001358 | 0   | DSC-03 | LIQUID | <u>N/A</u>   | <u>Ø</u>     |            | Joules/g |
| 96000257 | AY-101 GRAB | 6 DUP    | S96T001358 | 0   | DSC-03 | LIQUID | <u>Ø</u>     | <u>Ø</u>     | <u>N/A</u> | Joules/g |

Final page for worklist #

6751

See Attached for Signatures  
Analyst Signature \_\_\_\_\_ Date \_\_\_\_\_Dany Hammit  
Analyst Signature \_\_\_\_\_ Date 4-9-96Verified by Blandina Valenzuela  
4/15/96

S96T001357 produced one endotherm at 113.4°C with a delta H  
of 1971.3 J/g.

Data Entry Comments: S96T001358 produced one endotherm at 117.7°C with  
a delta H of 1995.2 J/g

Units shown for QC (SPK & STD) may not reflect the actual units. DL = Detection Limit, S = Worklist Slot Number,  
R = Replicate Number, A = Aliquot Code.

- 62

worklistrpt Version 2.1 05/15/95  
03/20/96 11:01

WHC-SD-WM-DF-178, REV. 1

Page: 1

## LABCORE Data Entry Template for Worklist#

6751

Analyst: RJ McCown

Instrument: DSC0

Book # 12014B

Method: LA-514-113 Rev/Mod

C-1

Rjm 4/3/96

Worklist Comment: AY-101 FOR DSC-01 PLEASE RUN UNDER N2 RTS!

| GROUP    | PROJECT     | S TYPE   | SAMPLE#    | R A | TEST   | MATRIX | ACTUAL | FOUND | DL  | UNIT     |
|----------|-------------|----------|------------|-----|--------|--------|--------|-------|-----|----------|
|          |             | 1 STD    |            |     | DSC-01 | LIQUID |        |       | N/A | Joules/g |
| 96000257 | AY-101 GRAB | 2 SAMPLE | S96T001357 | 0   | DSC-01 | LIQUID | N/A    |       |     | Joules/g |
| 96000257 | AY-101 GRAB | 3 DUP    | S96T001357 | 0   | DSC-01 | LIQUID |        |       | N/A | Joules/g |
| 96000257 | AY-101 GRAB | 4 SAMPLE | S96T001358 | 0   | DSC-01 | LIQUID | N/A    |       |     | Joules/g |
| 96000257 | AY-101 GRAB | 5 DUP    | S96T001358 | 0   | DSC-01 | LIQUID |        |       | N/A | Joules/g |

Final page for worklist #

6751

RJ McCown  
Analyst Signature4/3/96  
Date

Analyst Signature

Date

Other instrument  
was used  
4/15/96  
BM

Data Entry Comments:

Units shown for QC (SPK & STD) may not reflect the actual units. DL = Detection Limit, S = Worklist Slot Number,  
R = Replicate Number, A = Aliquot Code.

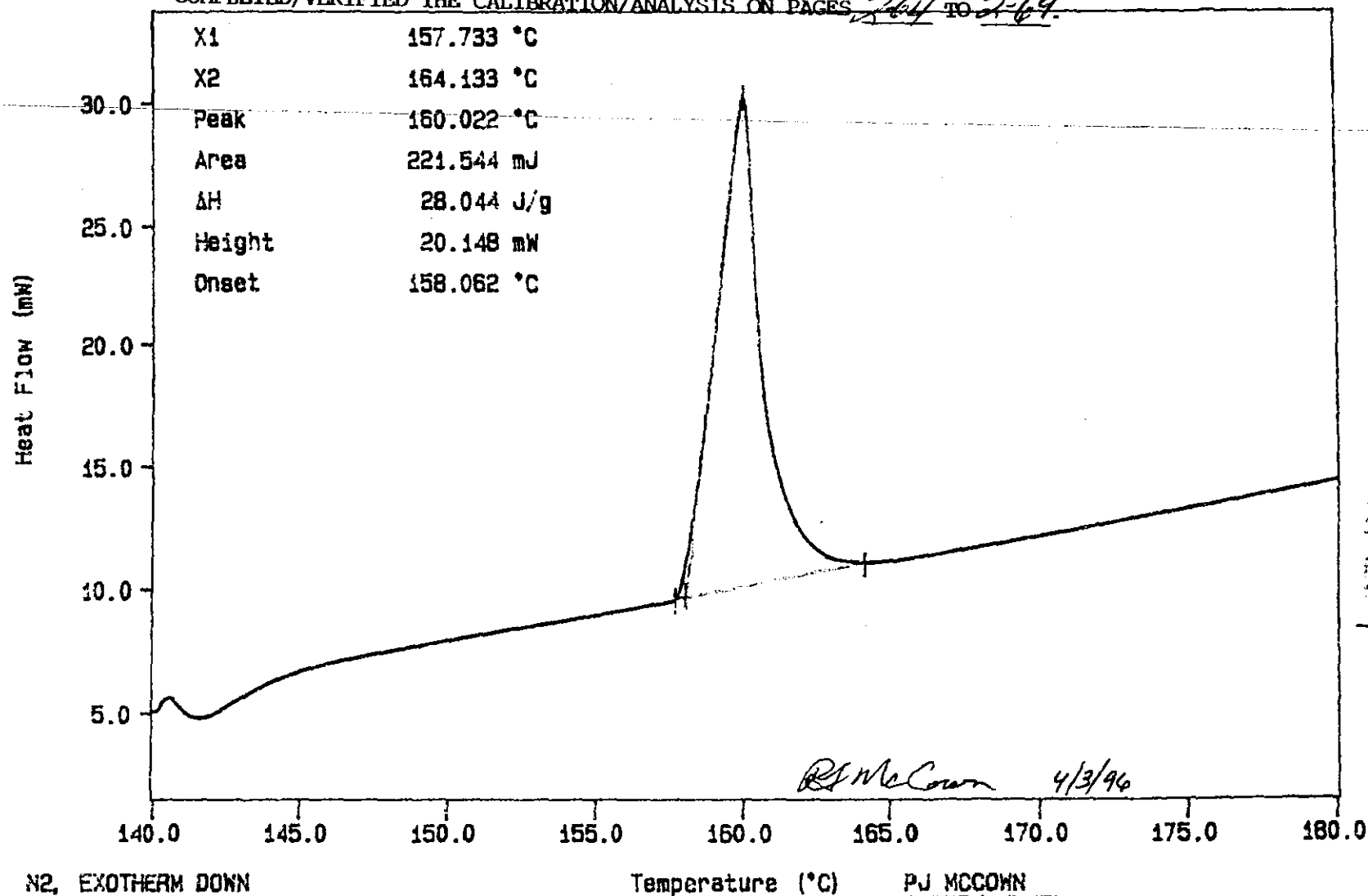
Curve 1: DSC

File info: IND040301 Wed Apr 3 06:03:55 1996

Sample Weight: 7.900 mg

12N14-B INDIUM AT 10C/MIN

SIGNATURE BELOW REPRESENTS CHEMICAL TECHNOLOGIST/CHEMIST THAT  
COMPLETED/VERIFIED THE CALIBRATION/ANALYSIS ON PAGES 2-64 TO 2-69.



N2, EXOTHERM DOWN

TEMP: 140.0 C TIME: 0.0 min RATE: 10.0 C/min  
TEMP: 180.0 C

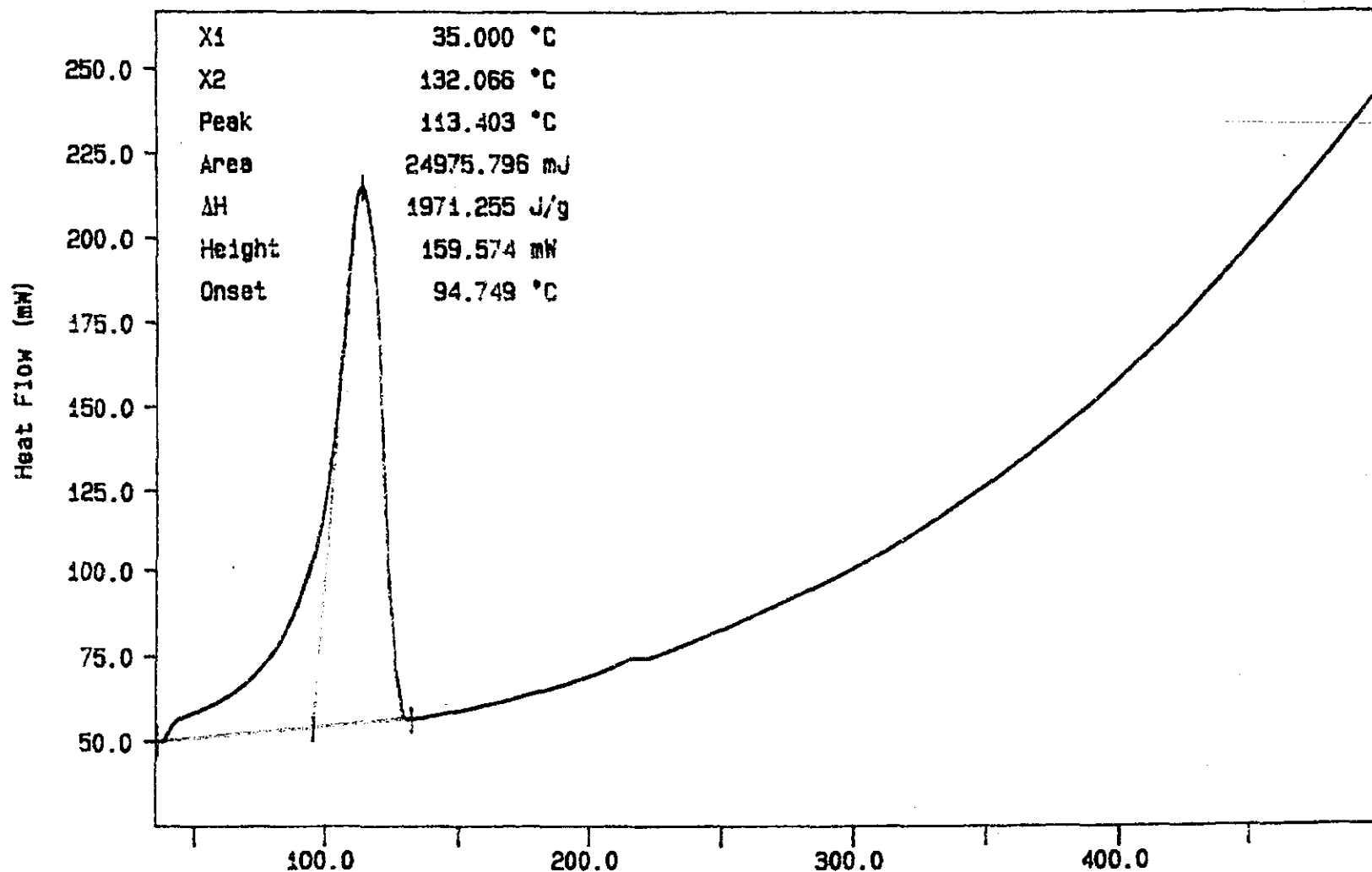
PJ MCCOHN  
PERKIN-ELMER  
7 Series Thermal Analysis System  
Wed Apr 3 06:58:29 1996

Curve 1: DSC

File info: SAM040301 Wed Apr 3 09:05:40 1996

Sample Weight: 12.670 mg

S96T001357 SAM



exotherm down, N2 purge gas

TEMP: 35.0 °C TIME: 0.0 min RATE: 10.0 °C/min  
TEMP: 500.0 °C

Temperature (°C)

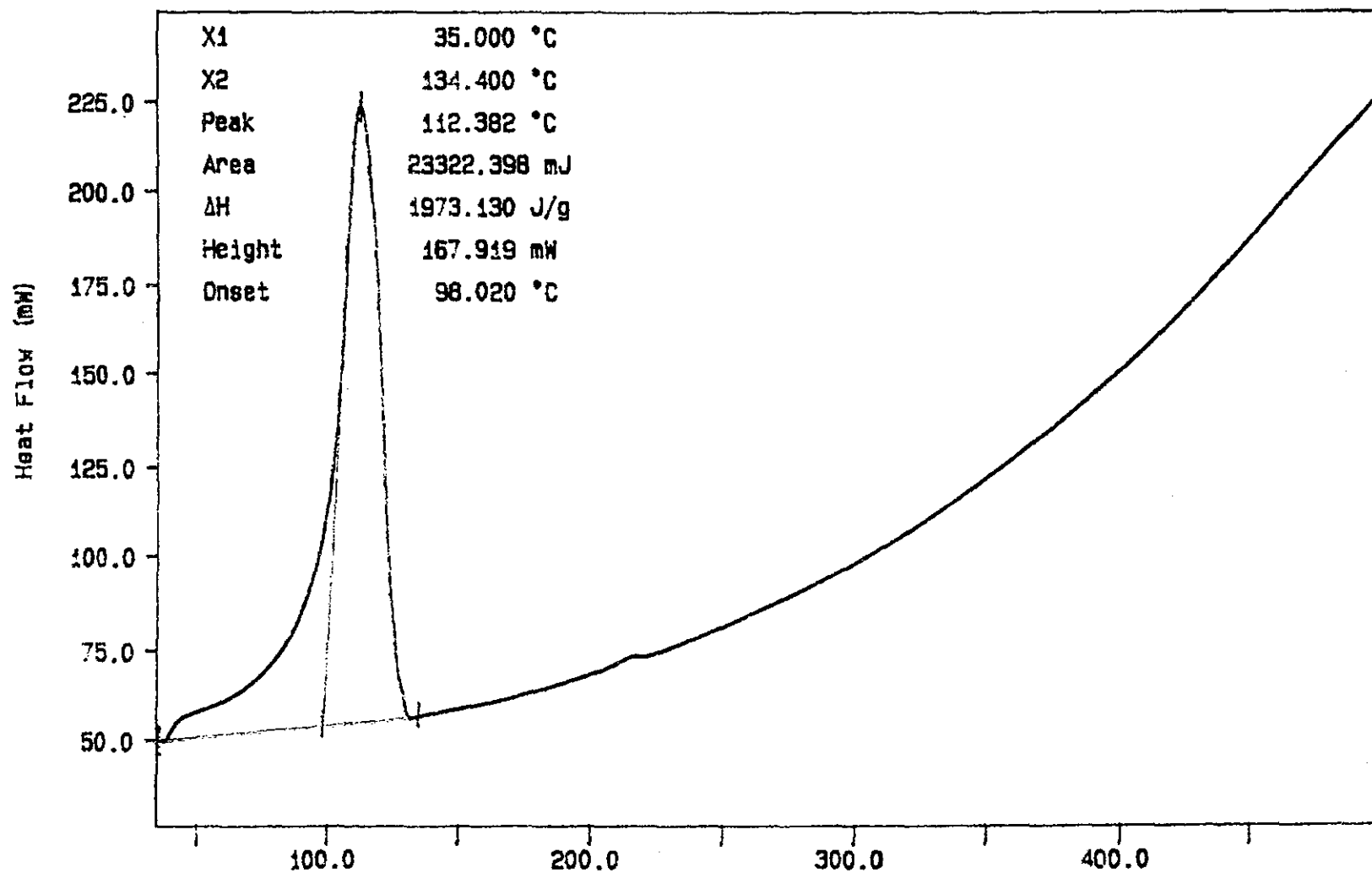
PJ MCCOWN  
PERKIN-ELMER  
7 Series Thermal Analysis System  
Wed Apr 3 09:27:23 1996

Curve 1: DSC

File info: SAM040302 Wed Apr 3 10:33:17 1996

Sample Weight: 11.820 mg

S96T001357 DUP



exotherm down, N2 purge gas

TEMP1: 35.0 °C TIME: 0.0 min RATE: 10.0 °C/min  
TEMP2: 500.0 °C

Temperature (°C)

PJ MCCOWN  
PERKIN-ELMER  
7 Series Thermal Analysis System  
Wed Apr 3 10:38:54 1996

WHC-SD-WM-DP-178, REV. /

04/09/96

07:29

0509 372 2929

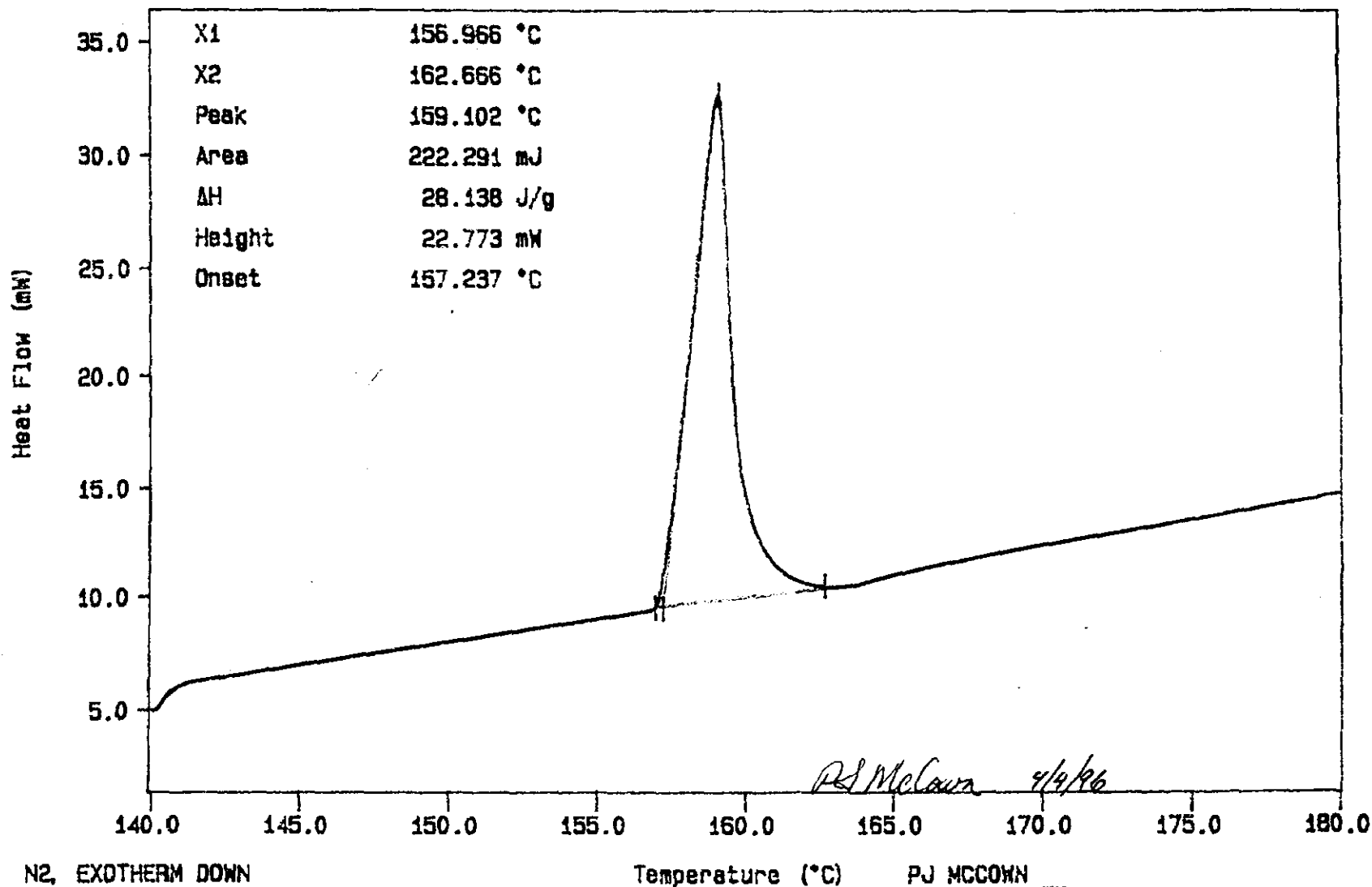
WHLINSTRON

444 MU-82A 2000

96020



Curve 1: DSC  
File info: IND040401 Thu Apr 4 06:40:50 1996  
Sample Weight: 7.900 mg  
12N14-B INDIUM AT 10C\MIN



N2, EXOTHERM DOWN  
TEMP1: 140.0 °C TIME1: 0.0 min RATE1: 10.0 °C/min  
TEMP2: 180.0 °C

PJ MCCOWN  
PERKIN-ELMER  
7 Series Thermal Analysis System  
Thu Apr 4 06:41:11 1996

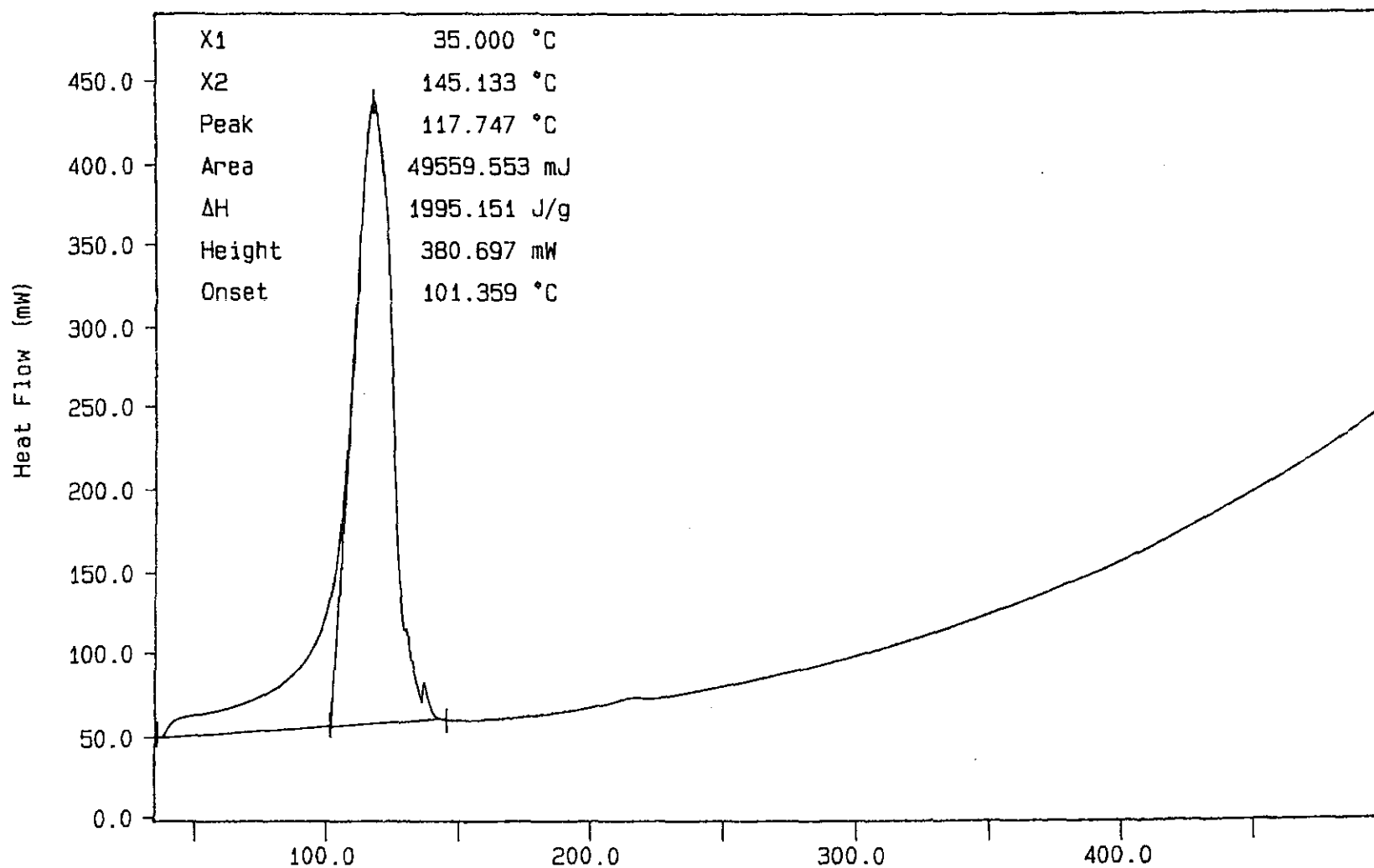
WHC-SD-WN-DP-178 REV 1

Curve 1: DSC

File info: SAM040401 Thu Apr 4 09:49:21 1996

Sample Weight: 24.840 mg

S96T001358 SAM



exotherm down, N2 purge gas

TEMP1: 35.0 °C TIME1: 0.0 min RATE1: 10.0 °C/min  
TEMP2: 500.0 °C

Temperature (°C)

PJ MCCOWN  
PERKIN-ELMER  
7 Series Thermal Analysis System  
Thu Apr 4 10:15:00 1996

WMC-SD-WM-DP-178, REV.1

04/09/96 07:31 0309 372 2929

MSD-00000000

444 MU-024 2004

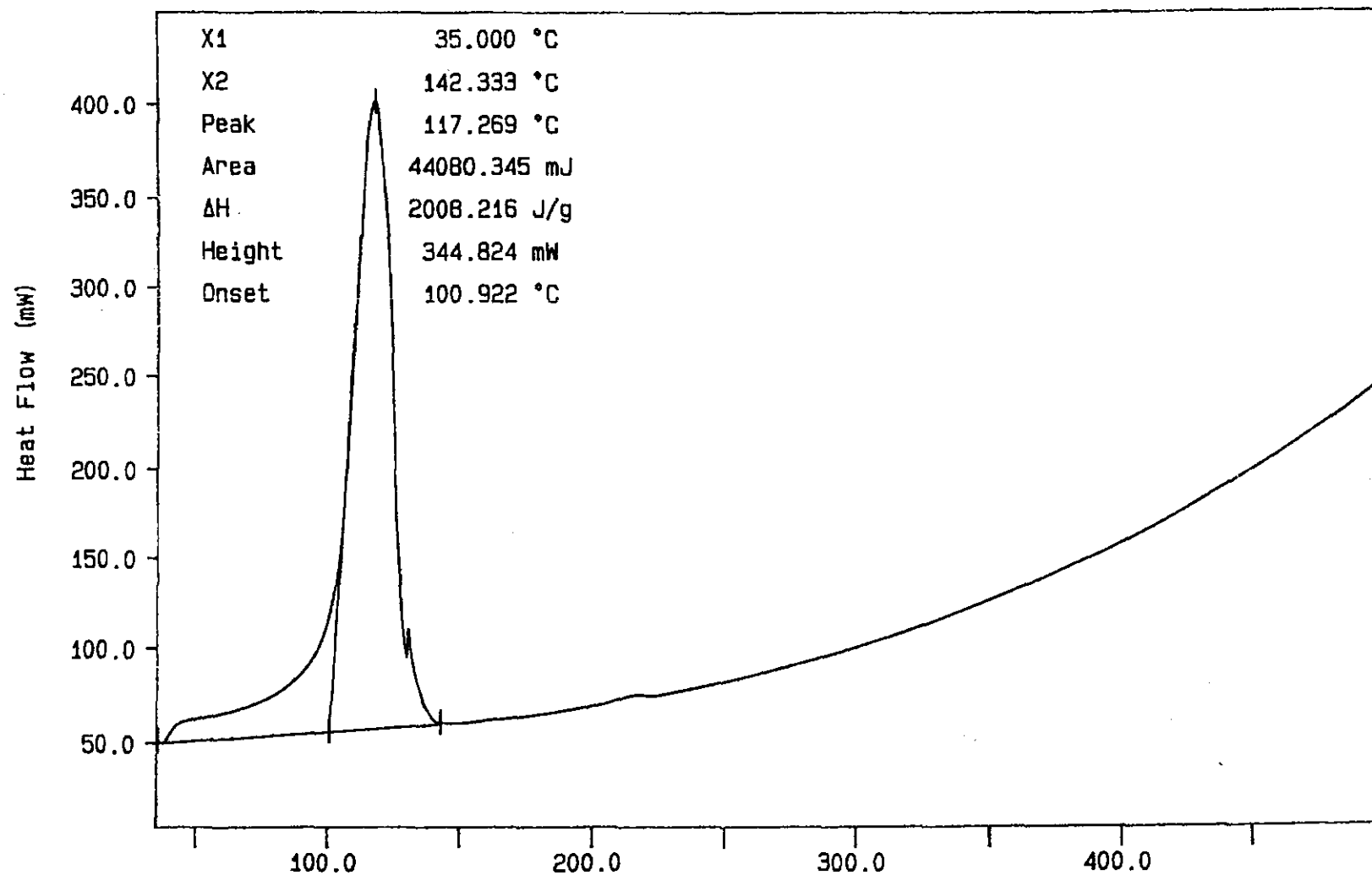
00000

Curve 1: DSC

File info: SAM040402 Thu Apr 4 11:12:47 1996

Sample Weight: 21.950 mg

S96T001358 DUP



exotherm down, N2 purge gas

TEMP1: 35.0 °C TIME1: 0.0 min RATE1: 10.0 °C/min  
TEMP2: 500.0 °C

PJ MCCOWN  
PERKIN-ELMER  
7 Series Thermal Analysis System  
Thu Apr 4 12:13:59 1996

WHC-SD-MM-IDP-178 REV 1

04/09/96 07:32

0509 372 2929

WESTINGHOUSE

444 MO-924 200W

0.001

worklistrpt Version 2.1 05/15/95  
04/08/96 10:31

WHC-SD-WM-DF-78, REV. /

Page: 1

## LABCORE Data Entry Template for Worklist#

7206

Analyst: PJM Instrument: DSC0 1 Book # 12N14BMethod: LA-514-113 Rev/Mod C-1

Worklist Comment: AY101 FOR DSC PLEASE RUN UNDER N2

| GROUP    | PROJECT     | S | TYPE   | SAMPLE#    | R | A | TEST   | MATRIX | ACTUAL | FOUND | DL  | UNIT     |
|----------|-------------|---|--------|------------|---|---|--------|--------|--------|-------|-----|----------|
|          |             | 1 | STD    |            |   |   | DSC-01 | LIQUID | 28.45  | 30.9  | N/A | Joules/g |
| 96000257 | AY-101 GRAB | 2 | SAMPLE | S96T001519 | 0 |   | DSC-01 | LIQUID | N/A    | 7.6   |     | Joules/g |
| 96000257 | AY-101 GRAB | 3 | DUP    | S96T001519 | 0 |   | DSC-01 | LIQUID | 7.6    | 7.6   | N/A | Joules/g |
|          |             | 4 | STD    |            |   |   | DSC-01 | LIQUID | 28.45  | 28.3* | N/A | Joules/g |
| 96000257 | AY-101 GRAB | 5 | SAMPLE | S96T001520 | 0 |   | DSC-01 | LIQUID | N/A    | φ     |     | Joules/g |
| 96000257 | AY-101 GRAB | 6 | DUP    | S96T001520 | 0 |   | DSC-01 | LIQUID | φ      | 12.2  | N/A | Joules/g |
| 96000257 | AY-101 GRAB | 7 | TRIPL  | S96T001520 | 0 |   | DSC-01 | LIQUID | φ      | φ     | N/A | Joules/g |

Final page for worklist #

7206

See Attached for Signatures.  
Analyst Signature Date

[Signature] 4-9-96  
Analyst Signature Date

Verified by Hanastor 4-11-96

S96T001519 produced two endotherms, one at 99.3°C with a delta H of 1452.9 J/g, the other at 214.6°C with a delta H of 6.1 J/g.

S96T001520 produced two endotherms, one at 101.3°C with a delta H of 1674.5 J/g, the other at 214.7°C with a delta H of 6.8 J/g.

Data Entry Comments:

Units shown for QC (SPK & STD) may not reflect the actual units. DL = Detection Limit, S = Worklist Slot Number.  
R = Replicate Number, A = Aliquot Code.

worklistrpt Version 2.1 05/15/95  
04/01/96 15:10

Page: 1

## LABCORE Data Entry Template for Worklist#

7206

Analyst: RL McCown Instrument: DSC0 Book # 12014BMethod: LA-514-113 Rev/Mod C-1 WHO-SD-WM-DP-178, REV. 1

Worklist Comment: AY101 FOR DSC PLEASE RUN UNDER N2

| GROUP    | PROJECT     | S | TYPE   | SAMPLE#    | R | A | -----TEST----- | MATRIX | ACTUAL | FOUND | DL  | UNIT     |
|----------|-------------|---|--------|------------|---|---|----------------|--------|--------|-------|-----|----------|
|          |             | 1 | STD    |            |   |   | DSC-01         | LIQUID |        |       | N/A | Joules/g |
| 96000257 | AY-101 GRAB | 2 | SAMPLE | S96T001519 | 0 |   | DSC-01         | LIQUID | N/A    |       |     | Joules/g |
| 96000257 | AY-101 GRAB | 3 | DUP    | S96T001519 | 0 |   | DSC-01         | LIQUID |        |       | N/A | Joules/g |
| 96000257 | AY-101 GRAB | 4 | SAMPLE | S96T001520 | 0 |   | DSC-01         | LIQUID | N/A    |       |     | Joules/g |
| 96000257 | AY-101 GRAB | 5 | DUP    | S96T001520 | 0 |   | DSC-01         | LIQUID |        |       | N/A | Joules/g |

Final page for worklist # 7206

RL McCown 4/3/96  
Analyst Signature DateValerie Massie 04-04-96  
Analyst Signature Date

Data Entry Comments:

Units shown for QC (SPK & STD) may not reflect the actual units. DL = Detection Limit, S = Worklist Slot Number,  
R = Replicate Number, A = Aliquot Code.

SIGNATURE BELOW REPRESENTS CHEMICAL TECHNOLOGIST/CHEMIST THAT  
COMPLETED/VERIFIED THE CALIBRATION/ANALYSIS ON PAGES 272 TO 278.

DSC STD 12N14B

9.010 mg

Rate: 10.0 °C/min

File: 00048.001 DSC METTLER 03-Apr-96

Ident: 0.0

222-S Laboratory

*R. McCown 4/3/96*

exo>

10. mW

Integration

Delta H 278 mJ

30.9 J/g

Peak 159.1°C

-17.5 mW

120.

140.

160.

180. °C

WHC-SD-WM-DP-178, REV 1

S96T001519 SAM N2

14.254 mg

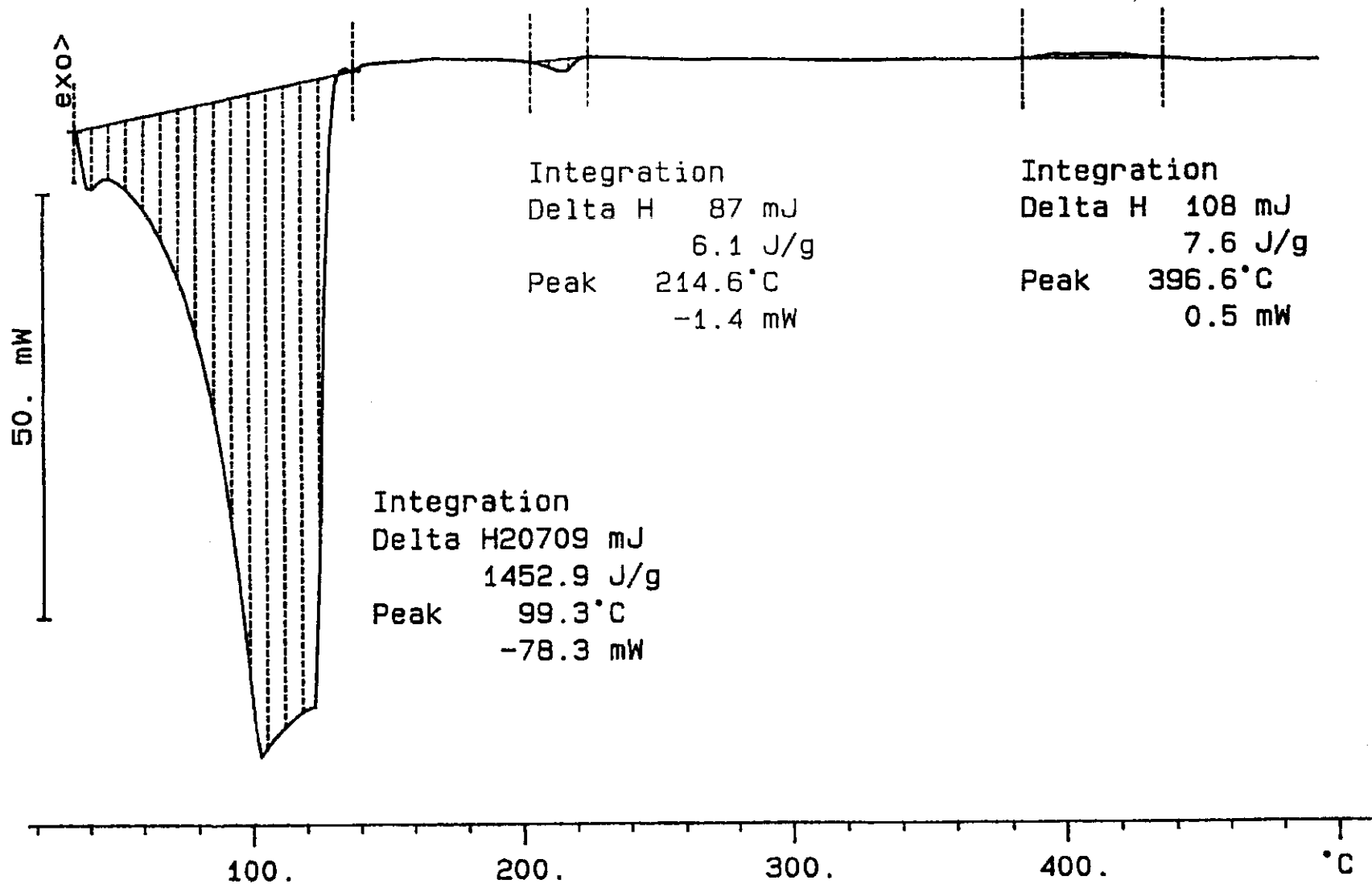
Rate: 10.0 °C/min

File: 00048.001

Ident: 0.0

DSC METTLER 03-Apr-96

222-S Laboratory



WHC-SD-WM-DP-178, REV. 1

S96T001519 DUP N2

13.442 mg

Rate: 10.0 °C/min

File: 00050.001

Ident: 0.0

DSC METTLER

03-Apr-96

222-S Laboratory

exo >

50. mW

Integration  
Delta H 78 mJ  
5.8 J/g  
Peak 214.6°C  
-1.3 mW

Integration  
Delta H 102 mJ  
7.6 J/g  
Peak 408.7°C  
0.6 mW

Integration  
Delta H 16635 mJ  
1237.5 J/g  
Peak 103.3°C  
-76.5 mW

100.

200.

300.

400.

°C

WHC-SD-WM-DP-178, REV. 1



DSC STD 12N14B

9.010 mg

Rate: 10.0 °C/min

File: 00052.001

DSC METTLER 04-Apr-96

Ident: 0.0

222-S Laboratory

*RL McCown 4/4/96*

exo>

10. mW

Integration

Delta H 255 mJ

28.3 J/g

Peak 158.9 °C

-16.2 mW

120.

140.

160.

180. °C

WHC-SD-WM-DP-178, REV. 1

S96T001520 SAM N2

11.992 mg

Rate: 10.0 °C/min

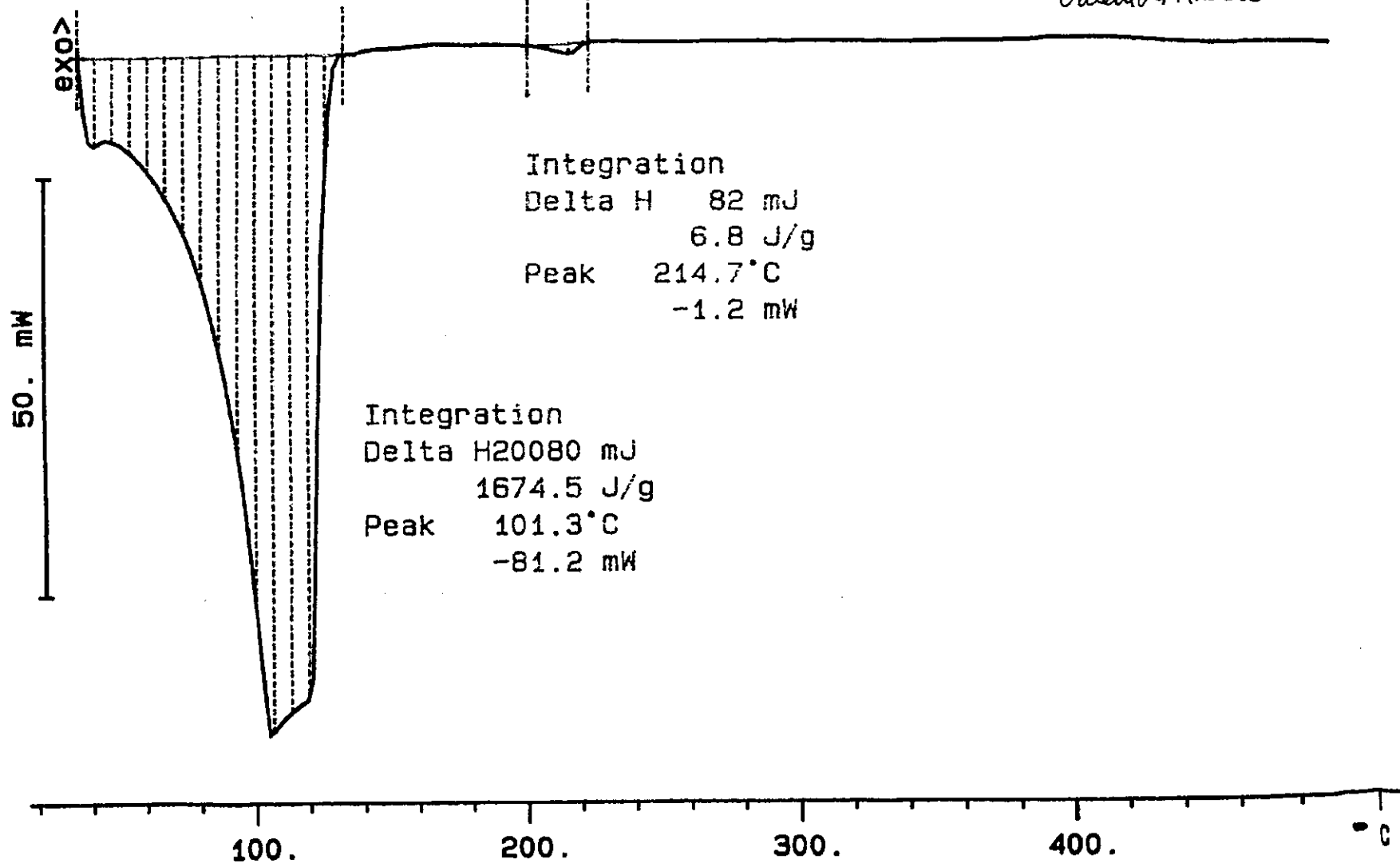
File: 00056.001

DSC METTLER 04-Apr-96

Ident: 0.0

222-S Laboratory.

*Valerie Massie* 04-04-96



WHC-SD-WM-DP-178 REV 1

S96T001520 DUP N2

26.455 mg

Rate: 10.0 °C/min

File: 00054.001

Ident: 0.0

DSC METTLER 04-Apr-96

222-S Laboratory

*H McCoun* 4/4/96

exo >

50. mW

Integration

Delta H 160 mJ

6.1 J/g

Peak 214.6°C

-2.6 mW

Integration

Delta H 323 mJ

12.2 J/g

Peak 404.8°C

1.6 mW

Integration

Delta H 24358 mJ

920.7 J/g

Peak 103.3°C

-77.6 mW

100.

200.

300.

400.

°C

WHC-SD-WM-DP-178, REV 1

S96T001520 TRIPL N2

12.708 mg

Rate: 10.0 °C/min

File: 00058.001

DSC METTLER

222-S Laboratory

Ident: 0.0

04-Apr-96

*Valentini 04-04-96*

EXO

50. mW

Integration  
Delta H 67 mJ  
5.3 J/g  
Peak 214.7°C  
-1.2 mW

Integration  
Delta H19832 mJ  
1560.6 J/g  
Peak 101.3°C  
-79.9 mW

°C

400.

300.

200.

100.

WHC-SD-WM-DP-178 REV 1

# LABCORE Data Entry Template for Worklist#

7618

Analyst: BRJM Instrument: DSC0 3 Book # 12N14B

Method: <sup>4/15 K6 EDV</sup> LA-514-114 Rev/Mod C-1

Worklist Comment: AY-101 DSC RUN UNDER N2. RCJ

| GROUP    | PROJECT     | S TYPE   | SAMPLE#    | R A | -----TEST----- | MATRIX | ACTUAL       | FOUND        | DL         | UNIT     |
|----------|-------------|----------|------------|-----|----------------|--------|--------------|--------------|------------|----------|
|          |             | 1 STD    |            |     | DSC-03         | LIQUID | <u>28.45</u> | <u>28.47</u> | <u>N/A</u> | Joules/g |
| 96000210 | AY-101 GRAB | 2 SAMPLE | S96T001208 | 0   | DSC-03         | LIQUID | <u>N/A</u>   | <u>Ø</u>     |            | Joules/g |
| 96000210 | AY-101 GRAB | 3 DUP    | S96T001208 | 0   | DSC-03         | LIQUID | <u>Ø</u>     | <u>Ø</u>     | <u>N/A</u> | Joules/g |

Final page for worklist # 7618

See attached for signatures

Analyst Signature Date

Analyst Signature Date

Verified by Blandina Valenzuela  
4/15/96

Data Entry Comments:

Sample produced an endotherm at 117.14°C with a delta  
H of 2442.15/g

# LABCORE Data Entry Template for Worklist#

7618

Analyst: R McCown Instrument: DSC0 \_\_\_\_\_ Book # 12N14B

Method: LA-514-<sup>114</sup>~~113~~ Rev/Mod C-1  
<sup>4/14/96 RM</sup>

**RUSH**

Worklist Comment: AY-101 DSC RUN UNDER N2. RCJ

| GROUP    | PROJECT     | S TYPE   | SAMPLE#    | R A | -----TEST----- | MATRIX | ACTUAL | FOUND | DL    | UNIT     |
|----------|-------------|----------|------------|-----|----------------|--------|--------|-------|-------|----------|
|          |             | 1 STD    |            |     | DSC-01         | LIQUID | _____  | _____ | N/A   | Joules/g |
| 96000210 | AY-101 GRAB | 2 SAMPLE | S96T001208 | 0   | DSC-01         | LIQUID | N/A    | _____ | _____ | Joules/g |
| 96000210 | AY-101 GRAB | 3 DUP    | S96T001208 | 0   | DSC-01         | LIQUID | _____  | _____ | N/A   | Joules/g |

Final page for worklist #

7618

R McCown 4/14/96  
Analyst Signature Date

\_\_\_\_\_  
Analyst Signature Date

Other instrument  
was used  
4/15/96  
BMV

Data Entry Comments:

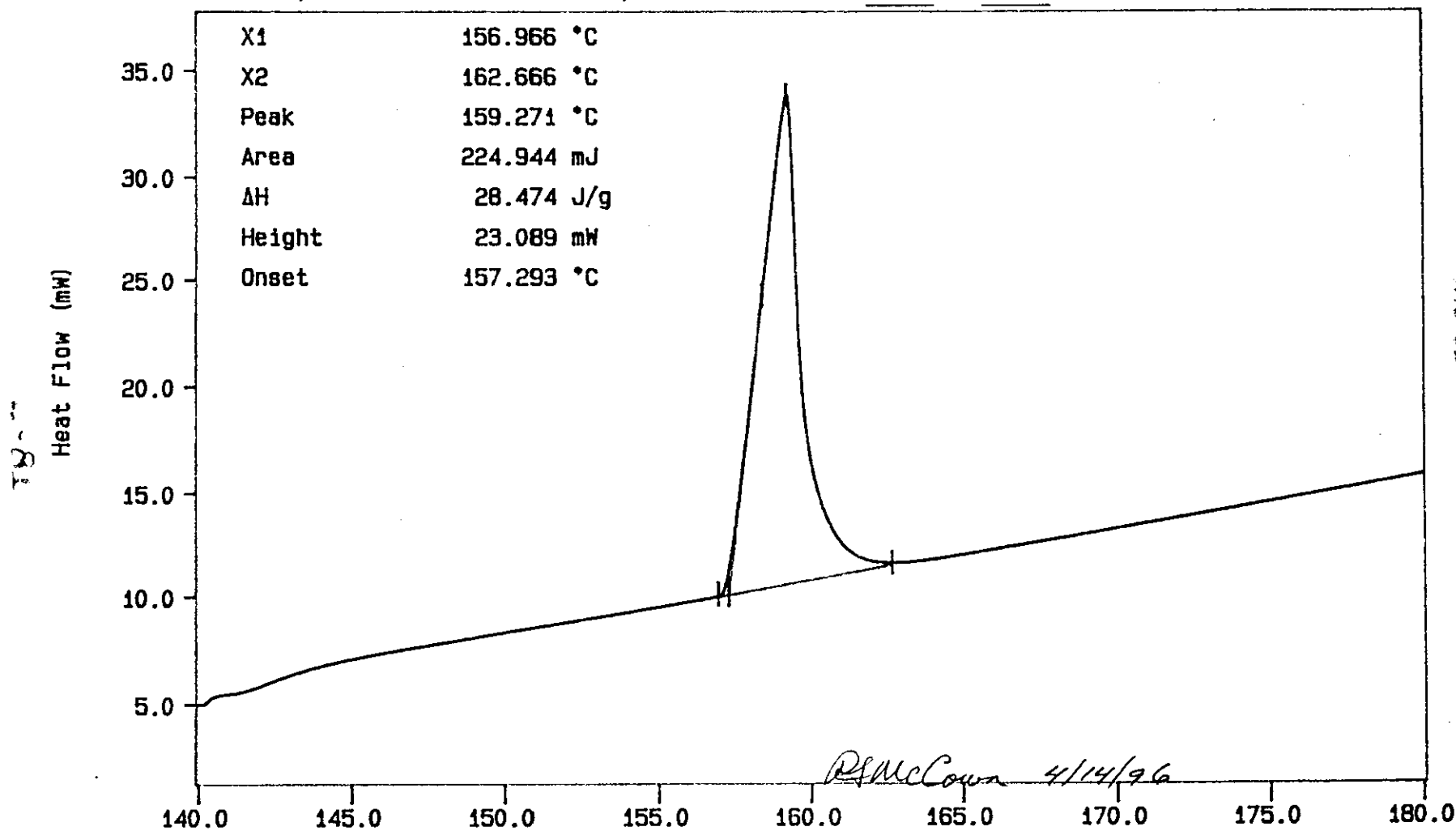
Curve 1: DSC

File info: IND041401 Sun Apr 14 19:10:22 1996

Sample Weight: 7.900 mg

12N14-B INDIUM AT 10C/MIN

SIGNATURE BELOW REPRESENTS CHEMICAL TECHNOLOGIST/CHEMIST THAT  
COMPLETED/VERIFIED THE CALIBRATION/ANALYSIS ON PAGES 281 TO 283.



N2, EXOTHERM DOWN

TEMP1: 140.0 °C TIME1: 0.0 min RATE1: 10.0 °C/min  
TEMP2: 180.0 °C

Temperature (°C)

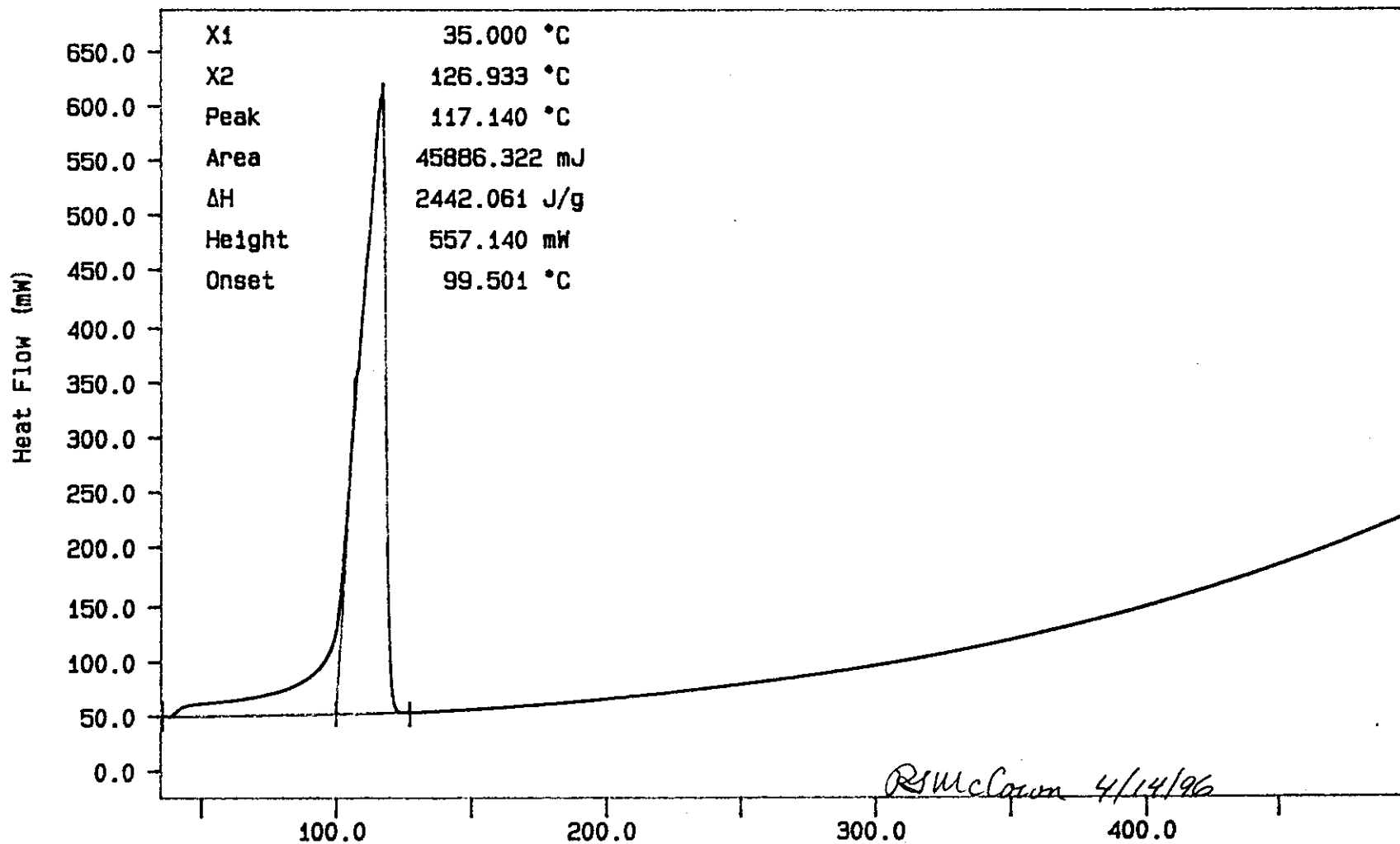
PJ MCCOWN  
PERKIN-ELMER  
7 Series Thermal Analysis System  
Sun Apr 14 19:40:41 1996

Curve 1: DSC

File info: SAM041404 Sun Apr 14 20: 40: 02 1996

Sample Weight: 18.790 mg

S96T001208 SAM



exotherm down, N2 purge gas

TEMP1: 35.0 °C TIME1: 0.0 min RATE1: 10.0 °C/min  
TEMP2: 500.0 °C

Temperature (°C)

PJ MCCOWN  
PERKIN-ELMER  
7 Series Thermal Analysis System  
Sun Apr 14 21: 25: 56 1996

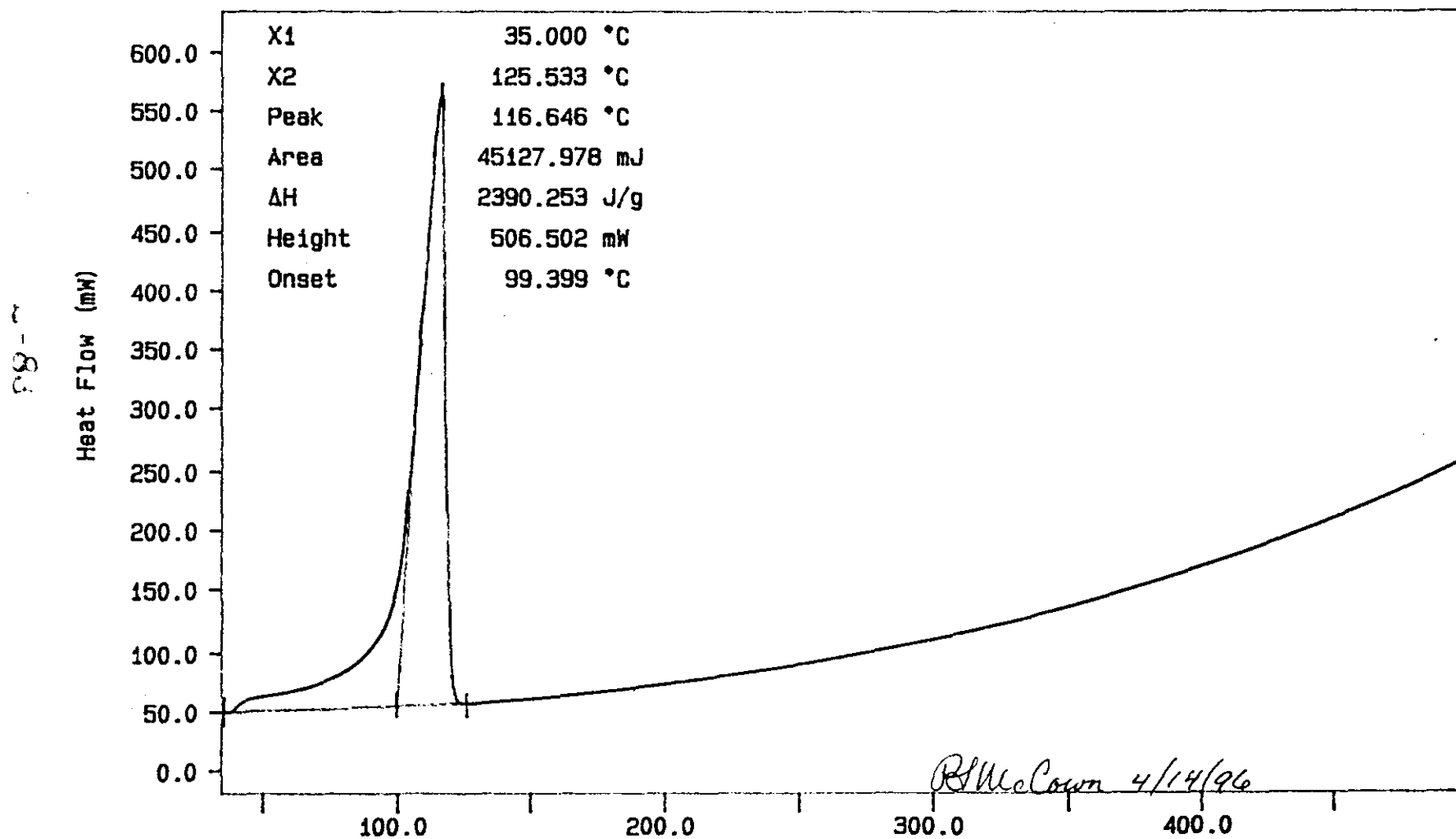


Curve 1: DSC

File info: SAM041405 Sun Apr 14 22:18:47 1996

Sample Weight: 18.880 mg

S96T001208 DUP



WMC-SD-WM-DP-178, REV. 1

exotherm down, N2 purge gas

TEMP1: 35.0 °C TIME1: 0.0 min RATE1: 10.0 °C/min  
TEMP2: 500.0 °C

Temperature (°C)

PJ MCCOWN  
PERKIN-ELMER  
7 Series Thermal Analysis System  
Sun Apr 14 22:42:28 1996

# LABCORE Data Entry Template for Worklist#

7686

Analyst: BDN Instrument: DSC01 Book #       

Method: LA-514-113 Rev/Mod       

Worklist Comment: Dry DSC for AY-101. bdv

| GROUP    | PROJECT     | S TYPE    | SAMPLE#    | R A | TEST   | MATRIX | ACTUAL | FOUND | DL  | UNIT         |
|----------|-------------|-----------|------------|-----|--------|--------|--------|-------|-----|--------------|
| 96000210 | AY-101 GRAB | 1 SAMPLE  | S96T001208 | 0   | DSC-02 | LIQUID | N/A    | Ø     |     | Joules/g Dry |
| 96000210 | AY-101 GRAB | 2 DUP     | S96T001208 | 0   | DSC-02 | LIQUID | Ø      | Ø     | N/A | Joules/g Dry |
| 96000210 | AY-101 GRAB | 3 SAMPLE  | S96T001317 | 0   | DSC-02 | LIQUID | N/A    | 761.1 |     | Joules/g Dry |
| 96000210 | AY-101 GRAB | 4 DUP     | S96T001317 | 0   | DSC-02 | LIQUID | 761.1  | 642.4 | N/A | Joules/g Dry |
| 96000210 | AY-101 GRAB | 5 SAMPLE  | S96T001318 | 0   | DSC-02 | LIQUID | N/A    | Ø     |     | Joules/g Dry |
| 96000210 | AY-101 GRAB | 6 DUP     | S96T001318 | 0   | DSC-02 | LIQUID | Ø      | Ø     | N/A | Joules/g Dry |
| 96000210 | AY-101 GRAB | 7 SAMPLE  | S96T001201 | 0   | DSC-02 | LIQUID | N/A    | Ø     |     | Joules/g Dry |
| 96000210 | AY-101 GRAB | 8 DUP     | S96T001201 | 0   | DSC-02 | LIQUID | Ø      | Ø     | N/A | Joules/g Dry |
| 96000210 | AY-101 GRAB | 9 SAMPLE  | S96T001202 | 0   | DSC-02 | LIQUID | N/A    | Ø     |     | Joules/g Dry |
| 96000210 | AY-101 GRAB | 10 DUP    | S96T001202 | 0   | DSC-02 | LIQUID | Ø      | Ø     | N/A | Joules/g Dry |
| 96000210 | AY-101 GRAB | 11 SAMPLE | S96T001203 | 0   | DSC-02 | LIQUID | N/A    | Ø     |     | Joules/g Dry |
| 96000210 | AY-101 GRAB | 12 DUP    | S96T001203 | 0   | DSC-02 | LIQUID | Ø      | Ø     | N/A | Joules/g Dry |
| 96000257 | AY-101 GRAB | 13 SAMPLE | S96T001356 | 0   | DSC-02 | LIQUID | N/A    | Ø     |     | Joules/g Dry |
| 96000257 | AY-101 GRAB | 14 DUP    | S96T001356 | 0   | DSC-02 | LIQUID | Ø      | Ø     | N/A | Joules/g Dry |
| 96000257 | AY-101 GRAB | 15 SAMPLE | S96T001357 | 0   | DSC-02 | LIQUID | N/A    | Ø     |     | Joules/g Dry |
| 96000257 | AY-101 GRAB | 16 DUP    | S96T001357 | 0   | DSC-02 | LIQUID | Ø      | Ø     | N/A | Joules/g Dry |
| 96000257 | AY-101 GRAB | 17 SAMPLE | S96T001358 | 0   | DSC-02 | LIQUID | N/A    | Ø     |     | Joules/g Dry |
| 96000257 | AY-101 GRAB | 18 DUP    | S96T001358 | 0   | DSC-02 | LIQUID | Ø      | Ø     | N/A | Joules/g Dry |

Data Entry Comments:

Units shown for QC (SPK & STD) may not reflect the actual units. DL = Detection Limit, S = Worklist Slot Number, R = Replicate Number, A = Aliquot Code.

# LABCORE Data Entry Template for Worklist#

7686

| GROUP    | PROJECT     | S  | TYPE   | SAMPLE#    | R | A | TEST   | MATRIX | ACTUAL | FOUND | DL  | UNIT         |
|----------|-------------|----|--------|------------|---|---|--------|--------|--------|-------|-----|--------------|
| 96000257 | AY-101 GRAB | 19 | SAMPLE | S96T001519 | 0 |   | DSC-02 | LIQUID | N/A    | 47.06 |     | Joules/g Dry |
| 96000257 | AY-101 GRAB | 20 | DUP    | S96T001519 | 0 |   | DSC-02 | LIQUID | 47.06  | 47.06 | N/A | Joules/g Dry |
| 96000257 | AY-101 GRAB | 21 | SAMPLE | S96T001520 | 0 |   | DSC-02 | LIQUID | N/A    | Ø     |     | Joules/g Dry |
| 96000257 | AY-101 GRAB | 22 | DUP    | S96T001520 | 0 |   | DSC-02 | LIQUID | Ø      | 80.21 | N/A | Joules/g Dry |
| 96000257 | AY-101 GRAB | 23 | TRIPL  | S96T001520 | 0 |   | DSC-02 | LIQUID | Ø      | Ø     | N/A | Joules/g Dry |

Data entered and verified by

Final page for worklist #

7686

Blandina Valenzuela 4/15/96  
Analyst Signature Date

Analyst Signature Date

Data Entry Comments:

Units shown for QC (SPK & STD) may not reflect the actual units. DL = Detection Limit, S = Worklist Slot Number, R = Replicate Number, A = Aliquot Code.

# LABCORE Data Entry Template for Worklist#

7689

Analyst: BDV Instrument: DSC01 Book #     

Method: LA-514-113 Rev/Mod     

Worklist Comment: Dry DSC for AY-101. bdv

| GROUP    | PROJECT     | S TYPE   | SAMPLE#    | R A | -----TEST----- | MATRIX | ACTUAL             | FOUND | DL  | UNIT         |
|----------|-------------|----------|------------|-----|----------------|--------|--------------------|-------|-----|--------------|
| 96000210 | AY-101 GRAB | 1 SAMPLE | S96T001275 | 0   | DSC-02         | SOLID  | N/A                | 196.3 |     | Joules/g Dry |
| 96000210 | AY-101 GRAB | 2 DUP    | S96T001275 | 0   | DSC-02         | SOLID  | 194.3 <sup>6</sup> | 194.8 | N/A | Joules/g Dry |

Data entered and verified by **Final page for worklist # 7689**

Blandina Valenzuela

Analyst Signature                      Date 4/15/96  
BDV

Analyst Signature                      Date                     

Data Entry Comments:

Units shown for QC (SPK & STD) may not reflect the actual units. DL = Detection Limit, S = Worklist Slot Number, R = Replicate Number, A = Aliquot Code.

AY-101

WHC-SD-WM-DP-178, REV. 1

| CALCULATED DRY DSC |                  |                      |                |
|--------------------|------------------|----------------------|----------------|
| SAMPLE NO.         | DSC RESULT (J/g) | TGA RESULT (% water) | DRY DSC RESULT |
| S96TC01275         | 105.1            | 46.47                | 196.3          |
| 1275D              | 104.3            | 46.47                | 194.8          |
| 1208               | Ø                | 99.79                | Ø              |
| 1208D              | Ø                | 99.79                | Ø              |
| 1317               | 144.3            | 81.04                | 761.1          |
| 1317D              | 121.8            | 81.04                | 642.4          |
| 1318               | Ø                | 84.84                | Ø              |
| 1318D              | Ø                | 84.84                | Ø              |
| 1201               | Ø                | 84.33                | Ø              |
| 1201D              | Ø                | 84.33                | Ø              |
| 1202               | Ø                | 84.33                | Ø              |
| 1202D              | Ø                | 84.33                | Ø              |
| 1203               | Ø                | 84.33                | Ø              |
| 1203D              | Ø                | 84.33                | Ø              |
| 1356               | Ø                | 84.33                | Ø              |
| 1356D              | Ø                | 84.33                | Ø              |
| 1357               | Ø                | 84.33                | Ø              |
| 1357D              | Ø                | 84.33                | Ø              |
| 1358               | Ø                | 84.33                | Ø              |
| 1358D              | Ø                | 84.33                | Ø              |
| 1519               | 7.6              | 83.55                | 47.06          |
| 1519D              | 7.6              | 83.85                | 47.06          |
| 1520               | Ø                | 84.79                | Ø              |
| 1520D              | 12.2             | 84.79                | 50.21          |
| 1520T              | Ø                | 84.79                | Ø              |

# LABCORE Data Entry Template for Worklist#

6653

Analyst: RK Instrument: TGA01        Book # 75N8A

Method: LA-560-112 Rev/Mod B-1

Worklist Comment: AY101 FOR TGA03 (RUN UNDER N2 PLEASE)

| GROUP    | PROJECT     | S TYPE   | SAMPLE#    | R A | -----TEST----- | MATRIX | ACTUAL       | FOUND        | DL         | UNIT |
|----------|-------------|----------|------------|-----|----------------|--------|--------------|--------------|------------|------|
|          |             | 1 STD    |            |     | TGA-01         | LIQUID | <u>59.2</u>  | <u>59.86</u> | <u>N/A</u> | %    |
| 96000210 | AY-101 GRAB | 2 SAMPLE | S96T001317 | 0   | TGA-01         | LIQUID | <u>N/A</u>   | <u>81.43</u> |            | %    |
| 96000210 | AY-101 GRAB | 3 DUP    | S96T001317 | 0   | TGA-01         | LIQUID | <u>81.43</u> | <u>80.65</u> | <u>N/A</u> | %    |

Final page for worklist #

6653

See Attached for Signatures.  
Analyst Signature                      Date                     

                     04/05/96  
Analyst Signature                      Date                     

Verified by  
HAnasto 4-9-96

Data Entry Comments:

# LABCORE Data Entry Template for Worklist#

6653

Analyst: PK Instrument: TGA01 Book # 7548-A

Method: LA-514-114 Rev/Mod B-1

Worklist Comment: AY101 FOR TGA03 (RUN UNDER N2 PLEASE)

| GROUP    | PROJECT     | S TYPE   | SAMPLE#    | R A | TEST   | MATRIX | ACTUAL | FOUND | DL  | UNIT |
|----------|-------------|----------|------------|-----|--------|--------|--------|-------|-----|------|
|          |             | 1 STD    |            |     | TGA-03 | LIQUID | 59.2   | 59.86 | N/A | %    |
| 96000210 | AY-101 GRAB | 2 SAMPLE | S96T001317 | 0   | TGA-03 | LIQUID | N/A    | 81.43 |     | %    |
| 96000210 | AY-101 GRAB | 3 DUP    | S96T001317 | 0   | TGA-03 | LIQUID | 81.43  | 80.65 | N/A | %    |

Final page for worklist #

6653

Nob King 3/26/96  
Analyst Signature Date

\_\_\_\_\_  
Analyst Signature Date

Data Entry Comments:

Units shown for QC (SPK & STD) may not reflect the actual units. DL = Detection Limit, S = Worklist Slot Number, R = Replicate Number, A = Aliquot Code.

TGA STD 75N8-A N2

14.377 mg

Rate: 10.0 °C/min

File: 00034.001

TG

METTLER

25-Mar-96

Ident: 0.0

222-S Laboratory

Step Analysis

Height -8.61 mg

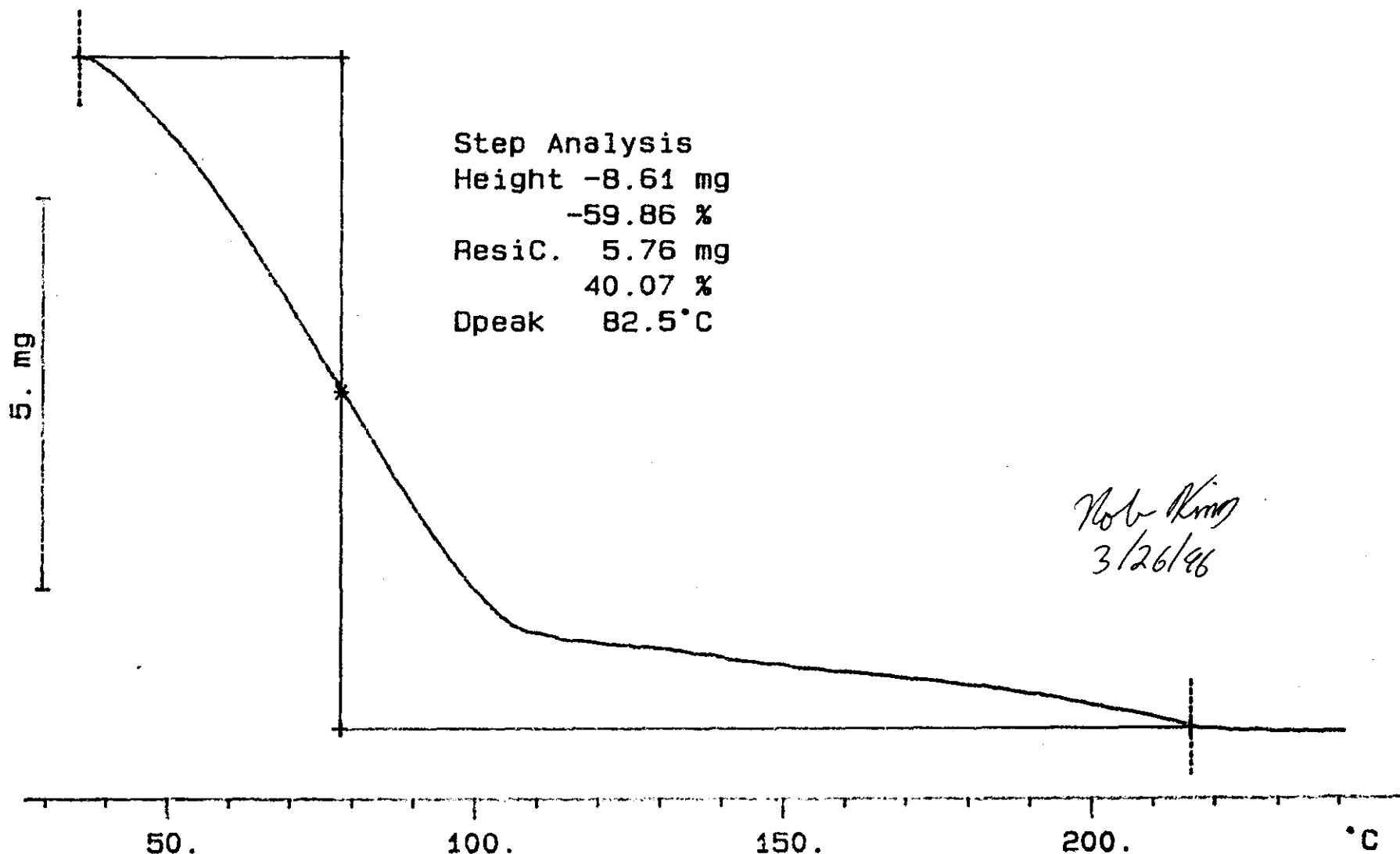
-59.86 %

ResiC. 5.76 mg

40.07 %

Dpeak 82.5°C

*Rob King*  
3/26/96





S96T001317 N2

7.274 mg

Rate: 10.0 °C/min

File: 00036.001

Ident: 0.0

TG METTLER 26-Mar-96

222-S Laboratory

Step Analysis

Height -5.92 mg

-81.43 %

ResiC. 1.35 mg

18.57 %

2. mg

*Rob King*  
*3/26/96*

100.

200.

300.

400.

°C

S96T001317 DUP N2

6.715 mg

Rate: 10.0 °C/min

File: 00038.001

TG

METTLER

26-Mar-95

Ident: 0.0

222-S Laboratory

Step Analysis

Height -5.42 mg

-80.65 %

ResidC. 1.30 mg

19.35 %

2. mg

*Not King*  
3/26/96

100.

200.

300.

400.

°C

WHC-SD-WM-DP-178, REV 1

worklistrpt Version 2.1 05/15/95

WHC-SD-WM-DP-178 REV 1

Page: 1

04/03/96 11:53

## LABCORE Data Entry Template for Worklist#

6657

Analyst: SMF Instrument: TGA01 Book # 100CN2Method: LA-560-112 Rev/Mod B-1

Worklist Comment: AY101 FOR TGA03 (PLEASE RUN UNDER N2)

| GROUP    | PROJECT     | S TYPE   | SAMPLE#    | R A | TEST   | MATRIX | ACTUAL       | FOUND        | DL         | UNIT  |
|----------|-------------|----------|------------|-----|--------|--------|--------------|--------------|------------|-------|
|          |             | 1 STD    |            |     | TGA-01 | SOLID  | <u>59.4</u>  | <u>61.24</u> | <u>X</u>   | N/A % |
| 96000210 | AY-101 GRAB | 2 SAMPLE | S96T001275 | 0   | TGA-01 | SOLID  | <u>N/A</u>   | <u>45.21</u> |            | %     |
| 96000210 | AY-101 GRAB | 3 DUP    | S96T001275 | 0   | TGA-01 | SOLID  | <u>45.21</u> | <u>47.73</u> | <u>N/A</u> | %     |

Final page for worklist #

6657

See attached for signatures  
Analyst Signature                      Date 4-3-96

                     4-8-96  
Analyst Signature Date

Verified by Blandina Valenzuela  
                     4-9-96

Data Entry Comments: Sample produced a second weight loss step of 15.79%.

Units shown for QC (SPK & STD) may not reflect the actual units. DL = Detection Limit, S = Worklist Slot Number, R = Replicate Number, A = Aliquot Code.

worklistrpt Version 2.1 05/15/95

03/18/96 14:41

WHC-SD-WM-DP-178, REV 1

Page: 1

## LABCORE Data Entry Template for Worklist#

6657

Analyst:

SMF

Instrument: TGA01

Book # 100CN2

Method: LA-514-114 Rev/Mod

Worklist Comment: AY101 FOR TGA03 (PLEASE RUN UNDER N2)

| GROUP    | PROJECT     | S TYPE   | SAMPLE#    | R A | TEST   | MATRIX | ACTUAL | FOUND | DL  | UNIT |
|----------|-------------|----------|------------|-----|--------|--------|--------|-------|-----|------|
|          |             | 1 STD    |            |     | TGA-03 | SOLID  |        |       | N/A | %    |
| 96000210 | AY-101 GRAB | 2 SAMPLE | S96T001275 | 0   | TGA-03 | SOLID  | N/A    |       |     | %    |
| 96000210 | AY-101 GRAB | 3 DUP    | S96T001275 | 0   | TGA-03 | SOLID  |        |       | N/A | %    |

Final page for worklist #

6657

Analyst Signature

Date

Analyst Signature

Date

Data Entry Comments:

Units shown for QC (SPK & STD) may not reflect the actual units. DL = Detection Limit, S = Worklist Slot Number, R = Replicate Number, A = Aliquot Code.

SIGNATURE BELOW REPRESENTS CHEMICAL TECHNOLOGIST/CHEMIST THAT  
COMPLETED/VERIFIED THE CALIBRATION/ANALYSIS ON PAGES 295 TO 297.

TGA STD 100CN2

12.493 mg

Rate: 10.0 °C/min

File: 00077.001

TG

METTLER

29-Mar-96

Ident: 0.0

222-S Laboratory

Step Analysis

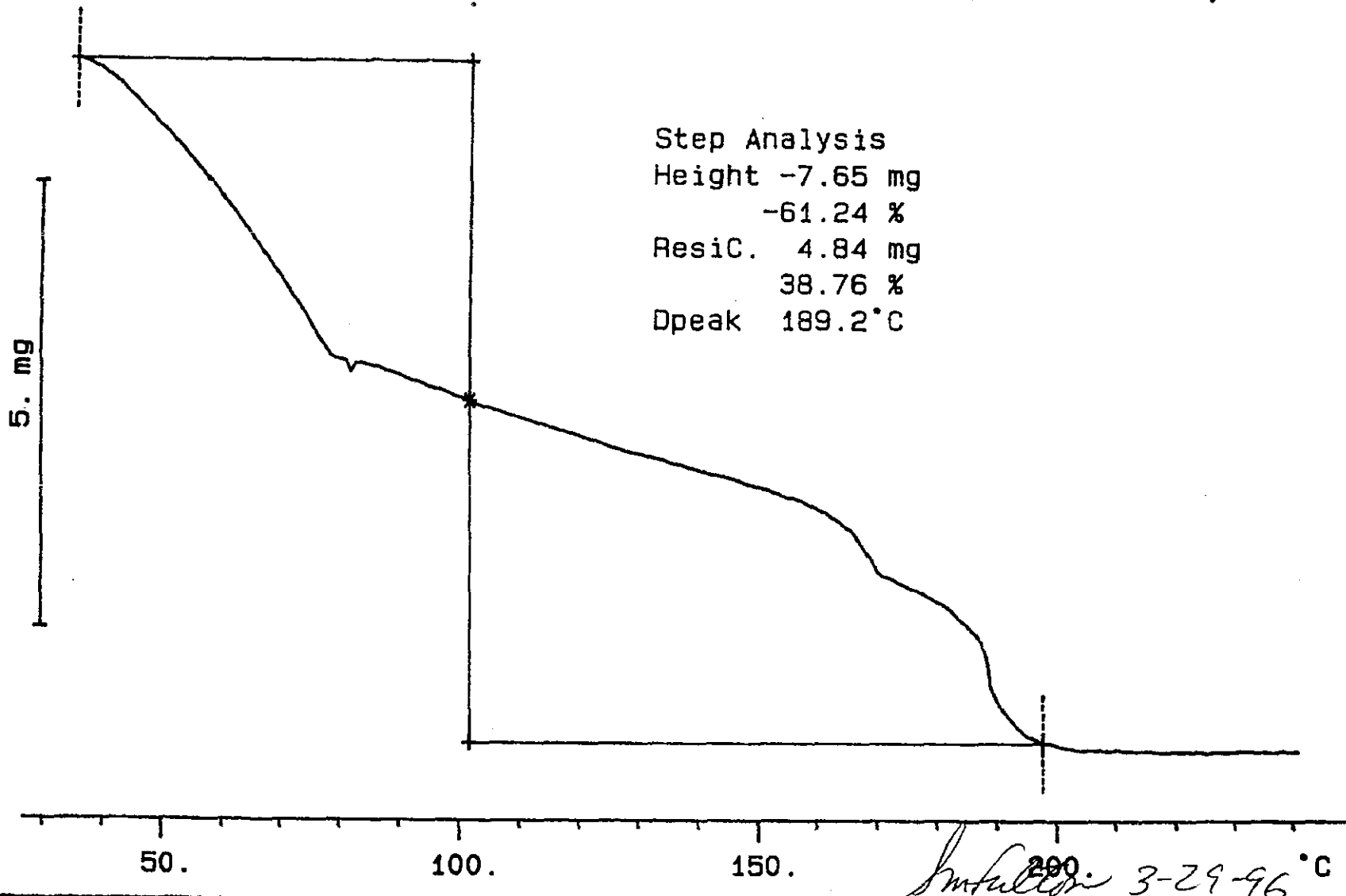
Height -7.65 mg

-61.24 %

ResidC. 4.84 mg

38.76 %

Dpeak 189.2 °C



WHC-SD-WM-DP-178, REV 1

S96T001275 N2

39.474 mg

Rate: 10.0 °C/min

File: 00091.001

TG

METTLER

30-Mar-96

Ident: 0.0

222-S Laboratory

Step Analysis

Height-17.85 mg

-45.21 %

ResiC. 21.63 mg

54.79 %

Step Analysis

Height -6.23 mg

-15.79 %

ResiC. 15.39 mg

39.00 %

Dpeak 313.0 °C

10. mg

100.

200.

300.

400.

°C

WHC-SD-WM-DP-178, REV. 1

S96T001275 DUP N2

19.969 mg

Rate: 10.0 °C/min

File: 00093.001

TG

METTLER

30-Mar-96

Ident: 0.0

222-S Laboratory

Step Analysis

Height -9.53 mg

-47.73 %

ResiC. 10.44 mg

52.27 %

Dpeak 79.0 °C

Step Analysis

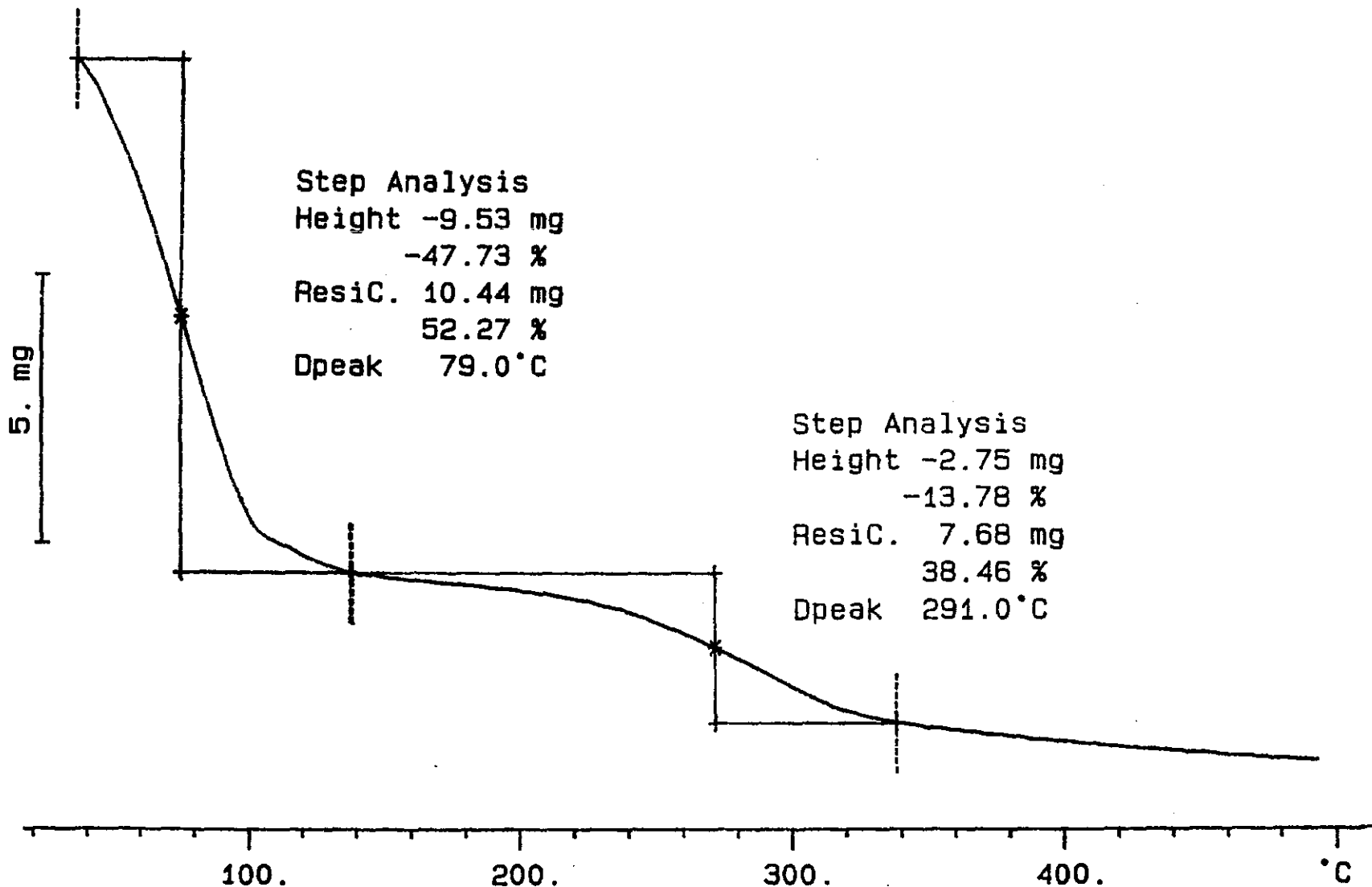
Height -2.75 mg

-13.78 %

ResiC. 7.68 mg

38.46 %

Dpeak 291.0 °C



worklistrpt Version 2.1 05/15/95  
03/20/96 11:27

WHC-SD-WM-DP-178, REV 1

Page: 1

## LABCORE Data Entry Template for Worklist#

6754

Analyst: SMF Instrument: TGA0 1 Book # 100CN2Method: LA-560-112 Rev/Mod B-1

Worklist Comment: AY-101 FOR TGA-01 PLEASE RUN UNDER N2 RTS!

| GROUP    | PROJECT     | S TYPE   | SAMPLE#    | R A | TEST   | MATRIX | ACTUAL       | FOUND                      | DL                           | UNIT |
|----------|-------------|----------|------------|-----|--------|--------|--------------|----------------------------|------------------------------|------|
|          |             | 1 STD    |            |     | TGA-01 | LIQUID | <u>59.4</u>  | <u>60.99</u>               | <u>N/A</u>                   | %    |
| 96000210 | AY-101 GRAB | 2 SAMPLE | S96T001201 | 0   | TGA-01 | LIQUID | <u>N/A</u>   | <u>84.28</u>               |                              | %    |
| 96000210 | AY-101 GRAB | 3 DUP    | S96T001201 | 0   | TGA-01 | LIQUID | <u>84.28</u> | <u>84.37</u>               | <u>N/A</u>                   | %    |
| 96000210 | AY-101 GRAB | 4 SAMPLE | S96T001202 | 0   | TGA-01 | LIQUID | <u>N/A</u>   | <u>84.21</u>               |                              | %    |
| 96000210 | AY-101 GRAB | 5 DUP    | S96T001202 | 0   | TGA-01 | LIQUID | <u>84.21</u> | <u>84.44</u> <sup>22</sup> | <u>1519600</u><br><u>N/A</u> | %    |

Final page for worklist #

6754

Susie M. Fulton 3-31-96  
Analyst Signature Date

[Signature] 4-8-96  
Analyst Signature Date

Verified by  
Anastin 4-9-96

Data Entry Comments:

Units shown for QC (SPK & STD) may not reflect the actual units. DL = Detection Limit, S = Worklist Slot Number,  
R = Replicate Number, A = Aliquot Code.



SIGNATURE BELOW REPRESENTS CHEMICAL TECHNOLOGIST/CHEMIST THAT  
COMPLETED/VERIFIED THE CALIBRATION/ANALYSIS ON PAGES 299 TO 2163

TGA-STD 100CN2

12.752 mg

Rate: 10.0 °C/min

File: 00007.001

TG METTLER 31-Mar-96

Ident: 0.0

222-S Laboratory

Step Analysis

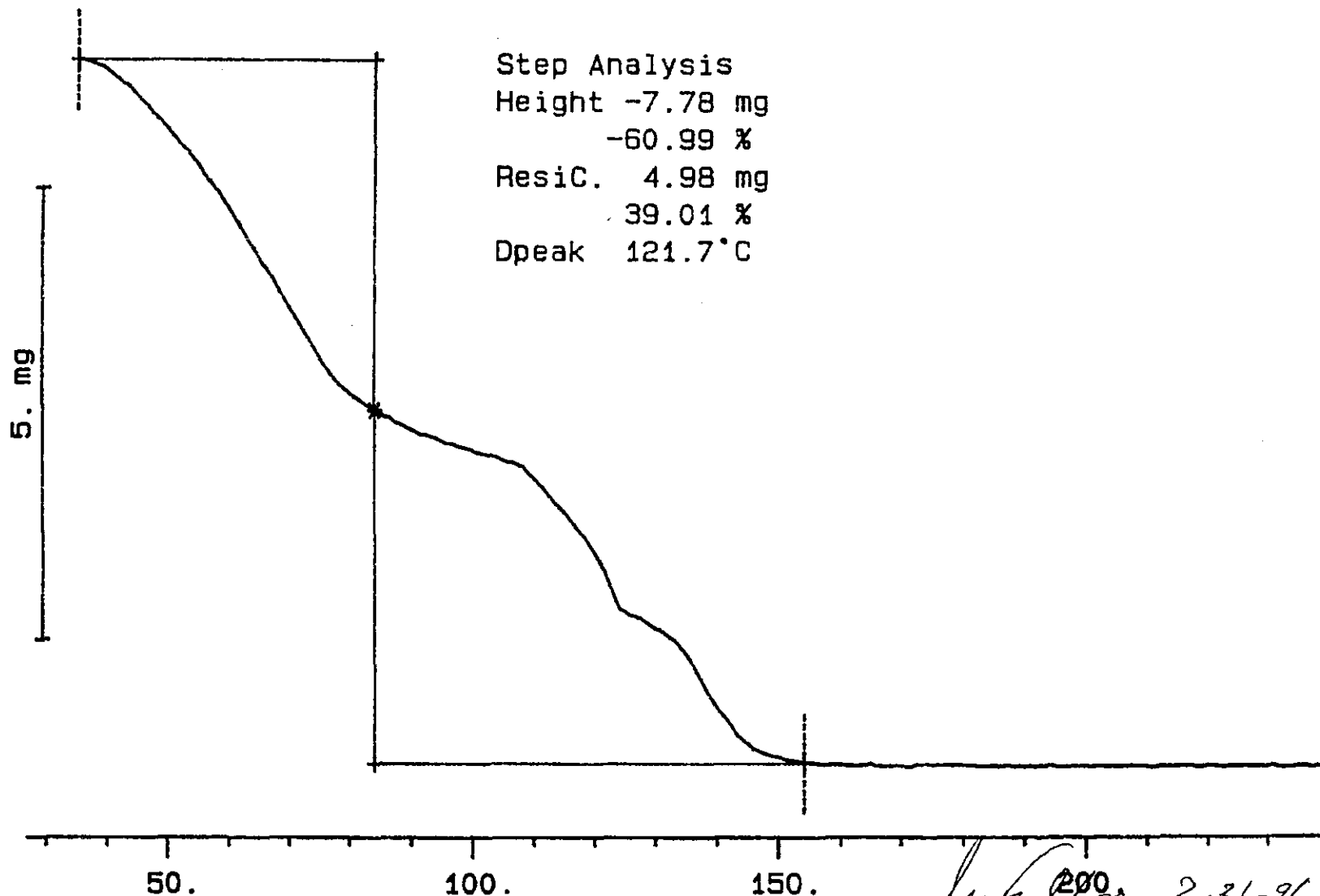
Height -7.78 mg

-60.99 %

ResiC. 4.98 mg

39.01 %

Dpeak 121.7 °C



WHC-SD-MM-DP-178, REV 1

S96T001201 N2

13.647 mg

Rate: 10.0 °C/min

File: 00009.001

TG

METTLER

31-Mar-96

Ident: 0.0

222-S Laboratory

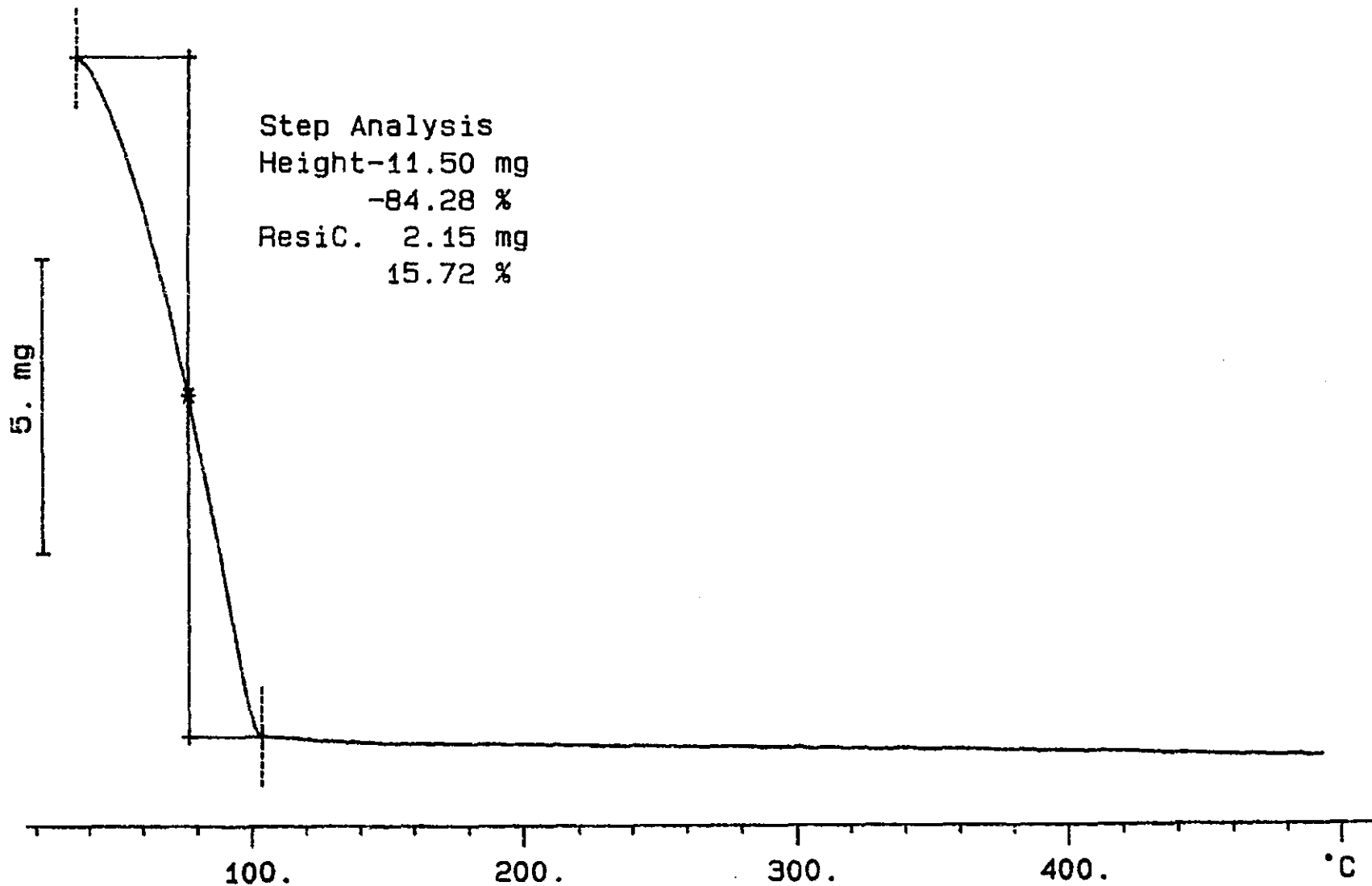
Step Analysis

Height-11.50 mg

-84.28 %

ResiC. 2.15 mg

15.72 %



201-2

WHC-SD-WM-DP-178, REV 1

S96T001201 DUP N2

File: 00011.001

TG

METTLER

31-Mar-96

11.713 mg

Rate: 10.0 °C/min

Ident: 0.0

222-S Laboratory

Step Analysis

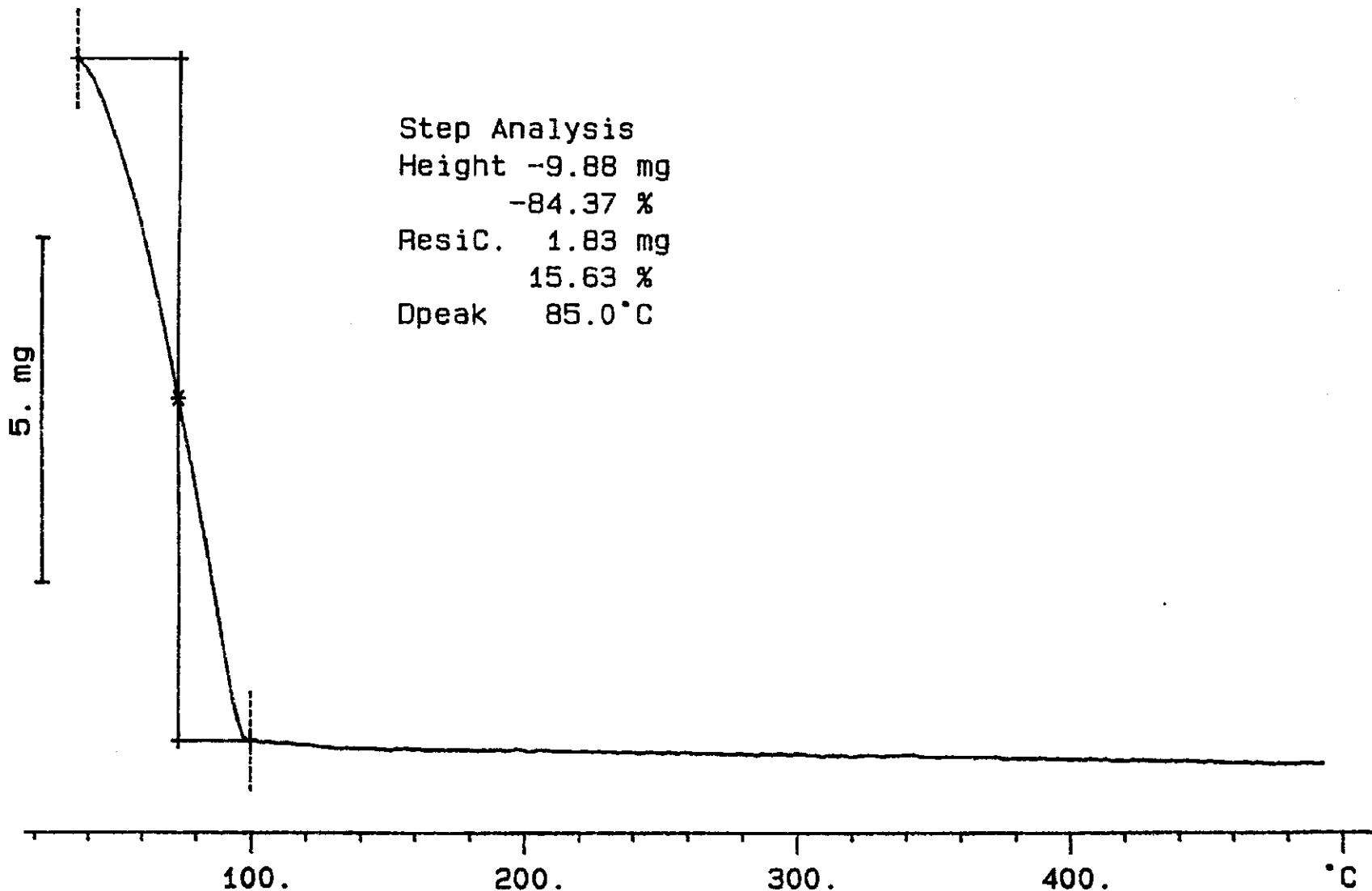
Height -9.88 mg

-84.37 %

ResiC. 1.83 mg

15.63 %

Dpeak 85.0 °C



WHC-SD-MM-DP-178, REV 1

S96T001202 N2

12.414 mg

Rate: 10.0 °C/min

File: 00013.001

TG

METTLER

31-Mar-96

Ident: 0.0

222-S Laboratory

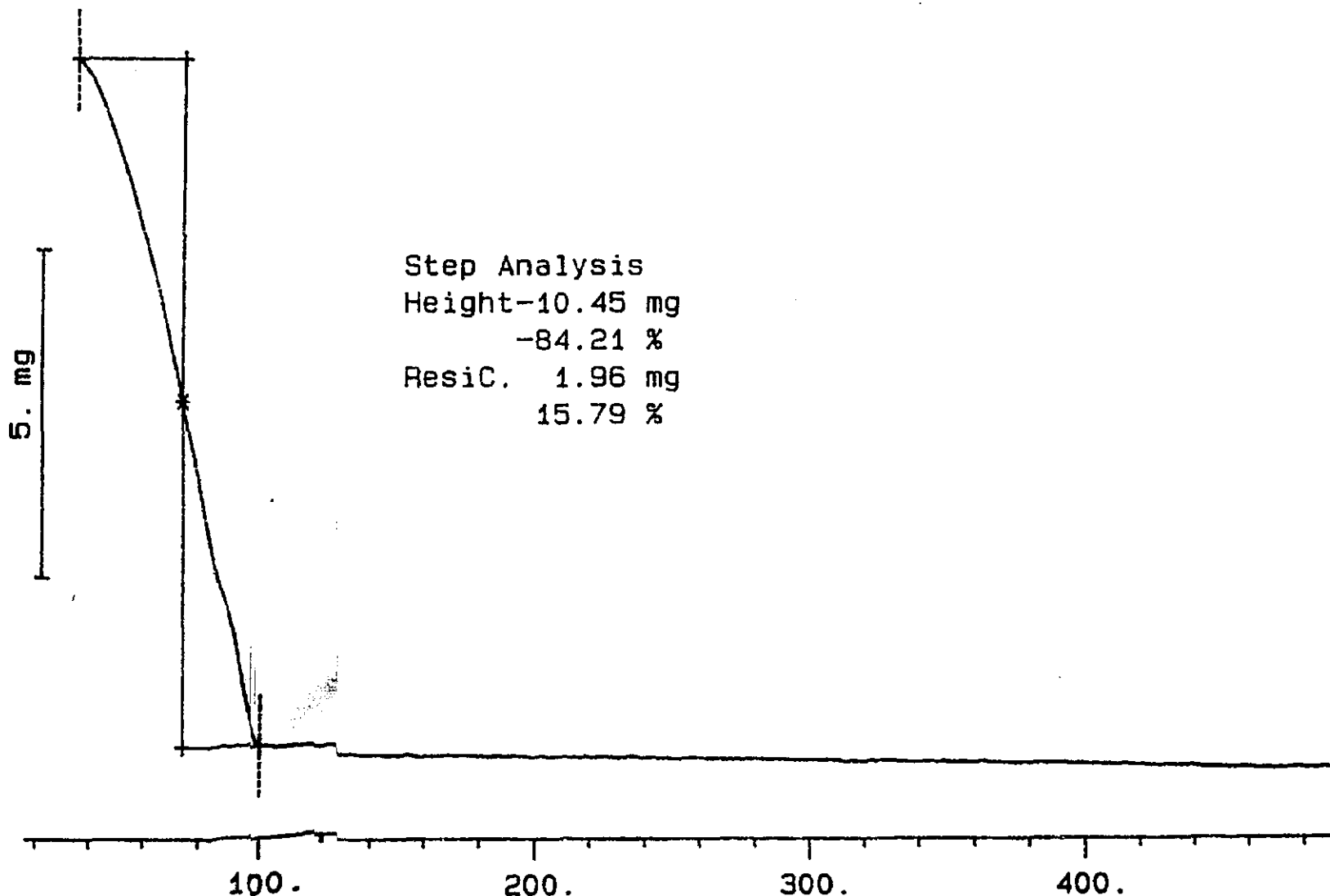
Step Analysis

Height-10.45 mg

-84.21 %

ResiC. 1.96 mg

15.79 %



WHC-SD-WM-DP-178, REV /

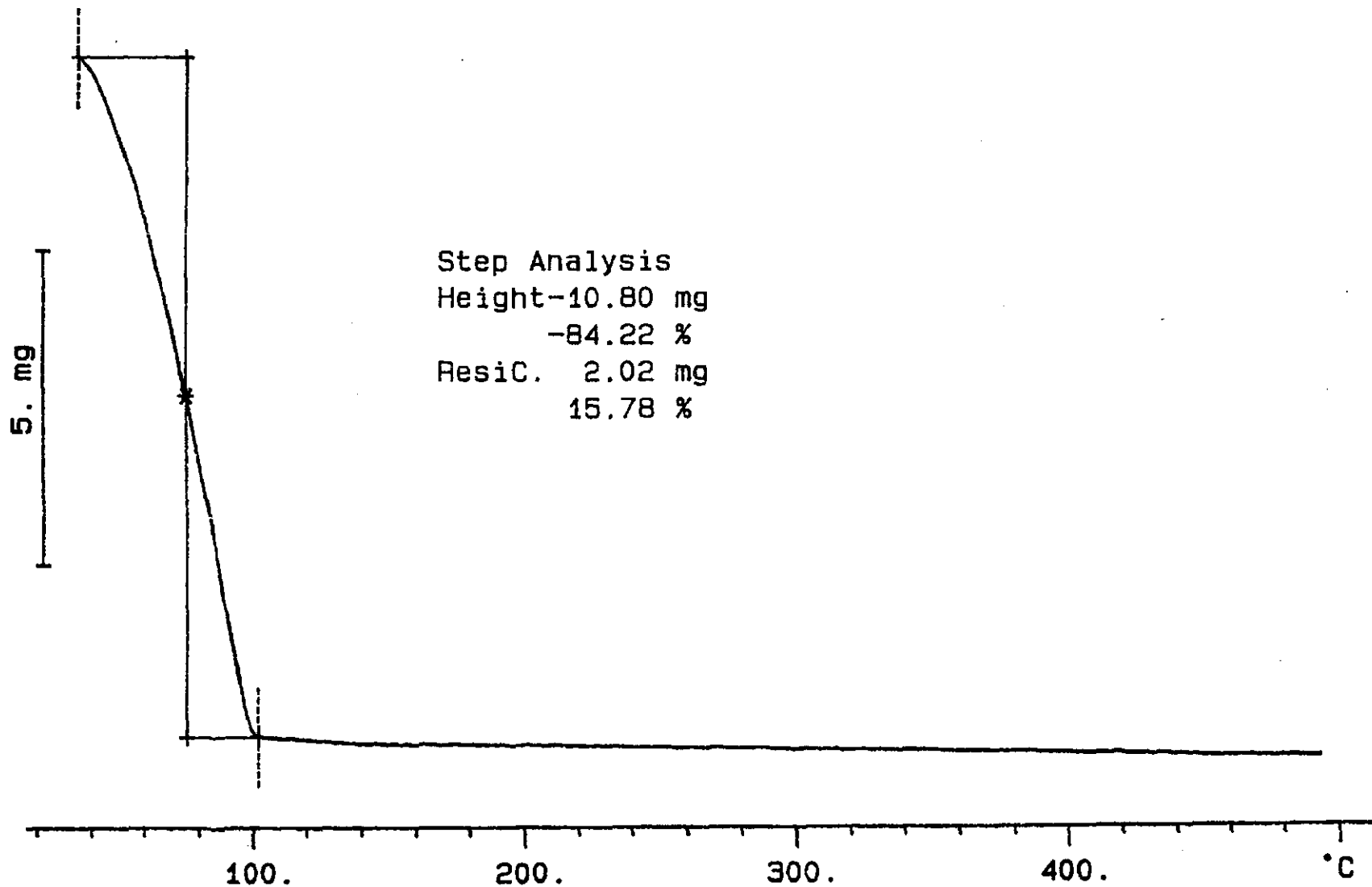
**12.822 mg**

**File: 00015.001**

Ident: 0.0

TG    METTLER    31-Mar-96

**222-S Laboratory**



2-703

WHC-SD-WM-DP-178, REV 1

worklistrpt Version 2.1 05/15/95  
03/20/96 11:27

WHC-SD-WM-DP-178, REV 1

Page: 1

# LABCORE Data Entry Template for Worklist#

6755

Analyst: SMF Instrument: TGA01 Book # 1000DC <sup>RJ</sup> 4-5-96  
Method: LA-560-112 Rev/Mod B-1 10002

Worklist Comment: AY-101 FOR TGA-01 PLEASE RUN UNDER N2 RTS!

| GROUP    | PROJECT     | S TYPE   | SAMPLE#    | R A | TEST   | MATRIX | ACTUAL       | FOUND        | DL                  | UNIT |
|----------|-------------|----------|------------|-----|--------|--------|--------------|--------------|---------------------|------|
|          |             | 1 STD    |            |     | TGA-01 | LIQUID | <u>59.4</u>  | <u>59.07</u> | <sup>*</sup><br>N/A | %    |
| 96000210 | AY-101 GRAB | 2 SAMPLE | S96T001203 | 0   | TGA-01 | LIQUID | <u>N/A</u>   | <u>84.17</u> |                     | %    |
| 96000210 | AY-101 GRAB | 3 DUP    | S96T001203 | 0   | TGA-01 | LIQUID | <u>84.17</u> | <u>84.08</u> | N/A                 | %    |
| 96000257 | AY-101 GRAB | 4 SAMPLE | S96T001356 | 0   | TGA-01 | LIQUID | <u>N/A</u>   | <u>84.40</u> |                     | %    |
| 96000257 | AY-101 GRAB | 5 DUP    | S96T001356 | 0   | TGA-01 | LIQUID | <u>84.40</u> | <u>84.15</u> | N/A                 | %    |

Final page for worklist #

6755

Lusie M. Daulton 4-1-96  
Analyst Signature Date

RJ 4-5-96  
Analyst Signature Date

Verified by  
Hanaston  
4-9-96

Data Entry Comments:

Units shown for QC (SPK & STD) may not reflect the actual units. DL = Detection Limit, S = Worklist Slot Number, R = Replicate Number, A = Aliquot Code.

SIGNATURE BELOW REPRESENTS CHEMICAL TECHNOLOGIST/CHEMIST THAT  
COMPLETED/VERIFIED THE CALIBRATION/ANALYSIS ON PAGES 2-105 TO 2-109

TGA STD 100CN2

12.923 mg

Rate: 10.0 °C/min

File: 00020.001

TG

METTLER

01-Apr-96

Ident: 0.0

222-S Laboratory

Step Analysis

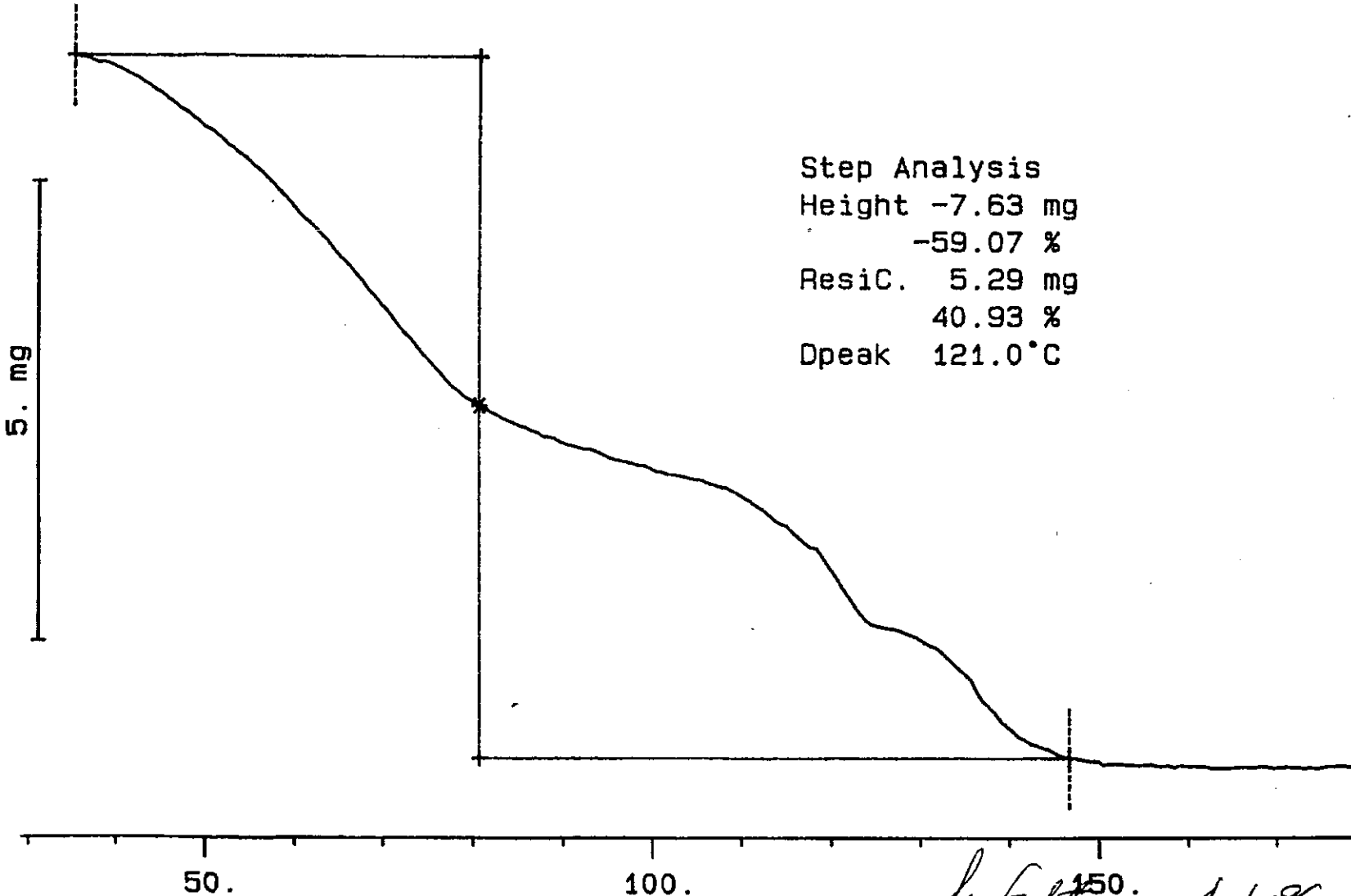
Height -7.63 mg

-59.07 %

Resid. 5.29 mg

40.93 %

Dpeak 121.0 °C



WHC-SD-WM-DP-178, REV 1

*Smullen* 4-1-96 °C

S96T001203 N2

11.342 mg

Rate: 10.0 °C/min

File: 00027.001 TG METTLER 01-Apr-96

Ident: 0.0

222-S Laboratory

Step Analysis

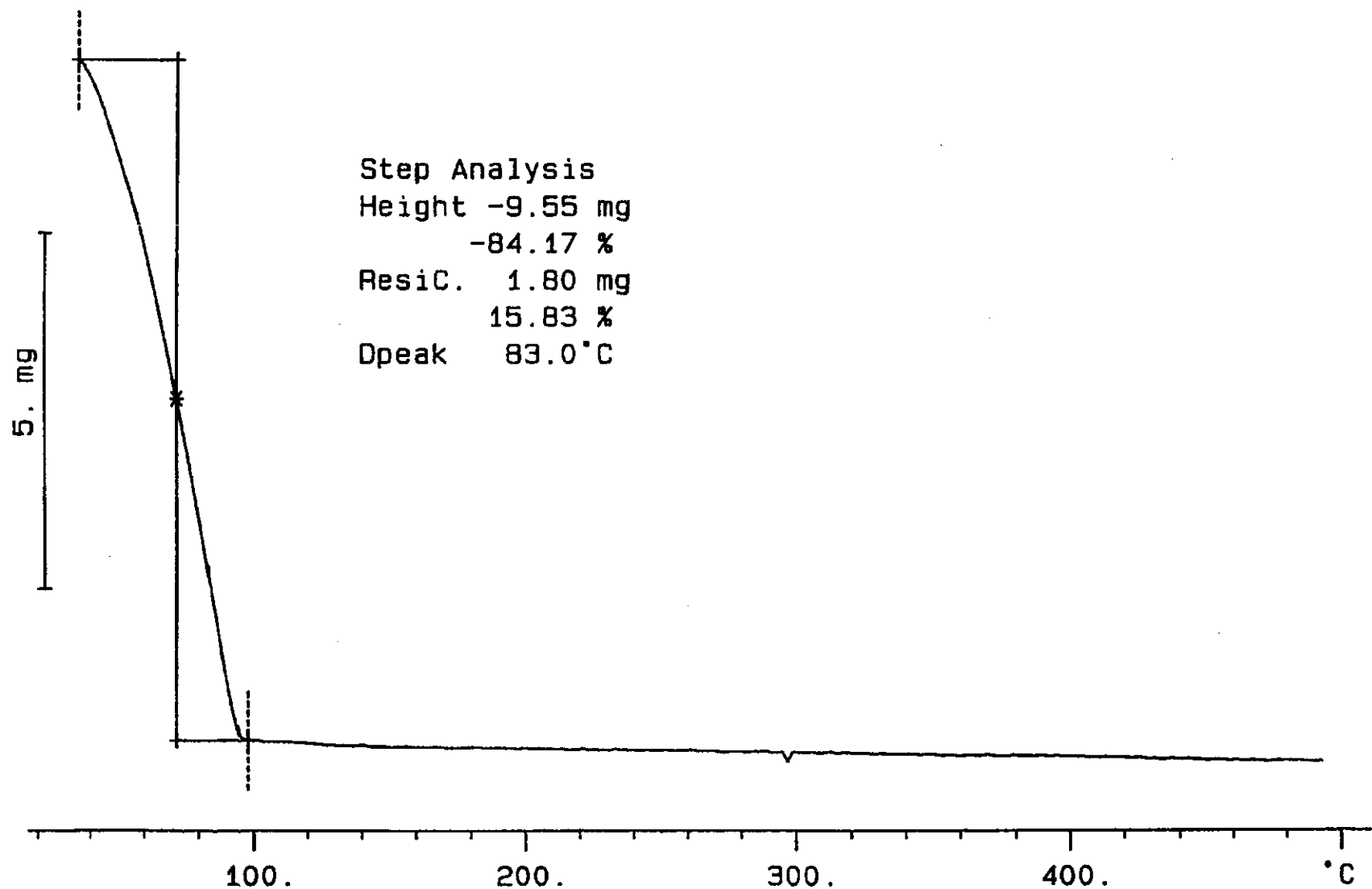
Height -9.55 mg

-84.17 %

ResidC. 1.80 mg

15.83 %

Dpeak 83.0 °C



2-106

WMC-SD-WM-DP-178, REV. 1



S96T001203 DUP N2

11.690 mg

Rate: 10.0 °C/min

File: 00029.001

TG

METTLER

01-Apr-96

Ident: 0.0

222-S Laboratory

Step Analysis

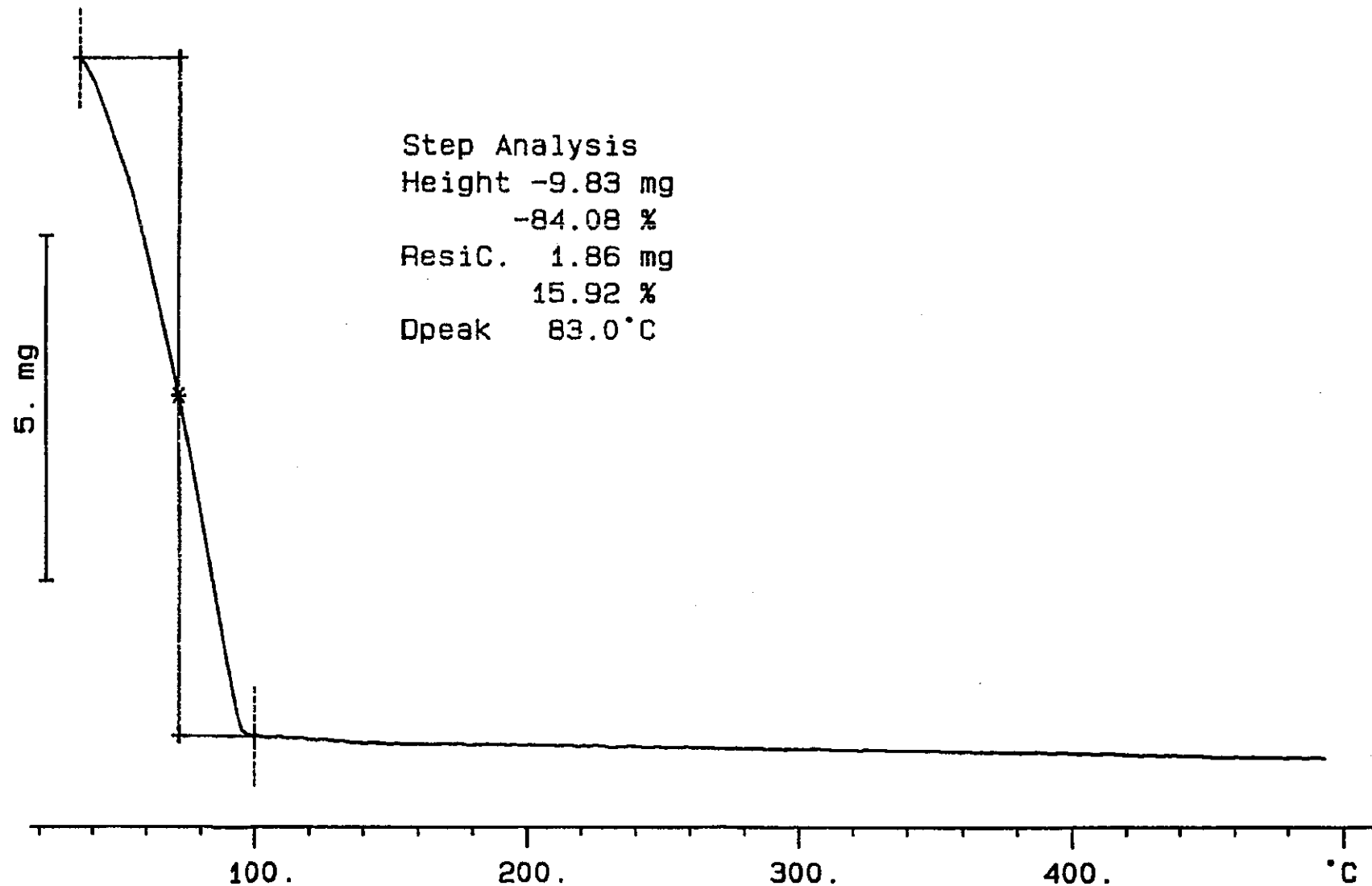
Height -9.83 mg

-84.08 %

ResiC. 1.86 mg

15.92 %

Dpeak 83.0 °C



WHC-SD-WM-DP-178, REV. 1

S96T001356 N2

11.881 mg

Rate: 10.0 °C/min

File: 00031.001

TG

METTLER

01-Apr-96

Ident: 0.0

222-S Laboratory

Step Analysis

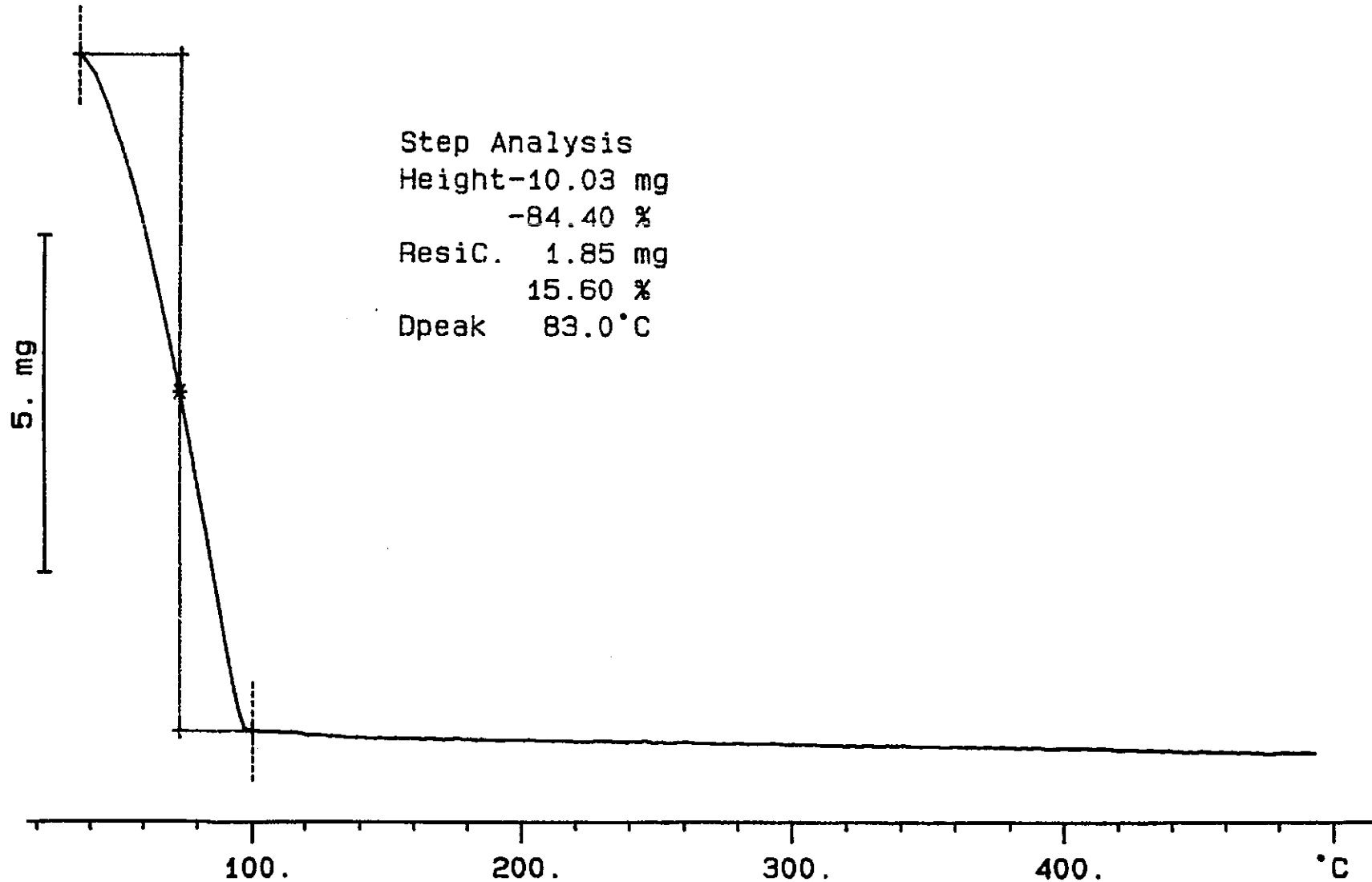
Height-10.03 mg

-84.40 %

ResiC. 1.85 mg

15.60 %

Dpeak 83.0 °C



2-100

WHC-SD-WM-DP-178, REV 1

S96T001356 DUP N2

13.760 mg

Rate: 10.0 °C/min

File: 00033.001

TG

METTLER

02-Apr-96

Ident: 0.0

222-S Laboratory

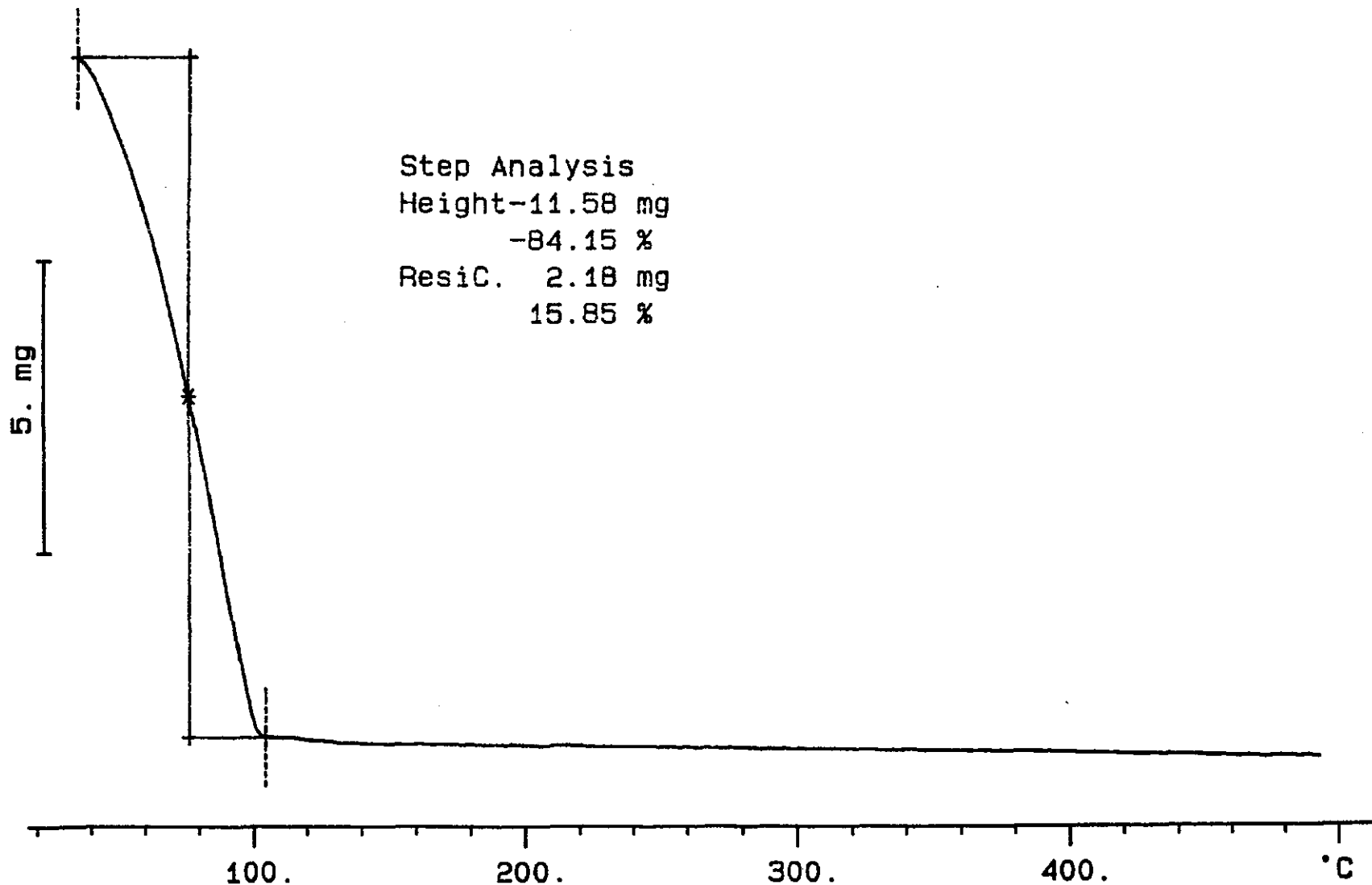
Step Analysis

Height-11.58 mg

-84.15 %

ResiC. 2.18 mg

15.85 %



2-103

MHC-SD-WM-DP-178, REV. 1

worklistrpt Version 2.1 05/15/95  
04/08/96 11:19

WHC-SD-WM-DP-178 REV 1

Page: 1

## LABCORE Data Entry Template for Worklist#

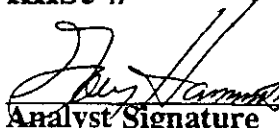
6756

Analyst: PJM Instrument: TGA0 3 Book # 75N8AMethod: LA-514-114 Rev/Mod C-1

Worklist Comment: AY-101 FOR TGA-01 PLEASE RUN UNDER N2 RTS!

| GROUP    | PROJECT     | S TYPE   | SAMPLE#    | R A | -----TEST----- | MATRIX | ACTUAL       | FOUND        | DL         | UNIT |
|----------|-------------|----------|------------|-----|----------------|--------|--------------|--------------|------------|------|
|          |             | 1 STD    |            |     | TGA-03         | LIQUID | <u>59.2</u>  | <u>58.90</u> | <u>N/A</u> | %    |
| 96000257 | AY-101 GRAB | 2 SAMPLE | S96T001357 | 0   | TGA-03         | LIQUID | <u>N/A</u>   | <u>84.93</u> |            | %    |
| 96000257 | AY-101 GRAB | 3 DUP    | S96T001357 | 0   | TGA-03         | LIQUID | <u>84.93</u> | <u>84.83</u> | <u>N/A</u> | %    |
|          |             | 4 STD    |            |     | TGA-03         | LIQUID | <u>59.2</u>  | <u>60.40</u> | <u>N/A</u> | %    |
| 96000257 | AY-101 GRAB | 5 SAMPLE | S96T001358 | 0   | TGA-03         | LIQUID | <u>N/A</u>   | <u>83.87</u> |            | %    |
| 96000257 | AY-101 GRAB | 6 DUP    | S96T001358 | 0   | TGA-03         | LIQUID | <u>83.87</u> | <u>84.84</u> | <u>N/A</u> | %    |

Final page for worklist # 6756

See Attached for Signatures.  
Analyst Signature \_\_\_\_\_ Date \_\_\_\_\_

 Analyst Signature \_\_\_\_\_ Date 4-9-96
Verified by Blanchina Valenzuela  
4/15/96

Data Entry Comments:

Units shown for QC (SPK &amp; STD) may not reflect the actual units. DL = Detection Limit, S = Worklist Slot Number, R = Replicate Number, A = Aliquot Code.

worklistrpt Version 2.1 05/15/95  
03/20/96 11:28

WHC-SD-WM-OP-78 REV-1

Page: 1

## LABCORE Data Entry Template for Worklist#

6756

Analyst: RMelCrown Instrument: TGA0 Book # 75N8A  
Method: LA-560-112 Rev/Mod C-1  
Rev 4/3/96  
Worklist Comment: AY-101 FOR TGA-01 PLEASE RUN UNDER N2 RTS!

| GROUP    | PROJECT     | S TYPE   | SAMPLE#    | R A | TEST   | MATRIX | ACTUAL | FOUND | DL  | UNIT |
|----------|-------------|----------|------------|-----|--------|--------|--------|-------|-----|------|
|          |             | 1 STD    |            |     | TGA-01 | LIQUID |        |       | N/A | %    |
| 96000257 | AY-101 GRAB | 2 SAMPLE | S96T001357 | 0   | TGA-01 | LIQUID | N/A    |       |     | %    |
| 96000257 | AY-101 GRAB | 3 DUP    | S96T001357 | 0   | TGA-01 | LIQUID |        |       | N/A | %    |
| 96000257 | AY-101 GRAB | 4 SAMPLE | S96T001358 | 0   | TGA-01 | LIQUID | N/A    |       |     | %    |
| 96000257 | AY-101 GRAB | 5 DUP    | S96T001358 | 0   | TGA-01 | LIQUID |        |       | N/A | %    |

*TGA-03*  
*4-8-96*

Final page for worklist #

6756

RMelCrown 4/3/96  
Analyst Signature Date

\_\_\_\_\_  
Analyst Signature Date

Other instrument  
was used  
4/15/96  
BBV

Data Entry Comments:

Units shown for QC (SPK & STD) may not reflect the actual units. DL = Detection Limit, S = Worklist Slot Number,  
R = Replicate Number, A = Aliquot Code.

2-111

Curve 1: TGA

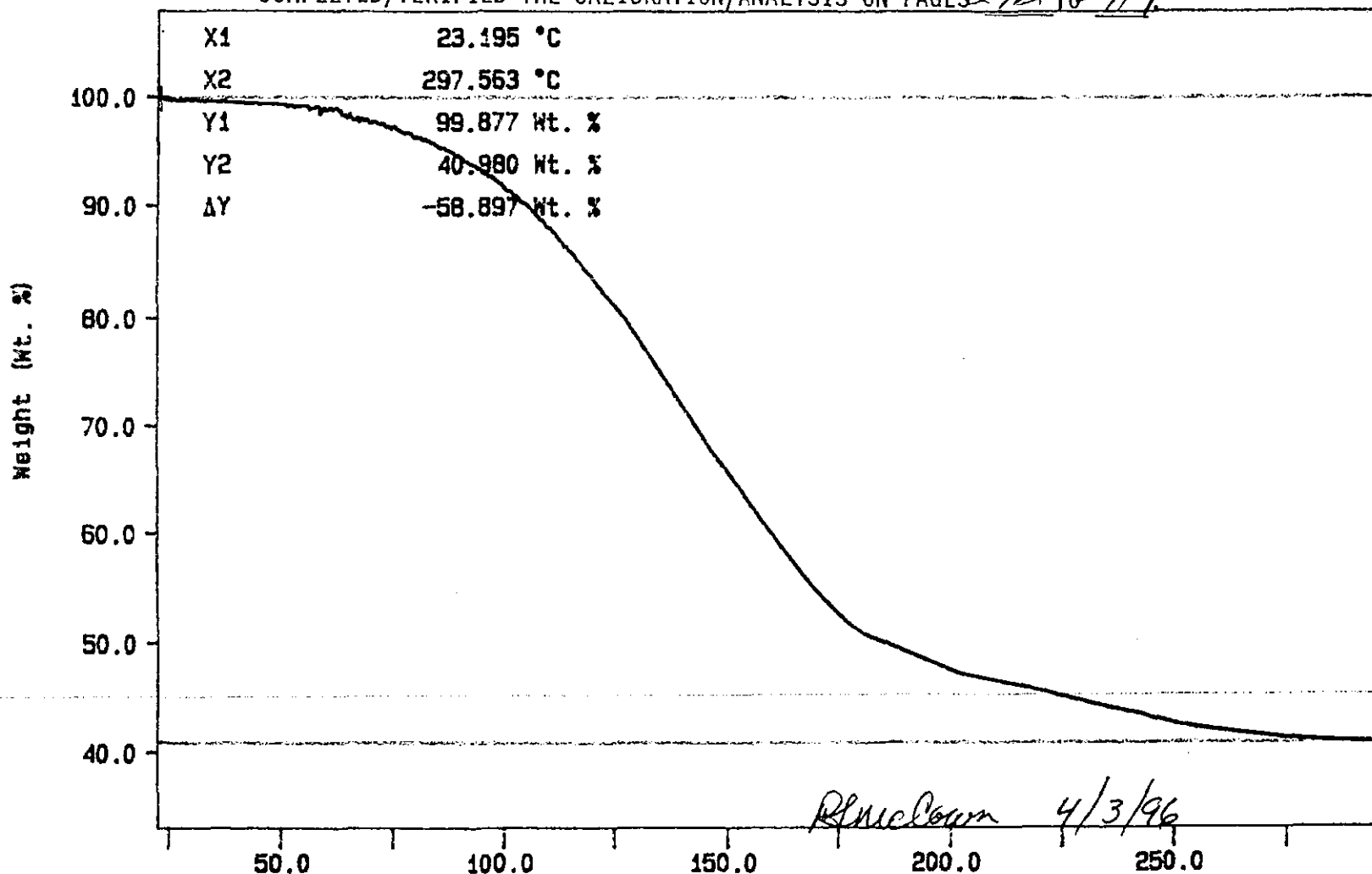
File info: TER040301 Wed Apr 3 06:26:22 1996

Sample Weight: 23.516 mg

TGA STD 75N8-A

SIGNATURE BELOW REPRESENTS CHEMICAL TECHNOLOGIST/CHEMIST THAT  
COMPLETED/VERIFIED THE CALIBRATION/ANALYSIS ON PAGES 2112 TO 2117.

2-112



WHC-SD-MM-DP-178, REV 1

*PJ McCown* 4/3/96

N2 10C/MIN  
TEMP: 35.0 C  
TIME: 0.0 min RATE: 10.0 C/min

Temperature (°C)

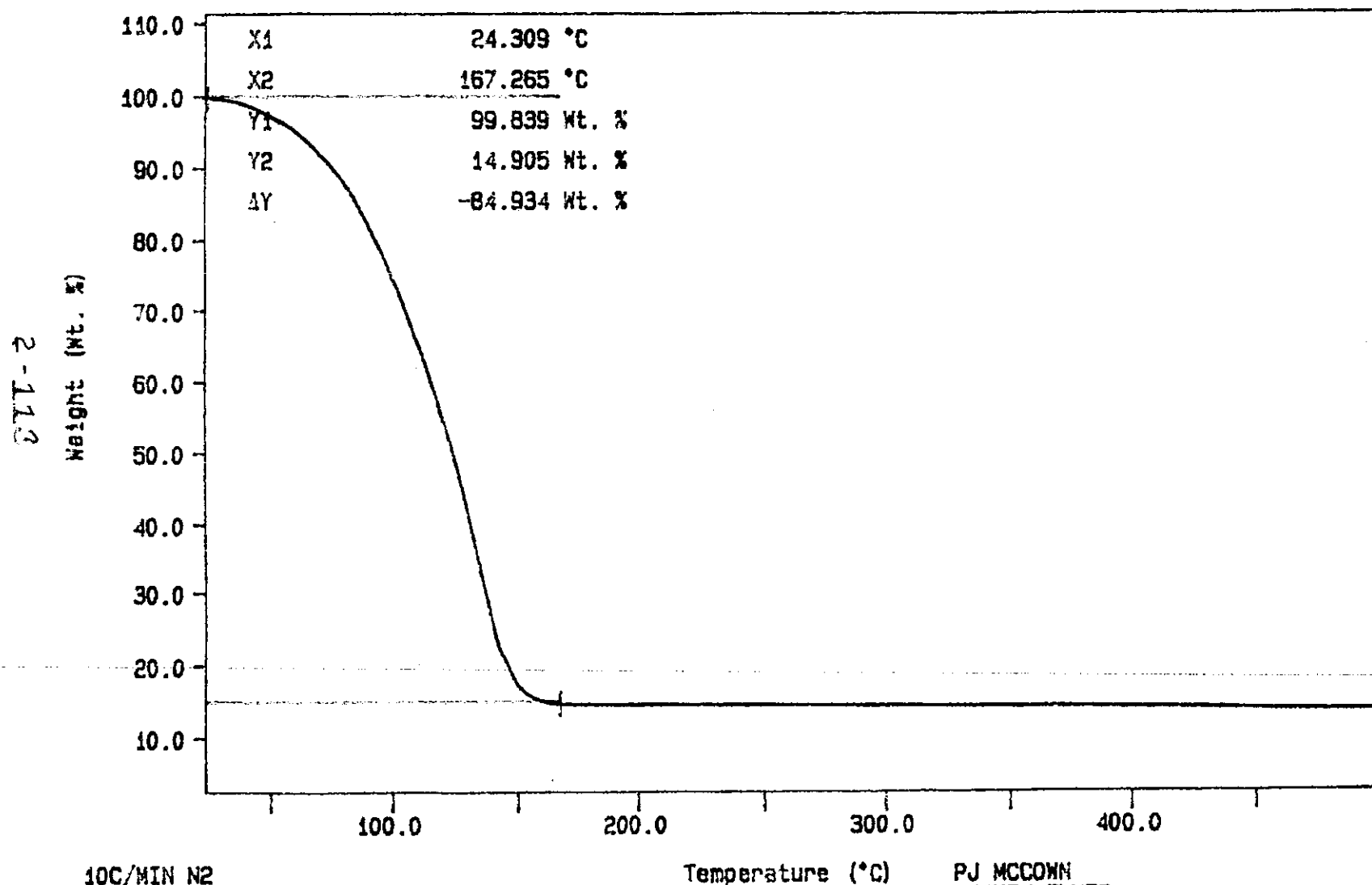
PJ MCCOWN  
PERKIN-ELMER  
7 Series Thermal Analysis System  
Wed Apr 3 06:51:13 1996

Curve 1: TGA

File info: SAM040301 Wed Apr 3 09:05:35 1996

Sample Weight: 13.850 mg

S96T001357 SAM



TEMP: 35.0 °C TIME: 0.0 min RATE: 10.0 °C/min  
TEMP: 500.0 °C

PJ MCCOWN  
PERKIN-ELMER  
7 Series Thermal Analysis System  
Wed Apr 3 09:21:44 1996

WHOSD-MM-DE-178 REV 1

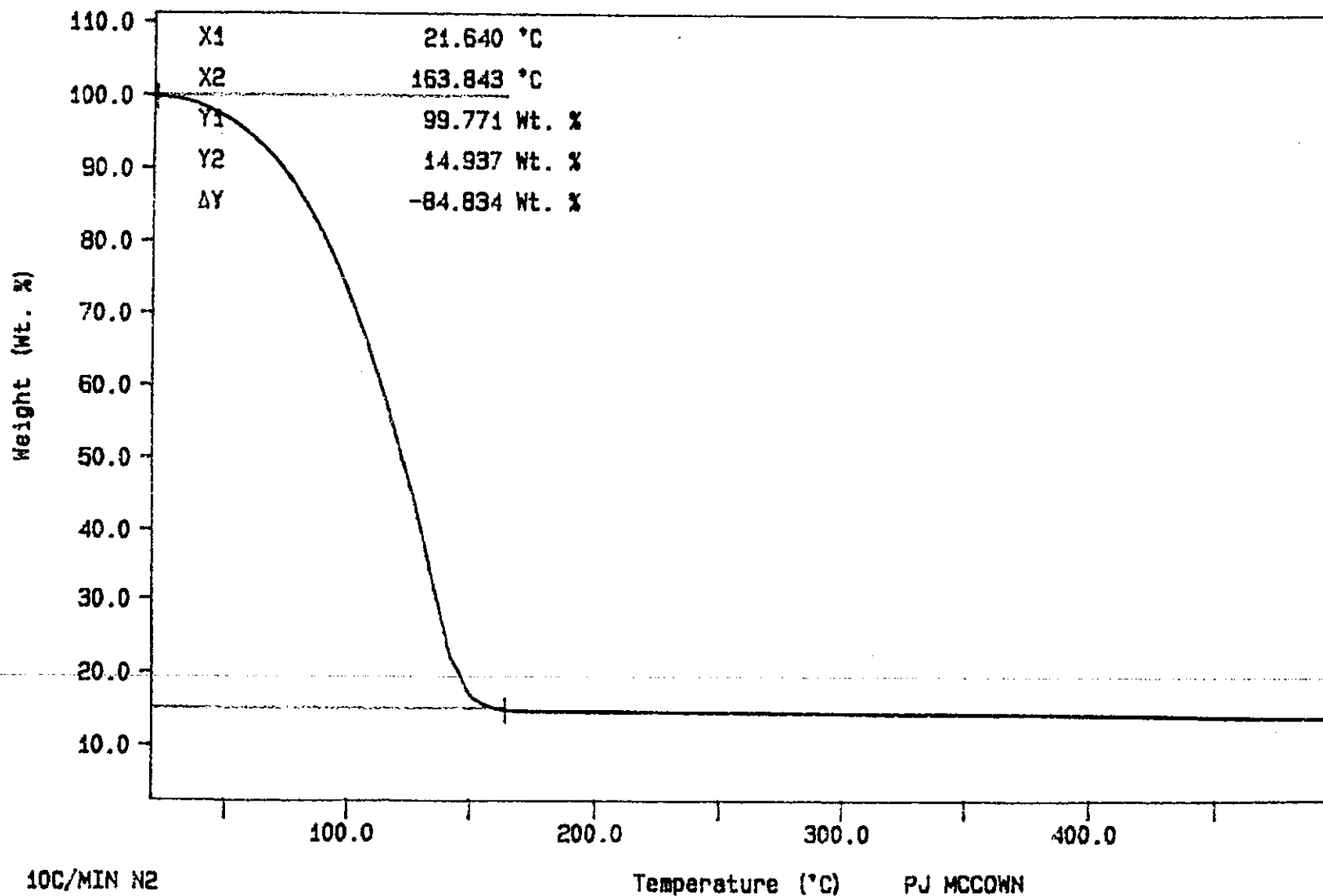
Curve 1: TGA

File info: SAM040302 Wed Apr 3 10:33:12 1996

Sample Weight: 13.638 mg

S96T001357 DUP

2-114



WMC-SD-MN-DP-178, REV 1

10C/MIN N2

TEMP1: 35.0 °C TIME1: 0.0 min RATE1: 10.0 °C/min  
TEMP2: 500.0 °C

PJ MCCOWN  
PERKIN-ELMER  
7 Series Thermal Analysis System  
Wed Apr 3 10:44:32 1996

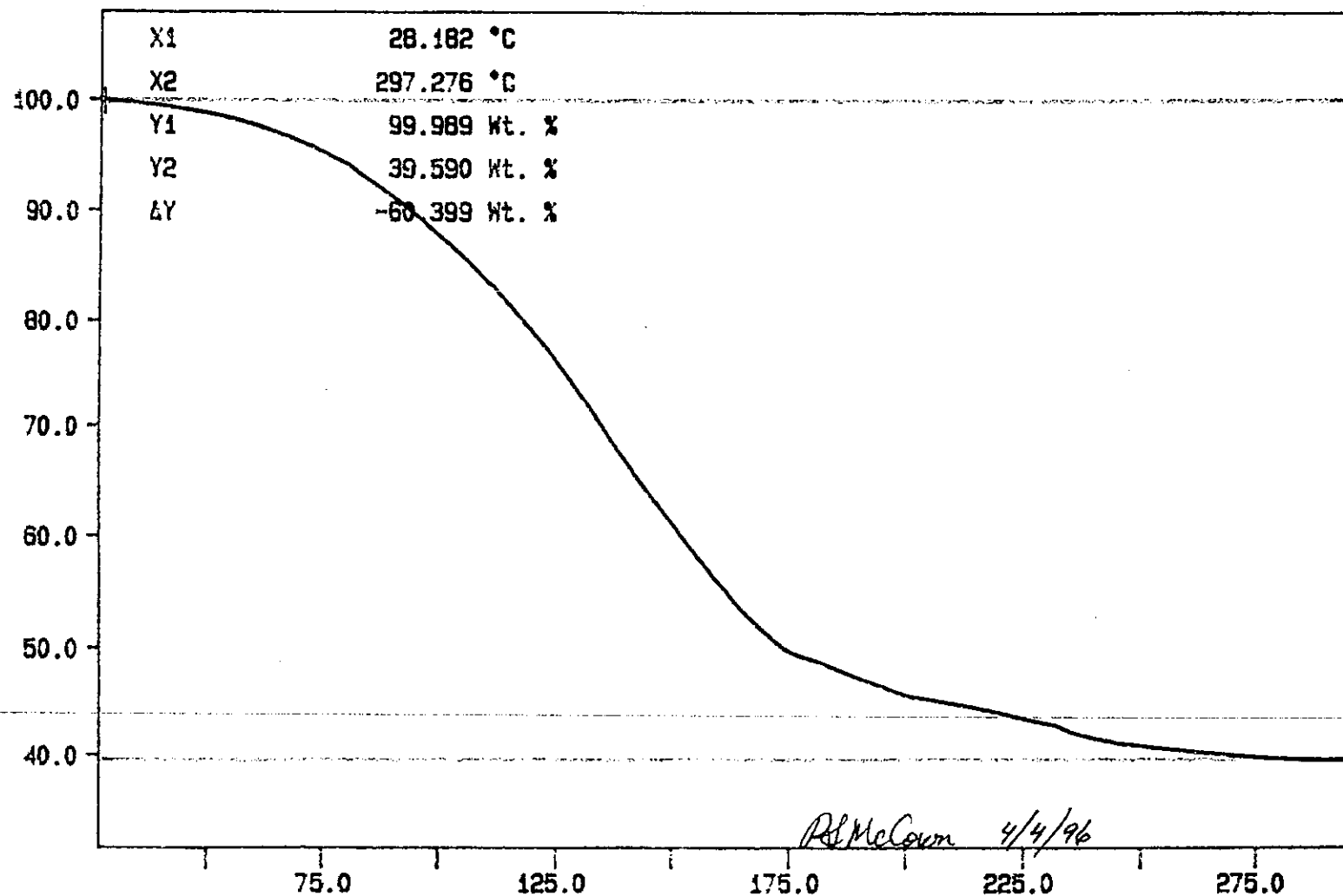


Curve 1: TGA

File info: TER040401 Thu Apr 4 07:03:08 1996

Sample Weight: 22.156 mg

TGA STD 75N8-A



*PJ McCann 4/4/96*

N2 10C/MIN

TEMP1: 35.0 °C TIME1: 0.0 min RATE1: 10.0 °C/min  
TEMP2: 300.0 °C

Temperature (°C)

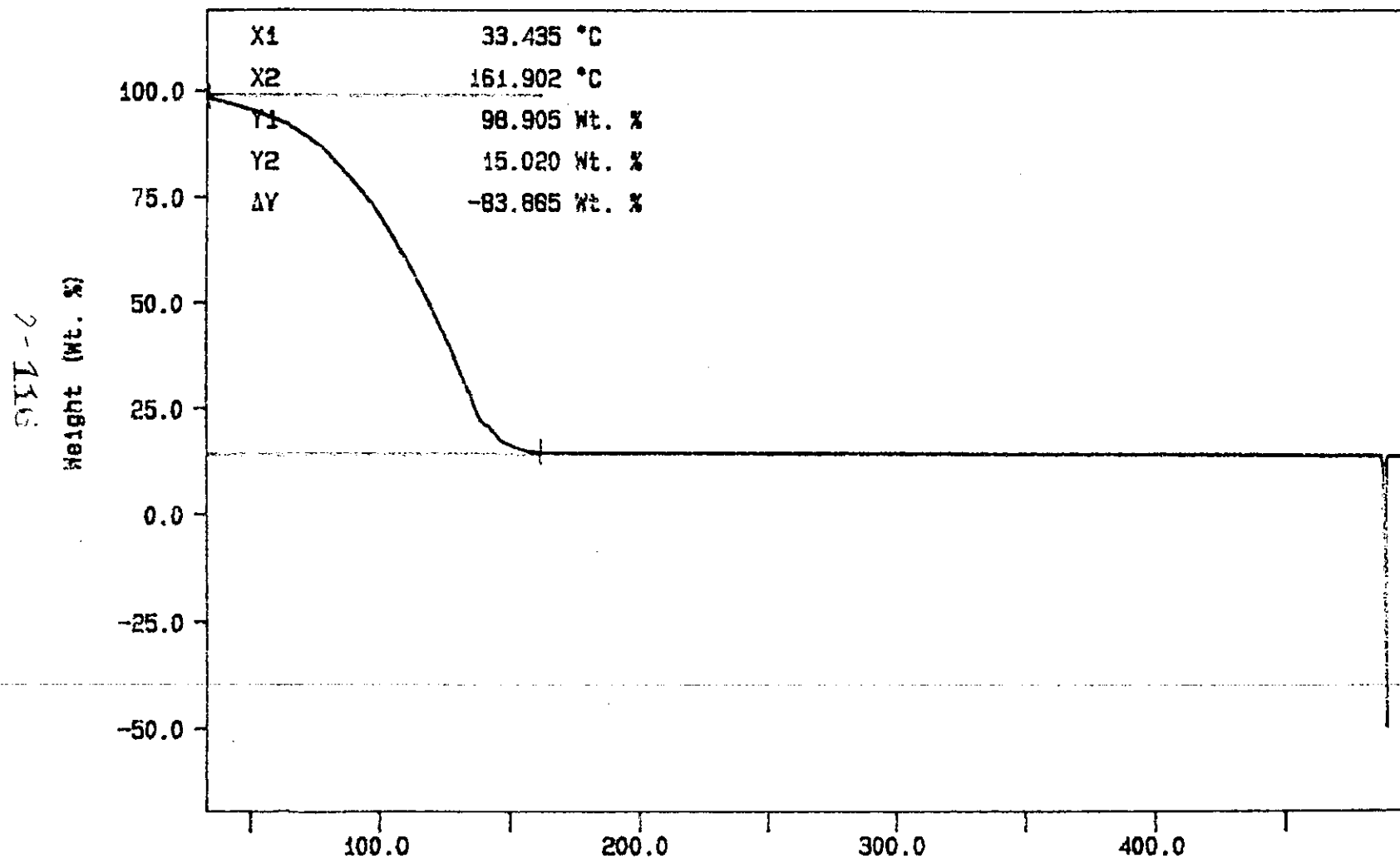
PJ MCCANN  
PERKIN-ELMER  
7 Series Thermal Analysis System  
Thu Apr 4 07:03:29 1996

Curve 1: TGA

File info: SAM040402 Thu Apr 4 09:50:31 1996

Sample Weight: 12.549 mg

S96T001358 SAM



MMQ-SD-WM-DP-178, REV 1

10C/MIN N2  
TEMP: 98.0 °C  
TEMP: 500.0 °C  
TIME: 0.0 min RATE: 10.0 C/min

Temperature (°C)

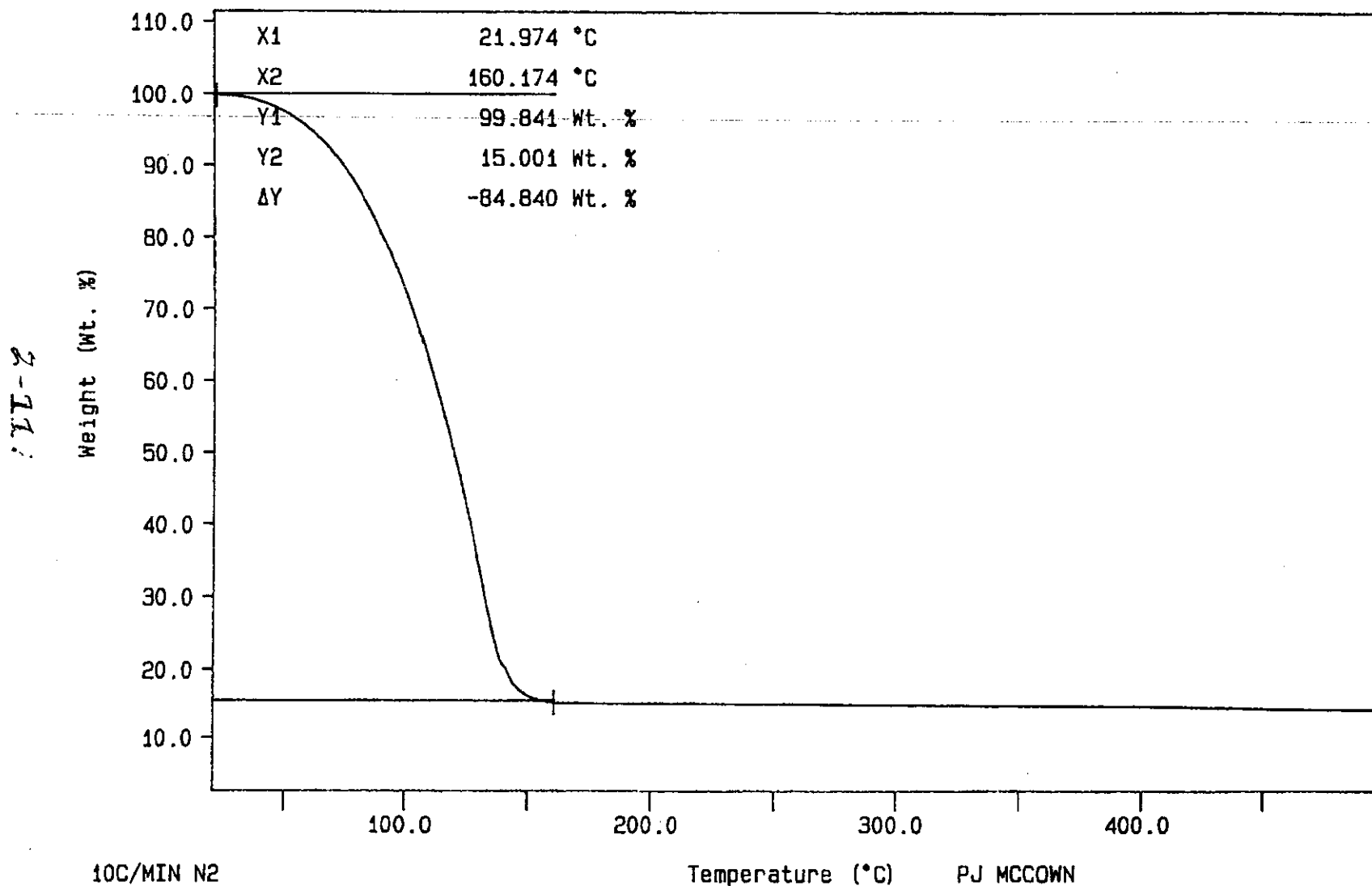
PJ MCCOWN  
PERKIN-ELMER  
7 Series Thermal Analysis System  
Thu Apr 4 10:02:27 1996

Curve 1: TGA

File info: SAM040403 Thu Apr 4 11:13:12 1996

Sample Weight: 11.112 mg

S96T001358 DUP



TEMP1: 35.0 C TIME1: 0.0 min RATE1: 10.0 C/min  
TEMP2: 500.0 C

PJ MCCOWN  
PERKIN-ELMER  
7 Series Thermal Analysis System  
Thu Apr 4 12:07:21 1996

WHC-SD-MW-DF-178 REV 1

worklistrpt Version 2.1 05/15/95

WHC-SD-WM-DP-178, REV 1

Page: 1

04/04/96 10:12

## LABCORE Data Entry Template for Worklist#

6764

Analyst: SME Instrument: TGA01 \_\_\_\_\_ Book # 100CN2Method: LA-560-112 Rev/Mod B-1

Worklist Comment: AY-101 FOR TGA-03 PLEASE RUN UNDER N2 RTS!

| GROUP    | PROJECT     | S TYPE   | SAMPLE#    | R A | TEST   | MATRIX | ACTUAL | FOUND  | DL  | UNIT |
|----------|-------------|----------|------------|-----|--------|--------|--------|--------|-----|------|
|          |             | 1 STD    |            |     | TGA-01 | LIQUID | 59.4   | 61.30* | N/A | %    |
| 96000210 | AY-101 GRAB | 2 SAMPLE | S96T001318 | 0   | TGA-01 | LIQUID | N/A    | 84.70  |     | X    |
| 96000210 | AY-101 GRAB | 3 DUP    | S96T001318 | 0   | TGA-01 | LIQUID | 84.70  | 84.97  | N/A | X    |

Final page for worklist #

6764

See Attached In Signatures.  
\_\_\_\_\_  
Analyst Signature Date

\_\_\_\_\_  
Analyst Signature Date 4-8-96

Verified by  
HAnastos 4-9-96

Data Entry Comments:

Units shown for QC (SPK & STD) may not reflect the actual units. DL = Detection Limit, S = Worklist Slot Number,  
R = Replicate Number, A = Aliquot Code.

2 - 110

worklistrpt Version 2.1 05/15/95  
03/20/96 11:37

WHC-SD-WM-DP-178, REV (

Page: 1

**LABCORE Data Entry Template for Worklist#****6764**Analyst: SMF Instrument: TGA01 \_\_\_\_\_ Book # 100 C22

Method: LA-514-114 Rev/Mod \_\_\_\_\_

Worklist Comment: AY-101 FOR TGA-03 PLEASE RUN UNDER N2 RTSI

| GROUP    | PROJECT     | S TYPE   | SAMPLE#    | R A | TEST   | MATRIX | ACTUAL | FOUND | DL    | UNIT |
|----------|-------------|----------|------------|-----|--------|--------|--------|-------|-------|------|
|          |             | 1 STD    |            |     | TGA-03 | LIQUID | _____  | _____ | N/A   | %    |
| 96000210 | AY-101 GRAB | 2 SAMPLE | S96T001318 | 0   | TGA-03 | LIQUID | N/A    | _____ | _____ | %    |
| 96000210 | AY-101 GRAB | 3 DUP    | S96T001318 | 0   | TGA-03 | LIQUID | _____  | _____ | N/A   | %    |

Final page for worklist #

**6764**

Laurie M. Fulton 3-29-96  
Analyst Signature Date

\_\_\_\_\_  
Analyst Signature Date

Data Entry Comments:

Units shown for QC (SPK & STD) may not reflect the actual units. DL = Detection Limit, S = Worklist Slot Number,  
R = Replicate Number, A = Allquot Code.

SIGNATURE ABOVE REPRESENTS CHEMICAL TECHNOLOGIST/CHEMIST THAT  
COMPLETED/VERIFIED THE CALIBRATION/ANALYSIS ON PAGES 2-120 to 2-122

TGA STD 100CN2

12.493 mg

Rate: 10.0 °C/min

File: 00077.001

Ident: 0.0

TG

METTLER

29-Mar-96

222-S Laboratory

Step Analysis

Height -7.66 mg

-61.30 %

ResidC. 4.83 mg

38.70 %

Dpeak 189.2 °C

5. mg

50.

100.

150.

200.

WHC-SD-WM-DP-178 REV 1

*Lucian Fulton* 3-29-96

S96T001318 N2

10.735 mg

Rate: 10.0 °C/min

File: 00087.001

TG

METTLER

29-Mar-96

Ident: 0.0

222-S Laboratory

Step Analysis

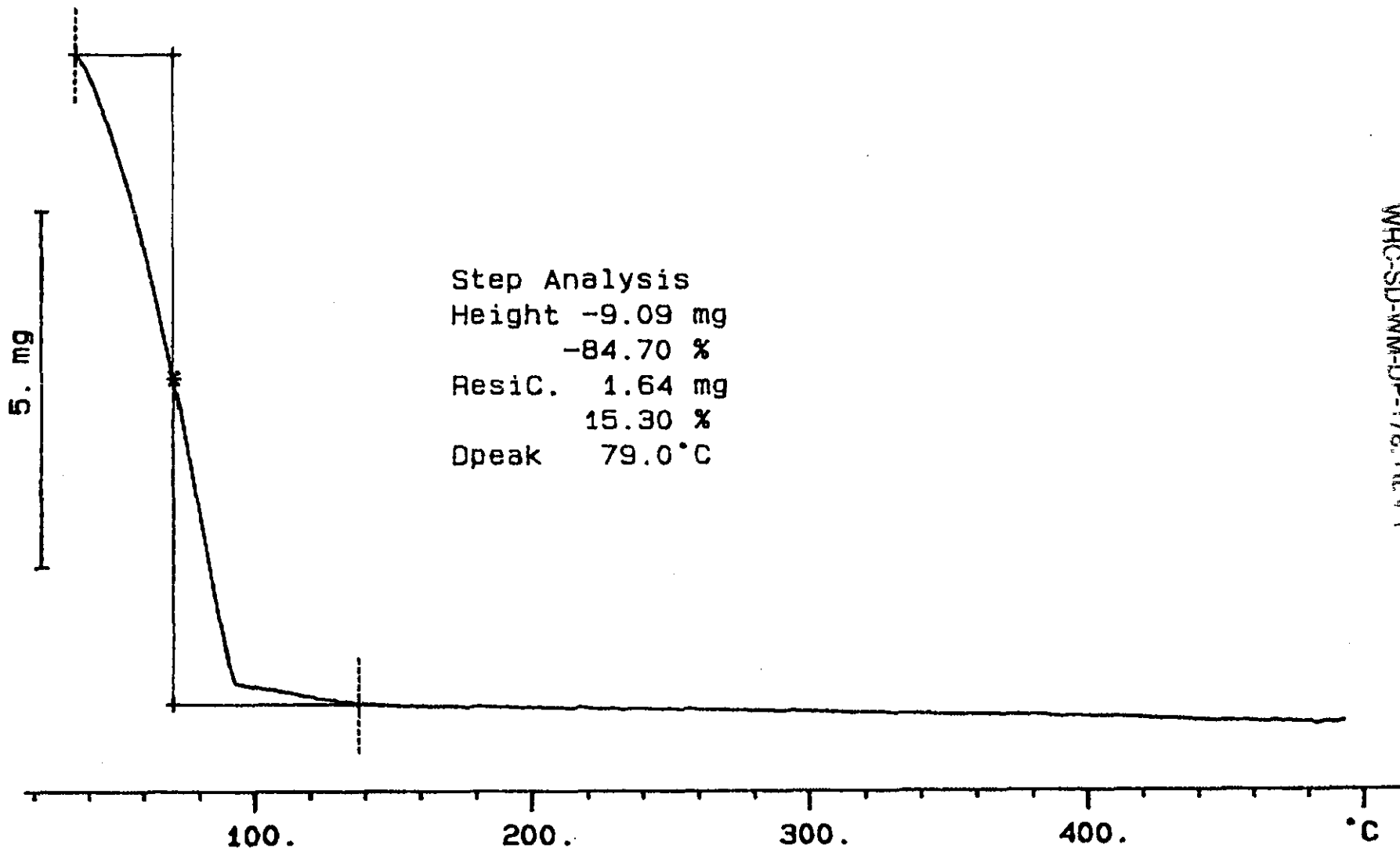
Height -9.09 mg

-84.70 %

ResiC. 1.64 mg

15.30 %

Dpeak 79.0 °C



WHC-SD-WM-DP-178, REV 1

2-131

**9.903 mg**

**File: 00089.001**

**Ident: 0.0**

TG      METTLER

30-Mar-96

**222-S Laboratory**

Height -8.41 mg

-84.97 %

ResiC. 1.49 mg

15.03 %

Dpeak 77.0°C

59.

**100.**

**200.**

300.

**400.**

°C

7-132

[illegible]



worklistrpt Version 2.1 05/15/95  
04/08/96 10:17

WHC-SD-WM-0P-178 REV 1

Page: 1

## LABCORE Data Entry Template for Worklist#

7258

Analyst: PJM Instrument: TGA0 1 Book # 75N8AMethod: LA-560-112 Rev/Mod B-1

Worklist Comment: AY-101 TGA RUN UNDER N2. RCJ

| GROUP    | PROJECT     | S TYPE   | SAMPLE#    | R A | TEST   | MATRIX | ACTUAL       | FOUND         | DL         | UNIT |
|----------|-------------|----------|------------|-----|--------|--------|--------------|---------------|------------|------|
|          |             | 1 STD    |            |     | TGA-01 | LIQUID | <u>59.2</u>  | <u>60.69</u>  | <u>N/A</u> | %    |
| 96000257 | AY-101 GRAB | 2 SAMPLE | S96T001519 | 0   | TGA-01 | LIQUID | <u>N/A</u>   | <u>83.91</u>  |            | %    |
| 96000257 | AY-101 GRAB | 3 DUP    | S96T001519 | 0   | TGA-01 | LIQUID | <u>83.91</u> | <u>83.78</u>  | <u>N/A</u> | %    |
|          |             | 4 STD    |            |     | TGA-01 | LIQUID | <u>59.2</u>  | <u>60.46*</u> | <u>N/A</u> | %    |
| 96000257 | AY-101 GRAB | 5 SAMPLE | S96T001520 | 0   | TGA-01 | LIQUID | <u>N/A</u>   | <u>84.30</u>  |            | %    |
| 96000257 | AY-101 GRAB | 6 DUP    | S96T001520 | 0   | TGA-01 | LIQUID | <u>84.30</u> | <u>85.27</u>  | <u>N/A</u> | %    |

Final page for worklist #

7258

See Attached In Signatures.  
Analyst Signature Date

[Signature] 4-9-96  
Analyst Signature Date

Verified by Blandina Valenzuela  
4/15/96

Data Entry Comments:

Units shown for QC (SPK & STD) may not reflect the actual units. DL = Detection Limit, S = Worklist Slot Number,  
R = Replicate Number, A = Aliquot Code.

2-123

worklistrpt Version 2.1 05/15/95  
04/02/96 09:38

WHC-SD-WM-DP-178, REV 1

Page: 1

## LABCORE Data Entry Template for Worklist#

7258

Analyst: Pat McCown Instrument: TGA0 Book # 75108AMethod: LA-560-112 Rev/Mod B-1

Worklist Comment: AY-101 TGA RUN UNDER N2: RCJ

| GROUP    | PROJECT     | S | TYPE   | SAMPLE#    | R | A | -----TEST----- | MATRIX | ACTUAL | FOUND | DL  | UNIT |
|----------|-------------|---|--------|------------|---|---|----------------|--------|--------|-------|-----|------|
|          |             | 1 | STD    |            |   |   | TGA-01         | LIQUID |        |       | N/A | %    |
| 96000257 | AY-101 GRAB | 2 | SAMPLE | S96T001519 | 0 |   | TGA-01         | LIQUID | N/A    |       |     | %    |
| 96000257 | AY-101 GRAB | 3 | DUP    | S96T001519 | 0 |   | TGA-01         | LIQUID |        |       | N/A | %    |
| 96000257 | AY-101 GRAB | 4 | SAMPLE | S96T001520 | 0 |   | TGA-01         | LIQUID | N/A    |       |     | %    |
| 96000257 | AY-101 GRAB | 5 | DUP    | S96T001520 | 0 |   | TGA-01         | LIQUID |        |       | N/A | %    |

Final page for worklist #

7258

Pat McCown 4/3/96  
Analyst Signature DateValerie Massie 04-04-96  
Analyst Signature Date

Data Entry Comments:

Units shown for QC (SPK & STD) may not reflect the actual units. DL = Detection Limit, S = Worklist Slot Number,  
R = Replicate Number, A = Aliquot Code.

2-124

SIGNATURE BELOW REPRESENTS CHEMICAL TECHNOLOGIST/CHEMIST THAT  
COMPLETED/VERIFIED THE CALIBRATION/ANALYSIS ON PAGES 5125 TO 5130

TGA STD 75N8A

24.749 mg

Rate: 10.0 °C/min

File: 00047.001

TG

METTLER

03-Apr-96

Ident: 0.0

222-S Laboratory

*Bl McCown 4/3/96*

Step Analysis

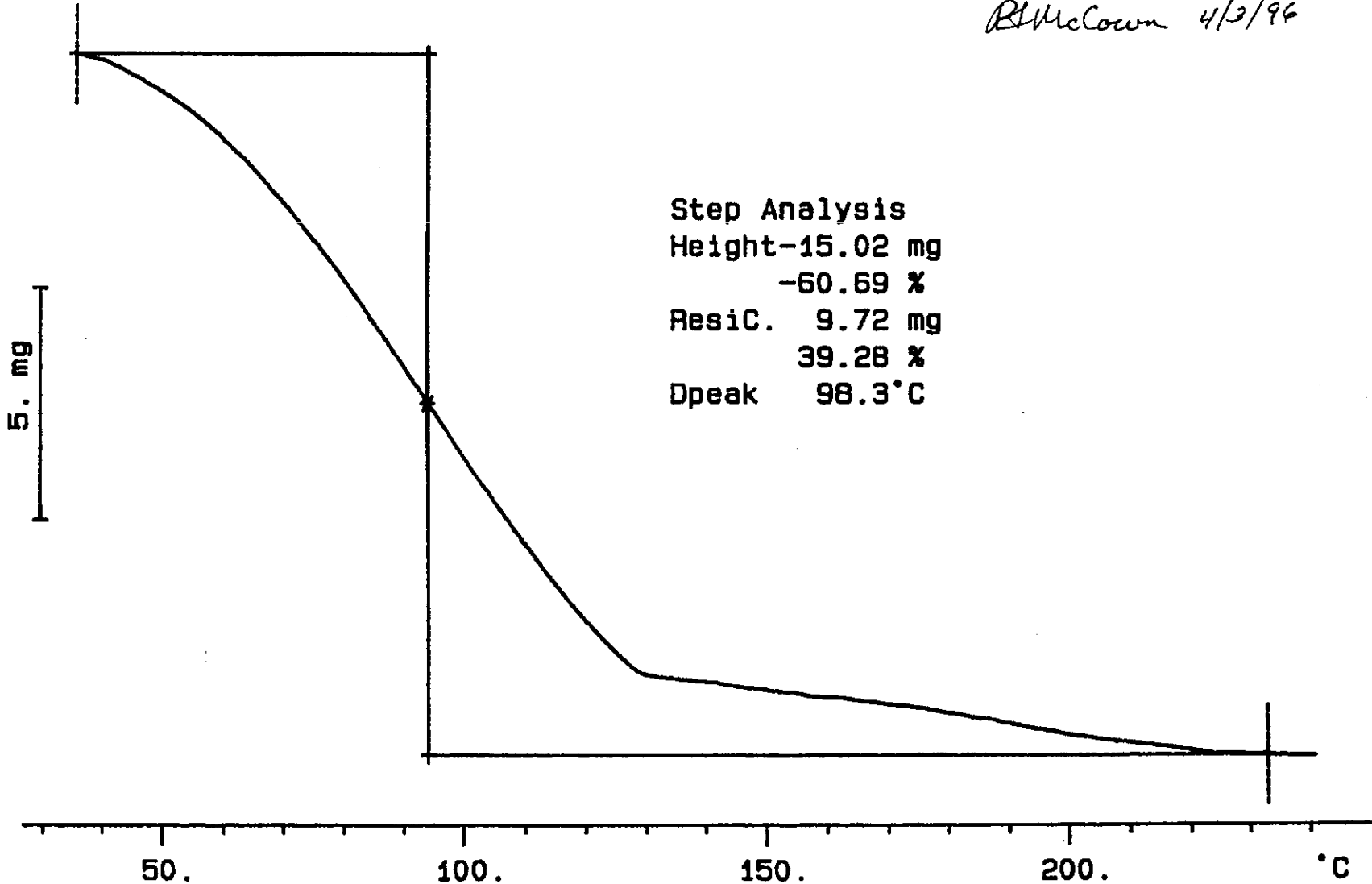
Height-15.02 mg

-60.69 %

ResidC. 9.72 mg

39.28 %

Dpeak 98.3°C



2-125

WMC-SD-WM-DP-178, REV 1

S96T001519 SAM N2

13.621 mg

Rate: 10.0 °C/min

File: 00049.001

TG

METTLER

03-Apr-96

Ident: 0.0

222-S Laboratory

Step Analysis

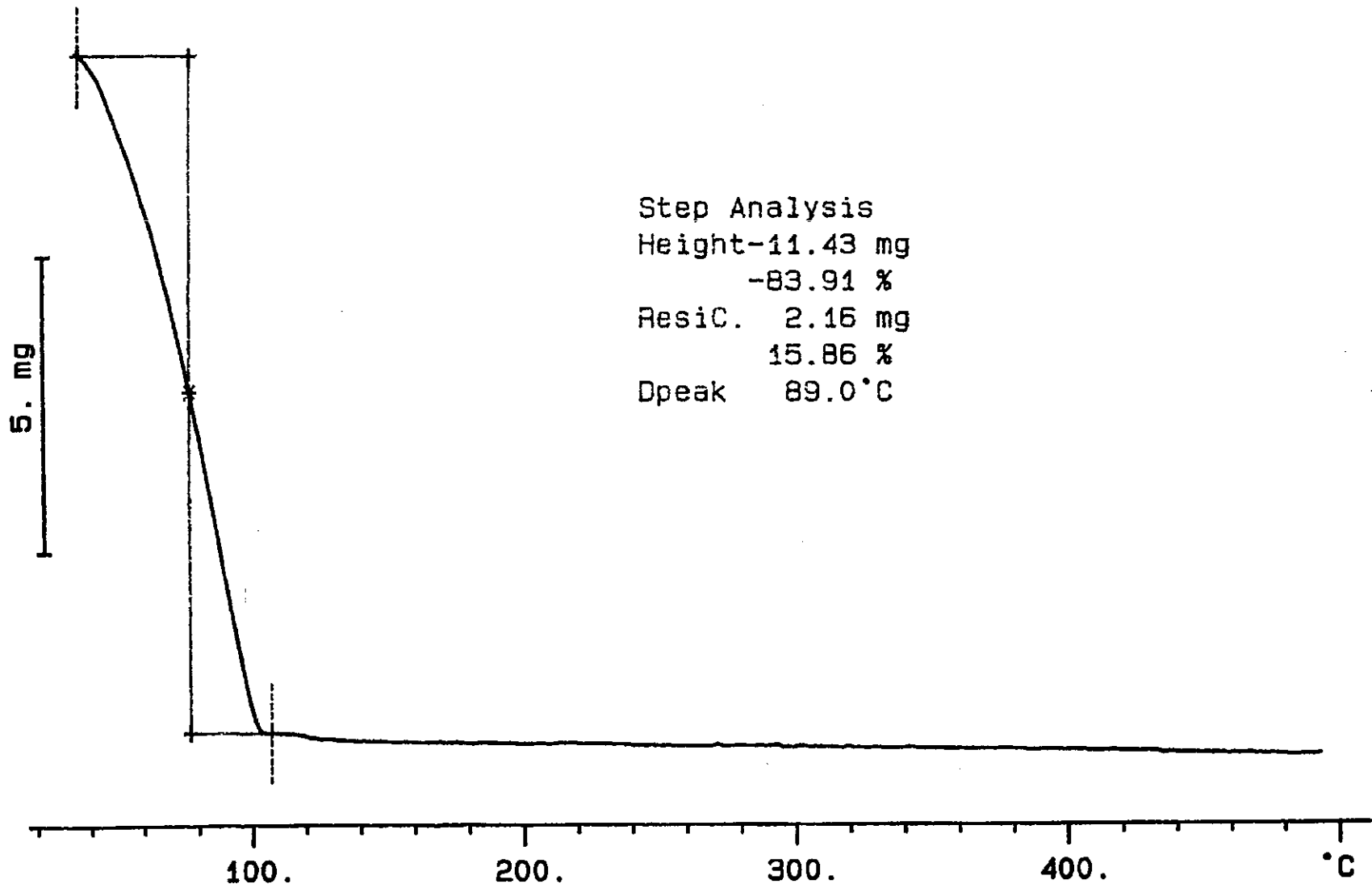
Height-11.43 mg

-83.91 %

Resid. 2.16 mg

15.86 %

Dpeak 89.0 °C



2-120

WHC-SD-WM-DP-178, REV 1

S96T001519 DUP N2

12.942 mg

Rate: 10.0 °C/min

File: 00051.001

TG METTLER 03-Apr-96

Ident: 0.0

222-S Laboratory

Step Analysis

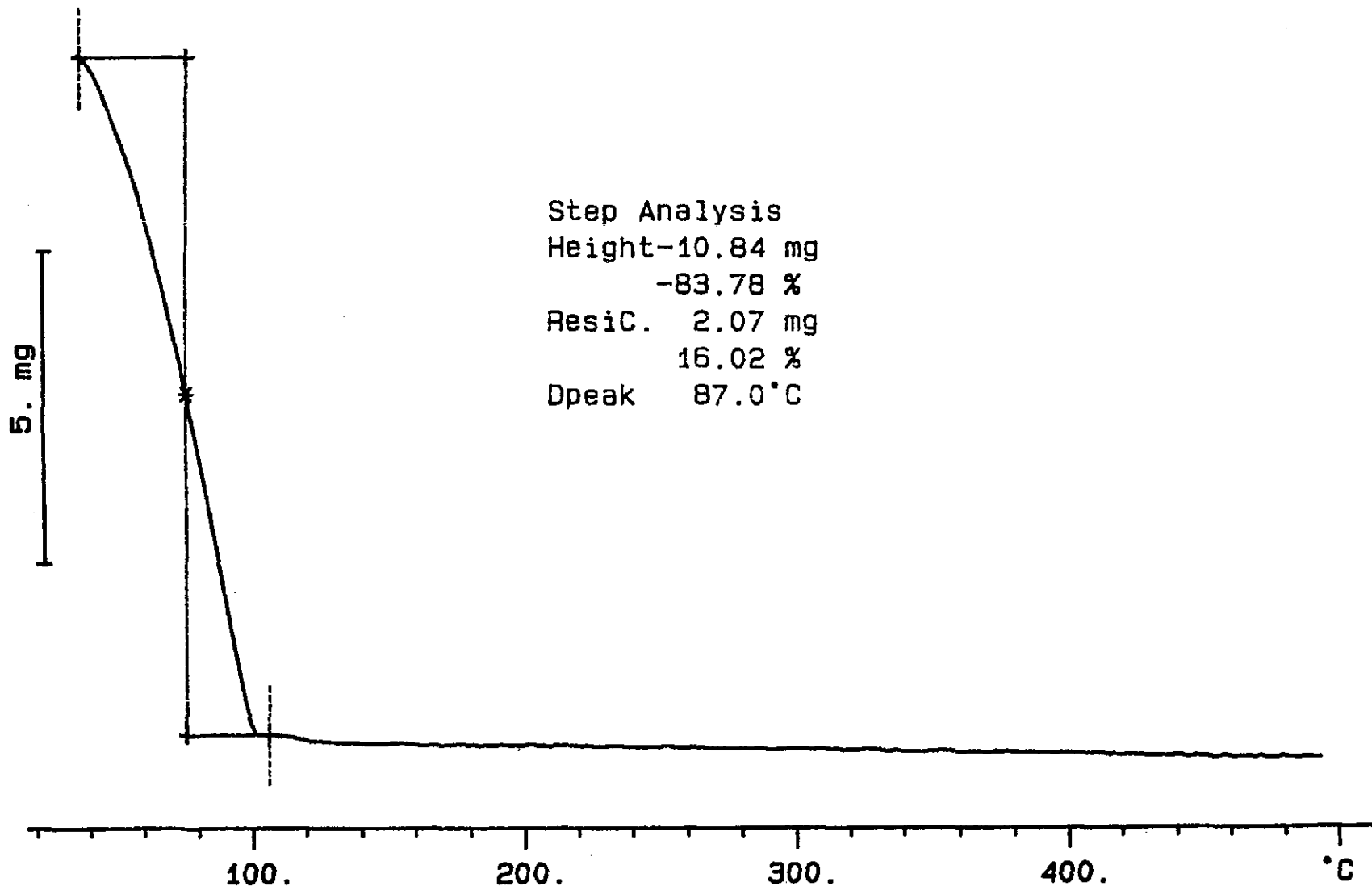
Height-10.84 mg

-83.78 %

ResiC. 2.07 mg

16.02 %

Dpeak 87.0°C



2-127

WFO-SD-WM-DP-178, REV 1

TGA STD 75N8A

30.484 mg

Rate: 10.0 °C/min

File: 00053.001

TG

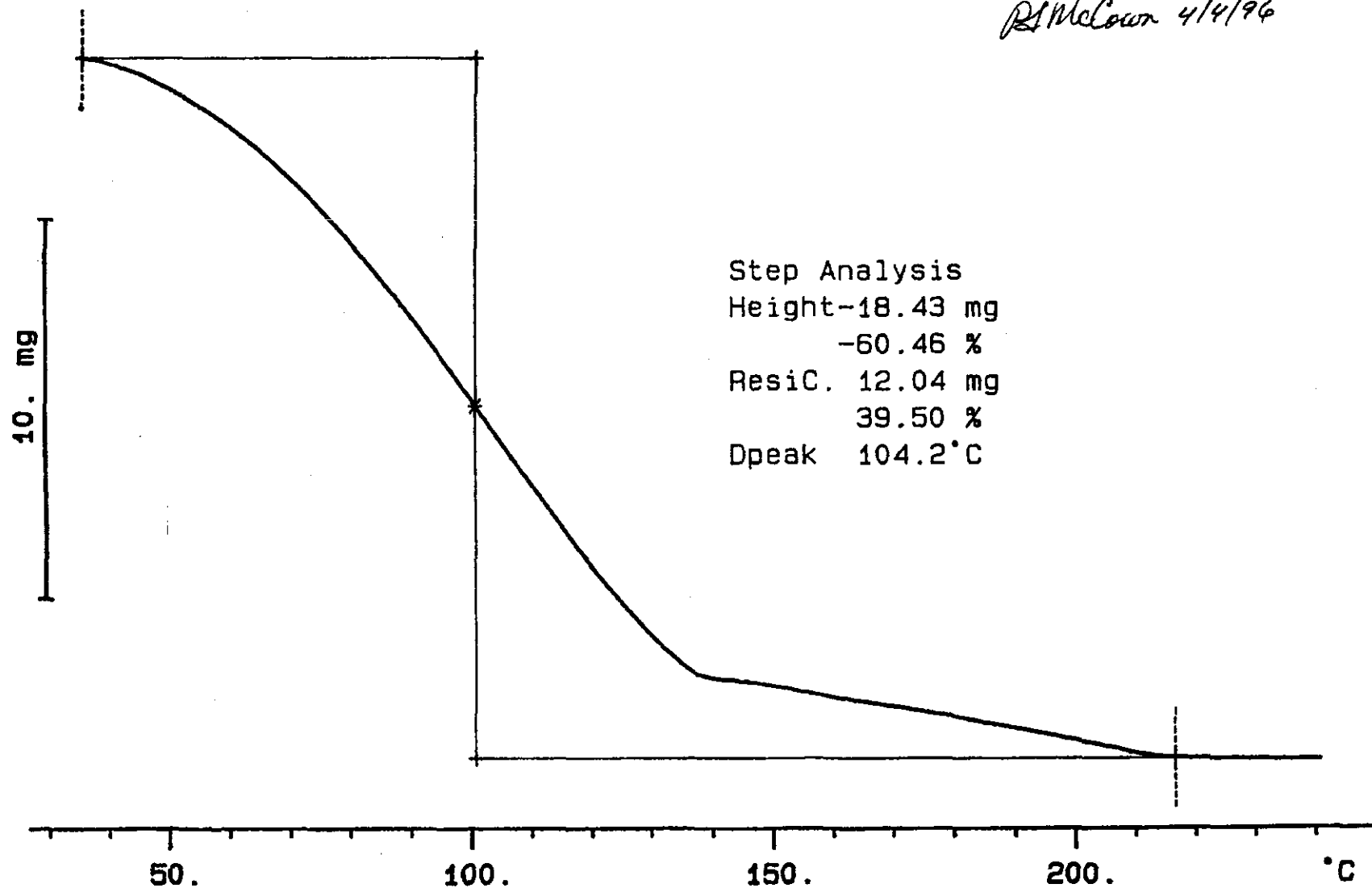
METTLER

04-Apr-96

Ident: 0.0

222-S Laboratory

*RL McCown 4/4/96*



Step Analysis

Height-18.43 mg

-60.46 %

ResiC. 12.04 mg

39.50 %

Dpeak 104.2°C

WFO-SD-MM-OP-178 RPN 1

2-128

S96T001520 SAM N2

13.065 mg

Rate: 10.0 °C/min

File: 00057.001

TG METTLER 04-Apr-96

Ident: 0.0

222-S Laboratory

*Valerie L. M. 04-04-96*

Step Analysis

Height-11.01 mg

-84.30 %

ResiC. 2.05 mg

15.70 %

Dpeak 89.0 °C

5. mg

100. 200. 300. 400. °C

WHC-SD-WM-DP-178, REV 1

S96T001520 DUP N2

24.351 mg

Rate: 10.0 °C/min

File: 00055.001

TG METTLER 04-Apr-96

Ident: 0.0

222-S Laboratory

*RS McCown 4/4/96*

Step Analysis

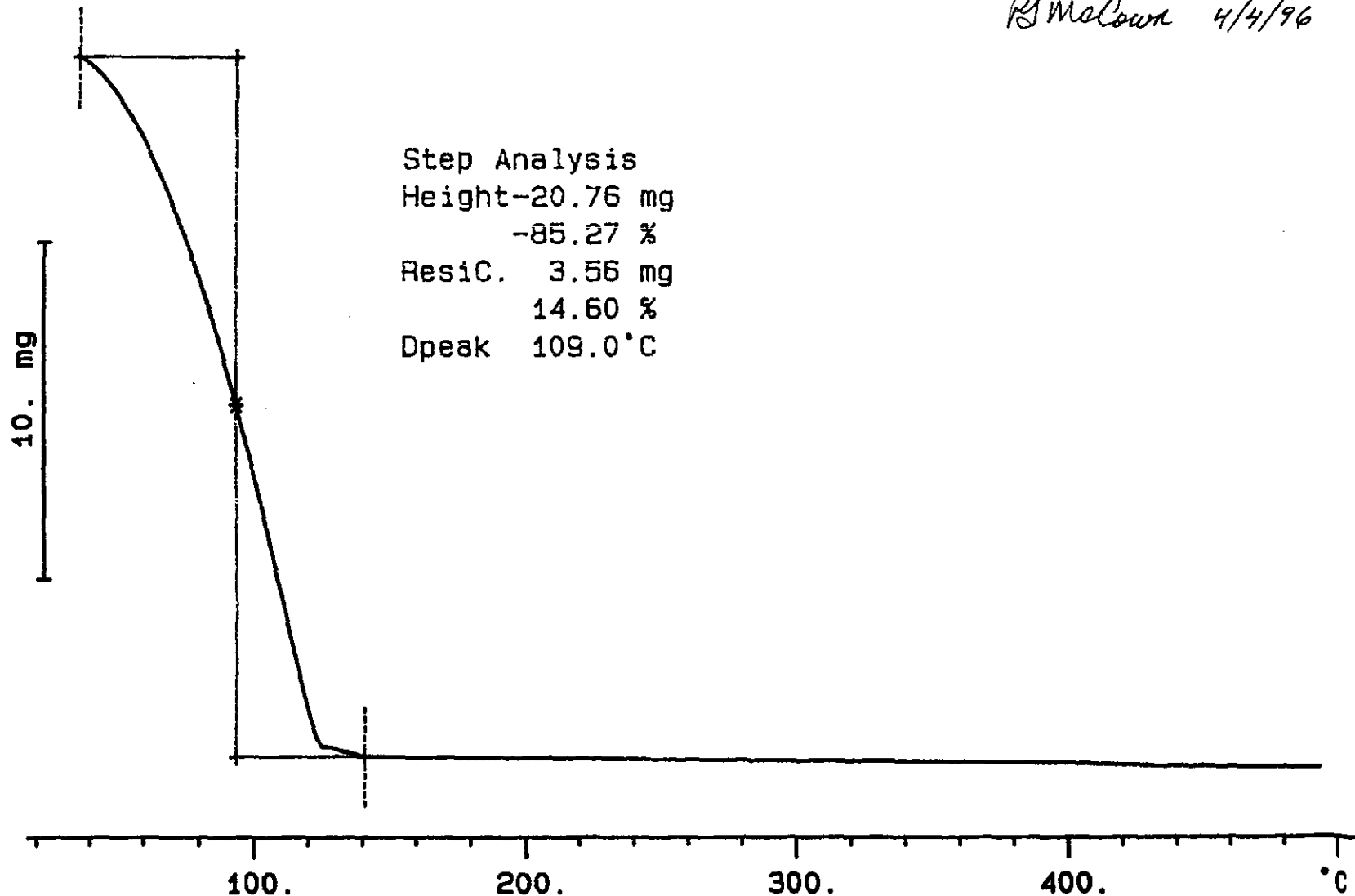
Height-20.76 mg

-85.27 %

ResidC. 3.56 mg

14.60 %

Dpeak 109.0 °C



2-130

MHC-SD-WM-DP-178, REV 1



# LABCORE Data Entry Template for Worklist#

7619

Analyst: PJM Instrument: TGA0 3 Book # 82N8A

Method: LA-514-114 Rev/Mod C-1

Worklist Comment: AY-101 TGA RUN UNDER N2. RCJ

| GROUP    | PROJECT     | S TYPE   | SAMPLE#    | R A | TEST   | MATRIX | ACTUAL       | FOUND        | DL         | UNIT |
|----------|-------------|----------|------------|-----|--------|--------|--------------|--------------|------------|------|
|          |             | 1 STD    |            |     | TGA-03 | LIQUID | <u>59.2</u>  | <u>58.29</u> | <u>N/A</u> | %    |
| 96000210 | AY-101 GRAB | 2 SAMPLE | S96T001208 | 0   | TGA-03 | LIQUID | <u>N/A</u>   | <u>99.79</u> |            | %    |
| 96000210 | AY-101 GRAB | 3 DUP    | S96T001208 | 0   | TGA-03 | LIQUID | <u>99.79</u> | <u>99.79</u> | <u>N/A</u> | %    |

Final page for worklist #

7619

*See attached for signatures*

Analyst Signature \_\_\_\_\_ Date 4/15/96  
*BBY*

Analyst Signature \_\_\_\_\_ Date \_\_\_\_\_

*Verified by Blandina Valenzuela*  
4/15/96  
*BBY*

Data Entry Comments:

Units shown for QC (SPK & STD) may not reflect the actual units. DL = Detection Limit, S = Worklist Slot Number, R = Replicate Number, A = Aliquot Code.

# LABCORE Data Entry Template for Worklist#

7619

Analyst: RMcLown Instrument: TGA0 Book # 82 NS-A

Method: <sup>514-114</sup>LA-560-112 Rev/Mod C-1  
<sub>Rm 4/14/96</sub>

Worklist Comment: AY-101 TGA RUN UNDER N2. RCJ

**RUSH**

| GROUP    | PROJECT     | S TYPE   | SAMPLE#    | R A | TEST   | MATRIX | ACTUAL | FOUND | DL  | UNIT |
|----------|-------------|----------|------------|-----|--------|--------|--------|-------|-----|------|
|          |             | 1 STD    |            |     | TGA-01 | LIQUID |        |       | N/A | %    |
| 96000210 | AY-101 GRAB | 2 SAMPLE | S96T001208 | 0   | TGA-01 | LIQUID | N/A    |       |     | %    |
| 96000210 | AY-101 GRAB | 3 DUP    | S96T001208 | 0   | TGA-01 | LIQUID |        |       | N/A | %    |

Final page for worklist #

7619

RMcLown 4/14/96  
Analyst Signature Date

\_\_\_\_\_  
Analyst Signature Date

Other instrument

was used

4/15/96

BBV

Data Entry Comments:

Units shown for QC (SPK & STD) may not reflect the actual units. DL = Detection Limit, S = Worklist Slot Number,  
R = Replicate Number, A = Aliquot Code.

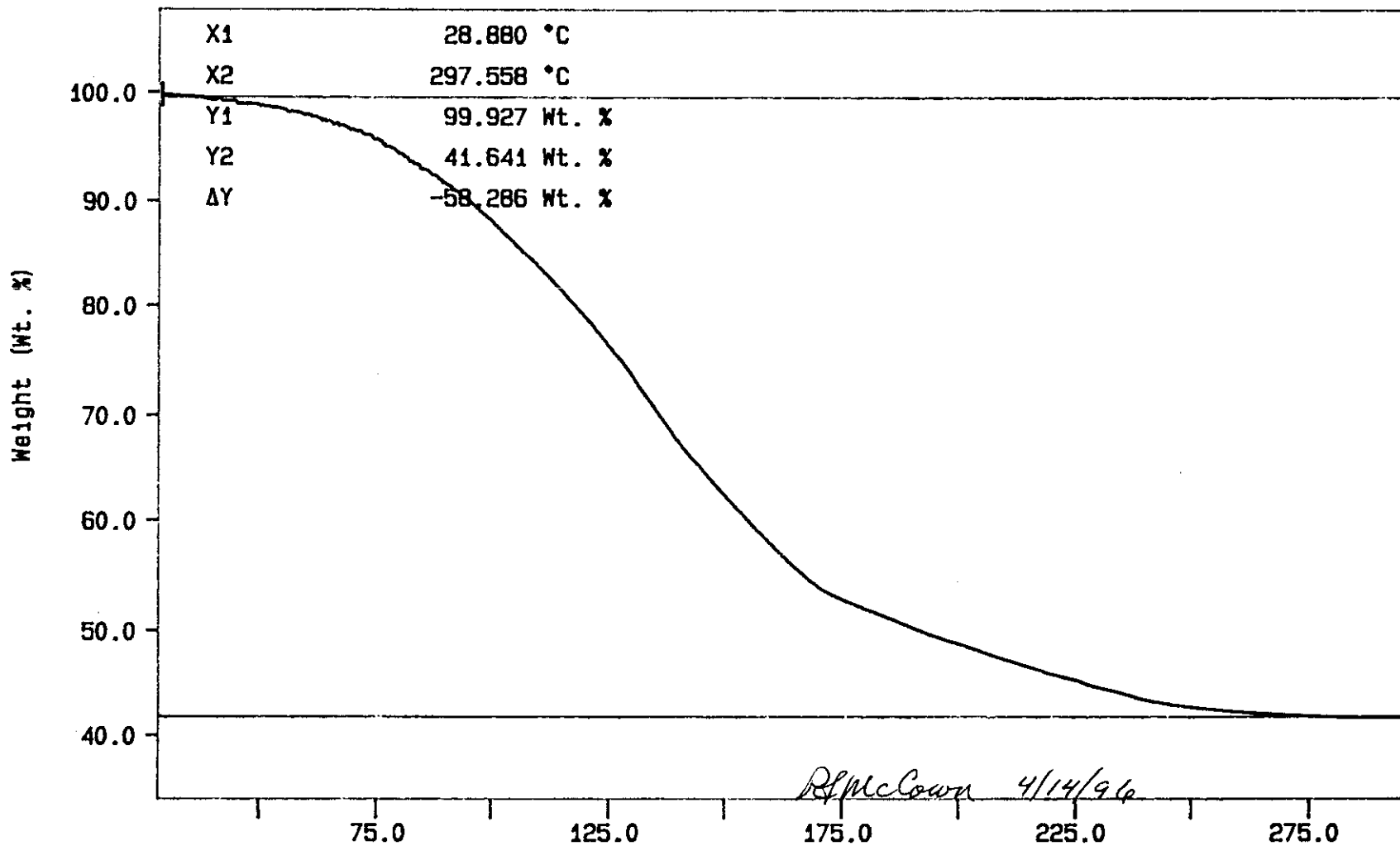
Curve 1: TGA

File info: TER041401 Sun Apr 14 19:32:44 1996

Sample Weight: 22.349 mg

TGA STD 82N8-A

SIGNATURE BELOW REPRESENTS CHEMICAL TECHNOLOGIST/CHEMIST THAT  
COMPLETED/VERIFIED THE CALIBRATION/ANALYSIS ON PAGES 2133 TO 2135



N2 10C/MIN

TEMP1: 35.0 C TIME1: 0.0 min RATE1: 10.0 C/min  
TEMP2: 300.0 C

Temperature (°C)

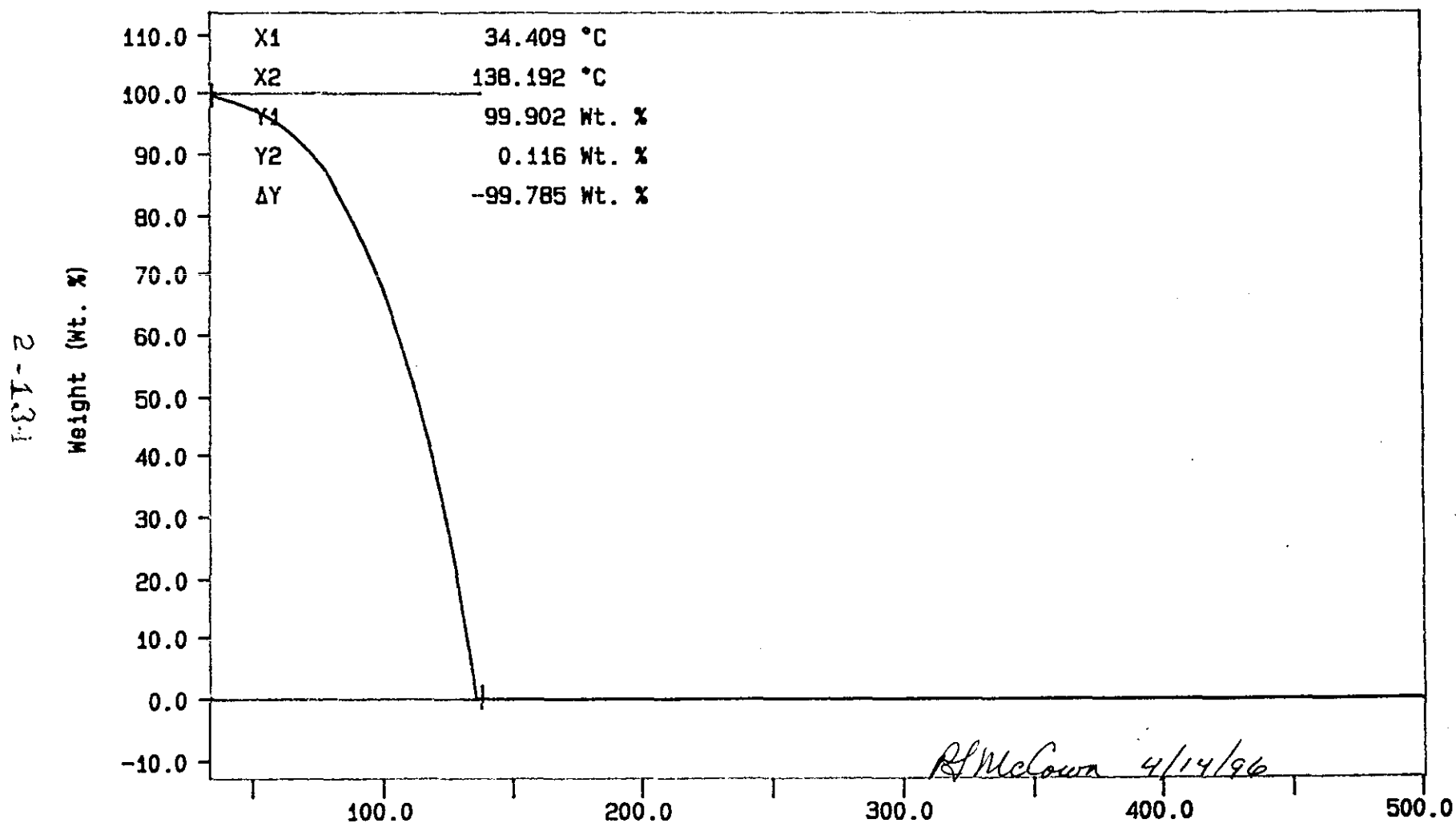
PJ MCCOWN  
PERKIN-ELMER  
7 Series Thermal Analysis System  
Sun Apr 14 19:35:23 1996

Curve 1: TGA

File info: SAM041403 Sun Apr 14 20:39:56 1996

Sample Weight: 9.726 mg

S96T001208 SAM



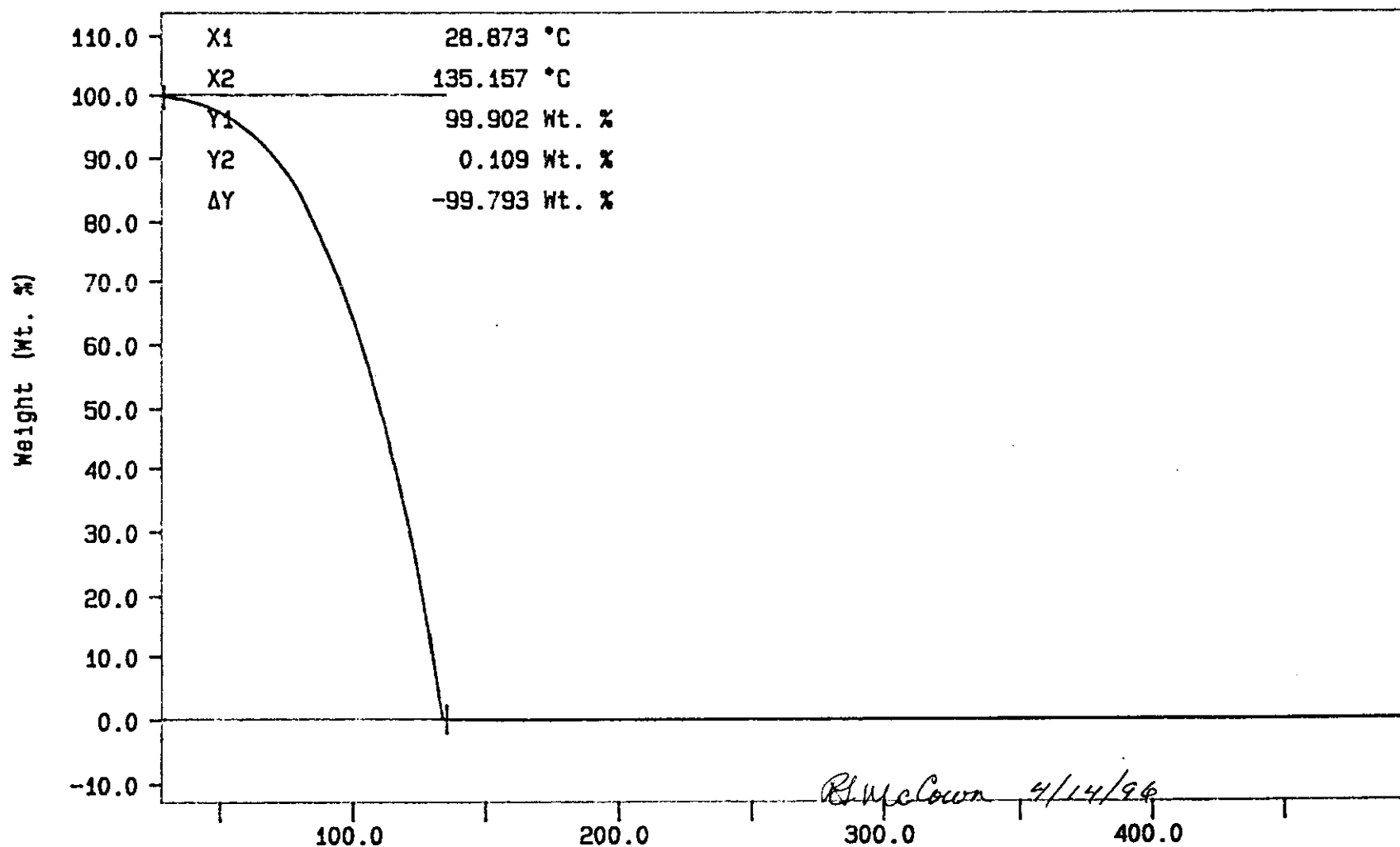
Curve 1: TGA

File info: SAM041404 Sun Apr 14 22:18:40 1996

Sample Weight: 9.647 mg

S96T001208 DUP

501-135



440C-SD-WM-DP-178, REV 1