# State of Missouri
# Department of Natural Resources

## DEQ/HWP/FFS

## STANDARD LEVEL IV
## REPORT OF ANALYSIS

## WORK ORDER #05-09118-OR

## October 18, 2005

**EBERLINE SERVICES/OAK RIDGE LABORATORY**
**OAK RIDGE, TN**

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**Eberline Services – Oak Ridge Laboratory**

**LABORATORY DATA SUPPORT CHECKLIST**
**MP-001-3**

Eberline Services Work Order # 05-09118

The checklist items listed below are to be initialed by appropriate staff upon completion/verification.

| Date for Partial | Initials | Date | Initials | Checklist Items |
|---|---|---|---|---|
| | | 9/30/05 | KAB | Sample Log-In |
| | | 10/11/05 | KBS | Data Compilation |
| | | 10/12/05 | MLT | Technical Data Review NAN 10/15/05 |
| | | 10/18/05 | DP | Data Entry/Electronic Deliverable |
| | | 10/18/05 | DP | Case Narrative |
| | | 10/18/05 | G | Electronic Deliverable Proof |
| | | 10/18/05 | G.H | Samples Analyzed within Holding Time YES |
| | | 10/18/05 | G.H | QA/QC Review |
| | | | | Invoiced by Laboratory |

| Technical/Clerical Corrections, Signatures Needed, Problems,Etc | Date/Initials |
|---|---|
| | |
| | |
| | |
| | |

Date package approved by: _____ 10/18/05

Laboratory Manager Date

# SECTION I

# CHAIN OF CUSTODY

05-09118

MISSOURI DEPARTMENT OF NATURAL RESOURCES
**FIELD SHEET AND CHAIN-OF-CUSTODY RECORD**

Collector's Name (Please Print): **Eric Gilstrap**

Affiliation (Division/Program/Section): DEQ ~~ALPD~~/HWP/FFS

**Description of Shipment**
X Shipped-Carrier: UPS
X Tape sealed and initialed
__ Hand Delivered
No. Of Containers: 4

| | Sample Number | Sample Collected | Analyses | Sample Type | For Lab Use Only: Matrix | Container | Preserved |
|---|---|---|---|---|---|---|---|
| 4 | VPBR092705SL17 | Date: 09/27/05<br>Time: 11:49 AM | Iso Th, Iso U, $Ra_{226}$<br>pH / Temp. / Spec. Cond. / D.O. / Flow / Other: | X Grab; __ Composite; __ Modified; __ Other: | __ Water; X Soil; __ Organic; __ Sludge; __ Other: | __ 1L amber; __ Cubitainer; __ 2 oz glass; __ 8 oz glass; __ VOA vial; __ Encore; X Other: | __ $H_2SO_4$; __ $HNO_3$; __ NAOH; __ HCL; X None; __ Disinfected |
| | *For Lab Use Only* | | | | | | |
| 5 | VPBR092705SL18 | Date: 09/27/05<br>Time: 11:52 AM | Iso Th, Iso U, $Ra_{226}$<br>pH / Temp. / Spec. Cond. / D.O. / Flow / Other: | X Grab; __ Composite; __ Modified; __ Other: | __ Water; X Soil; __ Organic; __ Sludge; __ Other: | __ 1L amber; __ Cubitainer; __ 2 oz glass; __ 8 oz glass; __ VOA vial; __ Encore; X Other: | __ $H_2SO_4$; __ $HNO_3$; __ NAOH; __ HCL; X None; __ Disinfected |
| | *For Lab Use Only* | | | | | | |
| 6 | VPBR092705SL19 | Date: 09/27/05<br>Time: 11:58 AM | Iso Th, Iso U, $Ra_{226}$<br>pH / Temp. / Spec. Cond. / D.O. / Flow / Other: | X Grab; __ Composite; __ Modified; __ Other: | __ Water; X Soil; __ Organic; __ Sludge; __ Other: | __ 1L amber; __ Cubitainer; __ 2 oz glass; __ 8 oz glass; __ VOA vial; __ Encore; X Other: | __ $H_2SO_4$; __ $HNO_3$; __ NAOH; __ HCL; X None; __ Disinfected |
| | *For Lab Use Only* | | | | | | |
| 7 | VPBR092705SL20 | Date: 09/27/05<br>Time: 12:03 PM | Iso Th, Iso U, $Ra_{226}$<br>pH / Temp. / Spec. Cond. / D.O. / Flow / Other: | X Grab; __ Composite; __ Modified; __ Other: | __ Water; X Soil; __ Organic; __ Sludge; __ Other: | __ 1L amber; __ Cubitainer; __ 2 oz glass; __ 8 oz glass; __ VOA vial; __ Encore; X Other: | __ $H_2SO_4$; __ $HNO_3$; __ NAOH; __ HCL; X None; __ Disinfected |
| | *For Lab Use Only* | | | | | | |

| | | | |
|---|---|---|---|
| Relinquished By: Eric Gilstrap via UPS | Received By: | Date: 9/29/05 | Time: |
| Relinquished By: UPS | Received By: JC Bannister | Date: 9/30/05 | Time: 0935 |
| Relinquished By: | Received By: | Date: | Time: |

SEP 30 2005

05-09118

MISSOURI DEPARTMENT OF NATURAL RESOURCES
**FIELD SHEET AND CHAIN-OF-CUSTODY RECORD**

Collector's Name (Please Print): **Eric Gilstrap**

Affiliation (Division/Program/Section): DEQ ~~ALPD~~/HWP/FFS

**Description of Shipment**
X Shipped-Carrier: UPS
X Tape sealed and initialed
__ Hand Delivered
No. Of Containers: 4

| | Sample Number | Sample Collected | Analyses | Sample Type | For Lab Use Only: Matrix | Container | Preserved |
|---|---|---|---|---|---|---|---|
| 8 | VPTR092805SL0A | Date: 09/28/05 Time: 7:40 AM | Iso Th, Iso U, $Ra_{226}$ | X Grab, __ Composite, __ Modified, __ Other: | __ Water, X Soil, __ Organic, __ Sludge, __ Other: | __ 1L amber, __ Cubitainer, __ 2 oz glass, __ 8 oz glass, __ VOA vial, __ Encore, X Other: | __ $H_2SO_4$, __ $HNO_3$, __ NAOH, __ HCL, X None, __ Disinfected |
| | *For Lab Use Only* | | pH \| Temp. \| Spec. Cond. \| D.O. \| Flow \| Other: | | | | |
| 9 | VPTR092805SL0B | Date: 09/28/05 Time: 7:46 AM | Iso Th, Iso U, $Ra_{226}$ | X Grab, __ Composite, __ Modified, __ Other: | __ Water, X Soil, __ Organic, __ Sludge, __ Other: | __ 1L amber, __ Cubitainer, __ 2 oz glass, __ 8 oz glass, __ VOA vial, __ Encore, X Other: | __ $H_2SO_4$, __ $HNO_3$, __ NAOH, __ HCL, X None, __ Disinfected |
| | *For Lab Use Only* | | pH \| Temp. \| Spec. Cond. \| D.O. \| Flow \| Other: | | | | |
| 10 | VPTR092805SL0C | Date: 09/28/05 Time: 7:53 AM | Iso Th, Iso U, $Ra_{226}$ | X Grab, __ Composite, __ Modified, __ Other: | __ Water, X Soil, __ Organic, __ Sludge, __ Other: | __ 1L amber, __ Cubitainer, __ 2 oz glass, __ 8 oz glass, __ VOA vial, __ Encore, X Other: | __ $H_2SO_4$, __ $HNO_3$, __ NAOH, __ HCL, X None, __ Disinfected |
| | *For Lab Use Only* | | pH \| Temp. \| Spec. Cond. \| D.O. \| Flow \| Other: | | | | |
| 11 | VPTR092805SL0D | Date: 09/28/05 Time: 7:58 AM | Iso Th, Iso U, $Ra_{226}$ | X Grab, __ Composite, __ Modified, __ Other: | __ Water, X Soil, __ Organic, __ Sludge, __ Other: | __ 1L amber, __ Cubitainer, __ 2 oz glass, __ 8 oz glass, __ VOA vial, __ Encore, X Other: | __ $H_2SO_4$, __ $HNO_3$, __ NAOH, __ HCL, X None, __ Disinfected |
| | *For Lab Use Only* | | pH \| Temp. \| Spec. Cond. \| D.O. \| Flow \| Other: | | | | |

| | | | |
|---|---|---|---|
| Relinquished By: Eric Gilstrap via UPS | Received By: | Date: 9/29/05 | Time: |
| Relinquished By: UPS | Received By: K Bannister | Date: 9/30/05 | Time: 0935 |
| Relinquished By: | Received By: | Date: | Time: |

SEP 30 2005

05-09118

MISSOURI DEPARTMENT OF NATURAL RESOURCES
**FIELD SHEET AND CHAIN-OF-CUSTODY RECORD**

Collector's Name (Please Print): **Eric Gilstrap**

Affiliation (Division/Program/Section): DEQ ~~ALPD~~/HWP/FFS

**Description of Shipment**
X Shipped-Carrier: UPS
X Tape sealed and initialed
__ Hand Delivered
No. Of Containers: 4

| | Sample Number | Sample Collected | Analyses | Sample Type | For Lab Use Only: Matrix | Container | Preserved |
|---|---|---|---|---|---|---|---|
| 12 | VPTR092805SL0E | Date: 09/28/05 | Iso Th, Iso U, $Ra_{226}$ | X Grab | Water | 1L amber | $H_2SO_4$ |
| | | | | Composite | X Soil | Cubitainer | $HNO_3$ |
| | | | | Modified | Organic | 2 oz glass | NAOH |
| | | | | Other: | Sludge | 8 oz glass | HCL |
| | For Lab Use Only | Time: 8:03 AM | pH / Temp. / Spec. Cond. / D.O. / Flow / Other: | | Other: | VOA vial | X None |
| | | | | | | Encore | Disinfected |
| | | | | | | X Other: | |
| 13 | VPTR092805SL0F | Date: 09/28/05 | Iso Th, Iso U, $Ra_{226}$ | X Grab | Water | 1L amber | $H_2SO_4$ |
| | | | | Composite | X Soil | Cubitainer | $HNO_3$ |
| | | | | Modified | Organic | 2 oz glass | NAOH |
| | | | | Other: | Sludge | 8 oz glass | HCL |
| | For Lab Use Only | Time: 8:08 AM | pH / Temp. / Spec. Cond. / D.O. / Flow / Other: | | Other: | VOA vial | X None |
| | | | | | | Encore | Disinfected |
| | | | | | | X Other: | |
| 14 | VPTR092805SL0G | Date: 09/28/05 | Iso Th, Iso U, $Ra_{226}$ | X Grab | Water | 1L amber | $H_2SO_4$ |
| | | | | Composite | X Soil | Cubitainer | $HNO_3$ |
| | | | | Modified | Organic | 2 oz glass | NAOH |
| | | | | Other: | Sludge | 8 oz glass | HCL |
| | For Lab Use Only | Time: 8:20 AM | pH / Temp. / Spec. Cond. / D.O. / Flow / Other: | | Other: | VOA vial | X None |
| | | | | | | Encore | Disinfected |
| | | | | | | X Other: | |
| 15 | VPTR092805SL0H | Date: 09/28/05 | Iso Th, Iso U, $Ra_{226}$ | X Grab | Water | 1L amber | $H_2SO_4$ |
| | | | | Composite | X Soil | Cubitainer | $HNO_3$ |
| | | | | Modified | Organic | 2 oz glass | NAOH |
| | | | | Other: | Sludge | 8 oz glass | HCL |
| | For Lab Use Only | Time: 8:25 AM | pH / Temp. / Spec. Cond. / D.O. / Flow / Other: | | Other: | VOA vial | X None |
| | | | | | | Encore | Disinfected |
| | | | | | | X Other: | |

| Relinquished By: | Received By: | Date: | Time: |
|---|---|---|---|
| Eric Gilstrap via UPS | | 9/29/05 | |
| UPS | TG Bannister | 9/30/05 | 0935 |
| | | | |

SEP 30 2005
TMA, Eberline
OAK RIDGE LAB

05-09118

MISSOURI DEPARTMENT OF NATURAL RESOURCES
**FIELD SHEET AND CHAIN-OF-CUSTODY RECORD**

Collector's Name (Please Print): **Eric Gilstrap**

Affiliation (Division/Program/Section): DEQ ~~ALPD~~/HWP/FFS

**Description of Shipment**
X Shipped-Carrier: UPS
X Tape sealed and initialed
__ Hand Delivered
No. Of Containers: 4

| | Sample Number | Sample Collected | Analyses | Sample Type | For Lab Use Only: Matrix | Container | Preserved |
|---|---|---|---|---|---|---|---|
| 16 | VPTR092805SL0I | Date: 09/28/05 | Iso Th, Iso U, $Ra_{226}$ | X Grab | Water | 1L amber | $H_2SO_4$ |
| | | Time: | | Composite | X Soil | Cubitainer | $HNO_3$ |
| | *For Lab Use Only* | 8:36 AM | pH / Temp. / Spec. Cond. / D.O. / Flow / Other: | Modified | Organic | 2 oz glass | NAOH |
| | | | | Other: | Sludge | 8 oz glass | HCL |
| | | | | | Other: | VOA vial | X None |
| | | | | | | Encore | Disinfected |
| | | | | | | X Other: | |
| 17 | VPTR092805SL0J | Date: 09/28/05 | Iso Th, Iso U, $Ra_{226}$ | X Grab | Water | 1L amber | $H_2SO_4$ |
| | | Time: | | Composite | X Soil | Cubitainer | $HNO_3$ |
| | *For Lab Use Only* | 8:49 AM | pH / Temp. / Spec. Cond. / D.O. / Flow / Other: | Modified | Organic | 2 oz glass | NAOH |
| | | | | Other: | Sludge | 8 oz glass | HCL |
| | | | | | Other: | VOA vial | X None |
| | | | | | | Encore | Disinfected |
| | | | | | | X Other: | |
| 18 | VPTR092805SL0K | Date: 09/28/05 | Iso Th, Iso U, $Ra_{226}$ | X Grab | Water | 1L amber | $H_2SO_4$ |
| | | Time: | | Composite | X Soil | Cubitainer | $HNO_3$ |
| | *For Lab Use Only* | 8:58 AM | pH / Temp. / Spec. Cond. / D.O. / Flow / Other: | Modified | Organic | 2 oz glass | NAOH |
| | | | | Other: | Sludge | 8 oz glass | HCL |
| | | | | | Other: | VOA vial | X None |
| | | | | | | Encore | Disinfected |
| | | | | | | X Other: | |
| 19 | VPTR092805SL0L | Date: 09/28/05 | Iso Th, Iso U, $Ra_{226}$ | X Grab | Water | 1L amber | $H_2SO_4$ |
| | | Time: | | Composite | X Soil | Cubitainer | $HNO_3$ |
| | *For Lab Use Only* | 9:00 AM | pH / Temp. / Spec. Cond. / D.O. / Flow / Other: | Modified | Organic | 2 oz glass | NAOH |
| | | | | Other: | Sludge | 8 oz glass | HCL |
| | | | | | Other: | VOA vial | X None |
| | | | | | | Encore | Disinfected |
| | | | | | | X Other: | |

| | | | |
|---|---|---|---|
| Relinquished By: Eric Gilstrap via UPS | Received By: | Date: 9/29/05 | Time: |
| Relinquished By: UPS | Received By: JC Bannister | Date: 9/30/05 | Time: 0935 |
| Relinquished By: | Received By: | Date: | Time: |

SEP 30 2005
MMA/Pipeline
OAK RIDGE, TN

EBERLINE SERVICES
Oak Ridge Laboratory

# Internal Chain of Custody

| | |
|---|---|
| Work Order # | 05-09118 |
| Lab Deadline | 10/20/2005 |
| Analysis | UUISO - Level 4 |
| Sample Matrix | Soil/Solid |

| Comments | Sample Fraction | HP 210 / 270 Detector Activity | Storage Location |
|---|---|---|---|
| | 04 | 37 | H1.4 |
| | 05 | 35 | H1.4 |
| | 06 | 44 | H1.4 |
| | 07 | 43 | H1.4 |
| | 08 | 63 | H1.4 |
| | 09 | 53 | H1.4 |
| | 10 | 44 | H1.4 |
| | 11 | 41 | H1.4 |
| | 12 | 45 | H1.4 |
| | 13 | 33 | H1.4 |
| | 14 | 36 | H1.4 |
| | 15 | 42 | H1.4 |
| | 16 | 45 | H1.4 |
| | 17 | 36 | H1.4 |
| | 18 | 43 | H1.4 |
| | 19 | 44 | H1.4 |

| | Location (circle one) | | | | | Initials | Date |
|---|---|---|---|---|---|---|---|
| Received by | (Sample Storage) | (Rough Prep) | Prep | Separations | Count Room 1300 | Kenny Scallion | 9-30-05 |
| **Relinquished by** | Sample Storage | (Rough Prep) | Prep | Separations | Count Room 1315 | Kenny Scallion | 10-3-05 |
| Received by | Sample Storage | Rough Prep | (Prep) | Separations | Count Room | JR Renaud | 10/3/05 1315 |
| **Relinquished by** | Sample Storage | Rough Prep | (Prep) | Separations | Count Room | JR Renaud | 10/3/05 1420 |
| Received by | Sample Storage | Rough Prep | Prep | (Separations) | Count Room | [illegible] | 10/5/05 1450 |
| **Relinquished by** | Sample Storage | Rough Prep | Prep | (Separations) | Count Room | [illegible] | 10-7-05 0745 |
| Received by | Sample Storage | Rough Prep | Prep | Separations | (Count Room) | [illegible] | 10-7-05 0745 |
| **Relinquished by** | Sample Storage | Rough Prep | Prep | Separations | (Count Room) | [illegible] | 10-7-05 1101 |
| Received by | (Sample Storage) | Rough Prep | Prep | Separations | Count Room | | |
| **Relinquished by** | Sample Storage | Rough Prep | Prep | Separations | Count Room | | |
| Received by | Sample Storage | Rough Prep | Prep | Separations | Count Room | | |
| **Relinquished by** | Sample Storage | Rough Prep | Prep | Separations | Count Room | | |
| Received by | Sample Storage | Rough Prep | Prep | Separations | Count Room | | |
| **Relinquished by** | Sample Storage | Rough Prep | Prep | Separations | Count Room | | |

EBERLINE SERVICES
Oak Ridge Laboratory

# Internal Chain of Custody

| | |
|---|---|
| Work Order # | 05-09118 |
| Lab Deadline | 10/20/2005 |
| Analysis | ThISO - Level 4 |
| Sample Matrix | Soil/Solid |

| Comments |
|---|
| |
| |

| Sample Fraction | HP 210 / 270 Detector Activity | Storage Location |
|---|---|---|
| 04 | 37 | H1.4 |
| 05 | 35 | H1.4 |
| 06 | 44 | H1.4 |
| 07 | 43 | H1.4 |
| 08 | 63 | H1.4 |
| 09 | 53 | H1.4 |
| 10 | 44 | H1.4 |
| 11 | 41 | H1.4 |
| 12 | 45 | H1.4 |
| 13 | 33 | H1.4 |
| 14 | 36 | H1.4 |
| 15 | 42 | H1.4 |
| 16 | 45 | H1.4 |
| 17 | 36 | H1.4 |
| 18 | 43 | H1.4 |
| 19 | 44 | H1.4 |
| | | |

| | Location (circle one) | | | | | Initials | Date |
|---|---|---|---|---|---|---|---|
| Received by | (Sample Storage) | (Rough Prep) | Prep | Separations | Count Room 1300 | Kenny Sellers | 9-30-05 |
| **Relinquished by** | Sample Storage | (Rough Prep) | Prep | Separations | Count Room 1315 | Kenny Sellers | 10-3-05 |
| Received by | Sample Storage | Rough Prep | (Prep) | Separations | Count Room | [illegible] | 10/3/05 1315 |
| **Relinquished by** | Sample Storage | Rough Prep | (Prep) | Separations | Count Room | [illegible] | 10/6/05 1050 |
| Received by | Sample Storage | Rough Prep | Prep | (Separations) | Count Room | [illegible] | 10/6/05 1050 |
| **Relinquished by** | Sample Storage | Rough Prep | Prep | (Separations) | Count Room | [illegible] | 10/11-05 0700 |
| Received by | Sample Storage | Rough Prep | Prep | Separations | (Count Room) | E Price | 10-11-05 0700 |
| **Relinquished by** | Sample Storage | Rough Prep | Prep | Separations | (Count Room) | E Price | 10-11-05 1105 |
| Received by | (Sample Storage) | Rough Prep | Prep | Separations | Count Room | | |
| **Relinquished by** | Sample Storage | Rough Prep | Prep | Separations | Count Room | | |
| Received by | Sample Storage | Rough Prep | Prep | Separations | Count Room | | |
| **Relinquished by** | Sample Storage | Rough Prep | Prep | Separations | Count Room | | |
| Received by | Sample Storage | Rough Prep | Prep | Separations | Count Room | | |
| **Relinquished by** | Sample Storage | Rough Prep | Prep | Separations | Count Room | | |

EBERLINE SERVICES
Oak Ridge Laboratory

# Internal Chain of Custody

| | |
|---|---|
| Work Order # | 05-09118 |
| Lab Deadline | 10/20/2005 |
| Analysis | Ra226 - Level 4 |
| Sample Matrix | Soil/Solid |

| Comments | Sample Fraction | HP 210 / 270 Detector Activity | Storage Location |
|---|---|---|---|
| | 04 | 37 | H1.4 |
| | 05 | 35 | H1.4 |
| | 06 | 44 | H1.4 |
| | 07 | 43 | H1.4 |
| | 08 | 63 | H1.4 |
| | 09 | 53 | H1.4 |
| | 10 | 44 | H1.4 |
| | 11 | 41 | H1.4 |
| | 12 | 45 | H1.4 |
| | 13 | 33 | H1.4 |
| | 14 | 36 | H1.4 |
| | 15 | 42 | H1.4 |
| | 16 | 45 | H1.4 |
| | 17 | 36 | H1.4 |
| | 18 | 43 | H1.4 |
| | 19 | 44 | H1.4 |

| | Location (circle one) | | | | | Initials | Date |
|---|---|---|---|---|---|---|---|
| Received by | (Sample Storage) | (Rough Prep) | Prep | Separations | Count Room 1300 | Kenny Sallee | 9-30-05 |
| **Relinquished by** | Sample Storage | (Rough Prep) | Prep | Separations | Count Room 1315 | Kenny Sallee | 10-3-05 |
| Received by | Sample Storage | Rough Prep | (Prep) | Separations | Count Room | Bernard | 10/3/05 1315 |
| **Relinquished by** | Sample Storage | Rough Prep | (Prep) | Separations | Count Room | Bernard | 10/6/05 0930 |
| Received by | Sample Storage | Rough Prep | Prep | (Separations) | Count Room 0930 | | 10/6/05 |
| **Relinquished by** | Sample Storage | Rough Prep | Prep | (Separations) | Count Room 1235 | | 10/6/05 |
| Received by | Sample Storage | Rough Prep | Prep | Separations | (Count Room) | | 10.6.05 1236 |
| **Relinquished by** | Sample Storage | Rough Prep | Prep | Separations | (Count Room) | | 10-7-05 0935 |
| Received by | (Sample Storage) | Rough Prep | Prep | Separations | Count Room | | |
| **Relinquished by** | Sample Storage | Rough Prep | Prep | Separations | Count Room | | |
| Received by | Sample Storage | Rough Prep | Prep | Separations | Count Room | | |
| **Relinquished by** | Sample Storage | Rough Prep | Prep | Separations | Count Room | | |
| Received by | Sample Storage | Rough Prep | Prep | Separations | Count Room | | |
| **Relinquished by** | Sample Storage | Rough Prep | Prep | Separations | Count Room | | |

## SECTION II

## SAMPLE ACKNOWLEDGEMENT

| Client Name | Contract/PO | Project Type | Date Received | Required Turnaround Days | Eberline Services Work Order |
|---|---|---|---|---|---|
| Missouri Dept. of Natural Resources | C302092001 | Environmental | 09/30/2005 | 28 | 05-09118 |
| **Project Name** | **Client WO** | **Sample Disp** | **Lab Deadline** | **Internal Deadline** | **Client Deadline** |
| B3Z02092 | DEQ/HWP/FFS | R | 10/20/2005 | 10/26/2005 | 10/27/2005 |

| Internal ID | Client ID | Sample Date | Matrix | Storage | Ra226 | ThISO | UUISO | | | | | | | | | | | | | | | | | | | | | Ttl |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 01 | LCS | 09/30/05 | SO | H1.4 | X | X | X | | | | | | | | | | | | | | | | | | | | | 3 |
| 02 | BLANK | 09/30/05 | SO | H1.4 | X | X | X | | | | | | | | | | | | | | | | | | | | | 3 |
| 03 | DUP | 09/30/05 | SO | H1.4 | X | X | X | | | | | | | | | | | | | | | | | | | | | 3 |
| 04 | VPBR092705SL17 | 09/27/05 11:49 | SO | H1.4 | X | X | X | | | | | | | | | | | | | | | | | | | | | 3 |
| 05 | VPBR092705SL18 | 09/27/05 11:52 | SO | H1.4 | X | X | X | | | | | | | | | | | | | | | | | | | | | 3 |
| 06 | VPBR092705SL19 | 09/27/05 11:58 | SO | H1.4 | X | X | X | | | | | | | | | | | | | | | | | | | | | 3 |
| 07 | VPBR092705SL20 | 09/27/05 12:03 | SO | H1.4 | X | X | X | | | | | | | | | | | | | | | | | | | | | 3 |
| 08 | VPTR092805SL0A | 09/28/05 07:40 | SO | H1.4 | X | X | X | | | | | | | | | | | | | | | | | | | | | 3 |
| 09 | VPTR092805SL0B | 09/28/05 07:46 | SO | H1.4 | X | X | X | | | | | | | | | | | | | | | | | | | | | 3 |
| 10 | VPTR092805SL0C | 09/28/05 07:53 | SO | H1.4 | X | X | X | | | | | | | | | | | | | | | | | | | | | 3 |
| 11 | VPTR092805SL0D | 09/28/05 07:58 | SO | H1.4 | X | X | X | | | | | | | | | | | | | | | | | | | | | 3 |
| 12 | VPTR092805SL0E | 09/28/05 08:03 | SO | H1.4 | X | X | X | | | | | | | | | | | | | | | | | | | | | 3 |
| 13 | VPTR092805SL0F | 09/28/05 08:08 | SO | H1.4 | X | X | X | | | | | | | | | | | | | | | | | | | | | 3 |
| 14 | VPTR092805SL0G | 09/28/05 08:20 | SO | H1.4 | X | X | X | | | | | | | | | | | | | | | | | | | | | 3 |
| 15 | VPTR092805SL0H | 09/28/05 08:25 | SO | H1.4 | X | X | X | | | | | | | | | | | | | | | | | | | | | 3 |
| 16 | VPTR092805SL0I | 09/28/05 08:36 | SO | H1.4 | X | X | X | | | | | | | | | | | | | | | | | | | | | 3 |
| 17 | VPTR092805SL0J | 09/28/05 08:49 | SO | H1.4 | X | X | X | | | | | | | | | | | | | | | | | | | | | 3 |
| 18 | VPTR092805SL0K | 09/28/05 08:58 | SO | H1.4 | X | X | X | | | | | | | | | | | | | | | | | | | | | 3 |
| 19 | VPTR092805SL0L | 09/28/05 09:00 | SO | H1.4 | X | X | X | | | | | | | | | | | | | | | | | | | | | 3 |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | 0 |
| | | Totals Per Analysis (non QA samples) | | | 16 | 16 | 16 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |

EBERLINE SERVICES

Sample Log In Report

013


Oak Ridge Laboratory
601 Scarboro Rd.
Oak Ridge, TN 37830

Voice: (865) 481-0683
Fax: (865) 483-4621


| Invoice | |
|---|---|
| | Accounts Payable |
| | Missouri Dept. of Natural Resources |
| | 917 Hwy 67 North #104 |
| | Florissant, MO 63031 |
| Voice | 314-877-3252 |
| Fax | 314-877-3254 |

| Contact | |
|---|---|
| | Steve Lang |
| Voice | 314-877-3252 |
| Fax | 314-877-3254 |

| Report Data | |
|---|---|
| | Steve Lang |
| | Missouri Dept. of Natural Resources |
| | 917 Hwy. 67 North #104 |
| | Florissant, MO 63031 |
| *Voice* | 314-877-3252 |
| *Fax* | 314-877-3254 |

Printed: 9/30/2005 11:09 AM

**Eberline Services – Oak Ridge Laboratory**

**SAMPLE RECEIPT CHECKLIST**

**MP-001-2**

WORK ORDER # 05-09118

SAMPLE MATRIX/MATRICES: (CIRCLE ONE OR BOTH)

AQUEOUS (NON-AQUEOUS)

(CIRCLE EITHER YES, NO, OR N/A)

WERE SAMPLES:

| | | | | |
|---|---|---|---|---|
| Received in good condition? | (Y) | OR | N | |
| If aqueous, properly preserved | Y | OR | N | (N/A) |

WERE CHAIN OF CUSTODY SEALS:

| | | | |
|---|---|---|---|
| Present on outside of package? | (Y) | OR | N |
| Unbroken on outside of package? | (Y) | OR | N |
| Present on samples? | (Y) | OR | N |
| Unbroken on samples? | (Y) | OR | N |

Was chain of custody present upon sample receipt? Yes

IF ANY OF THE ABOVE ARE CIRCLED, A DISCREPANT SAMPLE RECEIPT REPORT (DSR) HAS BEEN ISSUED.

REMARKS: _____

SIGNATURE: JGBannister DATE: 9/30/05

05-09118

Electronic copy
of letterhead

STATE OF MISSOURI Matt Blunt, Governor • Doyle Childers, Director

# DEPARTMENT OF NATURAL RESOURCES

www.dnr.mo.gov

September 29, 2005

Ms. Kathy Shaulis
Eberline Services
601 Scarboro Rd.
Oak Ridge, TN 37830

Dear Ms. Shaulis:

Accompanying this letter are 43 soil samples (VPBR092705SL01, VPBR092705SL02, VPBR092705SL03, VPBR092705SL04, VPBR092705SL05, VPBR092705SL06, VPBR092705SL07, VPBR092705SL08, VPBR092705SL09, VPBR092705SL10, VPBR092705SL11, VPBR092705SL12, VPBR092705SL13, VPBR092705SL14, VPBR092705SL15, VPBR092705SL16, VPBR092705SL17, VPBR092705SL18, VPBR092705SL19, VPBR092705SL20, VPTR092805SL0A, VPTR092805SL0B, VPTR092805SL0C, VPTR092805SL0D, VPTR092805SL0E, VPTR092805SL0F, VPTR092805SL0G, VPTR092805SL0H, VPTR092805SL0I, VPTR092805SL0J, VPTR092805SL0K, VPTR092805SL0L, VPTR092805SL0M, VPTR092805SL0N, VPTR092805SL0P, VPTR092805SL0Q, VPTR092805SL0R, VPTR092805SL0S, VPTR092805SL0T, VPMR092805SL*, VPSR092805SL**, and VPSR092805SL***) that pertain to the FUSRAP St. Louis project and were obtained on September 27 and September 28, 2005 from the shoulders and drainage ditches bordering Boenker, Taussig, Mallinckrodt, and Salisbury Roads at the locations listed on the enclosed chain-of-custody records. We are requesting analysis for the following parameters:

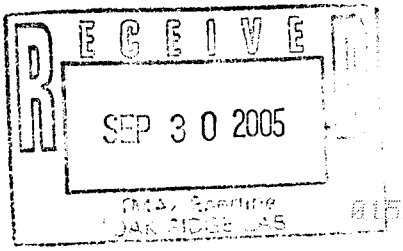
Isotopic Thorium (Th-228, 230, 232), Isotopic Uranium (U-234, 235, 238), and Radium-226

**Please fax us confirmation of having received these samples.** This will help us complete our documentation needed to comply with our FY05 funding agreements. You can contact me at (314)877-3250, if you have any questions.

Sincerely,
HAZARDOUS WASTE PROGRAM
Eric Gilstrap
Eric Gilstrap, P.E.
Environmental Engineer

cc: Darrick Steen, Environmental Engineer
Jo Anne Wade, Environmental Specialist
Steve Lang, Environmental Engineer

Attachments: Chain-of-custody records.




Recycled Paper

# SECTION III

# CASE NARRATIVE

EBERLINE SERVICES

Oak Ridge Laboratory
601 Scarboro Road
Oak Ridge, TN 37830
Phone (865) 481-0683
Fax (865) 483-4621

EBS-OR-23102

October 18, 2005

Steve Lang
Missouri Dept. of Natural Resources
St. Louis Field Office
917 Hwy 67 N #104
Florissant, MO 63031

# CASE NARRATIVE
Work Order# 05-09118-OR

## SAMPLE RECEIPT

This work order contains sixteen soil samples received 9/30/2005. These samples were analyzed for Radium-226, Isotopic Thorium and Isotopic Uranium.

| CLIENT ID | LAB ID | CLIENT ID | LAB ID |
|---|---|---|---|
| VPBR092705SL17 | 05-09118-04 | VPTR092805SL0E | 05-09118-12 |
| VPBR092705SL18 | 05-09118-05 | VPTR092805SL0F | 05-09118-13 |
| VPBR092705SL19 | 05-09118-06 | VPTR092805SL0G | 05-09118-14 |
| VPBR092705SL20 | 05-09118-07 | VPTR092805SL0H | 05-09118-15 |
| VPTR092805SL0A | 05-09118-08 | VPTR092805SL0I | 05-09118-16 |
| VPTR092805SL0B | 05-09118-09 | VPTR092805SL0J | 05-09118-17 |
| VPTR092805SL0C | 05-09118-10 | VPTR092805SL0K | 05-09118-18 |
| VPTR092805SL0D | 05-09118-11 | VPTR092805SL0L | 05-09118-19 |

The file name for these samples is 0509118.xls.

## ANALYTICAL METHODS

Radium-226 was analyzed using EPA Method 903.0 Modified. Isotopic Thorium was analyzed using Method EML Th-01 Modified. Isotopic Uranium was analyzed using Method EML U-02 Modified.

## ANALYTICAL RESULTS

### ISOTOPIC URANIUM

Samples were prepared by removing a representative aliquot from each sample followed by mixed acid digestions as appropriate. Uranium was selectively extracted by ion exchange. Uranium was eluted, micro-precipitated and mounted on micro-porous filter media. Sample activities were then determined by alpha spectroscopy using energy specific regions of interest for Uranium-234, Uranium-235 and Uranium-238. Chemical recovery was determined by the use of a Uranium-232 tracer. Activity of the Uranium-232 tracer was determined by alpha spectroscopy using an energy specific region of interest.

ANALYTICAL RESULTS CONTINUED

ISOTOPIC URANIUM continued

Samples demonstrated near background equivalent to only slightly positive results for Uranium-234, Uranium-235 and Uranium-238 activity. Chemical recovery was acceptable for all samples. Results for the Uranium-234, Uranium-235 and Uranium-238 method blank demonstrated background equivalent activity. Results for the Uranium-234, Uranium-235 and Uranium-238 replicate demonstrated an acceptable relative percent difference and normalized difference. Results for the Uranium-234 and Uranium-238 laboratory control sample demonstrated an acceptable percent recovery. Results for the Uranium-235 laboratory control sample demonstrated a high percent recovery; however, normalized difference is within acceptable limits for the analytical technique.

ISOTOPIC THORIUM

Samples were prepared by removing a representative aliquot from each sample followed by mixed acid digestions as appropriate. Thorium was selectively extracted by ion exchange. Thorium was eluted, micro-precipitated and mounted on micro-porous filter media. Sample activities were then determined by alpha spectroscopy using energy specific regions of interest for Thorium-228, Thorium-230 and Thorium-232. Chemical recovery was determined by the use of a Thorium-229 tracer. Activity of the Thorium-229 tracer was determined by alpha spectroscopy using an energy specific region of interest.

Samples demonstrated near background equivalent to only slightly positive results for Thorium-228, Thorium-230 and Thorium-232 activity. Chemical recovery was acceptable for all samples. Results for the Thorium-228, Thorium-230 and Thorium-232 method blank demonstrated background equivalent activity. Results for the Thorium-228, Thorium-230 and Thorium-232 replicate demonstrated an acceptable relative percent difference and normalized difference. Results for the Thorium-228, Thorium-230 and Thorium-232 laboratory control sample demonstrated an acceptable percent recovery.

RADIUM-226

Samples were prepared by drying, pulverizing and homogenization. Representative aliquots of samples were removed and digested using mixed acids. Radium-226 was precipitated as Radium sulfate using elemental Barium and Lead as carriers. Sulfates were dissolved in alkaline EDTA. Radium-226 was selectively precipitated from slightly acidic EDTA. Precipitates were then mounted by semi-micro-precipitation onto micro-porous filters. The samples were counted by alpha spectroscopy using an energy specific region of interest for Radium-226. Chemical recovery was calculated by the use of a Barium-133 tracer, which was determined by HPGe gamma spectroscopy.

Samples demonstrated near background equivalent to only slightly positive results for Radium-226 activity. Chemical recovery was acceptable for all samples. Results for the Radium-226 method blank demonstrated background equivalent activity. Results for the Radium-226 replicate demonstrated an acceptable relative percent difference and normalized difference. Results for the Radium-226 laboratory control sample demonstrated an acceptable percent recovery

CERTIFICATION OF ACCURACY

I certify that this data report is in compliance with the terms and conditions of the Purchase Order, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hard copy data package has been authorized by the cognizant project manager or his/her designee to be accurate as verified by the following signature.

M.R. McDougall
Laboratory Manager

Date: 10/18/2005

# SECTION IV

# ANALYTICAL RESULTS SUMMARY

Steve Lang
Miss. Dept. of Nat. Resources
917 N. Hwy 67 #104
Florissant, MO 63031

Affiliation: DEQ/HWP/FFS
SDG: 0509118
Matrix: Soil

Final Report of Analysis
Date Reported: 10/18/2005


| Client ID | Lab ID | Date Analyzed | Analyte | Method | Result | Error | MDA | Unit | Qualifer |
|---|---|---|---|---|---|---|---|---|---|
| KNOWN | 0509118-01 | 10/07/05 | Radium-226 | EPA 903.0 Modified | 10.44 | 0.48 | 0.26 | pCi/g | |
| KNOWN | 0509118-01 | 10/11/05 | Thorium-228 | EML Th-01 Modified | 4.75 | 0.17 | 0.09 | pCi/g | |
| KNOWN | 0509118-01 | 10/11/05 | Thorium-230 | EML Th-01 Modified | 5.33 | 0.14 | 0.09 | pCi/g | |
| KNOWN | 0509118-01 | 10/11/05 | Thorium-232 | EML Th-01 Modified | 4.75 | 0.17 | 0.07 | pCi/g | |
| KNOWN | 0509118-01 | 10/07/05 | Uranium-234 | EML U-02 Modified | 8.00 | 0.29 | 0.07 | pCi/g | |
| KNOWN | 0509118-01 | 10/07/05 | Uranium-235 | EML U-02 Modified | 0.36 | 0.01 | 0.05 | pCi/g | |
| KNOWN | 0509118-01 | 10/07/05 | Uranium-238 | EML U-02 Modified | 7.80 | 0.28 | 0.07 | pCi/g | |
| SPIKE | 0509118-01 | 10/07/05 | Radium-226 | EPA 903.0 Modified | 11.64 | 1.43 | 0.26 | pCi/g | |
| SPIKE | 0509118-01 | 10/11/05 | Thorium-228 | EML Th-01 Modified | 4.41 | 0.83 | 0.09 | pCi/g | |
| SPIKE | 0509118-01 | 10/11/05 | Thorium-230 | EML Th-01 Modified | 5.18 | 0.95 | 0.09 | pCi/g | |
| SPIKE | 0509118-01 | 10/11/05 | Thorium-232 | EML Th-01 Modified | 4.21 | 0.80 | 0.07 | pCi/g | |
| SPIKE | 0509118-01 | 10/07/05 | Uranium-234 | EML U-02 Modified | 7.61 | 1.33 | 0.07 | pCi/g | |
| SPIKE | 0509118-01 | 10/07/05 | Uranium-235 | EML U-02 Modified | 0.48 | 0.20 | 0.05 | pCi/g | |
| SPIKE | 0509118-01 | 10/07/05 | Uranium-238 | EML U-02 Modified | 8.15 | 1.41 | 0.07 | pCi/g | |
| BLANK | 0509118-02 | 10/07/05 | Radium-226 | EPA 903.0 Modified | 0.08 | 0.12 | 0.29 | pCi/g | U |
| BLANK | 0509118-02 | 10/11/05 | Thorium-228 | EML Th-01 Modified | 0.04 | 0.05 | 0.09 | pCi/g | U |
| BLANK | 0509118-02 | 10/11/05 | Thorium-230 | EML Th-01 Modified | 0.26 | 0.13 | 0.09 | pCi/g | |
| BLANK | 0509118-02 | 10/11/05 | Thorium-232 | EML Th-01 Modified | 0.10 | 0.08 | 0.07 | pCi/g | J |
| BLANK | 0509118-02 | 10/07/05 | Uranium-234 | EML U-02 Modified | 0.07 | 0.07 | 0.12 | pCi/g | U |
| BLANK | 0509118-02 | 10/07/05 | Uranium-235 | EML U-02 Modified | 0.05 | 0.06 | 0.08 | pCi/g | U |
| BLANK | 0509118-02 | 10/07/05 | Uranium-238 | EML U-02 Modified | 0.04 | 0.06 | 0.11 | pCi/g | U |
| VPBR092705SL17 DUP | 0509118-03 | 10/07/05 | Radium-226 | EPA 903.0 Modified | 1.53 | 0.44 | 0.28 | pCi/g | |
| VPBR092705SL17 DUP | 0509118-03 | 10/11/05 | Thorium-228 | EML Th-01 Modified | 1.09 | 0.29 | 0.09 | pCi/g | |
| VPBR092705SL17 DUP | 0509118-03 | 10/11/05 | Thorium-230 | EML Th-01 Modified | 1.95 | 0.43 | 0.09 | pCi/g | |
| VPBR092705SL17 DUP | 0509118-03 | 10/11/05 | Thorium-232 | EML Th-01 Modified | 1.19 | 0.31 | 0.06 | pCi/g | |
| VPBR092705SL17 DUP | 0509118-03 | 10/07/05 | Uranium-234 | EML U-02 Modified | 0.87 | 0.26 | 0.08 | pCi/g | |
| VPBR092705SL17 DUP | 0509118-03 | 10/07/05 | Uranium-235 | EML U-02 Modified | 0.05 | 0.06 | 0.05 | pCi/g | U |
| VPBR092705SL17 DUP | 0509118-03 | 10/07/05 | Uranium-238 | EML U-02 Modified | 0.76 | 0.24 | 0.08 | pCi/g | |

Steve Lang
Miss. Dept. of Nat. Resources
917 N. Hwy 67 #104
Florissant, MO 63031

Affiliation: DEQ/HWP/FFS
SDG: 0509118
Matrix: Soil



| Client ID | Lab ID | Date Analyzed | Analyte | Method | Result | Error | MDA | Unit | Qualifer |
|---|---|---|---|---|---|---|---|---|---|
| VPBR092705SL17 | 0509118-04 | 10/07/05 | Radium-226 | EPA 903.0 Modified | 1.67 | 0.44 | 0.18 | pCi/g | |
| VPBR092705SL17 | 0509118-04 | 10/11/05 | Thorium-228 | EML Th-01 Modified | 1.04 | 0.28 | 0.10 | pCi/g | |
| VPBR092705SL17 | 0509118-04 | 10/11/05 | Thorium-230 | EML Th-01 Modified | 1.82 | 0.42 | 0.09 | pCi/g | |
| VPBR092705SL17 | 0509118-04 | 10/11/05 | Thorium-232 | EML Th-01 Modified | 1.06 | 0.29 | 0.10 | pCi/g | |
| VPBR092705SL17 | 0509118-04 | 10/07/05 | Uranium-234 | EML U-02 Modified | 1.05 | 0.29 | 0.10 | pCi/g | |
| VPBR092705SL17 | 0509118-04 | 10/07/05 | Uranium-235 | EML U-02 Modified | 0.05 | 0.06 | 0.08 | pCi/g | U |
| VPBR092705SL17 | 0509118-04 | 10/07/05 | Uranium-238 | EML U-02 Modified | 0.93 | 0.27 | 0.08 | pCi/g | |
| VPBR092705SL18 | 0509118-05 | 10/07/05 | Radium-226 | EPA 903.0 Modified | 1.67 | 0.50 | 0.21 | pCi/g | |
| VPBR092705SL18 | 0509118-05 | 10/11/05 | Thorium-228 | EML Th-01 Modified | 1.32 | 0.34 | 0.10 | pCi/g | |
| VPBR092705SL18 | 0509118-05 | 10/11/05 | Thorium-230 | EML Th-01 Modified | 1.37 | 0.35 | 0.10 | pCi/g | |
| VPBR092705SL18 | 0509118-05 | 10/11/05 | Thorium-232 | EML Th-01 Modified | 1.28 | 0.33 | 0.06 | pCi/g | |
| VPBR092705SL18 | 0509118-05 | 10/07/05 | Uranium-234 | EML U-02 Modified | 1.06 | 0.27 | 0.08 | pCi/g | |
| VPBR092705SL18 | 0509118-05 | 10/07/05 | Uranium-235 | EML U-02 Modified | 0.09 | 0.07 | 0.04 | pCi/g | J |
| VPBR092705SL18 | 0509118-05 | 10/07/05 | Uranium-238 | EML U-02 Modified | 1.05 | 0.26 | 0.05 | pCi/g | |
| VPBR092705SL19 | 0509118-06 | 10/07/05 | Radium-226 | EPA 903.0 Modified | 1.79 | 0.50 | 0.21 | pCi/g | |
| VPBR092705SL19 | 0509118-06 | 10/11/05 | Thorium-228 | EML Th-01 Modified | 0.81 | 0.24 | 0.08 | pCi/g | |
| VPBR092705SL19 | 0509118-06 | 10/11/05 | Thorium-230 | EML Th-01 Modified | 2.43 | 0.52 | 0.07 | pCi/g | |
| VPBR092705SL19 | 0509118-06 | 10/11/05 | Thorium-232 | EML Th-01 Modified | 0.61 | 0.20 | 0.09 | pCi/g | |
| VPBR092705SL19 | 0509118-06 | 10/07/05 | Uranium-234 | EML U-02 Modified | 1.10 | 0.30 | 0.10 | pCi/g | |
| VPBR092705SL19 | 0509118-06 | 10/07/05 | Uranium-235 | EML U-02 Modified | 0.06 | 0.07 | 0.08 | pCi/g | U |
| VPBR092705SL19 | 0509118-06 | 10/07/05 | Uranium-238 | EML U-02 Modified | 0.72 | 0.23 | 0.11 | pCi/g | |
| VPBR092705SL20 | 0509118-07 | 10/07/05 | Radium-226 | EPA 903.0 Modified | 1.66 | 0.49 | 0.22 | pCi/g | |
| VPBR092705SL20 | 0509118-07 | 10/11/05 | Thorium-228 | EML Th-01 Modified | 1.07 | 0.30 | 0.09 | pCi/g | |
| VPBR092705SL20 | 0509118-07 | 10/11/05 | Thorium-230 | EML Th-01 Modified | 1.68 | 0.41 | 0.08 | pCi/g | |
| VPBR092705SL20 | 0509118-07 | 10/11/05 | Thorium-232 | EML Th-01 Modified | 1.34 | 0.35 | 0.04 | pCi/g | |
| VPBR092705SL20 | 0509118-07 | 10/07/05 | Uranium-234 | EML U-02 Modified | 1.34 | 0.33 | 0.09 | pCi/g | |
| VPBR092705SL20 | 0509118-07 | 10/07/05 | Uranium-235 | EML U-02 Modified | 0.12 | 0.09 | 0.10 | pCi/g | J |
| VPBR092705SL20 | 0509118-07 | 10/07/05 | Uranium-238 | EML U-02 Modified | 1.08 | 0.29 | 0.06 | pCi/g | |



EBERLINE SERVICES
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601 Scarboro Road, Oak Ridge, TN 37830 865/481-0683 FAX 865/483-4621

Steve Lang
Miss. Dept. of Nat. Resources
917 N. Hwy 67 #104
Florissant, MO 63031

Affiliation: DEQ/HWP/FFS
SDG: 0509118
Matrix: Soil



| Client ID | Lab ID | Date Analyzed | Analyte | Method | Result | Error | MDA | Unit | Qualifer |
|---|---|---|---|---|---|---|---|---|---|
| VPTR092805SL0A | 0509118-08 | 10/07/05 | Radium-226 | EPA 903.0 Modified | 1.99 | 0.53 | 0.23 | pCi/g | |
| VPTR092805SL0A | 0509118-08 | 10/11/05 | Thorium-228 | EML Th-01 Modified | 0.96 | 0.27 | 0.10 | pCi/g | |
| VPTR092805SL0A | 0509118-08 | 10/11/05 | Thorium-230 | EML Th-01 Modified | 1.78 | 0.42 | 0.06 | pCi/g | |
| VPTR092805SL0A | 0509118-08 | 10/11/05 | Thorium-232 | EML Th-01 Modified | 1.22 | 0.32 | 0.08 | pCi/g | |
| VPTR092805SL0A | 0509118-08 | 10/07/05 | Uranium-234 | EML U-02 Modified | 0.83 | 0.25 | 0.10 | pCi/g | |
| VPTR092805SL0A | 0509118-08 | 10/07/05 | Uranium-235 | EML U-02 Modified | 0.03 | 0.05 | 0.08 | pCi/g | U |
| VPTR092805SL0A | 0509118-08 | 10/07/05 | Uranium-238 | EML U-02 Modified | 1.02 | 0.28 | 0.09 | pCi/g | |
| VPTR092805SL0B | 0509118-09 | 10/07/05 | Radium-226 | EPA 903.0 Modified | 1.69 | 0.47 | 0.14 | pCi/g | |
| VPTR092805SL0B | 0509118-09 | 10/11/05 | Thorium-228 | EML Th-01 Modified | 1.22 | 0.31 | 0.07 | pCi/g | |
| VPTR092805SL0B | 0509118-09 | 10/11/05 | Thorium-230 | EML Th-01 Modified | 2.39 | 0.50 | 0.09 | pCi/g | |
| VPTR092805SL0B | 0509118-09 | 10/11/05 | Thorium-232 | EML Th-01 Modified | 1.10 | 0.29 | 0.06 | pCi/g | |
| VPTR092805SL0B | 0509118-09 | 10/07/05 | Uranium-234 | EML U-02 Modified | 1.08 | 0.30 | 0.14 | pCi/g | |
| VPTR092805SL0B | 0509118-09 | 10/07/05 | Uranium-235 | EML U-02 Modified | 0.08 | 0.08 | 0.09 | pCi/g | U |
| VPTR092805SL0B | 0509118-09 | 10/07/05 | Uranium-238 | EML U-02 Modified | 0.79 | 0.24 | 0.10 | pCi/g | |
| VPTR092805SL0C | 0509118-10 | 10/07/05 | Radium-226 | EPA 903.0 Modified | 1.34 | 0.42 | 0.14 | pCi/g | |
| VPTR092805SL0C | 0509118-10 | 10/11/05 | Thorium-228 | EML Th-01 Modified | 0.57 | 0.18 | 0.05 | pCi/g | |
| VPTR092805SL0C | 0509118-10 | 10/11/05 | Thorium-230 | EML Th-01 Modified | 1.34 | 0.32 | 0.03 | pCi/g | |
| VPTR092805SL0C | 0509118-10 | 10/11/05 | Thorium-232 | EML Th-01 Modified | 0.51 | 0.17 | 0.03 | pCi/g | |
| VPTR092805SL0C | 0509118-10 | 10/07/05 | Uranium-234 | EML U-02 Modified | 0.73 | 0.23 | 0.08 | pCi/g | |
| VPTR092805SL0C | 0509118-10 | 10/07/05 | Uranium-235 | EML U-02 Modified | 0.02 | 0.05 | 0.10 | pCi/g | U |
| VPTR092805SL0C | 0509118-10 | 10/07/05 | Uranium-238 | EML U-02 Modified | 0.67 | 0.21 | 0.08 | pCi/g | |
| VPTR092805SL0D | 0509118-11 | 10/07/05 | Radium-226 | EPA 903.0 Modified | 1.23 | 0.44 | 0.29 | pCi/g | |
| VPTR092805SL0D | 0509118-11 | 10/11/05 | Thorium-228 | EML Th-01 Modified | 0.78 | 0.23 | 0.07 | pCi/g | |
| VPTR092805SL0D | 0509118-11 | 10/11/05 | Thorium-230 | EML Th-01 Modified | 2.21 | 0.48 | 0.06 | pCi/g | |
| VPTR092805SL0D | 0509118-11 | 10/11/05 | Thorium-232 | EML Th-01 Modified | 0.97 | 0.27 | 0.06 | pCi/g | |
| VPTR092805SL0D | 0509118-11 | 10/07/05 | Uranium-234 | EML U-02 Modified | 0.83 | 0.25 | 0.12 | pCi/g | |
| VPTR092805SL0D | 0509118-11 | 10/07/05 | Uranium-235 | EML U-02 Modified | 0.16 | 0.11 | 0.05 | pCi/g | |
| VPTR092805SL0D | 0509118-11 | 10/07/05 | Uranium-238 | EML U-02 Modified | 0.95 | 0.27 | 0.09 | pCi/g | |



EBERLINE SERVICES
Oak Ridge Laboratory
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Affiliation: DEQ/HWP/FFS
SDG: 0509118
Matrix: Soil



| Client ID | Lab ID | Date Analyzed | Analyte | Method | Result | Error | MDA | Unit | Qualifer |
|---|---|---|---|---|---|---|---|---|---|
| VPTR092805SL0E | 0509118-12 | 10/07/05 | Radium-226 | EPA 903.0 Modified | 1.49 | 0.44 | 0.24 | pCi/g | |
| VPTR092805SL0E | 0509118-12 | 10/11/05 | Thorium-228 | EML Th-01 Modified | 0.84 | 0.27 | 0.12 | pCi/g | |
| VPTR092805SL0E | 0509118-12 | 10/11/05 | Thorium-230 | EML Th-01 Modified | 2.31 | 0.53 | 0.09 | pCi/g | |
| VPTR092805SL0E | 0509118-12 | 10/11/05 | Thorium-232 | EML Th-01 Modified | 0.85 | 0.26 | 0.04 | pCi/g | |
| VPTR092805SL0E | 0509118-12 | 10/07/05 | Uranium-234 | EML U-02 Modified | 1.01 | 0.29 | 0.08 | pCi/g | |
| VPTR092805SL0E | 0509118-12 | 10/07/05 | Uranium-235 | EML U-02 Modified | 0.09 | 0.09 | 0.09 | pCi/g | U |
| VPTR092805SL0E | 0509118-12 | 10/07/05 | Uranium-238 | EML U-02 Modified | 1.05 | 0.30 | 0.09 | pCi/g | |
| VPTR092805SL0F | 0509118-13 | 10/07/05 | Radium-226 | EPA 903.0 Modified | 1.34 | 0.41 | 0.25 | pCi/g | |
| VPTR092805SL0F | 0509118-13 | 10/11/05 | Thorium-228 | EML Th-01 Modified | 0.87 | 0.26 | 0.13 | pCi/g | |
| VPTR092805SL0F | 0509118-13 | 10/11/05 | Thorium-230 | EML Th-01 Modified | 1.60 | 0.39 | 0.08 | pCi/g | |
| VPTR092805SL0F | 0509118-13 | 10/11/05 | Thorium-232 | EML Th-01 Modified | 0.96 | 0.28 | 0.07 | pCi/g | |
| VPTR092805SL0F | 0509118-13 | 10/07/05 | Uranium-234 | EML U-02 Modified | 0.93 | 0.26 | 0.09 | pCi/g | |
| VPTR092805SL0F | 0509118-13 | 10/07/05 | Uranium-235 | EML U-02 Modified | 0.07 | 0.07 | 0.04 | pCi/g | U |
| VPTR092805SL0F | 0509118-13 | 10/07/05 | Uranium-238 | EML U-02 Modified | 1.06 | 0.28 | 0.06 | pCi/g | |
| VPTR092805SL0G | 0509118-14 | 10/07/05 | Radium-226 | EPA 903.0 Modified | 1.27 | 0.40 | 0.23 | pCi/g | |
| VPTR092805SL0G | 0509118-14 | 10/11/05 | Thorium-228 | EML Th-01 Modified | 0.86 | 0.25 | 0.08 | pCi/g | |
| VPTR092805SL0G | 0509118-14 | 10/11/05 | Thorium-230 | EML Th-01 Modified | 1.53 | 0.37 | 0.11 | pCi/g | |
| VPTR092805SL0G | 0509118-14 | 10/11/05 | Thorium-232 | EML Th-01 Modified | 0.96 | 0.27 | 0.10 | pCi/g | |
| VPTR092805SL0G | 0509118-14 | 10/07/05 | Uranium-234 | EML U-02 Modified | 1.33 | 0.34 | 0.11 | pCi/g | |
| VPTR092805SL0G | 0509118-14 | 10/07/05 | Uranium-235 | EML U-02 Modified | 0.08 | 0.08 | 0.08 | pCi/g | U |
| VPTR092805SL0G | 0509118-14 | 10/07/05 | Uranium-238 | EML U-02 Modified | 1.12 | 0.30 | 0.08 | pCi/g | |
| VPTR092805SL0H | 0509118-15 | 10/07/05 | Radium-226 | EPA 903.0 Modified | 1.31 | 0.44 | 0.26 | pCi/g | |
| VPTR092805SL0H | 0509118-15 | 10/11/05 | Thorium-228 | EML Th-01 Modified | 1.07 | 0.30 | 0.08 | pCi/g | |
| VPTR092805SL0H | 0509118-15 | 10/11/05 | Thorium-230 | EML Th-01 Modified | 1.35 | 0.34 | 0.08 | pCi/g | |
| VPTR092805SL0H | 0509118-15 | 10/11/05 | Thorium-232 | EML Th-01 Modified | 1.11 | 0.30 | 0.07 | pCi/g | |
| VPTR092805SL0H | 0509118-15 | 10/07/05 | Uranium-234 | EML U-02 Modified | 0.78 | 0.24 | 0.10 | pCi/g | |
| VPTR092805SL0H | 0509118-15 | 10/07/05 | Uranium-235 | EML U-02 Modified | 0.08 | 0.08 | 0.08 | pCi/g | U |
| VPTR092805SL0H | 0509118-15 | 10/07/05 | Uranium-238 | EML U-02 Modified | 0.92 | 0.27 | 0.11 | pCi/g | |

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SDG: 0509118
Matrix: Soil



| Client ID | Lab ID | Date Analyzed | Analyte | Method | Result | Error | MDA | Unit | Qualifer |
|---|---|---|---|---|---|---|---|---|---|
| VPTR092805SL0I | 0509118-16 | 10/07/05 | Radium-226 | EPA 903.0 Modified | 1.91 | 0.51 | 0.25 | pCi/g | |
| VPTR092805SL0I | 0509118-16 | 10/11/05 | Thorium-228 | EML Th-01 Modified | 1.15 | 0.32 | 0.04 | pCi/g | |
| VPTR092805SL0I | 0509118-16 | 10/11/05 | Thorium-230 | EML Th-01 Modified | 1.65 | 0.42 | 0.04 | pCi/g | |
| VPTR092805SL0I | 0509118-16 | 10/11/05 | Thorium-232 | EML Th-01 Modified | 1.15 | 0.32 | 0.08 | pCi/g | |
| VPTR092805SL0I | 0509118-16 | 10/07/05 | Uranium-234 | EML U-02 Modified | 1.00 | 0.27 | 0.06 | pCi/g | |
| VPTR092805SL0I | 0509118-16 | 10/07/05 | Uranium-235 | EML U-02 Modified | 0.03 | 0.05 | 0.04 | pCi/g | U |
| VPTR092805SL0I | 0509118-16 | 10/07/05 | Uranium-238 | EML U-02 Modified | 0.93 | 0.26 | 0.06 | pCi/g | |
| VPTR092805SL0J | 0509118-17 | 10/07/05 | Radium-226 | EPA 903.0 Modified | 1.40 | 0.41 | 0.26 | pCi/g | |
| VPTR092805SL0J | 0509118-17 | 10/11/05 | Thorium-228 | EML Th-01 Modified | 1.10 | 0.31 | 0.09 | pCi/g | |
| VPTR092805SL0J | 0509118-17 | 10/11/05 | Thorium-230 | EML Th-01 Modified | 1.51 | 0.38 | 0.08 | pCi/g | |
| VPTR092805SL0J | 0509118-17 | 10/11/05 | Thorium-232 | EML Th-01 Modified | 1.19 | 0.33 | 0.10 | pCi/g | |
| VPTR092805SL0J | 0509118-17 | 10/07/05 | Uranium-234 | EML U-02 Modified | 0.89 | 0.26 | 0.11 | pCi/g | |
| VPTR092805SL0J | 0509118-17 | 10/07/05 | Uranium-235 | EML U-02 Modified | 0.01 | 0.03 | 0.08 | pCi/g | U |
| VPTR092805SL0J | 0509118-17 | 10/07/05 | Uranium-238 | EML U-02 Modified | 0.97 | 0.28 | 0.10 | pCi/g | |
| VPTR092805SL0K | 0509118-18 | 10/07/05 | Radium-226 | EPA 903.0 Modified | 1.50 | 0.46 | 0.20 | pCi/g | |
| VPTR092805SL0K | 0509118-18 | 10/11/05 | Thorium-228 | EML Th-01 Modified | 0.86 | 0.27 | 0.09 | pCi/g | |
| VPTR092805SL0K | 0509118-18 | 10/11/05 | Thorium-230 | EML Th-01 Modified | 1.85 | 0.45 | 0.09 | pCi/g | |
| VPTR092805SL0K | 0509118-18 | 10/11/05 | Thorium-232 | EML Th-01 Modified | 0.96 | 0.29 | 0.11 | pCi/g | |
| VPTR092805SL0K | 0509118-18 | 10/07/05 | Uranium-234 | EML U-02 Modified | 0.84 | 0.27 | 0.09 | pCi/g | |
| VPTR092805SL0K | 0509118-18 | 10/07/05 | Uranium-235 | EML U-02 Modified | 0.08 | 0.08 | 0.05 | pCi/g | U |
| VPTR092805SL0K | 0509118-18 | 10/07/05 | Uranium-238 | EML U-02 Modified | 1.09 | 0.31 | 0.08 | pCi/g | |
| VPTR092805SL0L | 0509118-19 | 10/07/05 | Radium-226 | EPA 903.0 Modified | 1.64 | 0.52 | 0.38 | pCi/g | |
| VPTR092805SL0L | 0509118-19 | 10/11/05 | Thorium-228 | EML Th-01 Modified | 0.81 | 0.25 | 0.11 | pCi/g | |
| VPTR092805SL0L | 0509118-19 | 10/11/05 | Thorium-230 | EML Th-01 Modified | 1.40 | 0.36 | 0.07 | pCi/g | |
| VPTR092805SL0L | 0509118-19 | 10/11/05 | Thorium-232 | EML Th-01 Modified | 1.06 | 0.30 | 0.09 | pCi/g | |
| VPTR092805SL0L | 0509118-19 | 10/07/05 | Uranium-234 | EML U-02 Modified | 0.85 | 0.25 | 0.09 | pCi/g | |
| VPTR092805SL0L | 0509118-19 | 10/07/05 | Uranium-235 | EML U-02 Modified | 0.06 | 0.07 | 0.08 | pCi/g | U |
| VPTR092805SL0L | 0509118-19 | 10/07/05 | Uranium-238 | EML U-02 Modified | 0.99 | 0.27 | 0.07 | pCi/g | |

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# SECTION V

# ANALYTICAL STANDARD

QA/QC REVIEWED
Date 1/16/95 Initials MK

# CERTIFICATE OF CALIBRATION ALPHA STANDARD SOLUTION

U-8

| | | | |
|---|---|---|---|
| Radionuclide: | U-238NAT | Customer: | TMA EBERLINE |
| Half Life: | (4.468 ± 0.005) x 10^9 years | P.O.No.: | OR2778 |
| Catalog No.: | 7338 | Reference Date: | January 1 1995 12:00 PST. |
| Source No.: | 479-50 | Contained Radioactivity: | (Total U) 8.016 μCi |
| | | Contained Radioactivity: | (Total U) 297 kBq |

Description of Solution

a. Mass of solution: 65.2896 g in a 50 ml flame sealed ampoule
b. Chemical form: Uranyl Nitrate in H2O
c. Carrier content: None
d. Density: Approximately 1.3202 g/ml @ 20°C.

Radioimpurities: Refer to attached technical data sheet

Radioactive Daughters: Refer to attached technical data sheet

Radionuclide Concentration: (Total U) 0.1228 μCi/g.

Method of Calibration

Activity calculations are based upon known specific activity and mass.

Uncertainty of Measurement

| | |
|---|---|
| a. Systematic uncertainty in instrument calibration: | ±3.0% |
| b. Random uncertainty in assay: | ±0.0% |
| c. Random uncertainty in weighing(s): | ±2.0% |
| d. Total uncertainty at the 99% confidence level: | ±3.6% |

NIST Traceability

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

Leak Test(s)

See reverse side for Leak Test(s) applied to this source.

Notes

1. Nuclear data were taken from "Table of Radioactive Isotopes", edited by Virginia S. Shirley, 1986.
2. IPL participates in an NIST measurement assurance program to establish and maintain implicit traceability for a number of nuclides, based on the blind assay (and later NIST certification) of Standard Reference Materials (As in NRC Regulatory Guide 4.15).

ERIC, ERIC ALLAS
QUALITY CONTROL

29 DECEMBER 1994
Date Signed

ISOTOPE PRODUCTS LABORATORIES
3017 N. SAN FERNANDO BLVD.
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EBERLINE

# QUALITY CONTROL PROGRAM

MP-009

Rev.8; 11/01/03
Title: Radioactive Reference Standards Solutions & Records

## EBERLINE SERVICES - OAK RIDGE LABORATORY
## RADIOACTIVE REFERENCE SOLUTIONS
## *PRIMARY DILUTION RECERTIFICATION*
## MP 009

| | | | |
|---|---|---|---|
| | | CURRENT DATE | 1/4/2005 0:00 |
| SOLUTION REFERENCE # | IPL 479-50 | SOLUTION # | U-8 |

| Principal Radionuclide | Half Life, Years | Half Life, Days |
|---|---|---|
| $^{234, 235, 238}U$ | 4.468E+09 | 1.632E+12 |

| | | | |
|---|---|---|---|
| Radionuclide | $^{234, 235, 238}U$ | Reference Date | 1/1/1995 0:00 |
| Certified Activity | 8.016E+00 µCi | | |
| Certified Concentration | µCi per gram | | |

| | | |
|---|---|---|
| Ampoule /Solution Gross | 97.6400 | Weight, Grams |
| Empty Ampoule | 32.5020 | Weight, Grams |
| Solution Net | 65.1380 | Weight, Grams |
| Total Activity in Ampoule | 8.0160 | µCi |

**Chemical Composition of Standard Solution**

Uranyl nitrate in dilute $HNO_3$

**Dilution Instructions:** **Dilution Solvent Used** 1M $HNO_3$

**Dilute to a volume of** 1000.00 **milliliters**

**Certified Total Activity of** 8.0160 µCi **Which Equals** 1.780E+07 **dpm at the date listed above**

**And after dilution the activity of this solution is** 1.77955E+04 **dpm/ml**

This activity concentration is based on the original reference date listed above. All activities are corrected to the date and time of analysis by the laboratory data processing software.

**Expiration Date:** January 4, 2006

Recertified By _____ Date: 1/18/2005 11:55

Verified & Approved By _____ Date: 1/18/2005 11:55

QC Approval _____ Date: 1/18/2005 11:55

EBERLINE SERVICES

# QUALITY CONTROL PROGRAM

MP-009

Rev.8; 11/01/03

Title: **Radioactive Reference Standards Solutions & Records**

## EBERLINE SERVICES - OAK RIDGE LABORATORY
## RADIOACTIVE REFERENCE STANDARD SOLUTIONS
### *SECONDARY DILUTION RECERTIFICATION*

| | | | |
|---|---|---|---|
| | MP-009 | Date | 1/4/2005 0:00 |
| Solution Reference # | IPL 479-50 | Solution # | U-8a |

| Principal Radionuclide | Half Life, Years | Half Life, Days |
|---|---|---|
| $^{234, 235, 238}U$ | 4.468E+09 | 1.632E+12 |

**Radionuclide of Interest:** $^{234, 235, 238}U$ **Reference Date:** 1/1/1995 0:00

**Parent Solution Conc.:** 1.7796E+04 dpm/ml

**Chemical Composition of Standard Solution**

Uranly Nitrate in 1M $HNO_3$

**Dilution Instructions:** **Dilution Solvent Used:** 1M $HNO_3$

### *SECONDARY VOLUMETRIC DILUTION*

| | | |
|---|---|---|
| **Vol. Parent Solution:** | 4.0000 | ml |
| **Total Activity:** | 7.1182E+04 | dpm |
| **Final Volume:** | 1000.00 | ml |

**Final Activity Concentration:** 7.1182E+01 dpm/ml

**NOTES:**

**This activity concentration is based on the original reference date listed above. All activities are corrected to the date and time of analysis by the laboratory data processing software.**

Isotopic Distribution as:
U-238 Atom % = 48.239 U-238 = 71.182 dpm/ml X 0.48249 = 34.345 dpm/ml
U-235 Atom % = 2.25 U-235 = 71.182 dpm/ml X 0.0225 = 1.602 dpm/ml
U-234 Atom % = 49.501 U-238 = 71.182 dpm/ml X 0.49501 = 35.236 dpm/ml
All values +/- 3.6%

Isotopic ratios from manufacturer's data sheet

**Expiration Date:** January 4, 2006

Recertified By _____ Date: 1/18/2005 11:54

Verified & Approved By _____ Date: 1/18/2005 11:54

QC Approval _____ Date: 1/18/2005 11:54

RECORD COPY

# Tracer Solution for Environmental Analysis & Disequilibrium Studies

## Product Description & Measurement Certificate

| | | | |
|---|---|---|---|
| *Description* | Principal radionuclide: | **uranium 232** (U-232) | Product code: **UDP10050** |
| | Daughter Nuclide: | Th-228 | Batch Number: 92/232/67 |
| *Measurement* | Reference date: | | 01 March 2000 |
| | Radioactive concentration U-232 | | 6.739E+03 becquerels per gram of solution |
| | which is equivalent to | | 1.821E-01 microcuries per gram of solution |
| | Mass of solution | | 5.356 grams |
| | Volume of solution | | 5.035 millilitres |
| | Total activity of U-232 | | 3.61E+04 becquerels |
| | which is equivalent to | | 9.76E-01 microcuries |

*Accuracy*

Method of measurement (see reverse of this certificate)
Random uncertainty is: ± 0.7% Systematic uncertainty: ± 0.5%
Overall uncertainty in the radioactive concentration quoted above: ± 1.7%
Overall uncertainty is defined on the reverse of this certificate.

*Radionuclidic Purity*

Any radioactive impurities measured are listed below, expressed as percentages of the activity of the principle radionuclide at the reference date .

Th-228 and daughter activity removed 2 Feb 2000
U-232 daughters activity will increase with time. By alpha 88% U-232, 12% daughters on 1/3/00

*Isotopic Purity*

The isotopic composition, expressed as atom per cent at the reference date .

Not measured

*Chemical Composition*

Calculated weight of U-232, 4.42E-08 grams, as 2M HNO3 solution in a flame sealed glass vial.
This Tracer solution has been produced 'carrier free'.

*Physical Data*

Recommended half life of uranium 232: 6.980E+01 years
Principle energies of alpha emissions (MeV): 5.263 31.7%, 5.320 68.0%
Branching ratio for alpha emission: 100%
Calculated specific activity of uranium 232: 8.167E+05 Bq per microgram U-232.

*Remarks*

For safety information and notes to ensure correct usage by all persons handling this radioactive Tracer solution please read the instructions accompanying the package.

AEA Technology operates a quality management system which has been independently audited and approved to ISO 9001.

Approved Signatory

Roger Wiltshire

Project Ref. AE2315

Prepared and characterised in the UK, for world wide distribution by **Isotrak, AEA Technology, QSA.**



AEA Technology is the trading name of AEA Technology plc

EBERLINE SERVICES

# QUALITY CONTROL PROGRAM

MP-009

Rev.8; 11/01/03

Title: Radioactive Reference Standards Solutions & Records

## EBERLINE SERVICES - OAK RIDGE LABORATORY
## RADIOACTIVE REFERENCE SOLUTIONS
## *PRIMARY DILUTION RECERTIFICATION*
## MP 009

| | | | |
|---|---|---|---|
| **SOLUTION REFERENCE #** | AEA/Amersham 92/232/67 | **CURRENT DATE** | 1/4/2005 0:00 |
| | | **SOLUTION #** | U-10 |

| **Principal Radionuclide** | **Half Life, Years** | **Half Life, Days** |
|---|---|---|
| $^{232}U$ | 7.200E+01 | 2.630E+04 |

| | | | |
|---|---|---|---|
| **Radionuclide** | $^{232}U$ | | |
| **Certified Activity** | 9.760E-01 | µCi | **Reference Date** 3/1/2000 0:00 |
| **Certified Concentration** | | µCi per gram | |

| | | |
|---|---|---|
| **Ampoule /Solution Gross** | | **Weight, Grams** |
| **Empty Ampoule** | | **Weight, Grams** |
| **Solution Net** | | **Weight, Grams** |
| **Total Activity in Ampoule** | 0.9760 | µCi |

**Chemical Composition of Standard Solution**

$^{232}U(NO_3)_6$ in 2M $HNO_3$

**Dilution Instructions:** **Dilution Solvent Used** 2M $HNO_3$

**Dilute to a volume of** 1000.00 **milliliters**

**Certified Total Activity of** 0.9760 µCi **Which Equals** 2.167E+06 **dpm at the date listed above**

**And after dilution the activity of this solution is** 2.167E+03 **dpm/ml**

**This activity concentration is based on the original reference date listed above. All activities are corrected to the date and time of analysis by the laboratory data processing software.**

**Expiration Date:** January 4, 2006

Recertified By _____ Date: 1/18/2005 10:37

Verified & Approved By _____ Date: 1/18/2005 10:37

QC Approval _____ Date: 1/18/2005 10:37

EBERLINE SERVICES

# QUALITY CONTROL PROGRAM

MP-009

Rev.8; 11/01/03

Title: **Radioactive Reference Standards Solutions & Records**

## EBERLINE SERVICES - OAK RIDGE LABORATORY
## RADIOACTIVE REFERENCE STANDARD SOLUTIONS
### *SECONDARY DILUTION RECERTIFICATION*

| | | | |
|---|---|---|---|
| | MP-009 | | |
| **Solution Reference #** | AEA/Amersham 92/232/67 | **Date** | 1/4/2005 0:00 |
| | | **Solution #** | U-10a |

| **Principal Radionuclide** | **Half Life, Years** | **Half Life, Days** |
|---|---|---|
| $^{232}U$ | 7.200E+01 | 2.630E+04 |

**Radionuclide of Interest** $^{232}U$

**Parent Solution Conc.** 2.167E+03 dpm/ml

**Reference Date** 3/1/2000 0:00

**Chemical Composition of Standard Solution**

$^{232}U(NO_3)_6$ in 2M $HNO_3$

**Dilution Instructions:**

**Dilution Solvent Used** 2M $HNO_3$

### *SECONDARY VOLUMETRIC DILUTION*

**Vol. Parent Solution:** 10.0000 ml

**Total Activity:** 2.1670E+04 dpm

**Final Volume:** 1000.00 ml

**Final Activity Concentration:** 2.1670E+01 dpm/ml

**NOTES:**

**This activity concentration is based on the original reference date listed above. All activities are corrected to the date and time of analysis by the laboratory data processing software.**

**Expiration Date:** January 4, 2006

Recertified By _____ Date: 1/18/2005 10:37

Verified & Approved By _____ Date: 1/18/2005 10:37

QC Approval _____ Date: 1/18/2005 10:37

QA/QC REVIEWED
Date 10/14/91 Initials MT 10/14/91 MT

# CERTIFICATE OF CALIBRATION ALPHA STANDARD SOLUTION

Received
OCT 14 1991
TMA/Eberline
Oak Ridge Lab

| | | | |
|---|---|---|---|
| Radionuclide | Th-230 | Customer: | TMA EBERLINE |
| Half Life: | (7.54 ± 0.03) x 10^4 years | P.O.No.: | TT4944 |
| Catalog No.: | 7230 | Reference Date: | November 1 1991 12:00 PST. |
| Source No.: | 388-116 | Contained Radioactivity: | 1.036 μCi. |

**Description of Solution**

| | | |
|---|---|---|
| a. Mass of solution: | 5.0042 | grams. |
| b. Chemical form: | Th(NO3)4 in 0.1N HNO3 | |
| c. Carrier content: | None added | |
| d. Density: | 1.0016 | gram/ml @ 20°C. |

**Radioimpurities**

See attached technical data sheet

**Radioactive Daughters**

See attached technical data sheet

**Radionuclide Concentration**

0.207 μCi/gram.

**Method of Calibration**

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

**Uncertainty of Measurement**

| | |
|---|---|
| a. Systematic uncertainty in instrument calibration: | ±2.0% |
| b. Random uncertainty in assay: | ±0.5% |
| c. Random uncertainty in weighing(s): | ±0.2% |
| d. Total uncertainty at the 99% confidence level: | ±2.7% |

**NIST Traceability**

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

**Notes**

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

QUALITY CONTROL

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

035

EBERLINE SERVICES

# QUALITY CONTROL PROGRAM

MP-009

Rev.8; 11/01/03
Title: Radioactive Reference Standards Solutions & Records

## EBERLINE SERVICES - OAK RIDGE LABORATORY
## RADIOACTIVE REFERENCE SOLUTIONS
## *PRIMARY DILUTION RECERTIFICATION*
## MP 009

CURRENT DATE: 1/5/2005 0:00

SOLUTION REFERENCE #: IPL 388-116 | SOLUTION #: Th-1

| Principal Radionuclide | Half Life, Years | Half Life, Days |
|---|---|---|
| $^{230}$Th | 7.540E+04 | 2.754E+07 |

Radionuclide: $^{230}$Thorium
Reference Date: 11/1/1991 0:00
Certified Activity: 1.036E+00 µCi
Certified Concentration: µCi per gram

| | | |
|---|---|---|
| Ampoule /Solution Gross | 9.2660 | Weight, Grams |
| Empty Ampoule | 4.6218 | Weight, Grams |
| Solution Net | 4.6442 | Weight, Grams |
| Total Activity in Ampoule | 1.0360 | µCi |

**Chemical Composition of Standard Solution**

$^{230}Th(NO_3)_4$ in 0.1N $HNO_3$

**Dilution Instructions:**

Dilution Solvent Used: 0.1N $HNO_3$

Dilute to a volume of 1000.00 milliliters

Certified Total Activity of 1.0360 µCi Which Equals 2.300E+06 dpm at the date listed above

And after dilution the activity of this solution is 2.300E+03 dpm/ml

This activity concentration is based on the original reference date listed above. All activities are corrected to the date and time of analysis by the laboratory data processing software.

Expiration Date: January 5, 2006

Recertified By _____ Date: 1/18/2005 9:42

Verified & Approved By _____ Date: 1/19/05

QC Approval _____ Date: _____

EBERLINE SERVICES

# QUALITY CONTROL PROGRAM

MP-009

Rev.8; 11/01/03
Title: Radioactive Reference Standards Solutions & Records

## EBERLINE SERVICES - OAK RIDGE LABORATORY
## RADIOACTIVE REFERENCE STANDARD SOLUTIONS

*SECONDARY DILUTION RECERTIFICATION*

| | | | |
|---|---|---|---|
| | MP-009 | Date | 1/5/2005 0:00 |
| Solution Reference # | IPL 388-116 | Solution # | Th-1b |

| Principal Radionuclide | Half Life, Years | Half Life, Days |
|---|---|---|
| $^{230}$Th | 7.540E+04 | 2.754E+07 |

Radionuclide of Interest: $^{230}$Thorium
Parent Solution Conc.: 2.30E+03 dpm/ml

Reference Date: 11/1/1991 0:00

**Chemical Composition of Standard Solution**
$^{230}Th(NO_3)_4$ in 0.1N $HNO_3$

Dilution Instructions:

Dilution Solvent Used: 0.1N $HNO_3$

*SECONDARY VOLUMETRIC DILUTION*

Vol. Parent Solution: 10.0000 ml
Total Activity: 2.2999E+04 dpm
Final Volume: 1000.00 ml

Final Activity Concentration: 2.2999E+01 dpm/ml

This activity concentration is based on the original reference date listed above. All activities are corrected to the date and time of analysis by the laboratory data processing software.

NOTES:

Expiration Date: January 5, 2006

Recertified By _____ Date: 1/18/2005 0:00

Verified & Approved By _____ Date: 1/19/05

QC Approval _____ Date: 1/19/05

Th-8

# CERTIFICATE OF CALIBRATION
# ALPHA STANDARD SOLUTION

| | | | |
|---|---|---|---|
| Radionuclide: | Th-232 | Customer: | TMA EBERLINE |
| Half Life: | (1.405 ± 0.006) x 10^10 years | P.O.No.: | VH1632 |
| Catalog No.: | 7232 | Reference Date: | November 1 1993 12:00 PST. |
| Source No.: | 435-104-2 | Contained Radioactivity: | (Th-232) 0.0933 μCi. |
| | | Contained Radioactivity: | (Th-232) 3.45 kBq. |

Description of Solution

| | |
|---|---|
| a. Mass of solution: | 11.9712 g (in a 10 ml flame sealed ampoule) |
| b. Chemical form: | Th(NO3)4 in water |
| c. Carrier content: | None added |
| d. Density: | Approx. 1.21 g/ml @ 20°C. |

Radioimpurities

None detected (other than daughters).

Radioactive Daughters

Ra-228, Ac-228, Th-228, Ra-224, Rn-220, Po-216, Pb-212, Bi-212, Po-212, Tl-208

Radionuclide Concentration

(Th-232) 0.00779 μCi/g.

Method of Calibration

Activity calculations are based upon known specific activity and mass.

Uncertainty of Measurement

| | |
|---|---|
| a. Systematic uncertainty in instrument calibration: | ±3.0% |
| b. Random uncertainty in assay: | ±0.0% |
| c. Random uncertainty in weighing(s): | ±2.0% |
| d. Total uncertainty at the 99% confidence level: | ±3.6% |

NIST Traceability

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

Leak Test(s)

See reverse side for Leak Test(s) applied to this source.

Notes

1. Nuclear data were taken from "Table of Radioactive Isotopes", edited by Virginia S. Shirley, 1986.
2. IPL participates in an NIST measurement assurance program to establish and maintain implicit traceability for a number of nuclides, based on the blind assay (and later NIST certification) of Standard Reference Materials (As in NRC Regulatory Guide 4.15).

Anna U. Khan
QUALITY CONTROL

NOV. 8, 1993
Date Signed

ISOTOPE PRODUCTS LABORATORIES
1800 North Keystone Street
Burbank, California 91504
(818) 843 - 7000

EBERLINE SERVICES

# QUALITY CONTROL PROGRAM

MP-009

Rev.8; 1/10/03

Title: Radioactive Reference Standards Solutions & Records

## EBERLINE SERVICES - OAK RIDGE LABORATORY
## RADIOACTIVE REFERENCE SOLUTIONS
## *PRIMARY DILUTION RECERTIFICATION*
## MP 009

| | | | |
|---|---|---|---|
| | | CURRENT DATE | 1/13/2005 0:00 |
| SOLUTION REFERENCE # | IPL 435-104-2 | SOLUTION # | Th-8 |

| Principal Radionuclide | Half Life, Years | Half Life, Days |
|---|---|---|
| $^{232}Th$, $^{228}Th$ | 1.405E+10 | 5.132E+12 |

| | | | |
|---|---|---|---|
| Radionuclide | $^{232\ \&\ 228}Th$ | Reference Date | 11/1/1993 0:00 |
| Certified Activity | 9.330E-02 µCi | | |
| Certified Concentration | µCi per gram | | |

| | | |
|---|---|---|
| Ampoule /Solution Gross | 18.8415 | Weight, Grams |
| Empty Ampoule | 6.9296 | Weight, Grams |
| Solution Net | 11.9119 | Weight, Grams |
| Total Activity in Ampoule | 0.0933 | µCi |

**Chemical Composition of Standard Solution**

$Th(NO_3)_4$ in H2O

**Dilution Instructions:** **Dilution Solvent Used** 1% Nitric Acid

**Dilute to a volume of** 1000.00 **milliliters**

**Certified Total Activity of** 0.0933 µCi **Which Equals** 2.071E+05 **dpm at the date listed above**

**And after dilution the activity of this solution is** 2.071E+02 **dpm/ml**

**This activity concentration is based on the original reference date listed above. All activities are corrected to the date and time of analysis by the laboratory data processing software.**

**Expiration Date:** January 13, 2006

| | | |
|---|---|---|
| Recertified By | | Date: 1/13/2005 0:00 |
| Verified & Approved By | | Date: 1/18/2005 0:00 |
| QC Approval | | Date: 1/13/2005 0:00 |

EBERLINE SERVICES

# QUALITY CONTROL PROGRAM

MP-009

Rev.8; 1/10/03
Title: **Radioactive Reference Standards Solutions & Records**

## EBERLINE SERVICES - OAK RIDGE LABORATORY
## RADIOACTIVE REFERENCE STANDARD SOLUTIONS
### *SECONDARY DILUTION RECERTIFICATION*

| | | | |
|---|---|---|---|
| | MP-009 | Date | 1/13/2005 0:00 |
| Solution Reference # | IPL 435-104-2 | Solution # | Th-8b |

| Principal Radionuclide | Half Life, Years | Half Life, Days |
|---|---|---|
| $^{228\ \&\ 232}Th$ | 1.405E+10 | 5.132E+12 |

| | | | |
|---|---|---|---|
| Radionuclide of Interest | $^{228\ \&\ 232}Th$ | Reference Date | 11/1/1993 0:00 |
| Parent Solution Conc. | 2.07E+02 dpm/ml | | |

**Chemical Composition of Standard Solution**

$Th(NO_3)_4$ in 1% $HNO_3$

**Dilution Instructions:** **Dilution Solvent Used** 1% Nitric Acid

### *SECONDARY VOLUMETRIC DILUTION*

| | | | |
|---|---|---|---|
| Vol. Parent Solution: | 500.0000 ml | | |
| Total Activity: | 1.0355E+05 dpm | Final Activity Concentration: | 1.0355E+02 dpm/ml |
| Final Volume: | 1000.00 ml | | |

**NOTES:**

**This activity concentration is based on the original reference date listed above. All activities are corrected to the date and time of analysis by the laboratory data processing software.**

**Expiration Date:** January 13, 2006

Recertified By _____ Date: 1/13/2005 12:19

Verified & Approved By _____ Date: 1/18/05

QC Approval _____ Date: _____

Isotope Products Laboratories
An Eckert & Ziegler Company

24937 Avenue Tibbitts
Valencia, California 91355

Tel 661•309•1010
Fax 661•257•8303

Th-19

# CERTIFICATE OF CALIBRATION
# ALPHA STANDARD SOLUTION

| | | | |
|---|---|---|---|
| **Radionuclide:** | Th-229 | **Customer:** | EBERLINE SERVICES |
| **Half-life:** | 7340 ± 160 years | **P.O. No.:** | 00009633 |
| **Catalog No.:** | 7229 | **Reference Date:** | 15-Jan-02 12:00 PST |
| **Source No.:** | 867-54 | **Contained Radioactivity: (Th-229 only)** | 1.013 µCi 37.48 kBq |

**Physical Description:**

| | |
|---|---|
| A. Mass of solution: | 5.0147 g in 5 mL flame-sealed ampoule |
| B. Chemical form: | $Th(NO_3)_4$ in 0.1M $HNO_3$ |
| C. Carrier content: | 10µg Th/mL |
| D. Density: | 1.0016 g/mL @ 20°C. |

**Radioimpurities:**

None detected (daughters in equilibrium)

**Radionuclide Concentration:** 0.2020 µCi/g, 7.474 kBq/g

**Method of Calibration:**

This source was prepared from a weighed aliquot of solution whose activity in µCi/g was determined using gamma ray spectrometry.

| | |
|---|---|
| Peak energy used for integration: | 193.5 keV |
| Branching ratio used: | 0.0441 gammas per decay |

**Uncertainty of Measurement:**

| | |
|---|---|
| A. Type A (random) uncertainty: | ± 0.7 % |
| B. Type B (systematic) uncertainty: | ± 3.0 % |
| C. Uncertainty in aliquot weighing: | ± 0.0 % |
| D. Total uncertainty at the 99% confidence level: | ± 3.1 % |

**Notes:**

- See reverse side for leak test(s) performed on this source.
- IPL participates in a NIST measurement assurance program to establish and maintain implicit traceability for a number of nuclides, based on the blind assay (and later NIST certification) of Standard Reference Materials (As in NRC Regulatory Guide 4.15).
- Nuclear data was taken from IAEA Technical Report Series No. 261.
- This solution has a working life of 5 years.

[signature] 9-Jan-02

Quality Control — Date Signed

IPL Ref. No.: 867-54

EBERLINE SERVICES

# QUALITY CONTROL PROGRAM

MP-009

Rev.8; 1/10/03
Title: Radioactive Reference Standards Solutions & Records

## EBERLINE SERVICES - OAK RIDGE LABORATORY
## RADIOACTIVE REFERENCE SOLUTIONS
## *PRIMARY DILUTION RECERTIFICATION*
## MP 009

| | | | |
|---|---|---|---|
| | | CURRENT DATE | 1/12/2005 0:00 |
| SOLUTION REFERENCE # | IPL 867-54 | SOLUTION # | Th-18 |

| Principal Radionuclide | Half Life, Years | Half Life, Days |
|---|---|---|
| $^{229}$Th | 7.340E+03 | 2.681E+06 |

| | | | |
|---|---|---|---|
| Radionuclide | $^{229}$Th | Reference Date | 1/15/2002 0:00 |
| Certified Activity | 1.013E+00 | µCi | |
| Certified Concentration | | µCi per gram | |

| | | |
|---|---|---|
| Ampoule /Solution Gross | 8.7752 | Weight, Grams |
| Empty Ampoule | 3.7591 | Weight, Grams |
| Solution Net | 5.0161 | Weight, Grams |
| Total Activity in Ampoule | 1.0130 | µCi |

**Chemical Composition of Standard Solution**

$^{229}Th(NO_3)_4$ in 0.1M $HNO_3$

**Dilution Instructions:** **Dilution Solvent Used** 0.1 M $HNO_3$

**Dilute to a volume of** 1000.00 **milliliters**

**Certified Total Activity of** 1.0130 µCi **Which Equals** 2.249E+06 **dpm at the date listed above**

**And after dilution the activity of this solution is** 2.249E+03 **dpm/ml**

This activity concentration is based on the original reference date listed above. All activities are corrected to the date and time of analysis by the laboratory data processing software.

**Expiration Date:** January 12, 2006

Recertified By _____ Date: 1/12/2005 7:53

Verified & Approved By _____ Date: 1/19/05

QC Approval _____ Date: 1/19/05

EBERLINE SERVICES

# QUALITY CONTROL PROGRAM

MP-009

Rev.8; 1/10/03

Title: **Radioactive Reference Standards Solutions & Records**

## EBERLINE SERVICES - OAK RIDGE LABORATORY
## RADIOACTIVE REFERENCE STANDARD SOLUTIONS
### *SECONDARY DILUTION RECERTIFICATION*

| | | | |
|---|---|---|---|
| | MP-009 | Date | 1/12/2005 0:00 |
| Solution Reference # | IPL 867-54 | Solution # | Th-18a |

| Principal Radionuclide | Half Life, Years | Half Life, Days |
|---|---|---|
| $^{229}Th$ | 7.340E+03 | 2.681E+06 |

| | | | |
|---|---|---|---|
| Radionuclide of Interest | $^{229}Th$ | Reference Date | 1/15/2002 0:00 |
| Parent Solution Conc. | 2.25E+03 dpm/ml | | |

**Chemical Composition of Standard Solution**

$TH(NO_3)_4$ in 0.1M $HNO_3$

**Dilution Instructions:**

**Dilution Solvent Used** 0.1M $HNO_3$

### *SECONDARY VOLUMETRIC DILUTION*

| | | | |
|---|---|---|---|
| Vol. Parent Solution: | 10.0000 ml | | |
| Total Activity: | 2.2490E+04 dpm | Final Activity Concentration: | 2.2490E+01 dpm/ml |
| Final Volume: | 1000.00 ml | | |

**NOTES:**

**This activity concentration is based on the original reference date listed above. All activities are corrected to the date and time of analysis by the laboratory data processing software.**

**Expiration Date:** January 12, 2006

Recertified By _____ Date: 1/12/2005 7:53

Verified & Approved By _____ Date: 1/19/05

QC Approval _____ Date: 1/19/05

Ba-6
(Ba-6)

# National Institute of Standards & Technology

# Certificate

## Standard Reference Material 4251C
## Barium-133 Radioactivity Standard

This Standard Reference Material (SRM) consists of radioactive barium-133 chloride, non-radioactive barium chloride, and hydrochloric acid dissolved in 5 mL of distilled water. The solution is contained in a flame-sealed NIST borosilicate-glass ampoule. The SRM is intended for the calibration of ionization chambers and solid-state gamma-ray spectrometry systems.

### Radiological Hazard

The SRM ampoule contains barium-133 with a total activity of approximately 2.5 MBq. Barium-133 decays by electron capture and during the decay process X-rays and gamma rays with energies from 4 to 400 keV are emitted. Most of these photons escape from the SRM ampoule and can represent a radiation hazard. Approximate unshielded dose rates at several distances (as of the reference time) are given in note [a]*. Appropriate shielding and/or distance should be used to minimize personnel exposure. The SRM should be used only by persons qualified to handle radioactive material.

### Chemical Hazard

The SRM ampoule contains hydrochloric acid (HCl) with a concentration of 1 mole per liter of water. The solution is corrosive and represents a health hazard if it comes in contact with eyes or skin. If the ampoule is to be opened to transfer the solution, the recommended procedure is given on page 2. The ampoule should be opened only by persons qualified to handle both radioactive material and strong acid solution.

### Storage and Handling

The SRM should be stored and used at a temperature between 5 and 65 °C. The solution in an unopened ampoule should remain stable and homogeneous until at least June 2004.

The ampoule (or any subsequent container) should always be clearly marked as containing radioactive material. If the ampoule is transported it should be packed, marked, labeled, and shipped in accordance with the applicable national, international, and carrier regulations. The solution in the ampoule is a dangerous good (hazardous material) both because of the radioactivity and because of the strong acid.

### Preparation

This Standard Reference Material was prepared in the Physics Laboratory, Ionizing Radiation Division, Radioactivity Group, J.M.R. Hutchinson, Group Leader. The overall technical direction and physical measurements leading to certification were provided by L.L. Lucas of the Radioactivity Group and D.B. Golas, Nuclear Energy Institute Research Associate.

The support aspects involved in the preparation, certification, and issuance of this SRM were coordinated through the Standard Reference Materials Program by N.M. Trahey.

Gaithersburg, Maryland 20899
October 1994

Thomas E. Gills, Chief
Standard Reference Materials Program



*Notes and references are on pages 5 and 6.

044

EBERLINE SERVICES

# QUALITY CONTROL PROGRAM

QCP-009

Rev.8; 11/10/03

Title: Radioactive Reference Standards Solutions & Records

## EBERLINE SERVICES - OAK RIDGE LABORATORY
## RADIOACTIVE REFERENCE SOLUTIONS
## *PRIMARY DILUTION RECERTIFICATION*
## QCP 009-1

| | | | |
|---|---|---|---|
| SOLUTION REFERENCE # | NIST SRM4251C | CURRENT DATE | 11/6/2004 0:00 |
| | | SOLUTION # | Ba-6 |

| Principal Radionuclide | Half Life, Years | Half Life, Days |
|---|---|---|
| $^{133}$Barium | 1.048E+01 | 3.828E+03 |

| | | | |
|---|---|---|---|
| Radionuclide | $^{133}$Barium | | |
| Certified Activity | | µCi | Reference Date 9/1/1993 0:00 |
| Certified Concentration | 1.318E+01 | µCi per gram | |

| | | |
|---|---|---|
| Ampoule /Solution Gross | 9.3081 | Weight, Grams |
| Empty Ampoule | 4.2582 | Weight, Grams |
| Solution Net | 5.0499 | Weight, Grams |
| Total Activity in Ampoule | 66.5577 | µCi |

**Chemical Composition of Standard Solution**

$^{133}BaCl_2$ in 1M HCl

**Dilution Instructions:**

Dilution Solvent Used: 1M HCl

Dilute to a volume of 1000.00 milliliters

Certified Total Activity of 66.5577 µCi Which Equals 1.478E+08 dpm at the date listed above

And after dilution the activity of this solution is 1.478E+05 dpm/ml

This activity concentration is based on the original reference date listed above. All activities are corrected to the date and time of analysis by the laboratory data processing software.

Expiration Date: November 6, 2005

Diluted By _____ Date: 11/6/04

Verified & Approved By _____ Date: 11/6/04

QC Approval _____ Date: 11/6/04

EBERLINE SERVICES

**QUALITY CONTROL PROGRAM**
QCP-009

Rev.8; 11/10/03
Title: Radioactive Reference Standards Solutions & Records

## EBERLINE SERVICES - OAK RIDGE LABORATORY
## RADIOACTIVE REFERENCE STANDARD SOLUTIONS
***SECONDARY DILUTION RECERTIFICATION***

QCP-009-1-A

Solution Reference # NIST SRM4251C

Date 11/6/2004 0:00

Solution # Ba-6a

| Principal Radionuclide | Half Life, Years | Half Life, Days |
|---|---|---|
| $^{133}$Ba | 1.048E+01 | 3.828E+03 |

Radionuclide of Interest $^{133}$Ba

Parent Solution Conc. 1.48E+05 dpm/ml

Reference Date 9/1/1993 0:00

**Chemical Composition of Standard Solution**

$^{133}BaCl_2$ in 1M HCl

**Dilution Instructions:**

Dilution Solvent Used 1M HCl

***SECONDARY VOLUMETRIC DILUTION***

Vol. Parent Solution: 25.0000 ml
Total Activity: 3.6950E+06 dpm
Final Volume: 1000.00 ml

Final Activity Concentration: 3.6950E+03 dpm/ml

**NOTES:**

**This activity concentration is based on the original reference date listed above. All activities are corrected to the date and time of analysis by the laboratory data processing software.**

**Expiration Date:** November 6, 2005

Diluted By _____ Date: 11/6/04

Verified & Approved By _____ Date: 11/6/04

QC Approval _____ Date: 11/6/04

# CERTIFICATE OF CALIBRATION
# ALPHA STANDARD SOLUTION

Ra-5

QA/QC REVIEWED
Date 2/8/94 Initials MT

| | | | |
|---|---|---|---|
| Radionuclide: | Ra-226 | Customer: | TMA EBERLINE |
| Half Life: | 1600 ± 7 years | P.O.No.: | VH1888 |
| Catalog No.: | 7226 | Reference Date: | February 1 1994 12:00 PST. |
| Source No.: | 453-26 | Contained Radioactivity: (Ra-226) | 1.001 μCi. |
| | | Contained Radioactivity: (Ra-226) | 37.0 kBq. |

Description of Solution

a. Mass of solution: 5.1864 g (in a 5 ml Flame Sealed Ampoule)

b. Chemical form: Ra(NO3)2 in 1 N HNO3

c. Carrier content: None added

d. Density: 1.0318 g/ml @ 20°C.

Radioimpurities: None detected(other than daughters)

Radioactive Daughters

Rn-222, Po-218, At-218, Pb-214, Bi-214, Po-214, Tl-210, Pb-210, Bi-210, Po-210 and Tl-206.

Radionuclide Concentration

(Ra-226) 0.1929 μCi/g.

Method of Calibration

Weighed aliquots of the solution were assayed using gamma spectrometry:
Energy peak(s) integrated under: 186 keV.
Branching ratio(s) used: 0.0351 gamma rays per decay.

Uncertainty of Measurement

| | |
|---|---|
| a. Systematic uncertainty in instrument calibration: | ±3.4% |
| b. Random uncertainty in assay: | ±3.1% |
| c. Random uncertainty in weighing(s): | ±0.2% |
| d. Total uncertainty at the 99% confidence level: | ±4.6% |

NIST Traceability

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

Leak Test(s)

See reverse side for Leak Test(s) applied to this source.

Notes

1. Nuclear data were taken from "Table of Radioactive Isotopes", edited by Virginia S. Shirley, 1986.
2. IPL participates in an NIST measurement assurance program to establish and maintain implicit traceability for a number of nuclides, based on the blind assay (and later NIST certification) of Standard Reference Materials (As in NRC Regulatory Guide 4.15).

Anna U. Kwan
QUALITY CONTROL

Feb. 3, 1994
Date Signed

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EBERLINE SERVICES

# QUALITY CONTROL PROGRAM

MP 009

Rev.8; 11/01/03

Title: Radioactive Reference Standards Solutions & Records

## EBERLINE SERVICES - OAK RIDGE LABORATORY
## RADIOACTIVE REFERENCE SOLUTIONS
## *PRIMARY DILUTION RECERTIFICATION*
## MP 009

| | | | |
|---|---|---|---|
| | | CURRENT DATE | 1/3/2005 0:00 |
| SOLUTION REFERENCE # | IPL 453-26 | SOLUTION # | Ra-5 |

| Principal Radionuclide | Half Life, Years | Half Life, Days |
|---|---|---|
| $^{226}$Radium | 1.600E+03 | 5.844E+05 |

| | | | |
|---|---|---|---|
| Radionuclide | $^{228}$Radium | Reference Date | 2/1/1994 0:00 |
| Certified Activity | 1.001E+00 µCi | | |
| Certified Concentration | | µCi per gram | |

| | | |
|---|---|---|
| Ampoule /Solution Gross | | Weight, Grams |
| Empty Ampoule | | Weight, Grams |
| Solution Net | | Weight, Grams |
| Total Activity in Ampoule | 1.0010 | µCi |

**Chemical Composition of Standard Solution**

$^{228}Ra(NO_3)_2$ in 1M $HNO_3$

**Dilution Instructions:** Dilution Solvent Used: 1M $HNO_3$

Dilute to a volume of 1000.00 milliliters

Certified Total Activity of 1.0010 µCi Which Equals 2.222E+06 dpm at the date listed above

And after dilution the activity of this solution is 2.222E+03 dpm/ml

This activity concentration is based on the original reference date listed above. All activities are corrected to the date and time of analysis by the laboratory data processing software.

Expiration Date: January 3, 2006

Diluted By _____ Date: 1/3/2005

Verified & Approved By _____ Date: 1/3/2005

QC Approval _____ Date: 1/3/2005

EBERLINE SERVICES

# QUALITY CONTROL PROGRAM

MP 009

Rev.8; 11/01/03

Title: **Radioactive Reference Standards Solutions & Records**

## EBERLINE SERVICES - OAK RIDGE LABORATORY
## RADIOACTIVE REFERENCE STANDARD SOLUTIONS
### *SECONDARY DILUTION RECERTIFICATION*

| | | | |
|---|---|---|---|
| | MP 009 | | |
| **Solution Reference #** | IPL-453-26 | **Date** | 1/3/2005 0:00 |
| | | **Solution #** | Ra-5b |

| **Principal Radionuclide** | **Half Life, Years** | **Half Life, Days** |
|---|---|---|
| $^{226}$Radium | 1.600E+03 | 5.844E+05 |

**Radionuclide of Interest** $^{226}$Radium

**Parent Solution Conc.** 2.22E+03 dpm/ml

**Reference Date** 2/1/1994 0:00

**Chemical Composition of Standard Solution**

$^{226}Ra(NO_3)_2$ in 1M $HNO_3$

**Dilution Instructions:**

**Dilution Solvent Used** 1M $HNO_3$

### *SECONDARY VOLUMETRIC DILUTION*

**Vol. Parent Solution:** 20.0000 ml

**Total Activity:** 4.4440E+04 dpm

**Final Volume:** 1000.00 ml

**Final Activity Concentration:** 4.4440E+01 dpm/ml

**This activity concentration is based on the original reference date listed above. All activities are corrected to the date and time of analysis by the laboratory data processing software.**

**NOTES:**

**Expiration Date:** January 3, 2006

Diluted By _____ Date: 1/3/2005 0:00

Verified & Approved By _____ Date: 1/3/2005 0:00

QC Approval _____ Date: 1/24/05 38356

# SECTION VI

# QUALITY CONTROL SAMPLE RESULTS SUMMARY

| WO | Analysis | Run | Activity Units | Aliquot Units | Client Name |
|---|---|---|---|---|---|
| 05-09118 | UUISO | 1 | pCi | g | Missouri Dept. of Natural Resources |

## Laboratory Control Sample

| Analyte | Normalized Difference | LCS Measured | TPU Measured | LCS Expected | Uncert. Expected | Known | Known Error | Result | TPU | Standard ID | Standard ACT (dpm) | Standard Error | Standard Added (g) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| U-234 | 0.54 | 95.12% | 18.58% | 100.00% | 3.60% | 8.00E+00 | 2.88E-01 | 7.61E+00 | 1.41E+00 | U-8a | 3.52E+01 | 3.60E+00 | 5.04E-01 |
| U-235 | 1.15 | 133.36% | 42.47% | 100.00% | 3.60% | 3.63E-01 | 1.31E-02 | 4.85E-01 | 2.06E-01 | U-8a | 1.60E+00 | 3.60E+00 | 5.04E-01 |
| U-238 | 0.45 | 104.49% | 18.42% | 100.00% | 3.60% | 7.80E+00 | 2.81E-01 | 8.15E+00 | 1.50E+00 | U-8a | 3.44E+01 | 3.60E+00 | 5.04E-01 |

## Matrix Spike

| Analyte | Normalized Difference | MS Actual % Rec | Expected MS Result | Expected MS Uncert | Actual MS Result | Actual MS TPU | Sample Result | Sample TPU | Sample Aliquot | Standard ID | Standard ACT (dpm) | Standard Error % | Standard Added (g) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |

## Replicate Sample

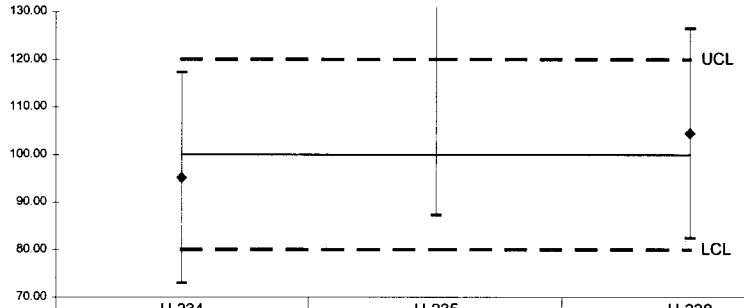
| Analyte | Normalized Difference | RPD | Original Result | Original TPU | Replicate Result | Replicate TPU |
|---|---|---|---|---|---|---|
| U-234 | 0.89 | 19.00 | 1.05E+00 | 3.01E-01 | 8.70E-01 | 2.68E-01 |
| U-235 | 0.10 | 8.83 | 5.02E-02 | 6.23E-02 | 5.49E-02 | 6.40E-02 |
| U-238 | 0.87 | 19.38 | 9.26E-01 | 2.76E-01 | 7.63E-01 | 2.47E-01 |

## QC Summary

| LCS Relative Bias | LCS % R | LCS ND | MS % R | MS ND | Rep RPD | Rep ND |
|---|---|---|---|---|---|---|
| 0.95 | OK | OK | | | OK | OK |
| 1.33 | INV | OK | | | OK | OK |
| 1.04 | OK | OK | | | OK | OK |

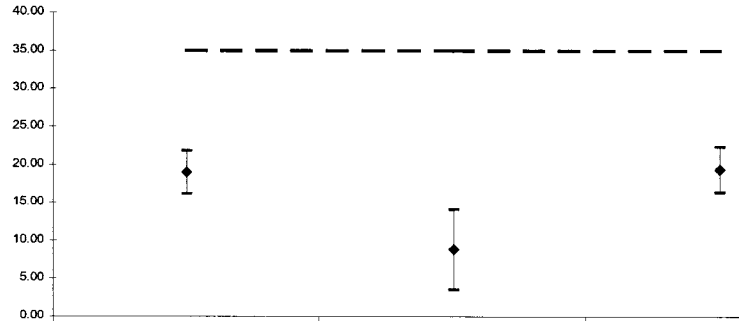
| WO | Analysis | Run | Activity Units | Aliquot Units | Client Name |
|---|---|---|---|---|---|
| 05-09118 | UUISO | 1 | pCi | g | Missouri Dept. of Natural Resources |

## LCS % Recovery



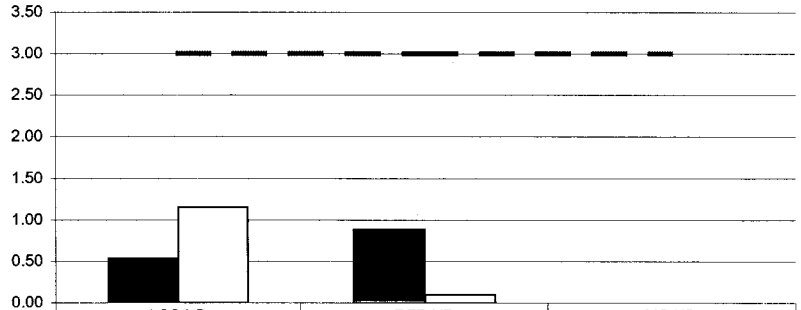

| | U-234 | U-235 | U-238 |
|---|---|---|---|
| Lower Error | 72.94 | 87.28 | 82.48 |
| Upper Error | 117.29 | 179.43 | 126.51 |
| %R | 95.12 | 133.36 | 104.49 |
| LCL | 80 | 80 | 80 |
| Mean | 100 | 100 | 100 |
| UCL | 120 | 120 | 120 |

## Replicate Sample RPD




| | U-234 | U-235 | U-238 |
|---|---|---|---|
| Lower Error | 21.81 | 14.14 | 22.38 |
| Upper Error | 16.18 | 3.52 | 16.38 |
| RPD | 19.00 | 8.83 | 19.38 |
| CL | 35 | 35 | 35 |

## Normalized Difference




| | LCS ND | REP ND | MS ND |
|---|---|---|---|
| U-234 | 0.54 | 0.89 | 0.00 |
| U-235 | 1.15 | 0.10 | 0.00 |
| UCL | 3 | 3 | 3 |

## No Matrix Spike

| WO | Analysis | Run | Activity Units | Aliquot Units | Client Name |
|---|---|---|---|---|---|
| 05-09118 | ThISO | 1 | pCi | g | Missouri Dept. of Natural Resources |

## Laboratory Control Sample

| Analyte | Normalized Difference | LCS Measured | TPU Measured | LCS Expected | Uncert. Expected | Known | Known Error | Result | TPU | Standard ID | Standard ACT (dpm) | Standard Error | Standard Added (g) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TH-228 | 0.78 | 92.76% | 19.49% | 100.00% | 3.60% | 4.75E+00 | 1.71E-01 | 4.41E+00 | 8.58E-01 | Th-8b | 1.04E+02 | 3.60E+00 | 1.02E-01 |
| TH-230 | 0.29 | 97.29% | 19.05% | 100.00% | 2.70% | 5.33E+00 | 1.44E-01 | 5.18E+00 | 9.87E-01 | Th-1b | 2.35E+01 | 2.70E+00 | 5.03E-01 |
| TH-232 | 1.28 | 88.59% | 19.62% | 100.00% | 3.60% | 4.75E+00 | 1.71E-01 | 4.21E+00 | 8.25E-01 | Th-8b | 1.04E+02 | 3.60E+00 | 1.02E-01 |

## Matrix Spike

| *Analyte* | *Normalized Difference* | *MS Actual % Rec* | *Expected MS Result* | *Expected MS Uncert* | *Actual MS Result* | *Actual MS TPU* | *Sample Result* | *Sample TPU* | *Sample Aliquot* | *Standard ID* | *Standard ACT (dpm)* | *Standard Error %* | *Standard Added (g)* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |

## Replicate Sample

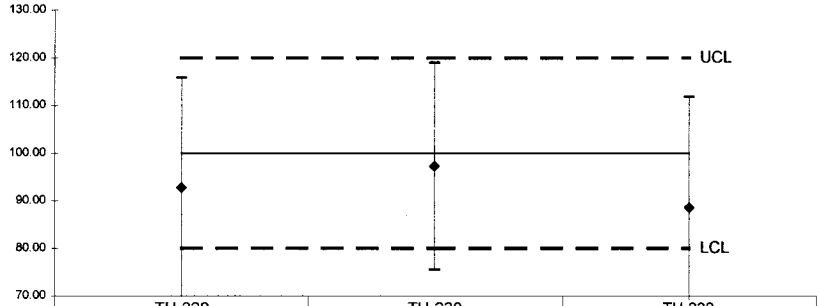
| *Analyte* | *Normalized Difference* | *RPD* | *Original Result* | *Original TPU* | *Replicate Result* | *Replicate TPU* |
|---|---|---|---|---|---|---|
| TH-228 | 0.27 | 5.36 | 1.04E+00 | 2.88E-01 | 1.09E+00 | 2.95E-01 |
| TH-230 | 0.40 | 6.63 | 1.82E+00 | 4.27E-01 | 1.95E+00 | 4.44E-01 |
| TH-232 | 0.63 | 12.08 | 1.06E+00 | 2.91E-01 | 1.19E+00 | 3.11E-01 |

## QC Summary

| *LCS Relative Bias* | *LCS % R* | *LCS ND* | *MS % R* | *MS ND* | *Rep RPD* | *Rep ND* |
|---|---|---|---|---|---|---|
| 0.93 | OK | OK | | | OK | OK |
| 0.97 | OK | OK | | | OK | OK |
| 0.89 | OK | OK | | | OK | OK |

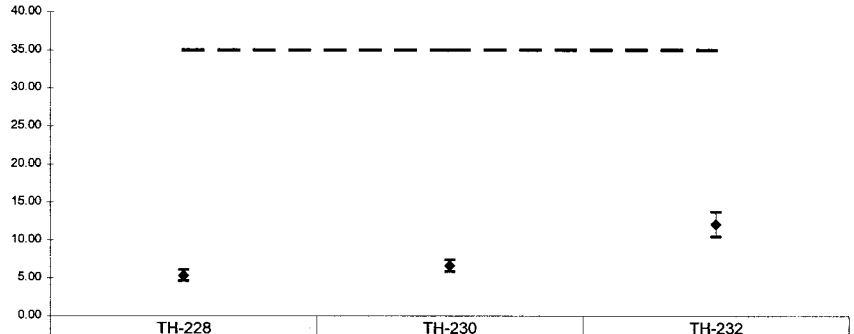
| WO | Analysis | Run | Activity Units | Aliquot Units | Client Name |
|---|---|---|---|---|---|
| 05-09118 | ThISO | 1 | pCi | g | Missouri Dept. of Natural Resources |

## LCS % Recovery



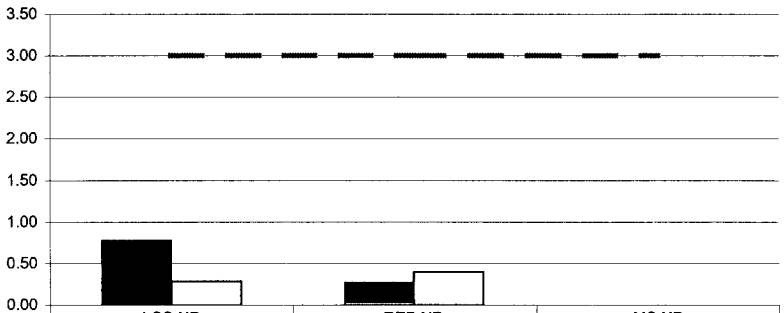

| | TH-228 | TH-230 | TH-232 |
|---|---|---|---|
| Lower Error | 69.67 | 75.54 | 65.37 |
| Upper Error | 115.85 | 119.03 | 111.81 |
| %R | 92.76 | 97.29 | 88.59 |
| LCL | 80 | 80 | 80 |
| Mean | 100 | 100 | 100 |
| UCL | 120 | 120 | 120 |

## Replicate Sample RPD




| | TH-228 | TH-230 | TH-232 |
|---|---|---|---|
| Lower Error | 6.09 | 7.40 | 13.69 |
| Upper Error | 4.63 | 5.87 | 10.46 |
| RPD | 5.36 | 6.63 | 12.08 |
| CL | 35 | 35 | 35 |

## Normalized Difference




| | LCS ND | REP ND | MS ND |
|---|---|---|---|
| TH-228 | 0.78 | 0.27 | 0.00 |
| TH-230 | 0.29 | 0.40 | 0.00 |
| UCL | 3 | 3 | 3 |

## No Matrix Spike

Version

| WO | Analysis | Run | Activity Units | Aliquot Units | Client Name |
|---|---|---|---|---|---|
| 05-09118 | Ra226 | 1 | pCi | g | Missouri Dept. of Natural Resources |

## Laboratory Control Sample

| Analyte | Normalized Difference | LCS Measured | TPU Measured | LCS Expected | Uncert. Expected | Known | Known Error | Result | TPU | Standard ID | Standard ACT (dpm) | Standard Error | Standard Added (g) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| RA-226 | 1.50 | 111.53% | 13.19% | 100.00% | 4.60% | 1.04E+01 | 4.80E-01 | 1.16E+01 | 1.54E+00 | Ra-5b | 4.42E+01 | 4.60E+00 | 5.24E-01 |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |

## Matrix Spike

| *Analyte* | *Normalized Difference* | *MS Actual % Rec* | *Expected MS Result* | *Expected MS Uncert* | *Actual MS Result* | *Actual MS TPU* | *Sample Result* | *Sample TPU* | *Sample Aliquot* | *Standard ID* | *Standard ACT (dpm)* | *Standard Error %* | *Standard Added (g)* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |

## Replicate Sample

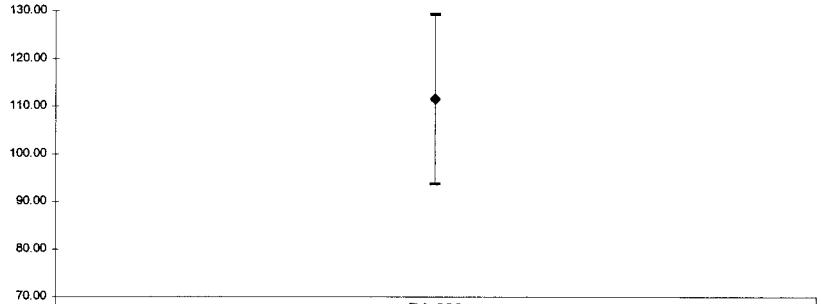
| *Analyte* | *Normalized Difference* | *RPD* | *Original Result* | *Original TPU* | *Replicate Result* | *Replicate TPU* |
|---|---|---|---|---|---|---|
| RA-226 | 0.44 | 8.84 | 1.67E+00 | 4.51E-01 | 1.53E+00 | 4.47E-01 |
| | | | | | | |
| | | | | | | |

## QC Summary

| *LCS Relative Bias* | *LCS % R* | *LCS ND* | *MS % R* | *MS ND* | *Rep RPD* | *Rep ND* |
|---|---|---|---|---|---|---|
| 1.12 | OK | OK | | | OK | OK |
| | | | | | | |
| | | | | | | |

| WO | Analysis | Run | Activity Units | Aliquot Units | Client Name |
|---|---|---|---|---|---|
| 05-09118 | Ra226 | 1 | pCi | g | Missouri Dept. of Natural Resources |

## LCS % Recovery

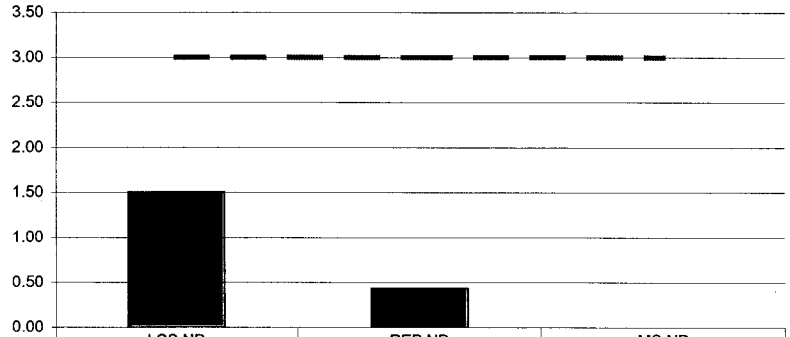



| | RA-226 |
|---|---|
| Lower Error | 93.74 |
| Upper Error | 129.32 |
| %R | 111.53 |
| LCL | 80 |
| Mean | 100 |
| UCL | 120 |

## Replicate Sample RPD

| | RA-226 |
|---|---|
| Lower Error | 10.08 |
| Upper Error | 7.59 |
| RPD | 8.84 |
| CL | 35 |

## Normalized Difference




| | LCS ND | REP ND | MS ND |
|---|---|---|---|
| RA-226 | 1.50 | 0.44 | 0.00 |
| UCL | 3 | 3 | 3 |

## No Matrix Spike

Version

# SECTION VII

# LABORATORY TECHNICIAN'S NOTES & RUN LOGS

**ISO-U NOTES**

EBERLINE SERVICES

## Work Order Analysis Notes

**Oak Ridge Laboratory**
**601 Scarboro Rd.**
**Oak Ridge, TN 37830**
**Voice: 865.481.0683**
**www.eberlineservices.com**

| | |
|---|---|
| Internal Work Order | 05-09118 |
| Analysis Code | UUISO |
| Run Number | 1 |

| # | Date | Dept | User | Notes |
|---|---|---|---|---|
| 1 | 10/05/05 10:31 | PREP | JBARNARD | ALIQUOTED AND ADDED SPIKES AND TRACERS- ADDED HF AND DRIED SAMPLES DOWN UNTIL NEAR DRY- ADDED MIXED ACIDS AND TOOK SAMPLES TO DRYNESS |

JBarnard 10/5/05

EBERLINE SERVICES

## Work Order Analysis Notes

**Oak Ridge Laboratory**
**601 Scarboro Rd.**
**Oak Ridge, TN 37830**
**Voice: 865.481.0683**
**www.eberlineservices.com**

| | |
|---|---|
| Internal Work Order | 05-09118 |
| Analysis Code | UUISO |
| Run Number | 1 |

| # | Date | Dept | User | Notes |
|---|---|---|---|---|
| 1 | 10/05/05 10:31 | PREP | JBARNARD | ALIQUOTED AND ADDED SPIKES AND TRACERS- ADDED HF AND DRIED SAMPLES DOWN UNTIL NEAR DRY- ADDED MIXED ACIDS AND TOOK SAMPLES TO DRYNESS |
| 2 | 10/06/05 15:28 | CHEM | BNEWTON | Used column separation technique to elute Uranium fraction (steps 12.2 to 12.2.7 in AP-005 rev. 9) |

BNewton 10/6/05

EBERLINE SERVICES

**Work Order Analysis Notes**

**Oak Ridge Laboratory**
**601 Scarboro Rd.**
**Oak Ridge, TN 37830**
**Voice: 865.481.0683**
**www.eberlineservices.com**

| | |
|---|---|
| Internal Work Order | 05-09118 |
| Analysis Code | UUISO |
| Run Number | 1 |

| # | Date | Dept | User | Notes |
|---|---|---|---|---|
| 1 | 10/05/05 10:31 | PREP | JBARNARD | ALIQUOTED AND ADDED SPIKES AND TRACERS- ADDED HF AND DRIED SAMPLES DOWN UNTIL NEAR DRY- ADDED MIXED ACIDS AND TOOK SAMPLES TO DRYNESS |
| 2 | 10/06/05 15:28 | CHEM | BNEWTON | Used column separation technique to elute Uranium fraction (steps 12.2 to 12.2.7 in AP-005 rev. 9) |
| 3 | 10/07/05 05:47 | CHEM | TSMITH | Followed steps 12.2.7 to 12.5.5 in AP-005 rev. 9 . ( Precipitated and filtered samples ) |

10-7-05

EBERLINE SERVICES

## Reagents Used in an Analysis

| Internal Work Order | |
|---|---|
| 05-09118 | |
| Analysis Code | Run |
| UUISO | 1 |

| Reagent ID | Reagent Name | Reagent Concentration | Analyst ID | Date Recorded |
|---|---|---|---|---|
| 003397P | Hydrofluoric Acid | Reagent Grade | JBARNARD | 10/5/2005 |
| 003367P | Nitric Acid | Reagent Grade | JBARNARD | 10/5/2005 |
| 002930P | Perchloric Acid | Reagent Grade | JBARNARD | 10/5/2005 |
| 000059P | Sulfuric Acid | Reagent Grade | JBARNARD | 10/5/2005 |
| 003338P | Anion Exchange Resin | Reagent Grade | BNEWTON | 10/5/2005 |
| 003366D03 | Hydrochloric Acid | 0.5N | BNEWTON | 10/6/2005 |
| 003210S | Hydrochloric Acid | 6.5N | BNEWTON | 10/6/2005 |
| 003428S | Hydrochloric Acid | 8N | BNEWTON | 10/6/2005 |
| 003440S | HCl - NH4I | 8N - 0.1M | BNEWTON | 10/6/2005 |
| 003416S | HCl - HF | 6.5N - 0.04N | BNEWTON | 10/6/2005 |
| 003366P | Hydrochloric Acid | Reagent Grade | BNEWTON | 10/6/2005 |
| 003409S | Carbon substrate | Solution | TSMITH | 10/7/2005 |
| 003116P | Hydrofluoric Acid | Reagent Grade | TSMITH | 10/7/2005 |
| 003393S | Neodymium Carrier | 1 mg/ml | TSMITH | 10/7/2005 |
| 003184P | Reagent Alcohol | Reagent Grade | TSMITH | 10/7/2005 |
| 002985P | Titanous Chloride | Reagent Grade | TSMITH | 10/7/2005 |

ALPHA #2



| Date | Sample # | Client | Load Time | Ct. Time | Analysis | Tech |
|---|---|---|---|---|---|---|
| 10-7-05 | 0509118A(5-9) | MON | 0452 | 2HR.50MIN. | Ra | DS |
| 10-7-05 | 0509117A(17-19) | MON | 0758 | 2HR.58MIN. | Un | JD |
| 10-7-05 | 0509118A(1-12) | MON | 0758 | 2HR.58MIN. | Un | DS |

ALPHA #2

| Date | Sample # | Client | Load time | Ct. time | Analysis | Tech |
|---|---|---|---|---|---|---|
| 10-7-05 | 0509118A (15-19) | MDN | 0452 | 2HR. 50MIN. | Ra | JP |
| 10-7-05 | 0509117A (17-19) | MDN | 0758 | 2HR. 06MIN. | Ra | JP |
| 10-7-05 | 0509118A (1-12) | MDN | 0758 | 2HR. 06MIN. | Ra | JP |
| 10-7-05 | 0509118A (13-19) | MDN | 1059 | 2HR. 50MIN. | Ra | JP |

**ISO-TH NOTES**

EBERLINE SERVICES

## Work Order Analysis Notes

**Oak Ridge Laboratory**
**601 Scarboro Rd.**
**Oak Ridge, TN 37830**
**Voice: 865.481.0683**
**www.eberlineservices.com**

| | |
|---|---|
| Internal Work Order | 05-09118 |
| Analysis Code | ThISO |
| Run Number | 1 |

| # | Date | Dept | User | Notes |
|---|---|---|---|---|
| 1 | 10/05/05 10:34 | PREP | JBARNARD | ALIQUOTED AND ADDED SPIKES AND TRACERS- ADDED HF AND DRIED SAMPLES DOWN UNTIL NEAR DRY- ADDED MIXED ACIDS AND TOOK SAMPLES TO DRYNESS- PRECIPITATED WITH BA CARRIER AND POTASSIUM SULFATE- DECANTED SAMPLES AND CENTRIFUGED- ADDED .25M EDTA TO PRECIP, VORTEXED AND PUT SAMPLES IN A HOT WATER BATH- ADDED 10M KOH AND TICL3 AND PUT SAMPLES BACK IN THE HOT WATER BATH- VORTEXED AND CENTRIFUGED- ADDED 30MLS OF 8N HNO3 TO THE THORIUM PRECIP, VORTEXED AND SUBMITTED TO SEPARATIONS |

Barnard 10/5/05

EBERLINE SERVICES

**Work Order Analysis Notes**

**Oak Ridge Laboratory**
**601 Scarboro Rd.**
**Oak Ridge, TN 37830**
**Voice: 865.481.0683**
**www.eberlineservices.com**

| | |
|---|---|
| Internal Work Order | 05-09118 |
| Analysis Code | ThISO |
| Run Number | 1 |

| # | Date | Dept | User | Notes |
|---|---|---|---|---|
| 1 | 10/05/05 10:34 | PREP | JBARNARD | ALIQUOTED AND ADDED SPIKES AND TRACERS- ADDED HF AND DRIED SAMPLES DOWN UNTIL NEAR DRY- ADDED MIXED ACIDS AND TOOK SAMPLES TO DRYNESS- PRECIPITATED WITH BA CARRIER AND POTASSIUM SULFATE- DECANTED SAMPLES AND CENTRIFUGED- ADDED .25M EDTA TO PRECIP, VORTEXED AND PUT SAMPLES IN A HOT WATER BATH- ADDED 10M KOH AND TICL3 AND PUT SAMPLES BACK IN THE HOT WATER BATH- VORTEXED AND CENTRIFUGED- ADDED 30MLS OF 8N HNO3 TO THE THORIUM PRECIP, VORTEXED AND SUBMITTED TO SEPARATIONS |
| 2 | 10/10/05 10:42 | CHEM | TSMITH | Followed steps 12.3 to 12.3.4 in AP-005 rev. 9 . ( Column separation for Thorium ) |
| 3 | 10/11/05 05:16 | CHEM | TSMITH | Followed steps 12.3.4 to 12.5.5 in AP-005 rev. 9 . ( Precipitated and filtered samples ) |

10-11-05

EBERLINE SERVICES

# Reagents Used in an Analysis

| Internal Work Order | |
|---|---|
| 05-09118 | |
| Analysis Code | Run |
| ThISO | 1 |

| Reagent ID | Reagent Name | Reagent Concentration | Analyst ID | Date Recorded |
|---|---|---|---|---|
| 003255D02 | Barium Carrier | 50 mg/ml | JBARNARD | 10/5/2005 |
| 003415S | EDTA | 0.25M | JBARNARD | 10/5/2005 |
| 003397P | Hydrofluoric Acid | Reagent Grade | JBARNARD | 10/5/2005 |
| 003367D03 | Nitric Acid | 8N | JBARNARD | 10/5/2005 |
| 003367P | Nitric Acid | Reagent Grade | JBARNARD | 10/5/2005 |
| 002930P | Perchloric Acid | Reagent Grade | JBARNARD | 10/5/2005 |
| 001365D02 | Potassium Hydroxide | 10M | JBARNARD | 10/5/2005 |
| 003425P | Potassium Sulfate | Reagent Grade | JBARNARD | 10/5/2005 |
| 000059P | Sulfuric Acid | Reagent Grade | JBARNARD | 10/5/2005 |
| 002985P | Titanous Chloride | Reagent Grade | JBARNARD | 10/5/2005 |
| 003338P | Anion Exchange Resin | Reagent Grade | BNEWTON | 10/5/2005 |
| 003420S | Nitric Acid | 8N | TSMITH | 10/10/2005 |
| 003444S | Hydrochloric Acid | 8N | TSMITH | 10/10/2005 |
| 003424S | Carbon substrate | Solution | TSMITH | 10/11/2005 |
| 000051D07 | Cerium Carrier (Alpha iso) | Solution | TSMITH | 10/11/2005 |
| 003116P | Hydrofluoric Acid | Reagent Grade | TSMITH | 10/11/2005 |
| 003184P | Reagent Alcohol | Reagent Grade | TSMITH | 10/11/2005 |

ALPHA #3



| DATE | SAMPLE # | CLIENT | LOAD TIME | CT. TIME | ANALYSIS | TECH |
|---|---|---|---|---|---|---|
| 10-8-05 | Daily Pulser | LAB | 1100 | 10min. | NA | |
| 10-8-05 | 0510018A(1-4) | SHERRY | 1154 | 5HR 35m | Ra | |
| 10-10-05 | Daily Pulser | LAB | 0408 | 10min. | NA | |
| 10-10-05 | 0509117A(16-19) | MDN | 0704 | 21HR 50MN. | Th | |
| 10-10-05 | 0510023A(1-4) | PCC | 0704 | 21HR 50mn | Th | |
| 10-10-05 | 0510020A(1-8) | PWR | 0726 | 5HR 35MN. | Th | |
| 10-10-05 | 0510020A(13,14) | PWR | 1000 | 5HR. 35MN. | Pu | |
| 10-11-05 | Daily Pulser | LAB | 0422 | 10MN. | NA | |
| 10-11-05 | 0509118A(16-19) | MDN | 0736 | 2HR 50mn. | Th | |

ALPHA 1

| DATE | SAMPLE # | CLIENT | LOAD TIME | CT. TIME | ANALYSIS | TECH |
|---|---|---|---|---|---|---|
| 10-5-05 | 0509104A(1-4) | DURATEK | 0817 | 5HR. 35MIN. | U-U | JP |
| 10-5-05 | 0509104A (1-4) | DURATEK | 0817 | 5HR. 35MIN. | Pu | JP |
| 10-5-05 | 0509102A (1-4) | CAS | 0817 | 5HR. 35MIN. | Pu | JP |
| 10-6-05 | DAILY PULSER | LAB | 0407 | 10MIN. | NA | JP |
| 10-6-05 | 0509111A( 2-7) | CAS | 0837 | 5HR 35MIN. | Pu | JP |
| 10-6-05 | 0509102A(1-4) | CAS | 0837 | 5HR. 35MIN. | Th | JP |
| 10-6-05 | 0509104A(1-4) | DURATEK | 0837 | 5HR. 35MIN. | Am/Cm | JP |
| 10-7-05 | DAILY PULSER | LAB | 0413 | 10MIN. | NA | JP |
| 10-7-05 | 0509118A(1-14) | MON | 0452 | 2HR. 50MIN. | Ra | JP |
| 10-7-05 | 0509102A(1-4) | CAS | 0926 | 5HR. 35MIN. | NP | JP |
| 10-7-05 | 0509111A(1-7) | CAS | 0926 | 5HR. 35MIN. | NP | JP |
| 10-7-05 | 0510020A(1-3) | PWR | 0926 | 5HR. 35MIN. | U-U | JP |
| 10-7-05 | Weekly Bkgds | LAB | 1707 | 16HR 40MIN. | K-40 | MP |
| 10-8-05 | DAILY PULSER | LAB | 1055 | 10MIN. | NA | JP |
| 10-10-05 | DAILY PULSER | LAB | 0407 | 10MIN. | NA | JP |
| 10-10-05 | 0510020A(9-13) | PWR | 0814 | 5HR 35MIN. | Th | JP |
| 10-10-05 | 0510020A (1-10) | PWR | 0814 | 5HR 35MIN. | Am | JP |
| 10/10/05 | 0510020A( 1-13) | PWR | 14:21 | 5HR 35MIN | PO-210 | AG |
| 10-11-05 | DAILY PULSER | LAB | 0422 | 10MIN. | NA | JP |
| 10-11-05 | 0509118A(1-15) | MON | 0736 | 2HR. 50MIN. | Th | JP |

**RA-226 NOTES**

EBERLINE SERVICES

## Work Order Analysis Notes

**Oak Ridge Laboratory**
**601 Scarboro Rd.**
**Oak Ridge, TN 37830**
**Voice: 865.481.0683**
**www.eberlineservices.com**

| | |
|---|---|
| Internal Work Order | 05-09118 |
| Analysis Code | Ra226 |
| Run Number | 1 |

| # | Date | Dept | User | Notes |
|---|---|---|---|---|
| 1 | 10/05/05 10:37 | PREP | JBARNARD | ALIQUOTED AND ADDED SPIKES AND TRACERS- ADDED HF AND DRIED SAMPLES DOWN UNTIL NEAR DRY- ADDED MIXED ACIDS AND TOOK SAMPLES TO DRYNESS- PH'D SAMPLS TO 2.8-3.0- PRECIPITATED WITH BA AND PB CARRIERS AND POTASSIUM SULFATE- DECANTED SAMPLES AND CENTRIFUGED- ADDED .25M EDTA AND PHENOLPTHALIEN TO PRECIP, VORTEXED AND PUT SAMPLES IN A HOT WATER BATH- VORTEXED AND CHECKED PH- CENTRIFUGED AND TRANSFERRED SUPERNATE INTO CLEAN C-TUBES AND SUBMITTED TO SEPARATIONS |

JBarnard 10/5/05

EBERLINE SERVICES

**Work Order Analysis Notes**

**Oak Ridge Laboratory**
**601 Scarboro Rd.**
**Oak Ridge, TN 37830**
**Voice: 865.481.0683**
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| | |
|---|---|
| Internal Work Order | 05-09118 |
| Analysis Code | Ra226 |
| Run Number | 1 |

| # | Date | Dept | User | Notes |
|---|---|---|---|---|
| 1 | 10/05/05 10:37 | PREP | JBARNARD | ALIQUOTED AND ADDED SPIKES AND TRACERS- ADDED HF AND DRIED SAMPLES DOWN UNTIL NEAR DRY- ADDED MIXED ACIDS AND TOOK SAMPLES TO DRYNESS- PH'D SAMPLS TO 2.8-3.0- PRECIPITATED WITH BA AND PB CARRIERS AND POTASSIUM SULFATE- DECANTED SAMPLES AND CENTRIFUGED- ADDED .25M EDTA AND PHENOLPTHALIEN TO PRECIP, VORTEXED AND PUT SAMPLES IN A HOT WATER BATH- VORTEXED AND CHECKED PH- CENTRIFUGED AND TRANSFERRED SUPERNATE INTO CLEAN C-TUBES AND SUBMITTED TO SEPARATIONS |
| 2 | 10/06/05 12:33 | CHEM | DJOHNSON | Received samples from prep lab in EDTA. Re-precipitated samples with glacial acetic acid and ammonium sulfate. Filtered samples on tarred filters.Rinsed c-tubes and funnels with diH2O and filtered. Dried and reweighed sample filters. Submitted samples to the count room. |

DJ 10/6/05

EBERLINE SERVICES

## Reagents Used in an Analysis

| Internal Work Order | |
|---|---|
| 05-09118 | |
| Analysis Code | Run |
| Ra226 | 1 |

| Reagent ID | Reagent Name | Reagent Concentration | Analyst ID | Date Recorded |
|---|---|---|---|---|
| 001772P | Ammonium Hydroxide | Reagent Grade | JBARNARD | 10/5/2005 |
| 003255D01 | Barium Carrier | 1 mg/ml | JBARNARD | 10/5/2005 |
| 003415S | EDTA | 0.25M | JBARNARD | 10/5/2005 |
| 003397P | Hydrofluoric Acid | Reagent Grade | JBARNARD | 10/5/2005 |
| 001848D10 | Lead Carrier | 40 mg/ml | JBARNARD | 10/5/2005 |
| 003367P | Nitric Acid | Reagent Grade | JBARNARD | 10/5/2005 |
| 002930P | Perchloric Acid | Reagent Grade | JBARNARD | 10/5/2005 |
| 001755S | Phenolphthalein Indicator | 0.1% | JBARNARD | 10/5/2005 |
| 003425P | Potassium Sulfate | Reagent Grade | JBARNARD | 10/5/2005 |
| 000059P | Sulfuric Acid | Reagent Grade | JBARNARD | 10/5/2005 |
| 000868P | Acetic Acid | Reagent Grade | DJOHNSON | 10/6/2005 |
| 002851D02 | Ammonium Sulfate | 200 mg/ml | DJOHNSON | 10/6/2005 |

ALPHA #2

77

| Date | Sample # | Client | Load time | Ct. time | Analysis | Tech |
|---|---|---|---|---|---|---|
| 10-7-05 | 0509118A (15-19) | MON | 0452 | 2HR. 50MIN. | Ra | [illegible] |

ALPHA 1

3

| DATE | SAMPLE# | CLIENT | LOAD TIME | CT. TIME | ANALYSIS | TECH |
|---|---|---|---|---|---|---|
| 10-5-05 | 0509104A(1-4) | DURATEK | 0817 | 5HR. 35MIN. | UU | [illegible] |
| 10-5-05 | 0509104A (1-4) | DURATEK | 0817 | 5HR. 35MIN. | Pu | [illegible] |
| 10-5-05 | 0509102A (1-4) | CAS | 0817 | 5HR. 35MIN. | Pu | [illegible] |
| 10-6-05 | DAILY PULSER | LAB | 0407 | 10MIN. | NA | [illegible] |
| 10-6-05 | 0509111A( 2-7) | CAS | 0837 | 5HR 35MIN. | Pu | [illegible] |
| 10-6-05 | 0509102A(1-4) | CAS | 0837 | 5HR. 35MIN. | Th | [illegible] |
| 10-6-05 | 0509104A(1-4) | DURATEK | 0837 | 5HR. 35MIN. | Am/Cm | [illegible] |
| 10-7-05 | DAILY PULSER | LAB | 0413 | 10MIN. | NA | [illegible] |
| 10-7-05 | 0509118A(1-14) | MDN | 0452 | 2HR. 50MIN | Ra | [illegible] |

# SECTION VIII

# ANALYTICAL DATA (ISOTOPIC URANIUM)

Eberline Services
Oak Ridge Laboratory
Analysis Sheet

# 05-09118
## UUISO
Run 1



| | |
|---|---|
| Work Order | 05-09118 |
| Analysis Code | UUISO |
| Run | 1 |
| Date Received | 9/30/2005 |
| Lab Deadline | 10/20/2005 |
| Client | Missouri Dept. of Natural Resources |
| Project | B3Z02092 |
| Report Level | 4 |
| Activity Units | pCi |
| Aliquot Units | g |
| Matrix | SO |
| Method | EML U-02 Modified |
| Instrument Type | Alpha Spectroscopy |
| Radiometric Tracer | U-232 |
| Radiometric Sol# | U-10a |
| Tracer Act (dpm/g) | 20.732 |
| Carrier | |
| Carrier Conc (mg/ml) | |
| | |
| | |
| | |

| Internal Fraction | Sample Desc | Client ID | Login CPM | Sample Date | Sample Aliquot |
|---|---|---|---|---|---|
| 01 | LCS | LCS | | 09/30/05 00:00 | 1.0000E+00 |
| 02 | MBL | BLANK | | 09/30/05 00:00 | 1.0000E+00 |
| 03 | DUP | VPBR092705SL17 | 37 | 09/27/05 11:49 | 9.9410E-01 |
| 04 | DO | VPBR092705SL17 | 37 | 09/27/05 11:49 | 9.9360E-01 |
| 05 | TRG | VPBR092705SL18 | 35 | 09/27/05 11:52 | 1.0236E+00 |
| 06 | TRG | VPBR092705SL19 | 44 | 09/27/05 11:58 | 1.0488E+00 |
| 07 | TRG | VPBR092705SL20 | 43 | 09/27/05 12:03 | 1.0526E+00 |
| 08 | TRG | VPTR092805SL0A | 63 | 09/28/05 07:40 | 1.0307E+00 |
| 09 | TRG | VPTR092805SL0B | 53 | 09/28/05 07:46 | 1.0164E+00 |
| 10 | TRG | VPTR092805SL0C | 44 | 09/28/05 07:53 | 9.9520E-01 |
| 11 | TRG | VPTR092805SL0D | 41 | 09/28/05 07:58 | 1.0130E+00 |
| 12 | TRG | VPTR092805SL0E | 45 | 09/28/05 08:03 | 1.0123E+00 |
| 13 | TRG | VPTR092805SL0F | 33 | 09/28/05 08:08 | 1.0147E+00 |
| 14 | TRG | VPTR092805SL0G | 36 | 09/28/05 08:20 | 1.0382E+00 |
| 15 | TRG | VPTR092805SL0H | 42 | 09/28/05 08:25 | 9.9190E-01 |
| 16 | TRG | VPTR092805SL0I | 45 | 09/28/05 08:36 | 1.0332E+00 |
| 17 | TRG | VPTR092805SL0J | 36 | 09/28/05 08:49 | 1.0010E+00 |
| 18 | TRG | VPTR092805SL0K | 43 | 09/28/05 08:58 | 1.1297E+00 |
| 19 | TRG | VPTR092805SL0L | 44 | 09/28/05 09:00 | 1.0585E+00 |
| | | | | | |

* SAF1 is used for Gross Alpha and all other radionuclides. SAF2 is used for Gross Beta only. ** Actual mass exceeded the calibration curve range. Results should be qualified as appropriate.

| Internal Fraction | Sample Desc | Tracer Aliquot (g) | Tracer Total ACT (dpm) | Radiometric Tracer (pCi) | Radiometric % Rec | Grav Carrier Added (ml) | Grav Filter Tare (g) | Grav Filter Final (g) | Grav Filter Net (g) | Grav % Rec | Mean % Rec | SAF 1* | SAF 2* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 01 | LCS | 0.6186 | 12.8 | | | | | | | | | | |
| 02 | MBL | 0.6060 | 12.6 | | | | | | | | | | |
| 03 | DUP | 0.5954 | 12.3 | | | | | | | | | | |
| 04 | DO | 0.5793 | 12.0 | | | | | | | | | | |
| 05 | TRG | 0.5580 | 11.6 | | | | | | | | | | |
| 06 | TRG | 0.5857 | 12.1 | | | | | | | | | | |
| 07 | TRG | 0.5995 | 12.4 | | | | | | | | | | |
| 08 | TRG | 0.5909 | 12.3 | | | | | | | | | | |
| 09 | TRG | 0.5875 | 12.2 | | | | | | | | | | |
| 10 | TRG | 0.6005 | 12.4 | | | | | | | | | | |
| 11 | TRG | 0.5935 | 12.3 | | | | | | | | | | |
| 12 | TRG | 0.5879 | 12.2 | | | | | | | | | | |
| 13 | TRG | 0.5964 | 12.4 | | | | | | | | | | |
| 14 | TRG | 0.5996 | 12.4 | | | | | | | | | | |
| 15 | TRG | 0.5965 | 12.4 | | | | | | | | | | |
| 16 | TRG | 0.5768 | 12.0 | | | | | | | | | | |
| 17 | TRG | 0.5880 | 12.2 | | | | | | | | | | |
| 18 | TRG | 0.6010 | 12.5 | | | | | | | | | | |
| 19 | TRG | 0.5910 | 12.3 | | | | | | | | | | |
| | | | | | | | | | | | | | |

* SAF1 is used for Gross Alpha and all other radionuclides. SAF2 is used for Gross Beta only. ** Actual mass exceeded the calibration curve range. Results should be qualified as appropriate.

| Internal Fraction | Sample Desc | Rough Prep Date | Rough Prep By | Prep Date | Prep By | Sep t0 Date/Time | Sep t0 By | Sep t1 Date/Time | Sep t1 By |
|---|---|---|---|---|---|---|---|---|---|
| 01 | LCS | | | 10/05/05 10:02 | JBARNARD | 10/07/05 05:50 | TSMITH | | |
| 02 | MBL | | | 10/05/05 10:02 | JBARNARD | 10/07/05 05:50 | TSMITH | | |
| 03 | DUP | | | 10/05/05 10:02 | JBARNARD | 10/07/05 05:50 | TSMITH | | |
| 04 | DO | 10/03/05 12:31 | KSALLINGS | 10/05/05 10:02 | JBARNARD | 10/07/05 05:50 | TSMITH | | |
| 05 | TRG | 10/03/05 12:31 | KSALLINGS | 10/05/05 10:02 | JBARNARD | 10/07/05 05:50 | TSMITH | | |
| 06 | TRG | 10/03/05 12:31 | KSALLINGS | 10/05/05 10:02 | JBARNARD | 10/07/05 05:50 | TSMITH | | |
| 07 | TRG | 10/03/05 12:31 | KSALLINGS | 10/05/05 10:02 | JBARNARD | 10/07/05 05:50 | TSMITH | | |
| 08 | TRG | 10/03/05 12:31 | KSALLINGS | 10/05/05 10:02 | JBARNARD | 10/07/05 05:50 | TSMITH | | |
| 09 | TRG | 10/03/05 12:31 | KSALLINGS | 10/05/05 10:02 | JBARNARD | 10/07/05 05:50 | TSMITH | | |
| 10 | TRG | 10/03/05 12:31 | KSALLINGS | 10/05/05 10:02 | JBARNARD | 10/07/05 05:50 | TSMITH | | |
| 11 | TRG | 10/03/05 12:31 | KSALLINGS | 10/05/05 10:02 | JBARNARD | 10/07/05 05:50 | TSMITH | | |
| 12 | TRG | 10/03/05 12:31 | KSALLINGS | 10/05/05 10:02 | JBARNARD | 10/07/05 05:50 | TSMITH | | |
| 13 | TRG | 10/03/05 12:31 | KSALLINGS | 10/05/05 10:02 | JBARNARD | 10/07/05 05:50 | TSMITH | | |
| 14 | TRG | 10/03/05 12:31 | KSALLINGS | 10/05/05 10:02 | JBARNARD | 10/07/05 05:50 | TSMITH | | |
| 15 | TRG | 10/03/05 12:31 | KSALLINGS | 10/05/05 10:02 | JBARNARD | 10/07/05 05:50 | TSMITH | | |
| 16 | TRG | 10/03/05 12:31 | KSALLINGS | 10/05/05 10:02 | JBARNARD | 10/07/05 05:50 | TSMITH | | |
| 17 | TRG | 10/03/05 12:31 | KSALLINGS | 10/05/05 10:02 | JBARNARD | 10/07/05 05:50 | TSMITH | | |
| 18 | TRG | 10/03/05 12:31 | KSALLINGS | 10/05/05 10:02 | JBARNARD | 10/07/05 05:50 | TSMITH | | |
| 19 | TRG | 10/03/05 12:31 | KSALLINGS | 10/05/05 10:02 | JBARNARD | 10/07/05 05:50 | TSMITH | | |
| | | | | | | | | | |

**Preliminary Data Report & Analytical Calculations**

# Work Order: 05-09118-UUISO-1



Run: 1
Analysis Code: UUISO
Eberline Services Work Order: 05-09118
Client: Missouri Dept. of Natural Resources

| Lab Fraction | Nuclide | Sample Desc | Client Identification | Activity Units | Results | Error Estimate | MDA | LCS Known | LCS %R | LCS Flag | RPD Flag | MDA Flag | Blank Flag |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 01 | U-234 | LCS | LCS | pCi/g | 7.61E+00 | 1.33E+00 | 6.99E-02 | 8.00E+00 | 95.12 | OK | | OK | |
| 02 | U-234 | MBL | BLANK | pCi/g | 6.77E-02 | 7.35E-02 | 1.19E-01 | | | | | OK | OK |
| 03 | U-234 | DUP | VPBR092705SL17 | pCi/g | 8.70E-01 | 2.63E-01 | 8.04E-02 | | | | OK | OK | |
| 04 | U-234 | DO | VPBR092705SL17 | pCi/g | 1.05E+00 | 2.94E-01 | 1.01E-01 | | | | | OK | |
| 05 | U-234 | TRG | VPBR092705SL18 | pCi/g | 1.06E+00 | 2.65E-01 | 8.12E-02 | | | | | OK | |
| 06 | U-234 | TRG | VPBR092705SL19 | pCi/g | 1.10E+00 | 2.97E-01 | 1.02E-01 | | | | | OK | |
| 07 | U-234 | TRG | VPBR092705SL20 | pCi/g | 1.34E+00 | 3.34E-01 | 9.29E-02 | | | | | OK | |
| 08 | U-234 | TRG | VPTR092805SL0A | pCi/g | 8.34E-01 | 2.48E-01 | 9.55E-02 | | | | | OK | |
| 09 | U-234 | TRG | VPTR092805SL0B | pCi/g | 1.08E+00 | 2.99E-01 | 1.39E-01 | | | | | OK | |
| 10 | U-234 | TRG | VPTR092805SL0C | pCi/g | 7.31E-01 | 2.26E-01 | 8.09E-02 | | | | | OK | |
| 11 | U-234 | TRG | VPTR092805SL0D | pCi/g | 8.30E-01 | 2.52E-01 | 1.15E-01 | | | | | OK | |
| 12 | U-234 | TRG | VPTR092805SL0E | pCi/g | 1.01E+00 | 2.93E-01 | 8.25E-02 | | | | | OK | |
| 13 | U-234 | TRG | VPTR092805SL0F | pCi/g | 9.32E-01 | 2.64E-01 | 8.80E-02 | | | | | OK | |
| 14 | U-234 | TRG | VPTR092805SL0G | pCi/g | 1.33E+00 | 3.36E-01 | 1.06E-01 | | | | | OK | |
| 15 | U-234 | TRG | VPTR092805SL0H | pCi/g | 7.80E-01 | 2.41E-01 | 9.89E-02 | | | | | OK | |
| 16 | U-234 | TRG | VPTR092805SL0I | pCi/g | 9.98E-01 | 2.73E-01 | 6.09E-02 | | | | | OK | |
| 17 | U-234 | TRG | VPTR092805SL0J | pCi/g | 8.88E-01 | 2.61E-01 | 1.14E-01 | | | | | OK | |
| 18 | U-234 | TRG | VPTR092805SL0K | pCi/g | 8.43E-01 | 2.66E-01 | 8.52E-02 | | | | | OK | |
| 19 | U-234 | TRG | VPTR092805SL0L | pCi/g | 8.54E-01 | 2.50E-01 | 9.32E-02 | | | | | OK | |
| | | | | | | | | | | | | | |

Preliminary Data Report & Analytical Calculations

# Work Order: 05-09118-UUISO-1



Client: Missouri Dept. of Natural Resources
Eberline Services Work Order: 05-09118
Analysis Code: UUISO
Run: 1

| Lab Fraction | Nuclide | Sample Desc | Sample Date | Sample Aliquot | Radiometric % Rec | Grav % Rec | Mean % Rec | SAF | Sep t0 Date/Time | Sep t1 Date/Time |
|---|---|---|---|---|---|---|---|---|---|---|
| 01 | U-234 | LCS | 09/30/05 00:00 | 1.00E+00 | 91.30 | | | | 10/7/2005 5:50 | |
| 02 | U-234 | MBL | 09/30/05 00:00 | 1.00E+00 | 99.26 | | | | 10/7/2005 5:50 | |
| 03 | U-234 | DUP | 09/27/05 11:49 | 9.94E-01 | 100.97 | | | | 10/7/2005 5:50 | |
| 04 | U-234 | DO | 09/27/05 11:49 | 9.94E-01 | 95.01 | | | | 10/7/2005 5:50 | |
| 05 | U-234 | TRG | 09/27/05 11:52 | 1.02E+00 | 115.52 | | | | 10/7/2005 5:50 | |
| 06 | U-234 | TRG | 09/27/05 11:58 | 1.05E+00 | 96.45 | | | | 10/7/2005 5:50 | |
| 07 | U-234 | TRG | 09/27/05 12:03 | 1.05E+00 | 94.66 | | | | 10/7/2005 5:50 | |
| 08 | U-234 | TRG | 09/28/05 07:40 | 1.03E+00 | 97.03 | | | | 10/7/2005 5:50 | |
| 09 | U-234 | TRG | 09/28/05 07:46 | 1.02E+00 | 96.76 | | | | 10/7/2005 5:50 | |
| 10 | U-234 | TRG | 09/28/05 07:53 | 9.95E-01 | 96.00 | | | | 10/7/2005 5:50 | |
| 11 | U-234 | TRG | 09/28/05 07:58 | 1.01E+00 | 94.46 | | | | 10/7/2005 5:50 | |
| 12 | U-234 | TRG | 09/28/05 08:03 | 1.01E+00 | 89.57 | | | | 10/7/2005 5:50 | |
| 13 | U-234 | TRG | 09/28/05 08:08 | 1.01E+00 | 100.38 | | | | 10/7/2005 5:50 | |
| 14 | U-234 | TRG | 09/28/05 08:20 | 1.04E+00 | 94.75 | | | | 10/7/2005 5:50 | |
| 15 | U-234 | TRG | 09/28/05 08:25 | 9.92E-01 | 99.81 | | | | 10/7/2005 5:50 | |
| 16 | U-234 | TRG | 09/28/05 08:36 | 1.03E+00 | 101.50 | | | | 10/7/2005 5:50 | |
| 17 | U-234 | TRG | 09/28/05 08:49 | 1.00E+00 | 103.58 | | | | 10/7/2005 5:50 | |
| 18 | U-234 | TRG | 09/28/05 08:58 | 1.13E+00 | 83.90 | | | | 10/7/2005 5:50 | |
| 19 | U-234 | TRG | 09/28/05 09:00 | 1.06E+00 | 96.31 | | | | 10/7/2005 5:50 | |
| | | | | | | | | | | |

| Run | Analysis Code | Eberline Services Work Order | Client |
|---|---|---|---|
| 1 | UUISO | 05-09118 | Missouri Dept. of Natural Resources |

| Lab Fraction | Nuclide | Sample Desc | Counting Date/Time | Halflife (days) | Detect | Carrier | Count Time | Counts | Bkg CPM | Eff |
|---|---|---|---|---|---|---|---|---|---|---|
| 01 | U-234 | LCS | 10/07/05 07:54 | | A_Spec | 20 | 170.08 | 5.04 E+02 | 1.00 E-03 | 19.2 |
| 02 | U-234 | MBL | 10/07/05 07:54 | | A_Spec | 21 | 170.03 | 4.64 E+00 | 8.00 E-03 | 18.3 |
| 03 | U-234 | DUP | 10/07/05 07:54 | | A_Spec | 22 | 170.1 | 5.87 E+01 | 2.00 E-03 | 17.8 |
| 04 | U-234 | DO | 10/07/05 07:55 | | A_Spec | 23 | 170.07 | 7.32 E+01 | 5.00 E-03 | 19.5 |
| 05 | U-234 | TRG | 10/07/05 07:55 | | A_Spec | 25 | 170 | 9.70 E+01 | 6.00 E-03 | 20.5 |
| 06 | U-234 | TRG | 10/07/05 07:55 | | A_Spec | 26 | 170.12 | 8.00 E+01 | 6.00 E-03 | 19.1 |
| 07 | U-234 | TRG | 10/07/05 07:55 | | A_Spec | 27 | 170.07 | 1.01 E+02 | 5.00 E-03 | 20.1 |
| 08 | U-234 | TRG | 10/07/05 07:56 | | A_Spec | 28 | 170.05 | 6.12 E+01 | 5.00 E-03 | 19.5 |
| 09 | U-234 | TRG | 10/07/05 07:56 | | A_Spec | 29 | 170.1 | 7.66 E+01 | 1.40 E-02 | 19.1 |
| 10 | U-234 | TRG | 10/07/05 07:57 | | A_Spec | 30 | 170.02 | 5.45 E+01 | 3.00 E-03 | 20.7 |
| 11 | U-234 | TRG | 10/07/05 07:57 | | A_Spec | 31 | 170.12 | 5.86 E+01 | 8.00 E-03 | 19.6 |
| 12 | U-234 | TRG | 10/07/05 07:58 | | A_Spec | 32 | 170.13 | 6.67 E+01 | 2.00 E-03 | 19.2 |
| 13 | U-234 | TRG | 10/07/05 10:57 | | A_Spec | 17 | 170.1 | 6.93 E+01 | 4.00 E-03 | 19.4 |
| 14 | U-234 | TRG | 10/07/05 10:57 | | A_Spec | 18 | 170.12 | 9.78 E+01 | 7.00 E-03 | 19.8 |
| 15 | U-234 | TRG | 10/07/05 10:57 | | A_Spec | 19 | 170.07 | 5.52 E+01 | 5.00 E-03 | 19 |
| 16 | U-234 | TRG | 10/07/05 10:58 | | A_Spec | 20 | 170.08 | 7.58 E+01 | 1.00 E-03 | 19.2 |
| 17 | U-234 | TRG | 10/07/05 10:58 | | A_Spec | 21 | 170.1 | 6.36 E+01 | 8.00 E-03 | 18.3 |
| 18 | U-234 | TRG | 10/07/05 10:59 | | A_Spec | 22 | 170.02 | 5.37 E+01 | 2.00 E-03 | 17.8 |
| 19 | U-234 | TRG | 10/07/05 10:59 | | A_Spec | 23 | 170.1 | 6.42 E+01 | 5.00 E-03 | 19.5 |
| | | | | | | | | | | |

**Preliminary Data Report & Analytical Calculations**

# Work Order: 05-09118-UUISO-1



| Run | Analysis Code | Eberline Services Work Order | Client |
|---|---|---|---|
| 1 | UUISO | 05-09118 | Missouri Dept. of Natural Resources |

| Lab Fraction | Nuclide | Sample Desc | Client Identification | Activity Units | Results | Error Estimate | MDA | LCS Known | LCS %R | LCS Flag | RPD Flag | MDA Flag | Blank Flag |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 01 | U-235 | LCS | LCS | pCi/g | 4.85E-01 | 2.03E-01 | 5.05E-02 | 3.63E-01 | 133.36 | INV | | OK | |
| 02 | U-235 | MBL | BLANK | pCi/g | 5.09E-02 | 6.31E-02 | 8.32E-02 | | | | | OK | OK |
| 03 | U-235 | DUP | VPBR092705SL17 | pCi/g | 5.49E-02 | 6.39E-02 | 4.96E-02 | | | | OK | OK | |
| 04 | U-235 | DO | VPBR092705SL17 | pCi/g | 5.02E-02 | 6.22E-02 | 8.21E-02 | | | | | OK | |
| 05 | U-235 | TRG | VPBR092705SL18 | pCi/g | 9.46E-02 | 7.28E-02 | 3.66E-02 | | | | | OK | |
| 06 | U-235 | TRG | VPBR092705SL19 | pCi/g | 6.48E-02 | 6.87E-02 | 7.84E-02 | | | | | OK | |
| 07 | U-235 | TRG | VPBR092705SL20 | pCi/g | 1.23E-01 | 9.49E-02 | 9.88E-02 | | | | | OK | |
| 08 | U-235 | TRG | VPTR092805SL0A | pCi/g | 3.08E-02 | 4.82E-02 | 7.79E-02 | | | | | OK | |
| 09 | U-235 | TRG | VPTR092805SL0B | pCi/g | 8.10E-02 | 7.91E-02 | 9.43E-02 | | | | | OK | |
| 10 | U-235 | TRG | VPTR092805SL0C | pCi/g | 2.46E-02 | 4.79E-02 | 9.97E-02 | | | | | OK | |
| 11 | U-235 | TRG | VPTR092805SL0D | pCi/g | 1.57E-01 | 1.07E-01 | 4.74E-02 | | | | | OK | |
| 12 | U-235 | TRG | VPTR092805SL0E | pCi/g | 9.06E-02 | 8.53E-02 | 8.69E-02 | | | | | OK | |
| 13 | U-235 | TRG | VPTR092805SL0F | pCi/g | 6.64E-02 | 6.71E-02 | 4.50E-02 | | | | | OK | |
| 14 | U-235 | TRG | VPTR092805SL0G | pCi/g | 8.13E-02 | 7.64E-02 | 7.79E-02 | | | | | OK | |
| 15 | U-235 | TRG | VPTR092805SL0H | pCi/g | 8.42E-02 | 7.92E-02 | 8.07E-02 | | | | | OK | |
| 16 | U-235 | TRG | VPTR092805SL0I | pCi/g | 3.25E-02 | 4.62E-02 | 4.40E-02 | | | | | OK | |
| 17 | U-235 | TRG | VPTR092805SL0J | pCi/g | 1.43E-02 | 3.50E-02 | 7.97E-02 | | | | | OK | |
| 18 | U-235 | TRG | VPTR092805SL0K | pCi/g | 7.75E-02 | 7.84E-02 | 5.25E-02 | | | | | OK | |
| 19 | U-235 | TRG | VPTR092805SL0L | pCi/g | 6.29E-02 | 6.66E-02 | 7.60E-02 | | | | | OK | |
| | | | | | | | | | | | | | |

Client: Missouri Dept. of Natural Resources
Eberline Services Work Order: 05-09118
Analysis Code: UUISO
Run: 1

| Lab Fraction | Nuclide | Sample Desc | Sample Date | Sample Aliquot | Radiometric % Rec | Grav % Rec | Mean % Rec | SAF | Sep t0 Date/Time | Sep t1 Date/Time |
|---|---|---|---|---|---|---|---|---|---|---|
| 01 | U-235 | LCS | 09/30/05 00:00 | 1.00E+00 | 91.30 | | | | 10/7/2005 5:50 | |
| 02 | U-235 | MBL | 09/30/05 00:00 | 1.00E+00 | 99.26 | | | | 10/7/2005 5:50 | |
| 03 | U-235 | DUP | 09/27/05 11:49 | 9.94E-01 | 100.97 | | | | 10/7/2005 5:50 | |
| 04 | U-235 | DO | 09/27/05 11:49 | 9.94E-01 | 95.01 | | | | 10/7/2005 5:50 | |
| 05 | U-235 | TRG | 09/27/05 11:52 | 1.02E+00 | 115.52 | | | | 10/7/2005 5:50 | |
| 06 | U-235 | TRG | 09/27/05 11:58 | 1.05E+00 | 96.45 | | | | 10/7/2005 5:50 | |
| 07 | U-235 | TRG | 09/27/05 12:03 | 1.05E+00 | 94.66 | | | | 10/7/2005 5:50 | |
| 08 | U-235 | TRG | 09/28/05 07:40 | 1.03E+00 | 97.03 | | | | 10/7/2005 5:50 | |
| 09 | U-235 | TRG | 09/28/05 07:46 | 1.02E+00 | 96.76 | | | | 10/7/2005 5:50 | |
| 10 | U-235 | TRG | 09/28/05 07:53 | 9.95E-01 | 96.00 | | | | 10/7/2005 5:50 | |
| 11 | U-235 | TRG | 09/28/05 07:58 | 1.01E+00 | 94.46 | | | | 10/7/2005 5:50 | |
| 12 | U-235 | TRG | 09/28/05 08:03 | 1.01E+00 | 89.57 | | | | 10/7/2005 5:50 | |
| 13 | U-235 | TRG | 09/28/05 08:08 | 1.01E+00 | 100.38 | | | | 10/7/2005 5:50 | |
| 14 | U-235 | TRG | 09/28/05 08:20 | 1.04E+00 | 94.75 | | | | 10/7/2005 5:50 | |
| 15 | U-235 | TRG | 09/28/05 08:25 | 9.92E-01 | 99.81 | | | | 10/7/2005 5:50 | |
| 16 | U-235 | TRG | 09/28/05 08:36 | 1.03E+00 | 101.50 | | | | 10/7/2005 5:50 | |
| 17 | U-235 | TRG | 09/28/05 08:49 | 1.00E+00 | 103.58 | | | | 10/7/2005 5:50 | |
| 18 | U-235 | TRG | 09/28/05 08:58 | 1.13E+00 | 83.90 | | | | 10/7/2005 5:50 | |
| 19 | U-235 | TRG | 09/28/05 09:00 | 1.06E+00 | 96.31 | | | | 10/7/2005 5:50 | |
| | | | | | | | | | | |

Client: Missouri Dept. of Natural Resources
Eberline Services Work Order: 05-09118
Analysis Code: UUISO
Run: 1

| Lab Fraction | Nuclide | Sample Desc | Counting Date/Time | Halflife (days) | Detect | Carrier | Count Time | Counts | Bkg CPM | Eff |
|---|---|---|---|---|---|---|---|---|---|---|
| 01 | U-235 | LCS | 10/07/05 07:54 | | A_Spec | 20 | 170.08 | 2.60 E+01 | 0.00 E+00 | 19.2 |
| 02 | U-235 | MBL | 10/07/05 07:54 | | A_Spec | 21 | 170.03 | 2.83 E+00 | 1.00 E-03 | 18.3 |
| 03 | U-235 | DUP | 10/07/05 07:54 | | A_Spec | 22 | 170.1 | 3.00 E+00 | 0.00 E+00 | 17.8 |
| 04 | U-235 | DO | 10/07/05 07:55 | | A_Spec | 23 | 170.07 | 2.83 E+00 | 1.00 E-03 | 19.5 |
| 05 | U-235 | TRG | 10/07/05 07:55 | | A_Spec | 25 | 170 | 7.00 E+00 | 0.00 E+00 | 20.5 |
| 06 | U-235 | TRG | 10/07/05 07:55 | | A_Spec | 26 | 170.12 | 3.83 E+00 | 1.00 E-03 | 19.1 |
| 07 | U-235 | TRG | 10/07/05 07:55 | | A_Spec | 27 | 170.07 | 7.49 E+00 | 3.00 E-03 | 20.1 |
| 08 | U-235 | TRG | 10/07/05 07:56 | | A_Spec | 28 | 170.05 | 1.83 E+00 | 1.00 E-03 | 19.5 |
| 09 | U-235 | TRG | 10/07/05 07:56 | | A_Spec | 29 | 170.1 | 4.66 E+00 | 2.00 E-03 | 19.1 |
| 10 | U-235 | TRG | 10/07/05 07:57 | | A_Spec | 30 | 170.02 | 1.49 E+00 | 3.00 E-03 | 20.7 |
| 11 | U-235 | TRG | 10/07/05 07:57 | | A_Spec | 31 | 170.12 | 9.00 E+00 | 0.00 E+00 | 19.6 |
| 12 | U-235 | TRG | 10/07/05 07:58 | | A_Spec | 32 | 170.13 | 4.83 E+00 | 1.00 E-03 | 19.2 |
| 13 | U-235 | TRG | 10/07/05 10:57 | | A_Spec | 17 | 170.1 | 4.00 E+00 | 0.00 E+00 | 19.4 |
| 14 | U-235 | TRG | 10/07/05 10:57 | | A_Spec | 18 | 170.12 | 4.83 E+00 | 1.00 E-03 | 19.8 |
| 15 | U-235 | TRG | 10/07/05 10:57 | | A_Spec | 19 | 170.07 | 4.83 E+00 | 1.00 E-03 | 19 |
| 16 | U-235 | TRG | 10/07/05 10:58 | | A_Spec | 20 | 170.08 | 2.00 E+00 | 0.00 E+00 | 19.2 |
| 17 | U-235 | TRG | 10/07/05 10:58 | | A_Spec | 21 | 170.1 | 8.30 E-01 | 1.00 E-03 | 18.3 |
| 18 | U-235 | TRG | 10/07/05 10:59 | | A_Spec | 22 | 170.02 | 4.00 E+00 | 0.00 E+00 | 17.8 |
| 19 | U-235 | TRG | 10/07/05 10:59 | | A_Spec | 23 | 170.1 | 3.83 E+00 | 1.00 E-03 | 19.5 |
| | | | | | | | | | | |

**Preliminary Data Report & Analytical Calculations**

# Work Order: 05-09118-UUISO-1



Client: Missouri Dept. of Natural Resources
Eberline Services Work Order: 05-09118
Analysis Code: UUISO
Run: 1

| Lab Fraction | Nuclide | Sample Desc | Client Identification | Activity Units | Results | Error Estimate | MDA | LCS Known | LCS %R | LCS Flag | RPD Flag | MDA Flag | Blank Flag |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 01 | U-238 | LCS | LCS | pCi/g | 8.15E+00 | 1.41E+00 | 6.96E-02 | 7.80E+00 | 104.49 | OK | | OK | |
| 02 | U-238 | MBL | BLANK | pCi/g | 4.33E-02 | 5.97E-02 | 1.08E-01 | | | | | OK | OK |
| 03 | U-238 | DUP | VPBR092705SL17 | pCi/g | 7.63E-01 | 2.42E-01 | 8.00E-02 | | | | OK | OK | |
| 04 | U-238 | DO | VPBR092705SL17 | pCi/g | 9.26E-01 | 2.70E-01 | 7.77E-02 | | | | | OK | |
| 05 | U-238 | TRG | VPBR092705SL18 | pCi/g | 1.05E+00 | 2.61E-01 | 5.05E-02 | | | | | OK | |
| 06 | U-238 | TRG | VPBR092705SL19 | pCi/g | 7.19E-01 | 2.28E-01 | 1.11E-01 | | | | | OK | |
| 07 | U-238 | TRG | VPBR092705SL20 | pCi/g | 1.08E+00 | 2.88E-01 | 6.12E-02 | | | | | OK | |
| 08 | U-238 | TRG | VPTR092805SL0A | pCi/g | 1.02E+00 | 2.82E-01 | 8.89E-02 | | | | | OK | |
| 09 | U-238 | TRG | VPTR092805SL0B | pCi/g | 7.86E-01 | 2.43E-01 | 1.04E-01 | | | | | OK | |
| 10 | U-238 | TRG | VPTR092805SL0C | pCi/g | 6.74E-01 | 2.15E-01 | 8.05E-02 | | | | | OK | |
| 11 | U-238 | TRG | VPTR092805SL0D | pCi/g | 9.49E-01 | 2.72E-01 | 9.23E-02 | | | | | OK | |
| 12 | U-238 | TRG | VPTR092805SL0E | pCi/g | 1.05E+00 | 3.00E-01 | 9.14E-02 | | | | | OK | |
| 13 | U-238 | TRG | VPTR092805SL0F | pCi/g | 1.06E+00 | 2.84E-01 | 6.20E-02 | | | | | OK | |
| 14 | U-238 | TRG | VPTR092805SL0G | pCi/g | 1.12E+00 | 2.98E-01 | 8.19E-02 | | | | | OK | |
| 15 | U-238 | TRG | VPTR092805SL0H | pCi/g | 9.24E-01 | 2.68E-01 | 1.15E-01 | | | | | OK | |
| 16 | U-238 | TRG | VPTR092805SL0I | pCi/g | 9.28E-01 | 2.60E-01 | 6.06E-02 | | | | | OK | |
| 17 | U-238 | TRG | VPTR092805SL0J | pCi/g | 9.72E-01 | 2.75E-01 | 1.03E-01 | | | | | OK | |
| 18 | U-238 | TRG | VPTR092805SL0K | pCi/g | 1.09E+00 | 3.13E-01 | 8.48E-02 | | | | | OK | |
| 19 | U-238 | TRG | VPTR092805SL0L | pCi/g | 9.90E-01 | 2.73E-01 | 7.19E-02 | | | | | OK | |
| | | | | | | | | | | | | | |

| Client | Eberline Services Work Order | Analysis Code | Run |
|---|---|---|---|
| Missouri Dept. of Natural Resources | 05-09118 | UUISO | 1 |

| Lab Fraction | Nuclide | Sample Desc | Sample Date | Sample Aliquot | Radiometric % Rec | Grav % Rec | Mean % Rec | SAF | Sep t0 Date/Time | Sep t1 Date/Time |
|---|---|---|---|---|---|---|---|---|---|---|
| 01 | U-238 | LCS | 09/30/05 00:00 | 1.00E+00 | 91.30 | | | | 10/7/2005 5:50 | |
| 02 | U-238 | MBL | 09/30/05 00:00 | 1.00E+00 | 99.26 | | | | 10/7/2005 5:50 | |
| 03 | U-238 | DUP | 09/27/05 11:49 | 9.94E-01 | 100.97 | | | | 10/7/2005 5:50 | |
| 04 | U-238 | DO | 09/27/05 11:49 | 9.94E-01 | 95.01 | | | | 10/7/2005 5:50 | |
| 05 | U-238 | TRG | 09/27/05 11:52 | 1.02E+00 | 115.52 | | | | 10/7/2005 5:50 | |
| 06 | U-238 | TRG | 09/27/05 11:58 | 1.05E+00 | 96.45 | | | | 10/7/2005 5:50 | |
| 07 | U-238 | TRG | 09/27/05 12:03 | 1.05E+00 | 94.66 | | | | 10/7/2005 5:50 | |
| 08 | U-238 | TRG | 09/28/05 07:40 | 1.03E+00 | 97.03 | | | | 10/7/2005 5:50 | |
| 09 | U-238 | TRG | 09/28/05 07:46 | 1.02E+00 | 96.76 | | | | 10/7/2005 5:50 | |
| 10 | U-238 | TRG | 09/28/05 07:53 | 9.95E-01 | 96.00 | | | | 10/7/2005 5:50 | |
| 11 | U-238 | TRG | 09/28/05 07:58 | 1.01E+00 | 94.46 | | | | 10/7/2005 5:50 | |
| 12 | U-238 | TRG | 09/28/05 08:03 | 1.01E+00 | 89.57 | | | | 10/7/2005 5:50 | |
| 13 | U-238 | TRG | 09/28/05 08:08 | 1.01E+00 | 100.38 | | | | 10/7/2005 5:50 | |
| 14 | U-238 | TRG | 09/28/05 08:20 | 1.04E+00 | 94.75 | | | | 10/7/2005 5:50 | |
| 15 | U-238 | TRG | 09/28/05 08:25 | 9.92E-01 | 99.81 | | | | 10/7/2005 5:50 | |
| 16 | U-238 | TRG | 09/28/05 08:36 | 1.03E+00 | 101.50 | | | | 10/7/2005 5:50 | |
| 17 | U-238 | TRG | 09/28/05 08:49 | 1.00E+00 | 103.58 | | | | 10/7/2005 5:50 | |
| 18 | U-238 | TRG | 09/28/05 08:58 | 1.13E+00 | 83.90 | | | | 10/7/2005 5:50 | |
| 19 | U-238 | TRG | 09/28/05 09:00 | 1.06E+00 | 96.31 | | | | 10/7/2005 5:50 | |
| | | | | | | | | | | |

Client: Missouri Dept. of Natural Resources
Eberline Services Work Order: 05-09118
Analysis Code: UUISO
Run: 1

| Lab Fraction | Nuclide | Sample Desc | Counting Date/Time | Halflife (days) | Detect | Carrier | Count Time | Counts | Bkg CPM | Eff |
|---|---|---|---|---|---|---|---|---|---|---|
| 01 | U-238 | LCS | 10/07/05 07:54 | | A_Spec | 20 | 170.08 | 5.42 E+02 | 1.00 E-03 | 19.2 |
| 02 | U-238 | MBL | 10/07/05 07:54 | | A_Spec | 21 | 170.03 | 2.98 E+00 | 6.00 E-03 | 18.3 |
| 03 | U-238 | DUP | 10/07/05 07:54 | | A_Spec | 22 | 170.1 | 5.17 E+01 | 2.00 E-03 | 17.8 |
| 04 | U-238 | DO | 10/07/05 07:55 | | A_Spec | 23 | 170.07 | 6.47 E+01 | 2.00 E-03 | 19.5 |
| 05 | U-238 | TRG | 10/07/05 07:55 | | A_Spec | 25 | 170 | 9.58 E+01 | 1.00 E-03 | 20.5 |
| 06 | U-238 | TRG | 10/07/05 07:55 | | A_Spec | 26 | 170.12 | 5.26 E+01 | 8.00 E-03 | 19.1 |
| 07 | U-238 | TRG | 10/07/05 07:55 | | A_Spec | 27 | 170.07 | 8.18 E+01 | 1.00 E-03 | 20.1 |
| 08 | U-238 | TRG | 10/07/05 07:56 | | A_Spec | 28 | 170.05 | 7.53 E+01 | 4.00 E-03 | 19.5 |
| 09 | U-238 | TRG | 10/07/05 07:56 | | A_Spec | 29 | 170.1 | 5.60 E+01 | 6.00 E-03 | 19.1 |
| 10 | U-238 | TRG | 10/07/05 07:57 | | A_Spec | 30 | 170.02 | 5.05 E+01 | 3.00 E-03 | 20.7 |
| 11 | U-238 | TRG | 10/07/05 07:57 | | A_Spec | 31 | 170.12 | 6.73 E+01 | 4.00 E-03 | 19.6 |
| 12 | U-238 | TRG | 10/07/05 07:58 | | A_Spec | 32 | 170.13 | 6.95 E+01 | 3.00 E-03 | 19.2 |
| 13 | U-238 | TRG | 10/07/05 10:57 | | A_Spec | 17 | 170.1 | 7.88 E+01 | 1.00 E-03 | 19.4 |
| 14 | U-238 | TRG | 10/07/05 10:57 | | A_Spec | 18 | 170.12 | 8.25 E+01 | 3.00 E-03 | 19.8 |
| 15 | U-238 | TRG | 10/07/05 10:57 | | A_Spec | 19 | 170.07 | 6.56 E+01 | 8.00 E-03 | 19 |
| 16 | U-238 | TRG | 10/07/05 10:58 | | A_Spec | 20 | 170.08 | 7.08 E+01 | 1.00 E-03 | 19.2 |
| 17 | U-238 | TRG | 10/07/05 10:58 | | A_Spec | 21 | 170.1 | 7.00 E+01 | 6.00 E-03 | 18.3 |
| 18 | U-238 | TRG | 10/07/05 10:59 | | A_Spec | 22 | 170.02 | 6.97 E+01 | 2.00 E-03 | 17.8 |
| 19 | U-238 | TRG | 10/07/05 10:59 | | A_Spec | 23 | 170.1 | 7.47 E+01 | 2.00 E-03 | 19.5 |
| | | | | | | | | | | |

Client: Missouri Dept. of Natural Resources
Eberline Services Work Order: 05-09118
Analysis Code: UUISO
Run: 1

| Lab Fraction | Nuclide | Sample Desc | Client Identification | Activity Units | Results | Error Estimate | MDA | LCS Known | LCS %R | LCS Flag | RPD Flag | MDA Flag | Blank Flag |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 02 | U-236 | MBL | BLANK | pCi/g | -2.75E-03 | 5.51E-03 | 7.47E-02 | | | | | OK | OK |
| 03 | U-236 | DUP | VPBR092705SL17 | pCi/g | 1.36E-02 | 3.34E-02 | 7.60E-02 | | | | INV | OK | |
| 04 | U-236 | DO | VPBR092705SL17 | pCi/g | 6.10E-02 | 6.46E-02 | 7.37E-02 | | | | | OK | |
| 05 | U-236 | TRG | VPBR092705SL18 | pCi/g | 4.65E-02 | 4.92E-02 | 5.62E-02 | | | | | OK | |
| 06 | U-236 | TRG | VPBR092705SL19 | pCi/g | 1.00E-02 | 3.13E-02 | 8.24E-02 | | | | | OK | |
| 07 | U-236 | TRG | VPBR092705SL20 | pCi/g | 1.22E-02 | 2.99E-02 | 6.81E-02 | | | | | OK | |
| 08 | U-236 | TRG | VPTR092805SL0A | pCi/g | 0.00E+00 | 0.00E+00 | 4.09E-02 | | | | | OK | |
| 09 | U-236 | TRG | VPTR092805SL0B | pCi/g | -3.21E-04 | 3.38E-02 | 1.16E-01 | | | | | OK | |
| 10 | U-236 | TRG | VPTR092805SL0C | pCi/g | -2.52E-03 | 5.06E-03 | 6.87E-02 | | | | | OK | |
| 11 | U-236 | TRG | VPTR092805SL0D | pCi/g | 1.04E-02 | 3.23E-02 | 8.51E-02 | | | | | OK | |
| 12 | U-236 | TRG | VPTR092805SL0E | pCi/g | 5.88E-02 | 6.87E-02 | 1.02E-01 | | | | | OK | |
| 13 | U-236 | TRG | VPTR092805SL0F | pCi/g | -2.53E-03 | 5.08E-03 | 6.89E-02 | | | | | OK | |
| 14 | U-236 | TRG | VPTR092805SL0G | pCi/g | 4.27E-02 | 5.30E-02 | 6.99E-02 | | | | | OK | |
| 15 | U-236 | TRG | VPTR092805SL0H | pCi/g | 2.87E-02 | 4.48E-02 | 7.25E-02 | | | | | OK | |
| 16 | U-236 | TRG | VPTR092805SL0I | pCi/g | -2.48E-03 | 4.97E-03 | 6.74E-02 | | | | | OK | |
| 17 | U-236 | TRG | VPTR092805SL0J | pCi/g | 4.37E-02 | 5.42E-02 | 7.15E-02 | | | | | OK | |
| 18 | U-236 | TRG | VPTR092805SL0K | pCi/g | 1.44E-02 | 3.54E-02 | 8.05E-02 | | | | | OK | |
| 19 | U-236 | TRG | VPTR092805SL0L | pCi/g | 8.60E-02 | 7.36E-02 | 6.83E-02 | | | | | OK | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |

Client: Missouri Dept. of Natural Resources
Eberline Services Work Order: 05-09118
Analysis Code: UUISO
Run: 1

| Lab Fraction | Nuclide | Sample Desc | Sample Date | Sample Aliquot | Radiometric % Rec | Grav % Rec | Mean % Rec | SAF | Sep t0 Date/Time | Sep t1 Date/Time |
|---|---|---|---|---|---|---|---|---|---|---|
| 02 | U-236 | MBL | 09/30/05 00:00 | 1.00E+00 | 99.26 | | | | 10/7/2005 5:50 | |
| 03 | U-236 | DUP | 09/27/05 11:49 | 9.94E-01 | 100.97 | | | | 10/7/2005 5:50 | |
| 04 | U-236 | DO | 09/27/05 11:49 | 9.94E-01 | 95.01 | | | | 10/7/2005 5:50 | |
| 05 | U-236 | TRG | 09/27/05 11:52 | 1.02E+00 | 115.52 | | | | 10/7/2005 5:50 | |
| 06 | U-236 | TRG | 09/27/05 11:58 | 1.05E+00 | 96.45 | | | | 10/7/2005 5:50 | |
| 07 | U-236 | TRG | 09/27/05 12:03 | 1.05E+00 | 94.66 | | | | 10/7/2005 5:50 | |
| 08 | U-236 | TRG | 09/28/05 07:40 | 1.03E+00 | 97.03 | | | | 10/7/2005 5:50 | |
| 09 | U-236 | TRG | 09/28/05 07:46 | 1.02E+00 | 96.76 | | | | 10/7/2005 5:50 | |
| 10 | U-236 | TRG | 09/28/05 07:53 | 9.95E-01 | 96.00 | | | | 10/7/2005 5:50 | |
| 11 | U-236 | TRG | 09/28/05 07:58 | 1.01E+00 | 94.46 | | | | 10/7/2005 5:50 | |
| 12 | U-236 | TRG | 09/28/05 08:03 | 1.01E+00 | 89.57 | | | | 10/7/2005 5:50 | |
| 13 | U-236 | TRG | 09/28/05 08:08 | 1.01E+00 | 100.38 | | | | 10/7/2005 5:50 | |
| 14 | U-236 | TRG | 09/28/05 08:20 | 1.04E+00 | 94.75 | | | | 10/7/2005 5:50 | |
| 15 | U-236 | TRG | 09/28/05 08:25 | 9.92E-01 | 99.81 | | | | 10/7/2005 5:50 | |
| 16 | U-236 | TRG | 09/28/05 08:36 | 1.03E+00 | 101.50 | | | | 10/7/2005 5:50 | |
| 17 | U-236 | TRG | 09/28/05 08:49 | 1.00E+00 | 103.58 | | | | 10/7/2005 5:50 | |
| 18 | U-236 | TRG | 09/28/05 08:58 | 1.13E+00 | 83.90 | | | | 10/7/2005 5:50 | |
| 19 | U-236 | TRG | 09/28/05 09:00 | 1.06E+00 | 96.31 | | | | 10/7/2005 5:50 | |
| | | | | | | | | | | |
| | | | | | | | | | | |

Run: 1
Analysis Code: UUISO
Eberline Services Work Order: 05-09118
Client: Missouri Dept. of Natural Resources

| Lab Fraction | Nuclide | Sample Desc | Counting Date/Time | Halflife (days) | Detect | Carrier | Count Time | Counts | Bkg CPM | Eff |
|---|---|---|---|---|---|---|---|---|---|---|
| 02 | U-236 | MBL | 10/07/05 07:54 | | A_Spec | 21 | 170.03 | -1.70 E-01 | 1.00 E-03 | 18.3 |
| 03 | U-236 | DUP | 10/07/05 07:54 | | A_Spec | 22 | 170.1 | 8.30 E-01 | 1.00 E-03 | 17.8 |
| 04 | U-236 | DO | 10/07/05 07:55 | | A_Spec | 23 | 170.07 | 3.83 E+00 | 1.00 E-03 | 19.5 |
| 05 | U-236 | TRG | 10/07/05 07:55 | | A_Spec | 25 | 170 | 3.83 E+00 | 1.00 E-03 | 20.5 |
| 06 | U-236 | TRG | 10/07/05 07:55 | | A_Spec | 26 | 170.12 | 6.60 E-01 | 2.00 E-03 | 19.1 |
| 07 | U-236 | TRG | 10/07/05 07:55 | | A_Spec | 27 | 170.07 | 8.30 E-01 | 1.00 E-03 | 20.1 |
| 08 | U-236 | TRG | 10/07/05 07:56 | | A_Spec | 28 | 170.05 | 0.00 E+00 | 0.00 E+00 | 19.5 |
| 09 | U-236 | TRG | 10/07/05 07:56 | | A_Spec | 29 | 170.1 | -2.06 E-02 | 6.00 E-03 | 19.1 |
| 10 | U-236 | TRG | 10/07/05 07:57 | | A_Spec | 30 | 170.02 | -1.70 E-01 | 1.00 E-03 | 20.7 |
| 11 | U-236 | TRG | 10/07/05 07:57 | | A_Spec | 31 | 170.12 | 6.60 E-01 | 2.00 E-03 | 19.6 |
| 12 | U-236 | TRG | 10/07/05 07:58 | | A_Spec | 32 | 170.13 | 3.49 E+00 | 3.00 E-03 | 19.2 |
| 13 | U-236 | TRG | 10/07/05 10:57 | | A_Spec | 17 | 170.1 | -1.70 E-01 | 1.00 E-03 | 19.4 |
| 14 | U-236 | TRG | 10/07/05 10:57 | | A_Spec | 18 | 170.12 | 2.83 E+00 | 1.00 E-03 | 19.8 |
| 15 | U-236 | TRG | 10/07/05 10:57 | | A_Spec | 19 | 170.07 | 1.83 E+00 | 1.00 E-03 | 19 |
| 16 | U-236 | TRG | 10/07/05 10:58 | | A_Spec | 20 | 170.08 | -1.70 E-01 | 1.00 E-03 | 19.2 |
| 17 | U-236 | TRG | 10/07/05 10:58 | | A_Spec | 21 | 170.1 | 2.83 E+00 | 1.00 E-03 | 18.3 |
| 18 | U-236 | TRG | 10/07/05 10:59 | | A_Spec | 22 | 170.02 | 8.30 E-01 | 1.00 E-03 | 17.8 |
| 19 | U-236 | TRG | 10/07/05 10:59 | | A_Spec | 23 | 170.1 | 5.83 E+00 | 1.00 E-03 | 19.5 |
| | | | | | | | | | | |
| | | | | | | | | | | |

**Count Room Report**
**Client: Missouri Dept. of Natural**

**05-09118-UUISO-1 (pCi/g) in SO**
**Tracer ID: U-10a**

Printed: 10/7/2005 5:50 AM


20-32, 17-23

| Internal Fraction | Sample Desc | Client ID | Sample Date | Sample Aliquot | Tracer Aliquot (g) | Tracer ACT (dpm) | Radiometric Tracer (pCi) | Radiometric % Rec | SAF 1* | SAF 2* |
|---|---|---|---|---|---|---|---|---|---|---|
| 01 | LCS | LCS | 09/30/05 00:00 | 1.0000 | 0.6186 | 12.8248 | | | | |
| 02 | MBL | BLANK | 09/30/05 00:00 | 1.0000 | 0.6060 | 12.5636 | | | | |
| 03 | DUP | VPBR092705SL17 | 09/27/05 11:49 | 0.9941 | 0.5954 | 12.3438 | | | | |
| 04 | DO | VPBR092705SL17 | 09/27/05 11:49 | 0.9936 | 0.5793 | 12.0100 | | | | |
| 05 | TRG | VPBR092705SL18 | 09/27/05 11:52 | 1.0236 | 0.5580 | 11.5685 | | | | |
| 06 | TRG | VPBR092705SL19 | 09/27/05 11:58 | 1.0488 | 0.5857 | 12.1427 | | | | |
| 07 | TRG | VPBR092705SL20 | 09/27/05 12:03 | 1.0526 | 0.5995 | 12.4288 | | | | |
| 08 | TRG | VPTR092805SL0A | 09/28/05 07:40 | 1.0307 | 0.5909 | 12.2505 | | | | |
| 09 | TRG | VPTR092805SL0B | 09/28/05 07:46 | 1.0164 | 0.5875 | 12.1801 | | | | |
| 10 | TRG | VPTR092805SL0C | 09/28/05 07:53 | 0.9952 | 0.6005 | 12.4496 | | | | |
| 11 | TRG | VPTR092805SL0D | 09/28/05 07:58 | 1.0130 | 0.5935 | 12.3044 | | | | |
| 12 | TRG | VPTR092805SL0E | 09/28/05 08:03 | 1.0123 | 0.5879 | 12.1883 | | | | |
| 13 | TRG | VPTR092805SL0F | 09/28/05 08:08 | 1.0147 | 0.5964 | 12.3646 | | | | |
| 14 | TRG | VPTR092805SL0G | 09/28/05 08:20 | 1.0382 | 0.5996 | 12.4309 | | | | |
| 15 | TRG | VPTR092805SL0H | 09/28/05 08:25 | 0.9919 | 0.5965 | 12.3666 | | | | |
| 16 | TRG | VPTR092805SL0I | 09/28/05 08:36 | 1.0332 | 0.5768 | 11.9582 | | | | |
| 17 | TRG | VPTR092805SL0J | 09/28/05 08:49 | 1.0010 | 0.5880 | 12.1904 | | | | |
| 18 | TRG | VPTR092805SL0K | 09/28/05 08:58 | 1.1297 | 0.6010 | 12.4599 | | | | |
| 19 | TRG | VPTR092805SL0L | 09/28/05 09:00 | 1.0585 | 0.5910 | 12.2526 | | | | |
| | | | | | | | | | | |

Eberline Services
Oak Ridge Laboratory

# Spike and Tracer Worksheet


Printed: 10/5/2005 10:02 AM

| Internal Work Order | Run | Analysis Code | Date | Technician | Technician Initials | Witness Initials |
|---|---|---|---|---|---|---|
| 05-09118 | 1 | UUISO | 10/5/2005 9:48 | JBARNARD | | |

## LCS & Matrix Spikes

| | | | | | LCS | MS | LCSD | MSD | LCS | | MS | | LCSD | | MSD | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Isotope | Sol # | Activity dpm/g | Solution Date | Approx Addition | Volume Used (g) | Volume Used (g) | Volume Used (g) | Volume Used (g) | Known pCi | Error Estimate | Added pCi | Error Estimate | Known pCi | Error Estimate | Added pCi | Error Estimate |
| U-234 | U-8a | 35.240 | 10/5/2005 | 0.500 | 0.5042 | | | | 8.00 | 0.288 | 0.00 | 0.000 | 0.00 | 0.000 | 0.00 | 0.000 |
| U-235 | U-8a | 1.600 | 10/5/2005 | 0.500 | 0.5042 | | | | 0.36 | 0.013 | 0.00 | 0.000 | 0.00 | 0.000 | 0.00 | 0.000 |
| U-238 | U-8a | 34.350 | 10/5/2005 | 0.500 | 0.5042 | | | | 7.80 | 0.281 | 0.00 | 0.000 | 0.00 | 0.000 | 0.00 | 0.000 |

## Tracers

| fraction | Isotope | Sol # | Activity dpm/g | Solution Date | Volume Used (g) | Approx Addition |
|---|---|---|---|---|---|---|
| 01 | U-232 | U-10a | 20.732 | 10/5/2005 | 0.6186 | 0.5800 |
| 02 | U-232 | U-10a | 20.732 | 10/5/2005 | 0.6060 | 0.5800 |
| 03 | U-232 | U-10a | 20.732 | 10/5/2005 | 0.5954 | 0.5800 |
| 04 | U-232 | U-10a | 20.732 | 10/5/2005 | 0.5793 | 0.5800 |
| 05 | U-232 | U-10a | 20.732 | 10/5/2005 | 0.5580 | 0.5800 |
| 06 | U-232 | U-10a | 20.732 | 10/5/2005 | 0.5857 | 0.5800 |
| 07 | U-232 | U-10a | 20.732 | 10/5/2005 | 0.5995 | 0.5800 |
| 08 | U-232 | U-10a | 20.732 | 10/5/2005 | 0.5909 | 0.5800 |
| 09 | U-232 | U-10a | 20.732 | 10/5/2005 | 0.5875 | 0.5800 |
| 10 | U-232 | U-10a | 20.732 | 10/5/2005 | 0.6005 | 0.5800 |
| 11 | U-232 | U-10a | 20.732 | 10/5/2005 | 0.5935 | 0.5800 |
| 12 | U-232 | U-10a | 20.732 | 10/5/2005 | 0.5879 | 0.5800 |
| 13 | U-232 | U-10a | 20.732 | 10/5/2005 | 0.5964 | 0.5800 |
| 14 | U-232 | U-10a | 20.732 | 10/5/2005 | 0.5996 | 0.5800 |
| 15 | U-232 | U-10a | 20.732 | 10/5/2005 | 0.5965 | 0.5800 |
| 16 | U-232 | U-10a | 20.732 | 10/5/2005 | 0.5768 | 0.5800 |
| 17 | U-232 | U-10a | 20.732 | 10/5/2005 | 0.5880 | 0.5800 |
| 18 | U-232 | U-10a | 20.732 | 10/5/2005 | 0.6010 | 0.5800 |
| 19 | U-232 | U-10a | 20.732 | 10/5/2005 | 0.5910 | 0.5800 |
| | | | | | | |

## Balance Printer Tapes

### Tracer

0.6186 g
-0.6060 g
-0.5954 g
-0.5793 g
-0.5580 g
-0.5857 g
-0.5995 g
-0.5909 g
-0.5875 g
-0.6005 g
-0.5935 g
-0.5879 g
-0.5964 g
-0.5996 g
-0.5965 g
-0.5768 g
-0.5880 g
-0.6010 g
-0.5910 g

### LCS

0.5042 g

### Matrix Spike

Eberline Services - Oak Ridge
Version 2.0 8/1999

# Aliquot Worksheet

Printed: 10/5/2005 8:53 AM


| Work Order | Run | Analysis Code | Rpt Units | Lab Deadline | Technician |
|---|---|---|---|---|---|
| 05-09118 | 1 | UUISO | grams | 10/20/2005 | JBARNARD |

| Lab Fraction | Missouri Dept. of Natural Resources Client ID | Sample Type | Muffle Data Ratio Post/Pre | Dilution Data No of Dils | Dil Factor | Ratio | Aliquot Data Aliquot | Net Equiv | MS Aliquot Data Aliquot | Net Equiv | H-3 Solids Only Water Added (ml) | H3 Dist Aliq |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 01 | LCS | LCS | | | | | 1.0000E+00 | 1.0000E+00 | | | | |
| 02 | BLANK | MBL | | | | | 1.0000E+00 | 1.0000E+00 | | | | |
| 03 | VPBR092705SL17 | DUP | | | | | 9.9410E-01 | 9.9410E-01 | | | | |
| 04 | VPBR092705SL17 | DO | | | | | 9.9360E-01 | 9.9360E-01 | | | | |
| 05 | VPBR092705SL18 | TRG | | | | | 1.0236E+00 | 1.0236E+00 | | | | |
| 06 | VPBR092705SL19 | TRG | | | | | 1.0488E+00 | 1.0488E+00 | | | | |
| 07 | VPBR092705SL20 | TRG | | | | | 1.0526E+00 | 1.0526E+00 | | | | |
| 08 | VPTR092805SL0A | TRG | | | | | 1.0307E+00 | 1.0307E+00 | | | | |
| 09 | VPTR092805SL0B | TRG | | | | | 1.0164E+00 | 1.0164E+00 | | | | |
| 10 | VPTR092805SL0C | TRG | | | | | 9.9520E-01 | 9.9520E-01 | | | | |
| 11 | VPTR092805SL0D | TRG | | | | | 1.0130E+00 | 1.0130E+00 | | | | |
| 12 | VPTR092805SL0E | TRG | | | | | 1.0123E+00 | 1.0123E+00 | | | | |
| 13 | VPTR092805SL0F | TRG | | | | | 1.0147E+00 | 1.0147E+00 | | | | |
| 14 | VPTR092805SL0G | TRG | | | | | 1.0382E+00 | 1.0382E+00 | | | | |
| 15 | VPTR092805SL0H | TRG | | | | | 9.9190E-01 | 9.9190E-01 | | | | |
| 16 | VPTR092805SL0I | TRG | | | | | 1.0332E+00 | 1.0332E+00 | | | | |
| 17 | VPTR092805SL0J | TRG | | | | | 1.0010E+00 | 1.0010E+00 | | | | |
| 18 | VPTR092805SL0K | TRG | | | | | 1.1297E+00 | 1.1297E+00 | | | | |
| 19 | VPTR092805SL0L | TRG | | | | | 1.0585E+00 | 1.0585E+00 | | | | |
| | | | | | | | | | | | | |

0.9941 g
0.9936 g
1.0236 g
1.0488 g
1.0526 g
1.0307 g
1.0164 g
0.9952 g
1.0130 g
1.0123 g
1.0147 g
1.0382 g
0.9919 g
1.0332 g
1.0010 g
1.1297 g
1.0585 g

| Comments | |
|---|---|

Technician: JBarnard Date: 10/5/05

# Rough Sample Preparation Log Book



| Work Order | Lab Deadline | Date Received in Prep | Date Sealed | Date Returned | Technician |
|---|---|---|---|---|---|
| 05-09118 | 10/20/2005 | 10/2/2005 | 10/3/2005 | 10/4/2005 | KSALLINGS |

| Eberline | Missouri Dept. of Natural Resources | Tare (g) | Gross (g) | | Net (g) | | Percent | | Gamma | | Special |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Fraction | Client ID | Pan Wt | Wet Wt. | Dry Wt. | Wet Wt. | Dry Wt. | Liquid | Solid | Dry Wt. | LEPS Wt. | Info |
| 04 | VPBR092705SL17 | 13.9100 | 384.6400 | 286.2100 | 370.7300 | 272.3000 | 26.55% | 73.45% | | | |
| 05 | VPBR092705SL18 | 13.7500 | 421.8800 | 327.1500 | 408.1300 | 313.4000 | 23.21% | 76.79% | | | |
| 06 | VPBR092705SL19 | 13.8600 | 374.7200 | 284.1000 | 360.8600 | 270.2400 | 25.11% | 74.89% | | | |
| 07 | VPBR092705SL20 | 13.7600 | 406.4200 | 339.1300 | 392.6600 | 325.3700 | 17.14% | 82.86% | | | |
| 08 | VPTR092805SL0A | 13.7800 | 423.8300 | 359.5400 | 410.0500 | 345.7600 | 15.68% | 84.32% | | | |
| 09 | VPTR092805SL0B | 13.8300 | 414.0700 | 333.0900 | 400.2400 | 319.2600 | 20.23% | 79.77% | | | |
| 10 | VPTR092805SL0C | 13.8000 | 372.4900 | 324.7600 | 358.6900 | 310.9600 | 13.31% | 86.69% | | | |
| 11 | VPTR092805SL0D | 13.7900 | 361.6100 | 286.7900 | 347.8200 | 273.0000 | 21.51% | 78.49% | | | |
| 12 | VPTR092805SL0E | 13.7300 | 384.1500 | 309.6000 | 370.4200 | 295.8700 | 20.13% | 79.87% | | | |
| 13 | VPTR092805SL0F | 13.7700 | 459.2100 | 388.9200 | 445.4400 | 375.1500 | 15.78% | 84.22% | | | |
| 14 | VPTR092805SL0G | 13.8600 | 488.7000 | 406.7900 | 474.8400 | 392.9300 | 17.25% | 82.75% | | | |
| 15 | VPTR092805SL0H | 13.8000 | 396.4400 | 325.6400 | 382.6400 | 311.8400 | 18.50% | 81.50% | | | |
| 16 | VPTR092805SL0I | 13.8400 | 455.3700 | 372.8600 | 441.5300 | 359.0200 | 18.69% | 81.31% | | | |
| 17 | VPTR092805SL0J | 13.8700 | 502.7000 | 418.8900 | 488.8300 | 405.0200 | 17.15% | 82.85% | | | |
| 18 | VPTR092805SL0K | 13.9100 | 363.8600 | 308.3100 | 349.9500 | 294.4000 | 15.87% | 84.13% | | | |
| 19 | VPTR092805SL0L | 13.9300 | 425.9300 | 353.2400 | 412.0000 | 339.3100 | 17.64% | 82.36% | | | |
| | | | | | | | | | | | |

| | |
|---|---|
| *Comments* | |
| *Special Codes* | **H: Hot, O: Organic Hazard, P: PCB Hazard, R: Rush, T: Other (see comments)** |

Technician: Kenny Sallings Date: **Analysis: Rough Prep Logbook**

Eberline Services
Oak Ridge Laboratory

ALPHA SPECTROMETRY REPORT
7-OCT-2005 16:59:50

**********

Spectral File: ND_AMS_ARCHIVE_C:C_0509118A-UU$01_UU.CNF

**********

| | | | |
|---|---|---|---|
| BATCH ID: | 0509118A-UU | SAMPLE ID: | 01 |
| SAMPLE DATE: | 7-OCT-2005 00:00 | ALIQUOT: | 1.000E+00 gram |
| SAMPLE TITLE: | SPIKE | DETECTOR NUMBER: | 020 |
| ACQ DATE: | 7-OCT-2005 07:54 | AVERAGE EFFICIENCY: | 19.24% |
| ELAPSED LIVE TIME: | 10205. | RECOVERY: | 91.30% |
| TRACER ID: | UU-10A | TRACER FWHM (kev): | 62.67 |
| LAMBDA VALUE: | 619. | ROI TYPE: | STANDARD |
| TRACER DPM AT SAMPLE DATE: | 12.824 | CONFIDENCE FACTOR: | 4.65 |
| SAMPLE MATRIX: | SOIL | LLD CONSTANT: | 2.71 |
| ENERGY CAL DATE: | 29-SEP-2005 13:20 | EFF CAL DATE: | 29-SEP-2005 13:20 |
| BKG FILENAME: | B_020_1OCT05 | BKG ELAPSED TIME: | 60002. |

**********

NUCLIDE ACTIVITY SUMMARY

| NUCLIDE | ENERGY | NET AREA | BKG | %ABN | ACTIVITY pCi/ gram | TPU/ERROR 2-SIGMA | MDC pCi/ gram |
|---|---|---|---|---|---|---|---|
| U232 | 5302.5 | 382.32 | 0.68 | 99.8 | 5.777E+00 | 7.634E-01 | 9.890E-02 |
| U-234 | 4761.5 | 503.83 | 0.17 | 99.8 | 7.613E+00 | 1.325E+00 | 6.992E-02 |
| U-235 | 4385.5 | 26.00 | 0.00 | 80.9 | 4.846E-01 | 2.034E-01 | 5.051E-02 |
| U-236 | 4485.2 | 8.83 | 0.17 | 90.1 | 1.478E-01 | 1.030E-01 | 7.745E-02 |
| U-238 | 4184.4 | 541.83 | 0.17 | 100.2 | 8.152E+00 | 1.405E+00 | 6.962E-02 |

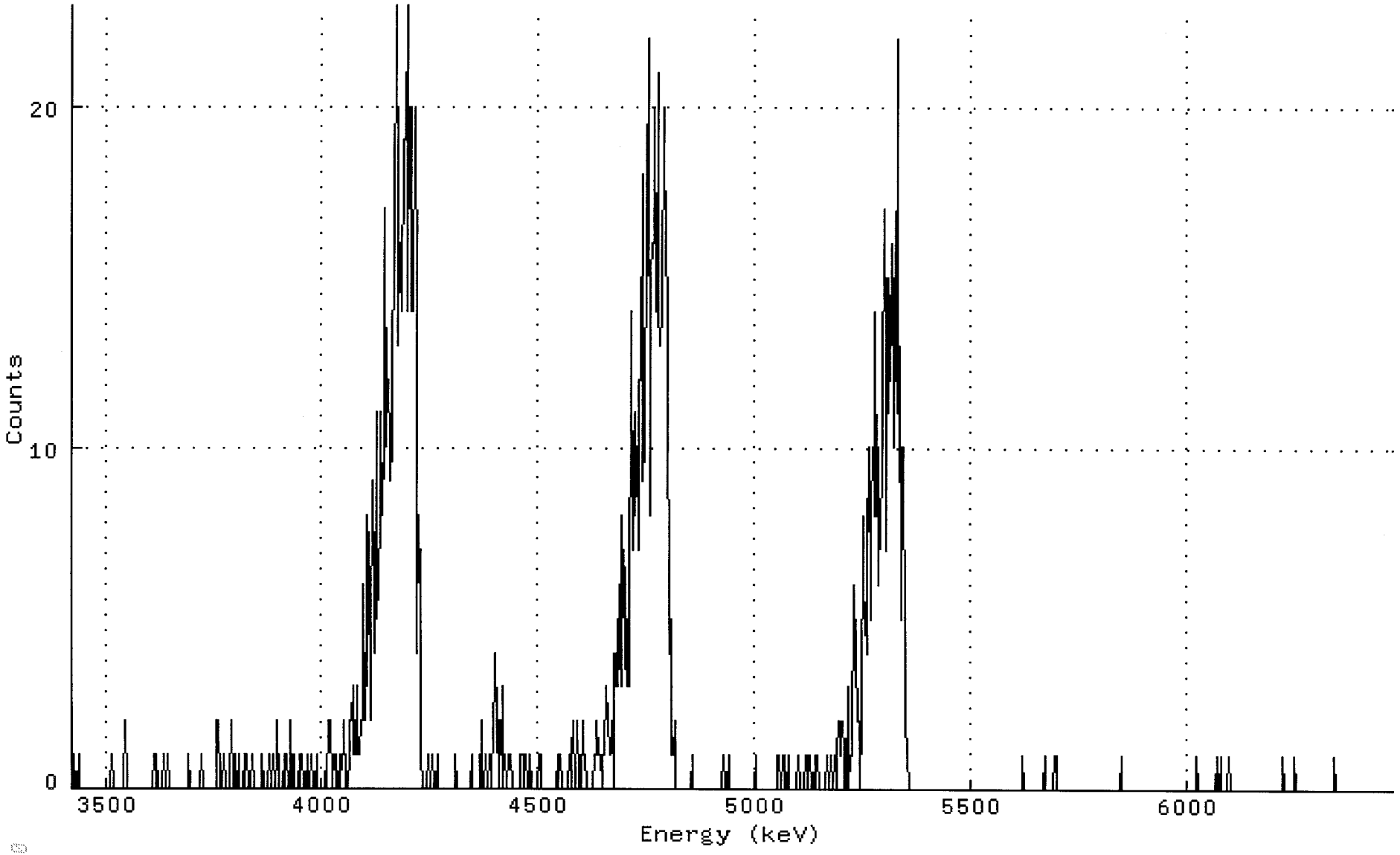
**********

Analyst _____ Date 10.7.05

Reviewer _____ Date 10/10/05

097

Spectrum : DKA100:[ALPHA.ALUSR.ARCHIVE.C]C_0509118A-UU$01_UU.CNF;1
Title : 020
Sample Title: SPIKE
Start Time: 7-OCT-2005 07:54: Sample Time: 7-OCT-2005 00:00: Energy Offset: 3.41197E+03
Real Time : 0 02:50:05.00 Sample ID : 01 Energy Slope : 3.17319E+00
Live Time : 0 02:50:05.00 Sample Type: UU Energy Quad : -1.79439E-04



Channel Contents for ND_AMS_ARCHIVE_C:C_0509118A-UU$01_UU

Channel

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1: | 10205 | 10205 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 29: | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| 43: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 57: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| 71: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 85: | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 99: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 | 0 |
| 113: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 1 |
| 127: | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 141: | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 1 |
| 155: | 2 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 2 | 0 | 1 | 0 |
| 169: | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 |
| 183: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 2 | 2 | 2 | 0 |
| 197: | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 1 | 2 | 0 | 0 | 1 | 2 | 2 |
| 211: | 3 | 1 | 1 | 3 | 1 | 1 | 2 | 2 | 6 | 2 | 4 | 8 | 7 | 2 |
| 225: | 4 | 9 | 4 | 11 | 5 | 6 | 8 | 11 | 8 | 10 | 17 | 10 | 12 | 10 |
| 239: | 9 | 10 | 18 | 16 | 23 | 17 | 13 | 16 | 14 | 19 | 19 | 19 | 23 | 14 |
| 253: | 20 | 20 | 14 | 14 | 20 | 14 | 4 | 8 | 6 | 1 | 0 | 0 | 0 | 0 |
| 267: | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 281: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 295: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 |
| 309: | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 2 | 3 | 4 | 2 | 0 | 2 | 1 |
| 323: | 3 | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 337: | 1 | 1 | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 351: | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 365: | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 2 | 0 |
| 379: | 0 | 2 | 0 | 0 | 0 | 2 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 393: | 1 | 1 | 2 | 1 | 1 | 1 | 0 | 2 | 1 | 3 | 2 | 2 | 1 | 2 |
| 407: | 0 | 4 | 3 | 5 | 3 | 4 | 8 | 3 | 7 | 6 | 4 | 3 | 7 | 3 |
| 421: | 14 | 7 | 11 | 8 | 10 | 7 | 12 | 12 | 18 | 9 | 10 | 17 | 17 | 22 |
| 435: | 8 | 15 | 16 | 16 | 20 | 14 | 21 | 14 | 13 | 14 | 20 | 19 | 16 | 14 |
| 449: | 13 | 4 | 5 | 1 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 463: | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 477: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 491: | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 505: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 519: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 533: | 1 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 547: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 0 |
| 561: | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| 575: | 0 | 0 | 1 | 0 | 1 | 2 | 1 | 2 | 2 | 1 | 0 | 0 | 3 | 0 |
| 589: | 1 | 1 | 1 | 6 | 4 | 4 | 2 | 2 | 0 | 2 | 8 | 6 | 5 | 4 |
| 603: | 7 | 10 | 5 | 8 | 10 | 8 | 14 | 8 | 10 | 6 | 8 | 9 | 11 | 17 |
| 617: | 13 | 7 | 15 | 12 | 13 | 16 | 10 | 15 | 12 | 22 | 11 | 13 | 5 | 10 |
| 631: | 10 | 4 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 645: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 659: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 673: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 687: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 701: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 715: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 729: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 743: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 |
| 757: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 771: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 785: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 799: | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 813: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 827: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 841: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 855: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 869: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 883: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 897: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 911: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 925: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 939: | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 953: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 967: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 981: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 995: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1009: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1023: | 0 | 0 | | | | | | | | | | | | |

Eberline Services
Oak Ridge Laboratory

Gross Sample Counts Within Peak Regions  Generated:  7-OCT-2005 16:59:46.46

Detector ID: 20  Acquisition Start: 7-OCT-2005 07:54:10.01
Live Time: 0 02:50:05.00  Real Time: 0 02:50:05.00
Batch Id: 0509118A-UU  Sample Id: 01
Sample Type: UU

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 4168.08 | 542 | 0 | 76.27 | 241.58 | 187 | 89 | 5.31E-02 | 4.3 | |
| 2 | 0 | 4395.02 | 26 | 0 | 23.18 | 315.42 | 284 | 42 | 2.55E-03 | 19.6 | |
| 3 | 0 | 4469.78 | 9 | 0 | 0.00 | 339.89 | 328 | 29 | 8.82E-04 | 33.3 | |
| 4 | 0 | 4749.88 | 504 | 0 | 90.25 | 432.19 | 383 | 80 | 4.94E-02 | 4.5 | |
| 5 | 0 | 5293.70 | 383 | 0 | 62.67 | 614.35 | 566 | 75 | 3.75E-02 | 5.1 | |

Background Counts Within Peak Regions  Generated:  7-OCT-2005 16:59:49.09

Acquisition Start: 1-OCT-2005 10:06:27.01
Live Time: 0 16:40:02.00  Real Time: 0 16:40:02.00

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 4135.40 | 1 | 0 | 3.17 | 231.00 | 187 | 89 | 1.67E-05 | 100.0 | |
| 2 | 0 | 4361.57 | 0 | 0 | 0.00 | 304.50 | 284 | 42 | 0.00E+00 | 0.0 | |
| 3 | 0 | 4476.22 | 1 | 0 | 3.17 | 342.00 | 328 | 29 | 1.67E-05 | 100.0 | |
| 4 | 0 | 4720.61 | 1 | 0 | 3.17 | 422.50 | 383 | 80 | 1.67E-05 | 100.0 | |
| 5 | 0 | 5260.16 | 4 | 0 | 174.53 | 603.00 | 566 | 75 | 6.67E-05 | 50.0 | |

Net Sample Counts Within Peak Regions  Generated:  7-OCT-2005 16:59:49.34

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 4168.08* | 542 | 0 | 76.27 | 241.58 | 187 | 89 | 5.31E-02 | 4.3 | |
| 2 | 0 | 4395.02* | 26 | 0 | 23.18 | 315.42 | 284 | 42 | 2.55E-03 | 19.6 | |
| 3 | 0 | 4469.78* | 9 | 0 | 0.00 | 339.89 | 328 | 29 | 8.65E-04 | 34.0 | |
| 4 | 0 | 4749.88* | 504 | 0 | 90.25 | 432.19 | 383 | 80 | 4.94E-02 | 4.5 | |
| 5 | 0 | 5293.70* | 382 | 0 | 62.67 | 614.35 | 566 | 75 | 3.75E-02 | 5.1 | |

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.0 Generated 7-OCT-2005 16:59:50

Configuration : MCA0:[AMSCOUNT]0000C192$1
Analyses by : ROIPEAK V1.2,PEAKEFF V2.2,ENBACK V1.6,NID V3.3
Sample title : SPIKE
Sample date : 7-OCT-2005 00:00:00 Acquisition date : 7-OCT-2005 07:54:10
Sample ID : 01 Sample quantity : 1.0000 gram
Sample type : UU Sample geometry :
Detector name : 020 Detector geometry:
Elapsed live time: 0 02:50:05.00 Elapsed real time: 0 02:50:05.00 0.0%
Energy tolerance : 100.00 keV Half life ratio : 8.00
Errors propagated: Yes Systematic Error : 3.00 %
Efficiency type : Average value Efficiencies at : Peak Energy
Abundance limit : 75.00

Post-NID Peak Search Report

| It | Energy | Area | FWHM | Channel | Left | Pw | %Err | Fit | Nuclides | Activity pCi/gram |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 4168.08* | 542 | 76.27 | 241.58 | 187 | 89 | 8.6 | | U-238 | 7.44 |
| 0 | 4395.02* | 26 | 23.18 | 315.42 | 284 | 42 | 39.2 | | U-235 | 0.442 |
| 0 | 4469.78* | 9 | 0.00 | 339.89 | 328 | 29 | 68.1 | | U-236 | 0.135 |
| 0 | 4749.88* | 504 | 90.25 | 432.19 | 383 | 80 | 8.9 | | U-234 | 6.95 |
| 0 | 5293.70* | 382 | 62.67 | 614.35 | 566 | 75 | 10.2 | | U232 | 5.27 |

Eberline Services
Oak Ridge Laboratory

ALPHA SPECTROMETRY REPORT
7-OCT-2005 17:00:07

**********

Spectral File: ND_AMS_ARCHIVE_R:R_0509118A-UU$02_UU.CNF

**********

| | | | |
|---|---|---|---|
| BATCH ID: | 0509118A-UU | SAMPLE ID: | 02 |
| SAMPLE DATE: | 7-OCT-2005 00:00 | ALIQUOT: | 1.000E+00 gram |
| SAMPLE TITLE: | BLANK | DETECTOR NUMBER: | 021 |
| ACQ DATE: | 7-OCT-2005 07:54 | AVERAGE EFFICIENCY: | 18.34% |
| ELAPSED LIVE TIME: | 10202. | RECOVERY: | 99.26% |
| TRACER ID: | UU-10A | TRACER FWHM (kev): | 34.42 |
| LAMBDA VALUE: | 606. | ROI TYPE: | STANDARD |
| TRACER DPM AT SAMPLE DATE: | 12.563 | CONFIDENCE FACTOR: | 4.65 |
| SAMPLE MATRIX: | SOIL | LLD CONSTANT: | 2.71 |
| ENERGY CAL DATE: | 29-SEP-2005 13:20 | EFF CAL DATE: | 29-SEP-2005 13:20 |
| BKG FILENAME: | B_021_1OCT05 | BKG ELAPSED TIME: | 60005. |

**********

NUCLIDE ACTIVITY SUMMARY

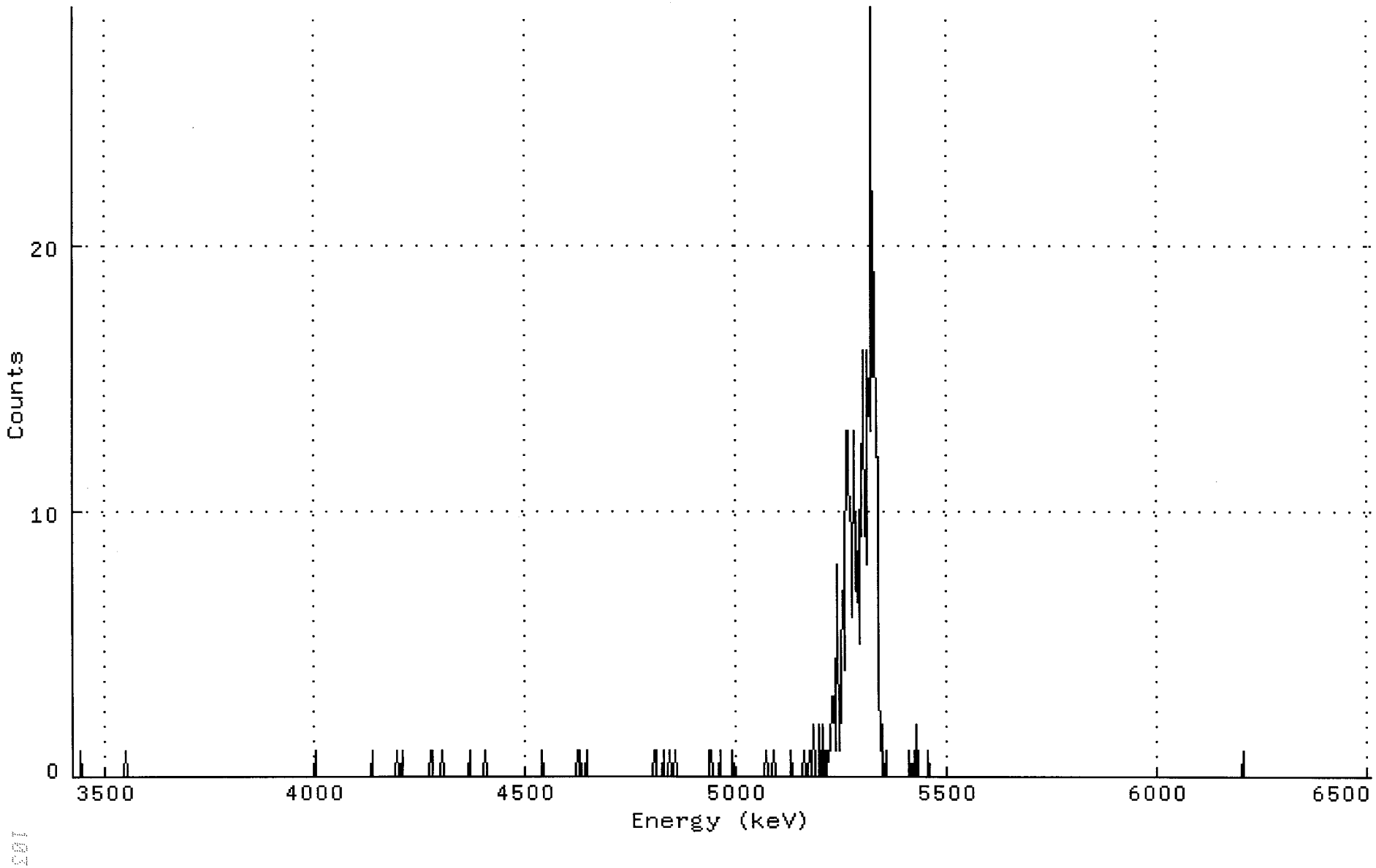
| NUCLIDE | ENERGY | NET AREA | BKG | %ABN | ACTIVITY pCi/ gram | TPU/ERROR 2-SIGMA | MDC pCi/ gram |
|---|---|---|---|---|---|---|---|
| U232 | 5302.5 | 388.15 | 0.85 | 99.8 | 5.659E+00 | 7.448E-01 | 1.020E-01 |
| U-234 | 4761.5 | 4.64 | 1.36 | 99.8 | 6.765E-02 | 7.348E-02 | 1.186E-01 |
| U-235 | 4385.5 | 2.83 | 0.17 | 80.9 | 5.090E-02 | 6.306E-02 | 8.322E-02 |
| U-236 | 4485.2 | -0.17 | 0.17 | 90.1 | -2.746E-03 | 5.506E-03 | 7.473E-02 |
| U-238 | 4184.4 | 2.98 | 1.02 | 100.2 | 4.326E-02 | 5.966E-02 | 1.075E-01 |

**********

Analyst _____ Date 10.7.05

Reviewer _____ Date 10/10/05

Spectrum : DKA100:[ALPHA.ALUSR.ARCHIVE.R]R_0509118A-UU$02_UU.CNF;1
Title : 021
Sample Title: BLANK
Start Time: 7-OCT-2005 07:54: Sample Time: 7-OCT-2005 00:00: Energy Offset: 3.41384E+03
Real Time : 0 02:50:02.00 Sample ID : 02 Energy Slope : 3.18885E+00
Live Time : 0 02:50:02.00 Sample Type: UU Energy Quad : -1.65046E-04



Channel Contents for ND_AMS_ARCHIVE_R:R_0509118A-UU$02_UU

Channel

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1: | 10202 | 10202 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 15: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 29: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 43: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 57: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 71: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 85: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 99: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 113: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 127: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 141: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 155: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 169: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 183: | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 197: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 211: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 225: | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 239: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 |
| 253: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 267: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 |
| 281: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 295: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 309: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 323: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 337: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 351: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 365: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 379: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 |
| 393: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 407: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 421: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 435: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| 449: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 463: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 477: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 491: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 505: | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 519: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 533: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 547: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 561: | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 2 | 0 | 0 | 0 |
| 575: | 0 | 2 | 0 | 0 | 2 | 0 | 1 | 0 | 1 | 1 | 1 | 3 | 3 | 3 |
| 589: | 1 | 8 | 6 | 1 | 3 | 4 | 7 | 4 | 7 | 13 | 13 | 11 | 10 | 9 |
| 603: | 6 | 13 | 7 | 9 | 8 | 5 | 10 | 9 | 16 | 13 | 10 | 8 | 16 | 14 |
| 617: | 13 | 29 | 15 | 19 | 18 | 12 | 12 | 4 | 1 | 2 | 0 | 0 | 1 | 0 |
| 631: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 645: | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 2 | 0 | 0 | 0 | 0 |
| 659: | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 673: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 687: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 701: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 715: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 729: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 743: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 757: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 771: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 785: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 799: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 813: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 827: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 841: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 855: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 869: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 883: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 897: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 911: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 925: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 939: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 953: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 967: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 981: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 995: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1009: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1023: | 0 | 0 | | | | | | | | | | | | |

Eberline Services
Oak Ridge Laboratory

Gross Sample Counts Within Peak Regions  Generated:  7-OCT-2005 17:00:01.80

Detector ID: 21  Acquisition Start: 7-OCT-2005 07:54:23.01
Live Time: 0 02:50:02.00  Real Time: 0 02:50:02.00
Batch Id: 0509118A-UU  Sample Id: 02
Sample Type: UU

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 4134.65 | 4 | 0 | 0.00 | 228.75 | 186 | 87 | 3.92E-04 | 50.0 | |
| 2 | 0 | 4358.73 | 3 | 0 | 108.42 | 301.00 | 282 | 41 | 2.94E-04 | 57.7 | |
| 3 | 0 | 4477.43 | 0 | 0 | 0.00 | 339.50 | 326 | 28 | 0.00E+00 | 0.0 | |
| 4 | 0 | 4723.54 | 6 | 0 | 216.84 | 419.83 | 379 | 80 | 5.88E-04 | 40.8 | |
| 5 | 0 | 5292.96 | 389 | 0 | 34.42 | 608.44 | 561 | 74 | 3.81E-02 | 5.1 | |

Background Counts Within Peak Regions  Generated:  7-OCT-2005 17:00:04.98

Acquisition Start: 1-OCT-2005 10:06:29.01
Live Time: 0 16:40:05.00  Real Time: 0 16:40:05.00

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 4135.43 | 6 | 0 | 197.71 | 229.00 | 186 | 87 | 1.00E-04 | 40.8 | |
| 2 | 0 | 4361.82 | 1 | 0 | 3.19 | 302.00 | 282 | 41 | 1.67E-05 | 100.0 | |
| 3 | 0 | 4477.43 | 1 | 0 | 0.00 | 339.50 | 326 | 28 | 1.67E-05 | 100.0 | |
| 4 | 0 | 4719.47 | 8 | 0 | 0.00 | 418.50 | 379 | 80 | 1.33E-04 | 35.4 | |
| 5 | 0 | 5260.26 | 5 | 0 | 3.19 | 597.50 | 561 | 74 | 8.33E-05 | 44.7 | |

Net Sample Counts Within Peak Regions  Generated:  7-OCT-2005 17:00:05.57

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 4134.65* | 3 | 0 | 0.00 | 228.75 | 186 | 87 | 2.92E-04 | 68.6 | |
| 2 | 0 | 4358.73* | 3 | 0 | 108.42 | 301.00 | 282 | 41 | 2.77E-04 | 61.5 | |
| 3 | 0 | 4477.43* | 0 | 0 | 0.00 | 339.50 | 326 | 28 | -1.67E-05 | 100.0 | |
| 4 | 0 | 4723.54* | 5 | 0 | 216.84 | 419.83 | 379 | 80 | 4.55E-04 | 53.8 | |
| 5 | 0 | 5292.96* | 388 | 0 | 34.42 | 608.44 | 561 | 74 | 3.80E-02 | 5.1 | |

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.0 Generated 7-OCT-2005 17:00:06

Configuration : MCA0:[AMSCOUNT]0000C192$1
Analyses by : ROIPEAK V1.2,PEAKEFF V2.2,ENBACK V1.6,NID V3.3
Sample title : BLANK
Sample date : 7-OCT-2005 00:00:00 Acquisition date : 7-OCT-2005 07:54:23
Sample ID : 02 Sample quantity : 1.0000 gram
Sample type : UU Sample geometry :
Detector name : 021 Detector geometry:
Elapsed live time: 0 02:50:02.00 Elapsed real time: 0 02:50:02.00 0.0%
Energy tolerance : 100.00 keV Half life ratio : 8.00
Errors propagated: Yes Systematic Error : 3.00 %
Efficiency type : Average value Efficiencies at : Peak Energy
Abundance limit : 75.00

Post-NID Peak Search Report

| It | Energy | Area | FWHM | Channel | Left | Pw | %Err | Fit | Nuclides | Activity pCi/gram |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 4134.65* | 3 | 0.00 | 228.75 | 186 | 87137.1 | | | U-238 | 4.294E-02 |
| 0 | 4358.73* | 31 | 08.42 | 301.00 | 282 | 41123.0 | | | U-235 | 5.052E-02 |
| 0 | 4477.43* | 0 | 0.00 | 339.50 | 326 | 28200.0 | | | U-236 | -2.725E-03 |
| 0 | 4723.54* | 52 | 16.84 | 419.83 | 379 | 80107.6 | | | U-234 | 6.715E-02 |
| 0 | 5292.96* | 388 | 34.42 | 608.44 | 561 | 74 | 10.2 | | U232 | 5.62 |

Eberline Services
Oak Ridge Laboratory

ALPHA SPECTROMETRY REPORT
7-OCT-2005 17:00:22

**********

Spectral File: ND_AMS_ARCHIVE_S:S_0509118A-UU$03_UU.CNF

**********

| | | | |
|---|---|---|---|
| BATCH ID: | 0509118A-UU | SAMPLE ID: | 03 |
| SAMPLE DATE: | 27-SEP-2005 00:00 | ALIQUOT: | 9.941E-01 gram |
| SAMPLE TITLE: | VPBR092705SL17 | DETECTOR NUMBER: | 022 |
| ACQ DATE: | 7-OCT-2005 07:54 | AVERAGE EFFICIENCY: | 17.83% |
| ELAPSED LIVE TIME: | 10206. | RECOVERY: | 100.97% |
| TRACER ID: | UU-10A | TRACER FWHM (kev): | 63.16 |
| LAMBDA VALUE: | 595. | ROI TYPE: | STANDARD |
| TRACER DPM AT SAMPLE DATE: | 12.346 | CONFIDENCE FACTOR: | 4.65 |
| SAMPLE MATRIX: | SOIL | LLD CONSTANT: | 2.71 |
| ENERGY CAL DATE: | 29-SEP-2005 13:20 | EFF CAL DATE: | 29-SEP-2005 13:20 |
| BKG FILENAME: | B_022_1OCT05 | BKG ELAPSED TIME: | 60003. |

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NUCLIDE ACTIVITY SUMMARY

| NUCLIDE | ENERGY | NET AREA | BKG | %ABN | ACTIVITY pCi/ gram | TPU/ERROR 2-SIGMA | MDC pCi/ gram |
|---|---|---|---|---|---|---|---|
| U232 | 5302.5 | 377.32 | 0.68 | 99.8 | 5.594E+00 | 7.426E-01 | 9.702E-02 |
| U-234 | 4761.5 | 58.66 | 0.34 | 99.8 | 8.695E-01 | 2.625E-01 | 8.037E-02 |
| U-235 | 4385.5 | 3.00 | 0.00 | 80.9 | 5.486E-02 | 6.388E-02 | 4.955E-02 |
| U-236 | 4485.2 | 0.83 | 0.17 | 90.1 | 1.363E-02 | 3.337E-02 | 7.598E-02 |
| U-238 | 4184.4 | 51.66 | 0.34 | 100.2 | 7.625E-01 | 2.417E-01 | 8.003E-02 |

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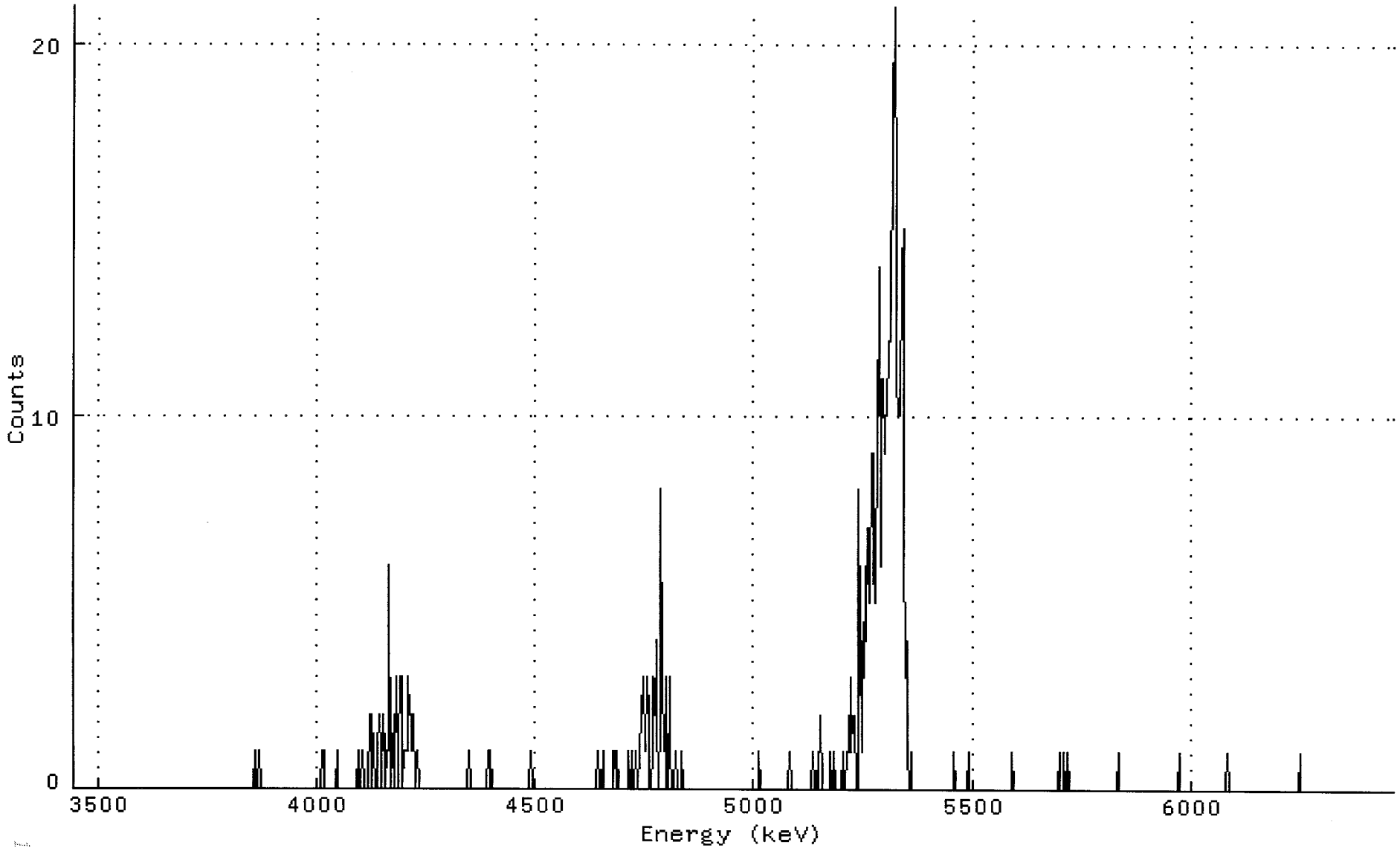
Analyst _____ Date 10.7.05

Reviewer _____ Date 10/10/05

Spectrum : DKA100:[ALPHA.ALUSR.ARCHIVE.S]S_0509118A-UU$03_UU.CNF;1
Title : 022
Sample Title: VPBR092705SL17
Start Time: 7-OCT-2005 07:54: Sample Time: 27-SEP-2005 00:00 Energy Offset: 3.43204E+03
Real Time : 0 02:50:06.00 Sample ID : 03 Energy Slope : 3.12016E+00
Live Time : 0 02:50:06.00 Sample Type: UU Energy Quad : -1.59202E-04



Channel Contents for ND_AMS_ARCHIVE_S:S_0509118A-UU$03_UU

Channel

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1: | 10206 | 10206 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 29: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 43: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 57: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 71: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 85: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 99: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 113: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 127: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 141: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 155: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 169: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 183: | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 197: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 211: | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 2 |
| 225: | 0 | 2 | 1 | 0 | 0 | 1 | 2 | 1 | 0 | 2 | 1 | 0 | 1 | 1 |
| 239: | 6 | 0 | 1 | 2 | 0 | 3 | 0 | 1 | 3 | 3 | 0 | 1 | 1 | 1 |
| 253: | 3 | 2 | 2 | 1 | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 267: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 281: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 295: | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 309: | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 323: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 337: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 351: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 365: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 379: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 393: | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 407: | 0 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 421: | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 1 | 2 | 2 | 3 | 1 | 1 | 3 |
| 435: | 2 | 0 | 0 | 1 | 3 | 2 | 4 | 2 | 0 | 2 | 8 | 3 | 1 | 3 |
| 449: | 0 | 0 | 3 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 |
| 463: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 477: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 491: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 505: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 519: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 533: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 547: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 561: | 1 | 0 | 0 | 0 | 1 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 575: | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 1 |
| 589: | 1 | 3 | 1 | 2 | 2 | 2 | 0 | 0 | 8 | 4 | 1 | 4 | 3 | 6 |
| 603: | 4 | 7 | 5 | 5 | 9 | 9 | 6 | 5 | 10 | 9 | 14 | 6 | 11 | 11 |
| 617: | 9 | 10 | 10 | 12 | 12 | 12 | 18 | 18 | 21 | 15 | 11 | 10 | 10 | 10 |
| 631: | 14 | 15 | 7 | 3 | 4 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 645: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 659: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 673: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 687: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 701: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 715: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 729: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 743: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 757: | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 771: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 785: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 799: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 813: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 827: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 841: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 855: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 869: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 883: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 897: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 911: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 925: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 939: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 953: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 967: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 981: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 995: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1009: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1023: | 0 | 0 | | | | | | | | | | | | |

Eberline Services
Oak Ridge Laboratory

Gross Sample Counts Within Peak Regions  Generated:  7-OCT-2005 17:00:12.62

Detector ID: 22  Acquisition Start: 7-OCT-2005 07:54:44.01
Live Time: 0 02:50:06.00  Real Time: 0 02:50:06.00
Batch Id: 0509118A-UU  Sample Id: 03
Sample Type: UU

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 4168.19 | 52 | 0 | 3.43 | 238.85 | 184 | 89 | 5.10E-03 | 13.9 | |
| 2 | 0 | 4380.96 | 3 | 0 | 53.04 | 309.00 | 282 | 43 | 2.94E-04 | 57.7 | |
| 3 | 0 | 4489.54 | 1 | 0 | 3.12 | 345.00 | 327 | 29 | 9.80E-05 | 100.0 | |
| 4 | 0 | 4764.74 | 59 | 0 | 4.57 | 436.86 | 382 | 81 | 5.78E-03 | 13.0 | |
| 5 | 0 | 5297.63 | 378 | 0 | 63.16 | 617.36 | 567 | 75 | 3.70E-02 | 5.1 | |

Background Counts Within Peak Regions  Generated:  7-OCT-2005 17:00:19.98

Acquisition Start: 1-OCT-2005 10:06:32.01
Live Time: 0 16:40:03.00  Real Time: 0 16:40:03.00

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 4135.16 | 2 | 0 | 90.48 | 228.00 | 184 | 89 | 3.33E-05 | 70.7 | |
| 2 | 0 | 4362.83 | 0 | 0 | 0.00 | 303.00 | 282 | 43 | 0.00E+00 | 0.0 | |
| 3 | 0 | 4477.50 | 1 | 0 | 3.12 | 341.00 | 327 | 29 | 1.67E-05 | 100.0 | |
| 4 | 0 | 4720.39 | 2 | 0 | 59.28 | 422.00 | 382 | 81 | 3.33E-05 | 70.7 | |
| 5 | 0 | 5258.53 | 4 | 0 | 71.76 | 604.00 | 567 | 75 | 6.67E-05 | 50.0 | |

Net Sample Counts Within Peak Regions  Generated:  7-OCT-2005 17:00:20.28

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 4168.19* | 52 | 0 | 3.43 | 238.85 | 184 | 89 | 5.06E-03 | 14.0 | |
| 2 | 0 | 4380.96* | 3 | 0 | 53.04 | 309.00 | 282 | 43 | 2.94E-04 | 57.7 | |
| 3 | 0 | 4489.54* | 1 | 0 | 3.12 | 345.00 | 327 | 29 | 8.13E-05 | 122.2 | |
| 4 | 0 | 4764.74* | 59 | 0 | 4.57 | 436.86 | 382 | 81 | 5.75E-03 | 13.1 | |
| 5 | 0 | 5297.63* | 377 | 0 | 63.16 | 617.36 | 567 | 75 | 3.70E-02 | 5.2 | |

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.0 Generated 7-OCT-2005 17:00:21

Configuration : MCA0:[AMSCOUNT]0000C192$1
Analyses by : ROIPEAK V1.2,PEAKEFF V2.2,ENBACK V1.6,NID V3.3
Sample title : VPBR092705SL17
Sample date : 27-SEP-2005 00:00:00 Acquisition date : 7-OCT-2005 07:54:44
Sample ID : 03 Sample quantity : 0.99410 gram
Sample type : UU Sample geometry :
Detector name : 022 Detector geometry:
Elapsed live time: 0 02:50:06.00 Elapsed real time: 0 02:50:06.00 0.0%
Energy tolerance : 100.00 keV Half life ratio : 8.00
Errors propagated: Yes Systematic Error : 3.00 %
Efficiency type : Average value Efficiencies at : Peak Energy
Abundance limit : 75.00

Post-NID Peak Search Report

| It | Energy | Area | FWHM | Channel | Left | Pw | %Err | Fit | Nuclides | Activity pCi/gram |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 4168.19* | 52 | 3.43 | 238.85 | 184 | 89 | 27.9 | | U-238 | 0.770 |
| 0 | 4380.96* | 3 | 53.04 | 309.00 | 282 | 43115.5 | | | U-235 | 5.539E-02 |
| 0 | 4489.54* | 1 | 3.12 | 345.00 | 327 | 29244.5 | | | U-236 | 1.376E-02 |
| 0 | 4764.74* | 59 | 4.57 | 436.86 | 382 | 81 | 26.2 | | U-234 | 0.878 |
| 0 | 5297.63* | 377 | 63.16 | 617.36 | 567 | 75 | 10.3 | | U232 | 5.65 |

Eberline Services
Oak Ridge Laboratory

ALPHA SPECTROMETRY REPORT
7-OCT-2005 17:00:33

**********

Spectral File: ND_AMS_ARCHIVE_S:S_0509118A-UU$04_UU.CNF

**********

| | | | |
|---|---|---|---|
| BATCH ID: | 0509118A-UU | SAMPLE ID: | 04 |
| SAMPLE DATE: | 27-SEP-2005 00:00 | ALIQUOT: | 9.936E-01 gram |
| SAMPLE TITLE: | VPBR092705SL17 | DETECTOR NUMBER: | 023 |
| ACQ DATE: | 7-OCT-2005 07:55 | AVERAGE EFFICIENCY: | 19.54% |
| ELAPSED LIVE TIME: | 10204. | RECOVERY: | 95.01% |
| TRACER ID: | UU-10A | TRACER FWHM (kev): | 76.39 |
| LAMBDA VALUE: | 579. | ROI TYPE: | STANDARD |
| TRACER DPM AT SAMPLE DATE: | 12.013 | CONFIDENCE FACTOR: | 4.65 |
| SAMPLE MATRIX: | SOIL | LLD CONSTANT: | 2.71 |
| ENERGY CAL DATE: | 29-SEP-2005 13:20 | EFF CAL DATE: | 29-SEP-2005 13:20 |
| BKG FILENAME: | B_023_1OCT05 | BKG ELAPSED TIME: | 60000. |

**********

NUCLIDE ACTIVITY SUMMARY

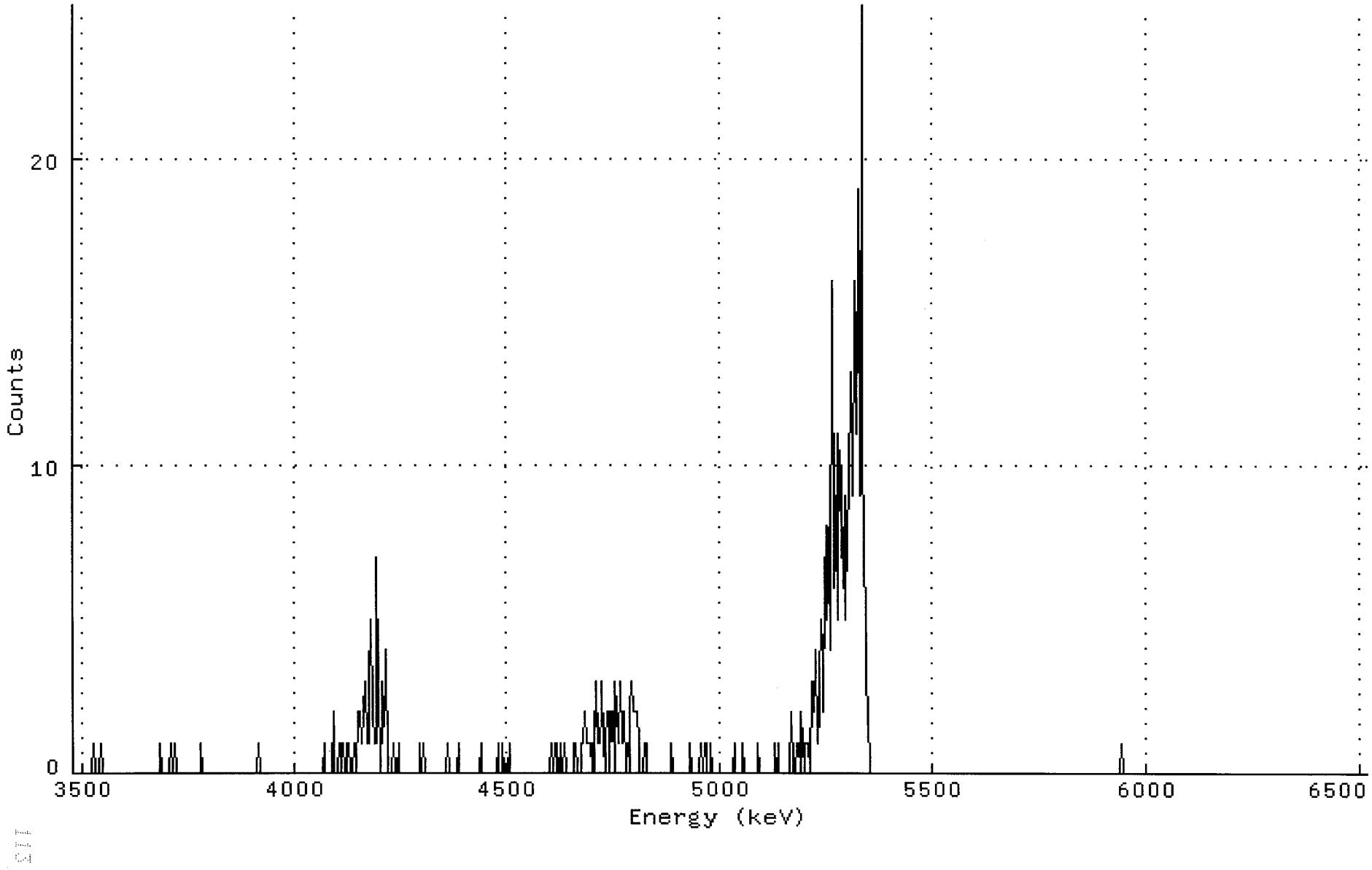
| NUCLIDE | ENERGY | NET AREA | BKG | %ABN | ACTIVITY pCi/ gram | TPU/ERROR 2-SIGMA | MDC pCi/ gram |
|---|---|---|---|---|---|---|---|
| U232 | 5302.5 | 378.49 | 0.51 | 99.8 | 5.446E+00 | 7.216E-01 | 8.676E-02 |
| U-234 | 4761.5 | 73.15 | 0.85 | 99.8 | 1.052E+00 | 2.936E-01 | 1.007E-01 |
| U-235 | 4385.5 | 2.83 | 0.17 | 80.9 | 5.022E-02 | 6.222E-02 | 8.212E-02 |
| U-236 | 4485.2 | 3.83 | 0.17 | 90.1 | 6.102E-02 | 6.461E-02 | 7.373E-02 |
| U-238 | 4184.4 | 64.66 | 0.34 | 100.2 | 9.261E-01 | 2.695E-01 | 7.766E-02 |

**********

Analyst _____ Date 10.7.05

Reviewer _____ Date 10/10/05

Spectrum : DKA100:[ALPHA.ALUSR.ARCHIVE.S]S_0509118A-UU$04_UU.CNF;1
Title : 023
Sample Title: VPBR092705SL17
Start Time: 7-OCT-2005 07:55: Sample Time: 27-SEP-2005 00:00 Energy Offset: 3.46895E+03
Real Time : 0 02:50:04.00 Sample ID : 04 Energy Slope : 3.16655E+00
Live Time : 0 02:50:04.00 Sample Type: UU Energy Quad : -1.87304E-04



Channel Contents for ND_AMS_ARCHIVE_S:S_0509118A-UU$04_UU

Channel

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1: | 10204 | 10204 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15: | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 29: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 43: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 57: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 71: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 85: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 99: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 113: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 127: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 141: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 155: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 169: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 183: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 197: | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 1 | 0 |
| 211: | 1 | 0 | 0 | 0 | 1 | 1 | 0 | 2 | 2 | 2 | 1 | 2 | 2 | 3 |
| 225: | 1 | 1 | 3 | 5 | 2 | 2 | 1 | 1 | 7 | 3 | 0 | 3 | 1 | 2 |
| 239: | 3 | 4 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 253: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 267: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 281: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 295: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 309: | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 323: | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 337: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 351: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 365: | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 1 | 0 |
| 379: | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 2 |
| 393: | 2 | 1 | 1 | 1 | 1 | 0 | 2 | 0 | 3 | 1 | 1 | 1 | 2 | 3 |
| 407: | 1 | 0 | 1 | 2 | 2 | 0 | 2 | 2 | 0 | 3 | 2 | 1 | 1 | 3 |
| 421: | 1 | 2 | 2 | 0 | 1 | 1 | 0 | 2 | 3 | 2 | 2 | 2 | 2 | 1 |
| 435: | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 449: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 463: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 477: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 0 |
| 491: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 505: | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 519: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 533: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 |
| 547: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 1 | 0 | 1 | 1 | 1 |
| 561: | 0 | 2 | 1 | 0 | 1 | 1 | 1 | 1 | 0 | 3 | 3 | 2 | 4 | 4 |
| 575: | 1 | 2 | 3 | 5 | 4 | 2 | 6 | 8 | 5 | 6 | 10 | 4 | 16 | 6 |
| 589: | 10 | 8 | 5 | 11 | 10 | 7 | 10 | 6 | 9 | 5 | 8 | 9 | 13 | 13 |
| 603: | 9 | 15 | 16 | 11 | 19 | 17 | 9 | 25 | 10 | 8 | 4 | 3 | 2 | 0 |
| 617: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 631: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 645: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 659: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 673: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 687: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 701: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 715: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 729: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 743: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 757: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 771: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 785: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 799: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 813: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 827: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 841: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 855: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 869: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 883: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 897: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 911: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 925: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 939: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 953: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 967: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 981: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 995: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1009: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1023: | 0 | 0 | | | | | | | | | | | | |

Eberline Services
Oak Ridge Laboratory

Gross Sample Counts Within Peak Regions  Generated:  7-OCT-2005 17:00:26.36

Detector ID: 23  Acquisition Start: 7-OCT-2005 07:55:02.01
Live Time: 0 02:50:04.00  Real Time: 0 02:50:04.00
Batch Id: 0509118A-UU  Sample Id: 04
Sample Type: UU

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 4177.06 | 65 | 0 | 40.71 | 226.66 | 169 | 89 | 6.37E-03 | 12.4 | |
| 2 | 0 | 4351.10 | 3 | 0 | 88.66 | 283.33 | 267 | 42 | 2.94E-04 | 57.7 | |
| 3 | 0 | 4478.29 | 4 | 0 | 72.83 | 325.00 | 311 | 29 | 3.92E-04 | 50.0 | |
| 4 | 0 | 4735.46 | 74 | 0 | 132.92 | 409.91 | 365 | 81 | 7.25E-03 | 11.6 | |
| 5 | 0 | 5288.99 | 379 | 0 | 76.39 | 595.77 | 549 | 75 | 3.71E-02 | 5.1 | |

Background Counts Within Peak Regions  Generated:  7-OCT-2005 17:00:31.34

Acquisition Start: 1-OCT-2005 10:06:35.01
Live Time: 0 16:40:00.00  Real Time: 0 16:40:00.00

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 4134.92 | 2 | 0 | 53.83 | 213.00 | 169 | 89 | 3.33E-05 | 70.7 | |
| 2 | 0 | 4363.85 | 1 | 0 | 3.17 | 287.50 | 267 | 42 | 1.67E-05 | 100.0 | |
| 3 | 0 | 4478.29 | 1 | 0 | 3.17 | 325.00 | 311 | 29 | 1.67E-05 | 100.0 | |
| 4 | 0 | 4720.68 | 5 | 0 | 174.16 | 405.00 | 365 | 81 | 8.33E-05 | 44.7 | |
| 5 | 0 | 5260.22 | 3 | 0 | 123.50 | 586.00 | 549 | 75 | 5.00E-05 | 57.7 | |

Net Sample Counts Within Peak Regions  Generated:  7-OCT-2005 17:00:31.63

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 4177.06* | 65 | 0 | 40.71 | 226.66 | 169 | 89 | 6.34E-03 | 12.5 | |
| 2 | 0 | 4351.10* | 3 | 0 | 88.66 | 283.33 | 267 | 42 | 2.77E-04 | 61.5 | |
| 3 | 0 | 4478.29* | 4 | 0 | 72.83 | 325.00 | 311 | 29 | 3.75E-04 | 52.4 | |
| 4 | 0 | 4735.46* | 73 | 0 | 132.92 | 409.91 | 365 | 81 | 7.17E-03 | 11.8 | |
| 5 | 0 | 5288.99* | 378 | 0 | 76.39 | 595.77 | 549 | 75 | 3.71E-02 | 5.1 | |

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.0 Generated 7-OCT-2005 17:00:33

Configuration : MCA0:[AMSCOUNT]0000C192$1
Analyses by : ROIPEAK V1.2,PEAKEFF V2.2,ENBACK V1.6,NID V3.3
Sample title : VPBR092705SL17
Sample date : 27-SEP-2005 00:00:00 Acquisition date : 7-OCT-2005 07:55:02
Sample ID : 04 Sample quantity : 0.99360 gram
Sample type : UU Sample geometry :
Detector name : 023 Detector geometry:
Elapsed live time: 0 02:50:04.00 Elapsed real time: 0 02:50:04.00 0.0%
Energy tolerance : 100.00 keV Half life ratio : 8.00
Errors propagated: Yes Systematic Error : 3.00 %
Efficiency type : Average value Efficiencies at : Peak Energy
Abundance limit : 75.00

Post-NID Peak Search Report

| It | Energy | Area | FWHM | Channel | Left | Pw | %Err | Fit | Nuclides | Activity pCi/gram |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 4177.06* | 65 | 40.71 | 226.66 | 169 | 89 | 24.9 | | U-238 | 0.880 |
| 0 | 4351.10* | 3 | 88.66 | 283.33 | 267 | 42123.0 | | | U-235 | 4.771E-02 |
| 0 | 4478.29* | 4 | 72.83 | 325.00 | 311 | 29104.8 | | | U-236 | 5.798E-02 |
| 0 | 4735.46* | 73132.92 | | 409.91 | 365 | 81 | 23.5 | | U-234 | 1.00 |
| 0 | 5288.99* | 378 | 76.39 | 595.77 | 549 | 75 | 10.3 | | U232 | 5.17 |

Eberline Services
Oak Ridge Laboratory

ALPHA SPECTROMETRY REPORT
7-OCT-2005 17:00:53

**********

Spectral File: ND_AMS_ARCHIVE_S:S_0509118A-UU$05_UU.CNF

**********

| | | | |
|---|---|---|---|
| BATCH ID: | 0509118A-UU | SAMPLE ID: | 05 |
| SAMPLE DATE: | 27-SEP-2005 00:00 | ALIQUOT: | 1.024E+00 gram |
| SAMPLE TITLE: | VPBR092705SL18 | DETECTOR NUMBER: | 025 |
| ACQ DATE: | 7-OCT-2005 07:55 | AVERAGE EFFICIENCY: | 20.49% |
| ELAPSED LIVE TIME: | 10200. | RECOVERY: | 115.52% |
| TRACER ID: | UU-10A | TRACER FWHM (kev): | 79.82 |
| LAMBDA VALUE: | 558. | ROI TYPE: | STANDARD |
| TRACER DPM AT SAMPLE DATE: | 11.571 | CONFIDENCE FACTOR: | 4.65 |
| SAMPLE MATRIX: | SOIL | LLD CONSTANT: | 2.71 |
| ENERGY CAL DATE: | 29-SEP-2005 13:20 | EFF CAL DATE: | 29-SEP-2005 13:20 |
| BKG FILENAME: | B_025_1OCT05 | BKG ELAPSED TIME: | 60002. |

**********

NUCLIDE ACTIVITY SUMMARY

| NUCLIDE | ENERGY | NET AREA | BKG | %ABN | ACTIVITY pCi/ gram | TPU/ERROR 2-SIGMA | MDC pCi/ gram |
|---|---|---|---|---|---|---|---|
| U232 | 5302.5 | 464.49 | 0.51 | 99.8 | 5.092E+00 | 6.355E-01 | 6.609E-02 |
| U-234 | 4761.5 | 96.98 | 1.02 | 99.8 | 1.063E+00 | 2.650E-01 | 8.117E-02 |
| U-235 | 4385.5 | 7.00 | 0.00 | 80.9 | 9.464E-02 | 7.281E-02 | 3.664E-02 |
| U-236 | 4485.2 | 3.83 | 0.17 | 90.1 | 4.649E-02 | 4.918E-02 | 5.617E-02 |
| U-238 | 4184.4 | 95.83 | 0.17 | 100.2 | 1.046E+00 | 2.609E-01 | 5.049E-02 |

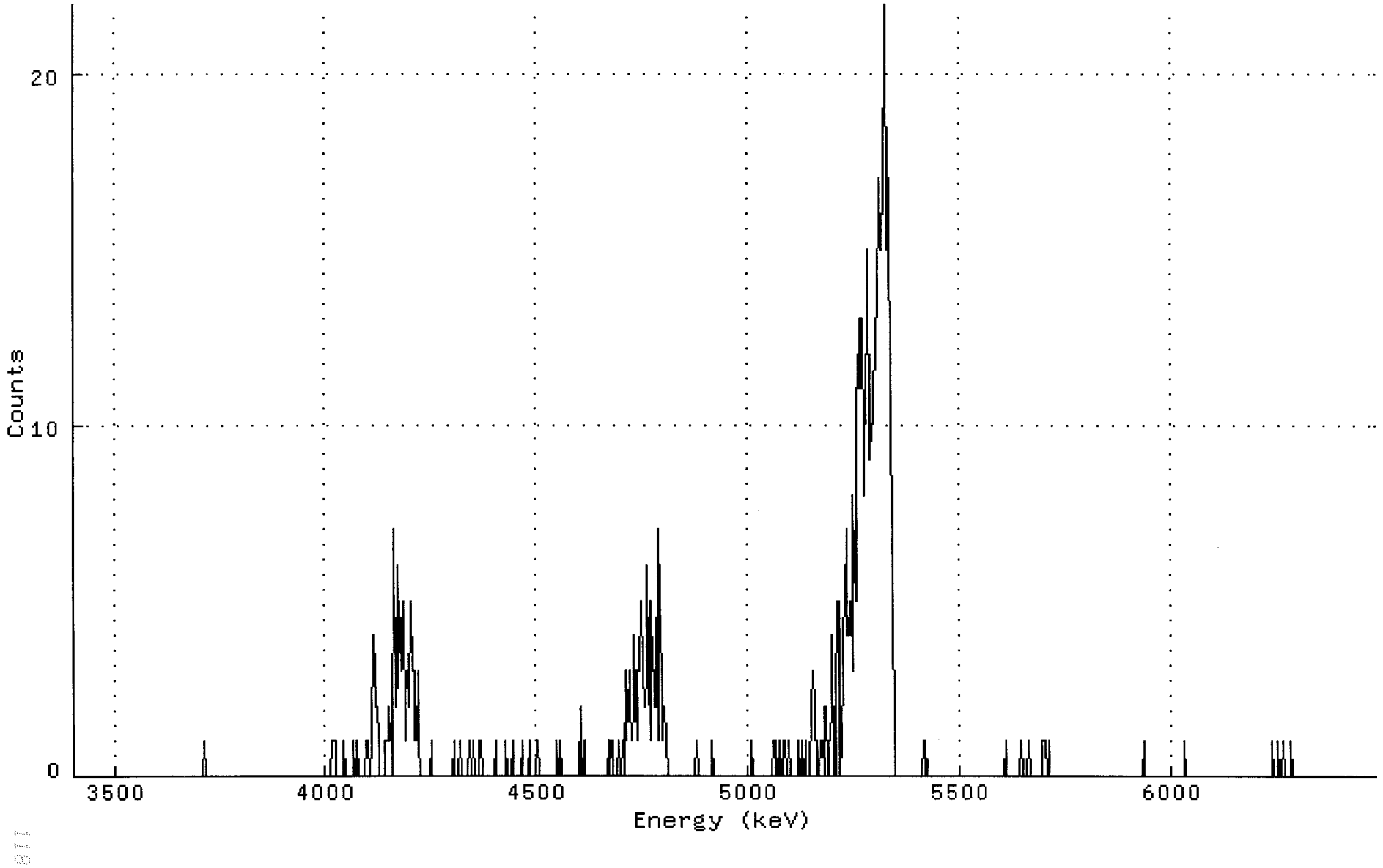
**********

*** Chemical Recovery > 115.0% ***

Analyst _____ Date 10.7.05

Reviewer _____ Date 10/10/05

Spectrum : DKA100:[ALPHA.ALUSR.ARCHIVE.S]S_0509118A-UU$05_UU.CNF;1
Title : 025
Sample Title: VPBR092705SL18
Start Time: 7-OCT-2005 07:55: Sample Time: 27-SEP-2005 00:00 Energy Offset: 3.39372E+03
Real Time : 0 02:50:00.00 Sample ID : 05 Energy Slope : 3.21173E+00
Live Time : 0 02:50:00.00 Sample Type: UU Energy Quad : -1.90164E-04



Channel Contents for ND_AMS_ARCHIVE_S:S_0509118A-UU$05_UU

Channel

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1: | 10200 | 10200 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 29: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 43: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 57: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 71: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 85: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 99: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 113: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 127: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 141: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 155: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 169: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 183: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 197: | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 211: | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 |
| 225: | 0 | 1 | 1 | 4 | 3 | 2 | 2 | 1 | 0 | 0 | 0 | 0 | 1 | 1 |
| 239: | 1 | 2 | 1 | 1 | 0 | 7 | 2 | 3 | 6 | 4 | 3 | 4 | 5 | 1 |
| 253: | 3 | 3 | 2 | 5 | 5 | 3 | 3 | 1 | 1 | 3 | 1 | 0 | 0 | 0 |
| 267: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 281: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| 295: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 309: | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 323: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 337: | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 351: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 365: | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 379: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 0 | 0 |
| 393: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 407: | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 0 |
| 421: | 3 | 1 | 2 | 3 | 2 | 1 | 2 | 4 | 2 | 1 | 3 | 3 | 5 | 3 |
| 435: | 3 | 2 | 3 | 6 | 3 | 1 | 5 | 3 | 3 | 2 | 2 | 7 | 1 | 6 |
| 449: | 1 | 2 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 463: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 477: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 491: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 505: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 519: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 533: | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 0 |
| 547: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 |
| 561: | 1 | 0 | 0 | 0 | 0 | 2 | 3 | 3 | 2 | 0 | 1 | 0 | 1 | 1 |
| 575: | 1 | 0 | 2 | 2 | 0 | 1 | 1 | 2 | 4 | 0 | 0 | 2 | 5 | 5 |
| 589: | 0 | 1 | 3 | 4 | 5 | 7 | 4 | 4 | 5 | 3 | 8 | 6 | 5 | 11 |
| 603: | 11 | 13 | 11 | 13 | 9 | 8 | 12 | 12 | 15 | 9 | 10 | 10 | 10 | 13 |
| 617: | 12 | 14 | 16 | 17 | 15 | 17 | 16 | 22 | 15 | 17 | 17 | 10 | 11 | 6 |
| 631: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 645: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 |
| 659: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 673: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 687: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 701: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 715: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 729: | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 743: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 1 | 0 |
| 757: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 771: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 785: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 799: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 813: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 827: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 841: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 855: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 869: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 883: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 897: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 911: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 925: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 939: | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 953: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 967: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 981: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 995: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1009: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1023: | 0 | 0 | | | | | | | | | | | | |

Eberline Services
Oak Ridge Laboratory

Gross Sample Counts Within Peak Regions  Generated:  7-OCT-2005 17:00:37.82

Detector ID: 25  Acquisition Start: 7-OCT-2005 07:55:21.01
Live Time: 0 02:50:00.00  Real Time: 0 02:50:00.00
Batch Id: 0509118A-UU  Sample Id: 05
Sample Type: UU

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 4166.39 | 96 | 0 | 96.03 | 244.10 | 191 | 87 | 9.41E-03 | 10.2 | |
| 2 | 0 | 4352.51 | 7 | 0 | 105.99 | 304.00 | 287 | 41 | 6.86E-04 | 37.8 | |
| 3 | 0 | 4475.28 | 4 | 0 | 64.23 | 343.75 | 331 | 28 | 3.92E-04 | 50.0 | |
| 4 | 0 | 4751.36 | 98 | 0 | 66.63 | 433.86 | 384 | 80 | 9.61E-03 | 10.1 | |
| 5 | 0 | 5285.72 | 465 | 0 | 79.82 | 611.21 | 566 | 74 | 4.56E-02 | 4.6 | |

Background Counts Within Peak Regions  Generated:  7-OCT-2005 17:00:51.35

Acquisition Start: 1-OCT-2005 10:06:37.01
Live Time: 0 16:40:02.00  Real Time: 0 16:40:02.00

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 4134.85 | 1 | 0 | 3.21 | 234.00 | 191 | 87 | 1.67E-05 | 100.0 | |
| 2 | 0 | 4361.80 | 0 | 0 | 0.00 | 307.00 | 287 | 41 | 0.00E+00 | 0.0 | |
| 3 | 0 | 4477.59 | 1 | 0 | 3.21 | 344.50 | 331 | 28 | 1.67E-05 | 100.0 | |
| 4 | 0 | 4719.78 | 6 | 0 | 247.30 | 423.50 | 384 | 80 | 1.00E-04 | 40.8 | |
| 5 | 0 | 5259.76 | 3 | 0 | 215.19 | 602.50 | 566 | 74 | 5.00E-05 | 57.7 | |

Net Sample Counts Within Peak Regions  Generated:  7-OCT-2005 17:00:51.68

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 4166.39* | 96 | 0 | 96.03 | 244.10 | 191 | 87 | 9.40E-03 | 10.2 | |
| 2 | 0 | 4352.51* | 7 | 0 | 105.99 | 304.00 | 287 | 41 | 6.86E-04 | 37.8 | |
| 3 | 0 | 4475.28* | 4 | 0 | 64.23 | 343.75 | 331 | 28 | 3.75E-04 | 52.4 | |
| 4 | 0 | 4751.36* | 97 | 0 | 66.63 | 433.86 | 384 | 80 | 9.51E-03 | 10.2 | |
| 5 | 0 | 5285.72* | 464 | 0 | 79.82 | 611.21 | 566 | 74 | 4.55E-02 | 4.6 | |

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.0 Generated 7-OCT-2005 17:00:52

Configuration : MCA0:[AMSCOUNT]0000C192$1
Analyses by : ROIPEAK V1.2,PEAKEFF V2.2,ENBACK V1.6,NID V3.3
Sample title : VPBR092705SL18
Sample date : 27-SEP-2005 00:00:00 Acquisition date : 7-OCT-2005 07:55:21
Sample ID : 05 Sample quantity : 1.0236 gram
Sample type : UU Sample geometry :
Detector name : 025 Detector geometry:
Elapsed live time: 0 02:50:00.00 Elapsed real time: 0 02:50:00.00 0.0%
Energy tolerance : 100.00 keV Half life ratio : 8.00
Errors propagated: Yes Systematic Error : 3.00 %
Efficiency type : Average value Efficiencies at : Peak Energy
Abundance limit : 75.00

Post-NID Peak Search Report

| It | Energy | Area | FWHM | Channel | Left | Pw | %Err | Fit | Nuclides | Activity pCi/gram |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 4166.39* | 96 | 96.03 | 244.10 | 191 | 87 | 20.5 | | U-238 | 1.21 |
| 0 | 4352.51* | 71 | 05.99 | 304.00 | 287 | 41 | 75.6 | | U-235 | 0.109 |
| 0 | 4475.28* | 4 | 64.23 | 343.75 | 331 | 28 | 104.8 | | U-236 | 5.371E-02 |
| 0 | 4751.36* | 97 | 66.63 | 433.86 | 384 | 80 | 20.4 | | U-234 | 1.23 |
| 0 | 5285.72* | 464 | 79.82 | 611.21 | 566 | 74 | 9.3 | | U232 | 5.88 |

Eberline Services
Oak Ridge Laboratory

ALPHA SPECTROMETRY REPORT
7-OCT-2005 17:01:14

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Spectral File: ND_AMS_ARCHIVE_S:S_0509118A-UU$06_UU.CNF

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| | | | |
|---|---|---|---|
| BATCH ID: | 0509118A-UU | SAMPLE ID: | 06 |
| SAMPLE DATE: | 27-SEP-2005 00:00 | ALIQUOT: | 1.049E+00 gram |
| SAMPLE TITLE: | VPBR092705SL19 | DETECTOR NUMBER: | 026 |
| ACQ DATE: | 7-OCT-2005 07:55 | AVERAGE EFFICIENCY: | 19.11% |
| ELAPSED LIVE TIME: | 10207. | RECOVERY: | 96.45% |
| TRACER ID: | UU-10A | TRACER FWHM (kev): | 74.48 |
| LAMBDA VALUE: | 586. | ROI TYPE: | STANDARD |
| TRACER DPM AT SAMPLE DATE: | 12.145 | CONFIDENCE FACTOR: | 4.65 |
| SAMPLE MATRIX: | SOIL | LLD CONSTANT: | 2.71 |
| ENERGY CAL DATE: | 29-SEP-2005 13:20 | EFF CAL DATE: | 29-SEP-2005 13:20 |
| BKG FILENAME: | B_026_1OCT05 | BKG ELAPSED TIME: | 60002. |

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NUCLIDE ACTIVITY SUMMARY

| NUCLIDE | ENERGY | NET AREA | BKG | %ABN | ACTIVITY pCi/ gram | TPU/ERROR 2-SIGMA | MDC pCi/ gram |
|---|---|---|---|---|---|---|---|
| U232 | 5302.5 | 380.00 | 0.00 | 99.8 | 5.216E+00 | 6.902E-01 | 3.719E-02 |
| U-234 | 4761.5 | 79.98 | 1.02 | 99.8 | 1.098E+00 | 2.968E-01 | 1.017E-01 |
| U-235 | 4385.5 | 3.83 | 0.17 | 80.9 | 6.484E-02 | 6.865E-02 | 7.835E-02 |
| U-236 | 4485.2 | 0.66 | 0.34 | 90.1 | 1.003E-02 | 3.130E-02 | 8.242E-02 |
| U-238 | 4184.4 | 52.64 | 1.36 | 100.2 | 7.193E-01 | 2.282E-01 | 1.112E-01 |

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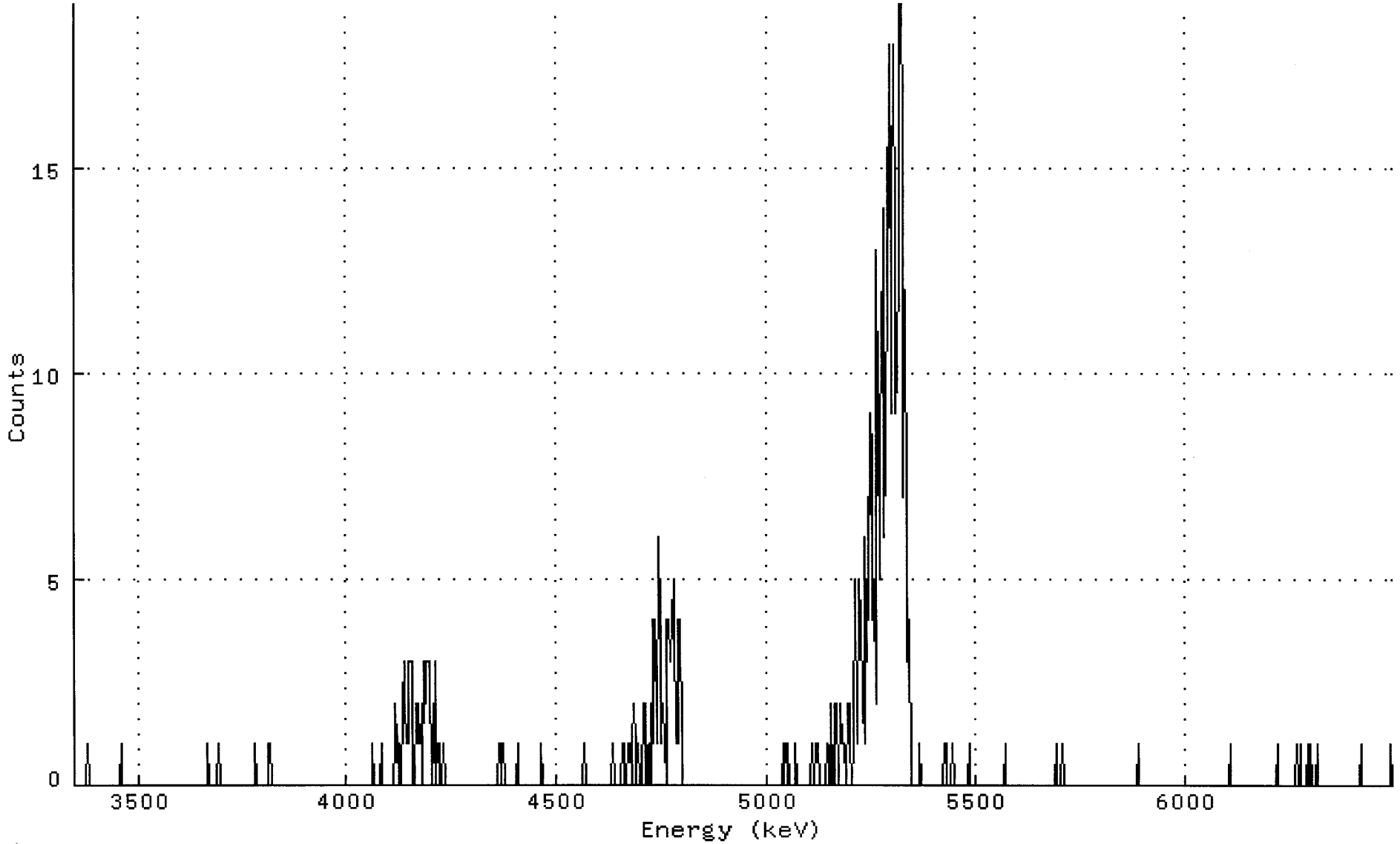
Analyst _____ Date 10-7-05

Reviewer _____ Date 10/10/05

Spectrum : DKA100:[ALPHA.ALUSR.ARCHIVE.S]S_0509118A-UU$06_UU.CNF;1
Title : 026
Sample Title: VPBR092705SL19
Start Time: 7-OCT-2005 07:55: Sample Time: 27-SEP-2005 00:00 Energy Offset: 3.33588E+03
Real Time : 0 02:50:07.00 Sample ID : 06 Energy Slope : 3.29001E+00
Live Time : 0 02:50:07.00 Sample Type: UU Energy Quad : -2.02172E-04



Channel Contents for ND_AMS_ARCHIVE_S:S_0509118A-UU$06_UU

Channel

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1: | 10207 | 10207 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 15: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 29: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 43: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 57: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 71: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 85: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 99: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 113: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 127: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 141: | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 155: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 169: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 183: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 197: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 211: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 225: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 239: | 0 | 1 | 2 | 1 | 0 | 1 | 0 | 2 | 3 | 2 | 1 | 1 | 3 | 3 |
| 253: | 3 | 0 | 0 | 2 | 2 | 1 | 1 | 2 | 0 | 3 | 2 | 3 | 3 | 3 |
| 267: | 0 | 0 | 1 | 3 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 281: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 295: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 309: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 0 |
| 323: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 337: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 351: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 365: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 379: | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 393: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 407: | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 0 | 1 |
| 421: | 2 | 1 | 0 | 1 | 0 | 0 | 0 | 2 | 0 | 2 | 0 | 1 | 0 | 0 |
| 435: | 4 | 1 | 4 | 3 | 1 | 6 | 4 | 1 | 2 | 1 | 0 | 4 | 4 | 3 |
| 449: | 3 | 4 | 5 | 4 | 1 | 4 | 1 | 4 | 1 | 0 | 0 | 0 | 0 | 0 |
| 463: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 477: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 491: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 505: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 519: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 533: | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 547: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 561: | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 2 | 0 | 0 |
| 575: | 2 | 0 | 2 | 0 | 0 | 2 | 1 | 1 | 1 | 0 | 0 | 2 | 2 | 1 |
| 589: | 0 | 1 | 1 | 5 | 1 | 1 | 5 | 4 | 4 | 2 | 1 | 6 | 3 | 7 |
| 603: | 4 | 9 | 8 | 4 | 5 | 2 | 13 | 9 | 5 | 9 | 10 | 14 | 6 | 8 |
| 617: | 13 | 13 | 18 | 9 | 14 | 18 | 13 | 9 | 10 | 13 | 19 | 19 | 16 | 7 |
| 631: | 12 | 6 | 3 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 645: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 659: | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 673: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 687: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 701: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 715: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 729: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 743: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 |
| 757: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 771: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 785: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 799: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 813: | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 827: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 841: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 855: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 869: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 883: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 897: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 911: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 925: | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 939: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 |
| 953: | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 967: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 981: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 995: | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1009: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1023: | 0 | 0 | | | | | | | | | | | | |

Eberline Services
Oak Ridge Laboratory

Gross Sample Counts Within Peak Regions  Generated:  7-OCT-2005 17:00:57.08

Detector ID: 26  Acquisition Start: 7-OCT-2005 07:55:39.01
Live Time: 0 02:50:07.00  Real Time: 0 02:50:07.00
Batch Id: 0509118A-UU  Sample Id: 06
Sample Type: UU

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 4164.51 | 54 | 0 | 98.70 | 255.89 | 204 | 86 | 5.29E-03 | 13.6 | |
| 2 | 0 | 4376.67 | 4 | 0 | 49.35 | 322.75 | 299 | 40 | 3.92E-04 | 50.0 | |
| 3 | 0 | 4462.61 | 1 | 0 | 3.29 | 350.00 | 341 | 28 | 9.80E-05 | 100.0 | |
| 4 | 0 | 4747.45 | 81 | 0 | 70.86 | 441.00 | 394 | 78 | 7.94E-03 | 11.1 | |
| 5 | 0 | 5285.02 | 380 | 0 | 74.48 | 615.74 | 571 | 73 | 3.72E-02 | 5.1 | |

Background Counts Within Peak Regions  Generated:  7-OCT-2005 17:01:12.35

Acquisition Start: 1-OCT-2005 10:06:43.01
Live Time: 0 16:40:02.00  Real Time: 0 16:40:02.00

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 4134.58 | 8 | 0 | 3.29 | 246.50 | 204 | 86 | 1.33E-04 | 35.4 | |
| 2 | 0 | 4363.23 | 1 | 0 | 3.29 | 318.50 | 299 | 40 | 1.67E-05 | 100.0 | |
| 3 | 0 | 4476.78 | 2 | 0 | 32.90 | 354.50 | 341 | 28 | 3.33E-05 | 70.7 | |
| 4 | 0 | 4720.99 | 6 | 0 | 0.00 | 432.50 | 394 | 78 | 1.00E-04 | 40.8 | |
| 5 | 0 | 5258.42 | 0 | 0 | 0.00 | 607.00 | 571 | 73 | 0.00E+00 | 0.0 | |

Net Sample Counts Within Peak Regions  Generated:  7-OCT-2005 17:01:12.64

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 4164.51* | 53 | 0 | 98.70 | 255.89 | 204 | 86 | 5.16E-03 | 14.0 | |
| 2 | 0 | 4376.67* | 4 | 0 | 49.35 | 322.75 | 299 | 40 | 3.75E-04 | 52.4 | |
| 3 | 0 | 4462.61* | 1 | 0 | 3.29 | 350.00 | 341 | 28 | 6.46E-05 | 155.9 | |
| 4 | 0 | 4747.45* | 80 | 0 | 70.86 | 441.00 | 394 | 78 | 7.84E-03 | 11.3 | |
| 5 | 0 | 5285.02* | 380 | 0 | 74.48 | 615.74 | 571 | 73 | 3.72E-02 | 5.1 | |

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.0 Generated 7-OCT-2005 17:01:13

Configuration : MCA0:[AMSCOUNT]0000C192$1
Analyses by : ROIPEAK V1.2,PEAKEFF V2.2,ENBACK V1.6,NID V3.3
Sample title : VPBR092705SL19
Sample date : 27-SEP-2005 00:00:00 Acquisition date : 7-OCT-2005 07:55:39
Sample ID : 06 Sample quantity : 1.0488 gram
Sample type : UU Sample geometry :
Detector name : 026 Detector geometry:
Elapsed live time: 0 02:50:07.00 Elapsed real time: 0 02:50:07.00 0.0%
Energy tolerance : 100.00 keV Half life ratio : 8.00
Errors propagated: Yes Systematic Error : 3.00 %
Efficiency type : Average value Efficiencies at : Peak Energy
Abundance limit : 75.00

Post-NID Peak Search Report

| It | Energy | Area | FWHM | Channel | Left | Pw | %Err | Fit | Nuclides | Activity pCi/gram |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 4164.51* | 53 | 98.70 | 255.89 | 204 | 86 | 28.0 | | U-238 | 0.694 |
| 0 | 4376.67* | 4 | 49.35 | 322.75 | 299 | 40 | 104.8 | | U-235 | 6.254E-02 |
| 0 | 4462.61* | 1 | 3.29 | 350.00 | 341 | 28 | 311.8 | | U-236 | 9.673E-03 |
| 0 | 4747.45* | 80 | 70.86 | 441.00 | 394 | 78 | 22.5 | | U-234 | 1.06 |
| 0 | 5285.02* | 380 | 74.48 | 615.74 | 571 | 73 | 10.3 | | U232 | 5.03 |

Eberline Services
Oak Ridge Laboratory

ALPHA SPECTROMETRY REPORT
7-OCT-2005 17:01:24

**********

Spectral File: ND_AMS_ARCHIVE_S:S_0509118A-UU$07_UU.CNF

**********

| | | | |
|---|---|---|---|
| BATCH ID: | 0509118A-UU | SAMPLE ID: | 07 |
| SAMPLE DATE: | 27-SEP-2005 00:00 | ALIQUOT: | 1.053E+00 gram |
| SAMPLE TITLE: | VPBR092705SL20 | DETECTOR NUMBER: | 027 |
| ACQ DATE: | 7-OCT-2005 07:55 | AVERAGE EFFICIENCY: | 20.06% |
| ELAPSED LIVE TIME: | 10204. | RECOVERY: | 94.66% |
| TRACER ID: | UU-10A | TRACER FWHM (kev): | 84.12 |
| LAMBDA VALUE: | 599. | ROI TYPE: | STANDARD |
| TRACER DPM AT SAMPLE DATE: | 12.431 | CONFIDENCE FACTOR: | 4.65 |
| SAMPLE MATRIX: | SOIL | LLD CONSTANT: | 2.71 |
| ENERGY CAL DATE: | 29-SEP-2005 13:20 | EFF CAL DATE: | 29-SEP-2005 13:20 |
| BKG FILENAME: | B_027_1OCT05 | BKG ELAPSED TIME: | 60004. |

**********

NUCLIDE ACTIVITY SUMMARY

| NUCLIDE | ENERGY | NET AREA | BKG | %ABN | ACTIVITY pCi/ gram | TPU/ERROR 2-SIGMA | MDC pCi/ gram |
|---|---|---|---|---|---|---|---|
| U232 | 5302.5 | 400.49 | 0.51 | 99.8 | 5.320E+00 | 6.929E-01 | 8.010E-02 |
| U-234 | 4761.5 | 101.15 | 0.85 | 99.8 | 1.343E+00 | 3.338E-01 | 9.293E-02 |
| U-235 | 4385.5 | 7.49 | 0.51 | 80.9 | 1.227E-01 | 9.492E-02 | 9.881E-02 |
| U-236 | 4485.2 | 0.83 | 0.17 | 90.1 | 1.221E-02 | 2.990E-02 | 6.807E-02 |
| U-238 | 4184.4 | 81.83 | 0.17 | 100.2 | 1.082E+00 | 2.879E-01 | 6.119E-02 |

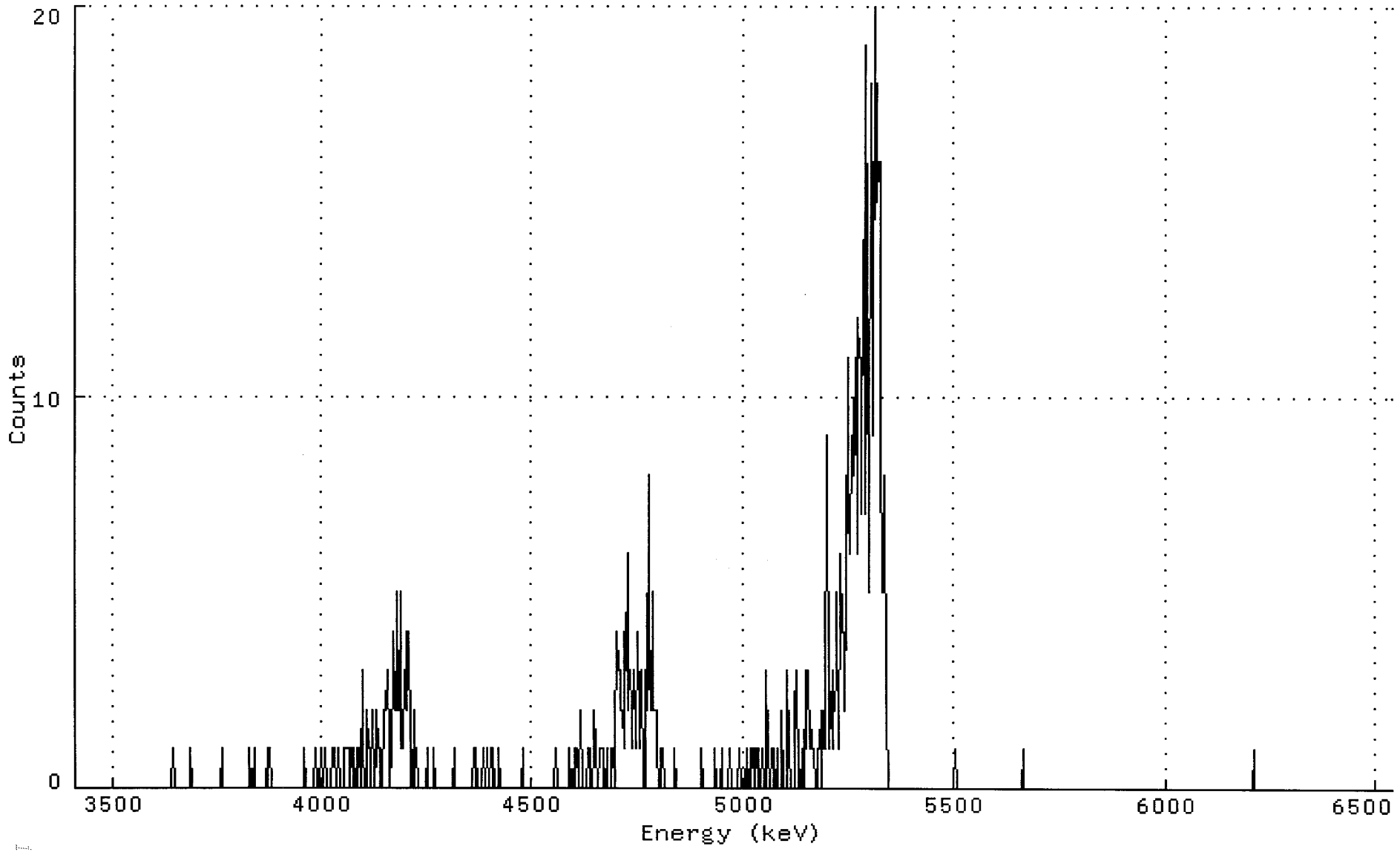
**********

*** Tracer FWHM > 80.0 Kev ***

Analyst _____ Date 10.7.05

Reviewer _____ Date 10/10/05

Spectrum : DKA100:[ALPHA.ALUSR.ARCHIVE.S]S_0509118A-UU$07_UU.CNF;1
Title : 027
Sample Title: VPBR092705SL20
Start Time: 7-OCT-2005 07:55: Sample Time: 27-SEP-2005 00:00 Energy Offset: 3.40169E+03
Real Time : 0 02:50:04.00 Sample ID : 07 Energy Slope : 3.24024E+00
Live Time : 0 02:50:04.00 Sample Type: UU Energy Quad : -1.75434E-04



Channel Contents for ND_AMS_ARCHIVE_S:S_0509118A-UU$07_UU

Channel

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1: | 10204 | 10204 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 29: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 43: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 57: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 71: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 85: | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 99: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 113: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 127: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 141: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 155: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 169: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 183: | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| 197: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 1 | 0 |
| 211: | 1 | 0 | 1 | 0 | 1 | 0 | 3 | 1 | 0 | 0 | 2 | 1 | 1 | 0 |
| 225: | 2 | 0 | 1 | 2 | 1 | 1 | 0 | 0 | 2 | 2 | 2 | 3 | 1 | 0 |
| 239: | 1 | 3 | 4 | 2 | 2 | 5 | 2 | 5 | 1 | 1 | 3 | 2 | 4 | 4 |
| 253: | 1 | 0 | 0 | 2 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 267: | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 281: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 295: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| 309: | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 |
| 323: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 337: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 351: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 365: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 |
| 379: | 1 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 1 |
| 393: | 2 | 1 | 0 | 1 | 1 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 1 |
| 407: | 1 | 0 | 1 | 4 | 3 | 3 | 2 | 2 | 1 | 4 | 3 | 6 | 2 | 3 |
| 421: | 2 | 1 | 3 | 2 | 1 | 4 | 2 | 1 | 3 | 0 | 0 | 3 | 2 | 8 |
| 435: | 3 | 2 | 5 | 2 | 2 | 2 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 0 |
| 449: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 463: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 477: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| 491: | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| 505: | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 1 | 0 |
| 519: | 1 | 0 | 1 | 1 | 0 | 0 | 3 | 1 | 0 | 0 | 1 | 0 | 1 | 0 |
| 533: | 1 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 3 | 1 | 0 | 0 | 0 | 0 |
| 547: | 2 | 3 | 0 | 0 | 0 | 1 | 0 | 0 | 3 | 1 | 3 | 1 | 2 | 1 |
| 561: | 1 | 1 | 0 | 0 | 1 | 1 | 2 | 0 | 2 | 1 | 1 | 9 | 1 | 3 |
| 575: | 2 | 1 | 3 | 2 | 3 | 5 | 1 | 5 | 6 | 4 | 4 | 2 | 5 | 11 |
| 589: | 7 | 6 | 9 | 8 | 9 | 11 | 6 | 12 | 11 | 11 | 7 | 14 | 7 | 19 |
| 603: | 13 | 5 | 6 | 18 | 14 | 9 | 20 | 16 | 15 | 16 | 16 | 9 | 5 | 7 |
| 617: | 8 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 631: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 645: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 659: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 673: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 687: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 701: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 715: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 729: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 743: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 757: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 771: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 785: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 799: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 813: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 827: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 841: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 855: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 869: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 883: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 897: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 911: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 925: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 939: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 953: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 967: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 981: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 995: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1009: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1023: | 0 | 0 | | | | | | | | | | | | |

Eberline Services
Oak Ridge Laboratory

Gross Sample Counts Within Peak Regions  Generated:  7-OCT-2005 17:01:17.93

Detector ID: 27  Acquisition Start: 7-OCT-2005 07:55:58.01
Live Time: 0 02:50:04.00  Real Time: 0 02:50:04.00
Batch Id: 0509118A-UU  Sample Id: 07
Sample Type: UU

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 4154.34 | 82 | 0 | 115.57 | 235.28 | 187 | 86 | 8.04E-03 | 11.0 | |
| 2 | 0 | 4381.08 | 8 | 0 | 113.41 | 307.37 | 282 | 40 | 7.84E-04 | 35.4 | |
| 3 | 0 | 4476.85 | 1 | 0 | 3.24 | 338.00 | 325 | 28 | 9.80E-05 | 100.0 | |
| 4 | 0 | 4733.43 | 102 | 0 | 64.79 | 420.58 | 378 | 78 | 1.00E-02 | 9.9 | |
| 5 | 0 | 5277.49 | 401 | 0 | 84.12 | 598.29 | 556 | 73 | 3.93E-02 | 5.0 | |

Background Counts Within Peak Regions  Generated:  7-OCT-2005 17:01:21.98

Acquisition Start: 1-OCT-2005 10:06:46.01
Live Time: 0 16:40:04.00  Real Time: 0 16:40:04.00

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 4136.08 | 1 | 0 | 3.24 | 229.50 | 187 | 86 | 1.67E-05 | 100.0 | |
| 2 | 0 | 4362.67 | 3 | 0 | 97.21 | 301.50 | 282 | 40 | 5.00E-05 | 57.7 | |
| 3 | 0 | 4478.41 | 1 | 0 | 3.24 | 338.50 | 325 | 28 | 1.67E-05 | 100.0 | |
| 4 | 0 | 4720.81 | 5 | 0 | 116.65 | 416.50 | 378 | 78 | 8.33E-05 | 44.7 | |
| 5 | 0 | 5258.43 | 3 | 0 | 0.00 | 592.00 | 556 | 73 | 5.00E-05 | 57.7 | |

Net Sample Counts Within Peak Regions  Generated:  7-OCT-2005 17:01:22.26

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 4154.34* | 82 | 0 | 115.57 | 235.28 | 187 | 86 | 8.02E-03 | 11.1 | |
| 2 | 0 | 4381.08* | 7 | 0 | 113.41 | 307.37 | 282 | 40 | 7.34E-04 | 38.0 | |
| 3 | 0 | 4476.85* | 1 | 0 | 3.24 | 338.00 | 325 | 28 | 8.13E-05 | 122.2 | |
| 4 | 0 | 4733.43* | 101 | 0 | 64.79 | 420.58 | 378 | 78 | 9.91E-03 | 10.0 | |
| 5 | 0 | 5277.49* | 400 | 0 | 84.12 | 598.29 | 556 | 73 | 3.92E-02 | 5.0 | |

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.0 Generated 7-OCT-2005 17:01:23

| | | | |
|---|---|---|---|
| Configuration | : MCA0:[AMSCOUNT]0000C192$1 | | |
| Analyses by | : ROIPEAK V1.2,PEAKEFF V2.2,ENBACK V1.6,NID V3.3 | | |
| Sample title | : VPBR092705SL20 | | |
| Sample date | : 27-SEP-2005 00:00:00 | Acquisition date | : 7-OCT-2005 07:55:58 |
| Sample ID | : 07 | Sample quantity | : 1.0526 gram |
| Sample type | : UU | Sample geometry | : |
| Detector name | : 027 | Detector geometry | : |
| Elapsed live time | : 0 02:50:04.00 | Elapsed real time | : 0 02:50:04.00 0.0% |
| Energy tolerance | : 100.00 keV | Half life ratio | : 8.00 |
| Errors propagated | : Yes | Systematic Error | : 3.00 % |
| Efficiency type | : Average value | Efficiencies at | : Peak Energy |
| Abundance limit | : 75.00 | | |

Post-NID Peak Search Report

| It | Energy | Area | FWHM | Channel | Left | Pw | %Err | Fit | Nuclides | Activity pCi/gram |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 4154.34* | 82115.57 | 235.28 | 187 | 86 | 22.1 | | | U-238 | 1.02 |
| 0 | 4381.08* | 7113.41 | 307.37 | 282 | 40 | 75.9 | | | U-235 | 0.116 |
| 0 | 4476.85* | 1 3.24 | 338.00 | 325 | 28 | 244.4 | | | U-236 | 1.156E-02 |
| 0 | 4733.43* | 101 64.79 | 420.58 | 378 | 78 | 20.0 | | | U-234 | 1.27 |
| 0 | 5277.49* | 400 84.12 | 598.29 | 556 | 73 | 10.0 | | | U232 | 5.04 |

Eberline Services
Oak Ridge Laboratory

ALPHA SPECTROMETRY REPORT
7-OCT-2005 17:01:40

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Spectral File: ND_AMS_ARCHIVE_S:S_0509118A-UU$08_UU.CNF

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| | | | |
|---|---|---|---|
| BATCH ID: | 0509118A-UU | SAMPLE ID: | 08 |
| SAMPLE DATE: | 28-SEP-2005 00:00 | ALIQUOT: | 1.031E+00 gram |
| SAMPLE TITLE: | VPTR092805SL0A | DETECTOR NUMBER: | 028 |
| ACQ DATE: | 7-OCT-2005 07:56 | AVERAGE EFFICIENCY: | 19.46% |
| ELAPSED LIVE TIME: | 10203. | RECOVERY: | 97.03% |
| TRACER ID: | UU-10A | TRACER FWHM (kev): | 72.42 |
| LAMBDA VALUE: | 591. | ROI TYPE: | STANDARD |
| TRACER DPM AT SAMPLE DATE: | 12.253 | CONFIDENCE FACTOR: | 4.65 |
| SAMPLE MATRIX: | SOIL | LLD CONSTANT: | 2.71 |
| ENERGY CAL DATE: | 29-SEP-2005 13:20 | EFF CAL DATE: | 29-SEP-2005 13:20 |
| BKG FILENAME: | B_028_1OCT05 | BKG ELAPSED TIME: | 60001. |

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NUCLIDE ACTIVITY SUMMARY

| NUCLIDE | ENERGY | NET AREA | BKG | %ABN | ACTIVITY pCi/ gram | TPU/ERROR 2-SIGMA | MDC pCi/ gram |
|---|---|---|---|---|---|---|---|
| U232 | 5302.5 | 392.49 | 0.51 | 99.8 | 5.355E+00 | 7.019E-01 | 8.227E-02 |
| U-234 | 4761.5 | 61.15 | 0.85 | 99.8 | 8.341E-01 | 2.482E-01 | 9.545E-02 |
| U-235 | 4385.5 | 1.83 | 0.17 | 80.9 | 3.079E-02 | 4.815E-02 | 7.787E-02 |
| U-236 | 4485.2 | 0.00 | 0.00 | 90.1 | 0.000E+00 | 0.000E+00 | 4.094E-02 |
| U-238 | 4184.4 | 75.32 | 0.68 | 100.2 | 1.023E+00 | 2.815E-01 | 8.889E-02 |

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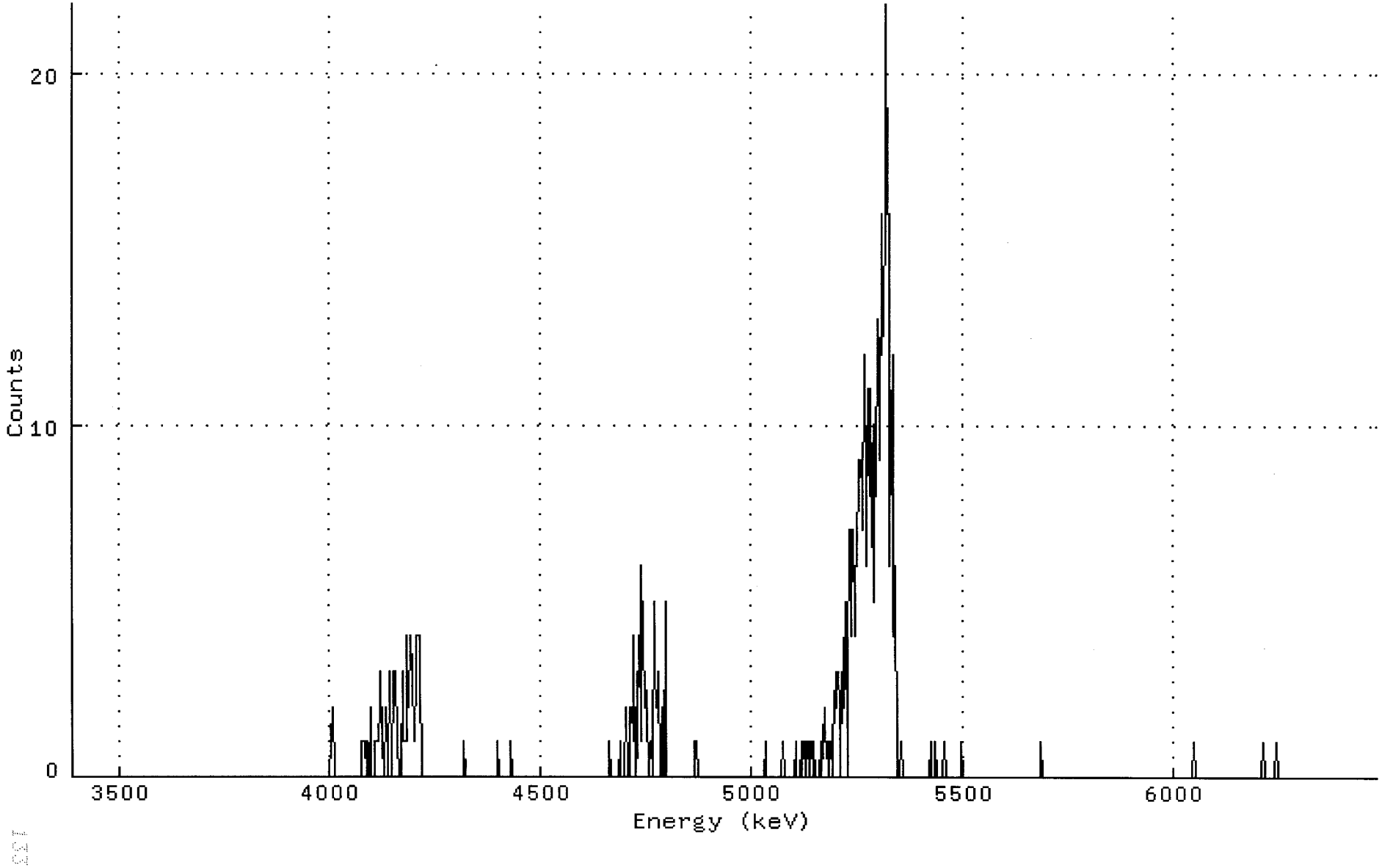
Analyst _____ Date 10-7-05

Reviewer _____ Date 10/10/05

Spectrum : DKA100:[ALPHA.ALUSR.ARCHIVE.S]S_0509118A-UU$08_UU.CNF;1
Title : 028
Sample Title: VPTR092805SL0A
Start Time: 7-OCT-2005 07:56: Sample Time: 28-SEP-2005 00:00 Energy Offset: 3.37691E+03
Real Time : 0 02:50:03.00 Sample ID : 08 Energy Slope : 3.24408E+00
Live Time : 0 02:50:03.00 Sample Type: UU Energy Quad : -2.11561E-04



Channel Contents for ND_AMS_ARCHIVE_S:S_0509118A-UU$08_UU

Channel

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1: | 10203 | 10203 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 29: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 43: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 57: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 71: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 85: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 99: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 113: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 127: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 141: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 155: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 169: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 183: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 197: | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 211: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 1 | 0 |
| 225: | 2 | 0 | 0 | 0 | 1 | 1 | 1 | 2 | 3 | 1 | 0 | 0 | 2 | 1 |
| 239: | 0 | 3 | 0 | 3 | 2 | 3 | 1 | 1 | 0 | 0 | 3 | 1 | 1 | 1 |
| 253: | 4 | 2 | 4 | 4 | 3 | 1 | 3 | 4 | 4 | 4 | 3 | 0 | 0 | 0 |
| 267: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 281: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 295: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 309: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 323: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 337: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 351: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 365: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 379: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 393: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 407: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 2 |
| 421: | 0 | 0 | 2 | 2 | 1 | 4 | 0 | 1 | 2 | 4 | 1 | 6 | 4 | 2 |
| 435: | 3 | 2 | 0 | 0 | 1 | 0 | 5 | 3 | 2 | 3 | 3 | 0 | 2 | 0 |
| 449: | 0 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 463: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 |
| 477: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 491: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 505: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 519: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 533: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 547: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 1 |
| 561: | 1 | 0 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 2 |
| 575: | 1 | 1 | 0 | 1 | 1 | 0 | 1 | 2 | 3 | 2 | 3 | 2 | 0 | 3 |
| 589: | 2 | 3 | 5 | 0 | 3 | 7 | 4 | 7 | 7 | 4 | 6 | 6 | 9 | 9 |
| 603: | 9 | 8 | 7 | 12 | 8 | 6 | 11 | 8 | 11 | 8 | 5 | 10 | 8 | 13 |
| 617: | 13 | 9 | 16 | 12 | 13 | 16 | 22 | 16 | 16 | 6 | 10 | 12 | 4 | 6 |
| 631: | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 645: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 659: | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 673: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 687: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 701: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 715: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 729: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 743: | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 757: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 771: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 785: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 799: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 813: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 827: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 841: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 855: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 869: | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 883: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 897: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 911: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 925: | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 939: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 953: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 967: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 981: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 995: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1009: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1023: | 0 | 0 | | | | | | | | | | | | |

Eberline Services
Oak Ridge Laboratory

Gross Sample Counts Within Peak Regions  Generated:  7-OCT-2005 17:01:27.97

Detector ID: 28  Acquisition Start: 7-OCT-2005 07:56:23.01
Live Time: 0 02:50:03.00  Real Time: 0 02:50:03.00
Batch Id: 0509118A-UU  Sample Id: 08
Sample Type: UU

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 4161.00 | 76 | 0 | 101.59 | 245.63 | 195 | 86 | 7.45E-03 | 11.5 | |
| 2 | 0 | 4359.13 | 2 | 0 | 87.59 | 309.00 | 290 | 41 | 1.96E-04 | 70.7 | |
| 3 | 0 | 4477.13 | 0 | 0 | 0.00 | 347.00 | 333 | 29 | 0.00E+00 | 0.0 | |
| 4 | 0 | 4747.46 | 62 | 0 | 80.10 | 434.81 | 387 | 79 | 6.08E-03 | 12.7 | |
| 5 | 0 | 5281.45 | 393 | 0 | 72.42 | 611.46 | 568 | 74 | 3.85E-02 | 5.0 | |

Background Counts Within Peak Regions  Generated:  7-OCT-2005 17:01:38.64

Acquisition Start: 1-OCT-2005 10:06:49.01
Live Time: 0 16:40:01.00  Real Time: 0 16:40:01.00

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 4135.45 | 4 | 0 | 155.72 | 237.50 | 195 | 86 | 6.67E-05 | 50.0 | |
| 2 | 0 | 4362.25 | 1 | 0 | 3.24 | 310.00 | 290 | 41 | 1.67E-05 | 100.0 | |
| 3 | 0 | 4477.13 | 0 | 0 | 0.00 | 347.00 | 333 | 29 | 0.00E+00 | 0.0 | |
| 4 | 0 | 4720.50 | 5 | 0 | 230.33 | 426.00 | 387 | 79 | 8.33E-05 | 44.7 | |
| 5 | 0 | 5260.65 | 3 | 0 | 0.00 | 604.50 | 568 | 74 | 5.00E-05 | 57.7 | |

Net Sample Counts Within Peak Regions  Generated:  7-OCT-2005 17:01:38.93

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 4161.00* | 75 | 0 | 101.59 | 245.63 | 195 | 86 | 7.38E-03 | 11.6 | |
| 2 | 0 | 4359.13* | 2 | 0 | 87.59 | 309.00 | 290 | 41 | 1.79E-04 | 77.8 | |
| 3 | 0 | 4477.13* | 0 | 0 | 0.00 | 347.00 | 333 | 29 | 0.00E+00 | 0.0 | |
| 4 | 0 | 4747.46* | 61 | 0 | 80.10 | 434.81 | 387 | 79 | 5.99E-03 | 12.9 | |
| 5 | 0 | 5281.45* | 392 | 0 | 72.42 | 611.46 | 568 | 74 | 3.85E-02 | 5.1 | |

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.0 Generated 7-OCT-2005 17:01:39

Configuration : MCA0:[AMSCOUNT]0000C192$1
Analyses by : ROIPEAK V1.2,PEAKEFF V2.2,ENBACK V1.6,NID V3.3
Sample title : VPTR092805SL0A
Sample date : 28-SEP-2005 00:00:00 Acquisition date : 7-OCT-2005 07:56:23
Sample ID : 08 Sample quantity : 1.0307 gram
Sample type : UU Sample geometry :
Detector name : 028 Detector geometry:
Elapsed live time: 0 02:50:03.00 Elapsed real time: 0 02:50:03.00 0.0%
Energy tolerance : 100.00 keV Half life ratio : 8.00
Errors propagated: Yes Systematic Error : 3.00 %
Efficiency type : Average value Efficiencies at : Peak Energy
Abundance limit : 75.00

Post-NID Peak Search Report

| It | Energy | Area | FWHM | Channel | Left | Pw | %Err | Fit | Nuclides | Activity pCi/gram |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 4161.00* | 75 | 101.59 | 245.63 | 195 | 86 | 23.2 | | U-238 | 0.993 |
| 0 | 4359.13* | 2 | 87.59 | 309.00 | 290 | 41 | 155.7 | | U-235 | 2.988E-02 |
| 0 | 4477.13* | 0 | 0.00 | 347.00 | 333 | 29 | 0.0 | | U-236 | 0.000E+00 |
| 0 | 4747.46* | 61 | 80.10 | 434.81 | 387 | 79 | 25.8 | | U-234 | 0.809 |
| 0 | 5281.45* | 392 | 72.42 | 611.46 | 568 | 74 | 10.1 | | U232 | 5.20 |

Eberline Services
Oak Ridge Laboratory

ALPHA SPECTROMETRY REPORT
7-OCT-2005 17:01:49

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Spectral File: ND_AMS_ARCHIVE_S:S_0509118A-UU$09_UU.CNF

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| | | | |
|---|---|---|---|
| BATCH ID: | 0509118A-UU | SAMPLE ID: | 09 |
| SAMPLE DATE: | 28-SEP-2005 00:00 | ALIQUOT: | 1.016E+00 gram |
| SAMPLE TITLE: | VPTR092805SL0B | DETECTOR NUMBER: | 029 |
| ACQ DATE: | 7-OCT-2005 07:56 | AVERAGE EFFICIENCY: | 19.14% |
| ELAPSED LIVE TIME: | 10206. | RECOVERY: | 96.76% |
| TRACER ID: | UU-10A | TRACER FWHM (kev): | 63.50 |
| LAMBDA VALUE: | 587. | ROI TYPE: | STANDARD |
| TRACER DPM AT SAMPLE DATE: | 12.182 | CONFIDENCE FACTOR: | 4.65 |
| SAMPLE MATRIX: | SOIL | LLD CONSTANT: | 2.71 |
| ENERGY CAL DATE: | 29-SEP-2005 13:20 | EFF CAL DATE: | 29-SEP-2005 13:20 |
| BKG FILENAME: | B_029_1OCT05 | BKG ELAPSED TIME: | 60002. |

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NUCLIDE ACTIVITY SUMMARY

| NUCLIDE | ENERGY | NET AREA | BKG | %ABN | ACTIVITY pCi/ gram | TPU/ERROR 2-SIGMA | MDC pCi/ gram |
|---|---|---|---|---|---|---|---|
| U232 | 5302.5 | 382.98 | 1.02 | 99.8 | 5.399E+00 | 7.134E-01 | 1.044E-01 |
| U-234 | 4761.5 | 76.62 | 2.38 | 99.8 | 1.080E+00 | 2.985E-01 | 1.393E-01 |
| U-235 | 4385.5 | 4.66 | 0.34 | 80.9 | 8.102E-02 | 7.913E-02 | 9.427E-02 |
| U-236 | 4485.2 | -0.02 | 1.02 | 90.1 | -3.211E-04 | 3.382E-02 | 1.156E-01 |
| U-238 | 4184.4 | 55.98 | 1.02 | 100.2 | 7.856E-01 | 2.425E-01 | 1.040E-01 |

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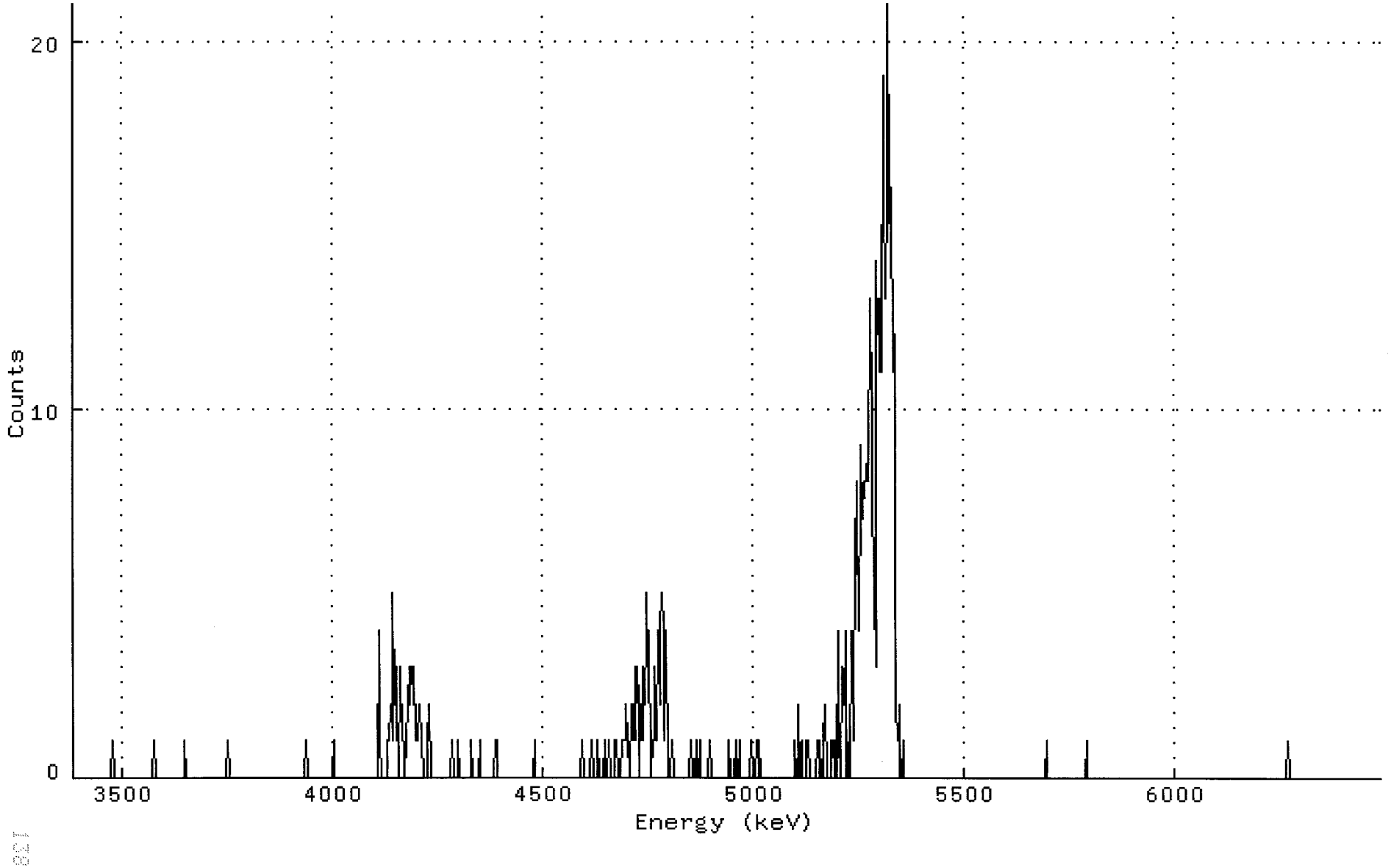
Analyst _____ Date 10.7.05

Reviewer _____ Date 10/10/05

Spectrum : DKA100:[ALPHA.ALUSR.ARCHIVE.S]S_0509118A-UU$09_UU.CNF;1
Title : 029
Sample Title: VPTR092805SL0B
Start Time: 7-OCT-2005 07:56: Sample Time: 28-SEP-2005 00:00 Energy Offset: 3.37141E+03
Real Time : 0 02:50:06.00 Sample ID : 09 Energy Slope : 3.23165E+00
Live Time : 0 02:50:06.00 Sample Type: UU Energy Quad : -1.87731E-04



Channel Contents for ND_AMS_ARCHIVE_S:S_0509118A-UU$09_UU

Channel

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1: | 10206 | 10206 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 29: | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 43: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 57: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 71: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 85: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 99: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 113: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 127: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 141: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 155: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 169: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 183: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 197: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 211: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 225: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 1 | 0 | 0 | 0 | 0 | 0 |
| 239: | 1 | 1 | 2 | 1 | 5 | 2 | 3 | 2 | 0 | 3 | 2 | 2 | 0 | 1 |
| 253: | 1 | 2 | 3 | 2 | 3 | 2 | 3 | 1 | 1 | 2 | 2 | 1 | 0 | 0 |
| 267: | 0 | 0 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 281: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 295: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| 309: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 |
| 323: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 337: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 351: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 365: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 379: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 393: | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 407: | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 1 | 1 | 1 |
| 421: | 2 | 1 | 0 | 0 | 2 | 1 | 3 | 1 | 3 | 2 | 0 | 2 | 1 | 3 |
| 435: | 2 | 4 | 5 | 3 | 1 | 0 | 1 | 1 | 3 | 1 | 4 | 2 | 4 | 5 |
| 449: | 4 | 1 | 4 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 463: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 |
| 477: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 491: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 505: | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| 519: | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 533: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 547: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 2 | 0 | 1 | 0 | 0 | 0 |
| 561: | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 1 |
| 575: | 2 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 0 | 4 | 1 | 0 | 3 |
| 589: | 3 | 2 | 4 | 0 | 0 | 2 | 0 | 4 | 1 | 2 | 6 | 8 | 7 | 4 |
| 603: | 8 | 9 | 7 | 8 | 8 | 8 | 9 | 8 | 13 | 10 | 8 | 5 | 3 | 14 |
| 617: | 12 | 13 | 11 | 11 | 19 | 16 | 13 | 16 | 21 | 16 | 14 | 16 | 11 | 12 |
| 631: | 2 | 1 | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 645: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 659: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 673: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 687: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 701: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 715: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 729: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 743: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 757: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 771: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 785: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 799: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 813: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 827: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 841: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 855: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 869: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 883: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 897: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 911: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 925: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 939: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 953: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 967: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 981: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 995: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1009: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1023: | 0 | 0 | | | | | | | | | | | | |

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Gross Sample Counts Within Peak Regions  Generated:  7-OCT-2005 17:01:44.74

Detector ID: 29  Acquisition Start: 7-OCT-2005 07:56:45.01
Live Time: 0 02:50:06.00  Real Time: 0 02:50:06.00
Batch Id: 0509118A-UU  Sample Id: 09
Sample Type: UU

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 4166.60 | 57 | 0 | 89.25 | 249.68 | 197 | 87 | 5.58E-03 | 13.2 | |
| 2 | 0 | 4350.82 | 5 | 0 | 0.00 | 308.60 | 292 | 41 | 4.90E-04 | 44.7 | |
| 3 | 0 | 4479.49 | 1 | 0 | 3.23 | 350.00 | 336 | 28 | 9.80E-05 | 100.0 | |
| 4 | 0 | 4743.79 | 79 | 0 | 79.53 | 435.70 | 389 | 79 | 7.74E-03 | 11.3 | |
| 5 | 0 | 5287.06 | 384 | 0 | 63.50 | 614.73 | 569 | 74 | 3.76E-02 | 5.1 | |

Background Counts Within Peak Regions  Generated:  7-OCT-2005 17:01:47.00

Acquisition Start: 1-OCT-2005 10:06:51.01
Live Time: 0 16:40:02.00  Real Time: 0 16:40:02.00

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 4136.19 | 6 | 0 | 3.23 | 240.00 | 197 | 87 | 1.00E-04 | 40.8 | |
| 2 | 0 | 4361.41 | 2 | 0 | 0.00 | 312.00 | 292 | 41 | 3.33E-05 | 70.7 | |
| 3 | 0 | 4477.94 | 6 | 0 | 3.23 | 349.50 | 336 | 28 | 1.00E-04 | 40.8 | |
| 4 | 0 | 4720.17 | 14 | 0 | 3.23 | 428.00 | 389 | 79 | 2.33E-04 | 26.7 | |
| 5 | 0 | 5259.35 | 6 | 0 | 0.00 | 605.50 | 569 | 74 | 1.00E-04 | 40.8 | |

Net Sample Counts Within Peak Regions  Generated:  7-OCT-2005 17:01:47.37

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 4166.60* | 56 | 0 | 89.25 | 249.68 | 197 | 87 | 5.48E-03 | 13.5 | |
| 2 | 0 | 4350.82* | 5 | 0 | 0.00 | 308.60 | 292 | 41 | 4.57E-04 | 48.3 | |
| 3 | 0 | 4479.49* | 0 | 0 | 3.23 | 350.00 | 336 | 28 | -2.02E-06 | ***** | |
| 4 | 0 | 4743.79* | 77 | 0 | 79.53 | 435.70 | 389 | 79 | 7.51E-03 | 11.6 | |
| 5 | 0 | 5287.06* | 383 | 0 | 63.50 | 614.73 | 569 | 74 | 3.75E-02 | 5.1 | |

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.0 Generated 7-OCT-2005 17:01:48

Configuration : MCA0:[AMSCOUNT]0000C192$1
Analyses by : ROIPEAK V1.2,PEAKEFF V2.2,ENBACK V1.6,NID V3.3
Sample title : VPTR092805SL0B
Sample date : 28-SEP-2005 00:00:00 Acquisition date : 7-OCT-2005 07:56:45
Sample ID : 09 Sample quantity : 1.0164 gram
Sample type : UU Sample geometry :
Detector name : 029 Detector geometry:
Elapsed live time: 0 02:50:06.00 Elapsed real time: 0 02:50:06.00 0.0%
Energy tolerance : 100.00 keV Half life ratio : 8.00
Errors propagated: Yes Systematic Error : 3.00 %
Efficiency type : Average value Efficiencies at : Peak Energy
Abundance limit : 75.00

Post-NID Peak Search Report

| It | Energy | Area | FWHM | Channel | Left | Pw | %Err | Fit | Nuclides | Activity pCi/gram |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 4166.60* | 56 | 89.25 | 249.68 | 197 | 87 | 27.0 | | U-238 | 0.760 |
| 0 | 4350.82* | 5 | 0.00 | 308.60 | 292 | 41 | 96.5 | | U-235 | 7.839E-02 |
| 0 | 4479.49* | 0 | 3.23 | 350.00 | 336 | 28 | ***** | | U-236 | -3.107E-04 |
| 0 | 4743.79* | 77 | 79.53 | 435.70 | 389 | 79 | 23.3 | | U-234 | 1.04 |
| 0 | 5287.06* | 383 | 63.50 | 614.73 | 569 | 74 | 10.2 | | U232 | 5.22 |

Eberline Services
Oak Ridge Laboratory

ALPHA SPECTROMETRY REPORT
7-OCT-2005 17:02:02

**********

Spectral File: ND_AMS_ARCHIVE_S:S_0509118A-UU$10_UU.CNF

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| | | | |
|---|---|---|---|
| BATCH ID: | 0509118A-UU | SAMPLE ID: | 10 |
| SAMPLE DATE: | 28-SEP-2005 00:00 | ALIQUOT: | 9.952E-01 gram |
| SAMPLE TITLE: | VPTR092805SL0C | DETECTOR NUMBER: | 030 |
| ACQ DATE: | 7-OCT-2005 07:57 | AVERAGE EFFICIENCY: | 20.73% |
| ELAPSED LIVE TIME: | 10201. | RECOVERY: | 96.00% |
| TRACER ID: | UU-10A | TRACER FWHM (kev): | 83.94 |
| LAMBDA VALUE: | 600. | ROI TYPE: | STANDARD |
| TRACER DPM AT SAMPLE DATE: | 12.452 | CONFIDENCE FACTOR: | 4.65 |
| SAMPLE MATRIX: | SOIL | LLD CONSTANT: | 2.71 |
| ENERGY CAL DATE: | 29-SEP-2005 13:20 | EFF CAL DATE: | 29-SEP-2005 13:20 |
| BKG FILENAME: | B_030_1OCT05 | BKG ELAPSED TIME: | 60004. |

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NUCLIDE ACTIVITY SUMMARY

| NUCLIDE | ENERGY | NET AREA | BKG | %ABN | ACTIVITY pCi/ gram | TPU/ERROR 2-SIGMA | MDC pCi/ gram |
|---|---|---|---|---|---|---|---|
| U232 | 5302.5 | 420.32 | 0.68 | 99.8 | 5.636E+00 | 7.237E-01 | 8.773E-02 |
| U-234 | 4761.5 | 54.49 | 0.51 | 99.8 | 7.305E-01 | 2.258E-01 | 8.085E-02 |
| U-235 | 4385.5 | 1.49 | 0.51 | 80.9 | 2.464E-02 | 4.791E-02 | 9.973E-02 |
| U-236 | 4485.2 | -0.17 | 0.17 | 90.1 | -2.524E-03 | 5.062E-03 | 6.871E-02 |
| U-238 | 4184.4 | 50.49 | 0.51 | 100.2 | 6.739E-01 | 2.147E-01 | 8.050E-02 |

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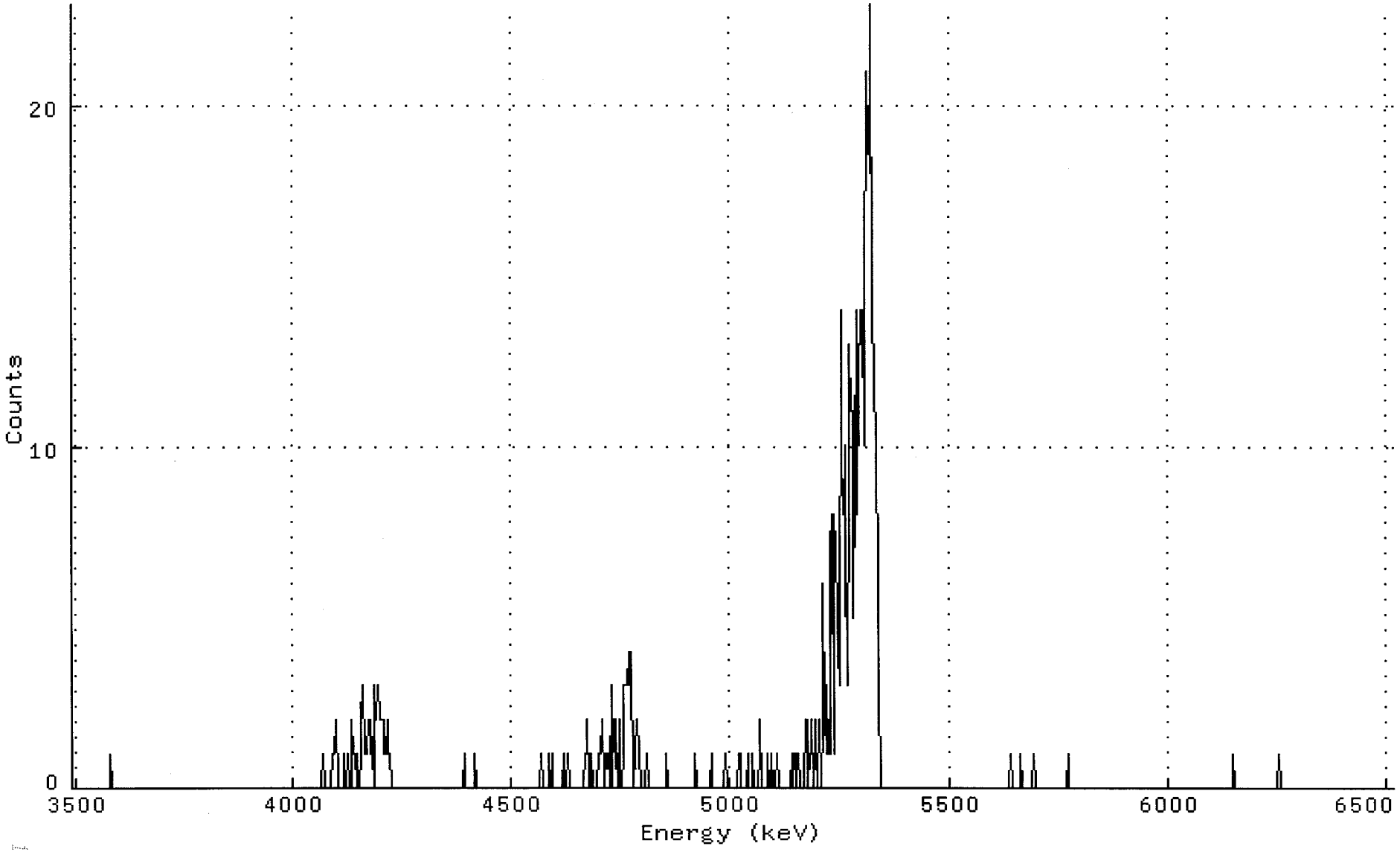
*** Tracer FWHM > 80.0 Kev ***

Analyst _____ Date 10.7.05

Reviewer _____ Date 10/10/05

Spectrum : DKA100:[ALPHA.ALUSR.ARCHIVE.S]S_0509118A-UU$10_UU.CNF;1
Title : 030
Sample Title: VPTR092805SLOC
Start Time: 7-OCT-2005 07:57: Sample Time: 28-SEP-2005 00:00 Energy Offset: 3.48178E+03
Real Time : 0 02:50:01.00 Sample ID : 10 Energy Slope : 3.17539E+00
Live Time : 0 02:50:01.00 Sample Type: UU Energy Quad : -2.09487E-04



Channel Contents for ND_AMS_ARCHIVE_S:S_0509118A-UU$10_UU

Channel

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1: | 10201 | 10201 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 29: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 43: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 57: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 71: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 85: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 99: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 113: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 127: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 141: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 155: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 169: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 183: | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 |
| 197: | 2 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 2 | 1 |
| 211: | 1 | 0 | 1 | 0 | 1 | 2 | 3 | 1 | 1 | 1 | 2 | 1 | 2 | 1 |
| 225: | 0 | 3 | 2 | 3 | 2 | 2 | 2 | 2 | 1 | 1 | 2 | 1 | 1 | 0 |
| 239: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 253: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 267: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 281: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 295: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 309: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 323: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 337: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 351: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 365: | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 379: | 0 | 0 | 0 | 0 | 1 | 1 | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 393: | 1 | 1 | 1 | 2 | 2 | 0 | 1 | 1 | 1 | 0 | 3 | 0 | 2 | 2 |
| 407: | 1 | 0 | 2 | 0 | 0 | 1 | 3 | 3 | 3 | 4 | 3 | 4 | 0 | 0 |
| 421: | 1 | 2 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 435: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 449: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 463: | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 477: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 491: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 |
| 505: | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 2 | 0 |
| 519: | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 |
| 533: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 1 |
| 547: | 0 | 0 | 0 | 0 | 0 | 2 | 2 | 0 | 1 | 1 | 2 | 0 | 2 | 1 |
| 561: | 0 | 2 | 2 | 0 | 2 | 6 | 2 | 1 | 3 | 1 | 1 | 7 | 8 | 1 |
| 575: | 8 | 7 | 5 | 4 | 3 | 14 | 9 | 8 | 10 | 7 | 3 | 9 | 13 | 11 |
| 589: | 11 | 5 | 9 | 14 | 8 | 12 | 14 | 13 | 14 | 10 | 14 | 21 | 19 | 18 |
| 603: | 23 | 14 | 12 | 12 | 10 | 6 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 617: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 631: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 645: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 659: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 673: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 687: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 701: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 715: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 729: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 743: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 757: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 771: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 785: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 799: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 813: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 827: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 841: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 855: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 869: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 883: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 897: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 911: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 925: | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 939: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 953: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 967: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 981: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 995: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1009: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1023: | 0 | 0 | | | | | | | | | | | | |

Eberline Services
Oak Ridge Laboratory

Gross Sample Counts Within Peak Regions  Generated:  7-OCT-2005 17:01:54.07

Detector ID: 30  Acquisition Start: 7-OCT-2005 07:57:07.01
Live Time: 0 02:50:01.00  Real Time: 0 02:50:01.00
Batch Id: 0509118A-UU  Sample Id: 10
Sample Type: UU

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 4168.48 | 51 | 0 | 123.71 | 219.43 | 165 | 88 | 5.00E-03 | 14.0 | |
| 2 | 0 | 4403.34 | 2 | 0 | 28.58 | 296.00 | 262 | 42 | 1.96E-04 | 70.7 | |
| 3 | 0 | 4476.46 | 0 | 0 | 0.00 | 320.00 | 306 | 29 | 0.00E+00 | 0.0 | |
| 4 | 0 | 4738.97 | 55 | 0 | 50.28 | 406.84 | 361 | 81 | 5.39E-03 | 13.5 | |
| 5 | 0 | 5284.71 | 421 | 0 | 83.94 | 590.81 | 545 | 75 | 4.13E-02 | 4.9 | |

Background Counts Within Peak Regions  Generated:  7-OCT-2005 17:02:00.22

Acquisition Start: 1-OCT-2005 10:06:54.01
Live Time: 0 16:40:04.00  Real Time: 0 16:40:04.00

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 4134.75 | 3 | 0 | 177.82 | 208.50 | 165 | 88 | 5.00E-05 | 57.7 | |
| 2 | 0 | 4362.11 | 3 | 0 | 34.93 | 282.50 | 262 | 42 | 5.00E-05 | 57.7 | |
| 3 | 0 | 4476.46 | 1 | 0 | 3.18 | 320.00 | 306 | 29 | 1.67E-05 | 100.0 | |
| 4 | 0 | 4721.43 | 3 | 0 | 76.21 | 401.00 | 361 | 81 | 5.00E-05 | 57.7 | |
| 5 | 0 | 5258.90 | 4 | 0 | 219.10 | 582.00 | 545 | 75 | 6.67E-05 | 50.0 | |

Net Sample Counts Within Peak Regions  Generated:  7-OCT-2005 17:02:00.53

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 4168.48* | 50 | 0 | 123.71 | 219.43 | 165 | 88 | 4.95E-03 | 14.2 | |
| 2 | 0 | 4403.34* | 1 | 0 | 28.58 | 296.00 | 262 | 42 | 1.46E-04 | 97.0 | |
| 3 | 0 | 4476.46* | 0 | 0 | 0.00 | 320.00 | 306 | 29 | -1.67E-05 | 100.0 | |
| 4 | 0 | 4738.97* | 54 | 0 | 50.28 | 406.84 | 361 | 81 | 5.34E-03 | 13.6 | |
| 5 | 0 | 5284.71* | 420 | 0 | 83.94 | 590.81 | 545 | 75 | 4.12E-02 | 4.9 | |

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.0 Generated 7-OCT-2005 17:02:01

Configuration : MCA0:[AMSCOUNT]0000C192$1
Analyses by : ROIPEAK V1.2,PEAKEFF V2.2,ENBACK V1.6,NID V3.3
Sample title : VPTR092805SL0C
Sample date : 28-SEP-2005 00:00:00 Acquisition date : 7-OCT-2005 07:57:07
Sample ID : 10 Sample quantity : 0.99520 gram
Sample type : UU Sample geometry :
Detector name : 030 Detector geometry:
Elapsed live time: 0 02:50:01.00 Elapsed real time: 0 02:50:01.00 0.0%
Energy tolerance : 100.00 keV Half life ratio : 8.00
Errors propagated: Yes Systematic Error : 3.00 %
Efficiency type : Average value Efficiencies at : Peak Energy
Abundance limit : 75.00

Post-NID Peak Search Report

| It | Energy | Area | FWHM | Channel | Left | Pw | %Err | Fit | Nuclides | Activity pCi/gram |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 4168.48* | 50123.71 | | 219.43 | 165 | 88 | 28.3 | | U-238 | 0.647 |
| 0 | 4403.34* | 1 | 28.58 | 296.00 | 262 | 42193.9 | | | U-235 | 2.366E-02 |
| 0 | 4476.46* | 0 | 0.00 | 320.00 | 306 | 29200.0 | | | U-236 | -2.423E-03 |
| 0 | 4738.97* | 54 | 50.28 | 406.84 | 361 | 81 | 27.2 | | U-234 | 0.701 |
| 0 | 5284.71* | 420 | 83.94 | 590.81 | 545 | 75 | 9.8 | | U232 | 5.41 |

Eberline Services
Oak Ridge Laboratory

ALPHA SPECTROMETRY REPORT
7-OCT-2005 17:02:13

**********

Spectral File: ND_AMS_ARCHIVE_S:S_0509118A-UU$11_UU.CNF

**********

| | | | |
|---|---|---|---|
| BATCH ID: | 0509118A-UU | SAMPLE ID: | 11 |
| SAMPLE DATE: | 28-SEP-2005 00:00 | ALIQUOT: | 1.013E+00 gram |
| SAMPLE TITLE: | VPTR092805SL0D | DETECTOR NUMBER: | 031 |
| ACQ DATE: | 7-OCT-2005 07:57 | AVERAGE EFFICIENCY: | 19.58% |
| ELAPSED LIVE TIME: | 10207. | RECOVERY: | 94.46% |
| TRACER ID: | UU-10A | TRACER FWHM (kev): | 81.84 |
| LAMBDA VALUE: | 593. | ROI TYPE: | STANDARD |
| TRACER DPM AT SAMPLE DATE: | 12.307 | CONFIDENCE FACTOR: | 4.65 |
| SAMPLE MATRIX: | SOIL | LLD CONSTANT: | 2.71 |
| ENERGY CAL DATE: | 29-SEP-2005 13:20 | EFF CAL DATE: | 29-SEP-2005 13:20 |
| BKG FILENAME: | B_031_1OCT05 | BKG ELAPSED TIME: | 60003. |

**********

NUCLIDE ACTIVITY SUMMARY

| NUCLIDE | ENERGY | NET AREA | BKG | %ABN | ACTIVITY pCi/ gram | TPU/ERROR 2-SIGMA | MDC pCi/ gram |
|---|---|---|---|---|---|---|---|
| U232 | 5302.5 | 386.32 | 0.68 | 99.8 | 5.472E+00 | 7.209E-01 | 9.270E-02 |
| U-234 | 4761.5 | 58.64 | 1.36 | 99.8 | 8.304E-01 | 2.523E-01 | 1.152E-01 |
| U-235 | 4385.5 | 9.00 | 0.00 | 80.9 | 1.572E-01 | 1.074E-01 | 4.735E-02 |
| U-236 | 4485.2 | 0.66 | 0.34 | 90.1 | 1.035E-02 | 3.231E-02 | 8.506E-02 |
| U-238 | 4184.4 | 67.32 | 0.68 | 100.2 | 9.493E-01 | 2.724E-01 | 9.230E-02 |

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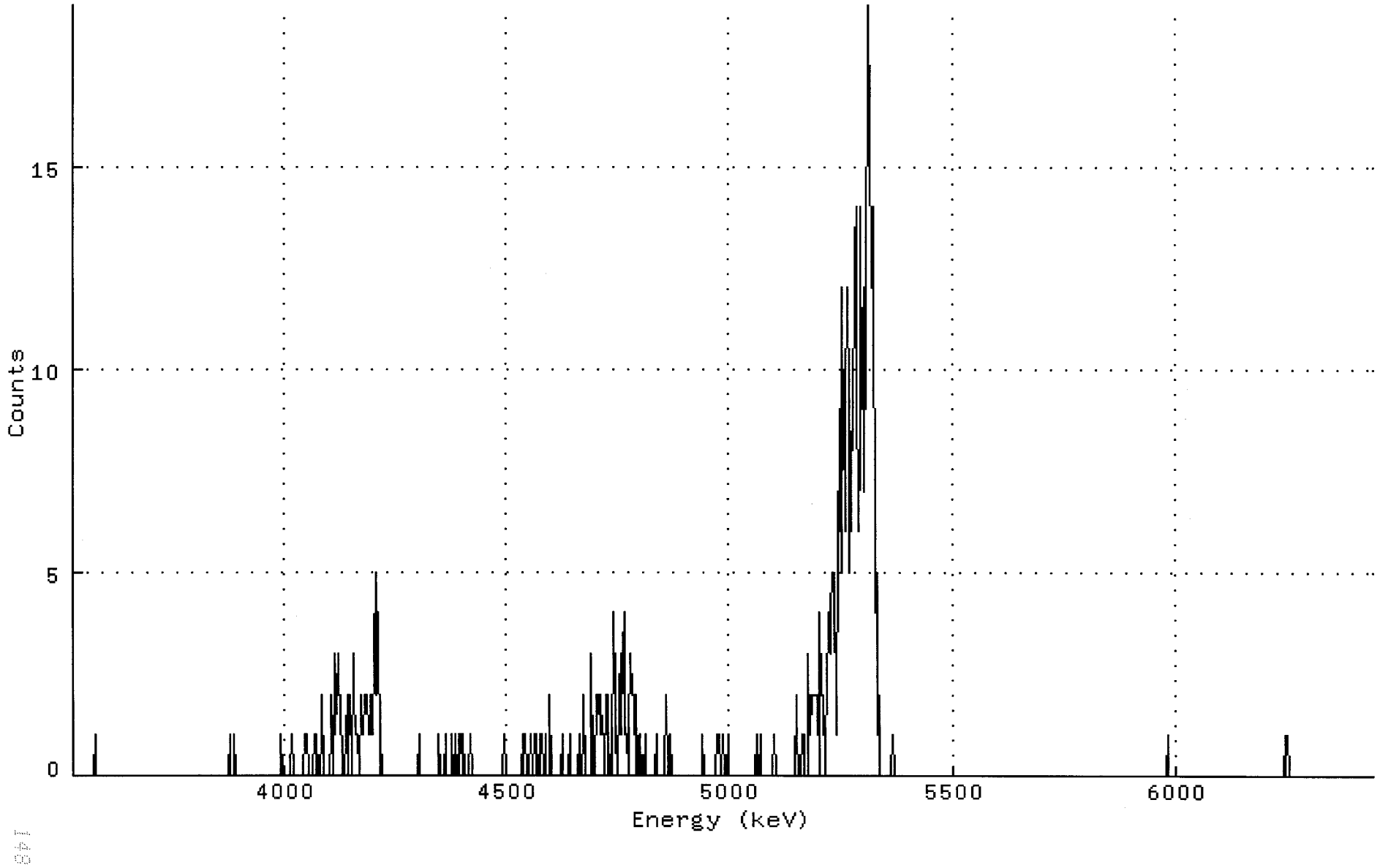
*** Tracer FWHM > 80.0 Kev ***

Analyst _____ Date 10.7.05

Reviewer _____ Date 10/10/05

Spectrum : DKA100:[ALPHA.ALUSR.ARCHIVE.S]S_0509118A-UU$11_UU.CNF;1
Title : 031
Sample Title: VPTR092805SL0D
Start Time: 7-OCT-2005 07:57: Sample Time: 28-SEP-2005 00:00 Energy Offset: 3.51499E+03
Real Time : 0 02:50:07.00 Sample ID : 11 Energy Slope : 3.06137E+00
Live Time : 0 02:50:07.00 Sample Type: UU Energy Quad : -2.01462E-04



Channel Contents for ND_AMS_ARCHIVE_S:S_0509118A-UU$11_UU

Channel

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1: | 10207 | 10207 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15: | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 29: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 43: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 57: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 71: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 85: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 99: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 113: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 127: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 141: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 155: | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 169: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 |
| 183: | 1 | 0 | 1 | 0 | 0 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 1 | 2 |
| 197: | 0 | 3 | 1 | 2 | 3 | 2 | 2 | 0 | 0 | 0 | 1 | 2 | 0 | 2 |
| 211: | 0 | 3 | 2 | 1 | 1 | 1 | 0 | 2 | 2 | 1 | 2 | 2 | 2 | 1 |
| 225: | 1 | 2 | 1 | 3 | 5 | 2 | 4 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 239: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 253: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 267: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 281: | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 1 |
| 295: | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 309: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 323: | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 337: | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| 351: | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 2 | 0 | 0 |
| 365: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 379: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 2 | 0 | 0 | 0 | 0 |
| 393: | 0 | 3 | 0 | 0 | 0 | 2 | 2 | 1 | 2 | 1 | 1 | 0 | 2 | 2 |
| 407: | 0 | 0 | 1 | 0 | 4 | 2 | 1 | 0 | 2 | 3 | 1 | 3 | 4 | 1 |
| 421: | 1 | 0 | 1 | 3 | 2 | 2 | 2 | 0 | 2 | 0 | 0 | 1 | 0 | 0 |
| 435: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 449: | 0 | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 463: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 477: | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 491: | 1 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 505: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 519: | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 533: | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 547: | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 0 | 0 | 1 | 1 | 0 |
| 561: | 0 | 0 | 3 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 0 | 4 | 2 | 2 |
| 575: | 2 | 0 | 3 | 2 | 4 | 3 | 4 | 5 | 5 | 5 | 1 | 6 | 7 | 6 |
| 589: | 12 | 5 | 10 | 6 | 9 | 12 | 9 | 5 | 7 | 10 | 8 | 13 | 14 | 10 |
| 603: | 6 | 8 | 14 | 9 | 12 | 7 | 11 | 19 | 19 | 16 | 12 | 13 | 14 | 4 |
| 617: | 9 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 631: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 645: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 659: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 673: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 687: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 701: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 715: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 729: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 743: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 757: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 771: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 785: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 799: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 813: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 827: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 841: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 855: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 869: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 883: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 897: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 911: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 925: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 939: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 |
| 953: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 967: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 981: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 995: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1009: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1023: | 0 | 0 | | | | | | | | | | | | |

Eberline Services
Oak Ridge Laboratory

Gross Sample Counts Within Peak Regions  Generated:  7-OCT-2005 17:02:06.48

Detector ID: 31  Acquisition Start: 7-OCT-2005 07:57:33.01
Live Time: 0 02:50:07.00  Real Time: 0 02:50:07.00
Batch Id: 0509118A-UU  Sample Id: 11
Sample Type: UU

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 4154.07 | 68 | 0 | 102.66 | 211.71 | 160 | 92 | 6.66E-03 | 12.1 | |
| 2 | 0 | 4376.68 | 9 | 0 | 122.45 | 286.89 | 261 | 43 | 8.82E-04 | 33.3 | |
| 3 | 0 | 4494.52 | 1 | 0 | 3.06 | 327.00 | 307 | 30 | 9.80E-05 | 100.0 | |
| 4 | 0 | 4739.96 | 60 | 0 | 95.75 | 411.27 | 363 | 84 | 5.88E-03 | 12.9 | |
| 5 | 0 | 5275.91 | 387 | 0 | 81.84 | 598.80 | 554 | 79 | 3.79E-02 | 5.1 | |

Background Counts Within Peak Regions  Generated:  7-OCT-2005 17:02:11.72

Acquisition Start: 1-OCT-2005 10:06:57.01
Live Time: 0 16:40:03.00  Real Time: 0 16:40:03.00

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 4135.60 | 4 | 0 | 143.88 | 205.50 | 160 | 92 | 6.67E-05 | 50.0 | |
| 2 | 0 | 4362.28 | 0 | 0 | 0.00 | 282.00 | 261 | 43 | 0.00E+00 | 0.0 | |
| 3 | 0 | 4478.40 | 2 | 0 | 9.18 | 321.50 | 307 | 30 | 3.33E-05 | 70.7 | |
| 4 | 0 | 4720.35 | 8 | 0 | 217.36 | 404.50 | 363 | 84 | 1.33E-04 | 35.4 | |
| 5 | 0 | 5259.54 | 4 | 0 | 0.00 | 593.00 | 554 | 79 | 6.67E-05 | 50.0 | |

Net Sample Counts Within Peak Regions  Generated:  7-OCT-2005 17:02:12.04

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 4154.07* | 67 | 0 | 102.66 | 211.71 | 160 | 92 | 6.60E-03 | 12.3 | |
| 2 | 0 | 4376.68* | 9 | 0 | 122.45 | 286.89 | 261 | 43 | 8.82E-04 | 33.3 | |
| 3 | 0 | 4494.52* | 1 | 0 | 3.06 | 327.00 | 307 | 30 | 6.46E-05 | 155.9 | |
| 4 | 0 | 4739.96* | 59 | 0 | 95.75 | 411.27 | 363 | 84 | 5.74E-03 | 13.2 | |
| 5 | 0 | 5275.91* | 386 | 0 | 81.84 | 598.80 | 554 | 79 | 3.78E-02 | 5.1 | |

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.0 Generated 7-OCT-2005 17:02:12

Configuration : MCA0:[AMSCOUNT]0000C192$1
Analyses by : ROIPEAK V1.2,PEAKEFF V2.2,ENBACK V1.6,NID V3.3
Sample title : VPTR092805SL0D
Sample date : 28-SEP-2005 00:00:00 Acquisition date : 7-OCT-2005 07:57:33
Sample ID : 11 Sample quantity : 1.0130 gram
Sample type : UU Sample geometry :
Detector name : 031 Detector geometry:
Elapsed live time: 0 02:50:07.00 Elapsed real time: 0 02:50:07.00 0.0%
Energy tolerance : 100.00 keV Half life ratio : 8.00
Errors propagated: Yes Systematic Error : 3.00 %
Efficiency type : Average value Efficiencies at : Peak Energy
Abundance limit : 75.00

Post-NID Peak Search Report

| It | Energy | Area | FWHM | Channel | Left | Pw | %Err | Fit | Nuclides | Activity pCi/gram |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 4154.07* | 67102.66 | 211.71 | 160 | 92 | 24.5 | | | U-238 | 0.897 |
| 0 | 4376.68* | 9122.45 | 286.89 | 261 | 43 | 66.7 | | | U-235 | 0.149 |
| 0 | 4494.52* | 1 3.06 | 327.00 | 307 | 30 | 311.8 | | | U-236 | 9.776E-03 |
| 0 | 4739.96* | 59 95.75 | 411.27 | 363 | 84 | 26.5 | | | U-234 | 0.784 |
| 0 | 5275.91* | 386 81.84 | 598.80 | 554 | 79 | 10.2 | | | U232 | 5.17 |

Eberline Services
Oak Ridge Laboratory

ALPHA SPECTROMETRY REPORT
7-OCT-2005 17:02:34

Spectral File: ND_AMS_ARCHIVE_S:S_0509118A-UU$12_UU.CNF

| | | | |
|---|---|---|---|
| BATCH ID: | 0509118A-UU | SAMPLE ID: | 12 |
| SAMPLE DATE: | 28-SEP-2005 00:00 | ALIQUOT: | 1.012E+00 gram |
| SAMPLE TITLE: | VPTR092805SL0E | DETECTOR NUMBER: | 032 |
| ACQ DATE: | 7-OCT-2005 07:58 | AVERAGE EFFICIENCY: | 19.23% |
| ELAPSED LIVE TIME: | 10208. | RECOVERY: | 89.57% |
| TRACER ID: | UU-10A | TRACER FWHM (kev): | 83.94 |
| LAMBDA VALUE: | 588. | ROI TYPE: | STANDARD |
| TRACER DPM AT SAMPLE DATE: | 12.191 | CONFIDENCE FACTOR: | 4.65 |
| SAMPLE MATRIX: | SOIL | LLD CONSTANT: | 2.71 |
| ENERGY CAL DATE: | 29-SEP-2005 13:20 | EFF CAL DATE: | 29-SEP-2005 13:20 |
| BKG FILENAME: | B_032_1OCT05 | BKG ELAPSED TIME: | 60001. |

NUCLIDE ACTIVITY SUMMARY

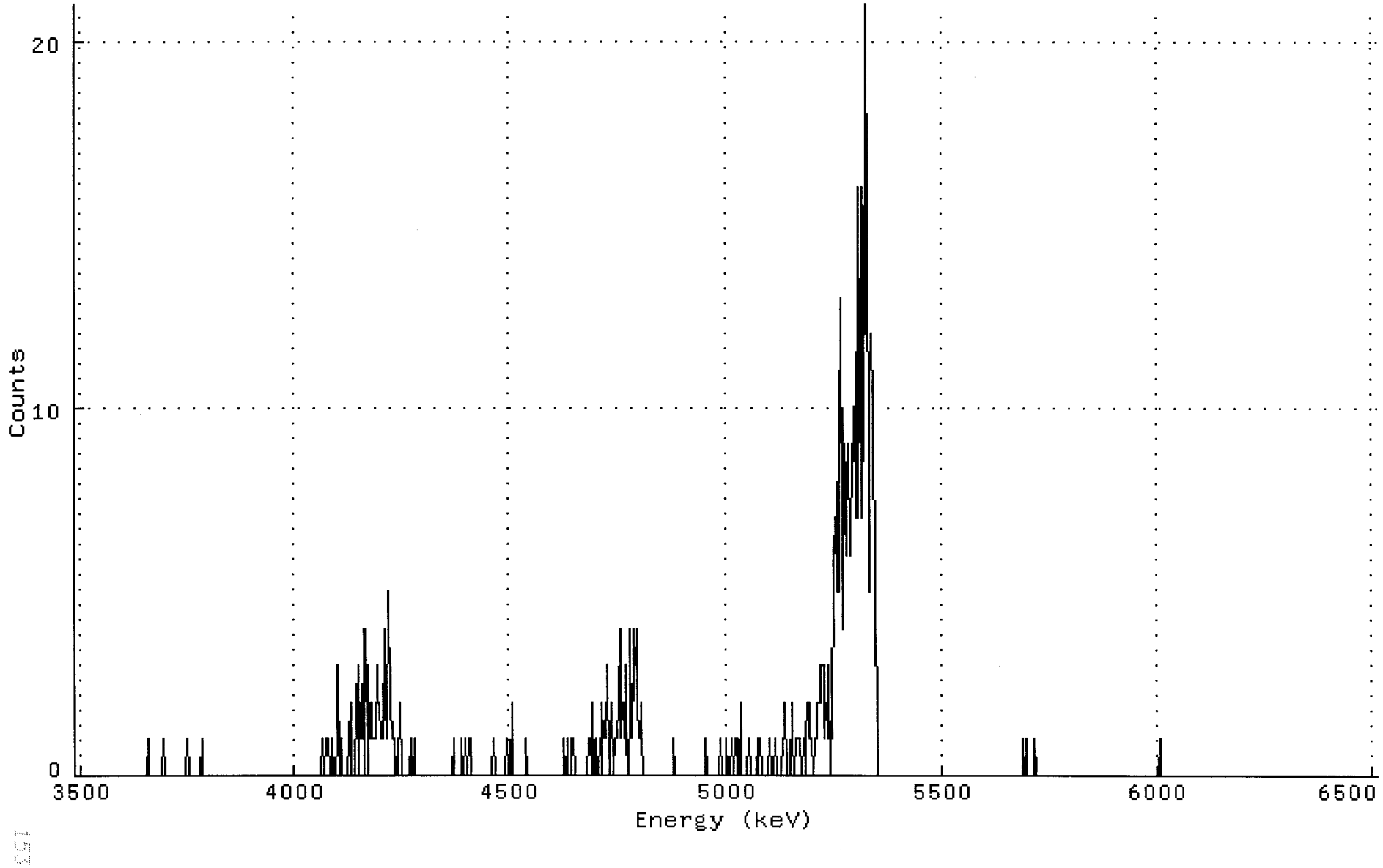
| NUCLIDE | ENERGY | NET AREA | BKG | %ABN | ACTIVITY pCi/ gram | TPU/ERROR 2-SIGMA | MDC pCi/ gram |
|---|---|---|---|---|---|---|---|
| U232 | 5302.5 | 356.49 | 0.51 | 99.8 | 5.425E+00 | 7.322E-01 | 9.176E-02 |
| U-234 | 4761.5 | 66.66 | 0.34 | 99.8 | 1.014E+00 | 2.929E-01 | 8.249E-02 |
| U-235 | 4385.5 | 4.83 | 0.17 | 80.9 | 9.064E-02 | 8.529E-02 | 8.685E-02 |
| U-236 | 4485.2 | 3.49 | 0.51 | 90.1 | 5.880E-02 | 6.871E-02 | 1.016E-01 |
| U-238 | 4184.4 | 69.49 | 0.51 | 100.2 | 1.053E+00 | 2.998E-01 | 9.137E-02 |

*** Tracer FWHM > 80.0 Kev ***

Analyst _____ Date 10.7.05

Reviewer _____ Date 10/10/05

Spectrum : DKA100:[ALPHA.ALUSR.ARCHIVE.S]S_0509118A-UU$12_UU.CNF;1
Title : 032
Sample Title: VPTR092805SL0E
Start Time: 7-OCT-2005 07:58: Sample Time: 28-SEP-2005 00:00 Energy Offset: 3.47806E+03
Real Time : 0 02:50:08.00 Sample ID : 12 Energy Slope : 3.12901E+00
Live Time : 0 02:50:08.00 Sample Type: UU Energy Quad : -1.67093E-04



Channel Contents for ND_AMS_ARCHIVE_S:S_0509118A-UU$12_UU

Channel

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1: | 10208 | 10208 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 29: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 43: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 57: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 71: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 85: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 99: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 113: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 127: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 141: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 155: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 169: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 183: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 1 | 0 | 0 |
| 197: | 1 | 0 | 0 | 1 | 3 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 2 |
| 211: | 0 | 0 | 0 | 0 | 2 | 3 | 0 | 2 | 1 | 4 | 0 | 4 | 0 | 3 |
| 225: | 1 | 2 | 1 | 1 | 1 | 3 | 2 | 2 | 1 | 1 | 1 | 4 | 2 | 1 |
| 239: | 5 | 2 | 2 | 1 | 1 | 0 | 0 | 1 | 0 | 2 | 0 | 0 | 0 | 0 |
| 253: | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 267: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 281: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 295: | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 309: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 323: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 2 | 0 | 0 |
| 337: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 351: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 365: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 |
| 379: | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 393: | 1 | 1 | 0 | 2 | 0 | 0 | 1 | 0 | 1 | 0 | 2 | 1 | 2 | 1 |
| 407: | 3 | 0 | 1 | 2 | 0 | 0 | 1 | 1 | 1 | 2 | 4 | 1 | 2 | 1 |
| 421: | 3 | 1 | 0 | 2 | 4 | 1 | 3 | 4 | 3 | 4 | 2 | 1 | 2 | 1 |
| 435: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 449: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 463: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 477: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 491: | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 |
| 505: | 0 | 0 | 1 | 0 | 1 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 519: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 533: | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 2 |
| 547: | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 1 | 1 | 1 | 1 | 0 | 0 | 1 |
| 561: | 0 | 1 | 2 | 2 | 1 | 1 | 0 | 0 | 1 | 1 | 2 | 2 | 2 | 3 |
| 575: | 3 | 3 | 1 | 2 | 1 | 3 | 0 | 2 | 1 | 6 | 7 | 7 | 5 | 11 |
| 589: | 5 | 13 | 7 | 4 | 9 | 6 | 8 | 9 | 6 | 7 | 8 | 10 | 10 | 7 |
| 603: | 16 | 7 | 11 | 16 | 7 | 10 | 21 | 12 | 18 | 5 | 10 | 12 | 10 | 9 |
| 617: | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 631: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 645: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 659: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 673: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 687: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 701: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 715: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 729: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 743: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 757: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 771: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 785: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 799: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 813: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 827: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 841: | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 855: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 869: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 883: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 897: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 911: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 925: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 939: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 953: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 967: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 981: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 995: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1009: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1023: | 0 | 0 | | | | | | | | | | | | |

Eberline Services
Oak Ridge Laboratory

Gross Sample Counts Within Peak Regions  Generated: 7-OCT-2005 17:02:17.86

Detector ID: 32  Acquisition Start: 7-OCT-2005 07:58:05.01
Live Time: 0 02:50:08.00  Real Time: 0 02:50:08.00
Batch Id: 0509118A-UU  Sample Id: 12
Sample Type: UU

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 4173.54 | 70 | 0 | 122.27 | 224.97 | 168 | 90 | 6.86E-03 | 12.0 | |
| 2 | 0 | 4393.24 | 5 | 0 | 43.81 | 297.20 | 266 | 43 | 4.90E-04 | 44.7 | |
| 3 | 0 | 4490.92 | 4 | 0 | 3.13 | 329.50 | 311 | 29 | 3.92E-04 | 50.0 | |
| 4 | 0 | 4748.89 | 67 | 0 | 76.62 | 415.36 | 366 | 81 | 6.56E-03 | 12.2 | |
| 5 | 0 | 5290.21 | 357 | 0 | 83.94 | 598.26 | 551 | 75 | 3.50E-02 | 5.3 | |

Background Counts Within Peak Regions  Generated: 7-OCT-2005 17:02:31.85

Acquisition Start: 1-OCT-2005 10:07:00.01
Live Time: 0 16:40:01.00  Real Time: 0 16:40:00.00

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 4135.43 | 3 | 0 | 87.61 | 212.50 | 168 | 90 | 5.00E-05 | 57.7 | |
| 2 | 0 | 4362.32 | 1 | 0 | 3.13 | 287.00 | 266 | 43 | 1.67E-05 | 100.0 | |
| 3 | 0 | 4477.34 | 3 | 0 | 9.00 | 325.00 | 311 | 29 | 5.00E-05 | 57.7 | |
| 4 | 0 | 4720.89 | 2 | 0 | 31.29 | 406.00 | 366 | 81 | 3.33E-05 | 70.7 | |
| 5 | 0 | 5260.14 | 3 | 0 | 62.58 | 588.00 | 551 | 75 | 5.00E-05 | 57.7 | |

Net Sample Counts Within Peak Regions  Generated: 7-OCT-2005 17:02:32.15

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 4173.54* | 69 | 0 | 122.27 | 224.97 | 168 | 90 | 6.81E-03 | 12.0 | |
| 2 | 0 | 4393.24* | 5 | 0 | 43.81 | 297.20 | 266 | 43 | 4.73E-04 | 46.4 | |
| 3 | 0 | 4490.92* | 3 | 0 | 3.13 | 329.50 | 311 | 29 | 3.42E-04 | 57.9 | |
| 4 | 0 | 4748.89* | 67 | 0 | 76.62 | 415.36 | 366 | 81 | 6.53E-03 | 12.3 | |
| 5 | 0 | 5290.21* | 356 | 0 | 83.94 | 598.26 | 551 | 75 | 3.49E-02 | 5.3 | |

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.0 Generated 7-OCT-2005 17:02:33

Configuration : MCA0:[AMSCOUNT]0000C192$1
Analyses by : ROIPEAK V1.2,PEAKEFF V2.2,ENBACK V1.6,NID V3.3
Sample title : VPTR092805SL0E
Sample date : 28-SEP-2005 00:00:00 Acquisition date : 7-OCT-2005 07:58:05
Sample ID : 12 Sample quantity : 1.0123 gram
Sample type : UU Sample geometry :
Detector name : 032 Detector geometry:
Elapsed live time: 0 02:50:08.00 Elapsed real time: 0 02:50:08.00 0.0%
Energy tolerance : 100.00 keV Half life ratio : 8.00
Errors propagated: Yes Systematic Error : 3.00 %
Efficiency type : Average value Efficiencies at : Peak Energy
Abundance limit : 75.00

Post-NID Peak Search Report

| It | Energy | Area | FWHM | Channel | Left | Pw | %Err | Fit | Nuclides | Activity pCi/gram |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 4173.54* | 69 | 122.27 | 224.97 | 168 | 90 | 24.1 | | U-238 | 0.943 |
| 0 | 4393.24* | 5 | 43.81 | 297.20 | 266 | 43 | 92.9 | | U-235 | 8.119E-02 |
| 0 | 4490.92* | 3 | 3.13 | 329.50 | 311 | 29 | 115.9 | | U-236 | 5.267E-02 |
| 0 | 4748.89* | 67 | 76.62 | 415.36 | 366 | 81 | 24.6 | | U-234 | 0.908 |
| 0 | 5290.21* | 356 | 83.94 | 598.26 | 551 | 75 | 10.6 | | U232 | 4.86 |

Eberline Services
Oak Ridge Laboratory

ALPHA SPECTROMETRY REPORT
7-OCT-2005 17:02:45

**********

Spectral File: ND_AMS_ARCHIVE_S:S_0509118A-UU$13_UU.CNF

**********

| | | | |
|---|---|---|---|
| BATCH ID: | 0509118A-UU | SAMPLE ID: | 13 |
| SAMPLE DATE: | 28-SEP-2005 00:00 | ALIQUOT: | 1.015E+00 gram |
| SAMPLE TITLE: | VPTR092805SL0F | DETECTOR NUMBER: | 017 |
| ACQ DATE: | 7-OCT-2005 10:57 | AVERAGE EFFICIENCY: | 19.37% |
| ELAPSED LIVE TIME: | 10206. | RECOVERY: | 100.38% |
| TRACER ID: | UU-10A | TRACER FWHM (kev): | 89.63 |
| LAMBDA VALUE: | 596. | ROI TYPE: | STANDARD |
| TRACER DPM AT SAMPLE DATE: | 12.367 | CONFIDENCE FACTOR: | 4.65 |
| SAMPLE MATRIX: | SOIL | LLD CONSTANT: | 2.71 |
| ENERGY CAL DATE: | 29-SEP-2005 13:20 | EFF CAL DATE: | 29-SEP-2005 13:20 |
| BKG FILENAME: | B_017_1OCT05 | BKG ELAPSED TIME: | 60004. |

**********

NUCLIDE ACTIVITY SUMMARY

| NUCLIDE | ENERGY | NET AREA | BKG | %ABN | ACTIVITY pCi/ gram | TPU/ERROR 2-SIGMA | MDC pCi/ gram |
|---|---|---|---|---|---|---|---|
| U232 | 5302.5 | 408.15 | 0.85 | 99.8 | 5.490E+00 | 7.116E-01 | 9.411E-02 |
| U-234 | 4761.5 | 69.32 | 0.68 | 99.8 | 9.322E-01 | 2.637E-01 | 8.802E-02 |
| U-235 | 4385.5 | 4.00 | 0.00 | 80.9 | 6.636E-02 | 6.707E-02 | 4.496E-02 |
| U-236 | 4485.2 | -0.17 | 0.17 | 90.1 | -2.534E-03 | 5.081E-03 | 6.893E-02 |
| U-238 | 4184.4 | 78.83 | 0.17 | 100.2 | 1.056E+00 | 2.843E-01 | 6.196E-02 |

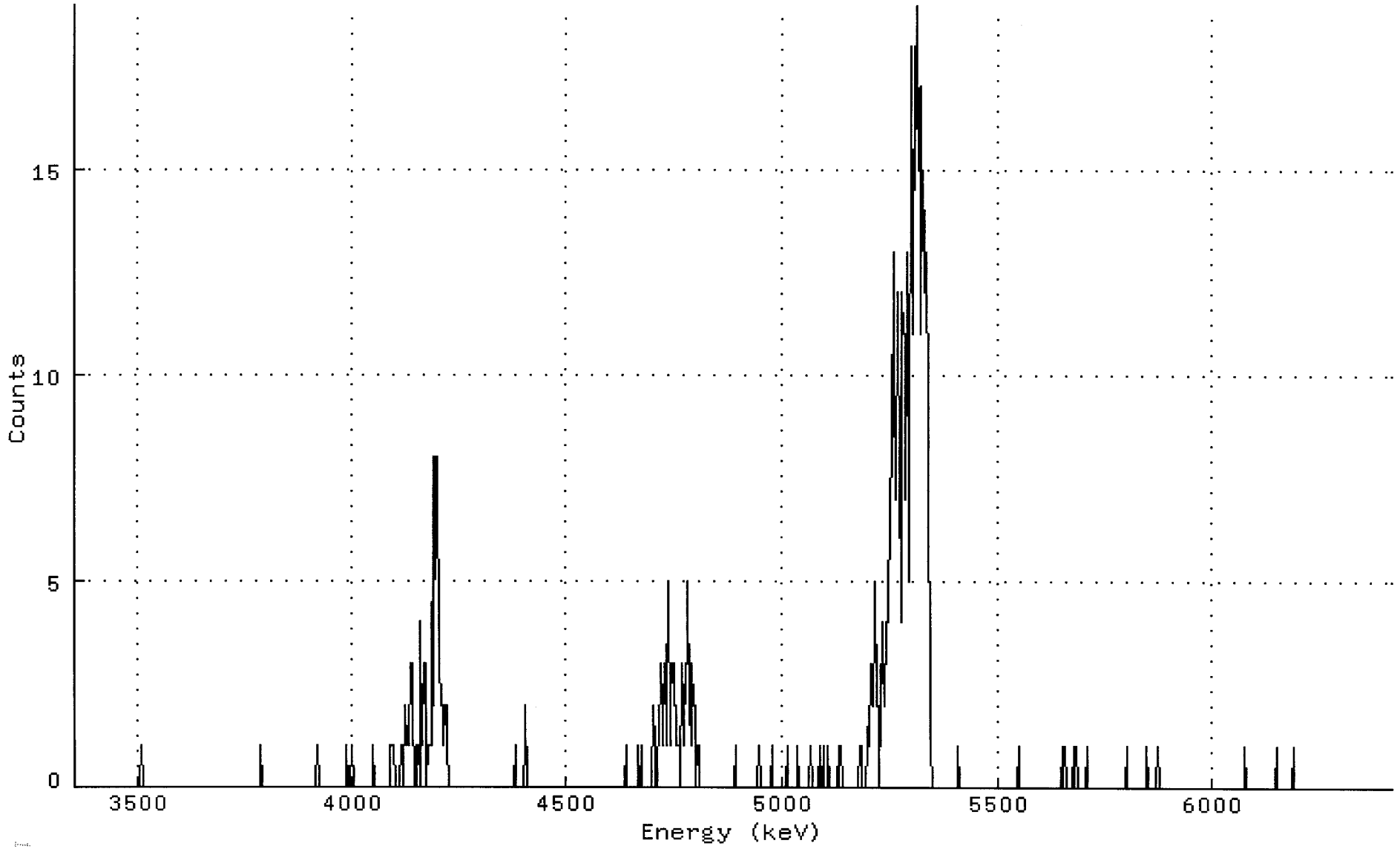
**********

*** Tracer FWHM > 80.0 Kev ***

Analyst _____ Date 10.7.05

Reviewer _____ Date 10/10/05

Spectrum : DKA100:[ALPHA.ALUSR.ARCHIVE.S]S_0509118A-UU$13_UU.CNF;1
Title : 017
Sample Title: VPTR092805SLOF
Start Time: 7-OCT-2005 10:57: Sample Time: 28-SEP-2005 00:00 Energy Offset: 3.34436E+03
Real Time : 0 02:50:06.00 Sample ID : 13 Energy Slope : 3.17970E+00
Live Time : 0 02:50:06.00 Sample Type: UU Energy Quad : -1.76830E-04




851

Channel Contents for ND_AMS_ARCHIVE_S:S_0509118A-UU$13_UU

Channel

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1: | 10206 | 10206 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 29: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 43: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 57: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 71: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 85: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 99: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 113: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 127: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 141: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 155: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 169: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 183: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 197: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 |
| 211: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 225: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 239: | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 2 | 1 | 1 | 1 |
| 253: | 3 | 3 | 2 | 0 | 1 | 0 | 1 | 0 | 4 | 1 | 3 | 3 | 0 | 1 |
| 267: | 1 | 1 | 1 | 8 | 2 | 8 | 8 | 3 | 3 | 2 | 2 | 1 | 2 | 2 |
| 281: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 295: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 309: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 323: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 337: | 0 | 0 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 351: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 365: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 379: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 393: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 407: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 421: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 435: | 0 | 0 | 2 | 1 | 0 | 0 | 2 | 1 | 3 | 2 | 1 | 3 | 1 | 2 |
| 449: | 5 | 1 | 3 | 3 | 2 | 3 | 1 | 1 | 1 | 0 | 3 | 2 | 1 | 3 |
| 463: | 3 | 5 | 2 | 1 | 3 | 2 | 2 | 0 | 1 | 1 | 0 | 0 | 0 | 0 |
| 477: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 491: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 505: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 519: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 533: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 547: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 561: | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 |
| 575: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 589: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 |
| 603: | 1 | 2 | 1 | 3 | 2 | 4 | 5 | 2 | 2 | 0 | 2 | 4 | 3 | 2 |
| 617: | 4 | 3 | 5 | 6 | 7 | 8 | 13 | 10 | 7 | 12 | 11 | 8 | 4 | 12 |
| 631: | 11 | 11 | 7 | 13 | 5 | 6 | 18 | 13 | 11 | 18 | 16 | 19 | 15 | 17 |
| 645: | 11 | 15 | 12 | 14 | 12 | 10 | 9 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 659: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 673: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 687: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 701: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 715: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 729: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 743: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 757: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 |
| 771: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 785: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 799: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 813: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 827: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 841: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 855: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 869: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 883: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 897: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 911: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 925: | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 939: | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 953: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 967: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 981: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 995: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1009: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1023: | 0 | 0 | | | | | | | | | | | | |

Eberline Services
Oak Ridge Laboratory

Gross Sample Counts Within Peak Regions  Generated:  7-OCT-2005 17:02:38.47

Detector ID: 17  Acquisition Start: 7-OCT-2005 10:57:15.01
Live Time: 0 02:50:06.00  Real Time: 0 02:50:06.00
Batch Id: 0509118A-UU  Sample Id: 13
Sample Type: UU

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 4172.84 | 79 | 0 | 13.89 | 264.44 | 209 | 88 | 7.74E-03 | 11.3 | |
| 2 | 0 | 4398.13 | 4 | 0 | 4.67 | 337.75 | 306 | 42 | 3.92E-04 | 50.0 | |
| 3 | 0 | 4478.34 | 0 | 0 | 0.00 | 364.00 | 350 | 29 | 0.00E+00 | 0.0 | |
| 4 | 0 | 4750.46 | 70 | 0 | 78.65 | 453.66 | 404 | 80 | 6.86E-03 | 12.0 | |
| 5 | 0 | 5289.44 | 409 | 0 | 89.63 | 634.08 | 587 | 75 | 4.01E-02 | 4.9 | |

Background Counts Within Peak Regions  Generated:  7-OCT-2005 17:02:43.64

Acquisition Start: 1-OCT-2005 10:06:19.01
Live Time: 0 16:40:04.00  Real Time: 0 16:40:04.00

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 4135.96 | 1 | 0 | 3.18 | 252.50 | 209 | 88 | 1.67E-05 | 100.0 | |
| 2 | 0 | 4363.68 | 0 | 0 | 0.00 | 326.50 | 306 | 42 | 0.00E+00 | 0.0 | |
| 3 | 0 | 4478.34 | 1 | 0 | 3.18 | 364.00 | 350 | 29 | 1.67E-05 | 100.0 | |
| 4 | 0 | 4719.78 | 4 | 0 | 143.09 | 443.50 | 404 | 80 | 6.67E-05 | 50.0 | |
| 5 | 0 | 5259.64 | 5 | 0 | 3.18 | 624.00 | 587 | 75 | 8.33E-05 | 44.7 | |

Net Sample Counts Within Peak Regions  Generated:  7-OCT-2005 17:02:43.95

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 4172.84* | 79 | 0 | 13.89 | 264.44 | 209 | 88 | 7.72E-03 | 11.3 | |
| 2 | 0 | 4398.13* | 4 | 0 | 4.67 | 337.75 | 306 | 42 | 3.92E-04 | 50.0 | |
| 3 | 0 | 4478.34* | 0 | 0 | 0.00 | 364.00 | 350 | 29 | -1.67E-05 | 100.0 | |
| 4 | 0 | 4750.46* | 69 | 0 | 78.65 | 453.66 | 404 | 80 | 6.79E-03 | 12.1 | |
| 5 | 0 | 5289.44* | 408 | 0 | 89.63 | 634.08 | 587 | 75 | 4.00E-02 | 5.0 | |

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.0 Generated 7-OCT-2005 17:02:44

| | | | |
|---|---|---|---|
| Configuration | : MCA0:[AMSCOUNT]0000C192$1 | | |
| Analyses by | : ROIPEAK V1.2,PEAKEFF V2.2,ENBACK V1.6,NID V3.3 | | |
| Sample title | : VPTR092805SL0F | | |
| Sample date | : 28-SEP-2005 00:00:00 | Acquisition date | : 7-OCT-2005 10:57:15 |
| Sample ID | : 13 | Sample quantity | : 1.0147 gram |
| Sample type | : UU | Sample geometry | : |
| Detector name | : 017 | Detector geometry: | |
| Elapsed live time | : 0 02:50:06.00 | Elapsed real time | : 0 02:50:06.00 0.0% |
| Energy tolerance | : 100.00 keV | Half life ratio | : 8.00 |
| Errors propagated | : Yes | Systematic Error | : 3.00 % |
| Efficiency type | : Average value | Efficiencies at | : Peak Energy |
| Abundance limit | : 75.00 | | |

Post-NID Peak Search Report

| It | Energy | Area | FWHM | Channel | Left | Pw | %Err | Fit | Nuclides | Activity pCi/gram |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 4172.84* | 79 | 13.89 | 264.44 | 209 | 88 | 22.6 | | U-238 | 1.06 |
| 0 | 4398.13* | 4 | 4.67 | 337.75 | 306 | 42 | 100.0 | | U-235 | 6.661E-02 |
| 0 | 4478.34* | 0 | 0.00 | 364.00 | 350 | 29 | 200.0 | | U-236 | -2.543E-03 |
| 0 | 4750.46* | 69 | 78.65 | 453.66 | 404 | 80 | 24.2 | | U-234 | 0.936 |
| 0 | 5289.44* | 408 | 89.63 | 634.08 | 587 | 75 | 9.9 | | U232 | 5.51 |

Eberline Services
Oak Ridge Laboratory

ALPHA SPECTROMETRY REPORT
7-OCT-2005 17:03:01

**********

Spectral File: ND_AMS_ARCHIVE_S:S_0509118A-UU$14_UU.CNF

**********

| | | | |
|---|---|---|---|
| BATCH ID: | 0509118A-UU | SAMPLE ID: | 14 |
| SAMPLE DATE: | 28-SEP-2005 00:00 | ALIQUOT: | 1.038E+00 gram |
| SAMPLE TITLE: | VPTR092805SL0G | DETECTOR NUMBER: | 018 |
| ACQ DATE: | 7-OCT-2005 10:57 | AVERAGE EFFICIENCY: | 19.78% |
| ELAPSED LIVE TIME: | 10207. | RECOVERY: | 94.75% |
| TRACER ID: | UU-10A | TRACER FWHM (kev): | 59.93 |
| LAMBDA VALUE: | 600. | ROI TYPE: | STANDARD |
| TRACER DPM AT SAMPLE DATE: | 12.433 | CONFIDENCE FACTOR: | 4.65 |
| SAMPLE MATRIX: | SOIL | LLD CONSTANT: | 2.71 |
| ENERGY CAL DATE: | 29-SEP-2005 13:20 | EFF CAL DATE: | 29-SEP-2005 13:20 |
| BKG FILENAME: | B_018_1OCT05 | BKG ELAPSED TIME: | 60001. |

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NUCLIDE ACTIVITY SUMMARY

| NUCLIDE | ENERGY | NET AREA | BKG | %ABN | ACTIVITY pCi/ gram | TPU/ERROR 2-SIGMA | MDC pCi/ gram |
|---|---|---|---|---|---|---|---|
| U232 | 5302.5 | 395.49 | 0.51 | 99.8 | 5.394E+00 | 7.053E-01 | 8.225E-02 |
| U-234 | 4761.5 | 97.81 | 1.19 | 99.8 | 1.334E+00 | 3.359E-01 | 1.062E-01 |
| U-235 | 4385.5 | 4.83 | 0.17 | 80.9 | 8.125E-02 | 7.640E-02 | 7.785E-02 |
| U-236 | 4485.2 | 2.83 | 0.17 | 90.1 | 4.274E-02 | 5.296E-02 | 6.990E-02 |
| U-238 | 4184.4 | 82.49 | 0.51 | 100.2 | 1.120E+00 | 2.980E-01 | 8.190E-02 |

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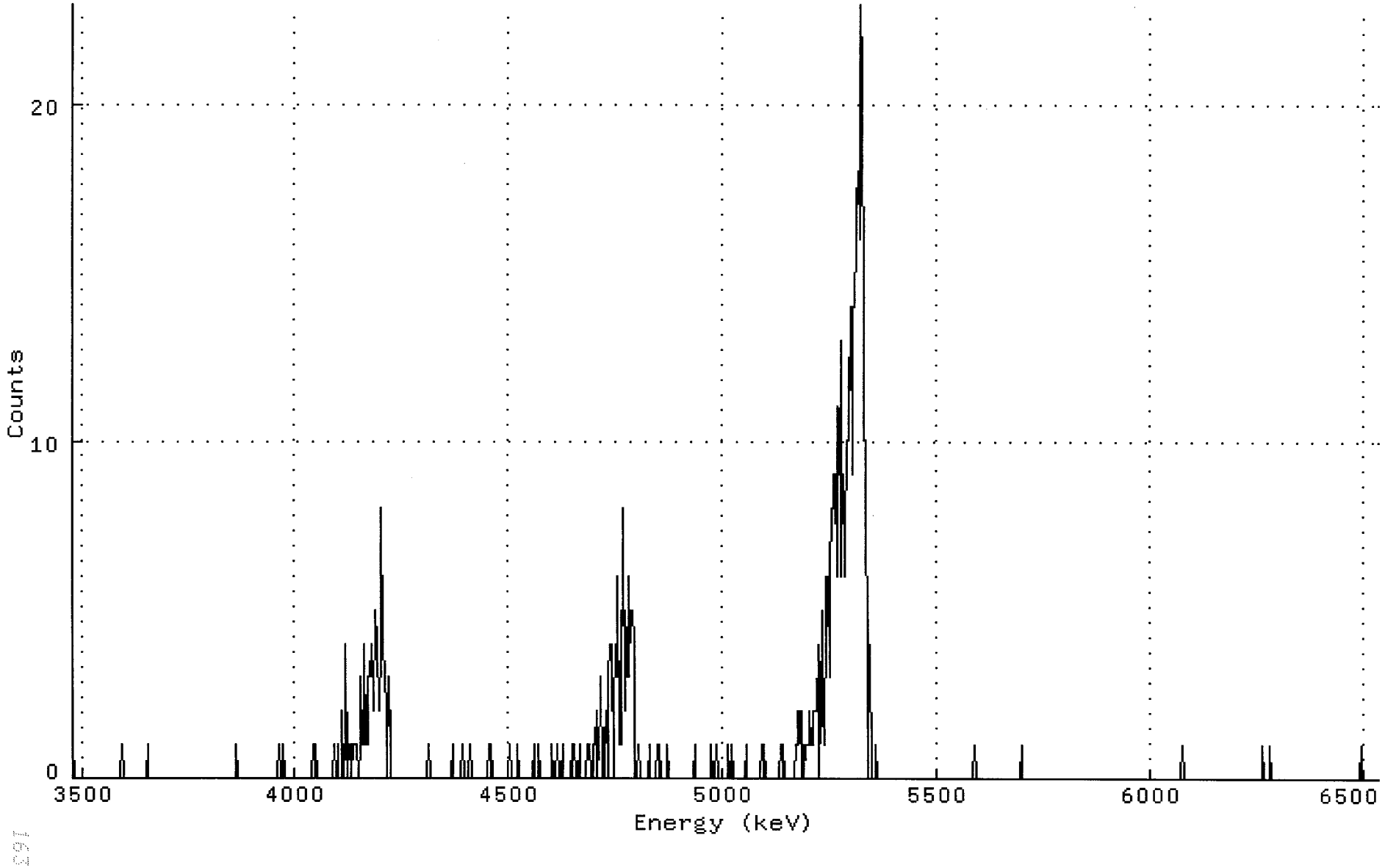
Analyst _____ Date 10.7.05

Reviewer _____ Date 10/10/05

Spectrum : DKA100:[ALPHA.ALUSR.ARCHIVE.S]S_0509118A-UU$14_UU.CNF;1
Title : 018
Sample Title: VPTR092805SLOG
Start Time: 7-OCT-2005 10:57: Sample Time: 28-SEP-2005 00:00 Energy Offset: 3.46899E+03
Real Time : 0 02:50:07.00 Sample ID : 14 Energy Slope : 3.19213E+00
Live Time : 0 02:50:07.00 Sample Type: UU Energy Quad : -1.96300E-04




291

Channel Contents for ND_AMS_ARCHIVE_S:S_0509118A-UU$14_UU

Channel

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1: | 10207 | 10207 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 29: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 43: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 57: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 71: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 85: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 99: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 113: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 127: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 141: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 155: | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 169: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 183: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 197: | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 2 | 0 | 1 | 4 | 0 | 1 | 1 |
| 211: | 0 | 1 | 1 | 1 | 1 | 0 | 1 | 3 | 1 | 1 | 4 | 1 | 1 | 3 |
| 225: | 3 | 4 | 2 | 2 | 5 | 4 | 4 | 2 | 4 | 8 | 4 | 3 | 2 | 0 |
| 239: | 3 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 253: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 267: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 281: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 295: | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 309: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 323: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 337: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 351: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 365: | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 379: | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 |
| 393: | 0 | 0 | 1 | 1 | 2 | 0 | 1 | 2 | 3 | 0 | 0 | 1 | 2 | 0 |
| 407: | 3 | 4 | 4 | 0 | 2 | 4 | 3 | 6 | 1 | 5 | 1 | 8 | 2 | 5 |
| 421: | 3 | 6 | 3 | 5 | 5 | 4 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 |
| 435: | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 |
| 449: | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 463: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 477: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 |
| 491: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 |
| 505: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 519: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 533: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 |
| 547: | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 2 | 2 | 0 | 2 | 0 | 1 | 1 |
| 561: | 1 | 1 | 2 | 1 | 1 | 2 | 2 | 2 | 4 | 0 | 2 | 5 | 2 | 1 |
| 575: | 5 | 6 | 6 | 3 | 6 | 8 | 8 | 9 | 9 | 6 | 11 | 9 | 13 | 6 |
| 589: | 9 | 6 | 7 | 10 | 10 | 11 | 14 | 9 | 14 | 14 | 16 | 17 | 18 | 16 |
| 603: | 23 | 21 | 13 | 10 | 10 | 2 | 0 | 4 | 0 | 0 | 0 | 0 | 1 | 0 |
| 617: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 631: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 645: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 659: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 673: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 687: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 701: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 715: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 729: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 743: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 757: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 771: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 785: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 799: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 813: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 827: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 841: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 855: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 869: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 883: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 897: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 911: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 925: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 939: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 953: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 967: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 981: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 995: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1009: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1023: | 0 | 0 | | | | | | | | | | | | |

Eberline Services
Oak Ridge Laboratory

Gross Sample Counts Within Peak Regions  Generated:  7-OCT-2005 17:02:49.87

Detector ID: 18  Acquisition Start: 7-OCT-2005 10:57:38.01
Live Time: 0 02:50:07.00  Real Time: 0 02:50:07.00
Batch Id: 0509118A-UU  Sample Id: 14
Sample Type: UU

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 4175.04 | 83 | 0 | 20.22 | 224.28 | 168 | 88 | 8.13E-03 | 11.0 | |
| 2 | 0 | 4379.43 | 5 | 0 | 105.34 | 290.40 | 265 | 41 | 4.90E-04 | 44.7 | |
| 3 | 0 | 4473.44 | 3 | 0 | 54.27 | 321.00 | 308 | 29 | 2.94E-04 | 57.7 | |
| 4 | 0 | 4751.29 | 99 | 0 | 40.41 | 412.15 | 362 | 80 | 9.70E-03 | 10.1 | |
| 5 | 0 | 5289.09 | 396 | 0 | 59.93 | 591.71 | 545 | 74 | 3.88E-02 | 5.0 | |

Background Counts Within Peak Regions  Generated:  7-OCT-2005 17:02:59.42

Acquisition Start: 1-OCT-2005 10:06:21.01
Live Time: 0 16:40:01.00  Real Time: 0 16:40:01.00

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 4135.35 | 3 | 0 | 124.49 | 211.50 | 168 | 88 | 5.00E-05 | 57.7 | |
| 2 | 0 | 4362.81 | 1 | 0 | 3.19 | 285.00 | 265 | 41 | 1.67E-05 | 100.0 | |
| 3 | 0 | 4476.51 | 1 | 0 | 0.00 | 322.00 | 308 | 29 | 1.67E-05 | 100.0 | |
| 4 | 0 | 4718.99 | 7 | 0 | 12.77 | 401.50 | 362 | 80 | 1.17E-04 | 37.8 | |
| 5 | 0 | 5258.84 | 3 | 0 | 25.54 | 581.50 | 545 | 74 | 5.00E-05 | 57.7 | |

Net Sample Counts Within Peak Regions  Generated:  7-OCT-2005 17:02:59.76

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 4175.04* | 82 | 0 | 20.22 | 224.28 | 168 | 88 | 8.08E-03 | 11.1 | |
| 2 | 0 | 4379.43* | 5 | 0 | 105.34 | 290.40 | 265 | 41 | 4.73E-04 | 46.4 | |
| 3 | 0 | 4473.44* | 3 | 0 | 54.27 | 321.00 | 308 | 29 | 2.77E-04 | 61.5 | |
| 4 | 0 | 4751.29* | 98 | 0 | 40.41 | 412.15 | 362 | 80 | 9.58E-03 | 10.2 | |
| 5 | 0 | 5289.09* | 395 | 0 | 59.93 | 591.71 | 545 | 74 | 3.87E-02 | 5.0 | |

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.0 Generated 7-OCT-2005 17:03:00

| | | | |
|---|---|---|---|
| Configuration | : MCA0:[AMSCOUNT]0000C192$1 | | |
| Analyses by | : ROIPEAK V1.2,PEAKEFF V2.2,ENBACK V1.6,NID V3.3 | | |
| Sample title | : VPTR092805SL0G | | |
| Sample date | : 28-SEP-2005 00:00:00 | Acquisition date | : 7-OCT-2005 10:57:38 |
| Sample ID | : 14 | Sample quantity | : 1.0382 gram |
| Sample type | : UU | Sample geometry | : |
| Detector name | : 018 | Detector geometry | : |
| Elapsed live time | : 0 02:50:07.00 | Elapsed real time | : 0 02:50:07.00 0.0% |
| Energy tolerance | : 100.00 keV | Half life ratio | : 8.00 |
| Errors propagated | : Yes | Systematic Error | : 3.00 % |
| Efficiency type | : Average value | Efficiencies at | : Peak Energy |
| Abundance limit | : 75.00 | | |

Post-NID Peak Search Report

| It | Energy | Area | FWHM | Channel | Left | Pw | %Err | Fit | Nuclides | Activity pCi/gram |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 4175.04* | 82 | 20.22 | 224.28 | 168 | 88 | 22.1 | | U-238 | 1.06 |
| 0 | 4379.43* | 5 | 105.34 | 290.40 | 265 | 41 | 92.9 | | U-235 | 7.699E-02 |
| 0 | 4473.44* | 3 | 54.27 | 321.00 | 308 | 29 | 123.0 | | U-236 | 4.050E-02 |
| 0 | 4751.29* | 98 | 40.41 | 412.15 | 362 | 80 | 20.4 | | U-234 | 1.26 |
| 0 | 5289.09* | 395 | 59.93 | 591.71 | 545 | 74 | 10.1 | | U232 | 5.11 |

Eberline Services
Oak Ridge Laboratory

ALPHA SPECTROMETRY REPORT
7-OCT-2005 17:03:17

**********

Spectral File: ND_AMS_ARCHIVE_S:S_0509118A-UU$15_UU.CNF

**********

| | | | |
|---|---|---|---|
| BATCH ID: | 0509118A-UU | SAMPLE ID: | 15 |
| SAMPLE DATE: | 28-SEP-2005 00:00 | ALIQUOT: | 9.919E-01 gram |
| SAMPLE TITLE: | VPTR092805SL0H | DETECTOR NUMBER: | 019 |
| ACQ DATE: | 7-OCT-2005 10:57 | AVERAGE EFFICIENCY: | 18.97% |
| ELAPSED LIVE TIME: | 10204. | RECOVERY: | 99.81% |
| TRACER ID: | UU-10A | TRACER FWHM (kev): | 80.00 |
| LAMBDA VALUE: | 596. | ROI TYPE: | STANDARD |
| TRACER DPM AT SAMPLE DATE: | 12.369 | CONFIDENCE FACTOR: | 4.65 |
| SAMPLE MATRIX: | SOIL | LLD CONSTANT: | 2.71 |
| ENERGY CAL DATE: | 29-SEP-2005 13:20 | EFF CAL DATE: | 29-SEP-2005 13:20 |
| BKG FILENAME: | B_019_1OCT05 | BKG ELAPSED TIME: | 60005. |

**********

NUCLIDE ACTIVITY SUMMARY

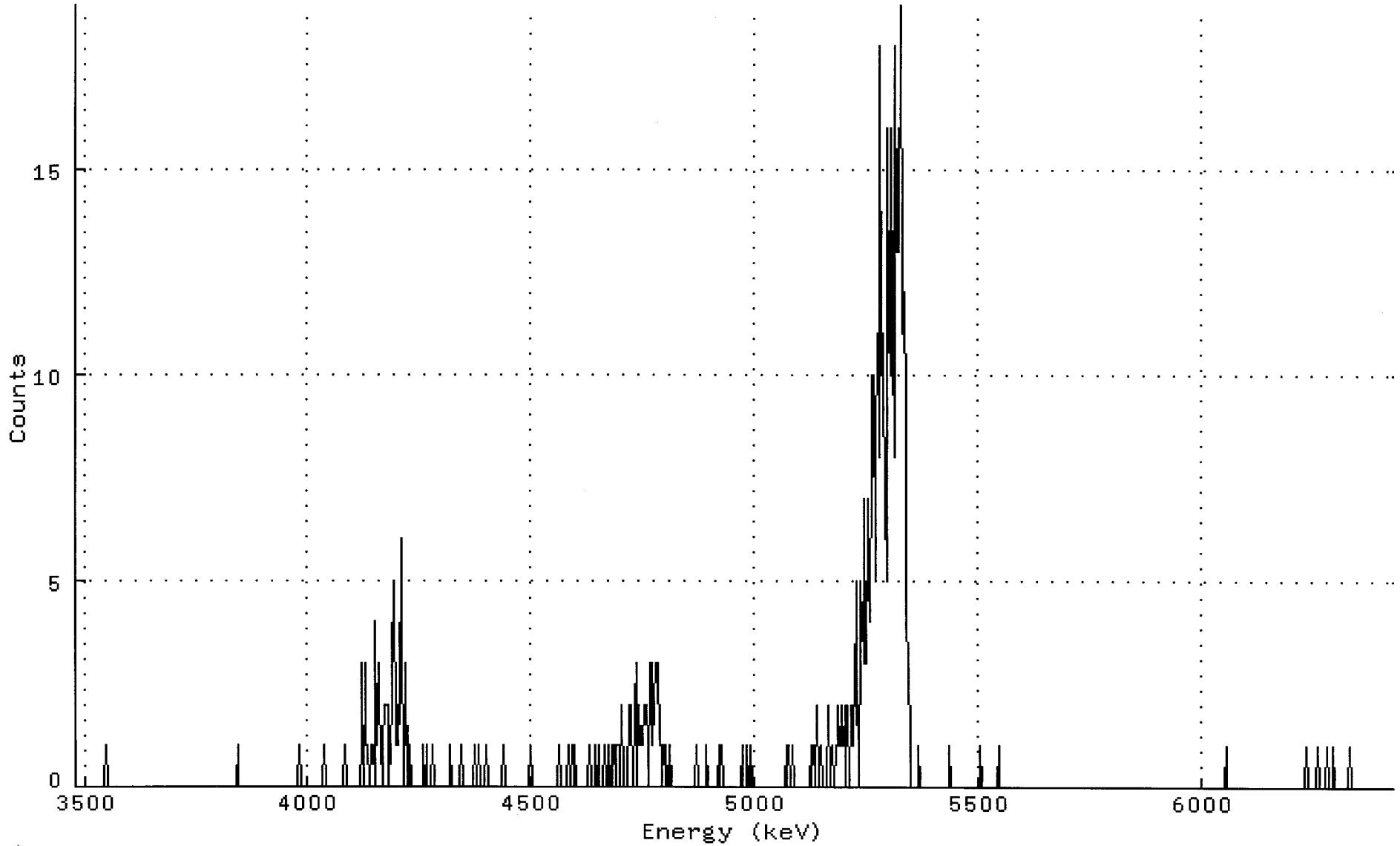
| NUCLIDE | ENERGY | NET AREA | BKG | %ABN | ACTIVITY pCi/ gram | TPU/ERROR 2-SIGMA | MDC pCi/ gram |
|---|---|---|---|---|---|---|---|
| U232 | 5302.5 | 397.32 | 0.68 | 99.8 | 5.617E+00 | 7.337E-01 | 9.251E-02 |
| U-234 | 4761.5 | 55.15 | 0.85 | 99.8 | 7.795E-01 | 2.412E-01 | 9.891E-02 |
| U-235 | 4385.5 | 4.83 | 0.17 | 80.9 | 8.421E-02 | 7.919E-02 | 8.069E-02 |
| U-236 | 4485.2 | 1.83 | 0.17 | 90.1 | 2.865E-02 | 4.480E-02 | 7.245E-02 |
| U-238 | 4184.4 | 65.64 | 1.36 | 100.2 | 9.238E-01 | 2.683E-01 | 1.145E-01 |

**********

Analyst _____ Date 10.7.05

Reviewer _____ Date 10/10/05

Spectrum : DKA100:[ALPHA.ALUSR.ARCHIVE.S]S_0509118A-UU$15_UU.CNF;1
Title : 019
Sample Title: VPTR092805SL0H
Start Time: 7-OCT-2005 10:57: Sample Time: 28-SEP-2005 00:00 Energy Offset: 3.46966E+03
Real Time : 0 02:50:03.00 Sample ID : 15 Energy Slope : 3.06748E+00
Live Time : 0 02:50:04.00 Sample Type: UU Energy Quad : -1.74918E-04



Channel Contents for ND_AMS_ARCHIVE_S:S_0509118A-UU$15_UU

Channel

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1: | 10203 | 10204 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 29: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 43: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 57: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 71: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 85: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 99: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 113: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 127: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 141: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 155: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 169: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 183: | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 197: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 211: | 0 | 0 | 0 | 0 | 1 | 3 | 0 | 3 | 1 | 1 | 0 | 0 | 1 | 1 |
| 225: | 0 | 4 | 1 | 3 | 2 | 1 | 0 | 1 | 2 | 2 | 2 | 0 | 1 | 2 |
| 239: | 3 | 5 | 1 | 3 | 1 | 2 | 6 | 4 | 0 | 2 | 3 | 0 | 0 | 1 |
| 253: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 |
| 267: | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 281: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 295: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 309: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 323: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 337: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 351: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 365: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 0 |
| 379: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| 393: | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 1 |
| 407: | 0 | 1 | 1 | 1 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 2 | 2 | 0 |
| 421: | 0 | 2 | 3 | 0 | 2 | 1 | 1 | 1 | 2 | 2 | 2 | 1 | 0 | 3 |
| 435: | 3 | 1 | 2 | 3 | 3 | 3 | 1 | 1 | 0 | 1 | 0 | 1 | 0 | 0 |
| 449: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 463: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 477: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 |
| 491: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 505: | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 519: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 533: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 |
| 547: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 |
| 561: | 0 | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 1 |
| 575: | 0 | 0 | 1 | 1 | 2 | 1 | 2 | 1 | 1 | 2 | 0 | 2 | 0 | 0 |
| 589: | 2 | 1 | 2 | 2 | 5 | 3 | 0 | 4 | 5 | 4 | 3 | 7 | 3 | 7 |
| 603: | 5 | 4 | 8 | 10 | 10 | 5 | 8 | 11 | 8 | 18 | 10 | 11 | 10 | 7 |
| 617: | 5 | 16 | 11 | 10 | 16 | 11 | 8 | 18 | 13 | 16 | 13 | 19 | 12 | 11 |
| 631: | 12 | 9 | 4 | 3 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 645: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 659: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 673: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 687: | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 701: | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 715: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 729: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 743: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 757: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 771: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 785: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 799: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 813: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 827: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 841: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 855: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 869: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 883: | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 897: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 911: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 925: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 939: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 953: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 |
| 967: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 981: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 995: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1009: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1023: | 0 | 0 | | | | | | | | | | | | |

Eberline Services
Oak Ridge Laboratory

Gross Sample Counts Within Peak Regions  Generated:  7-OCT-2005 17:03:05.36

Detector ID: 19  Acquisition Start: 7-OCT-2005 10:57:59.01
Live Time: 0 02:50:04.00  Real Time: 0 02:50:03.00
Batch Id: 0509118A-UU  Sample Id: 15
Sample Type: UU

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 4180.41 | 67 | 0 | 62.82 | 234.85 | 175 | 91 | 6.57E-03 | 12.2 | |
| 2 | 0 | 4364.68 | 5 | 0 | 85.89 | 296.80 | 275 | 43 | 4.90E-04 | 44.7 | |
| 3 | 0 | 4468.78 | 2 | 0 | 64.42 | 332.00 | 321 | 29 | 1.96E-04 | 70.7 | |
| 4 | 0 | 4744.66 | 56 | 0 | 88.77 | 426.00 | 377 | 83 | 5.49E-03 | 13.4 | |
| 5 | 0 | 5290.61 | 398 | 0 | 80.00 | 615.21 | 566 | 77 | 3.90E-02 | 5.0 | |

Background Counts Within Peak Regions  Generated:  7-OCT-2005 17:03:13.78

Acquisition Start: 1-OCT-2005 10:06:24.01
Live Time: 0 16:40:05.00  Real Time: 0 16:40:05.00

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 4136.04 | 8 | 0 | 180.98 | 220.00 | 175 | 91 | 1.33E-04 | 35.4 | |
| 2 | 0 | 4362.31 | 1 | 0 | 3.07 | 296.00 | 275 | 43 | 1.67E-05 | 100.0 | |
| 3 | 0 | 4477.64 | 1 | 0 | 3.07 | 335.00 | 321 | 29 | 1.67E-05 | 100.0 | |
| 4 | 0 | 4721.30 | 5 | 0 | 134.97 | 418.00 | 377 | 83 | 8.33E-05 | 44.7 | |
| 5 | 0 | 5258.61 | 4 | 0 | 226.99 | 604.00 | 566 | 77 | 6.67E-05 | 50.0 | |

Net Sample Counts Within Peak Regions  Generated:  7-OCT-2005 17:03:14.05

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 4180.41* | 66 | 0 | 62.82 | 234.85 | 175 | 91 | 6.43E-03 | 12.5 | |
| 2 | 0 | 4364.68* | 5 | 0 | 85.89 | 296.80 | 275 | 43 | 4.73E-04 | 46.4 | |
| 3 | 0 | 4468.78* | 2 | 0 | 64.42 | 332.00 | 321 | 29 | 1.79E-04 | 77.8 | |
| 4 | 0 | 4744.66* | 55 | 0 | 88.77 | 426.00 | 377 | 83 | 5.40E-03 | 13.6 | |
| 5 | 0 | 5290.61* | 397 | 0 | 80.00 | 615.21 | 566 | 77 | 3.89E-02 | 5.0 | |

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.0 Generated 7-OCT-2005 17:03:16

Configuration : MCA0:[AMSCOUNT]0000C192$1
Analyses by : ROIPEAK V1.2,PEAKEFF V2.2,ENBACK V1.6,NID V3.3
Sample title : VPTR092805SL0H
Sample date : 28-SEP-2005 00:00:00 Acquisition date : 7-OCT-2005 10:57:59
Sample ID : 15 Sample quantity : 0.99190 gram
Sample type : UU Sample geometry :
Detector name : 019 Detector geometry:
Elapsed live time: 0 02:50:04.00 Elapsed real time: 0 02:50:03.00 0.0%
Energy tolerance : 100.00 keV Half life ratio : 8.00
Errors propagated: Yes Systematic Error : 3.00 %
Efficiency type : Average value Efficiencies at : Peak Energy
Abundance limit : 75.00

Post-NID Peak Search Report

| It | Energy | Area | FWHM | Channel | Left | Pw | %Err | Fit | Nuclides | Activity pCi/gram |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 4180.41* | 66 | 62.82 | 234.85 | 175 | 91 | 25.0 | | U-238 | 0.922 |
| 0 | 4364.68* | 5 | 85.89 | 296.80 | 275 | 43 | 92.9 | | U-235 | 8.405E-02 |
| 0 | 4468.78* | 2 | 64.42 | 332.00 | 321 | 29 | 155.7 | | U-236 | 2.859E-02 |
| 0 | 4744.66* | 55 | 88.77 | 426.00 | 377 | 83 | 27.2 | | U-234 | 0.778 |
| 0 | 5290.61* | 397 | 80.00 | 615.21 | 566 | 77 | 10.0 | | U232 | 5.61 |

Eberline Services
Oak Ridge Laboratory

ALPHA SPECTROMETRY REPORT
7-OCT-2005 17:03:33

Spectral File: ND_AMS_ARCHIVE_S:S_0509118A-UU$16_UU.CNF

| | | | |
|---|---|---|---|
| BATCH ID: | 0509118A-UU | SAMPLE ID: | 16 |
| SAMPLE DATE: | 28-SEP-2005 00:00 | ALIQUOT: | 1.033E+00 gram |
| SAMPLE TITLE: | VPTR092805SL0I | DETECTOR NUMBER: | 020 |
| ACQ DATE: | 7-OCT-2005 10:58 | AVERAGE EFFICIENCY: | 19.24% |
| ELAPSED LIVE TIME: | 10205. | RECOVERY: | 101.50% |
| TRACER ID: | UU-10A | TRACER FWHM (kev): | 39.09 |
| LAMBDA VALUE: | 577. | ROI TYPE: | STANDARD |
| TRACER DPM AT SAMPLE DATE: | 11.960 | CONFIDENCE FACTOR: | 4.65 |
| SAMPLE MATRIX: | SOIL | LLD CONSTANT: | 2.71 |
| ENERGY CAL DATE: | 29-SEP-2005 13:20 | EFF CAL DATE: | 29-SEP-2005 13:20 |
| BKG FILENAME: | B_020_1OCT05 | BKG ELAPSED TIME: | 60002. |

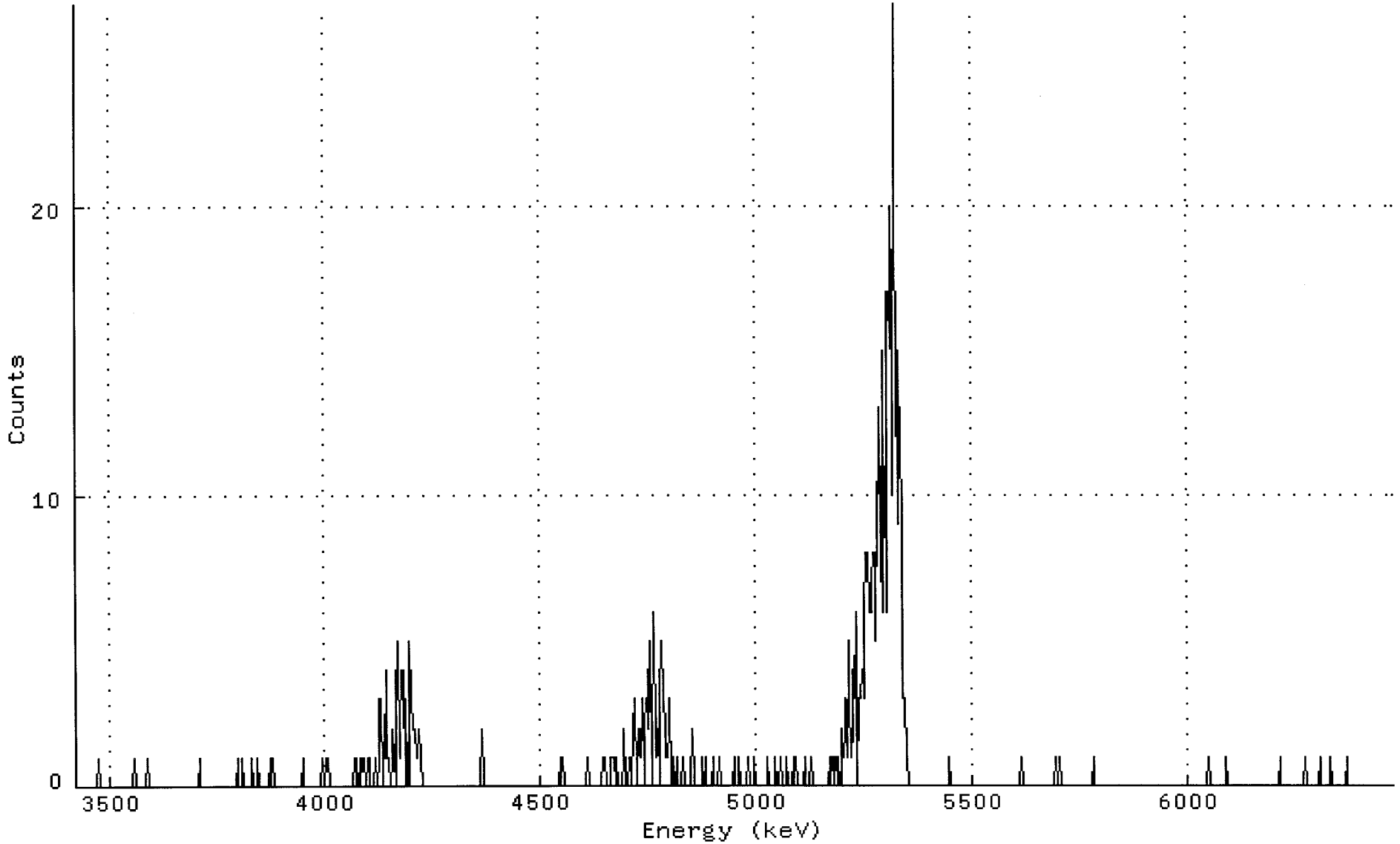
NUCLIDE ACTIVITY SUMMARY

| NUCLIDE | ENERGY | NET AREA | BKG | %ABN | ACTIVITY pCi/ gram | TPU/ERROR 2-SIGMA | MDC pCi/ gram |
|---|---|---|---|---|---|---|---|
| U232 | 5302.5 | 396.32 | 0.68 | 99.8 | 5.214E+00 | 6.818E-01 | 8.610E-02 |
| U-234 | 4761.5 | 75.83 | 0.17 | 99.8 | 9.975E-01 | 2.729E-01 | 6.087E-02 |
| U-235 | 4385.5 | 2.00 | 0.00 | 80.9 | 3.245E-02 | 4.615E-02 | 4.398E-02 |
| U-236 | 4485.2 | -0.17 | 0.17 | 90.1 | -2.478E-03 | 4.970E-03 | 6.743E-02 |
| U-238 | 4184.4 | 70.83 | 0.17 | 100.2 | 9.277E-01 | 2.601E-01 | 6.061E-02 |

Analyst _____ Date 10.7.05

Reviewer _____ Date 10/10/05

Spectrum : DKA100:[ALPHA.ALUSR.ARCHIVE.S]S_0509118A-UU$16_UU.CNF;1
Title : 020
Sample Title: VPTR092805SLOI
Start Time: 7-OCT-2005 10:58: Sample Time: 28-SEP-2005 00:00 Energy Offset: 3.41197E+03
Real Time : 0 02:50:06.00 Sample ID : 16 Energy Slope : 3.17319E+00
Live Time : 0 02:50:05.00 Sample Type: UU Energy Quad : -1.79439E-04




S21

Channel Contents for ND_AMS_ARCHIVE_S:S_0509118A-UU$16_UU

Channel

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1: | 10206 | 10205 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 29: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 43: | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 57: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 71: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 85: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 99: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 113: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 127: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 |
| 141: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 155: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 169: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 183: | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 197: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 211: | 0 | 1 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 0 |
| 225: | 0 | 1 | 0 | 1 | 3 | 3 | 0 | 1 | 1 | 4 | 1 | 1 | 0 | 1 |
| 239: | 2 | 1 | 0 | 3 | 5 | 1 | 2 | 4 | 4 | 0 | 3 | 0 | 0 | 5 |
| 253: | 3 | 2 | 2 | 2 | 1 | 2 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 267: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 281: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 295: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 |
| 309: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 323: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 337: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 351: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 365: | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 379: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 393: | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 1 |
| 407: | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 2 | 0 | 0 | 0 | 1 | 1 | 0 |
| 421: | 2 | 3 | 0 | 0 | 2 | 2 | 1 | 3 | 0 | 2 | 3 | 2 | 3 | 5 |
| 435: | 0 | 1 | 6 | 1 | 2 | 2 | 0 | 3 | 5 | 3 | 2 | 1 | 1 | 2 |
| 449: | 3 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 463: | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 |
| 477: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 491: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 |
| 505: | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 519: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 533: | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 1 |
| 547: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 561: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 |
| 575: | 0 | 1 | 1 | 0 | 1 | 0 | 0 | 2 | 1 | 2 | 3 | 1 | 5 | 3 |
| 589: | 1 | 2 | 4 | 3 | 6 | 0 | 3 | 3 | 3 | 4 | 3 | 6 | 8 | 7 |
| 603: | 8 | 6 | 6 | 7 | 8 | 8 | 5 | 10 | 11 | 13 | 7 | 15 | 6 | 11 |
| 617: | 6 | 17 | 16 | 18 | 20 | 10 | 27 | 22 | 12 | 15 | 9 | 13 | 8 | 3 |
| 631: | 3 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 645: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 659: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 673: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 687: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 701: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 715: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 729: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 743: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 |
| 757: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 771: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 785: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 799: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 813: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 827: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 841: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 855: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 869: | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 883: | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 897: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 911: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 925: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 939: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 953: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 967: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 981: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 995: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1009: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1023: | 0 | 0 | | | | | | | | | | | | |

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Gross Sample Counts Within Peak Regions  Generated:  7-OCT-2005 17:03:21.49

Detector ID: 20  Acquisition Start: 7-OCT-2005 10:58:21.01
Live Time: 0 02:50:05.00  Real Time: 0 02:50:06.00
Batch Id: 0509118A-UU  Sample Id: 16
Sample Type: UU

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 4163.29 | 71 | 0 | 78.34 | 240.03 | 187 | 89 | 6.96E-03 | 11.9 | |
| 2 | 0 | 4366.17 | 2 | 0 | 3.17 | 306.00 | 284 | 42 | 1.96E-04 | 70.7 | |
| 3 | 0 | 4476.22 | 0 | 0 | 0.00 | 342.00 | 328 | 29 | 0.00E+00 | 0.0 | |
| 4 | 0 | 4748.23 | 76 | 0 | 34.91 | 431.64 | 383 | 80 | 7.45E-03 | 11.5 | |
| 5 | 0 | 5291.06 | 397 | 0 | 39.09 | 613.46 | 566 | 75 | 3.89E-02 | 5.0 | |

Background Counts Within Peak Regions  Generated:  7-OCT-2005 17:03:30.35

Acquisition Start: 1-OCT-2005 10:06:27.01
Live Time: 0 16:40:02.00  Real Time: 0 16:40:02.00

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 4135.40 | 1 | 0 | 3.17 | 231.00 | 187 | 89 | 1.67E-05 | 100.0 | |
| 2 | 0 | 4361.57 | 0 | 0 | 0.00 | 304.50 | 284 | 42 | 0.00E+00 | 0.0 | |
| 3 | 0 | 4476.22 | 1 | 0 | 3.17 | 342.00 | 328 | 29 | 1.67E-05 | 100.0 | |
| 4 | 0 | 4720.61 | 1 | 0 | 3.17 | 422.50 | 383 | 80 | 1.67E-05 | 100.0 | |
| 5 | 0 | 5260.16 | 4 | 0 | 174.53 | 603.00 | 566 | 75 | 6.67E-05 | 50.0 | |

Net Sample Counts Within Peak Regions  Generated:  7-OCT-2005 17:03:30.66

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 4163.29* | 71 | 0 | 78.34 | 240.03 | 187 | 89 | 6.94E-03 | 11.9 | |
| 2 | 0 | 4366.17* | 2 | 0 | 3.17 | 306.00 | 284 | 42 | 1.96E-04 | 70.7 | |
| 3 | 0 | 4476.22* | 0 | 0 | 0.00 | 342.00 | 328 | 29 | -1.67E-05 | 100.0 | |
| 4 | 0 | 4748.23* | 76 | 0 | 34.91 | 431.64 | 383 | 80 | 7.43E-03 | 11.5 | |
| 5 | 0 | 5291.06* | 396 | 0 | 39.09 | 613.46 | 566 | 75 | 3.88E-02 | 5.0 | |

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.0 Generated 7-OCT-2005 17:03:31

Configuration : MCA0:[AMSCOUNT]0000C192$1
Analyses by : ROIPEAK V1.2,PEAKEFF V2.2,ENBACK V1.6,NID V3.3
Sample title : VPTR092805SL0I
Sample date : 28-SEP-2005 00:00:00 Acquisition date : 7-OCT-2005 10:58:21
Sample ID : 16 Sample quantity : 1.0332 gram
Sample type : UU Sample geometry :
Detector name : 020 Detector geometry:
Elapsed live time: 0 02:50:05.00 Elapsed real time: 0 02:50:06.00 0.0%
Energy tolerance : 100.00 keV Half life ratio : 8.00
Errors propagated: Yes Systematic Error : 3.00 %
Efficiency type : Average value Efficiencies at : Peak Energy
Abundance limit : 75.00

Post-NID Peak Search Report

| It | Energy | Area | FWHM | Channel | Left | Pw | %Err | Fit | Nuclides | Activity pCi/gram |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 4163.29* | 71 | 78.34 | 240.03 | 187 | 89 | 23.8 | | U-238 | 0.942 |
| 0 | 4366.17* | 2 | 3.17 | 306.00 | 284 | 42141.4 | | | U-235 | 3.294E-02 |
| 0 | 4476.22* | 0 | 0.00 | 342.00 | 328 | 29200.0 | | | U-236 | -2.515E-03 |
| 0 | 4748.23* | 76 | 34.91 | 431.64 | 383 | 80 | 23.0 | | U-234 | 1.01 |
| 0 | 5291.06* | 396 | 39.09 | 613.46 | 566 | 75 | 10.1 | | U232 | 5.29 |

Eberline Services
Oak Ridge Laboratory

ALPHA SPECTROMETRY REPORT
7-OCT-2005 17:03:42

**********

Spectral File: ND_AMS_ARCHIVE_S:S_0509118A-UU$17_UU.CNF

**********

| | | | |
|---|---|---|---|
| BATCH ID: | 0509118A-UU | SAMPLE ID: | 17 |
| SAMPLE DATE: | 28-SEP-2005 00:00 | ALIQUOT: | 1.001E+00 gram |
| SAMPLE TITLE: | VPTR092805SL0J | DETECTOR NUMBER: | 021 |
| ACQ DATE: | 7-OCT-2005 10:58 | AVERAGE EFFICIENCY: | 18.34% |
| ELAPSED LIVE TIME: | 10206. | RECOVERY: | 103.58% |
| TRACER ID: | UU-10A | TRACER FWHM (kev): | 26.96 |
| LAMBDA VALUE: | 588. | ROI TYPE: | STANDARD |
| TRACER DPM AT SAMPLE DATE: | 12.193 | CONFIDENCE FACTOR: | 4.65 |
| SAMPLE MATRIX: | SOIL | LLD CONSTANT: | 2.71 |
| ENERGY CAL DATE: | 29-SEP-2005 13:20 | EFF CAL DATE: | 29-SEP-2005 13:20 |
| BKG FILENAME: | B_021_1OCT05 | BKG ELAPSED TIME: | 60005. |

**********

NUCLIDE ACTIVITY SUMMARY

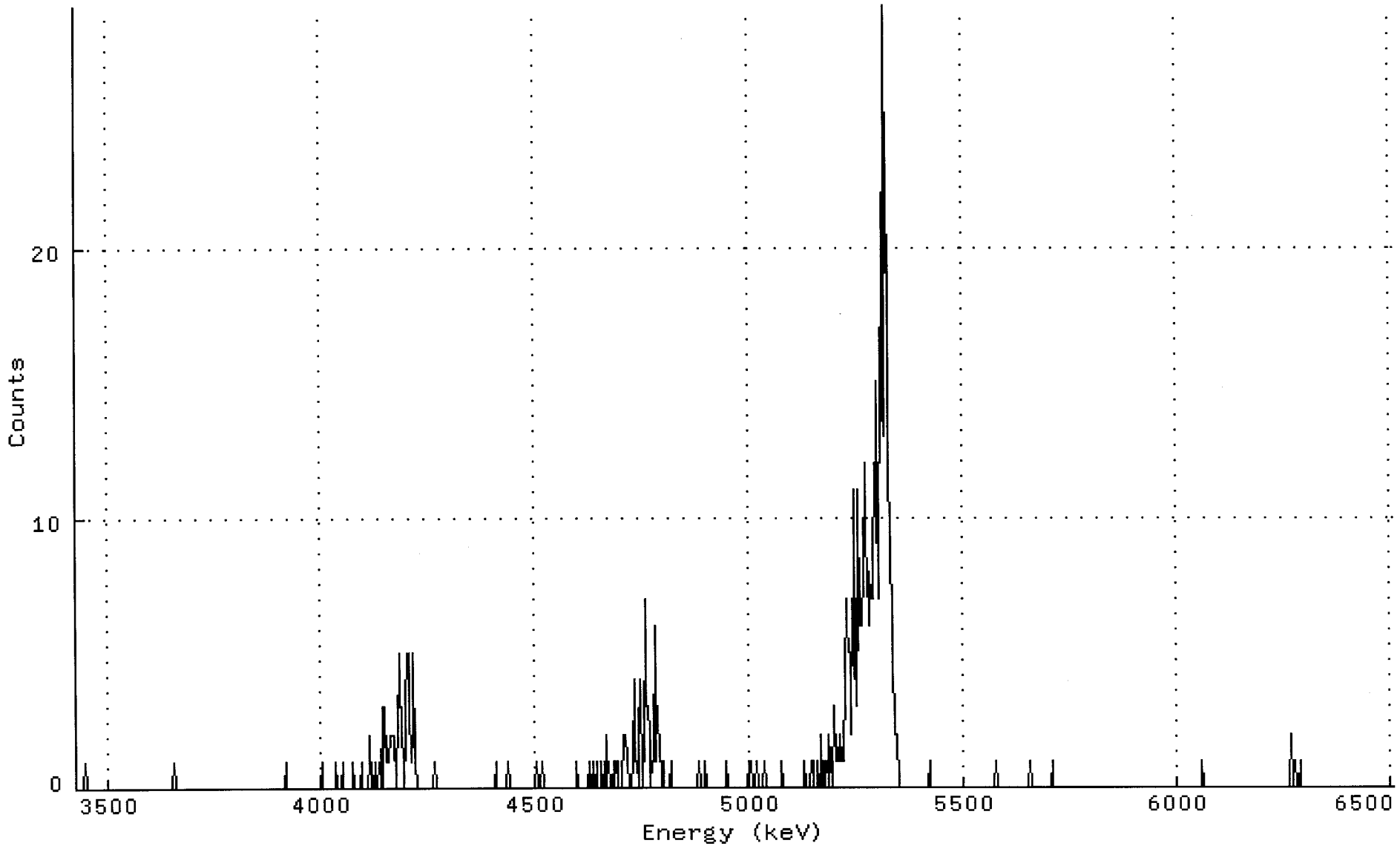
| NUCLIDE | ENERGY | NET AREA | BKG | %ABN | ACTIVITY pCi/ gram | TPU/ERROR 2-SIGMA | MDC pCi/ gram |
|---|---|---|---|---|---|---|---|
| U232 | 5302.5 | 393.15 | 0.85 | 99.8 | 5.487E+00 | 7.194E-01 | 9.764E-02 |
| U-234 | 4761.5 | 63.64 | 1.36 | 99.8 | 8.879E-01 | 2.611E-01 | 1.135E-01 |
| U-235 | 4385.5 | 0.83 | 0.17 | 80.9 | 1.428E-02 | 3.498E-02 | 7.965E-02 |
| U-236 | 4485.2 | 2.83 | 0.17 | 90.1 | 4.373E-02 | 5.418E-02 | 7.152E-02 |
| U-238 | 4184.4 | 69.98 | 1.02 | 100.2 | 9.722E-01 | 2.753E-01 | 1.029E-01 |

**********

Analyst _____ Date 10.7.05

Reviewer _____ Date 10/10/05

Spectrum : DKA100:[ALPHA.ALUSR.ARCHIVE.S]S_0509118A-UU$17_UU.CNF;1
Title : 021
Sample Title: VPTR092805SL0J
Start Time: 7-OCT-2005 10:58: Sample Time: 28-SEP-2005 00:00 Energy Offset: 3.41384E+03
Real Time : 0 02:50:06.00 Sample ID : 17 Energy Slope : 3.18885E+00
Live Time : 0 02:50:06.00 Sample Type: UU Energy Quad : -1.65046E-04




021

Channel Contents for ND_AMS_ARCHIVE_S:S_0509118A-UU$17_UU

Channel

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1: | 10206 | 10206 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 15: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 29: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 43: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 57: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 71: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 85: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 99: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 113: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 127: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 141: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 155: | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 169: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 183: | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 197: | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 211: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 0 |
| 225: | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 3 | 0 | 3 | 1 | 2 | 1 | 2 |
| 239: | 2 | 2 | 2 | 0 | 1 | 2 | 5 | 3 | 3 | 0 | 2 | 3 | 5 | 5 |
| 253: | 3 | 1 | 2 | 5 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 267: | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 281: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 295: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 309: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 323: | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 337: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 351: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 365: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 379: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 |
| 393: | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 2 | 0 | 1 | 0 | 0 | 0 |
| 407: | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 2 | 2 | 2 | 1 | 0 | 0 |
| 421: | 0 | 1 | 4 | 1 | 1 | 0 | 2 | 4 | 0 | 1 | 1 | 7 | 3 | 3 |
| 435: | 2 | 0 | 1 | 1 | 6 | 1 | 3 | 1 | 2 | 0 | 1 | 0 | 0 | 0 |
| 449: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 463: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 477: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 491: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 505: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 |
| 519: | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 533: | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 547: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 1 |
| 561: | 0 | 0 | 0 | 1 | 0 | 0 | 2 | 0 | 1 | 0 | 1 | 0 | 2 | 1 |
| 575: | 0 | 0 | 3 | 1 | 2 | 1 | 1 | 2 | 1 | 2 | 1 | 4 | 7 | 6 |
| 589: | 5 | 5 | 2 | 7 | 4 | 11 | 3 | 7 | 11 | 6 | 7 | 6 | 8 | 12 |
| 603: | 9 | 8 | 6 | 8 | 7 | 7 | 8 | 12 | 9 | 15 | 7 | 17 | 12 | 15 |
| 617: | 29 | 13 | 25 | 16 | 12 | 9 | 6 | 5 | 2 | 2 | 2 | 0 | 0 | 0 |
| 631: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 645: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 659: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 673: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 687: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 701: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 715: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 729: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 743: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 757: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 771: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 785: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 799: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 813: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 827: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 841: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 855: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 869: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 883: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 897: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 911: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 925: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 939: | 0 | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 953: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 967: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 981: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 995: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1009: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1023: | 0 | 0 | | | | | | | | | | | | |

Eberline Services
Oak Ridge Laboratory

Gross Sample Counts Within Peak Regions  Generated:  7-OCT-2005 17:03:37.04

Detector ID: 21  Acquisition Start: 7-OCT-2005 10:58:44.01
Live Time: 0 02:50:06.00  Real Time: 0 02:50:06.00
Batch Id: 0509118A-UU  Sample Id: 17
Sample Type: UU

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 4174.52 | 71 | 0 | 79.03 | 241.56 | 186 | 87 | 6.96E-03 | 11.9 | |
| 2 | 0 | 4408.12 | 1 | 0 | 3.19 | 317.00 | 282 | 41 | 9.80E-05 | 100.0 | |
| 3 | 0 | 4485.12 | 3 | 0 | 0.00 | 342.00 | 326 | 28 | 2.94E-04 | 57.7 | |
| 4 | 0 | 4741.68 | 65 | 0 | 53.11 | 425.78 | 379 | 80 | 6.37E-03 | 12.4 | |
| 5 | 0 | 5288.82 | 394 | 0 | 26.96 | 607.05 | 561 | 74 | 3.86E-02 | 5.0 | |

Background Counts Within Peak Regions  Generated:  7-OCT-2005 17:03:40.69

Acquisition Start: 1-OCT-2005 10:06:29.01
Live Time: 0 16:40:05.00  Real Time: 0 16:40:05.00

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 4135.43 | 6 | 0 | 197.71 | 229.00 | 186 | 87 | 1.00E-04 | 40.8 | |
| 2 | 0 | 4361.82 | 1 | 0 | 3.19 | 302.00 | 282 | 41 | 1.67E-05 | 100.0 | |
| 3 | 0 | 4477.43 | 1 | 0 | 0.00 | 339.50 | 326 | 28 | 1.67E-05 | 100.0 | |
| 4 | 0 | 4719.47 | 8 | 0 | 0.00 | 418.50 | 379 | 80 | 1.33E-04 | 35.4 | |
| 5 | 0 | 5260.26 | 5 | 0 | 3.19 | 597.50 | 561 | 74 | 8.33E-05 | 44.7 | |

Net Sample Counts Within Peak Regions  Generated:  7-OCT-2005 17:03:41.06

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 4174.52* | 70 | 0 | 79.03 | 241.56 | 186 | 87 | 6.86E-03 | 12.1 | |
| 2 | 0 | 4408.12* | 1 | 0 | 3.19 | 317.00 | 282 | 41 | 8.13E-05 | 122.2 | |
| 3 | 0 | 4485.12* | 3 | 0 | 0.00 | 342.00 | 326 | 28 | 2.77E-04 | 61.5 | |
| 4 | 0 | 4741.68* | 64 | 0 | 53.11 | 425.78 | 379 | 80 | 6.24E-03 | 12.7 | |
| 5 | 0 | 5288.82* | 393 | 0 | 26.96 | 607.05 | 561 | 74 | 3.85E-02 | 5.0 | |

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.0 Generated 7-OCT-2005 17:03:41

Configuration : MCA0:[AMSCOUNT]0000C192$1
Analyses by : ROIPEAK V1.2,PEAKEFF V2.2,ENBACK V1.6,NID V3.3
Sample title : VPTR092805SL0J
Sample date : 28-SEP-2005 00:00:00 Acquisition date : 7-OCT-2005 10:58:44
Sample ID : 17 Sample quantity : 1.0010 gram
Sample type : UU Sample geometry :
Detector name : 021 Detector geometry:
Elapsed live time: 0 02:50:06.00 Elapsed real time: 0 02:50:06.00 0.0%
Energy tolerance : 100.00 keV Half life ratio : 8.00
Errors propagated: Yes Systematic Error : 3.00 %
Efficiency type : Average value Efficiencies at : Peak Energy
Abundance limit : 75.00

Post-NID Peak Search Report

| It | Energy | Area | FWHM | Channel | Left | Pw | %Err | Fit | Nuclides | Activity pCi/gram |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 4174.52* | 70 | 79.03 | 241.56 | 186 | 87 | 24.1 | | U-238 | 1.01 |
| 0 | 4408.12* | 1 | 3.19 | 317.00 | 282 | 41244 | .4 | | U-235 | 1.480E-02 |
| 0 | 4485.12* | 3 | 0.00 | 342.00 | 326 | 28123 | .0 | | U-236 | 4.530E-02 |
| 0 | 4741.68* | 64 | 53.11 | 425.78 | 379 | 80 | 25.4 | | U-234 | 0.920 |
| 0 | 5288.82* | 393 | 26.96 | 607.05 | 561 | 74 | 10.1 | | U232 | 5.68 |

Eberline Services
Oak Ridge Laboratory

ALPHA SPECTROMETRY REPORT
7-OCT-2005 17:03:54

**********

Spectral File: ND_AMS_ARCHIVE_S:S_0509118A-UU$18_UU.CNF

**********

| | | | |
|---|---|---|---|
| BATCH ID: | 0509118A-UU | SAMPLE ID: | 18 |
| SAMPLE DATE: | 28-SEP-2005 00:00 | ALIQUOT: | 1.130E+00 gram |
| SAMPLE TITLE: | VPTR092805SL0K | DETECTOR NUMBER: | 022 |
| ACQ DATE: | 7-OCT-2005 10:59 | AVERAGE EFFICIENCY: | 17.83% |
| ELAPSED LIVE TIME: | 10201. | RECOVERY: | 83.90% |
| TRACER ID: | UU-10A | TRACER FWHM (kev): | 40.82 |
| LAMBDA VALUE: | 601. | ROI TYPE: | STANDARD |
| TRACER DPM AT SAMPLE DATE: | 12.462 | CONFIDENCE FACTOR: | 4.65 |
| SAMPLE MATRIX: | SOIL | LLD CONSTANT: | 2.71 |
| ENERGY CAL DATE: | 29-SEP-2005 13:20 | EFF CAL DATE: | 29-SEP-2005 13:20 |
| BKG FILENAME: | B_022_1OCT05 | BKG ELAPSED TIME: | 60003. |

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NUCLIDE ACTIVITY SUMMARY

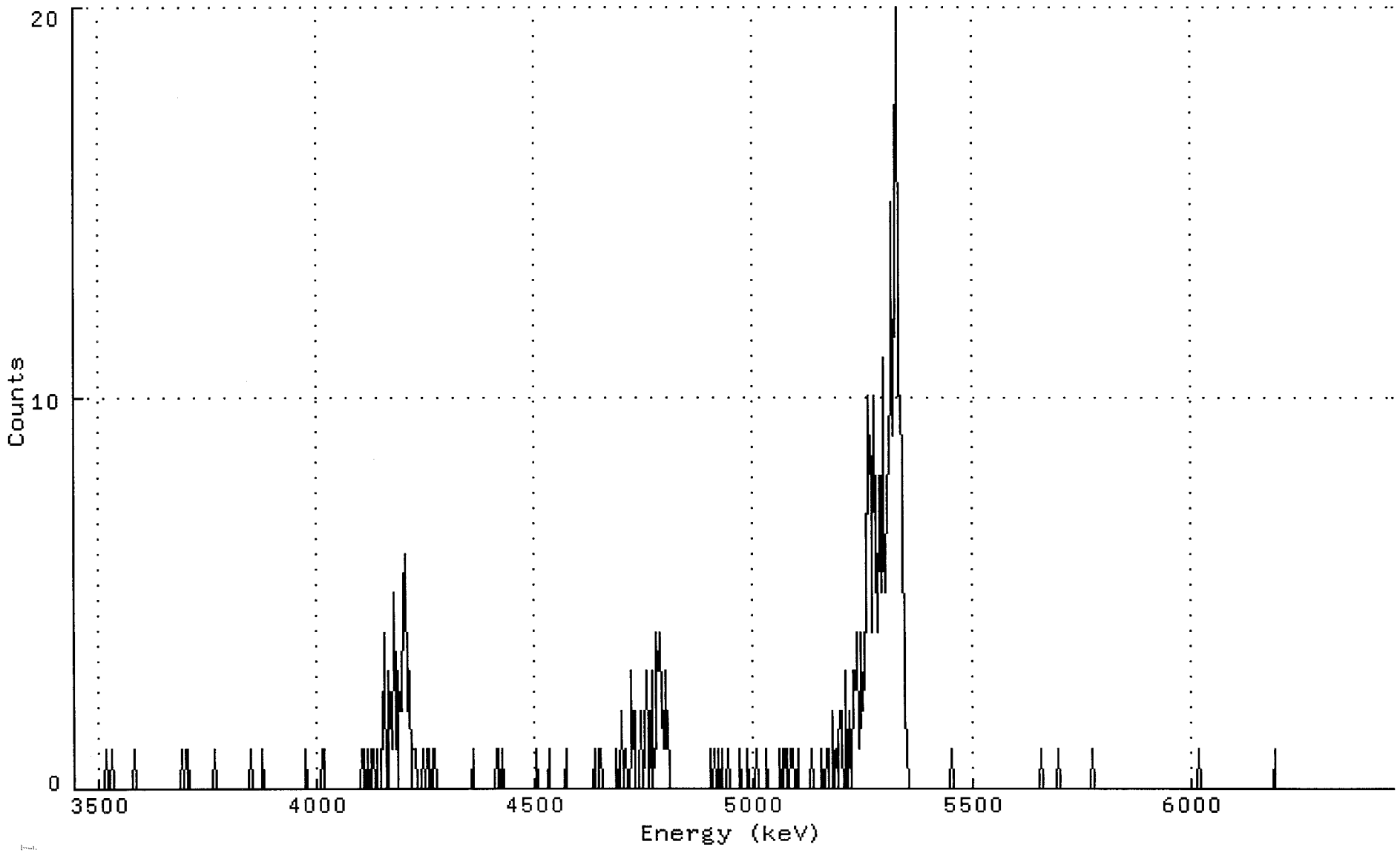
| NUCLIDE | ENERGY | NET AREA | BKG | %ABN | ACTIVITY pCi/ gram | TPU/ERROR 2-SIGMA | MDC pCi/ gram |
|---|---|---|---|---|---|---|---|
| U232 | 5302.5 | 316.32 | 0.68 | 99.8 | 4.969E+00 | 6.970E-01 | 1.028E-01 |
| U-234 | 4761.5 | 53.66 | 0.34 | 99.8 | 8.427E-01 | 2.660E-01 | 8.515E-02 |
| U-235 | 4385.5 | 4.00 | 0.00 | 80.9 | 7.750E-02 | 7.844E-02 | 5.250E-02 |
| U-236 | 4485.2 | 0.83 | 0.17 | 90.1 | 1.444E-02 | 3.536E-02 | 8.050E-02 |
| U-238 | 4184.4 | 69.66 | 0.34 | 100.2 | 1.089E+00 | 3.125E-01 | 8.478E-02 |

**********

Analyst _____ Date 10.7.05

Reviewer _____ Date 10/10/05

Spectrum : DKA100:[ALPHA.ALUSR.ARCHIVE.S]S_0509118A-UU$18_UU.CNF;1
Title : 022
Sample Title: VPTR092805SL0K
Start Time: 7-OCT-2005 10:59: Sample Time: 28-SEP-2005 00:00 Energy Offset: 3.43204E+03
Real Time : 0 02:50:01.00 Sample ID : 18 Energy Slope : 3.12016E+00
Live Time : 0 02:50:01.00 Sample Type: UU Energy Quad : -1.59202E-04



Channel Contents for ND_AMS_ARCHIVE_S:S_0509118A-UU$18_UU

Channel

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1: | 10201 | 10201 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 29: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 43: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 57: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 71: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 85: | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 99: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 113: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 127: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 141: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 155: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 169: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 183: | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 197: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 211: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 0 |
| 225: | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 1 | 1 | 4 | 3 | 0 | 0 |
| 239: | 3 | 2 | 1 | 4 | 5 | 2 | 0 | 3 | 2 | 3 | 2 | 5 | 6 | 2 |
| 253: | 2 | 3 | 0 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 267: | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 281: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 295: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 309: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 |
| 323: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 337: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 351: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 365: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 379: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 393: | 0 | 1 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 407: | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 0 |
| 421: | 0 | 1 | 3 | 1 | 2 | 0 | 0 | 0 | 2 | 2 | 0 | 1 | 1 | 3 |
| 435: | 1 | 0 | 1 | 3 | 0 | 1 | 1 | 4 | 3 | 4 | 4 | 2 | 1 | 3 |
| 449: | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 463: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 477: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 1 | 0 |
| 491: | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 505: | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 519: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 533: | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 1 | 1 | 1 |
| 547: | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 561: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 1 |
| 575: | 0 | 0 | 0 | 2 | 0 | 1 | 0 | 1 | 2 | 2 | 1 | 0 | 0 | 3 |
| 589: | 0 | 1 | 2 | 0 | 3 | 2 | 3 | 3 | 4 | 1 | 2 | 4 | 2 | 3 |
| 603: | 4 | 4 | 10 | 7 | 9 | 8 | 4 | 10 | 5 | 8 | 4 | 8 | 6 | 5 |
| 617: | 11 | 6 | 5 | 8 | 7 | 9 | 10 | 15 | 9 | 14 | 15 | 20 | 11 | 10 |
| 631: | 10 | 8 | 8 | 2 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 645: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 659: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 673: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 687: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 701: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 715: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 729: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 743: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 |
| 757: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 771: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 785: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 799: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 813: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 827: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 841: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 855: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 869: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 883: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 897: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 911: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 925: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 939: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 953: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 967: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 981: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 995: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1009: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1023: | 0 | 0 | | | | | | | | | | | | |

Eberline Services
Oak Ridge Laboratory

Gross Sample Counts Within Peak Regions  Generated:  7-OCT-2005 17:03:46.50

Detector ID: 22  Acquisition Start: 7-OCT-2005 10:59:06.01
Live Time: 0 02:50:01.00  Real Time: 0 02:50:01.00
Batch Id: 0509118A-UU  Sample Id: 18
Sample Type: UU

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 4182.31 | 70 | 0 | 53.10 | 243.49 | 184 | 89 | 6.86E-03 | 12.0 | |
| 2 | 0 | 4402.86 | 4 | 0 | 0.00 | 316.25 | 282 | 43 | 3.92E-04 | 50.0 | |
| 3 | 0 | 4504.59 | 1 | 0 | 3.12 | 350.00 | 327 | 29 | 9.80E-05 | 100.0 | |
| 4 | 0 | 4757.08 | 54 | 0 | 80.93 | 434.30 | 382 | 81 | 5.29E-03 | 13.6 | |
| 5 | 0 | 5294.05 | 317 | 0 | 40.82 | 616.14 | 567 | 75 | 3.11E-02 | 5.6 | |

Background Counts Within Peak Regions  Generated:  7-OCT-2005 17:03:52.00

Acquisition Start: 1-OCT-2005 10:06:32.01
Live Time: 0 16:40:03.00  Real Time: 0 16:40:03.00

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 4135.16 | 2 | 0 | 90.48 | 228.00 | 184 | 89 | 3.33E-05 | 70.7 | |
| 2 | 0 | 4362.83 | 0 | 0 | 0.00 | 303.00 | 282 | 43 | 0.00E+00 | 0.0 | |
| 3 | 0 | 4477.50 | 1 | 0 | 3.12 | 341.00 | 327 | 29 | 1.67E-05 | 100.0 | |
| 4 | 0 | 4720.39 | 2 | 0 | 59.28 | 422.00 | 382 | 81 | 3.33E-05 | 70.7 | |
| 5 | 0 | 5258.53 | 4 | 0 | 71.76 | 604.00 | 567 | 75 | 6.67E-05 | 50.0 | |

Net Sample Counts Within Peak Regions  Generated:  7-OCT-2005 17:03:52.29

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 4182.31* | 70 | 0 | 53.10 | 243.49 | 184 | 89 | 6.83E-03 | 12.0 | |
| 2 | 0 | 4402.86* | 4 | 0 | 0.00 | 316.25 | 282 | 43 | 3.92E-04 | 50.0 | |
| 3 | 0 | 4504.59* | 1 | 0 | 3.12 | 350.00 | 327 | 29 | 8.14E-05 | 122.2 | |
| 4 | 0 | 4757.08* | 54 | 0 | 80.93 | 434.30 | 382 | 81 | 5.26E-03 | 13.7 | |
| 5 | 0 | 5294.05* | 316 | 0 | 40.82 | 616.14 | 567 | 75 | 3.10E-02 | 5.6 | |

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.0 Generated 7-OCT-2005 17:03:53

| | | | |
|---|---|---|---|
| Configuration | : MCA0:[AMSCOUNT]0000C192$1 | | |
| Analyses by | : ROIPEAK V1.2,PEAKEFF V2.2,ENBACK V1.6,NID V3.3 | | |
| Sample title | : VPTR092805SL0K | | |
| Sample date | : 28-SEP-2005 00:00:00 | Acquisition date | : 7-OCT-2005 10:59:06 |
| Sample ID | : 18 | Sample quantity | : 1.1297 gram |
| Sample type | : UU | Sample geometry | : |
| Detector name | : 022 | Detector geometry | : |
| Elapsed live time | : 0 02:50:01.00 | Elapsed real time | : 0 02:50:01.00 0.0% |
| Energy tolerance | : 100.00 keV | Half life ratio | : 8.00 |
| Errors propagated | : Yes | Systematic Error | : 3.00 % |
| Efficiency type | : Average value | Efficiencies at | : Peak Energy |
| Abundance limit | : 75.00 | | |

Post-NID Peak Search Report

| It | Energy | Area | FWHM | Channel | Left | Pw | %Err | Fit | Nuclides | Activity pCi/gram |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 4182.31* | 70 | 53.10 | 243.49 | 184 | 89 | 24.0 | | U-238 | 0.914 |
| 0 | 4402.86* | 4 | 0.00 | 316.25 | 282 | 43100.0 | | | U-235 | 6.502E-02 |
| 0 | 4504.59* | 1 | 3.12 | 350.00 | 327 | 29244.4 | | | U-236 | 1.211E-02 |
| 0 | 4757.08* | 54 | 80.93 | 434.30 | 382 | 81 | 27.4 | | U-234 | 0.707 |
| 0 | 5294.05* | 316 | 40.82 | 616.14 | 567 | 75 | 11.3 | | U232 | 4.17 |

Eberline Services
Oak Ridge Laboratory

ALPHA SPECTROMETRY REPORT
7-OCT-2005 17:04:15

**********

Spectral File: ND_AMS_ARCHIVE_S:S_0509118A-UU$19_UU.CNF

**********

| | | | |
|---|---|---|---|
| BATCH ID: | 0509118A-UU | SAMPLE ID: | 19 |
| SAMPLE DATE: | 28-SEP-2005 00:00 | ALIQUOT: | 1.059E+00 gram |
| SAMPLE TITLE: | VPTR092805SL0L | DETECTOR NUMBER: | 023 |
| ACQ DATE: | 7-OCT-2005 10:59 | AVERAGE EFFICIENCY: | 19.54% |
| ELAPSED LIVE TIME: | 10206. | RECOVERY: | 96.31% |
| TRACER ID: | UU-10A | TRACER FWHM (kev): | 93.41 |
| LAMBDA VALUE: | 591. | ROI TYPE: | STANDARD |
| TRACER DPM AT SAMPLE DATE: | 12.255 | CONFIDENCE FACTOR: | 4.65 |
| SAMPLE MATRIX: | SOIL | LLD CONSTANT: | 2.71 |
| ENERGY CAL DATE: | 29-SEP-2005 13:20 | EFF CAL DATE: | 29-SEP-2005 13:20 |
| BKG FILENAME: | B_023_1OCT05 | BKG ELAPSED TIME: | 60000. |

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NUCLIDE ACTIVITY SUMMARY

| NUCLIDE | ENERGY | NET AREA | BKG | %ABN | ACTIVITY pCi/ gram | TPU/ERROR 2-SIGMA | MDC pCi/ gram |
|---|---|---|---|---|---|---|---|
| U232 | 5302.5 | 391.49 | 0.51 | 99.8 | 5.215E+00 | 6.841E-01 | 8.033E-02 |
| U-234 | 4761.5 | 64.15 | 0.85 | 99.8 | 8.543E-01 | 2.496E-01 | 9.320E-02 |
| U-235 | 4385.5 | 3.83 | 0.17 | 80.9 | 6.292E-02 | 6.661E-02 | 7.603E-02 |
| U-236 | 4485.2 | 5.83 | 0.17 | 90.1 | 8.600E-02 | 7.356E-02 | 6.827E-02 |
| U-238 | 4184.4 | 74.66 | 0.34 | 100.2 | 9.900E-01 | 2.728E-01 | 7.190E-02 |

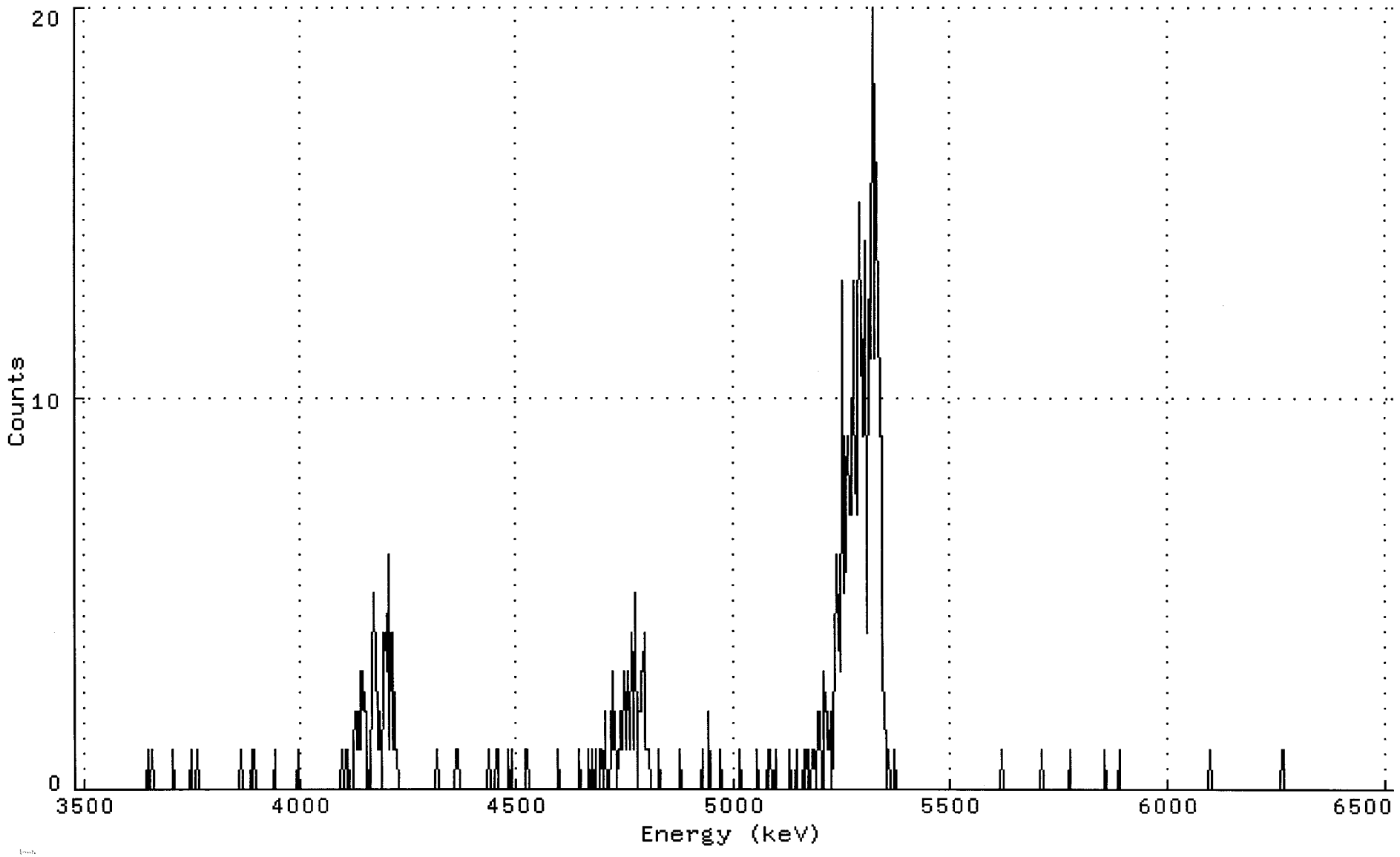
**********

*** Tracer FWHM > 80.0 Kev ***

Analyst _____ Date 10.7.05

Reviewer _____ Date 10/10/05

Spectrum : DKA100:[ALPHA.ALUSR.ARCHIVE.S]S_0509118A-UU$19_UU.CNF;1
Title : 023
Sample Title: VPTR092805SL0L
Start Time: 7-OCT-2005 10:59: Sample Time: 28-SEP-2005 00:00 Energy Offset: 3.46895E+03
Real Time : 0 02:50:06.00 Sample ID : 19 Energy Slope : 3.16655E+00
Live Time : 0 02:50:06.00 Sample Type: UU Energy Quad : -1.87304E-04




881

Channel Contents for ND_AMS_ARCHIVE_S:S_0509118A-UU$19_UU

Channel

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1: | 10206 | 10206 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 29: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 43: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 57: | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 71: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 85: | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 99: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 113: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 127: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 |
| 141: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 155: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 169: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 183: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 197: | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 1 |
| 211: | 2 | 1 | 2 | 1 | 3 | 1 | 3 | 2 | 2 | 0 | 0 | 1 | 0 | 3 |
| 225: | 5 | 3 | 4 | 1 | 2 | 2 | 0 | 3 | 4 | 4 | 3 | 6 | 1 | 4 |
| 239: | 1 | 4 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 253: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 267: | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 281: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 295: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 309: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 |
| 323: | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 337: | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 351: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 365: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 379: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 1 |
| 393: | 0 | 0 | 0 | 1 | 1 | 0 | 2 | 1 | 0 | 0 | 0 | 1 | 3 | 1 |
| 407: | 2 | 0 | 0 | 1 | 1 | 2 | 1 | 3 | 1 | 2 | 3 | 1 | 1 | 4 |
| 421: | 3 | 1 | 5 | 0 | 2 | 2 | 2 | 3 | 3 | 4 | 1 | 1 | 1 | 0 |
| 435: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 449: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 463: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 477: | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 491: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 505: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 519: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 |
| 533: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| 547: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 1 | 1 | 1 |
| 561: | 0 | 0 | 2 | 1 | 2 | 0 | 0 | 3 | 2 | 2 | 1 | 1 | 2 | 0 |
| 575: | 1 | 4 | 3 | 6 | 4 | 4 | 3 | 9 | 13 | 5 | 6 | 8 | 9 | 7 |
| 589: | 8 | 7 | 13 | 10 | 8 | 7 | 11 | 15 | 11 | 12 | 9 | 14 | 4 | 8 |
| 603: | 10 | 15 | 11 | 20 | 11 | 18 | 14 | 13 | 13 | 9 | 9 | 3 | 2 | 1 |
| 617: | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 631: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 645: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 659: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 673: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 687: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 701: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 715: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 729: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 743: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 757: | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 771: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 785: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 799: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 813: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 827: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 841: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 855: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 869: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 883: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 897: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 911: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 925: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 |
| 939: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 953: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 967: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 981: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 995: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1009: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1023: | 0 | 0 | | | | | | | | | | | | |

Eberline Services
Oak Ridge Laboratory

Gross Sample Counts Within Peak Regions  Generated:  7-OCT-2005 17:03:58.37

Detector ID: 23  Acquisition Start: 7-OCT-2005 10:59:25.01
Live Time: 0 02:50:06.00  Real Time: 0 02:50:06.00
Batch Id: 0509118A-UU  Sample Id: 19
Sample Type: UU

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 4178.35 | 75 | 0 | 51.64 | 227.08 | 169 | 89 | 7.35E-03 | 11.5 | |
| 2 | 0 | 4340.90 | 4 | 0 | 53.44 | 280.00 | 267 | 42 | 3.92E-04 | 50.0 | |
| 3 | 0 | 4472.71 | 6 | 0 | 0.00 | 323.17 | 311 | 29 | 5.88E-04 | 40.8 | |
| 4 | 0 | 4755.53 | 65 | 0 | 81.52 | 416.57 | 365 | 81 | 6.37E-03 | 12.4 | |
| 5 | 0 | 5289.77 | 392 | 0 | 93.41 | 596.03 | 549 | 75 | 3.84E-02 | 5.1 | |

Background Counts Within Peak Regions  Generated:  7-OCT-2005 17:04:13.32

Acquisition Start: 1-OCT-2005 10:06:35.01
Live Time: 0 16:40:00.00  Real Time: 0 16:40:00.00

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 4134.92 | 2 | 0 | 53.83 | 213.00 | 169 | 89 | 3.33E-05 | 70.7 | |
| 2 | 0 | 4363.85 | 1 | 0 | 3.17 | 287.50 | 267 | 42 | 1.67E-05 | 100.0 | |
| 3 | 0 | 4478.29 | 1 | 0 | 3.17 | 325.00 | 311 | 29 | 1.67E-05 | 100.0 | |
| 4 | 0 | 4720.68 | 5 | 0 | 174.16 | 405.00 | 365 | 81 | 8.33E-05 | 44.7 | |
| 5 | 0 | 5260.22 | 3 | 0 | 123.50 | 586.00 | 549 | 75 | 5.00E-05 | 57.7 | |

Net Sample Counts Within Peak Regions  Generated:  7-OCT-2005 17:04:13.62

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 4178.35* | 75 | 0 | 51.64 | 227.08 | 169 | 89 | 7.32E-03 | 11.6 | |
| 2 | 0 | 4340.90* | 4 | 0 | 53.44 | 280.00 | 267 | 42 | 3.75E-04 | 52.4 | |
| 3 | 0 | 4472.71* | 6 | 0 | 0.00 | 323.17 | 311 | 29 | 5.71E-04 | 42.1 | |
| 4 | 0 | 4755.53* | 64 | 0 | 81.52 | 416.57 | 365 | 81 | 6.29E-03 | 12.6 | |
| 5 | 0 | 5289.77* | 391 | 0 | 93.41 | 596.03 | 549 | 75 | 3.84E-02 | 5.1 | |

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.0 Generated 7-OCT-2005 17:04:14

Configuration : MCA0:[AMSCOUNT]0000C192$1
Analyses by : ROIPEAK V1.2,PEAKEFF V2.2,ENBACK V1.6,NID V3.3
Sample title : VPTR092805SL0L
Sample date : 28-SEP-2005 00:00:00 Acquisition date : 7-OCT-2005 10:59:25
Sample ID : 19 Sample quantity : 1.0585 gram
Sample type : UU Sample geometry :
Detector name : 023 Detector geometry:
Elapsed live time: 0 02:50:06.00 Elapsed real time: 0 02:50:06.00 0.0%
Energy tolerance : 100.00 keV Half life ratio : 8.00
Errors propagated: Yes Systematic Error : 3.00 %
Efficiency type : Average value Efficiencies at : Peak Energy
Abundance limit : 75.00

Post-NID Peak Search Report

| It | Energy | Area | FWHM | Channel | Left | Pw | %Err | Fit | Nuclides | Activity pCi/gram |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 4178.35* | 75 | 51.64 | 227.08 | 169 | 89 | 23.2 | | U-238 | 0.954 |
| 0 | 4340.90* | 4 | 53.44 | 280.00 | 267 | 42 | 104.8 | | U-235 | 6.060E-02 |
| 0 | 4472.71* | 6 | 0.00 | 323.17 | 311 | 29 | 84.2 | | U-236 | 8.283E-02 |
| 0 | 4755.53* | 64 | 81.52 | 416.57 | 365 | 81 | 25.2 | | U-234 | 0.823 |
| 0 | 5289.77* | 391 | 93.41 | 596.03 | 549 | 75 | 10.1 | | U232 | 5.02 |

# SECTION IX

# ANALYTICAL DATA (ISOTOPIC THORIUM)

| Work Order | 05-09118 |
|---|---|
| Analysis Code | ThISO |
| Run | 1 |
| Date Received | 9/30/2005 |
| Lab Deadline | 10/20/2005 |
| Client | Missouri Dept. of Natural Resources |
| Project | B3Z02092 |
| Report Level | 4 |
| Activity Units | pCi |
| Aliquot Units | g |
| Matrix | SO |
| Method | EML Th-01 Modified |
| Instrument Type | Alpha Spectroscopy |
| Radiometric Tracer | Th-229 |
| Radiometric Sol# | Th-18a |
| Tracer Act (dpm/g) | 22.482 |
| Carrier | |
| Carrier Conc (mg/ml) | |
| | |
| | |
| | |

| Internal Fraction | Sample Desc | Client ID | Login CPM | Sample Date | Sample Aliquot |
|---|---|---|---|---|---|
| 01 | LCS | LCS | | 09/30/05 00:00 | 1.0000E+00 |
| 02 | MBL | BLANK | | 09/30/05 00:00 | 1.0000E+00 |
| 03 | DUP | VPBR092705SL17 | 37 | 09/27/05 11:49 | 1.0255E+00 |
| 04 | DO | VPBR092705SL17 | 37 | 09/27/05 11:49 | 9.9810E-01 |
| 05 | TRG | VPBR092705SL18 | 35 | 09/27/05 11:52 | 1.0413E+00 |
| 06 | TRG | VPBR092705SL19 | 44 | 09/27/05 11:58 | 1.0580E+00 |
| 07 | TRG | VPBR092705SL20 | 43 | 09/27/05 12:03 | 1.0597E+00 |
| 08 | TRG | VPTR092805SL0A | 63 | 09/28/05 07:40 | 1.0839E+00 |
| 09 | TRG | VPTR092805SL0B | 53 | 09/28/05 07:46 | 1.0455E+00 |
| 10 | TRG | VPTR092805SL0C | 44 | 09/28/05 07:53 | 1.0807E+00 |
| 11 | TRG | VPTR092805SL0D | 41 | 09/28/05 07:58 | 1.1215E+00 |
| 12 | TRG | VPTR092805SL0E | 45 | 09/28/05 08:03 | 1.0285E+00 |
| 13 | TRG | VPTR092805SL0F | 33 | 09/28/05 08:08 | 1.1179E+00 |
| 14 | TRG | VPTR092805SL0G | 36 | 09/28/05 08:20 | 1.0293E+00 |
| 15 | TRG | VPTR092805SL0H | 42 | 09/28/05 08:25 | 1.0480E+00 |
| 16 | TRG | VPTR092805SL0I | 45 | 09/28/05 08:36 | 1.1179E+00 |
| 17 | TRG | VPTR092805SL0J | 36 | 09/28/05 08:49 | 1.0188E+00 |
| 18 | TRG | VPTR092805SL0K | 43 | 09/28/05 08:58 | 1.0340E+00 |
| 19 | TRG | VPTR092805SL0L | 44 | 09/28/05 09:00 | 1.0329E+00 |
| | | | | | |

* SAF1 is used for Gross Alpha and all other radionuclides. SAF2 is used for Gross Beta only. ** Actual mass exceeded the calibration curve range. Results should be qualified as appropriate.

| Internal Fraction | Sample Desc | Tracer Aliquot (g) | Tracer Total ACT (dpm) | Radiometric Tracer (pCi) | Radiometric % Rec | Grav Carrier Added (ml) | Grav Filter Tare (g) | Grav Filter Final (g) | Grav Filter Net (g) | Grav % Rec | Mean % Rec | SAF 1* | SAF 2* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 01 | LCS | 0.4648 | 10.4 | | | | | | | | | | |
| 02 | MBL | 0.4590 | 10.3 | | | | | | | | | | |
| 03 | DUP | 0.4549 | 10.2 | | | | | | | | | | |
| 04 | DO | 0.4530 | 10.2 | | | | | | | | | | |
| 05 | TRG | 0.4554 | 10.2 | | | | | | | | | | |
| 06 | TRG | 0.4536 | 10.2 | | | | | | | | | | |
| 07 | TRG | 0.4548 | 10.2 | | | | | | | | | | |
| 08 | TRG | 0.4529 | 10.2 | | | | | | | | | | |
| 09 | TRG | 0.4534 | 10.2 | | | | | | | | | | |
| 10 | TRG | 0.4527 | 10.2 | | | | | | | | | | |
| 11 | TRG | 0.4516 | 10.2 | | | | | | | | | | |
| 12 | TRG | 0.4534 | 10.2 | | | | | | | | | | |
| 13 | TRG | 0.4530 | 10.2 | | | | | | | | | | |
| 14 | TRG | 0.4533 | 10.2 | | | | | | | | | | |
| 15 | TRG | 0.4530 | 10.2 | | | | | | | | | | |
| 16 | TRG | 0.4502 | 10.1 | | | | | | | | | | |
| 17 | TRG | 0.4542 | 10.2 | | | | | | | | | | |
| 18 | TRG | 0.4516 | 10.2 | | | | | | | | | | |
| 19 | TRG | 0.4507 | 10.1 | | | | | | | | | | |
| | | | | | | | | | | | | | |

* SAF1 is used for Gross Alpha and all other radionuclides. SAF2 is used for Gross Beta only. ** Actual mass exceeded the calibration curve range. Results should be qualified as appropriate.

| Internal Fraction | Sample Desc | Rough Prep Date | Rough Prep By | Prep Date | Prep By | Sep t0 Date/Time | Sep t0 By | Sep t1 Date/Time | Sep t1 By |
|---|---|---|---|---|---|---|---|---|---|
| 01 | LCS | | | 10/05/05 09:47 | JBARNARD | 10/11/05 05:42 | TSMITH | | |
| 02 | MBL | | | 10/05/05 09:47 | JBARNARD | 10/11/05 05:42 | TSMITH | | |
| 03 | DUP | | | 10/05/05 09:47 | JBARNARD | 10/11/05 05:42 | TSMITH | | |
| 04 | DO | 10/03/05 12:31 | KSALLINGS | 10/05/05 09:47 | JBARNARD | 10/11/05 05:42 | TSMITH | | |
| 05 | TRG | 10/03/05 12:31 | KSALLINGS | 10/05/05 09:47 | JBARNARD | 10/11/05 05:42 | TSMITH | | |
| 06 | TRG | 10/03/05 12:31 | KSALLINGS | 10/05/05 09:47 | JBARNARD | 10/11/05 05:42 | TSMITH | | |
| 07 | TRG | 10/03/05 12:31 | KSALLINGS | 10/05/05 09:47 | JBARNARD | 10/11/05 05:42 | TSMITH | | |
| 08 | TRG | 10/03/05 12:31 | KSALLINGS | 10/05/05 09:47 | JBARNARD | 10/11/05 05:42 | TSMITH | | |
| 09 | TRG | 10/03/05 12:31 | KSALLINGS | 10/05/05 09:47 | JBARNARD | 10/11/05 05:42 | TSMITH | | |
| 10 | TRG | 10/03/05 12:31 | KSALLINGS | 10/05/05 09:47 | JBARNARD | 10/11/05 05:42 | TSMITH | | |
| 11 | TRG | 10/03/05 12:31 | KSALLINGS | 10/05/05 09:47 | JBARNARD | 10/11/05 05:42 | TSMITH | | |
| 12 | TRG | 10/03/05 12:31 | KSALLINGS | 10/05/05 09:47 | JBARNARD | 10/11/05 05:42 | TSMITH | | |
| 13 | TRG | 10/03/05 12:31 | KSALLINGS | 10/05/05 09:47 | JBARNARD | 10/11/05 05:42 | TSMITH | | |
| 14 | TRG | 10/03/05 12:31 | KSALLINGS | 10/05/05 09:47 | JBARNARD | 10/11/05 05:42 | TSMITH | | |
| 15 | TRG | 10/03/05 12:31 | KSALLINGS | 10/05/05 09:47 | JBARNARD | 10/11/05 05:42 | TSMITH | | |
| 16 | TRG | 10/03/05 12:31 | KSALLINGS | 10/05/05 09:47 | JBARNARD | 10/11/05 05:42 | TSMITH | | |
| 17 | TRG | 10/03/05 12:31 | KSALLINGS | 10/05/05 09:47 | JBARNARD | 10/11/05 05:42 | TSMITH | | |
| 18 | TRG | 10/03/05 12:31 | KSALLINGS | 10/05/05 09:47 | JBARNARD | 10/11/05 05:42 | TSMITH | | |
| 19 | TRG | 10/03/05 12:31 | KSALLINGS | 10/05/05 09:47 | JBARNARD | 10/11/05 05:42 | TSMITH | | |
| | | | | | | | | | |

* SAF1 is used for Gross Alpha and all other radionuclides. SAF2 is used for Gross Beta only. ** Actual mass exceeded the calibration curve range. Results should be qualified as appropriate.

Preliminary Data Report & Analytical Calculations

# Work Order: 05-09118-ThISO-1



| Client | Eberline Services Work Order | Analysis Code | Run |
|---|---|---|---|
| Missouri Dept. of Natural Resources | 05-09118 | ThISO | 1 |

| Lab Fraction | Nuclide | Sample Desc | Client Identification | Activity Units | Results | Error Estimate | MDA | LCS Known | LCS %R | LCS Flag | RPD Flag | MDA Flag | Blank Flag |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 01 | TH-228 | LCS | LCS | pCi/g | 4.41E+00 | 8.31E-01 | 8.75E-02 | 4.75E+00 | 92.76 | OK | | OK | |
| 02 | TH-228 | MBL | BLANK | pCi/g | 3.74E-02 | 5.31E-02 | 9.04E-02 | | | | | OK | OK |
| 03 | TH-228 | DUP | VPBR092705SL17 | pCi/g | 1.09E+00 | 2.90E-01 | 8.55E-02 | | | | OK | OK | |
| 04 | TH-228 | DO | VPBR092705SL17 | pCi/g | 1.04E+00 | 2.83E-01 | 9.83E-02 | | | | | OK | |
| 05 | TH-228 | TRG | VPBR092705SL18 | pCi/g | 1.32E+00 | 3.44E-01 | 9.53E-02 | | | | | OK | |
| 06 | TH-228 | TRG | VPBR092705SL19 | pCi/g | 8.06E-01 | 2.39E-01 | 8.09E-02 | | | | | OK | |
| 07 | TH-228 | TRG | VPBR092705SL20 | pCi/g | 1.07E+00 | 3.04E-01 | 8.54E-02 | | | | | OK | |
| 08 | TH-228 | TRG | VPTR092805SL0A | pCi/g | 9.63E-01 | 2.74E-01 | 1.00E-01 | | | | | OK | |
| 09 | TH-228 | TRG | VPTR092805SL0B | pCi/g | 1.22E+00 | 3.08E-01 | 7.14E-02 | | | | | OK | |
| 10 | TH-228 | TRG | VPTR092805SL0C | pCi/g | 5.69E-01 | 1.81E-01 | 5.02E-02 | | | | | OK | |
| 11 | TH-228 | TRG | VPTR092805SL0D | pCi/g | 7.80E-01 | 2.32E-01 | 6.56E-02 | | | | | OK | |
| 12 | TH-228 | TRG | VPTR092805SL0E | pCi/g | 8.43E-01 | 2.67E-01 | 1.16E-01 | | | | | OK | |
| 13 | TH-228 | TRG | VPTR092805SL0F | pCi/g | 8.69E-01 | 2.62E-01 | 1.27E-01 | | | | | OK | |
| 14 | TH-228 | TRG | VPTR092805SL0G | pCi/g | 8.64E-01 | 2.53E-01 | 7.74E-02 | | | | | OK | |
| 15 | TH-228 | TRG | VPTR092805SL0H | pCi/g | 1.07E+00 | 2.95E-01 | 7.93E-02 | | | | | OK | |
| 16 | TH-228 | TRG | VPTR092805SL0I | pCi/g | 1.15E+00 | 3.24E-01 | 3.98E-02 | | | | | OK | |
| 17 | TH-228 | TRG | VPTR092805SL0J | pCi/g | 1.10E+00 | 3.11E-01 | 8.75E-02 | | | | | OK | |
| 18 | TH-228 | TRG | VPTR092805SL0K | pCi/g | 8.65E-01 | 2.70E-01 | 8.95E-02 | | | | | OK | |
| 19 | TH-228 | TRG | VPTR092805SL0L | pCi/g | 8.07E-01 | 2.51E-01 | 1.07E-01 | | | | | OK | |
| | | | | | | | | | | | | | |

| Run | Analysis Code | Eberline Services Work Order | Client |
|---|---|---|---|
| 1 | ThISO | 05-09118 | Missouri Dept. of Natural Resources |

| Lab Fraction | Nuclide | Sample Desc | Sample Date | Sample Aliquot | Radiometric % Rec | Grav % Rec | Mean % Rec | SAF | Sep t0 Date/Time | Sep t1 Date/Time |
|---|---|---|---|---|---|---|---|---|---|---|
| 01 | TH-228 | LCS | 09/30/05 00:00 | 1.00E+00 | 98.97 | | | | 10/11/2005 5:42 | |
| 02 | TH-228 | MBL | 09/30/05 00:00 | 1.00E+00 | 87.84 | | | | 10/11/2005 5:42 | |
| 03 | TH-228 | DUP | 09/27/05 11:49 | 1.03E+00 | 104.03 | | | | 10/11/2005 5:42 | |
| 04 | TH-228 | DO | 09/27/05 11:49 | 9.98E-01 | 99.18 | | | | 10/11/2005 5:42 | |
| 05 | TH-228 | TRG | 09/27/05 11:52 | 1.04E+00 | 89.55 | | | | 10/11/2005 5:42 | |
| 06 | TH-228 | TRG | 09/27/05 11:58 | 1.06E+00 | 98.65 | | | | 10/11/2005 5:42 | |
| 07 | TH-228 | TRG | 09/27/05 12:03 | 1.06E+00 | 96.07 | | | | 10/11/2005 5:42 | |
| 08 | TH-228 | TRG | 09/28/05 07:40 | 1.08E+00 | 92.49 | | | | 10/11/2005 5:42 | |
| 09 | TH-228 | TRG | 09/28/05 07:46 | 1.05E+00 | 101.80 | | | | 10/11/2005 5:42 | |
| 10 | TH-228 | TRG | 09/28/05 07:53 | 1.08E+00 | 103.86 | | | | 10/11/2005 5:42 | |
| 11 | TH-228 | TRG | 09/28/05 07:58 | 1.12E+00 | 92.65 | | | | 10/11/2005 5:42 | |
| 12 | TH-228 | TRG | 09/28/05 08:03 | 1.03E+00 | 80.73 | | | | 10/11/2005 5:42 | |
| 13 | TH-228 | TRG | 09/28/05 08:08 | 1.12E+00 | 85.88 | | | | 10/11/2005 5:42 | |
| 14 | TH-228 | TRG | 09/28/05 08:20 | 1.03E+00 | 95.18 | | | | 10/11/2005 5:42 | |
| 15 | TH-228 | TRG | 09/28/05 08:25 | 1.05E+00 | 94.07 | | | | 10/11/2005 5:42 | |
| 16 | TH-228 | TRG | 09/28/05 08:36 | 1.12E+00 | 78.79 | | | | 10/11/2005 5:42 | |
| 17 | TH-228 | TRG | 09/28/05 08:49 | 1.02E+00 | 85.33 | | | | 10/11/2005 5:42 | |
| 18 | TH-228 | TRG | 09/28/05 08:58 | 1.03E+00 | 81.72 | | | | 10/11/2005 5:42 | |
| 19 | TH-228 | TRG | 09/28/05 09:00 | 1.03E+00 | 92.31 | | | | 10/11/2005 5:42 | |
| | | | | | | | | | | |

| Run | Analysis Code | Eberline Services Work Order | Client |
|---|---|---|---|
| 1 | ThISO | 05-09118 | Missouri Dept. of Natural Resources |

| Lab Fraction | Nuclide | Sample Desc | Counting Date/Time | Halflife (days) | Detect | Carrier | Count Time | Counts | Bkg CPM | Eff |
|---|---|---|---|---|---|---|---|---|---|---|
| 01 | TH-228 | LCS | 10/11/05 07:30 | | A_Spec | 1 | 170.1 | 3.52 E+02 | 5.00 E-03 | 21.4 |
| 02 | TH-228 | MBL | 10/11/05 07:30 | | A_Spec | 2 | 170.05 | 2.49 E+00 | 3.00 E-03 | 20.1 |
| 03 | TH-228 | DUP | 10/11/05 07:31 | | A_Spec | 3 | 170.05 | 8.82 E+01 | 5.00 E-03 | 20.3 |
| 04 | TH-228 | DO | 10/11/05 07:31 | | A_Spec | 5 | 170.07 | 8.08 E+01 | 7.00 E-03 | 21.2 |
| 05 | TH-228 | TRG | 10/11/05 07:31 | | A_Spec | 6 | 170.05 | 9.52 E+01 | 5.00 E-03 | 20.9 |
| 06 | TH-228 | TRG | 10/11/05 07:32 | | A_Spec | 7 | 170.07 | 6.43 E+01 | 4.00 E-03 | 20.6 |
| 07 | TH-228 | TRG | 10/11/05 07:32 | | A_Spec | 8 | 170.05 | 7.45 E+01 | 3.00 E-03 | 18.4 |
| 08 | TH-228 | TRG | 10/11/05 07:32 | | A_Spec | 9 | 170.08 | 7.38 E+01 | 7.00 E-03 | 20.5 |
| 09 | TH-228 | TRG | 10/11/05 07:33 | | A_Spec | 10 | 170.02 | 1.02 E+02 | 3.00 E-03 | 21.1 |
| 10 | TH-228 | TRG | 10/11/05 07:33 | | A_Spec | 11 | 170.1 | 5.18 E+01 | 1.00 E-03 | 21.8 |
| 11 | TH-228 | TRG | 10/11/05 07:33 | | A_Spec | 12 | 170.07 | 6.37 E+01 | 2.00 E-03 | 21.1 |
| 12 | TH-228 | TRG | 10/11/05 07:34 | | A_Spec | 13 | 170.03 | 5.58 E+01 | 7.00 E-03 | 21.4 |
| 13 | TH-228 | TRG | 10/11/05 07:34 | | A_Spec | 14 | 170.02 | 6.48 E+01 | 1.30 E-02 | 20.9 |
| 14 | TH-228 | TRG | 10/11/05 07:34 | | A_Spec | 15 | 170.13 | 6.65 E+01 | 3.00 E-03 | 21.1 |
| 15 | TH-228 | TRG | 10/11/05 07:34 | | A_Spec | 16 | 170.08 | 8.05 E+01 | 3.00 E-03 | 20.4 |
| 16 | TH-228 | TRG | 10/11/05 07:35 | | A_Spec | 45 | 170 | 7.70 E+01 | 0.00 E+00 | 20.5 |
| 17 | TH-228 | TRG | 10/11/05 07:35 | | A_Spec | 46 | 170 | 7.45 E+01 | 3.00 E-03 | 21 |
| 18 | TH-228 | TRG | 10/11/05 07:35 | | A_Spec | 47 | 170 | 5.75 E+01 | 3.00 E-03 | 21.1 |
| 19 | TH-228 | TRG | 10/11/05 07:36 | | A_Spec | 48 | 170 | 5.78 E+01 | 7.00 E-03 | 20.2 |
| | | | | | | | | | | |

**Preliminary Data Report & Analytical Calculations**

# Work Order: 05-09118-ThISO-1



| Client | Missouri Dept. of Natural Resources |
|---|---|
| Eberline Services Work Order | 05-09118 |
| Analysis Code | ThISO |
| Run | 1 |

| Lab Fraction | Nuclide | Sample Desc | Client Identification | Activity Units | Results | Error Estimate | MDA | LCS Known | LCS %R | LCS Flag | RPD Flag | MDA Flag | Blank Flag |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 01 | TH-230 | LCS | LCS | pCi/g | 5.18E+00 | 9.54E-01 | 9.27E-02 | 5.33E+00 | 97.29 | OK | | OK | |
| 02 | TH-230 | MBL | BLANK | pCi/g | 2.63E-01 | 1.35E-01 | 9.06E-02 | | | | | OK | OK |
| 03 | TH-230 | DUP | VPBR092705SL17 | pCi/g | 1.95E+00 | 4.34E-01 | 8.56E-02 | | | | OK | OK | |
| 04 | TH-230 | DO | VPBR092705SL17 | pCi/g | 1.82E+00 | 4.18E-01 | 8.85E-02 | | | | | OK | |
| 05 | TH-230 | TRG | VPBR092705SL18 | pCi/g | 1.37E+00 | 3.52E-01 | 9.54E-02 | | | | | OK | |
| 06 | TH-230 | TRG | VPBR092705SL19 | pCi/g | 2.43E+00 | 5.18E-01 | 6.71E-02 | | | | | OK | |
| 07 | TH-230 | TRG | VPBR092705SL20 | pCi/g | 1.68E+00 | 4.14E-01 | 7.69E-02 | | | | | OK | |
| 08 | TH-230 | TRG | VPTR092805SL0A | pCi/g | 1.78E+00 | 4.16E-01 | 5.96E-02 | | | | | OK | |
| 09 | TH-230 | TRG | VPTR092805SL0B | pCi/g | 2.39E+00 | 5.03E-01 | 9.22E-02 | | | | | OK | |
| 10 | TH-230 | TRG | VPTR092805SL0C | pCi/g | 1.34E+00 | 3.17E-01 | 2.94E-02 | | | | | OK | |
| 11 | TH-230 | TRG | VPTR092805SL0D | pCi/g | 2.21E+00 | 4.82E-01 | 5.61E-02 | | | | | OK | |
| 12 | TH-230 | TRG | VPTR092805SL0E | pCi/g | 2.31E+00 | 5.30E-01 | 9.00E-02 | | | | | OK | |
| 13 | TH-230 | TRG | VPTR092805SL0F | pCi/g | 1.60E+00 | 3.91E-01 | 7.99E-02 | | | | | OK | |
| 14 | TH-230 | TRG | VPTR092805SL0G | pCi/g | 1.53E+00 | 3.73E-01 | 1.13E-01 | | | | | OK | |
| 15 | TH-230 | TRG | VPTR092805SL0H | pCi/g | 1.35E+00 | 3.44E-01 | 7.94E-02 | | | | | OK | |
| 16 | TH-230 | TRG | VPTR092805SL0I | pCi/g | 1.65E+00 | 4.16E-01 | 3.98E-02 | | | | | OK | |
| 17 | TH-230 | TRG | VPTR092805SL0J | pCi/g | 1.51E+00 | 3.84E-01 | 7.88E-02 | | | | | OK | |
| 18 | TH-230 | TRG | VPTR092805SL0K | pCi/g | 1.85E+00 | 4.51E-01 | 8.96E-02 | | | | | OK | |
| 19 | TH-230 | TRG | VPTR092805SL0L | pCi/g | 1.40E+00 | 3.59E-01 | 7.48E-02 | | | | | OK | |
| | | | | | | | | | | | | | |

| Run | Analysis Code | Eberline Services Work Order | Client |
|---|---|---|---|
| 1 | ThISO | 05-09118 | Missouri Dept. of Natural Resources |

| Lab Fraction | Nuclide | Sample Desc | Sample Date | Sample Aliquot | Radiometric % Rec | Grav % Rec | Mean % Rec | SAF | Sep t0 Date/Time | Sep t1 Date/Time |
|---|---|---|---|---|---|---|---|---|---|---|
| 01 | TH-230 | LCS | 09/30/05 00:00 | 1.00E+00 | 98.97 | | | | 10/11/2005 5:42 | |
| 02 | TH-230 | MBL | 09/30/05 00:00 | 1.00E+00 | 87.84 | | | | 10/11/2005 5:42 | |
| 03 | TH-230 | DUP | 09/27/05 11:49 | 1.03E+00 | 104.03 | | | | 10/11/2005 5:42 | |
| 04 | TH-230 | DO | 09/27/05 11:49 | 9.98E-01 | 99.18 | | | | 10/11/2005 5:42 | |
| 05 | TH-230 | TRG | 09/27/05 11:52 | 1.04E+00 | 89.55 | | | | 10/11/2005 5:42 | |
| 06 | TH-230 | TRG | 09/27/05 11:58 | 1.06E+00 | 98.65 | | | | 10/11/2005 5:42 | |
| 07 | TH-230 | TRG | 09/27/05 12:03 | 1.06E+00 | 96.07 | | | | 10/11/2005 5:42 | |
| 08 | TH-230 | TRG | 09/28/05 07:40 | 1.08E+00 | 92.49 | | | | 10/11/2005 5:42 | |
| 09 | TH-230 | TRG | 09/28/05 07:46 | 1.05E+00 | 101.80 | | | | 10/11/2005 5:42 | |
| 10 | TH-230 | TRG | 09/28/05 07:53 | 1.08E+00 | 103.86 | | | | 10/11/2005 5:42 | |
| 11 | TH-230 | TRG | 09/28/05 07:58 | 1.12E+00 | 92.65 | | | | 10/11/2005 5:42 | |
| 12 | TH-230 | TRG | 09/28/05 08:03 | 1.03E+00 | 80.73 | | | | 10/11/2005 5:42 | |
| 13 | TH-230 | TRG | 09/28/05 08:08 | 1.12E+00 | 85.88 | | | | 10/11/2005 5:42 | |
| 14 | TH-230 | TRG | 09/28/05 08:20 | 1.03E+00 | 95.18 | | | | 10/11/2005 5:42 | |
| 15 | TH-230 | TRG | 09/28/05 08:25 | 1.05E+00 | 94.07 | | | | 10/11/2005 5:42 | |
| 16 | TH-230 | TRG | 09/28/05 08:36 | 1.12E+00 | 78.79 | | | | 10/11/2005 5:42 | |
| 17 | TH-230 | TRG | 09/28/05 08:49 | 1.02E+00 | 85.33 | | | | 10/11/2005 5:42 | |
| 18 | TH-230 | TRG | 09/28/05 08:58 | 1.03E+00 | 81.72 | | | | 10/11/2005 5:42 | |
| 19 | TH-230 | TRG | 09/28/05 09:00 | 1.03E+00 | 92.31 | | | | 10/11/2005 5:42 | |
| | | | | | | | | | | |

| Client | Eberline Services Work Order | Analysis Code | Run |
|---|---|---|---|
| Missouri Dept. of Natural Resources | 05-09118 | ThISO | 1 |

| Lab Fraction | Nuclide | Sample Desc | Counting Date/Time | Halflife (days) | Detect | Carrier | Count Time | Counts | Bkg CPM | Eff |
|---|---|---|---|---|---|---|---|---|---|---|
| 01 | TH-230 | LCS | 10/11/05 07:30 | | A_Spec | 1 | 170.1 | 4.14 E+02 | 6.00 E-03 | 21.4 |
| 02 | TH-230 | MBL | 10/11/05 07:30 | | A_Spec | 2 | 170.05 | 1.75 E+01 | 3.00 E-03 | 20.1 |
| 03 | TH-230 | DUP | 10/11/05 07:31 | | A_Spec | 3 | 170.05 | 1.59 E+02 | 5.00 E-03 | 20.3 |
| 04 | TH-230 | DO | 10/11/05 07:31 | | A_Spec | 5 | 170.07 | 1.44 E+02 | 5.00 E-03 | 21.2 |
| 05 | TH-230 | TRG | 10/11/05 07:31 | | A_Spec | 6 | 170.05 | 1.00 E+02 | 5.00 E-03 | 20.9 |
| 06 | TH-230 | TRG | 10/11/05 07:32 | | A_Spec | 7 | 170.07 | 1.97 E+02 | 2.00 E-03 | 20.6 |
| 07 | TH-230 | TRG | 10/11/05 07:32 | | A_Spec | 8 | 170.05 | 1.19 E+02 | 2.00 E-03 | 18.4 |
| 08 | TH-230 | TRG | 10/11/05 07:32 | | A_Spec | 9 | 170.08 | 1.38 E+02 | 1.00 E-03 | 20.5 |
| 09 | TH-230 | TRG | 10/11/05 07:33 | | A_Spec | 10 | 170.02 | 2.02 E+02 | 7.00 E-03 | 21.1 |
| 10 | TH-230 | TRG | 10/11/05 07:33 | | A_Spec | 11 | 170.1 | 1.23 E+02 | 0.00 E+00 | 21.8 |
| 11 | TH-230 | TRG | 10/11/05 07:33 | | A_Spec | 12 | 170.07 | 1.83 E+02 | 1.00 E-03 | 21.1 |
| 12 | TH-230 | TRG | 10/11/05 07:34 | | A_Spec | 13 | 170.03 | 1.55 E+02 | 3.00 E-03 | 21.4 |
| 13 | TH-230 | TRG | 10/11/05 07:34 | | A_Spec | 14 | 170.02 | 1.21 E+02 | 3.00 E-03 | 20.9 |
| 14 | TH-230 | TRG | 10/11/05 07:34 | | A_Spec | 15 | 170.13 | 1.19 E+02 | 1.00 E-02 | 21.1 |
| 15 | TH-230 | TRG | 10/11/05 07:34 | | A_Spec | 16 | 170.08 | 1.03 E+02 | 3.00 E-03 | 20.4 |
| 16 | TH-230 | TRG | 10/11/05 07:35 | | A_Spec | 45 | 170 | 1.12 E+02 | 0.00 E+00 | 20.5 |
| 17 | TH-230 | TRG | 10/11/05 07:35 | | A_Spec | 46 | 170 | 1.04 E+02 | 2.00 E-03 | 21 |
| 18 | TH-230 | TRG | 10/11/05 07:35 | | A_Spec | 47 | 170 | 1.25 E+02 | 3.00 E-03 | 21.1 |
| 19 | TH-230 | TRG | 10/11/05 07:36 | | A_Spec | 48 | 170 | 1.02 E+02 | 2.00 E-03 | 20.2 |
| | | | | | | | | | | |

# Preliminary Data Report & Analytical Calculations
# Work Order: 05-09118-ThISO-1



Client: Missouri Dept. of Natural Resources
Eberline Services Work Order: 05-09118
Analysis Code: ThISO
Run: 1

| Lab Fraction | Nuclide | Sample Desc | Client Identification | Activity Units | Results | Error Estimate | MDA | LCS Known | LCS %R | LCS Flag | RPD Flag | MDA Flag | Blank Flag |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 01 | TH-232 | LCS | LCS | pCi/g | 4.21E+00 | 8.00E-01 | 6.78E-02 | 4.75E+00 | 88.59 | OK | | OK | |
| 02 | TH-232 | MBL | BLANK | pCi/g | 1.02E-01 | 8.12E-02 | 6.94E-02 | | | | | OK | OK |
| 03 | TH-232 | DUP | VPBR092705SL17 | pCi/g | 1.19E+00 | 3.06E-01 | 5.65E-02 | | | | OK | OK | |
| 04 | TH-232 | DO | VPBR092705SL17 | pCi/g | 1.06E+00 | 2.86E-01 | 9.82E-02 | | | | | OK | |
| 05 | TH-232 | TRG | VPBR092705SL18 | pCi/g | 1.28E+00 | 3.35E-01 | 6.30E-02 | | | | | OK | |
| 06 | TH-232 | TRG | VPBR092705SL19 | pCi/g | 6.07E-01 | 1.99E-01 | 8.64E-02 | | | | | OK | |
| 07 | TH-232 | TRG | VPBR092705SL20 | pCi/g | 1.34E+00 | 3.53E-01 | 3.84E-02 | | | | | OK | |
| 08 | TH-232 | TRG | VPTR092805SL0A | pCi/g | 1.22E+00 | 3.18E-01 | 7.76E-02 | | | | | OK | |
| 09 | TH-232 | TRG | VPTR092805SL0B | pCi/g | 1.10E+00 | 2.85E-01 | 6.41E-02 | | | | | OK | |
| 10 | TH-232 | TRG | VPTR092805SL0C | pCi/g | 5.09E-01 | 1.68E-01 | 2.94E-02 | | | | | OK | |
| 11 | TH-232 | TRG | VPTR092805SL0D | pCi/g | 9.65E-01 | 2.66E-01 | 5.60E-02 | | | | | OK | |
| 12 | TH-232 | TRG | VPTR092805SL0E | pCi/g | 8.49E-01 | 2.65E-01 | 4.04E-02 | | | | | OK | |
| 13 | TH-232 | TRG | VPTR092805SL0F | pCi/g | 9.61E-01 | 2.75E-01 | 7.17E-02 | | | | | OK | |
| 14 | TH-232 | TRG | VPTR092805SL0G | pCi/g | 9.59E-01 | 2.71E-01 | 9.98E-02 | | | | | OK | |
| 15 | TH-232 | TRG | VPTR092805SL0H | pCi/g | 1.11E+00 | 3.01E-01 | 7.13E-02 | | | | | OK | |
| 16 | TH-232 | TRG | VPTR092805SL0I | pCi/g | 1.15E+00 | 3.25E-01 | 7.95E-02 | | | | | OK | |
| 17 | TH-232 | TRG | VPTR092805SL0J | pCi/g | 1.19E+00 | 3.28E-01 | 1.02E-01 | | | | | OK | |
| 18 | TH-232 | TRG | VPTR092805SL0K | pCi/g | 9.64E-01 | 2.89E-01 | 1.10E-01 | | | | | OK | |
| 19 | TH-232 | TRG | VPTR092805SL0L | pCi/g | 1.06E+00 | 2.98E-01 | 9.01E-02 | | | | | OK | |
| | | | | | | | | | | | | | |

2812

| Run | Analysis Code | Eberline Services Work Order | Client |
|---|---|---|---|
| 1 | ThISO | 05-09118 | Missouri Dept. of Natural Resources |

| Lab Fraction | Nuclide | Sample Desc | Sample Date | Sample Aliquot | Radiometric % Rec | Grav % Rec | Mean % Rec | SAF | Sep t0 Date/Time | Sep t1 Date/Time |
|---|---|---|---|---|---|---|---|---|---|---|
| 01 | TH-232 | LCS | 09/30/05 00:00 | 1.00E+00 | 98.97 | | | | 10/11/2005 5:42 | |
| 02 | TH-232 | MBL | 09/30/05 00:00 | 1.00E+00 | 87.84 | | | | 10/11/2005 5:42 | |
| 03 | TH-232 | DUP | 09/27/05 11:49 | 1.03E+00 | 104.03 | | | | 10/11/2005 5:42 | |
| 04 | TH-232 | DO | 09/27/05 11:49 | 9.98E-01 | 99.18 | | | | 10/11/2005 5:42 | |
| 05 | TH-232 | TRG | 09/27/05 11:52 | 1.04E+00 | 89.55 | | | | 10/11/2005 5:42 | |
| 06 | TH-232 | TRG | 09/27/05 11:58 | 1.06E+00 | 98.65 | | | | 10/11/2005 5:42 | |
| 07 | TH-232 | TRG | 09/27/05 12:03 | 1.06E+00 | 96.07 | | | | 10/11/2005 5:42 | |
| 08 | TH-232 | TRG | 09/28/05 07:40 | 1.08E+00 | 92.49 | | | | 10/11/2005 5:42 | |
| 09 | TH-232 | TRG | 09/28/05 07:46 | 1.05E+00 | 101.80 | | | | 10/11/2005 5:42 | |
| 10 | TH-232 | TRG | 09/28/05 07:53 | 1.08E+00 | 103.86 | | | | 10/11/2005 5:42 | |
| 11 | TH-232 | TRG | 09/28/05 07:58 | 1.12E+00 | 92.65 | | | | 10/11/2005 5:42 | |
| 12 | TH-232 | TRG | 09/28/05 08:03 | 1.03E+00 | 80.73 | | | | 10/11/2005 5:42 | |
| 13 | TH-232 | TRG | 09/28/05 08:08 | 1.12E+00 | 85.88 | | | | 10/11/2005 5:42 | |
| 14 | TH-232 | TRG | 09/28/05 08:20 | 1.03E+00 | 95.18 | | | | 10/11/2005 5:42 | |
| 15 | TH-232 | TRG | 09/28/05 08:25 | 1.05E+00 | 94.07 | | | | 10/11/2005 5:42 | |
| 16 | TH-232 | TRG | 09/28/05 08:36 | 1.12E+00 | 78.79 | | | | 10/11/2005 5:42 | |
| 17 | TH-232 | TRG | 09/28/05 08:49 | 1.02E+00 | 85.33 | | | | 10/11/2005 5:42 | |
| 18 | TH-232 | TRG | 09/28/05 08:58 | 1.03E+00 | 81.72 | | | | 10/11/2005 5:42 | |
| 19 | TH-232 | TRG | 09/28/05 09:00 | 1.03E+00 | 92.31 | | | | 10/11/2005 5:42 | |
| | | | | | | | | | | |

| Client | Eberline Services Work Order | Analysis Code | Run |
|---|---|---|---|
| Missouri Dept. of Natural Resources | 05-09118 | ThISO | 1 |

| Lab Fraction | Nuclide | Sample Desc | Counting Date/Time | Halflife (days) | Detect | Carrier | Count Time | Counts | Bkg CPM | Eff |
|---|---|---|---|---|---|---|---|---|---|---|
| 01 | TH-232 | LCS | 10/11/05 07:30 | | A_Spec | 1 | 170.1 | 3.37 E+02 | 2.00 E-03 | 21.4 |
| 02 | TH-232 | MBL | 10/11/05 07:30 | | A_Spec | 2 | 170.05 | 6.83 E+00 | 1.00 E-03 | 20.1 |
| 03 | TH-232 | DUP | 10/11/05 07:31 | | A_Spec | 3 | 170.05 | 9.78 E+01 | 1.00 E-03 | 20.3 |
| 04 | TH-232 | DO | 10/11/05 07:31 | | A_Spec | 5 | 170.07 | 8.38 E+01 | 7.00 E-03 | 21.2 |
| 05 | TH-232 | TRG | 10/11/05 07:31 | | A_Spec | 6 | 170.05 | 9.38 E+01 | 1.00 E-03 | 20.9 |
| 06 | TH-232 | TRG | 10/11/05 07:32 | | A_Spec | 7 | 170.07 | 4.92 E+01 | 5.00 E-03 | 20.6 |
| 07 | TH-232 | TRG | 10/11/05 07:32 | | A_Spec | 8 | 170.05 | 9.50 E+01 | 0.00 E+00 | 18.4 |
| 08 | TH-232 | TRG | 10/11/05 07:32 | | A_Spec | 9 | 170.08 | 9.45 E+01 | 3.00 E-03 | 20.5 |
| 09 | TH-232 | TRG | 10/11/05 07:33 | | A_Spec | 10 | 170.02 | 9.27 E+01 | 2.00 E-03 | 21.1 |
| 10 | TH-232 | TRG | 10/11/05 07:33 | | A_Spec | 11 | 170.1 | 4.70 E+01 | 0.00 E+00 | 21.8 |
| 11 | TH-232 | TRG | 10/11/05 07:33 | | A_Spec | 12 | 170.07 | 7.98 E+01 | 1.00 E-03 | 21.1 |
| 12 | TH-232 | TRG | 10/11/05 07:34 | | A_Spec | 13 | 170.03 | 5.70 E+01 | 0.00 E+00 | 21.4 |
| 13 | TH-232 | TRG | 10/11/05 07:34 | | A_Spec | 14 | 170.02 | 7.27 E+01 | 2.00 E-03 | 20.9 |
| 14 | TH-232 | TRG | 10/11/05 07:34 | | A_Spec | 15 | 170.13 | 7.48 E+01 | 7.00 E-03 | 21.1 |
| 15 | TH-232 | TRG | 10/11/05 07:34 | | A_Spec | 16 | 170.08 | 8.47 E+01 | 2.00 E-03 | 20.4 |
| 16 | TH-232 | TRG | 10/11/05 07:35 | | A_Spec | 45 | 170 | 7.87 E+01 | 2.00 E-03 | 20.5 |
| 17 | TH-232 | TRG | 10/11/05 07:35 | | A_Spec | 46 | 170 | 8.22 E+01 | 5.00 E-03 | 21 |
| 18 | TH-232 | TRG | 10/11/05 07:35 | | A_Spec | 47 | 170 | 6.50 E+01 | 6.00 E-03 | 21.1 |
| 19 | TH-232 | TRG | 10/11/05 07:36 | | A_Spec | 48 | 170 | 7.73 E+01 | 4.00 E-03 | 20.2 |
| | | | | | | | | | | |

**Count Room Report**
**Client: Missouri Dept. of Natural**

**05-09118-ThISO-1 (pCi/g) in SO**
**Tracer ID: Th-18a**



1-16, 45-48

| Internal Fraction | Sample Desc | Client ID | Sample Date | Sample Aliquot | Tracer Aliquot (g) | Tracer ACT (dpm) | Radiometric Tracer (pCi) | Radiometric % Rec | SAF 1* | SAF 2* |
|---|---|---|---|---|---|---|---|---|---|---|
| 01 | LCS | LCS | 09/30/05 00:00 | 1.0000 | 0.4648 | 10.4496 | | | | |
| 02 | MBL | BLANK | 09/30/05 00:00 | 1.0000 | 0.4590 | 10.3192 | | | | |
| 03 | DUP | VPBR092705SL17 | 09/27/05 11:49 | 1.0255 | 0.4549 | 10.2271 | | | | |
| 04 | DO | VPBR092705SL17 | 09/27/05 11:49 | 0.9981 | 0.4530 | 10.1843 | | | | |
| 05 | TRG | VPBR092705SL18 | 09/27/05 11:52 | 1.0413 | 0.4554 | 10.2383 | | | | |
| 06 | TRG | VPBR092705SL19 | 09/27/05 11:58 | 1.0580 | 0.4536 | 10.1978 | | | | |
| 07 | TRG | VPBR092705SL20 | 09/27/05 12:03 | 1.0597 | 0.4548 | 10.2248 | | | | |
| 08 | TRG | VPTR092805SL0A | 09/28/05 07:40 | 1.0839 | 0.4529 | 10.1821 | | | | |
| 09 | TRG | VPTR092805SL0B | 09/28/05 07:46 | 1.0455 | 0.4534 | 10.1933 | | | | |
| 10 | TRG | VPTR092805SL0C | 09/28/05 07:53 | 1.0807 | 0.4527 | 10.1776 | | | | |
| 11 | TRG | VPTR092805SL0D | 09/28/05 07:58 | 1.1215 | 0.4516 | 10.1529 | | | | |
| 12 | TRG | VPTR092805SL0E | 09/28/05 08:03 | 1.0285 | 0.4534 | 10.1933 | | | | |
| 13 | TRG | VPTR092805SL0F | 09/28/05 08:08 | 1.1179 | 0.4530 | 10.1843 | | | | |
| 14 | TRG | VPTR092805SL0G | 09/28/05 08:20 | 1.0293 | 0.4533 | 10.1911 | | | | |
| 15 | TRG | VPTR092805SL0H | 09/28/05 08:25 | 1.0480 | 0.4530 | 10.1843 | | | | |
| 16 | TRG | VPTR092805SL0I | 09/28/05 08:36 | 1.1179 | 0.4502 | 10.1214 | | | | |
| 17 | TRG | VPTR092805SL0J | 09/28/05 08:49 | 1.0188 | 0.4542 | 10.2113 | | | | |
| 18 | TRG | VPTR092805SL0K | 09/28/05 08:58 | 1.0340 | 0.4516 | 10.1529 | | | | |
| 19 | TRG | VPTR092805SL0L | 09/28/05 09:00 | 1.0329 | 0.4507 | 10.1326 | | | | |
| | | | | | | | | | | |

5987

# Spike and Tracer Worksheet



| Internal Work Order | Run | Analysis Code | Date | Technician | Technician Initials | Witness Initials |
|---|---|---|---|---|---|---|
| 05-09118 | 1 | ThISO | 10/5/2005 9:35 | JBARNARD | | |

| LCS & Matrix Spikes | | | | | LCS | MS | LCSD | MSD | LCS | | MS | | LCSD | | MSD | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Isotope | Sol # | Activity dpm/g | Solution Date | Approx Addition | Volume Used (g) | Volume Used (g) | Volume Used (g) | Volume Used (g) | Known pCi | Error Estimate | Added pCi | Error Estimate | Known pCi | Error Estimate | Added pCi | Error Estimate |
| Th-228 | Th-8b | 103.560 | 10/5/2005 | 0.100 | 0.1018 | | | | 4.75 | 0.171 | 0.00 | 0.000 | 0.00 | 0.000 | 0.00 | 0.000 |
| Th-230 | Th-1b | 23.527 | 10/5/2005 | 0.500 | 0.5027 | | | | 5.33 | 0.144 | 0.00 | 0.000 | 0.00 | 0.000 | 0.00 | 0.000 |
| Th-232 | Th-8b | 103.560 | 10/5/2005 | 0.100 | 0.1018 | | | | 4.75 | 0.171 | 0.00 | 0.000 | 0.00 | 0.000 | 0.00 | 0.000 |

## Tracers

| fraction | Isotope | Sol # | Activity dpm/g | Solution Date | Volume Used (g) | Approx Addition |
|---|---|---|---|---|---|---|
| 01 | Th-229 | Th-18a | 22.482 | 10/5/2005 | 0.4648 | 0.4600 |
| 02 | Th-229 | Th-18a | 22.482 | 10/5/2005 | 0.4590 | 0.4600 |
| 03 | Th-229 | Th-18a | 22.482 | 10/5/2005 | 0.4549 | 0.4600 |
| 04 | Th-229 | Th-18a | 22.482 | 10/5/2005 | 0.4530 | 0.4600 |
| 05 | Th-229 | Th-18a | 22.482 | 10/5/2005 | 0.4554 | 0.4600 |
| 06 | Th-229 | Th-18a | 22.482 | 10/5/2005 | 0.4536 | 0.4600 |
| 07 | Th-229 | Th-18a | 22.482 | 10/5/2005 | 0.4548 | 0.4600 |
| 08 | Th-229 | Th-18a | 22.482 | 10/5/2005 | 0.4529 | 0.4600 |
| 09 | Th-229 | Th-18a | 22.482 | 10/5/2005 | 0.4534 | 0.4600 |
| 10 | Th-229 | Th-18a | 22.482 | 10/5/2005 | 0.4527 | 0.4600 |
| 11 | Th-229 | Th-18a | 22.482 | 10/5/2005 | 0.4516 | 0.4600 |
| 12 | Th-229 | Th-18a | 22.482 | 10/5/2005 | 0.4534 | 0.4600 |
| 13 | Th-229 | Th-18a | 22.482 | 10/5/2005 | 0.4530 | 0.4600 |
| 14 | Th-229 | Th-18a | 22.482 | 10/5/2005 | 0.4533 | 0.4600 |
| 15 | Th-229 | Th-18a | 22.482 | 10/5/2005 | 0.4530 | 0.4600 |
| 16 | Th-229 | Th-18a | 22.482 | 10/5/2005 | 0.4502 | 0.4600 |
| 17 | Th-229 | Th-18a | 22.482 | 10/5/2005 | 0.4542 | 0.4600 |
| 18 | Th-229 | Th-18a | 22.482 | 10/5/2005 | 0.4516 | 0.4600 |
| 19 | Th-229 | Th-18a | 22.482 | 10/5/2005 | 0.4507 | 0.4600 |
| | | | | | | |

## Balance Printer Tapes

### Tracer

0.4648 g
-0.4590 g
-0.4549 g
-0.4530 g
-0.4554 g
-0.4536 g
-0.4548 g
-0.4529 g
-0.4534 g
-0.4527 g
-0.4516 g
-0.4534 g
-0.4530 g
-0.4533 g
-0.4530 g
-0.4502 g
-0.4542 g
-0.4516 g
-0.4507 g

### LCS

0.5027 g
0.1018 g

### Matrix Spike

Eberline Services - Oak Ridge
Version 2.0 8/1999

# Aliquot Worksheet

Printed: 10/5/2005 8:42 AM


| Work Order | Run | Analysis Code | Rpt Units | Lab Deadline | Technician |
|---|---|---|---|---|---|
| 05-09118 | 1 | ThISO | grams | 10/20/2005 | JBARNARD |

| Lab Fraction | Missouri Dept. of Natural Resources Client ID | Sample Type | Muffle Data | Dilution Data | | | Aliquot Data | | MS Aliquot Data | | H-3 Solids Only | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Ratio Post/Pre | No of Dils | Dil Factor | Ratio | Aliquot | Net Equiv | Aliquot | Net Equiv | Water Added (ml) | H3 Dist Aliq |
| 01 | LCS | LCS | | | | | 1.0000E+00 | 1.0000E+00 | | | | |
| 02 | BLANK | MBL | | | | | 1.0000E+00 | 1.0000E+00 | | | | |
| 03 | VPBR092705SL17 | DUP | | | | | 1.0255E+00 | 1.0255E+00 | | | | |
| 04 | VPBR092705SL17 | DO | | | | | 9.9810E-01 | 9.9810E-01 | | | | |
| 05 | VPBR092705SL18 | TRG | | | | | 1.0413E+00 | 1.0413E+00 | | | | |
| 06 | VPBR092705SL19 | TRG | | | | | 1.0580E+00 | 1.0580E+00 | | | | |
| 07 | VPBR092705SL20 | TRG | | | | | 1.0597E+00 | 1.0597E+00 | | | | |
| 08 | VPTR092805SL0A | TRG | | | | | 1.0839E+00 | 1.0839E+00 | | | | |
| 09 | VPTR092805SL0B | TRG | | | | | 1.0455E+00 | 1.0455E+00 | | | | |
| 10 | VPTR092805SL0C | TRG | | | | | 1.0807E+00 | 1.0807E+00 | | | | |
| 11 | VPTR092805SL0D | TRG | | | | | 1.1215E+00 | 1.1215E+00 | | | | |
| 12 | VPTR092805SL0E | TRG | | | | | 1.0285E+00 | 1.0285E+00 | | | | |
| 13 | VPTR092805SL0F | TRG | | | | | 1.1179E+00 | 1.1179E+00 | | | | |
| 14 | VPTR092805SL0G | TRG | | | | | 1.0293E+00 | 1.0293E+00 | | | | |
| 15 | VPTR092805SL0H | TRG | | | | | 1.0480E+00 | 1.0480E+00 | | | | |
| 16 | VPTR092805SL0I | TRG | | | | | 1.1179E+00 | 1.1179E+00 | | | | |
| 17 | VPTR092805SL0J | TRG | | | | | 1.0188E+00 | 1.0188E+00 | | | | |
| 18 | VPTR092805SL0K | TRG | | | | | 1.0340E+00 | 1.0340E+00 | | | | |
| 19 | VPTR092805SL0L | TRG | | | | | 1.0329E+00 | 1.0329E+00 | | | | |
| | | | | | | | | | | | | |

1.0255 g
0.9981 g
1.0413 g
1.0580 g
1.0597 g
1.0839 g
1.0455 g
1.0807 g
1.1215 g
1.0285 g
1.1179 g
1.0293 g
1.0480 g
1.1179 g
1.0188 g
1.0340 g
1.0329 g

| Comments | |
|---|---|

Technician: JBarnard Date: 10/5/05

Eberline Services - Oak Ridge
Prep Logbook
Version 2.0 8/1999

# Rough Sample Preparation Log Book

Printed: 10/3/2005 12:31 PM


| Work Order | Lab Deadline | Date Received in Prep | Date Sealed | Date Returned | Technician |
|---|---|---|---|---|---|
| 05-09118 | 10/20/2005 | 10/2/2005 | 10/3/2005 | 10/4/2005 | KSALLINGS |

| Eberline | Missouri Dept. of Natural Resources | Tare (g) | Gross (g) | | Net (g) | | Percent | | Gamma | | Special |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Fraction | Client ID | Pan Wt | Wet Wt. | Dry Wt. | Wet Wt. | Dry Wt. | Liquid | Solid | Dry Wt. | LEPS Wt. | Info |
| 04 | VPBR092705SL17 | 13.9100 | 384.6400 | 286.2100 | 370.7300 | 272.3000 | 26.55% | 73.45% | | | |
| 05 | VPBR092705SL18 | 13.7500 | 421.8800 | 327.1500 | 408.1300 | 313.4000 | 23.21% | 76.79% | | | |
| 06 | VPBR092705SL19 | 13.8600 | 374.7200 | 284.1000 | 360.8600 | 270.2400 | 25.11% | 74.89% | | | |
| 07 | VPBR092705SL20 | 13.7600 | 406.4200 | 339.1300 | 392.6600 | 325.3700 | 17.14% | 82.86% | | | |
| 08 | VPTR092805SL0A | 13.7800 | 423.8300 | 359.5400 | 410.0500 | 345.7600 | 15.68% | 84.32% | | | |
| 09 | VPTR092805SL0B | 13.8300 | 414.0700 | 333.0900 | 400.2400 | 319.2600 | 20.23% | 79.77% | | | |
| 10 | VPTR092805SL0C | 13.8000 | 372.4900 | 324.7600 | 358.6900 | 310.9600 | 13.31% | 86.69% | | | |
| 11 | VPTR092805SL0D | 13.7900 | 361.6100 | 286.7900 | 347.8200 | 273.0000 | 21.51% | 78.49% | | | |
| 12 | VPTR092805SL0E | 13.7300 | 384.1500 | 309.6000 | 370.4200 | 295.8700 | 20.13% | 79.87% | | | |
| 13 | VPTR092805SL0F | 13.7700 | 459.2100 | 388.9200 | 445.4400 | 375.1500 | 15.78% | 84.22% | | | |
| 14 | VPTR092805SL0G | 13.8600 | 488.7000 | 406.7900 | 474.8400 | 392.9300 | 17.25% | 82.75% | | | |
| 15 | VPTR092805SL0H | 13.8000 | 396.4400 | 325.6400 | 382.6400 | 311.8400 | 18.50% | 81.50% | | | |
| 16 | VPTR092805SL0I | 13.8400 | 455.3700 | 372.8600 | 441.5300 | 359.0200 | 18.69% | 81.31% | | | |
| 17 | VPTR092805SL0J | 13.8700 | 502.7000 | 418.8900 | 488.8300 | 405.0200 | 17.15% | 82.85% | | | |
| 18 | VPTR092805SL0K | 13.9100 | 363.8600 | 308.3100 | 349.9500 | 294.4000 | 15.87% | 84.13% | | | |
| 19 | VPTR092805SL0L | 13.9300 | 425.9300 | 353.2400 | 412.0000 | 339.3100 | 17.64% | 82.36% | | | |
| | | | | | | | | | | | |

| | |
|---|---|
| *Comments* | |
| *Special Codes* | **H: Hot, O: Organic Hazard, P: PCB Hazard, R: Rush, T: Other (see comments)** |

Technician: Kenny Sallings Date:

Eberline Services
Oak Ridge Laboratory

ALPHA SPECTROMETRY REPORT
11-OCT-2005 10:59:22

**********

Spectral File: ND_AMS_ARCHIVE_C:C_0509118A-TH$01_TH.CNF

**********

| | | | |
|---|---|---|---|
| BATCH ID: | 0509118A-TH | SAMPLE ID: | 01 |
| SAMPLE DATE: | 11-OCT-2005 00:00 | ALIQUOT: | 1.000E+00 gram |
| SAMPLE TITLE: | SPIKE | DETECTOR NUMBER: | 001 |
| ACQ DATE: | 11-OCT-2005 07:30 | AVERAGE EFFICIENCY: | 21.41% |
| ELAPSED LIVE TIME: | 10206. | RECOVERY: | 98.97% |
| TRACER ID: | TH-18A | TRACER FWHM (kev): | 131.51 |
| LAMBDA VALUE: | 465. | ROI TYPE: | STANDARD |
| TRACER DPM AT SAMPLE DATE: | 10.449 | CONFIDENCE FACTOR: | 4.65 |
| SAMPLE MATRIX: | SOIL | LLD CONSTANT: | 2.71 |
| ENERGY CAL DATE: | 5-OCT-2005 05:14 | EFF CAL DATE: | 5-OCT-2005 05:14 |
| BKG FILENAME: | B_001_7OCT05 | BKG ELAPSED TIME: | 60003. |

**********

NUCLIDE ACTIVITY SUMMARY

| NUCLIDE | ENERGY | NET AREA | BKG | %ABN | ACTIVITY pCi/ gram | TPU/ERROR 2-SIGMA | MDC pCi/ gram |
|---|---|---|---|---|---|---|---|
| TH-227 | 5850.0 | 3.81 | 1.19 | 97.5 | 4.883E-02 | 5.897E-02 | 9.978E-02 |
| TH-228 | 5400.0 | 352.15 | 0.85 | 99.9 | 4.405E+00 | 8.312E-01 | 8.751E-02 |
| TH229 | 4872.0 | 374.81 | 1.19 | 99.5 | 4.707E+00 | 6.553E-01 | 9.775E-02 |
| TH-230 | 4672.0 | 413.98 | 1.02 | 99.8 | 5.183E+00 | 9.543E-01 | 9.274E-02 |
| TH-232 | 3997.0 | 336.66 | 0.34 | 100.0 | 4.207E+00 | 7.995E-01 | 6.776E-02 |

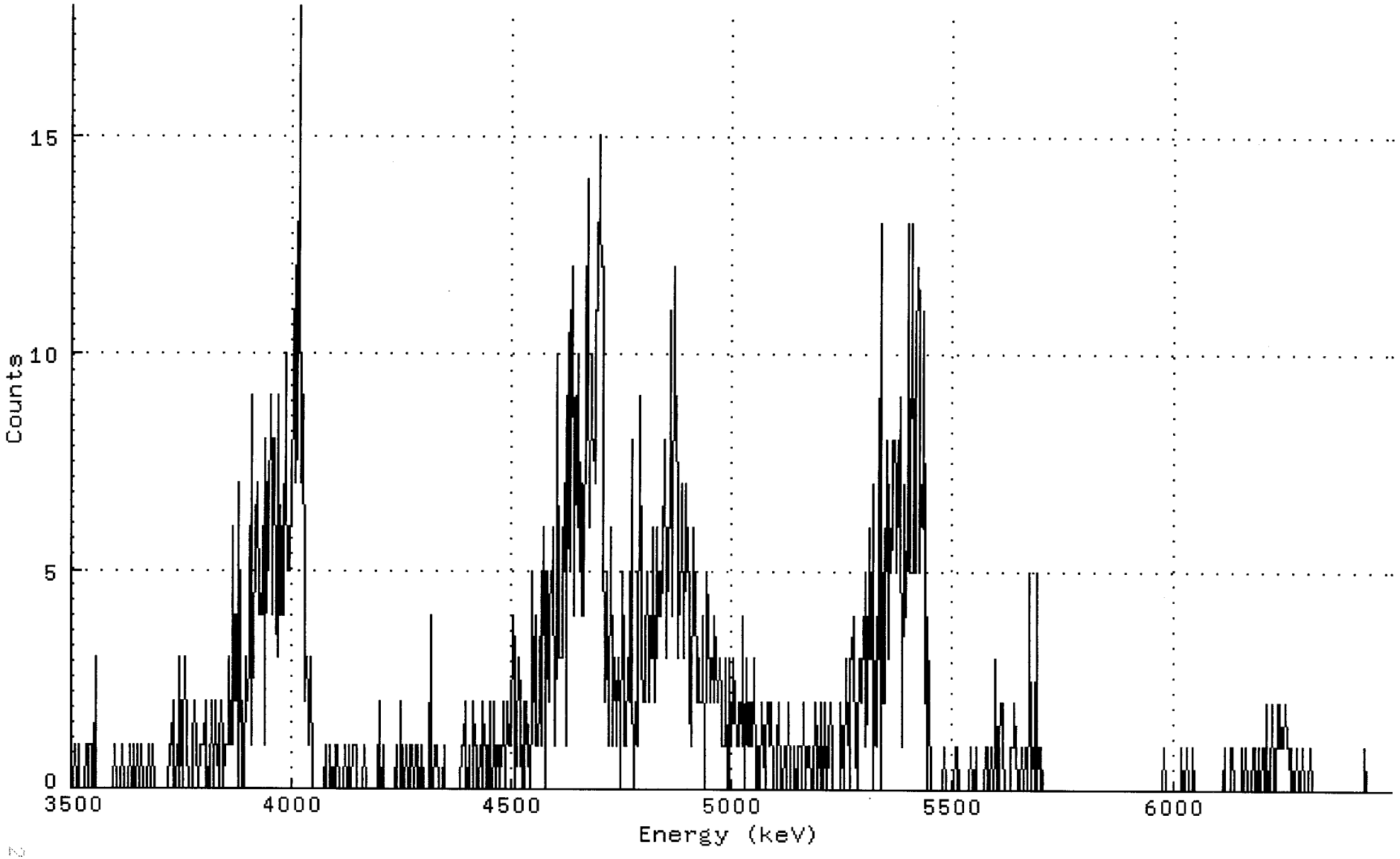
**********

*** Tracer FWHM > 80.0 Kev ***

Analyst _____ Date 10-11-05

Reviewer _____ Date 10/11/05

Spectrum : DKA100:[ALPHA.ALUSR.ARCHIVE.C]C_0509118A-TH$01_TH.CNF;1
Title : 001
Sample Title: SPIKE
Start Time: 11-OCT-2005 07:30 Sample Time: 11-OCT-2005 00:00 Energy Offset: 3.48800E+03
Real Time : 0 02:50:06.00 Sample ID : 01 Energy Slope : 3.07697E+00
Live Time : 0 02:50:06.00 Sample Type: TH Energy Quad : -1.40185E-04



Channel Contents for ND_AMS_ARCHIVE_C:C_0509118A-TH$01_TH

Channel

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1: | 10206 | 10206 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| 15: | 0 | 1 | 1 | 1 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 29: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 0 |
| 43: | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 1 | 0 |
| 57: | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 71: | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 2 | 0 | 0 | 1 | 0 | 3 |
| 85: | 1 | 0 | 1 | 3 | 1 | 0 | 0 | 0 | 0 | 1 | 2 | 1 | 1 | 0 |
| 99: | 1 | 1 | 1 | 1 | 2 | 0 | 0 | 1 | 0 | 2 | 0 | 2 | 1 | 1 |
| 113: | 0 | 1 | 2 | 1 | 0 | 1 | 1 | 1 | 3 | 1 | 1 | 6 | 2 | 4 |
| 127: | 0 | 7 | 3 | 0 | 2 | 0 | 3 | 3 | 2 | 3 | 9 | 1 | 4 | 5 |
| 141: | 6 | 7 | 4 | 5 | 4 | 4 | 8 | 1 | 7 | 5 | 6 | 9 | 7 | 4 |
| 155: | 8 | 4 | 3 | 9 | 4 | 6 | 4 | 4 | 10 | 7 | 5 | 5 | 7 | 6 |
| 169: | 10 | 12 | 7 | 8 | 18 | 13 | 7 | 9 | 4 | 2 | 3 | 2 | 1 | 3 |
| 183: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 197: | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 |
| 211: | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 225: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 0 |
| 239: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 2 | 0 | 0 |
| 253: | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 1 |
| 267: | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 |
| 281: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 295: | 1 | 1 | 1 | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 2 | 1 | 1 | 0 |
| 309: | 0 | 1 | 0 | 2 | 1 | 1 | 0 | 0 | 2 | 0 | 0 | 1 | 2 | 0 |
| 323: | 1 | 1 | 0 | 1 | 1 | 2 | 0 | 2 | 2 | 1 | 2 | 1 | 4 | 3 |
| 337: | 0 | 1 | 3 | 2 | 1 | 0 | 2 | 0 | 2 | 1 | 1 | 0 | 2 | 5 |
| 351: | 2 | 4 | 1 | 1 | 2 | 5 | 1 | 6 | 4 | 0 | 5 | 2 | 4 | 5 |
| 365: | 4 | 6 | 1 | 4 | 10 | 3 | 3 | 3 | 6 | 5 | 9 | 1 | 10 | 11 |
| 379: | 5 | 12 | 6 | 4 | 9 | 6 | 10 | 5 | 7 | 4 | 4 | 10 | 14 | 10 |
| 393: | 6 | 10 | 8 | 8 | 7 | 11 | 11 | 15 | 13 | 12 | 12 | 7 | 2 | 5 |
| 407: | 4 | 1 | 6 | 2 | 1 | 3 | 1 | 2 | 3 | 1 | 0 | 5 | 3 | 1 |
| 421: | 1 | 3 | 3 | 2 | 8 | 3 | 0 | 2 | 1 | 1 | 9 | 4 | 3 | 2 |
| 435: | 2 | 3 | 5 | 3 | 2 | 4 | 3 | 6 | 2 | 4 | 6 | 4 | 5 | 4 |
| 449: | 5 | 8 | 4 | 3 | 6 | 6 | 11 | 4 | 12 | 9 | 9 | 6 | 3 | 5 |
| 463: | 5 | 7 | 3 | 6 | 7 | 5 | 5 | 2 | 1 | 6 | 4 | 5 | 2 | 3 |
| 477: | 2 | 2 | 2 | 4 | 0 | 4 | 5 | 4 | 2 | 3 | 3 | 2 | 4 | 3 |
| 491: | 2 | 2 | 3 | 2 | 1 | 1 | 1 | 3 | 0 | 0 | 3 | 1 | 2 | 3 |
| 505: | 2 | 1 | 2 | 1 | 2 | 1 | 4 | 0 | 2 | 3 | 1 | 2 | 1 | 1 |
| 519: | 3 | 3 | 0 | 1 | 0 | 0 | 2 | 2 | 1 | 0 | 1 | 2 | 2 | 1 |
| 533: | 2 | 0 | 0 | 0 | 0 | 1 | 2 | 0 | 0 | 0 | 1 | 1 | 0 | 2 |
| 547: | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 1 | 0 | 2 | 0 | 0 |
| 561: | 1 | 1 | 1 | 0 | 1 | 0 | 2 | 1 | 0 | 1 | 0 | 2 | 0 | 1 |
| 575: | 2 | 0 | 1 | 1 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 1 |
| 589: | 0 | 3 | 2 | 2 | 0 | 3 | 3 | 4 | 3 | 1 | 0 | 1 | 3 | 2 |
| 603: | 3 | 3 | 5 | 1 | 2 | 6 | 3 | 3 | 7 | 0 | 2 | 4 | 1 | 5 |
| 617: | 13 | 0 | 4 | 6 | 2 | 8 | 3 | 7 | 5 | 6 | 8 | 8 | 7 | 5 |
| 631: | 7 | 9 | 8 | 1 | 6 | 7 | 4 | 6 | 13 | 5 | 12 | 13 | 5 | 5 |
| 645: | 10 | 12 | 11 | 5 | 7 | 6 | 11 | 4 | 0 | 4 | 2 | 0 | 0 | 0 |
| 659: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 673: | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 687: | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 701: | 0 | 1 | 0 | 1 | 1 | 0 | 1 | 3 | 0 | 0 | 1 | 2 | 2 | 1 |
| 715: | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 2 | 1 | 0 | 0 | 0 | 1 |
| 729: | 1 | 0 | 1 | 1 | 0 | 2 | 5 | 0 | 1 | 1 | 0 | 5 | 0 | 1 |
| 743: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 757: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 771: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 785: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 799: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 813: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 827: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 841: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 855: | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 869: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 883: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| 897: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 0 |
| 911: | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 2 | 0 |
| 925: | 0 | 1 | 0 | 2 | 0 | 1 | 0 | 2 | 1 | 1 | 2 | 1 | 1 | 1 |
| 939: | 2 | 1 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 953: | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 967: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 981: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 995: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 1009: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1023: | 0 | 0 | | | | | | | | | | | | |

Eberline Services
Oak Ridge Laboratory

Gross Sample Counts Within Peak Regions  Generated: 11-OCT-2005 10:59:18.24

Detector ID: 1  Acquisition Start: 11-OCT-2005 07:30:30.01
Live Time: 0 02:50:06.00  Real Time: 0 02:50:06.00
Batch Id: 0509118A-TH  Sample Id: 01
Sample Type: TH

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 3959.83 | 337 | 0 | 36.30 | 154.43 | 102 | 100 | 3.30E-02 | 5.4 | |
| 2 | 0 | 4634.16 | 415 | 0 | 108.62 | 379.04 | 309 | 102 | 4.07E-02 | 4.9 | |
| 3 | 0 | 4883.23 | 376 | 0 | 131.51 | 463.22 | 410 | 128 | 3.68E-02 | 5.2 | |
| 4 | 0 | 5356.14 | 353 | 0 | 125.35 | 624.93 | 554 | 104 | 3.46E-02 | 5.3 | |
| 5 | 0 | 5952.71 | 5 | 0 | 0.00 | 832.60 | 744 | 124 | 4.90E-04 | 44.7 | |

Background Counts Within Peak Regions  Generated: 11-OCT-2005 10:59:20.21

Acquisition Start: 7-OCT-2005 17:05:27.01
Live Time: 0 16:40:03.00  Real Time: 0 16:40:03.00

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 3952.43 | 2 | 0 | 172.61 | 151.50 | 102 | 100 | 3.33E-05 | 70.7 | |
| 2 | 0 | 4578.39 | 6 | 0 | 0.00 | 359.50 | 309 | 102 | 1.00E-04 | 40.8 | |
| 3 | 0 | 4916.23 | 7 | 0 | 0.00 | 473.50 | 410 | 128 | 1.17E-04 | 37.8 | |
| 4 | 0 | 5302.79 | 5 | 0 | 240.42 | 605.50 | 554 | 104 | 8.33E-05 | 44.7 | |
| 5 | 0 | 5879.00 | 7 | 0 | 0.00 | 805.50 | 744 | 124 | 1.17E-04 | 37.8 | |

Net Sample Counts Within Peak Regions  Generated: 11-OCT-2005 10:59:20.55

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 3959.83* | 337 | 0 | 36.30 | 154.43 | 102 | 100 | 3.30E-02 | 5.5 | |
| 2 | 0 | 4634.16* | 414 | 0 | 108.62 | 379.04 | 309 | 102 | 4.06E-02 | 4.9 | |
| 3 | 0 | 4883.23* | 375 | 0 | 131.51 | 463.22 | 410 | 128 | 3.67E-02 | 5.2 | |
| 4 | 0 | 5356.14* | 352 | 0 | 125.35 | 624.93 | 554 | 104 | 3.45E-02 | 5.3 | |
| 5 | 0 | 5952.71* | 4 | 0 | 0.00 | 832.60 | 744 | 124 | 3.73E-04 | 59.9 | |

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.0 Generated 11-OCT-2005 10:59:21

| | | | |
|---|---|---|---|
| Configuration | : MCA0:[AMSCOUNT]0000C192$1 | | |
| Analyses by | : ROIPEAK V1.2,PEAKEFF V2.2,ENBACK V1.6,NID V3.3 | | |
| Sample title | : SPIKE | | |
| Sample date | : 11-OCT-2005 00:00:00 | Acquisition date | : 11-OCT-2005 07:30:30 |
| Sample ID | : 01 | Sample quantity | : 1.0000 gram |
| Sample type | : TH | Sample geometry | : |
| Detector name | : 001 | Detector geometry | : |
| Elapsed live time | : 0 02:50:06.00 | Elapsed real time | : 0 02:50:06.00 0.0% |
| Energy tolerance | : 100.00 keV | Half life ratio | : 8.00 |
| Errors propagated | : Yes | Systematic Error | : 3.00 % |
| Efficiency type | : Average value | Efficiencies at | : Peak Energy |
| Abundance limit | : 75.00 | | |

Post-NID Peak Search Report

| It | Energy | Area | FWHM | Channel | Left | Pw | %Err | Fit | Nuclides | Activity pCi/gram |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 3959.83* | 337 | 36.30 | 154.43 | 102 | 100 | 10.9 | | TH-232 | 4.16 |
| 0 | 4634.16* | 414 | 108.62 | 379.04 | 309 | 102 | 9.8 | | TH-230 | 5.13 |
| 0 | 4883.23* | 375 | 131.51 | 463.22 | 410 | 128 | 10.3 | | TH229 | 4.66 |
| 0 | 5356.14* | 352 | 125.35 | 624.93 | 554 | 104 | 10.7 | | TH-228 | 4.36 |
| 0 | 5952.71* | 4 | 0.00 | 832.60 | 744 | 124 | 119.8 | | TH-227 | 4.833E-02 |

Eberline Services
Oak Ridge Laboratory

ALPHA SPECTROMETRY REPORT
11-OCT-2005 10:59:34

**********

Spectral File: ND_AMS_ARCHIVE_R:R_0509118A-TH$02_TH.CNF

**********

| | | | |
|---|---|---|---|
| BATCH ID: | 0509118A-TH | SAMPLE ID: | 02 |
| SAMPLE DATE: | 11-OCT-2005 00:00 | ALIQUOT: | 1.000E+00 gram |
| SAMPLE TITLE: | BLANK | DETECTOR NUMBER: | 002 |
| ACQ DATE: | 11-OCT-2005 07:30 | AVERAGE EFFICIENCY: | 20.12% |
| ELAPSED LIVE TIME: | 10203. | RECOVERY: | 87.84% |
| TRACER ID: | TH-18A | TRACER FWHM (kev): | 118.81 |
| LAMBDA VALUE: | 459. | ROI TYPE: | STANDARD |
| TRACER DPM AT SAMPLE DATE: | 10.319 | CONFIDENCE FACTOR: | 4.65 |
| SAMPLE MATRIX: | SOIL | LLD CONSTANT: | 2.71 |
| ENERGY CAL DATE: | 5-OCT-2005 05:14 | EFF CAL DATE: | 5-OCT-2005 05:14 |
| BKG FILENAME: | B_002_7OCT05 | BKG ELAPSED TIME: | 60010. |

**********

NUCLIDE ACTIVITY SUMMARY

| NUCLIDE | ENERGY | NET AREA | BKG | %ABN | ACTIVITY pCi/ gram | TPU/ERROR 2-SIGMA | MDC pCi/ gram |
|---|---|---|---|---|---|---|---|
| TH-227 | 5850.0 | 1.15 | 0.85 | 97.5 | 1.768E-02 | 4.511E-02 | 1.076E-01 |
| TH-228 | 5400.0 | 2.49 | 0.51 | 99.9 | 3.735E-02 | 5.306E-02 | 9.044E-02 |
| TH229 | 4872.0 | 308.66 | 0.34 | 99.5 | 4.648E+00 | 6.841E-01 | 8.164E-02 |
| TH-230 | 4672.0 | 17.49 | 0.51 | 99.8 | 2.626E-01 | 1.347E-01 | 9.055E-02 |
| TH-232 | 3997.0 | 6.83 | 0.17 | 100.0 | 1.024E-01 | 8.119E-02 | 6.935E-02 |

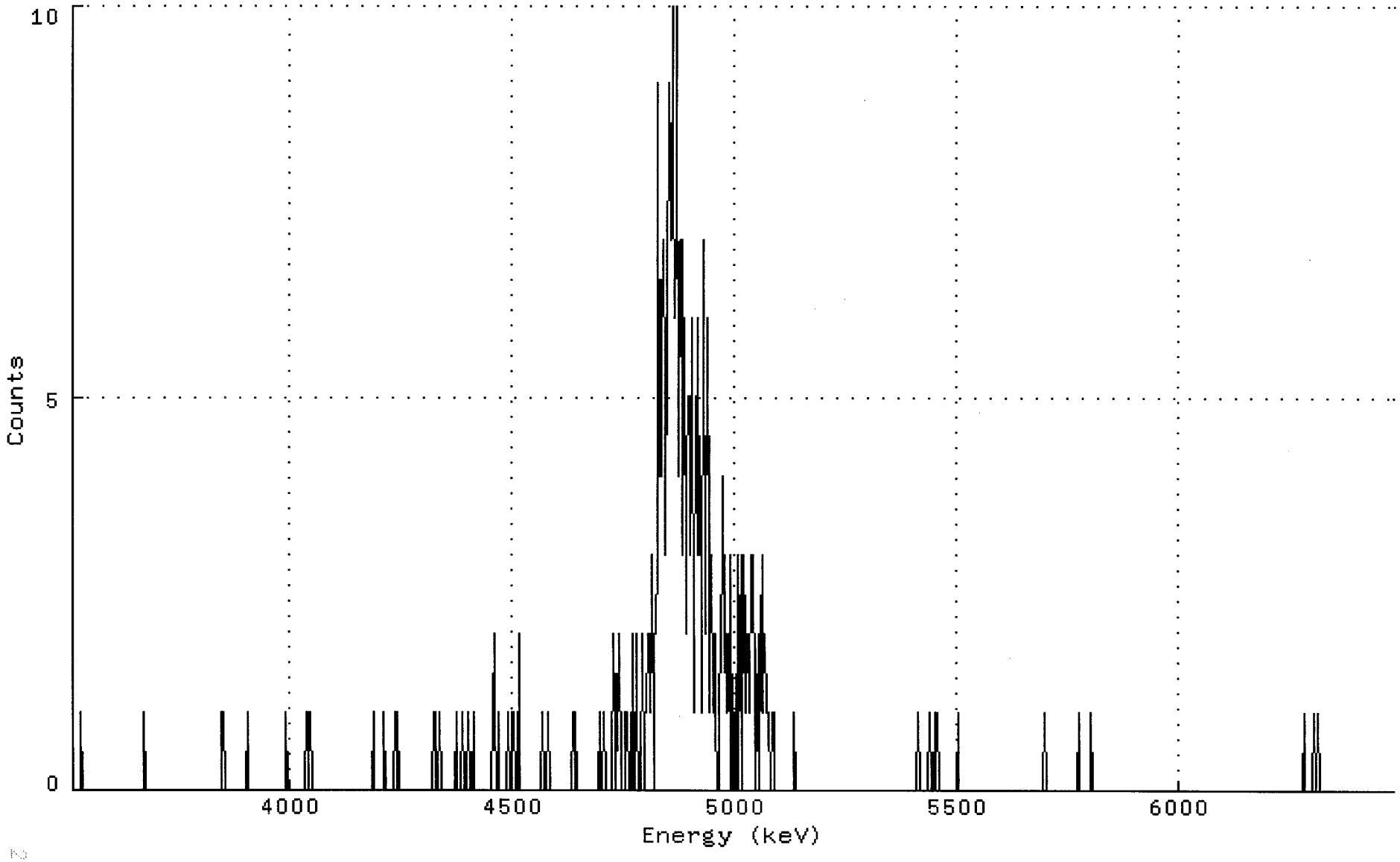
**********

*** Tracer FWHM > 80.0 Kev ***

Analyst _____ Date 10-11-05

Reviewer _____ Date 10/11/05

Spectrum : DKA100:[ALPHA.ALUSR.ARCHIVE.R]R_0509118A-TH$02_TH.CNF;1
Title : 002
Sample Title: BLANK
Start Time: 11-OCT-2005 07:30 Sample Time: 11-OCT-2005 00:00 Energy Offset: 3.50181E+03
Real Time : 0 02:50:03.00 Sample ID : 02 Energy Slope : 3.04682E+00
Live Time : 0 02:50:03.00 Sample Type: TH Energy Quad : -1.31555E-04



Channel Contents for ND_AMS_ARCHIVE_R:R_0509118A-TH$02_TH

Channel

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1: | 10203 | 10203 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 15: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 29: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 43: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 57: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 71: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 85: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 99: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 113: | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 127: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 141: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 155: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 169: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 0 |
| 183: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 197: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 211: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 225: | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 239: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 253: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 267: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 1 | 0 | 0 |
| 281: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 295: | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 309: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 1 | 0 | 1 |
| 323: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 1 | 0 | 0 |
| 337: | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 351: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 365: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 379: | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 393: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 0 |
| 407: | 0 | 0 | 0 | 2 | 1 | 0 | 1 | 2 | 0 | 0 | 0 | 0 | 1 | 1 |
| 421: | 0 | 0 | 0 | 2 | 0 | 0 | 2 | 1 | 0 | 1 | 0 | 2 | 0 | 1 |
| 435: | 1 | 2 | 2 | 1 | 3 | 0 | 2 | 2 | 3 | 9 | 4 | 4 | 6 | 7 |
| 449: | 5 | 3 | 6 | 9 | 8 | 7 | 10 | 8 | 6 | 7 | 10 | 4 | 7 | 7 |
| 463: | 3 | 6 | 2 | 4 | 5 | 5 | 3 | 6 | 1 | 2 | 5 | 3 | 6 | 3 |
| 477: | 3 | 1 | 7 | 2 | 2 | 6 | 3 | 1 | 3 | 1 | 2 | 1 | 0 | 0 |
| 491: | 1 | 2 | 3 | 4 | 2 | 1 | 2 | 2 | 0 | 3 | 0 | 0 | 1 | 0 |
| 505: | 3 | 0 | 2 | 3 | 0 | 3 | 2 | 1 | 2 | 2 | 1 | 3 | 3 | 1 |
| 519: | 0 | 1 | 2 | 0 | 2 | 3 | 1 | 2 | 1 | 1 | 1 | 0 | 0 | 1 |
| 533: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 547: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 561: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 575: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 589: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 603: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 617: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 631: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 645: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 |
| 659: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 673: | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 687: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 701: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 715: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 729: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 743: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 757: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 771: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 785: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 799: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 813: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 827: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 841: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 855: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 869: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 883: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 897: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 911: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 925: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 939: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 953: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 967: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 981: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 995: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1009: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1023: | 0 | 0 | | | | | | | | | | | | |

Eberline Services
Oak Ridge Laboratory

Gross Sample Counts Within Peak Regions  Generated: 11-OCT-2005 10:59:29.36

Detector ID: 2  Acquisition Start: 11-OCT-2005 07:30:42.01
Live Time: 0 02:50:03.00  Real Time: 0 02:50:03.00
Batch Id: 0509118A-TH  Sample Id: 02
Sample Type: TH

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 3961.46 | 7 | 0 | 206.80 | 151.86 | 98 | 101 | 6.86E-04 | 37.8 | |
| 2 | 0 | 4548.80 | 18 | 0 | 62.46 | 348.89 | 307 | 103 | 1.76E-03 | 23.6 | |
| 3 | 0 | 4899.42 | 309 | 0 | 118.81 | 468.17 | 409 | 129 | 3.03E-02 | 5.7 | |
| 4 | 0 | 5433.38 | 3 | 0 | 0.00 | 652.33 | 554 | 105 | 2.94E-04 | 57.7 | |
| 5 | 0 | 5786.93 | 2 | 0 | 33.52 | 776.00 | 745 | 125 | 1.96E-04 | 70.7 | |

Background Counts Within Peak Regions  Generated: 11-OCT-2005 10:59:32.54

Acquisition Start: 7-OCT-2005 17:05:30.01
Live Time: 0 16:40:10.00  Real Time: 0 16:40:10.00

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 3952.29 | 1 | 0 | 3.03 | 148.00 | 98 | 101 | 1.67E-05 | 100.0 | |
| 2 | 0 | 4576.94 | 3 | 0 | 75.80 | 358.00 | 307 | 103 | 5.00E-05 | 57.7 | |
| 3 | 0 | 4914.79 | 2 | 0 | 15.16 | 473.00 | 409 | 129 | 3.33E-05 | 70.7 | |
| 4 | 0 | 5301.77 | 3 | 0 | 87.92 | 606.00 | 554 | 105 | 5.00E-05 | 57.7 | |
| 5 | 0 | 5879.01 | 5 | 0 | 3.03 | 807.00 | 745 | 125 | 8.33E-05 | 44.7 | |

Net Sample Counts Within Peak Regions  Generated: 11-OCT-2005 10:59:32.86

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 3961.46* | 7 | 0 | 206.80 | 151.86 | 98 | 101 | 6.69E-04 | 38.8 | |
| 2 | 0 | 4548.80* | 17 | 0 | 62.46 | 348.89 | 307 | 103 | 1.71E-03 | 24.3 | |
| 3 | 0 | 4899.42* | 309 | 0 | 118.81 | 468.17 | 409 | 129 | 3.03E-02 | 5.7 | |
| 4 | 0 | 5433.38* | 2 | 0 | 0.00 | 652.33 | 554 | 105 | 2.44E-04 | 70.6 | |
| 5 | 0 | 5786.93* | 1 | 0 | 33.52 | 776.00 | 745 | 125 | 1.13E-04 | 127.4 | |

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.0 Generated 11-OCT-2005 10:59:33

| | | | |
|---|---|---|---|
| Configuration | : MCA0:[AMSCOUNT]0000C192$1 | | |
| Analyses by | : ROIPEAK V1.2,PEAKEFF V2.2,ENBACK V1.6,NID V3.3 | | |
| Sample title | : BLANK | | |
| Sample date | : 11-OCT-2005 00:00:00 | Acquisition date | : 11-OCT-2005 07:30:42 |
| Sample ID | : 02 | Sample quantity | : 1.0000 gram |
| Sample type | : TH | Sample geometry | : |
| Detector name | : 002 | Detector geometry | : |
| Elapsed live time | : 0 02:50:03.00 | Elapsed real time | : 0 02:50:03.00 0.0% |
| Energy tolerance | : 100.00 keV | Half life ratio | : 8.00 |
| Errors propagated | : Yes | Systematic Error | : 3.00 % |
| Efficiency type | : Average value | Efficiencies at | : Peak Energy |
| Abundance limit | : 75.00 | | |

Post-NID Peak Search Report

| It | Energy | Area | FWHM | Channel | Left | Pw | %Err | Fit | Nuclides | Activity pCi/gram |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 3961.46* | 7206.80 | 151.86 | | 98 | 101 | 77.6 | | TH-232 | 8.991E-02 |
| 0 | 4548.80* | 17 62.46 | 348.89 | | 307 | 103 | 48.6 | | TH-230 | 0.231 |
| 0 | 4899.42* | 309118.81 | 468.17 | | 409 | 129 | 11.4 | | TH229 | 4.08 |
| 0 | 5433.38* | 2 0.00 | 652.33 | | 554 | 105 | 141.1 | | TH-228 | 3.281E-02 |
| 0 | 5786.93* | 1 33.52 | 776.00 | | 745 | 125 | 254.7 | | TH-227 | 1.553E-02 |

Eberline Services
Oak Ridge Laboratory

ALPHA SPECTROMETRY REPORT
11-OCT-2005 10:59:47

**********

Spectral File: ND_AMS_ARCHIVE_S:S_0509118A-TH$03_TH.CNF

**********

| | | | |
|---|---|---|---|
| BATCH ID: | 0509118A-TH | SAMPLE ID: | 03 |
| SAMPLE DATE: | 27-SEP-2005 00:00 | ALIQUOT: | 1.026E+00 gram |
| SAMPLE TITLE: | VPBR092705SL17 | DETECTOR NUMBER: | 003 |
| ACQ DATE: | 11-OCT-2005 07:31 | AVERAGE EFFICIENCY: | 20.34% |
| ELAPSED LIVE TIME: | 10203. | RECOVERY: | 104.03% |
| TRACER ID: | TH-18A | TRACER FWHM (kev): | 87.43 |
| LAMBDA VALUE: | 455. | ROI TYPE: | STANDARD |
| TRACER DPM AT SAMPLE DATE: | 10.227 | CONFIDENCE FACTOR: | 4.65 |
| SAMPLE MATRIX: | SOIL | LLD CONSTANT: | 2.71 |
| ENERGY CAL DATE: | 5-OCT-2005 05:14 | EFF CAL DATE: | 5-OCT-2005 05:14 |
| BKG FILENAME: | B_003_7OCT05 | BKG ELAPSED TIME: | 60007. |

**********

NUCLIDE ACTIVITY SUMMARY

| NUCLIDE | ENERGY | NET AREA | BKG | %ABN | ACTIVITY pCi/ gram | TPU/ERROR 2-SIGMA | MDC pCi/ gram |
|---|---|---|---|---|---|---|---|
| TH-227 | 5850.0 | 4.47 | 1.53 | 97.5 | 5.604E-02 | 6.335E-02 | 1.060E-01 |
| TH-228 | 5400.0 | 88.15 | 0.85 | 99.9 | 1.092E+00 | 2.898E-01 | 8.549E-02 |
| TH229 | 4872.0 | 366.15 | 0.85 | 99.5 | 4.492E+00 | 6.294E-01 | 8.585E-02 |
| TH-230 | 4672.0 | 159.15 | 0.85 | 99.8 | 1.947E+00 | 4.342E-01 | 8.559E-02 |
| TH-232 | 3997.0 | 97.83 | 0.17 | 100.0 | 1.194E+00 | 3.056E-01 | 5.650E-02 |

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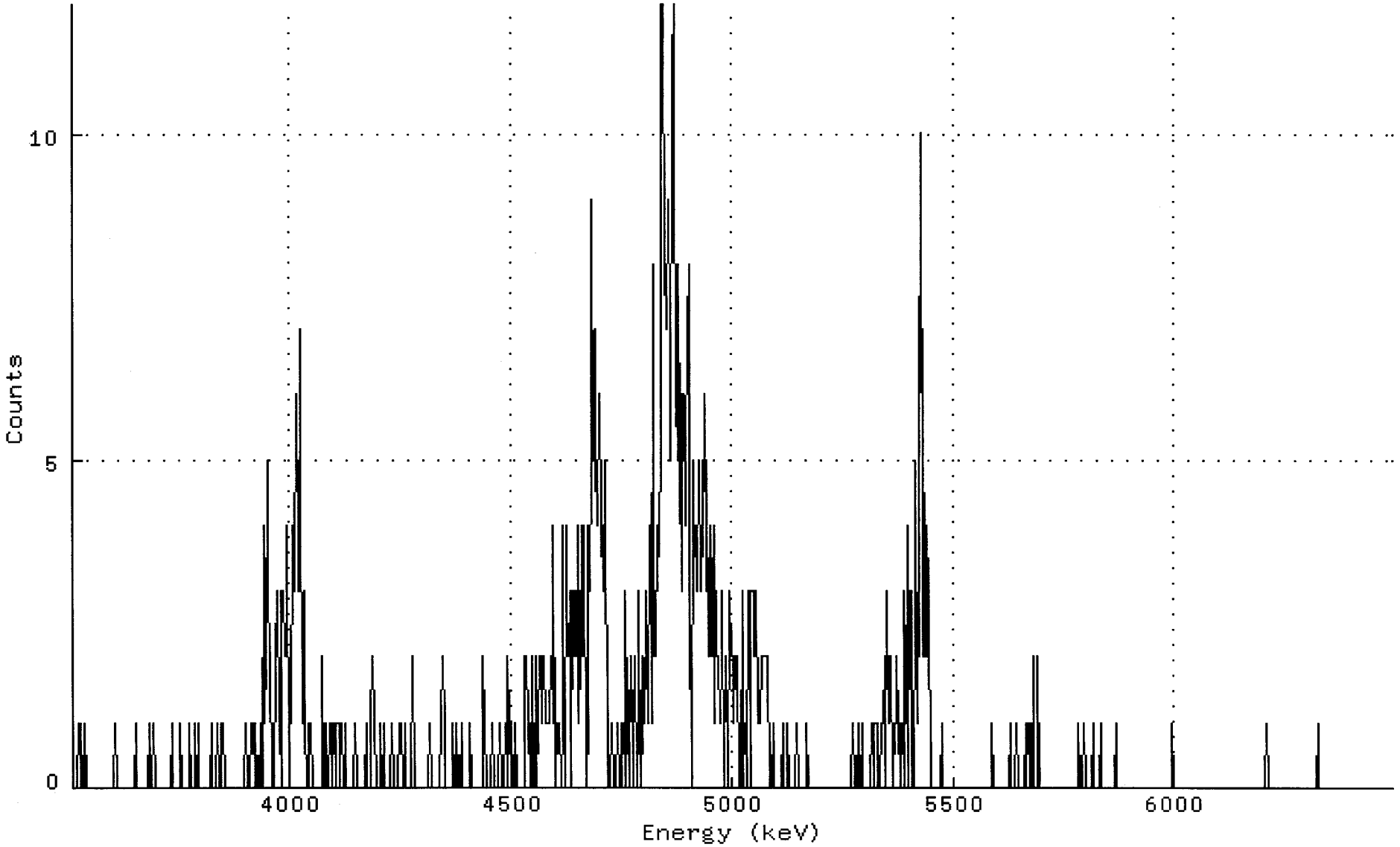
*** Tracer FWHM > 80.0 Kev ***

Analyst _____ Date 10-11-05

Reviewer _____ Date 10/11/05

Spectrum : DKA100:[ALPHA.ALUSR.ARCHIVE.S]S_0509118A-TH$03_TH.CNF;1
Title : 003
Sample Title: VPBR092705SL17
Start Time: 11-OCT-2005 07:31 Sample Time: 27-SEP-2005 00:00 Energy Offset: 3.49672E+03
Real Time : 0 02:50:03.00 Sample ID : 03 Energy Slope : 3.06387E+00
Live Time : 0 02:50:03.00 Sample Type: TH Energy Quad : -1.34327E-04




220

Channel Contents for ND_AMS_ARCHIVE_S:S_0509118A-TH$03_TH

Channel

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1: | 10203 | 10203 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 0 |
| 15: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 29: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 43: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 57: | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 71: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 85: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 |
| 99: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 |
| 113: | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 127: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 1 |
| 141: | 0 | 0 | 1 | 0 | 0 | 4 | 1 | 2 | 5 | 3 | 2 | 0 | 1 | 0 |
| 155: | 2 | 3 | 3 | 1 | 0 | 3 | 3 | 2 | 2 | 4 | 0 | 2 | 1 | 4 |
| 169: | 3 | 3 | 6 | 3 | 7 | 5 | 1 | 3 | 1 | 0 | 0 | 1 | 1 | 0 |
| 183: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 1 | 0 |
| 197: | 1 | 1 | 0 | 1 | 1 | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 |
| 211: | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 225: | 0 | 1 | 2 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 |
| 239: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 1 | 0 |
| 253: | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 267: | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 |
| 281: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 |
| 295: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 309: | 0 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 323: | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 2 | 1 | 0 | 1 | 0 | 0 | 1 |
| 337: | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 | 1 | 1 | 0 | 2 | 0 | 0 |
| 351: | 2 | 0 | 1 | 2 | 1 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 2 | 1 |
| 365: | 4 | 0 | 1 | 1 | 1 | 0 | 1 | 4 | 0 | 4 | 2 | 2 | 3 | 0 |
| 379: | 3 | 2 | 3 | 2 | 4 | 1 | 2 | 4 | 2 | 4 | 0 | 1 | 4 | 3 |
| 393: | 5 | 9 | 5 | 7 | 5 | 4 | 6 | 6 | 4 | 3 | 3 | 5 | 0 | 1 |
| 407: | 0 | 1 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 0 | 1 | 0 | 3 | 1 |
| 421: | 0 | 1 | 2 | 0 | 1 | 2 | 0 | 1 | 3 | 0 | 1 | 2 | 1 | 3 |
| 435: | 2 | 1 | 4 | 4 | 1 | 8 | 2 | 2 | 4 | 3 | 4 | 5 | 12 | 12 |
| 449: | 8 | 8 | 7 | 9 | 7 | 5 | 11 | 12 | 10 | 6 | 5 | 8 | 5 | 3 |
| 463: | 6 | 6 | 4 | 5 | 7 | 8 | 3 | 0 | 5 | 3 | 4 | 3 | 3 | 5 |
| 477: | 3 | 4 | 4 | 6 | 3 | 5 | 2 | 2 | 4 | 3 | 1 | 4 | 2 | 2 |
| 491: | 2 | 1 | 2 | 3 | 0 | 2 | 2 | 0 | 3 | 3 | 2 | 2 | 1 | 2 |
| 505: | 2 | 0 | 1 | 0 | 3 | 0 | 1 | 1 | 0 | 3 | 0 | 3 | 3 | 3 |
| 519: | 2 | 3 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 0 | 1 | 0 |
| 533: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 |
| 547: | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 561: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 575: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 589: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 |
| 603: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 1 | 0 | 0 | 1 |
| 617: | 1 | 1 | 2 | 0 | 3 | 1 | 2 | 2 | 0 | 0 | 1 | 1 | 2 | 1 |
| 631: | 0 | 1 | 1 | 0 | 3 | 1 | 4 | 0 | 3 | 3 | 0 | 0 | 3 | 5 |
| 645: | 1 | 3 | 5 | 10 | 2 | 7 | 2 | 2 | 4 | 3 | 0 | 0 | 0 | 0 |
| 659: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 673: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 687: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 701: | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 715: | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 729: | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 2 | 0 | 0 | 0 | 2 | 0 | 0 |
| 743: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 757: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 771: | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 785: | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 799: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 813: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 827: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 841: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 855: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 869: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 883: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 897: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 911: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 925: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 939: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 953: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 967: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 981: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 995: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1009: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1023: | 0 | 0 | | | | | | | | | | | | |

Eberline Services
Oak Ridge Laboratory

Gross Sample Counts Within Peak Regions  Generated: 11-OCT-2005 10:59:40.33

Detector ID: 3  Acquisition Start: 11-OCT-2005 07:31:03.01
Live Time: 0 02:50:03.00  Real Time: 0 02:50:03.00
Batch Id: 0509118A-TH  Sample Id: 03
Sample Type: TH

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 3988.40 | 98 | 0 | 87.26 | 161.62 | 99 | 101 | 9.61E-03 | 10.1 | |
| 2 | 0 | 4638.00 | 160 | 0 | 34.77 | 378.79 | 307 | 102 | 1.57E-02 | 7.9 | |
| 3 | 0 | 4898.03 | 367 | 0 | 87.43 | 466.92 | 409 | 128 | 3.60E-02 | 5.2 | |
| 4 | 0 | 5393.28 | 89 | 0 | 10.36 | 636.79 | 553 | 104 | 8.72E-03 | 10.6 | |
| 5 | 0 | 5846.17 | 6 | 0 | 229.79 | 794.50 | 743 | 124 | 5.88E-04 | 40.8 | |

Background Counts Within Peak Regions  Generated: 11-OCT-2005 10:59:45.29

Acquisition Start: 7-OCT-2005 17:05:33.01
Live Time: 0 16:40:07.00  Real Time: 0 16:40:07.00

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 3950.38 | 1 | 0 | 3.10 | 149.00 | 99 | 101 | 1.67E-05 | 100.0 | |
| 2 | 0 | 4578.25 | 5 | 0 | 260.78 | 357.50 | 307 | 102 | 8.33E-05 | 44.7 | |
| 3 | 0 | 4917.72 | 5 | 0 | 372.55 | 472.50 | 409 | 128 | 8.33E-05 | 44.7 | |
| 4 | 0 | 5301.36 | 5 | 0 | 3.10 | 604.50 | 553 | 104 | 8.33E-05 | 44.7 | |
| 5 | 0 | 5870.42 | 9 | 0 | 329.08 | 804.50 | 743 | 124 | 1.50E-04 | 33.3 | |

Net Sample Counts Within Peak Regions  Generated: 11-OCT-2005 10:59:45.58

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 3988.40* | 98 | 0 | 87.26 | 161.62 | 99 | 101 | 9.59E-03 | 10.1 | |
| 2 | 0 | 4638.00* | 159 | 0 | 34.77 | 378.79 | 307 | 102 | 1.56E-02 | 8.0 | |
| 3 | 0 | 4898.03* | 366 | 0 | 87.43 | 466.92 | 409 | 128 | 3.59E-02 | 5.2 | |
| 4 | 0 | 5393.28* | 88 | 0 | 10.36 | 636.79 | 553 | 104 | 8.64E-03 | 10.7 | |
| 5 | 0 | 5846.17* | 4 | 0 | 229.79 | 794.50 | 743 | 124 | 4.38E-04 | 56.0 | |

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.0 Generated 11-OCT-2005 10:59:46

Configuration : MCA0:[AMSCOUNT]0000C192$1
Analyses by : ROIPEAK V1.2,PEAKEFF V2.2,ENBACK V1.6,NID V3.3
Sample title : VPBR092705SL17
Sample date : 27-SEP-2005 00:00:00 Acquisition date : 11-OCT-2005 07:31:03
Sample ID : 03 Sample quantity : 1.0255 gram
Sample type : TH Sample geometry :
Detector name : 003 Detector geometry:
Elapsed live time: 0 02:50:03.00 Elapsed real time: 0 02:50:03.00 0.0%
Energy tolerance : 100.00 keV Half life ratio : 8.00
Errors propagated: Yes Systematic Error : 3.00 %
Efficiency type : Average value Efficiencies at : Peak Energy
Abundance limit : 75.00

Post-NID Peak Search Report

| It | Energy | Area | FWHM | Channel | Left | Pw | %Err | Fit | Nuclides | Activity pCi/gram |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 3988.40* | 98 | 87.26 | 161.62 | 99 | 101 | 20.2 | | TH-232 | 1.24 |
| 0 | 4638.00* | 159 | 34.77 | 378.79 | 307 | 102 | 15.9 | | TH-230 | 2.03 |
| 0 | 4898.03* | 366 | 87.43 | 466.92 | 409 | 128 | 10.5 | | TH229 | 4.67 |
| 0 | 5393.28* | 88 | 10.36 | 636.79 | 553 | 104 | 21.4 | | TH-228 | 1.14 |
| 0 | 5846.17* | 4229.79 | | 794.50 | 743 | 124 | 12.0 | | TH-227 | 5.830E-02 |

Eberline Services
Oak Ridge Laboratory

ALPHA SPECTROMETRY REPORT
11-OCT-2005 10:59:56

**********

Spectral File: ND_AMS_ARCHIVE_S:S_0509118A-TH$04_TH.CNF

**********

| | | | |
|---|---|---|---|
| BATCH ID: | 0509118A-TH | SAMPLE ID: | 04 |
| SAMPLE DATE: | 27-SEP-2005 00:00 | ALIQUOT: | 9.981E-01 gram |
| SAMPLE TITLE: | VPBR092705SL17 | DETECTOR NUMBER: | 005 |
| ACQ DATE: | 11-OCT-2005 07:31 | AVERAGE EFFICIENCY: | 21.21% |
| ELAPSED LIVE TIME: | 10204. | RECOVERY: | 99.18% |
| TRACER ID: | TH-18A | TRACER FWHM (kev): | 112.18 |
| LAMBDA VALUE: | 453. | ROI TYPE: | STANDARD |
| TRACER DPM AT SAMPLE DATE: | 10.184 | CONFIDENCE FACTOR: | 4.65 |
| SAMPLE MATRIX: | SOIL | LLD CONSTANT: | 2.71 |
| ENERGY CAL DATE: | 5-OCT-2005 05:14 | EFF CAL DATE: | 5-OCT-2005 05:14 |
| BKG FILENAME: | B_005_7OCT05 | BKG ELAPSED TIME: | 60001. |

**********

NUCLIDE ACTIVITY SUMMARY

| NUCLIDE | ENERGY | NET AREA | BKG | %ABN | ACTIVITY pCi/ gram | TPU/ERROR 2-SIGMA | MDC pCi/ gram |
|---|---|---|---|---|---|---|---|
| TH-227 | 5850.0 | 4.98 | 1.02 | 97.5 | 6.453E-02 | 6.518E-02 | 9.586E-02 |
| TH-228 | 5400.0 | 80.81 | 1.19 | 99.9 | 1.035E+00 | 2.832E-01 | 9.827E-02 |
| TH229 | 4872.0 | 362.49 | 0.51 | 99.5 | 4.596E+00 | 6.455E-01 | 7.647E-02 |
| TH-230 | 4672.0 | 144.15 | 0.85 | 99.8 | 1.822E+00 | 4.175E-01 | 8.846E-02 |
| TH-232 | 3997.0 | 83.81 | 1.19 | 100.0 | 1.058E+00 | 2.859E-01 | 9.822E-02 |

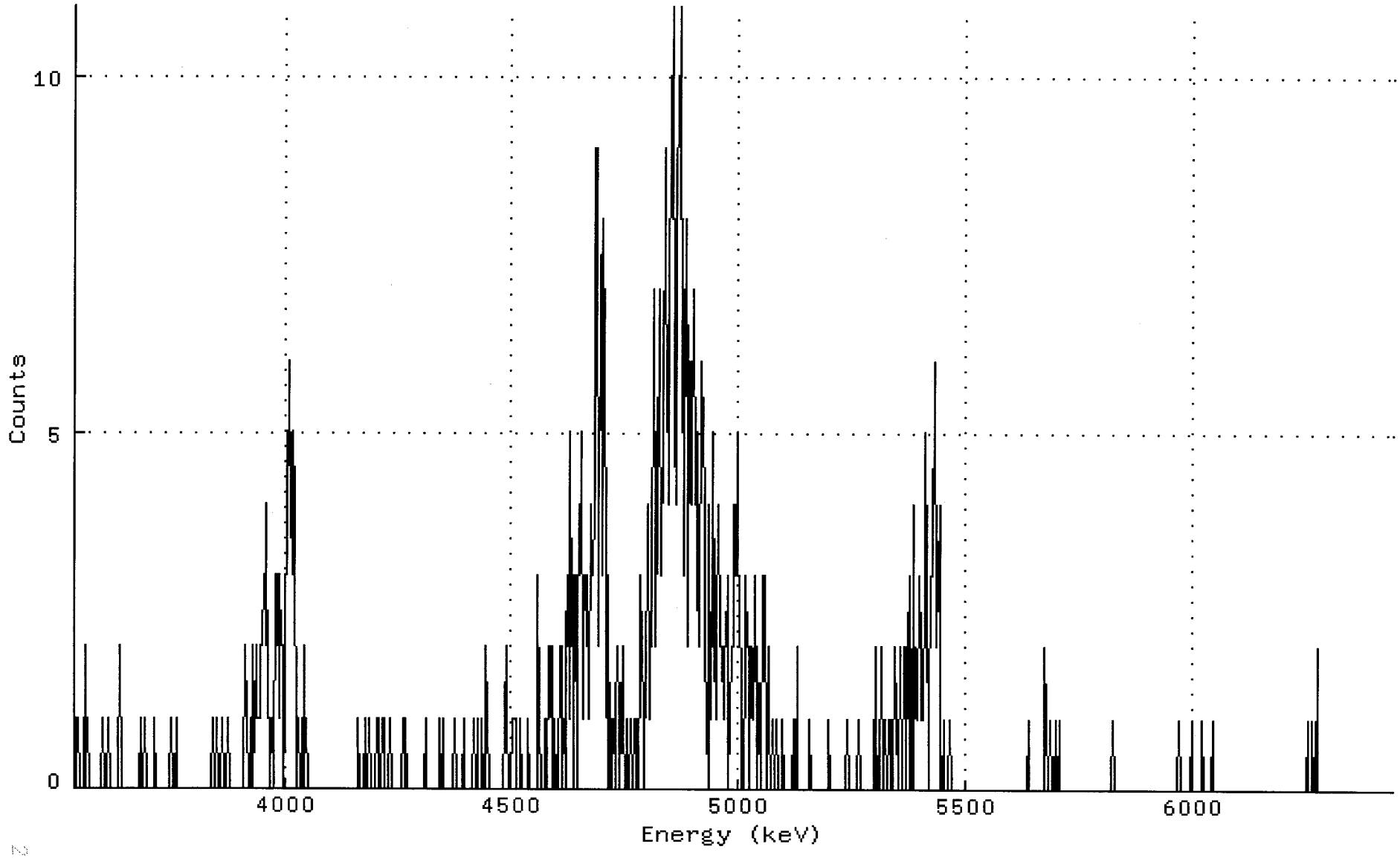
**********

*** Tracer FWHM > 80.0 Kev ***

Analyst _____ Date 10-11-05

Reviewer _____ Date 10/11/05

Spectrum : DKA100:[ALPHA.ALUSR.ARCHIVE.S]S_0509118A-TH$04_TH.CNF;1
Title : 005
Sample Title: VPBR092705SL17
Start Time: 11-OCT-2005 07:31 Sample Time: 27-SEP-2005 00:00 Energy Offset: 3.52553E+03
Real Time : 0 02:50:04.00 Sample ID : 04 Energy Slope : 2.97357E+00
Live Time : 0 02:50:04.00 Sample Type: TH Energy Quad : -1.26013E-04



Channel Contents for ND_AMS_ARCHIVE_S:S_0509118A-TH$04_TH

Channel

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1: | 10204 | 10204 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 2 | 0 | 1 | 0 |
| 15: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 |
| 29: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 |
| 43: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 1 |
| 57: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 71: | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 85: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 99: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 0 |
| 113: | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 127: | 0 | 0 | 0 | 0 | 2 | 1 | 1 | 0 | 0 | 2 | 0 | 1 | 2 | 1 |
| 141: | 1 | 1 | 2 | 2 | 3 | 2 | 4 | 1 | 1 | 0 | 1 | 1 | 0 | 3 |
| 155: | 3 | 1 | 3 | 2 | 2 | 0 | 1 | 5 | 3 | 6 | 4 | 3 | 5 | 4 |
| 169: | 0 | 1 | 1 | 0 | 0 | 0 | 2 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 183: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 197: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 211: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| 225: | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 0 |
| 239: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 |
| 253: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 267: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 |
| 281: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 295: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 0 | 0 |
| 309: | 0 | 1 | 0 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 323: | 0 | 0 | 0 | 0 | 1 | 2 | 1 | 0 | 0 | 0 | 1 | 1 | 1 | 0 |
| 337: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 351: | 0 | 3 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 2 | 1 | 2 | 0 | 2 |
| 365: | 0 | 0 | 1 | 0 | 2 | 2 | 0 | 1 | 0 | 2 | 3 | 1 | 5 | 2 |
| 379: | 3 | 0 | 3 | 0 | 3 | 3 | 5 | 1 | 3 | 3 | 2 | 3 | 1 | 4 |
| 393: | 4 | 3 | 4 | 9 | 9 | 2 | 3 | 7 | 8 | 3 | 7 | 2 | 0 | 3 |
| 407: | 0 | 0 | 1 | 1 | 0 | 1 | 2 | 1 | 0 | 1 | 2 | 1 | 0 | 0 |
| 421: | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 2 | 3 | 2 | 1 | 0 |
| 435: | 2 | 3 | 4 | 1 | 3 | 2 | 7 | 3 | 2 | 4 | 7 | 6 | 3 | 5 |
| 449: | 9 | 7 | 6 | 4 | 6 | 10 | 8 | 11 | 5 | 4 | 8 | 10 | 8 | 11 |
| 463: | 5 | 7 | 3 | 8 | 5 | 2 | 6 | 4 | 5 | 7 | 4 | 5 | 3 | 2 |
| 477: | 6 | 6 | 5 | 4 | 2 | 1 | 0 | 4 | 1 | 3 | 5 | 2 | 1 | 2 |
| 491: | 4 | 2 | 2 | 2 | 1 | 2 | 2 | 3 | 0 | 1 | 2 | 2 | 4 | 3 |
| 505: | 5 | 3 | 3 | 1 | 0 | 0 | 2 | 3 | 2 | 2 | 0 | 2 | 1 | 1 |
| 519: | 3 | 0 | 2 | 1 | 0 | 0 | 3 | 3 | 3 | 0 | 2 | 1 | 0 | 1 |
| 533: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 547: | 0 | 1 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 561: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 575: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 589: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 603: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 1 | 0 |
| 617: | 2 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 2 | 2 | 1 | 0 |
| 631: | 0 | 2 | 0 | 0 | 2 | 2 | 0 | 2 | 3 | 0 | 0 | 4 | 0 | 2 |
| 645: | 1 | 1 | 3 | 2 | 1 | 1 | 3 | 5 | 3 | 0 | 1 | 3 | 3 | 3 |
| 659: | 6 | 2 | 2 | 3 | 4 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 |
| 673: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 687: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 701: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 715: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 729: | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 743: | 0 | 0 | 2 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| 757: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 771: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 785: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 799: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 813: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 827: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 841: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 855: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 869: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 883: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 897: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 911: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 925: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 939: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 953: | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 |
| 967: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 981: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 995: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1009: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1023: | 0 | 0 | | | | | | | | | | | | |

Eberline Services
Oak Ridge Laboratory

Gross Sample Counts Within Peak Regions  Generated: 11-OCT-2005 10:59:52.05

Detector ID: 5  Acquisition Start: 11-OCT-2005 07:31:22.01
Live Time: 0 02:50:04.00  Real Time: 0 02:50:04.00
Batch Id: 0509118A-TH  Sample Id: 04
Sample Type: TH

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 3975.85 | 85 | 0 | 64.65 | 152.42 | 93 | 103 | 8.33E-03 | 10.8 | |
| 2 | 0 | 4643.82 | 145 | 0 | 78.75 | 382.27 | 306 | 106 | 1.42E-02 | 8.3 | |
| 3 | 0 | 4891.89 | 363 | 0 | 112.18 | 468.81 | 411 | 132 | 3.56E-02 | 5.2 | |
| 4 | 0 | 5385.48 | 82 | 0 | 63.92 | 643.01 | 560 | 107 | 8.04E-03 | 11.0 | |
| 5 | 0 | 5924.75 | 6 | 0 | 368.72 | 836.50 | 755 | 128 | 5.88E-04 | 40.8 | |

Background Counts Within Peak Regions  Generated: 11-OCT-2005 10:59:54.27

Acquisition Start: 7-OCT-2005 17:05:39.01
Live Time: 0 16:40:01.00  Real Time: 0 16:40:01.00

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 3953.03 | 7 | 0 | 230.14 | 144.00 | 93 | 103 | 1.17E-04 | 37.8 | |
| 2 | 0 | 4578.72 | 5 | 0 | 233.13 | 358.50 | 306 | 106 | 8.33E-05 | 44.7 | |
| 3 | 0 | 4917.31 | 3 | 0 | 367.62 | 476.50 | 411 | 132 | 5.00E-05 | 57.7 | |
| 4 | 0 | 5304.02 | 7 | 0 | 2.99 | 613.00 | 560 | 107 | 1.17E-04 | 37.8 | |
| 5 | 0 | 5876.17 | 6 | 0 | 340.72 | 818.50 | 755 | 128 | 1.00E-04 | 40.8 | |

Net Sample Counts Within Peak Regions  Generated: 11-OCT-2005 10:59:54.55

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 3975.85* | 84 | 0 | 64.65 | 152.42 | 93 | 103 | 8.21E-03 | 11.0 | |
| 2 | 0 | 4643.82* | 144 | 0 | 78.75 | 382.27 | 306 | 106 | 1.41E-02 | 8.4 | |
| 3 | 0 | 4891.89* | 362 | 0 | 112.18 | 468.81 | 411 | 132 | 3.55E-02 | 5.3 | |
| 4 | 0 | 5385.48* | 81 | 0 | 63.92 | 643.01 | 560 | 107 | 7.92E-03 | 11.2 | |
| 5 | 0 | 5924.75* | 5 | 0 | 368.72 | 836.50 | 755 | 128 | 4.88E-04 | 49.9 | |

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.0 Generated 11-OCT-2005 10:59:55

Configuration : MCA0:[AMSCOUNT]0000C192$1
Analyses by : ROIPEAK V1.2,PEAKEFF V2.2,ENBACK V1.6,NID V3.3
Sample title : VPBR092705SL17
Sample date : 27-SEP-2005 00:00:00 Acquisition date : 11-OCT-2005 07:31:22
Sample ID : 04 Sample quantity : 0.99810 gram
Sample type : TH Sample geometry :
Detector name : 005 Detector geometry:
Elapsed live time: 0 02:50:04.00 Elapsed real time: 0 02:50:04.00 0.0%
Energy tolerance : 100.00 keV Half life ratio : 8.00
Errors propagated: Yes Systematic Error : 3.00 %
Efficiency type : Average value Efficiencies at : Peak Energy
Abundance limit : 75.00

Post-NID Peak Search Report

| It | Energy | Area | FWHM | Channel | Left | Pw | %Err | Fit | Nuclides | Activity pCi/gram |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 3975.85* | 84 | 64.65 | 152.42 | 93 | 103 | 22.0 | | TH-232 | 1.05 |
| 0 | 4643.82* | 144 | 78.75 | 382.27 | 306 | 106 | 16.7 | | TH-230 | 1.81 |
| 0 | 4891.89* | 362 | 112.18 | 468.81 | 411 | 132 | 10.5 | | TH229 | 4.56 |
| 0 | 5385.48* | 81 | 63.92 | 643.01 | 560 | 107 | 22.4 | | TH-228 | 1.03 |
| 0 | 5924.75* | | 5368.72 | 836.50 | 755 | 128 | 99.8 | | TH-227 | 6.399E-02 |

Eberline Services
Oak Ridge Laboratory

ALPHA SPECTROMETRY REPORT
11-OCT-2005 11:00:16

**********

Spectral File: ND_AMS_ARCHIVE_S:S_0509118A-TH$05_TH.CNF

**********

| | | | |
|---|---|---|---|
| BATCH ID: | 0509118A-TH | SAMPLE ID: | 05 |
| SAMPLE DATE: | 27-SEP-2005 00:00 | ALIQUOT: | 1.041E+00 gram |
| SAMPLE TITLE: | VPBR092705SL18 | DETECTOR NUMBER: | 006 |
| ACQ DATE: | 11-OCT-2005 07:31 | AVERAGE EFFICIENCY: | 20.87% |
| ELAPSED LIVE TIME: | 10203. | RECOVERY: | 89.55% |
| TRACER ID: | TH-18A | TRACER FWHM (kev): | 61.10 |
| LAMBDA VALUE: | 455. | ROI TYPE: | STANDARD |
| TRACER DPM AT SAMPLE DATE: | 10.238 | CONFIDENCE FACTOR: | 4.65 |
| SAMPLE MATRIX: | SOIL | LLD CONSTANT: | 2.71 |
| ENERGY CAL DATE: | 5-OCT-2005 05:14 | EFF CAL DATE: | 5-OCT-2005 05:14 |
| BKG FILENAME: | B_006_7OCT05 | BKG ELAPSED TIME: | 60008. |

**********

NUCLIDE ACTIVITY SUMMARY

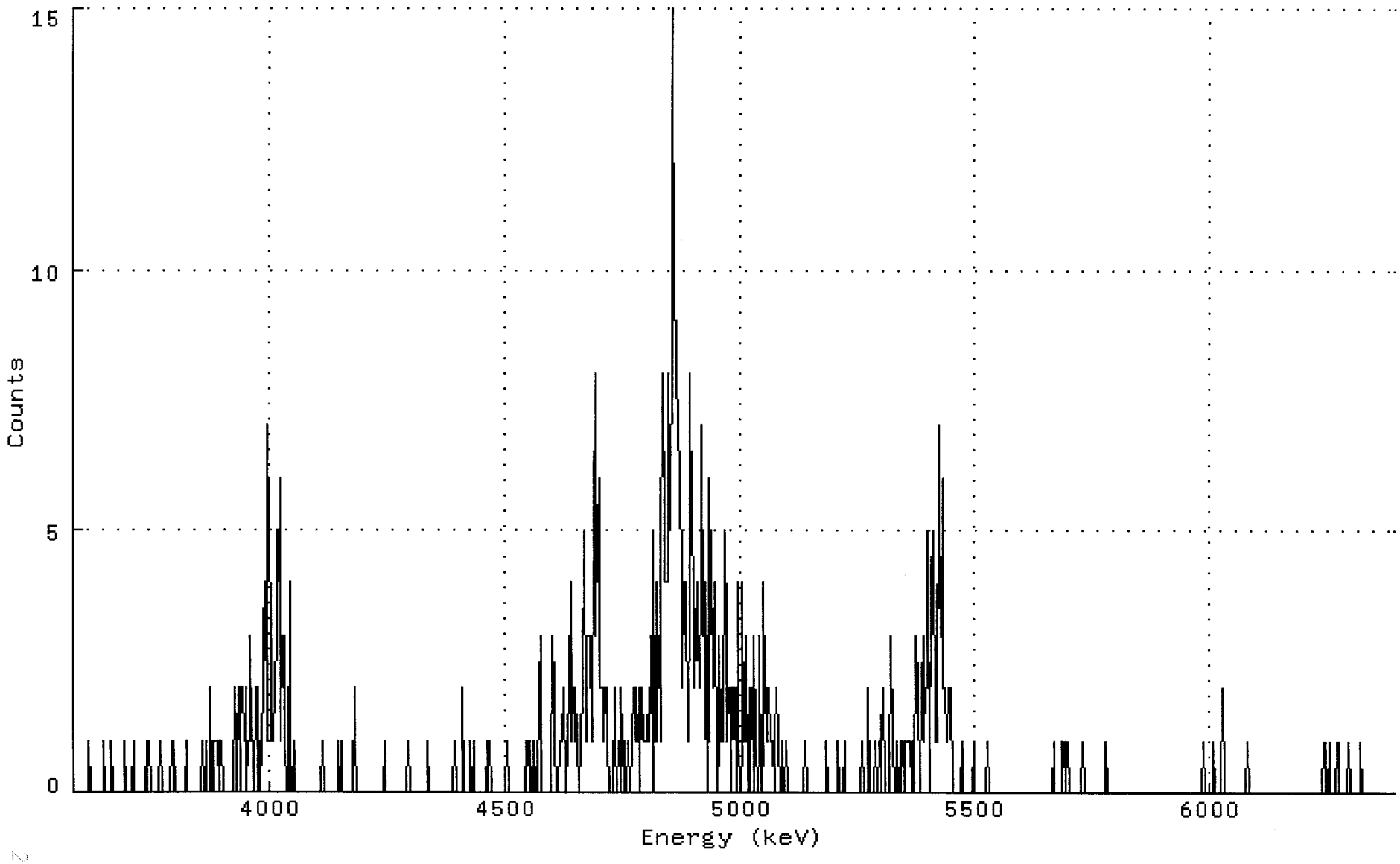
| NUCLIDE | ENERGY | NET AREA | BKG | %ABN | ACTIVITY pCi/ gram | TPU/ERROR 2-SIGMA | MDC pCi/ gram |
|---|---|---|---|---|---|---|---|
| TH-227 | 5850.0 | 5.98 | 1.02 | 97.5 | 8.359E-02 | 7.607E-02 | 1.034E-01 |
| TH-228 | 5400.0 | 95.15 | 0.85 | 99.9 | 1.315E+00 | 3.437E-01 | 9.530E-02 |
| TH229 | 4872.0 | 323.81 | 1.19 | 99.5 | 4.429E+00 | 6.430E-01 | 1.064E-01 |
| TH-230 | 4672.0 | 100.15 | 0.85 | 99.8 | 1.366E+00 | 3.515E-01 | 9.542E-02 |
| TH-232 | 3997.0 | 93.83 | 0.17 | 100.0 | 1.277E+00 | 3.346E-01 | 6.299E-02 |

**********

Analyst Jay Price — Date 10-11-05

Reviewer Glen Gregley — Date 10/11/05

Spectrum : DKA100:[ALPHA.ALUSR.ARCHIVE.S]S_0509118A-TH$05_TH.CNF;1
Title : 006
Sample Title: VPBR092705SL18
Start Time: 11-OCT-2005 07:31 Sample Time: 27-SEP-2005 00:00 Energy Offset: 3.57082E+03
Real Time : 0 02:50:03.00 Sample ID : 05 Energy Slope : 2.86980E+00
Live Time : 0 02:50:03.00 Sample Type: TH Energy Quad : -1.13562E-04



Channel Contents for ND_AMS_ARCHIVE_S:S_0509118A-TH$05_TH

Channel

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1: | 10203 | 10203 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 29: | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 43: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 57: | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 |
| 71: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 85: | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 99: | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 2 | 0 | 0 | 1 | 1 | 1 | 0 |
| 113: | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 0 |
| 127: | 2 | 0 | 2 | 2 | 1 | 2 | 0 | 1 | 1 | 3 | 1 | 1 | 0 | 2 |
| 141: | 0 | 2 | 0 | 1 | 2 | 3 | 4 | 1 | 7 | 5 | 3 | 1 | 1 | 2 |
| 155: | 3 | 5 | 4 | 6 | 1 | 3 | 3 | 1 | 0 | 0 | 4 | 0 | 0 | 1 |
| 169: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 183: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 197: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 211: | 0 | 0 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 225: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 239: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 253: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 267: | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 281: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 295: | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 |
| 309: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 323: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 337: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 1 |
| 351: | 0 | 0 | 0 | 2 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| 365: | 2 | 1 | 0 | 0 | 0 | 1 | 1 | 1 | 2 | 0 | 1 | 1 | 2 | 4 |
| 379: | 1 | 2 | 1 | 2 | 1 | 0 | 0 | 1 | 2 | 2 | 5 | 1 | 3 | 3 |
| 393: | 3 | 1 | 1 | 5 | 8 | 3 | 5 | 6 | 2 | 2 | 2 | 1 | 2 | 2 |
| 407: | 1 | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 1 | 0 | 2 | 1 | 0 | 1 |
| 421: | 0 | 1 | 1 | 0 | 1 | 1 | 2 | 2 | 1 | 1 | 2 | 0 | 2 | 1 |
| 435: | 1 | 1 | 1 | 2 | 1 | 3 | 0 | 5 | 1 | 4 | 1 | 3 | 1 | 4 |
| 449: | 8 | 5 | 4 | 4 | 4 | 8 | 5 | 9 | 15 | 9 | 9 | 8 | 7 | 6 |
| 463: | 4 | 2 | 4 | 4 | 4 | 1 | 4 | 8 | 5 | 4 | 2 | 3 | 4 | 3 |
| 477: | 2 | 4 | 7 | 3 | 4 | 2 | 0 | 6 | 1 | 5 | 2 | 3 | 4 | 0 |
| 491: | 1 | 3 | 1 | 3 | 1 | 5 | 3 | 1 | 2 | 2 | 0 | 2 | 2 | 2 |
| 505: | 0 | 4 | 1 | 0 | 1 | 4 | 1 | 1 | 3 | 0 | 2 | 0 | 2 | 0 |
| 519: | 3 | 1 | 0 | 1 | 3 | 0 | 1 | 4 | 2 | 1 | 2 | 2 | 1 | 1 |
| 533: | 1 | 0 | 1 | 2 | 1 | 1 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 0 |
| 547: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 561: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 575: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 589: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 603: | 1 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| 617: | 0 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 3 | 1 | 1 | 0 | 1 | 0 |
| 631: | 0 | 1 | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 0 | 3 |
| 645: | 3 | 2 | 0 | 0 | 2 | 3 | 1 | 2 | 2 | 5 | 0 | 4 | 4 | 5 |
| 659: | 1 | 1 | 1 | 7 | 4 | 3 | 6 | 2 | 2 | 1 | 1 | 2 | 2 | 2 |
| 673: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 687: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 701: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 715: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 729: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 743: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 757: | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 771: | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 785: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 799: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 813: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 827: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 841: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 855: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 869: | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 883: | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 897: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 911: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 925: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 939: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 953: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 967: | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | |
| 981: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 995: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 1009: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 1023: | 0 | 0 | | | | | | | | | | | | |

Eberline Services
Oak Ridge Laboratory

Gross Sample Counts Within Peak Regions  Generated: 11-OCT-2005 11:00:00.20

Detector ID: 6  Acquisition Start: 11-OCT-2005 07:31:44.01
Live Time: 0 02:50:03.00  Real Time: 0 02:50:03.00
Batch Id: 0509118A-TH  Sample Id: 05
Sample Type: TH

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 3981.08 | 94 | 0 | 53.00 | 143.78 | 80 | 107 | 9.21E-03 | 10.3 | |
| 2 | 0 | 4651.89 | 101 | 0 | 33.91 | 382.50 | 301 | 109 | 9.90E-03 | 10.0 | |
| 3 | 0 | 4900.19 | 325 | 0 | 61.10 | 472.05 | 409 | 137 | 3.19E-02 | 5.5 | |
| 4 | 0 | 5384.35 | 96 | 0 | 34.69 | 648.58 | 563 | 111 | 9.41E-03 | 10.2 | |
| 5 | 0 | 5932.31 | 7 | 0 | 2.87 | 851.57 | 765 | 132 | 6.86E-04 | 37.8 | |

Background Counts Within Peak Regions  Generated: 11-OCT-2005 11:00:14.98

Acquisition Start: 7-OCT-2005 17:05:43.01
Live Time: 0 16:40:08.00  Real Time: 0 16:40:08.00

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 3951.66 | 1 | 0 | 2.88 | 133.00 | 80 | 107 | 1.67E-05 | 100.0 | |
| 2 | 0 | 4577.37 | 5 | 0 | 161.17 | 355.00 | 301 | 109 | 8.33E-05 | 44.7 | |
| 3 | 0 | 4916.11 | 7 | 0 | 290.69 | 477.00 | 409 | 137 | 1.17E-04 | 37.8 | |
| 4 | 0 | 5303.08 | 5 | 0 | 143.90 | 618.00 | 563 | 111 | 8.33E-05 | 44.7 | |
| 5 | 0 | 5877.12 | 6 | 0 | 0.00 | 830.50 | 765 | 132 | 1.00E-04 | 40.8 | |

Net Sample Counts Within Peak Regions  Generated: 11-OCT-2005 11:00:15.28

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 3981.08* | 94 | 0 | 53.00 | 143.78 | 80 | 107 | 9.20E-03 | 10.3 | |
| 2 | 0 | 4651.89* | 100 | 0 | 33.91 | 382.50 | 301 | 109 | 9.82E-03 | 10.0 | |
| 3 | 0 | 4900.19* | 324 | 0 | 61.10 | 472.05 | 409 | 137 | 3.17E-02 | 5.6 | |
| 4 | 0 | 5384.35* | 95 | 0 | 34.69 | 648.58 | 563 | 111 | 9.33E-03 | 10.3 | |
| 5 | 0 | 5932.31* | 6 | 0 | 2.87 | 851.57 | 765 | 132 | 5.86E-04 | 44.8 | |

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.0 Generated 11-OCT-2005 11:00:16

| | | | |
|---|---|---|---|
| Configuration | : MCA0:[AMSCOUNT]0000C192$1 | | |
| Analyses by | : ROIPEAK V1.2,PEAKEFF V2.2,ENBACK V1.6,NID V3.3 | | |
| Sample title | : VPBR092705SL18 | | |
| Sample date | : 27-SEP-2005 00:00:00 | Acquisition date | : 11-OCT-2005 07:31:44 |
| Sample ID | : 05 | Sample quantity | : 1.0413 gram |
| Sample type | : TH | Sample geometry | : |
| Detector name | : 006 | Detector geometry | : |
| Elapsed live time | : 0 02:50:03.00 | Elapsed real time | : 0 02:50:03.00 0.0% |
| Energy tolerance | : 100.00 keV | Half life ratio | : 8.00 |
| Errors propagated | : Yes | Systematic Error | : 3.00 % |
| Efficiency type | : Average value | Efficiencies at | : Peak Energy |
| Abundance limit | : 75.00 | | |

Post-NID Peak Search Report

| It | Energy | Area | FWHM | Channel | Left | Pw | %Err | Fit | Nuclides | Activity pCi/gram |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 3981.08* | 94 | 53.00 | 143.78 | 80 | 107 | 20.7 | | TH-232 | 1.14 |
| 0 | 4651.89* | 100 | 33.91 | 382.50 | 301 | 109 | 20.1 | | TH-230 | 1.22 |
| 0 | 4900.19* | 324 | 61.10 | 472.05 | 409 | 137 | 11.1 | | TH229 | 3.97 |
| 0 | 5384.35* | 95 | 34.69 | 648.58 | 563 | 111 | 20.6 | | TH-228 | 1.18 |
| 0 | 5932.31* | 6 | 2.87 | 851.57 | 765 | 132 | 89.6 | | TH-227 | 7.485E-02 |

Eberline Services
Oak Ridge Laboratory

ALPHA SPECTROMETRY REPORT
11-OCT-2005 11:00:27

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Spectral File: ND_AMS_ARCHIVE_S:S_0509118A-TH$06_TH.CNF

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| | | | |
|---|---|---|---|
| BATCH ID: | 0509118A-TH | SAMPLE ID: | 06 |
| SAMPLE DATE: | 27-SEP-2005 00:00 | ALIQUOT: | 1.058E+00 gram |
| SAMPLE TITLE: | VPBR092705SL19 | DETECTOR NUMBER: | 007 |
| ACQ DATE: | 11-OCT-2005 07:32 | AVERAGE EFFICIENCY: | 20.56% |
| ELAPSED LIVE TIME: | 10204. | RECOVERY: | 98.65% |
| TRACER ID: | TH-18A | TRACER FWHM (kev): | 114.59 |
| LAMBDA VALUE: | 454. | ROI TYPE: | STANDARD |
| TRACER DPM AT SAMPLE DATE: | 10.197 | CONFIDENCE FACTOR: | 4.65 |
| SAMPLE MATRIX: | SOIL | LLD CONSTANT: | 2.71 |
| ENERGY CAL DATE: | 5-OCT-2005 05:14 | EFF CAL DATE: | 5-OCT-2005 05:14 |
| BKG FILENAME: | B_007_7OCT05 | BKG ELAPSED TIME: | 60004. |

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NUCLIDE ACTIVITY SUMMARY

| NUCLIDE | ENERGY | NET AREA | BKG | %ABN | ACTIVITY pCi/ gram | TPU/ERROR 2-SIGMA | MDC pCi/ gram |
|---|---|---|---|---|---|---|---|
| TH-227 | 5850.0 | 7.81 | 1.19 | 97.5 | 9.901E-02 | 7.849E-02 | 9.855E-02 |
| TH-228 | 5400.0 | 64.32 | 0.68 | 99.9 | 8.059E-01 | 2.390E-01 | 8.085E-02 |
| TH229 | 4872.0 | 350.00 | 0.00 | 99.5 | 4.342E+00 | 6.157E-01 | 3.362E-02 |
| TH-230 | 4672.0 | 196.66 | 0.34 | 99.8 | 2.432E+00 | 5.179E-01 | 6.705E-02 |
| TH-232 | 3997.0 | 49.15 | 0.85 | 100.0 | 6.068E-01 | 1.994E-01 | 8.639E-02 |

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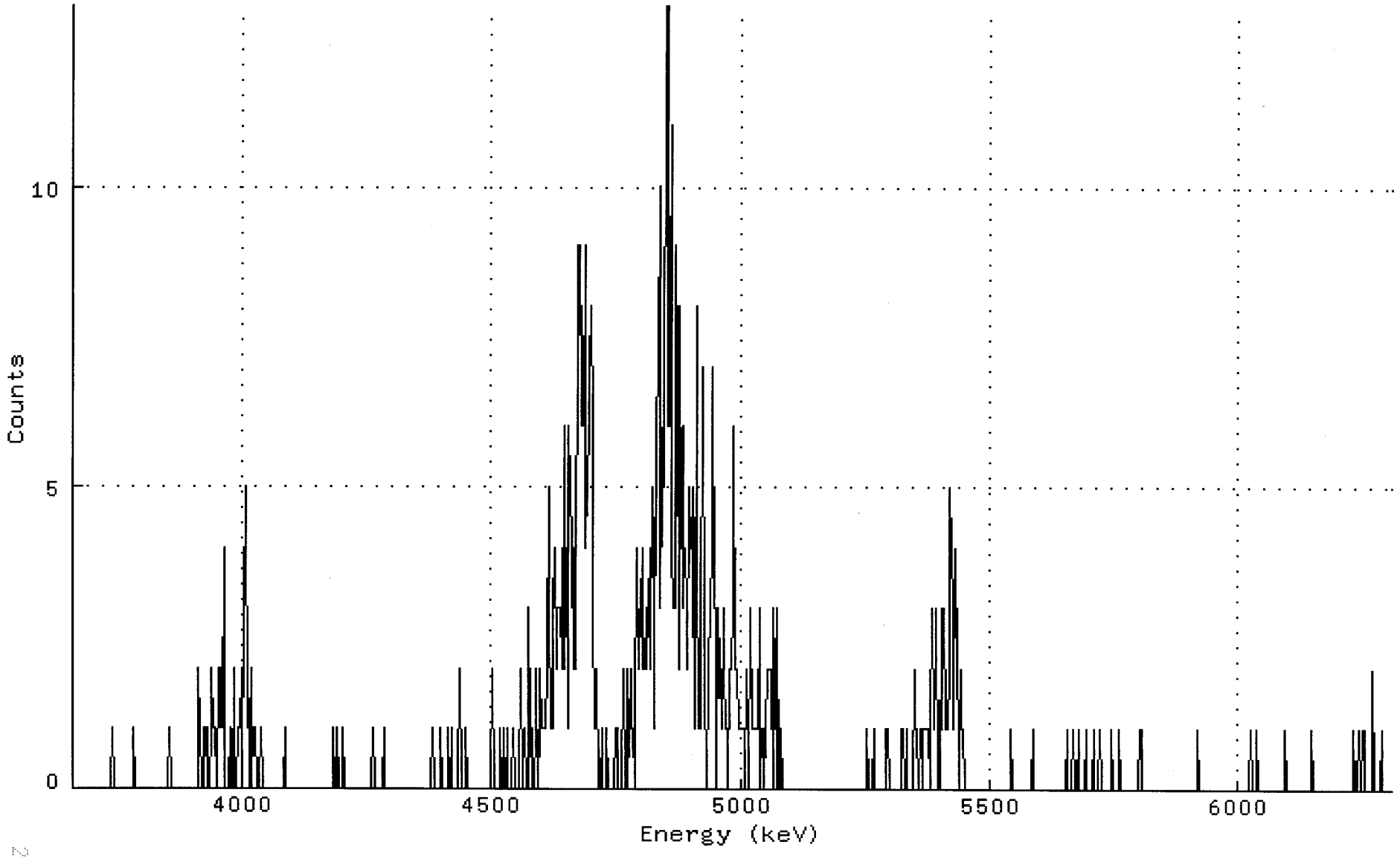
*** Tracer FWHM > 80.0 Kev ***

Analyst Jeff Price 10-11-05
Date

Reviewer [illegible] 10/11/05
Date

Spectrum : DKA100:[ALPHA.ALUSR.ARCHIVE.S]S_0509118A-TH$06_TH.CNF;1
Title : 007
Sample Title: VPBR092705SL19
Start Time: 11-OCT-2005 07:32 Sample Time: 27-SEP-2005 00:00 Energy Offset: 3.65164E+03
Real Time : 0 02:50:04.00 Sample ID : 06 Energy Slope : 2.68868E+00
Live Time : 0 02:50:04.00 Sample Type: TH Energy Quad : -9.49577E-05



Channel Contents for ND_AMS_ARCHIVE_S:S_0509118A-TH$06_TH

Channel

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1: | 10204 | 10204 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 29: | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 43: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 57: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 71: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 85: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| 99: | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 2 | 1 | 1 | 0 | 0 |
| 113: | 2 | 1 | 2 | 1 | 4 | 0 | 0 | 0 | 1 | 0 | 0 | 2 | 0 | 0 |
| 127: | 1 | 1 | 1 | 2 | 0 | 3 | 5 | 1 | 3 | 0 | 2 | 0 | 1 | 1 |
| 141: | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 155: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 169: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 183: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 197: | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 211: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 225: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 239: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 253: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 267: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 281: | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 295: | 2 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 309: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 |
| 323: | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| 337: | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 1 | 1 | 0 | 0 | 3 | 1 | 0 |
| 351: | 1 | 0 | 1 | 2 | 0 | 1 | 2 | 1 | 1 | 1 | 1 | 2 | 5 | 3 |
| 365: | 1 | 1 | 3 | 4 | 2 | 3 | 3 | 3 | 3 | 2 | 6 | 2 | 4 | 1 |
| 379: | 6 | 5 | 4 | 2 | 4 | 2 | 9 | 8 | 9 | 6 | 8 | 6 | 9 | 4 |
| 393: | 5 | 6 | 7 | 8 | 6 | 3 | 1 | 2 | 0 | 0 | 0 | 1 | 0 | 0 |
| 407: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 |
| 421: | 2 | 0 | 2 | 0 | 1 | 2 | 1 | 1 | 0 | 1 | 4 | 2 | 2 | 3 |
| 435: | 4 | 2 | 2 | 3 | 2 | 3 | 4 | 2 | 5 | 4 | 1 | 6 | 7 | 10 |
| 449: | 3 | 5 | 7 | 5 | 13 | 6 | 13 | 6 | 11 | 4 | 3 | 3 | 9 | 7 |
| 463: | 2 | 8 | 4 | 6 | 3 | 4 | 3 | 2 | 5 | 4 | 5 | 4 | 1 | 8 |
| 477: | 4 | 1 | 1 | 2 | 7 | 2 | 2 | 0 | 2 | 2 | 3 | 4 | 7 | 3 |
| 491: | 3 | 0 | 3 | 2 | 2 | 1 | 3 | 2 | 1 | 1 | 0 | 2 | 2 | 3 |
| 505: | 6 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 0 | 2 | 1 | 0 | 3 |
| 519: | 1 | 1 | 1 | 1 | 1 | 1 | 3 | 0 | 1 | 1 | 0 | 1 | 2 | 2 |
| 533: | 2 | 2 | 0 | 3 | 2 | 0 | 3 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 547: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 561: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 575: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 589: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 603: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 617: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 |
| 631: | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 645: | 2 | 1 | 1 | 0 | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 1 |
| 659: | 3 | 1 | 1 | 3 | 0 | 1 | 0 | 3 | 1 | 3 | 1 | 1 | 1 | 2 |
| 673: | 5 | 4 | 3 | 1 | 4 | 2 | 3 | 0 | 2 | 1 | 1 | 0 | 0 | 0 |
| 687: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 701: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 715: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 729: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 743: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 757: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| 771: | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 785: | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 799: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 813: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 |
| 827: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 841: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 855: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 869: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 883: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 897: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 911: | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 925: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 939: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 953: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 967: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 981: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 995: | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1009: | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1023: | 0 | 0 | | | | | | | | | | | | |

Eberline Services
Oak Ridge Laboratory

Gross Sample Counts Within Peak Regions  Generated: 11-OCT-2005 11:00:21.05

Detector ID: 7  Acquisition Start: 11-OCT-2005 07:32:03.01
Live Time: 0 02:50:04.00  Real Time: 0 02:50:04.00
Batch Id: 0509118A-TH  Sample Id: 06
Sample Type: TH

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 3980.11 | 50 | 0 | 50.11 | 122.70 | 55 | 114 | 4.90E-03 | 14.1 | |
| 2 | 0 | 4653.66 | 197 | 0 | 92.70 | 377.72 | 291 | 115 | 1.93E-02 | 7.1 | |
| 3 | 0 | 4894.42 | 350 | 0 | 114.59 | 470.03 | 405 | 145 | 3.43E-02 | 5.3 | |
| 4 | 0 | 5392.93 | 65 | 0 | 54.75 | 663.17 | 569 | 117 | 6.37E-03 | 12.4 | |
| 5 | 0 | 5834.14 | 9 | 0 | 352.22 | 836.44 | 784 | 139 | 8.82E-04 | 33.3 | |

Background Counts Within Peak Regions  Generated: 11-OCT-2005 11:00:25.45

Acquisition Start: 7-OCT-2005 17:05:46.01
Live Time: 0 16:40:04.00  Real Time: 0 16:40:04.00

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 3951.70 | 5 | 0 | 228.57 | 111.50 | 55 | 114 | 8.33E-05 | 44.7 | |
| 2 | 0 | 4577.20 | 2 | 0 | 99.50 | 348.00 | 291 | 115 | 3.33E-05 | 70.7 | |
| 3 | 0 | 4913.84 | 0 | 0 | 0.00 | 477.00 | 405 | 145 | 0.00E+00 | 0.0 | |
| 4 | 0 | 5301.24 | 4 | 0 | 287.73 | 627.00 | 569 | 117 | 6.67E-05 | 50.0 | |
| 5 | 0 | 5876.75 | 7 | 0 | 0.00 | 853.00 | 784 | 139 | 1.17E-04 | 37.8 | |

Net Sample Counts Within Peak Regions  Generated: 11-OCT-2005 11:00:25.76

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 3980.11* | 49 | 0 | 50.11 | 122.70 | 55 | 114 | 4.82E-03 | 14.4 | |
| 2 | 0 | 4653.66* | 197 | 0 | 92.70 | 377.72 | 291 | 115 | 1.93E-02 | 7.1 | |
| 3 | 0 | 4894.42* | 350 | 0 | 114.59 | 470.03 | 405 | 145 | 3.43E-02 | 5.3 | |
| 4 | 0 | 5392.93* | 64 | 0 | 54.75 | 663.17 | 569 | 117 | 6.30E-03 | 12.5 | |
| 5 | 0 | 5834.14* | 8 | 0 | 352.22 | 836.44 | 784 | 139 | 7.65E-04 | 38.8 | |

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.0 Generated 11-OCT-2005 11:00:27

Configuration : MCA0:[AMSCOUNT]0000C192$1
Analyses by : ROIPEAK V1.2,PEAKEFF V2.2,ENBACK V1.6,NID V3.3
Sample title : VPBR092705SL19
Sample date : 27-SEP-2005 00:00:00 Acquisition date : 11-OCT-2005 07:32:03
Sample ID : 06 Sample quantity : 1.0580 gram
Sample type : TH Sample geometry :
Detector name : 007 Detector geometry:
Elapsed live time: 0 02:50:04.00 Elapsed real time: 0 02:50:04.00 0.0%
Energy tolerance : 100.00 keV Half life ratio : 8.00
Errors propagated: Yes Systematic Error : 3.00 %
Efficiency type : Average value Efficiencies at : Peak Energy
Abundance limit : 75.00

Post-NID Peak Search Report

| It | Energy | Area | FWHM | Channel | Left | Pw | %Err | Fit | Nuclides | Activity pCi/gram |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 3980.11* | 49 | 50.11 | 122.70 | 55 | 114 | 28.8 | | TH-232 | 0.599 |
| 0 | 4653.66* | 197 | 92.70 | 377.72 | 291 | 115 | 14.3 | | TH-230 | 2.40 |
| 0 | 4894.42* | 350 | 114.59 | 470.03 | 405 | 145 | 10.7 | | TH229 | 4.28 |
| 0 | 5392.93* | 64 | 54.75 | 663.17 | 569 | 117 | 25.1 | | TH-228 | 0.795 |
| 0 | 5834.14* | 8 | 352.22 | 836.44 | 784 | 139 | 77.7 | | TH-227 | 9.767E-02 |

Eberline Services
Oak Ridge Laboratory

ALPHA SPECTROMETRY REPORT
11-OCT-2005 11:00:40

**********

Spectral File: ND_AMS_ARCHIVE_S:S_0509118A-TH$07_TH.CNF

**********

| | | | |
|---|---|---|---|
| BATCH ID: | 0509118A-TH | SAMPLE ID: | 07 |
| SAMPLE DATE: | 27-SEP-2005 00:00 | ALIQUOT: | 1.060E+00 gram |
| SAMPLE TITLE: | VPBR092705SL20 | DETECTOR NUMBER: | 008 |
| ACQ DATE: | 11-OCT-2005 07:32 | AVERAGE EFFICIENCY: | 18.39% |
| ELAPSED LIVE TIME: | 10203. | RECOVERY: | 96.07% |
| TRACER ID: | TH-18A | TRACER FWHM (kev): | 153.93 |
| LAMBDA VALUE: | 455. | ROI TYPE: | STANDARD |
| TRACER DPM AT SAMPLE DATE: | 10.224 | CONFIDENCE FACTOR: | 4.65 |
| SAMPLE MATRIX: | SOIL | LLD CONSTANT: | 2.71 |
| ENERGY CAL DATE: | 5-OCT-2005 05:14 | EFF CAL DATE: | 5-OCT-2005 05:14 |
| BKG FILENAME: | B_008_7OCT05 | BKG ELAPSED TIME: | 60002. |

**********

NUCLIDE ACTIVITY SUMMARY

| NUCLIDE | ENERGY | NET AREA | BKG | %ABN | ACTIVITY pCi/ gram | TPU/ERROR 2-SIGMA | MDC pCi/ gram |
|---|---|---|---|---|---|---|---|
| TH-227 | 5850.0 | 8.32 | 0.68 | 97.5 | 1.209E-01 | 8.994E-02 | 9.499E-02 |
| TH-228 | 5400.0 | 74.49 | 0.51 | 99.9 | 1.070E+00 | 3.041E-01 | 8.540E-02 |
| TH229 | 4872.0 | 305.66 | 0.34 | 99.5 | 4.346E+00 | 6.420E-01 | 7.709E-02 |
| TH-230 | 4672.0 | 118.66 | 0.34 | 99.8 | 1.682E+00 | 4.138E-01 | 7.686E-02 |
| TH-232 | 3997.0 | 95.00 | 0.00 | 100.0 | 1.344E+00 | 3.526E-01 | 3.835E-02 |

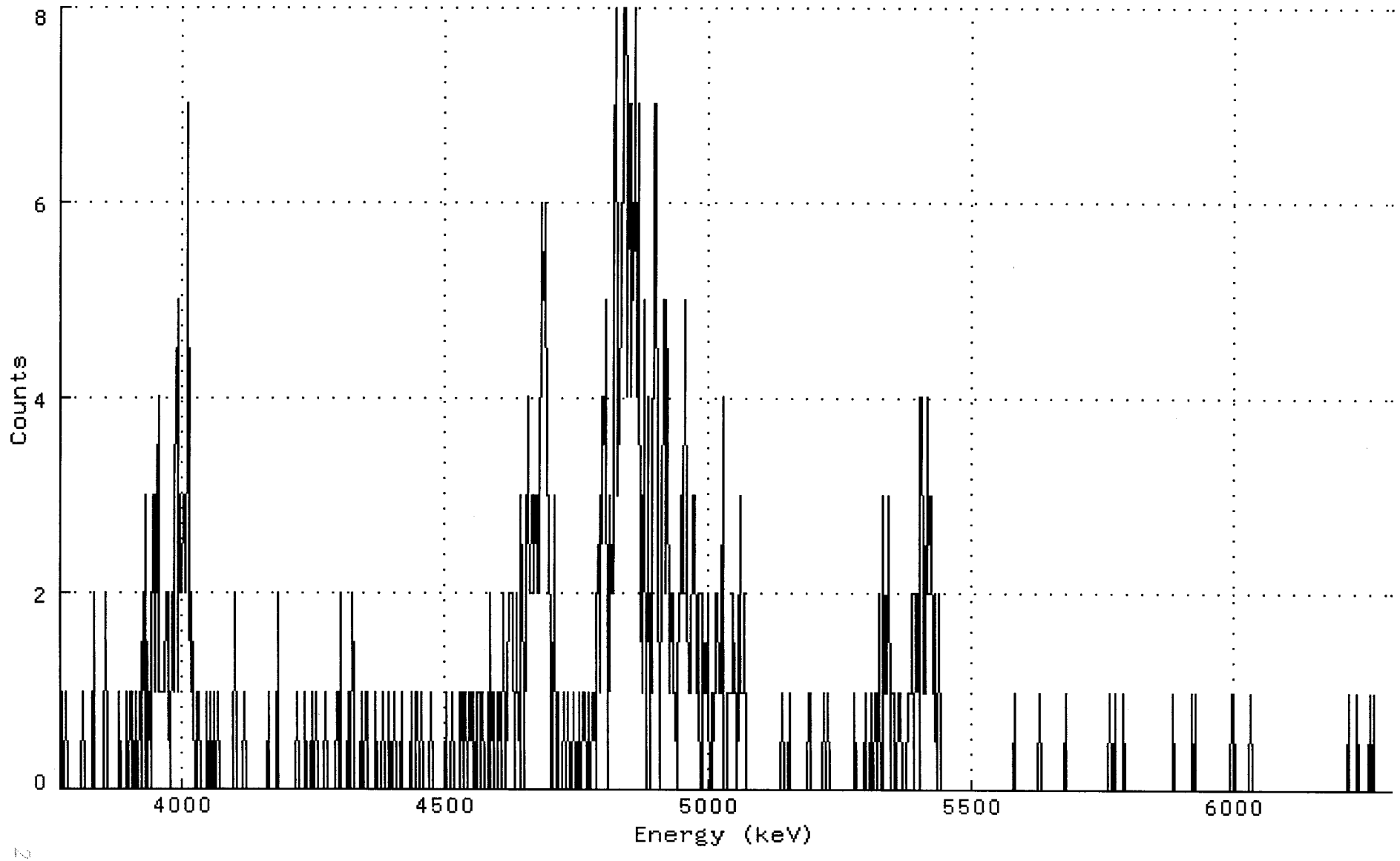
**********

*** Tracer FWHM > 80.0 Kev ***

Analyst _____ Date 10-11-05

Reviewer _____ Date 10/11/05

Spectrum : DKA100:[ALPHA.ALUSR.ARCHIVE.S]S_0509118A-TH$07_TH.CNF;1
Title : 008
Sample Title: VPBR092705SL20
Start Time: 11-OCT-2005 07:32 Sample Time: 27-SEP-2005 00:00 Energy Offset: 3.76092E+03
Real Time : 0 02:50:03.00 Sample ID : 07 Energy Slope : 2.57413E+00
Live Time : 0 02:50:03.00 Sample Type: TH Energy Quad : -9.43774E-05



Channel Contents for ND_AMS_ARCHIVE_S:S_0509118A-TH$07_TH

Channel

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1: | 10203 | 10203 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| 29: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 |
| 43: | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 |
| 57: | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 2 | 0 | 3 | 0 | 1 | 0 |
| 71: | 1 | 3 | 3 | 1 | 3 | 4 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 1 |
| 85: | 0 | 2 | 1 | 3 | 4 | 5 | 1 | 3 | 2 | 3 | 3 | 2 | 4 | 7 |
| 99: | 2 | 1 | 2 | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| 113: | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 127: | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 141: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 155: | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 |
| 169: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 183: | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 |
| 197: | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 211: | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 2 | 1 | 0 | 0 |
| 225: | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 239: | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 253: | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 267: | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 281: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 295: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 1 |
| 309: | 1 | 1 | 0 | 1 | 0 | 0 | 1 | 1 | 1 | 0 | 1 | 0 | 0 | 0 |
| 323: | 0 | 2 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 1 | 0 | 2 | 2 | 0 |
| 337: | 1 | 1 | 2 | 2 | 2 | 2 | 0 | 2 | 1 | 1 | 0 | 3 | 2 | 1 |
| 351: | 0 | 2 | 4 | 3 | 2 | 3 | 3 | 2 | 3 | 2 | 3 | 2 | 6 | 5 |
| 365: | 5 | 6 | 6 | 3 | 3 | 1 | 0 | 0 | 3 | 2 | 0 | 1 | 0 | 0 |
| 379: | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 |
| 393: | 0 | 0 | 1 | 1 | 1 | 0 | 1 | 0 | 0 | 1 | 1 | 1 | 0 | 2 |
| 407: | 2 | 3 | 1 | 4 | 4 | 3 | 5 | 0 | 2 | 3 | 2 | 2 | 6 | 8 |
| 421: | 4 | 3 | 4 | 5 | 7 | 8 | 8 | 7 | 4 | 7 | 4 | 7 | 5 | 6 |
| 435: | 8 | 4 | 7 | 5 | 2 | 1 | 5 | 4 | 0 | 3 | 4 | 0 | 2 | 1 |
| 449: | 7 | 7 | 6 | 3 | 0 | 1 | 2 | 5 | 2 | 5 | 4 | 1 | 1 | 2 |
| 463: | 2 | 1 | 1 | 0 | 1 | 2 | 2 | 3 | 2 | 5 | 2 | 2 | 1 | 1 |
| 477: | 1 | 3 | 2 | 3 | 1 | 2 | 1 | 0 | 0 | 2 | 1 | 1 | 2 | 1 |
| 491: | 0 | 1 | 0 | 1 | 1 | 2 | 2 | 1 | 1 | 1 | 4 | 0 | 0 | 0 |
| 505: | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 0 | 1 | 3 | 1 | 1 | 1 | 2 |
| 519: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 533: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 547: | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 561: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 575: | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 589: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 603: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 |
| 617: | 0 | 1 | 1 | 0 | 2 | 1 | 0 | 0 | 3 | 1 | 1 | 1 | 3 | 0 |
| 631: | 1 | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 1 |
| 645: | 1 | 1 | 2 | 0 | 2 | 2 | 2 | 0 | 4 | 4 | 2 | 1 | 1 | 4 |
| 659: | 2 | 3 | 3 | 3 | 1 | 2 | 1 | 0 | 2 | 2 | 0 | 0 | 0 | 0 |
| 673: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 687: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 701: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 715: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 729: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 743: | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 757: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 771: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 785: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 799: | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 813: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 827: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 841: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 855: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 |
| 869: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 883: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 897: | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 911: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 925: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 939: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 953: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 967: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 981: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 995: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 1009: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1023: | 0 | 0 | | | | | | | | | | | | |

Eberline Services
Oak Ridge Laboratory

Gross Sample Counts Within Peak Regions  Generated: 11-OCT-2005 11:00:32.10

Detector ID: 8  Acquisition Start: 11-OCT-2005 07:32:24.01
Live Time: 0 02:50:03.00  Real Time: 0 02:50:03.00
Batch Id: 0509118A-TH  Sample Id: 07
Sample Type: TH

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 3973.14 | 95 | 0 | 59.62 | 82.69 | 15 | 118 | 9.31E-03 | 10.3 | |
| 2 | 0 | 4641.46 | 119 | 0 | 39.66 | 346.47 | 260 | 121 | 1.17E-02 | 9.2 | |
| 3 | 0 | 4887.71 | 306 | 0 | 153.93 | 445.00 | 380 | 152 | 3.00E-02 | 5.7 | |
| 4 | 0 | 5372.20 | 75 | 0 | 96.85 | 641.01 | 551 | 123 | 7.35E-03 | 11.5 | |
| 5 | 0 | 5897.10 | 9 | 0 | 288.30 | 856.78 | 775 | 146 | 8.82E-04 | 33.3 | |

Background Counts Within Peak Regions  Generated: 11-OCT-2005 11:00:38.51

Acquisition Start: 7-OCT-2005 17:05:48.01
Live Time: 0 16:40:02.00  Real Time: 0 16:40:02.00

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 3949.22 | 0 | 0 | 0.00 | 73.50 | 15 | 118 | 0.00E+00 | 0.0 | |
| 2 | 0 | 4575.67 | 2 | 0 | 28.37 | 320.00 | 260 | 121 | 3.33E-05 | 70.7 | |
| 3 | 0 | 4915.10 | 2 | 0 | 74.78 | 455.50 | 380 | 152 | 3.33E-05 | 70.7 | |
| 4 | 0 | 5302.79 | 3 | 0 | 288.82 | 612.00 | 551 | 123 | 5.00E-05 | 57.7 | |
| 5 | 0 | 5877.41 | 4 | 0 | 317.19 | 847.50 | 775 | 146 | 6.67E-05 | 50.0 | |

Net Sample Counts Within Peak Regions  Generated: 11-OCT-2005 11:00:38.82

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 3973.14* | 95 | 0 | 59.62 | 82.69 | 15 | 118 | 9.31E-03 | 10.3 | |
| 2 | 0 | 4641.46* | 119 | 0 | 39.66 | 346.47 | 260 | 121 | 1.16E-02 | 9.2 | |
| 3 | 0 | 4887.71* | 306 | 0 | 153.93 | 445.00 | 380 | 152 | 3.00E-02 | 5.7 | |
| 4 | 0 | 5372.20* | 74 | 0 | 96.85 | 641.01 | 551 | 123 | 7.30E-03 | 11.6 | |
| 5 | 0 | 5897.10* | 8 | 0 | 288.30 | 856.78 | 775 | 146 | 8.15E-04 | 36.3 | |

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.0 Generated 11-OCT-2005 11:00:39

Configuration : MCA0:[AMSCOUNT]0000C192$1
Analyses by : ROIPEAK V1.2,PEAKEFF V2.2,ENBACK V1.6,NID V3.3
Sample title : VPBR092705SL20
Sample date : 27-SEP-2005 00:00:00 Acquisition date : 11-OCT-2005 07:32:24
Sample ID : 07 Sample quantity : 1.0597 gram
Sample type : TH Sample geometry :
Detector name : 008 Detector geometry:
Elapsed live time: 0 02:50:03.00 Elapsed real time: 0 02:50:03.00 0.0%
Energy tolerance : 100.00 keV Half life ratio : 8.00
Errors propagated: Yes Systematic Error : 3.00 %
Efficiency type : Average value Efficiencies at : Peak Energy
Abundance limit : 75.00

Post-NID Peak Search Report

| It | Energy | Area | FWHM | Channel | Left | Pw | %Err | Fit | Nuclides | Activity pCi/gram |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 3973.14* | 95 | 59.62 | 82.69 | 15 | 118 | 20.5 | | TH-232 | 1.29 |
| 0 | 4641.46* | 119 | 39.66 | 346.47 | 260 | 121 | 18.4 | | TH-230 | 1.62 |
| 0 | 4887.71* | 306 | 153.93 | 445.00 | 380 | 152 | 11.4 | | TH229 | 4.18 |
| 0 | 5372.20* | 74 | 96.85 | 641.01 | 551 | 123 | 23.3 | | TH-228 | 1.03 |
| 0 | 5897.10* | 8 | 288.30 | 856.78 | 775 | 146 | 72.6 | | TH-227 | 0.116 |

Eberline Services
Oak Ridge Laboratory

ALPHA SPECTROMETRY REPORT
11-OCT-2005 11:00:51

**********

Spectral File: ND_AMS_ARCHIVE_S:S_0509118A-TH$08_TH.CNF

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| | | | |
|---|---|---|---|
| BATCH ID: | 0509118A-TH | SAMPLE ID: | 08 |
| SAMPLE DATE: | 28-SEP-2005 00:00 | ALIQUOT: | 1.084E+00 gram |
| SAMPLE TITLE: | VPTR092805SL0A | DETECTOR NUMBER: | 009 |
| ACQ DATE: | 11-OCT-2005 07:32 | AVERAGE EFFICIENCY: | 20.53% |
| ELAPSED LIVE TIME: | 10205. | RECOVERY: | 92.49% |
| TRACER ID: | TH-18A | TRACER FWHM (kev): | 234.18 |
| LAMBDA VALUE: | 453. | ROI TYPE: | STANDARD |
| TRACER DPM AT SAMPLE DATE: | 10.182 | CONFIDENCE FACTOR: | 4.65 |
| SAMPLE MATRIX: | SOIL | LLD CONSTANT: | 2.71 |
| ENERGY CAL DATE: | 5-OCT-2005 05:14 | EFF CAL DATE: | 5-OCT-2005 05:14 |
| BKG FILENAME: | B_009_7OCT05 | BKG ELAPSED TIME: | 60006. |

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NUCLIDE ACTIVITY SUMMARY

| NUCLIDE | ENERGY | NET AREA | BKG | %ABN | ACTIVITY pCi/ gram | TPU/ERROR 2-SIGMA | MDC pCi/ gram |
|---|---|---|---|---|---|---|---|
| TH-227 | 5850.0 | 6.79 | 2.21 | 97.5 | 8.969E-02 | 8.217E-02 | 1.270E-01 |
| TH-228 | 5400.0 | 73.81 | 1.19 | 99.9 | 9.628E-01 | 2.740E-01 | 1.002E-01 |
| TH229 | 4872.0 | 327.32 | 0.68 | 99.5 | 4.231E+00 | 6.121E-01 | 8.461E-02 |
| TH-230 | 4672.0 | 137.83 | 0.17 | 99.8 | 1.776E+00 | 4.159E-01 | 5.964E-02 |
| TH-232 | 3997.0 | 94.49 | 0.51 | 100.0 | 1.216E+00 | 3.178E-01 | 7.760E-02 |

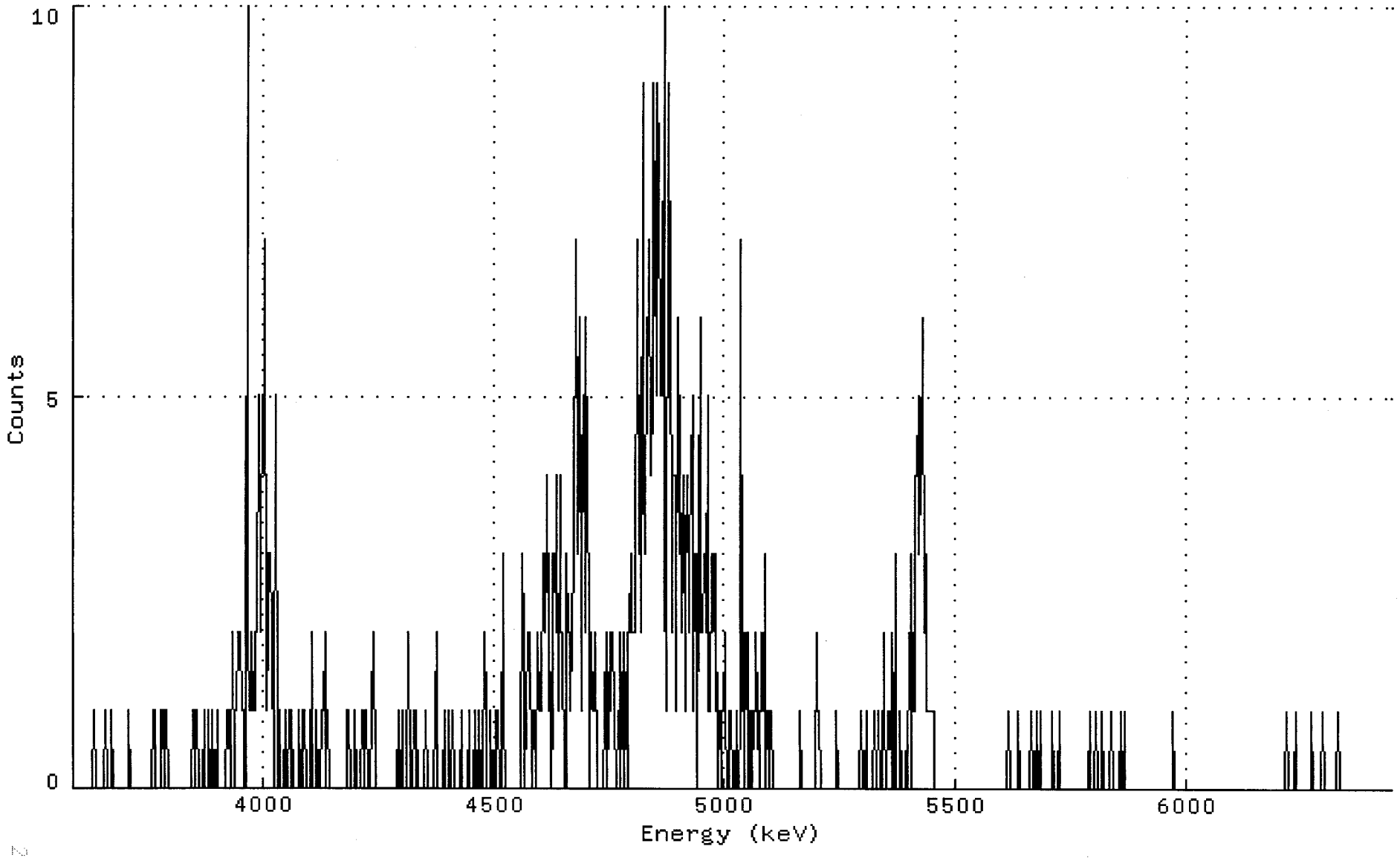
**********

*** Tracer FWHM > 80.0 Kev ***

Analyst _____ Date 10-11-05

Reviewer _____ Date 10/11/05

Spectrum : DKA100:[ALPHA.ALUSR.ARCHIVE.S]S_0509118A-TH$08_TH.CNF;1
Title : 009
Sample Title: VPTR092805SL0A
Start Time: 11-OCT-2005 07:32 Sample Time: 28-SEP-2005 00:00 Energy Offset: 3.57947E+03
Real Time : 0 02:50:05.00 Sample ID : 08 Energy Slope : 2.90089E+00
Live Time : 0 02:50:05.00 Sample Type: TH Energy Quad : -1.03734E-04



Channel Contents for ND_AMS_ARCHIVE_S:S_0509118A-TH$08_TH

Channel

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1: | 10205 | 10205 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15: | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 29: | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 43: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 57: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 1 |
| 71: | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 85: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 0 | 0 |
| 99: | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 |
| 113: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 2 | 0 | 1 | 1 |
| 127: | 2 | 2 | 2 | 1 | 1 | 0 | 0 | 10 | 2 | 1 | 1 | 2 | 1 | 1 |
| 141: | 2 | 2 | 5 | 2 | 3 | 5 | 4 | 7 | 1 | 2 | 3 | 3 | 2 | 2 |
| 155: | 0 | 5 | 0 | 2 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 1 |
| 169: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 |
| 183: | 2 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 1 | 2 | 0 | 1 | 0 |
| 197: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 211: | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 |
| 225: | 0 | 0 | 0 | 1 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 239: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 |
| 253: | 0 | 0 | 0 | 2 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 |
| 267: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 0 | 0 | 0 |
| 281: | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 295: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 |
| 309: | 1 | 0 | 0 | 1 | 0 | 2 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| 323: | 0 | 1 | 0 | 0 | 0 | 3 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 337: | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 2 | 0 | 1 | 2 | 2 | 2 | 0 |
| 351: | 0 | 1 | 1 | 0 | 2 | 1 | 1 | 1 | 3 | 2 | 2 | 4 | 1 | 3 |
| 365: | 0 | 1 | 3 | 3 | 2 | 4 | 1 | 4 | 2 | 2 | 0 | 0 | 3 | 2 |
| 379: | 2 | 1 | 2 | 3 | 3 | 7 | 3 | 5 | 6 | 1 | 4 | 5 | 2 | 6 |
| 393: | 4 | 2 | 0 | 2 | 1 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 407: | 2 | 0 | 1 | 2 | 1 | 2 | 1 | 1 | 0 | 1 | 0 | 2 | 1 | 0 |
| 421: | 2 | 1 | 0 | 2 | 2 | 3 | 2 | 2 | 2 | 2 | 7 | 3 | 5 | 2 |
| 435: | 9 | 4 | 3 | 6 | 5 | 7 | 4 | 5 | 9 | 7 | 5 | 9 | 8 | 5 |
| 449: | 5 | 5 | 10 | 3 | 1 | 9 | 8 | 7 | 2 | 4 | 4 | 4 | 1 | 6 |
| 463: | 3 | 5 | 2 | 4 | 1 | 3 | 4 | 2 | 3 | 4 | 5 | 1 | 3 | 3 |
| 477: | 0 | 3 | 6 | 2 | 2 | 3 | 3 | 2 | 5 | 1 | 1 | 3 | 2 | 3 |
| 491: | 1 | 3 | 0 | 1 | 0 | 1 | 1 | 2 | 1 | 0 | 1 | 0 | 1 | 0 |
| 505: | 0 | 0 | 1 | 0 | 0 | 1 | 7 | 1 | 2 | 0 | 2 | 0 | 2 | 0 |
| 519: | 1 | 0 | 1 | 1 | 2 | 1 | 0 | 2 | 1 | 1 | 3 | 0 | 1 | 1 |
| 533: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 547: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 561: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 1 | 0 | 0 | 0 |
| 575: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 589: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 603: | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 |
| 617: | 1 | 1 | 0 | 0 | 2 | 1 | 0 | 1 | 1 | 1 | 0 | 2 | 0 | 3 |
| 631: | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 2 | 0 | 3 | 1 |
| 645: | 1 | 4 | 4 | 5 | 3 | 4 | 6 | 6 | 2 | 3 | 1 | 1 | 1 | 1 |
| 659: | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 673: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 687: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 701: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 715: | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 729: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 |
| 743: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 757: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 771: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 785: | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 799: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 |
| 813: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 827: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 841: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 855: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 869: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 883: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 897: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 911: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 925: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 939: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 953: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 967: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 981: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 995: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1009: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1023: | 0 | 0 | | | | | | | | | | | | |

Eberline Services
Oak Ridge Laboratory

Gross Sample Counts Within Peak Regions  Generated: 11-OCT-2005 11:00:44.20

Detector ID: 9  Acquisition Start: 11-OCT-2005 07:32:47.01
Live Time: 0 02:50:05.00  Real Time: 0 02:50:05.00
Batch Id: 0509118A-TH  Sample Id: 08
Sample Type: TH

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 3985.43 | 95 | 0 | 43.02 | 140.65 | 76 | 106 | 9.31E-03 | 10.3 | |
| 2 | 0 | 4635.26 | 138 | 0 | 91.38 | 368.82 | 295 | 107 | 1.35E-02 | 8.5 | |
| 3 | 0 | 4890.71 | 328 | 0 | 234.18 | 459.57 | 401 | 134 | 3.21E-02 | 5.5 | |
| 4 | 0 | 5384.13 | 75 | 0 | 20.34 | 636.60 | 552 | 109 | 7.35E-03 | 11.5 | |
| 5 | 0 | 5816.46 | 9 | 0 | 278.49 | 793.67 | 751 | 129 | 8.82E-04 | 33.3 | |

Background Counts Within Peak Regions  Generated: 11-OCT-2005 11:00:49.06

Acquisition Start: 7-OCT-2005 17:05:51.01
Live Time: 0 16:40:06.00  Real Time: 0 16:40:06.00

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 3950.94 | 3 | 0 | 262.78 | 128.50 | 76 | 106 | 5.00E-05 | 57.7 | |
| 2 | 0 | 4578.62 | 1 | 0 | 2.92 | 348.00 | 295 | 107 | 1.67E-05 | 100.0 | |
| 3 | 0 | 4915.22 | 4 | 0 | 186.87 | 467.50 | 401 | 134 | 6.67E-05 | 50.0 | |
| 4 | 0 | 5300.83 | 7 | 0 | 2.92 | 606.00 | 552 | 109 | 1.17E-04 | 37.8 | |
| 5 | 0 | 5873.55 | 13 | 0 | 2.92 | 815.00 | 751 | 129 | 2.17E-04 | 27.7 | |

Net Sample Counts Within Peak Regions  Generated: 11-OCT-2005 11:00:49.76

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 3985.43* | 94 | 0 | 43.02 | 140.65 | 76 | 106 | 9.26E-03 | 10.3 | |
| 2 | 0 | 4635.26* | 138 | 0 | 91.38 | 368.82 | 295 | 107 | 1.35E-02 | 8.5 | |
| 3 | 0 | 4890.71* | 327 | 0 | 234.18 | 459.57 | 401 | 134 | 3.21E-02 | 5.5 | |
| 4 | 0 | 5384.13* | 74 | 0 | 20.34 | 636.60 | 552 | 109 | 7.23E-03 | 11.7 | |
| 5 | 0 | 5816.46* | 7 | 0 | 278.49 | 793.67 | 751 | 129 | 6.65E-04 | 45.1 | |

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.0 Generated 11-OCT-2005 11:00:50

Configuration : MCA0:[AMSCOUNT]0000C192$1
Analyses by : ROIPEAK V1.2,PEAKEFF V2.2,ENBACK V1.6,NID V3.3
Sample title : VPTR092805SL0A
Sample date : 28-SEP-2005 00:00:00 Acquisition date : 11-OCT-2005 07:32:47
Sample ID : 08 Sample quantity : 1.0839 gram
Sample type : TH Sample geometry :
Detector name : 009 Detector geometry:
Elapsed live time: 0 02:50:05.00 Elapsed real time: 0 02:50:05.00 0.0%
Energy tolerance : 100.00 keV Half life ratio : 8.00
Errors propagated: Yes Systematic Error : 3.00 %
Efficiency type : Average value Efficiencies at : Peak Energy
Abundance limit : 75.00

Post-NID Peak Search Report

| It | Energy | Area | FWHM | Channel | Left | Pw | %Err | Fit | Nuclides | Activity pCi/gram |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 3985.43* | 94 | 43.02 | 140.65 | 76 | 106 | 20.6 | | TH-232 | 1.12 |
| 0 | 4635.26* | 138 | 91.38 | 368.82 | 295 | 107 | 17.0 | | TH-230 | 1.64 |
| 0 | 4890.71* | 327234 | .18 | 459.57 | 401 | 134 | 11.1 | | TH229 | 3.91 |
| 0 | 5384.13* | 74 | 20.34 | 636.60 | 552 | 109 | 23.5 | | TH-228 | 0.891 |
| 0 | 5816.46* | 7278 | .49 | 793.67 | 751 | 129 | 90.2 | | TH-227 | 8.296E-02 |

Eberline Services
Oak Ridge Laboratory

ALPHA SPECTROMETRY REPORT
11-OCT-2005 11:01:00

**********

Spectral File: ND_AMS_ARCHIVE_S:S_0509118A-TH$09_TH.CNF

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| | | | |
|---|---|---|---|
| BATCH ID: | 0509118A-TH | SAMPLE ID: | 09 |
| SAMPLE DATE: | 28-SEP-2005 00:00 | ALIQUOT: | 1.046E+00 gram |
| SAMPLE TITLE: | VPTR092805SL0B | DETECTOR NUMBER: | 010 |
| ACQ DATE: | 11-OCT-2005 07:33 | AVERAGE EFFICIENCY: | 21.06% |
| ELAPSED LIVE TIME: | 10201. | RECOVERY: | 101.80% |
| TRACER ID: | TH-18A | TRACER FWHM (kev): | 66.27 |
| LAMBDA VALUE: | 453. | ROI TYPE: | STANDARD |
| TRACER DPM AT SAMPLE DATE: | 10.193 | CONFIDENCE FACTOR: | 4.65 |
| SAMPLE MATRIX: | SOIL | LLD CONSTANT: | 2.71 |
| ENERGY CAL DATE: | 5-OCT-2005 05:14 | EFF CAL DATE: | 5-OCT-2005 05:14 |
| BKG FILENAME: | B_010_7OCT05 | BKG ELAPSED TIME: | 60003. |

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NUCLIDE ACTIVITY SUMMARY

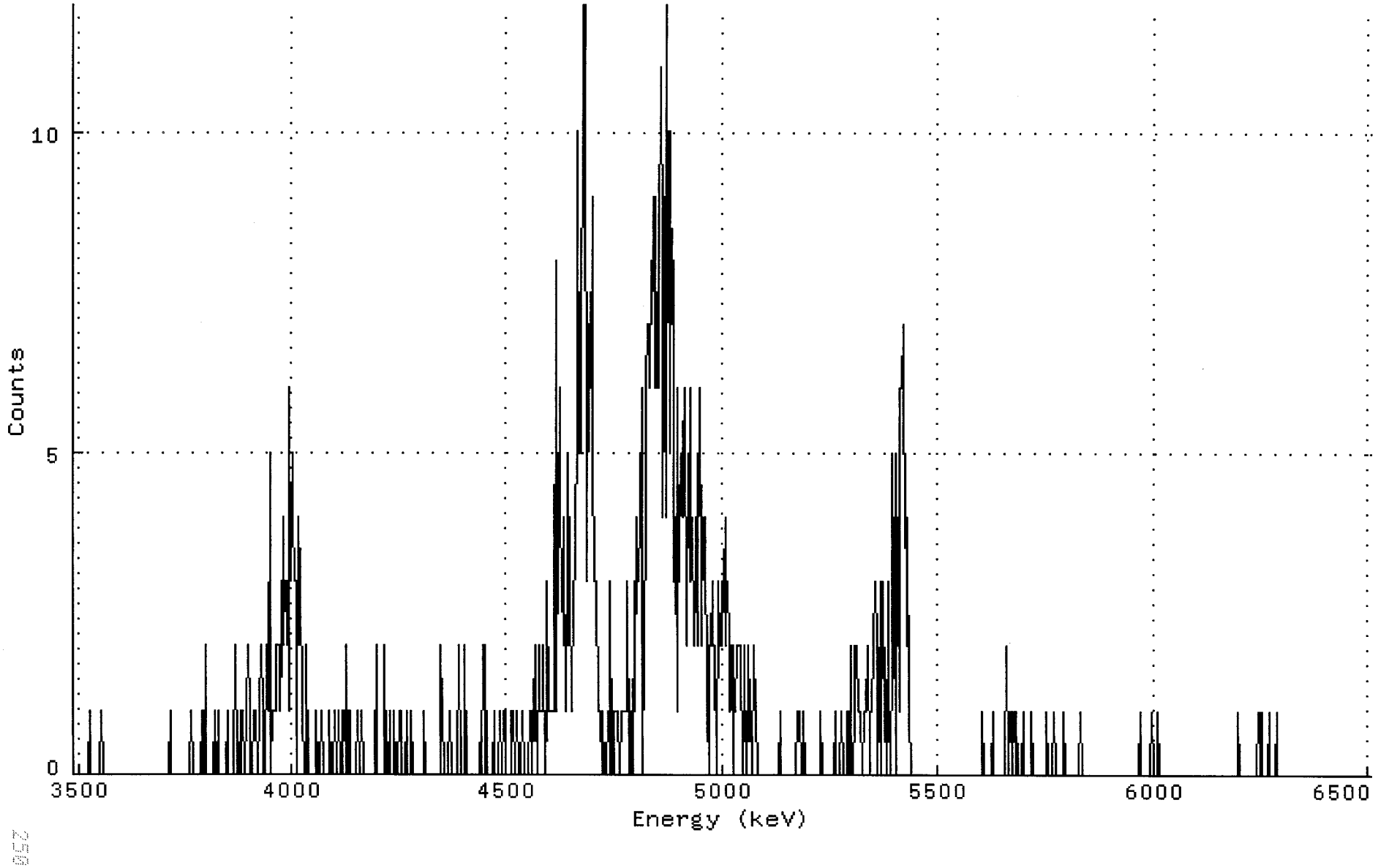
| NUCLIDE | ENERGY | NET AREA | BKG | %ABN | ACTIVITY pCi/ gram | TPU/ERROR 2-SIGMA | MDC pCi/ gram |
|---|---|---|---|---|---|---|---|
| TH-227 | 5850.0 | 5.62 | 2.38 | 97.5 | 6.823E-02 | 7.119E-02 | 1.199E-01 |
| TH-228 | 5400.0 | 101.49 | 0.51 | 99.9 | 1.217E+00 | 3.078E-01 | 7.135E-02 |
| TH229 | 4872.0 | 369.66 | 0.34 | 99.5 | 4.392E+00 | 6.134E-01 | 6.441E-02 |
| TH-230 | 4672.0 | 201.81 | 1.19 | 99.8 | 2.390E+00 | 5.031E-01 | 9.218E-02 |
| TH-232 | 3997.0 | 92.66 | 0.34 | 100.0 | 1.096E+00 | 2.850E-01 | 6.410E-02 |

**********

Analyst _____ Date 10-11-05

Reviewer _____ Date 10/11/05

Spectrum : DKA100:[ALPHA.ALUSR.ARCHIVE.S]S_0509118A-TH$09_TH.CNF;1
Title : 010
Sample Title: VPTR092805SL0B
Start Time: 11-OCT-2005 07:33 Sample Time: 28-SEP-2005 00:00 Energy Offset: 3.47909E+03
Real Time : 0 02:50:01.00 Sample ID : 09 Energy Slope : 3.09967E+00
Live Time : 0 02:50:01.00 Sample Type: TH Energy Quad : -1.42569E-04




052

Channel Contents for ND_AMS_ARCHIVE_S:S_0509118A-TH$09_TH

Channel

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1: | 10201 | 10201 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 29: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 43: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 57: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 71: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 85: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 99: | 0 | 1 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 113: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 2 |
| 127: | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 2 | 1 | 0 | 0 | 1 |
| 141: | 1 | 1 | 0 | 0 | 1 | 2 | 1 | 0 | 0 | 2 | 2 | 1 | 5 | 0 |
| 155: | 1 | 1 | 1 | 2 | 2 | 2 | 1 | 2 | 4 | 2 | 3 | 3 | 1 | 6 |
| 169: | 3 | 5 | 4 | 3 | 3 | 0 | 4 | 3 | 1 | 1 | 0 | 0 | 2 | 0 |
| 183: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 197: | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 0 |
| 211: | 2 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 |
| 225: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 |
| 239: | 0 | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 1 |
| 253: | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 267: | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 281: | 0 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 295: | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 |
| 309: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 2 | 0 | 2 | 0 | 0 | 0 | 0 |
| 323: | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 0 |
| 337: | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 |
| 351: | 0 | 1 | 1 | 0 | 1 | 2 | 1 | 0 | 2 | 1 | 1 | 1 | 2 | 0 |
| 365: | 1 | 3 | 1 | 1 | 1 | 1 | 1 | 8 | 1 | 4 | 6 | 4 | 3 | 2 |
| 379: | 4 | 1 | 3 | 5 | 3 | 1 | 3 | 2 | 4 | 5 | 10 | 5 | 8 | 5 |
| 393: | 12 | 9 | 12 | 3 | 7 | 7 | 6 | 9 | 5 | 3 | 3 | 1 | 1 | 1 |
| 407: | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 3 | 0 | 0 | 1 | 1 | 1 | 1 |
| 421: | 0 | 1 | 1 | 1 | 1 | 1 | 3 | 0 | 0 | 1 | 0 | 3 | 1 | 4 |
| 435: | 3 | 3 | 4 | 6 | 0 | 2 | 4 | 6 | 7 | 6 | 8 | 7 | 9 | 6 |
| 449: | 9 | 6 | 6 | 8 | 11 | 8 | 4 | 6 | 12 | 4 | 10 | 5 | 10 | 7 |
| 463: | 8 | 3 | 4 | 1 | 6 | 3 | 5 | 4 | 5 | 6 | 2 | 3 | 4 | 6 |
| 477: | 3 | 4 | 2 | 2 | 3 | 5 | 2 | 6 | 3 | 2 | 4 | 3 | 4 | 1 |
| 491: | 0 | 2 | 2 | 3 | 2 | 2 | 0 | 3 | 2 | 2 | 3 | 2 | 3 | 4 |
| 505: | 2 | 3 | 2 | 1 | 2 | 0 | 2 | 1 | 2 | 2 | 2 | 2 | 2 | 0 |
| 519: | 1 | 2 | 0 | 1 | 2 | 1 | 0 | 0 | 2 | 1 | 1 | 0 | 0 | 0 |
| 533: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 547: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 561: | 1 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 575: | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 589: | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 2 |
| 603: | 0 | 0 | 1 | 2 | 2 | 1 | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 2 |
| 617: | 0 | 1 | 1 | 2 | 2 | 3 | 2 | 0 | 1 | 3 | 0 | 3 | 1 | 1 |
| 631: | 0 | 3 | 1 | 0 | 2 | 5 | 3 | 0 | 5 | 3 | 1 | 6 | 6 | 7 |
| 645: | 5 | 5 | 2 | 4 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 659: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 673: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 687: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 701: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 715: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 |
| 729: | 0 | 1 | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 743: | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 757: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 771: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 785: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 799: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 813: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 827: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 841: | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 855: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 869: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 883: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 897: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 911: | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 925: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 |
| 939: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 953: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 967: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 981: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 995: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1009: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1023: | 0 | 0 | | | | | | | | | | | | |

Eberline Services
Oak Ridge Laboratory

Gross Sample Counts Within Peak Regions  Generated: 11-OCT-2005 11:00:56.18

Detector ID: 10  Acquisition Start: 11-OCT-2005 07:33:06.01
Live Time: 0 02:50:01.00  Real Time: 0 02:50:01.00
Batch Id: 0509118A-TH  Sample Id: 09
Sample Type: TH

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 3972.44 | 93 | 0 | 72.72 | 160.34 | 104 | 99 | 9.12E-03 | 10.4 | |
| 2 | 0 | 4644.32 | 203 | 0 | 89.88 | 382.66 | 310 | 101 | 1.99E-02 | 7.0 | |
| 3 | 0 | 4891.26 | 370 | 0 | 66.27 | 465.56 | 410 | 127 | 3.63E-02 | 5.2 | |
| 4 | 0 | 5370.23 | 102 | 0 | 39.22 | 628.26 | 553 | 104 | 1.00E-02 | 9.9 | |
| 5 | 0 | 5852.15 | 8 | 0 | 319.27 | 794.62 | 742 | 123 | 7.84E-04 | 35.4 | |

Background Counts Within Peak Regions  Generated: 11-OCT-2005 11:00:58.28

Acquisition Start: 7-OCT-2005 17:05:54.01
Live Time: 0 16:40:03.00  Real Time: 0 16:40:03.00

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 3951.67 | 2 | 0 | 31.03 | 153.00 | 104 | 99 | 3.33E-05 | 70.7 | |
| 2 | 0 | 4578.20 | 7 | 0 | 192.37 | 360.00 | 310 | 101 | 1.17E-04 | 37.8 | |
| 3 | 0 | 4914.87 | 2 | 0 | 186.16 | 473.00 | 410 | 127 | 3.33E-05 | 70.7 | |
| 4 | 0 | 5301.88 | 3 | 0 | 254.42 | 604.50 | 553 | 104 | 5.00E-05 | 57.7 | |
| 5 | 0 | 5876.38 | 14 | 0 | 27.92 | 803.00 | 742 | 123 | 2.33E-04 | 26.7 | |

Net Sample Counts Within Peak Regions  Generated: 11-OCT-2005 11:00:58.62

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 3972.44* | 93 | 0 | 72.72 | 160.34 | 104 | 99 | 9.08E-03 | 10.4 | |
| 2 | 0 | 4644.32* | 202 | 0 | 89.88 | 382.66 | 310 | 101 | 1.98E-02 | 7.1 | |
| 3 | 0 | 4891.26* | 370 | 0 | 66.27 | 465.56 | 410 | 127 | 3.62E-02 | 5.2 | |
| 4 | 0 | 5370.23* | 101 | 0 | 39.22 | 628.26 | 553 | 104 | 9.95E-03 | 10.0 | |
| 5 | 0 | 5852.15* | 6 | 0 | 319.27 | 794.62 | 742 | 123 | 5.51E-04 | 51.6 | |

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.0 Generated 11-OCT-2005 11:00:59

Configuration : MCA0:[AMSCOUNT]0000C192$1
Analyses by : ROIPEAK V1.2,PEAKEFF V2.2,ENBACK V1.6,NID V3.3
Sample title : VPTR092805SL0B
Sample date : 28-SEP-2005 00:00:00 Acquisition date : 11-OCT-2005 07:33:06
Sample ID : 09 Sample quantity : 1.0455 gram
Sample type : TH Sample geometry :
Detector name : 010 Detector geometry:
Elapsed live time: 0 02:50:01.00 Elapsed real time: 0 02:50:01.00 0.0%
Energy tolerance : 100.00 keV Half life ratio : 8.00
Errors propagated: Yes Systematic Error : 3.00 %
Efficiency type : Average value Efficiencies at : Peak Energy
Abundance limit : 75.00

Post-NID Peak Search Report

| It | Energy | Area | FWHM | Channel | Left | Pw | %Err | Fit | Nuclides | Activity pCi/gram |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 3972.44* | 93 | 72.72 | 160.34 | 104 | 99 | 20.8 | | TH-232 | 1.12 |
| 0 | 4644.32* | 202 | 89.88 | 382.66 | 310 | 101 | 14.1 | | TH-230 | 2.43 |
| 0 | 4891.26* | 370 | 66.27 | 465.56 | 410 | 127 | 10.4 | | TH229 | 4.47 |
| 0 | 5370.23* | 101 | 39.22 | 628.26 | 553 | 104 | 19.9 | | TH-228 | 1.24 |
| 0 | 5852.15* | 6319.27 | | 794.62 | 742 | 123 | 103.2 | | TH-227 | 6.945E-02 |

Eberline Services
Oak Ridge Laboratory

ALPHA SPECTROMETRY REPORT
11-OCT-2005 11:01:16

Spectral File: ND_AMS_ARCHIVE_S:S_0509118A-TH$10_TH.CNF

| | | | |
|---|---|---|---|
| BATCH ID: | 0509118A-TH | SAMPLE ID: | 10 |
| SAMPLE DATE: | 28-SEP-2005 00:00 | ALIQUOT: | 1.081E+00 gram |
| SAMPLE TITLE: | VPTR092805SL0C | DETECTOR NUMBER: | 011 |
| ACQ DATE: | 11-OCT-2005 07:33 | AVERAGE EFFICIENCY: | 21.78% |
| ELAPSED LIVE TIME: | 10206. | RECOVERY: | 103.86% |
| TRACER ID: | TH-18A | TRACER FWHM (kev): | 92.05 |
| LAMBDA VALUE: | 453. | ROI TYPE: | STANDARD |
| TRACER DPM AT SAMPLE DATE: | 10.177 | CONFIDENCE FACTOR: | 4.65 |
| SAMPLE MATRIX: | SOIL | LLD CONSTANT: | 2.71 |
| ENERGY CAL DATE: | 5-OCT-2005 05:14 | EFF CAL DATE: | 5-OCT-2005 05:14 |
| BKG FILENAME: | B_011_7OCT05 | BKG ELAPSED TIME: | 60000. |

NUCLIDE ACTIVITY SUMMARY

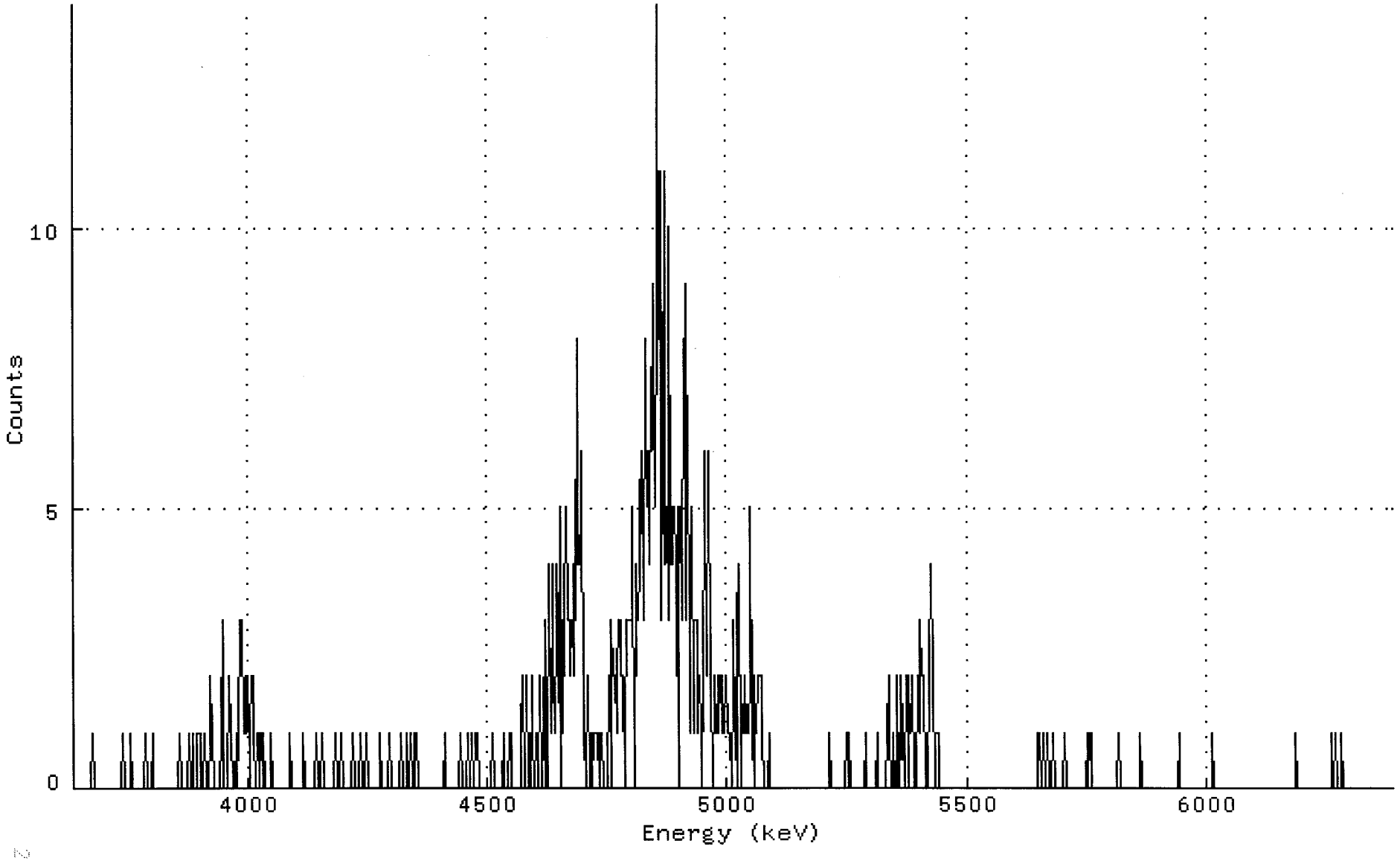
| NUCLIDE | ENERGY | NET AREA | BKG | %ABN | ACTIVITY pCi/ gram | TPU/ERROR 2-SIGMA | MDC pCi/ gram |
|---|---|---|---|---|---|---|---|
| TH-227 | 5850.0 | 7.30 | 1.70 | 97.5 | 8.120E-02 | 6.896E-02 | 9.750E-02 |
| TH-228 | 5400.0 | 51.83 | 0.17 | 99.9 | 5.694E-01 | 1.812E-01 | 5.017E-02 |
| TH229 | 4872.0 | 389.66 | 0.34 | 99.5 | 4.242E+00 | 5.838E-01 | 5.903E-02 |
| TH-230 | 4672.0 | 123.00 | 0.00 | 99.8 | 1.335E+00 | 3.167E-01 | 2.941E-02 |
| TH-232 | 3997.0 | 47.00 | 0.00 | 100.0 | 5.092E-01 | 1.680E-01 | 2.936E-02 |

*** Tracer FWHM > 80.0 Kev ***

Analyst _____ Date 10-11-05

Reviewer _____ Date 10/11/05

Spectrum : DKA100:[ALPHA.ALUSR.ARCHIVE.S]S_0509118A-TH$10_TH.CNF;1
Title : 011
Sample Title: VPTR092805SL0C
Start Time: 11-OCT-2005 07:33 Sample Time: 28-SEP-2005 00:00 Energy Offset: 3.62359E+03
Real Time : 0 02:50:06.00 Sample ID : 10 Energy Slope : 2.81507E+00
Live Time : 0 02:50:06.00 Sample Type: TH Energy Quad : -1.11969E-04



Channel Contents for ND_AMS_ARCHIVE_S:S_0509118A-TH$10_TH

Channel

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1: | 10206 | 10206 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 29: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 43: | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 57: | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 71: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 |
| 85: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 1 | 1 | 1 |
| 99: | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 2 | 1 | 0 | 0 | 0 | 0 | 0 |
| 113: | 0 | 1 | 3 | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 0 | 0 | 1 | 0 |
| 127: | 1 | 3 | 2 | 3 | 1 | 1 | 2 | 2 | 0 | 1 | 2 | 2 | 1 | 0 |
| 141: | 1 | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 155: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 169: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 183: | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 197: | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 |
| 211: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 |
| 225: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 239: | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 253: | 0 | 1 | 0 | 1 | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 267: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 281: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 295: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 0 |
| 309: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 323: | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 |
| 337: | 0 | 0 | 0 | 0 | 1 | 2 | 0 | 0 | 2 | 0 | 0 | 0 | 2 | 1 |
| 351: | 0 | 1 | 1 | 0 | 2 | 0 | 0 | 1 | 3 | 0 | 0 | 4 | 3 | 1 |
| 365: | 4 | 2 | 1 | 3 | 4 | 3 | 0 | 5 | 1 | 3 | 5 | 5 | 3 | 3 |
| 379: | 2 | 3 | 2 | 4 | 3 | 8 | 4 | 4 | 5 | 6 | 1 | 0 | 0 | 2 |
| 393: | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 |
| 407: | 0 | 2 | 0 | 3 | 2 | 2 | 1 | 2 | 3 | 3 | 2 | 2 | 0 | 1 |
| 421: | 3 | 3 | 3 | 3 | 3 | 5 | 0 | 4 | 3 | 3 | 4 | 5 | 6 | 3 |
| 435: | 8 | 6 | 6 | 4 | 6 | 6 | 9 | 7 | 5 | 9 | 14 | 8 | 11 | 3 |
| 449: | 6 | 11 | 4 | 5 | 3 | 10 | 4 | 5 | 4 | 5 | 4 | 0 | 5 | 5 |
| 463: | 3 | 3 | 8 | 3 | 9 | 5 | 4 | 1 | 5 | 1 | 3 | 3 | 3 | 1 |
| 477: | 2 | 1 | 0 | 2 | 5 | 6 | 2 | 6 | 2 | 2 | 0 | 2 | 1 | 1 |
| 491: | 2 | 1 | 2 | 2 | 1 | 1 | 2 | 2 | 1 | 1 | 1 | 0 | 2 | 3 |
| 505: | 1 | 0 | 3 | 4 | 0 | 2 | 1 | 1 | 2 | 1 | 1 | 2 | 5 | 1 |
| 519: | 0 | 2 | 1 | 2 | 2 | 2 | 2 | 1 | 0 | 0 | 0 | 0 | 1 | 0 |
| 533: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 547: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 561: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 575: | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 589: | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 603: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 617: | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 1 | 0 | 0 | 1 | 0 | 0 | 2 |
| 631: | 0 | 1 | 2 | 1 | 0 | 0 | 2 | 0 | 2 | 1 | 2 | 2 | 0 | 0 |
| 645: | 0 | 2 | 1 | 3 | 2 | 2 | 2 | 0 | 0 | 0 | 2 | 4 | 4 | 2 |
| 659: | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 673: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 687: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 701: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 715: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 729: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| 743: | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 |
| 757: | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 771: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 0 |
| 785: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 799: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 813: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 827: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 841: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 855: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 869: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 883: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 897: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 911: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 925: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 939: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 953: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 967: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 |
| 981: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 995: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1009: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1023: | 0 | 0 | | | | | | | | | | | | |

Eberline Services
Oak Ridge Laboratory

Gross Sample Counts Within Peak Regions  Generated: 11-OCT-2005 11:01:04.28

Detector ID: 11  Acquisition Start: 11-OCT-2005 07:33:26.01
Live Time: 0 02:50:06.00  Real Time: 0 02:50:06.00
Batch Id: 0509118A-TH  Sample Id: 10
Sample Type: TH

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 3968.09 | 47 | 0 | 92.83 | 122.98 | 63 | 108 | 4.61E-03 | 14.6 | |
| 2 | 0 | 4649.01 | 123 | 0 | 46.72 | 369.70 | 288 | 111 | 1.21E-02 | 9.0 | |
| 3 | 0 | 4887.69 | 390 | 0 | 92.05 | 457.37 | 398 | 139 | 3.82E-02 | 5.1 | |
| 4 | 0 | 5380.08 | 52 | 0 | 29.21 | 640.27 | 554 | 113 | 5.10E-03 | 13.9 | |
| 5 | 0 | 5810.13 | 9 | 0 | 0.00 | 802.33 | 761 | 134 | 8.82E-04 | 33.3 | |

Background Counts Within Peak Regions  Generated: 11-OCT-2005 11:01:14.19

Acquisition Start: 7-OCT-2005 17:05:57.01
Live Time: 0 16:40:00.00  Real Time: 0 16:40:00.00

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 3948.90 | 0 | 0 | 0.00 | 116.50 | 63 | 108 | 0.00E+00 | 0.0 | |
| 2 | 0 | 4577.18 | 0 | 0 | 0.00 | 343.00 | 288 | 111 | 0.00E+00 | 0.0 | |
| 3 | 0 | 4915.32 | 2 | 0 | 39.70 | 467.00 | 398 | 139 | 3.33E-05 | 70.7 | |
| 4 | 0 | 5300.15 | 1 | 0 | 0.00 | 610.00 | 554 | 113 | 1.67E-05 | 100.0 | |
| 5 | 0 | 5874.97 | 10 | 0 | 2.84 | 827.50 | 761 | 134 | 1.67E-04 | 31.6 | |

Net Sample Counts Within Peak Regions  Generated: 11-OCT-2005 11:01:14.50

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 3968.09* | 47 | 0 | 92.83 | 122.98 | 63 | 108 | 4.61E-03 | 14.6 | |
| 2 | 0 | 4649.01* | 123 | 0 | 46.72 | 369.70 | 288 | 111 | 1.21E-02 | 9.0 | |
| 3 | 0 | 4887.69* | 390 | 0 | 92.05 | 457.37 | 398 | 139 | 3.82E-02 | 5.1 | |
| 4 | 0 | 5380.08* | 52 | 0 | 29.21 | 640.27 | 554 | 113 | 5.08E-03 | 13.9 | |
| 5 | 0 | 5810.13* | 7 | 0 | 0.00 | 802.33 | 761 | 134 | 7.15E-04 | 41.8 | |

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.0 Generated 11-OCT-2005 11:01:15

| | | | |
|---|---|---|---|
| Configuration | : MCA0:[AMSCOUNT]0000C192$1 | | |
| Analyses by | : ROIPEAK V1.2,PEAKEFF V2.2,ENBACK V1.6,NID V3.3 | | |
| Sample title | : VPTR092805SL0C | | |
| Sample date | : 28-SEP-2005 00:00:00 | Acquisition date | : 11-OCT-2005 07:33:26 |
| Sample ID | : 10 | Sample quantity | : 1.0807 gram |
| Sample type | : TH | Sample geometry | : |
| Detector name | : 011 | Detector geometry | : |
| Elapsed live time | : 0 02:50:06.00 | Elapsed real time | : 0 02:50:06.00 0.0% |
| Energy tolerance | : 100.00 keV | Half life ratio | : 8.00 |
| Errors propagated | : Yes | Systematic Error | : 3.00 % |
| Efficiency type | : Average value | Efficiencies at | : Peak Energy |
| Abundance limit | : 75.00 | | |

Post-NID Peak Search Report

| It | Energy | Area | FWHM | Channel | Left | Pw | %Err | Fit | Nuclides | Activity pCi/gram |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 3968.09* | 47 | 92.83 | 122.98 | 63 | 108 | 29.2 | | TH-232 | 0.529 |
| 0 | 4649.01* | 123 | 46.72 | 369.70 | 288 | 111 | 18.0 | | TH-230 | 1.39 |
| 0 | 4887.69* | 390 | 92.05 | 457.37 | 398 | 139 | 10.1 | | TH229 | 4.41 |
| 0 | 5380.08* | 52 | 29.21 | 640.27 | 554 | 113 | 27.8 | | TH-228 | 0.591 |
| 0 | 5810.13* | 7 | 0.00 | 802.33 | 761 | 134 | 83.5 | | TH-227 | 8.434E-02 |

Eberline Services
Oak Ridge Laboratory

ALPHA SPECTROMETRY REPORT
11-OCT-2005 11:01:24

**********

Spectral File: ND_AMS_ARCHIVE_S:S_0509118A-TH$11_TH.CNF

**********

| | | | |
|---|---|---|---|
| BATCH ID: | 0509118A-TH | SAMPLE ID: | 11 |
| SAMPLE DATE: | 28-SEP-2005 00:00 | ALIQUOT: | 1.122E+00 gram |
| SAMPLE TITLE: | VPTR092805SL0D | DETECTOR NUMBER: | 012 |
| ACQ DATE: | 11-OCT-2005 07:33 | AVERAGE EFFICIENCY: | 21.08% |
| ELAPSED LIVE TIME: | 10204. | RECOVERY: | 92.65% |
| TRACER ID: | TH-18A | TRACER FWHM (kev): | 44.42 |
| LAMBDA VALUE: | 452. | ROI TYPE: | STANDARD |
| TRACER DPM AT SAMPLE DATE: | 10.152 | CONFIDENCE FACTOR: | 4.65 |
| SAMPLE MATRIX: | SOIL | LLD CONSTANT: | 2.71 |
| ENERGY CAL DATE: | 5-OCT-2005 05:14 | EFF CAL DATE: | 5-OCT-2005 05:14 |
| BKG FILENAME: | B_012_7OCT05 | BKG ELAPSED TIME: | 60006. |

**********

NUCLIDE ACTIVITY SUMMARY

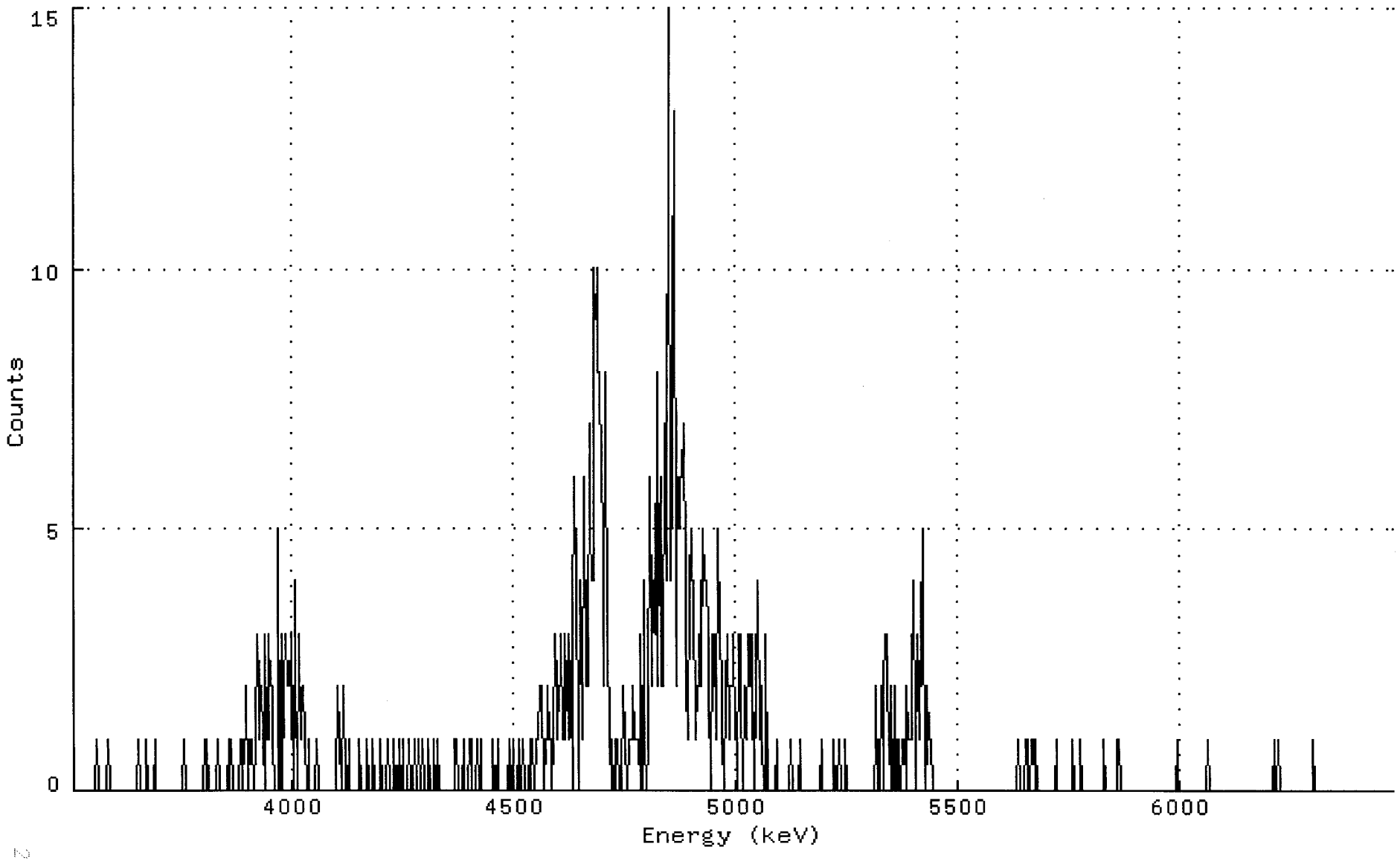
| NUCLIDE | ENERGY | NET AREA | BKG | %ABN | ACTIVITY pCi/ gram | TPU/ERROR 2-SIGMA | MDC pCi/ gram |
|---|---|---|---|---|---|---|---|
| TH-227 | 5850.0 | 6.32 | 0.68 | 97.5 | 7.846E-02 | 6.740E-02 | 8.116E-02 |
| TH-228 | 5400.0 | 63.66 | 0.34 | 99.9 | 7.804E-01 | 2.324E-01 | 6.559E-02 |
| TH229 | 4872.0 | 335.66 | 0.34 | 99.5 | 4.078E+00 | 5.854E-01 | 6.587E-02 |
| TH-230 | 4672.0 | 182.83 | 0.17 | 99.8 | 2.214E+00 | 4.818E-01 | 5.605E-02 |
| TH-232 | 3997.0 | 79.83 | 0.17 | 100.0 | 9.652E-01 | 2.655E-01 | 5.595E-02 |

**********

Analyst _____ Date 10-11-05

Reviewer _____ Date 10/11/05

Spectrum : DKA100:[ALPHA.ALUSR.ARCHIVE.S]S_0509118A-TH$11_TH.CNF;1
Title : 012
Sample Title: VPTR092805SL0D
Start Time: 11-OCT-2005 07:33 Sample Time: 28-SEP-2005 00:00 Energy Offset: 3.49788E+03
Real Time : 0 02:50:04.00 Sample ID : 11 Energy Slope : 3.06653E+00
Live Time : 0 02:50:04.00 Sample Type: TH Energy Quad : -1.53307E-04



Channel Contents for ND_AMS_ARCHIVE_S:S_0509118A-TH$11_TH

Channel

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1: | 10204 | 10204 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 29: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 43: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 57: | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 71: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 85: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 99: | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 113: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 127: | 1 | 1 | 0 | 1 | 1 | 2 | 0 | 1 | 1 | 1 | 0 | 1 | 1 | 3 |
| 141: | 2 | 1 | 2 | 1 | 0 | 3 | 1 | 1 | 3 | 2 | 2 | 1 | 0 | 0 |
| 155: | 0 | 5 | 0 | 3 | 0 | 2 | 3 | 3 | 2 | 2 | 3 | 2 | 0 | 4 |
| 169: | 2 | 0 | 3 | 1 | 1 | 2 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 |
| 183: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 197: | 0 | 0 | 0 | 2 | 1 | 0 | 0 | 2 | 0 | 0 | 0 | 1 | 0 | 0 |
| 211: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 225: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 |
| 239: | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 253: | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 |
| 267: | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 281: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 1 |
| 295: | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 |
| 309: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 |
| 323: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 1 |
| 337: | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 1 |
| 351: | 1 | 2 | 2 | 2 | 0 | 0 | 1 | 1 | 2 | 1 | 1 | 0 | 1 | 3 |
| 365: | 2 | 1 | 2 | 2 | 3 | 1 | 1 | 3 | 2 | 1 | 3 | 2 | 0 | 3 |
| 379: | 6 | 3 | 5 | 0 | 4 | 3 | 1 | 6 | 2 | 4 | 2 | 7 | 5 | 4 |
| 393: | 4 | 10 | 9 | 10 | 8 | 8 | 6 | 5 | 2 | 8 | 2 | 3 | 1 | 0 |
| 407: | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 2 | 2 | 1 | 0 | 1 | 1 |
| 421: | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 0 | 3 | 0 | 4 | 1 | 0 | 1 |
| 435: | 1 | 6 | 3 | 2 | 4 | 3 | 8 | 2 | 5 | 6 | 2 | 2 | 7 | 7 |
| 449: | 4 | 15 | 13 | 4 | 11 | 5 | 13 | 2 | 7 | 5 | 5 | 6 | 6 | 7 |
| 463: | 4 | 2 | 1 | 4 | 4 | 5 | 3 | 4 | 1 | 2 | 2 | 2 | 4 | 2 |
| 477: | 5 | 4 | 4 | 4 | 3 | 2 | 0 | 3 | 2 | 3 | 1 | 5 | 5 | 3 |
| 491: | 2 | 1 | 0 | 2 | 2 | 3 | 1 | 2 | 2 | 2 | 3 | 1 | 1 | 0 |
| 505: | 3 | 3 | 2 | 0 | 2 | 2 | 1 | 3 | 2 | 3 | 1 | 3 | 0 | 2 |
| 519: | 4 | 4 | 1 | 2 | 1 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 |
| 533: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 547: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 561: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 575: | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 |
| 589: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 603: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 0 | 0 | 0 | 2 | 0 |
| 617: | 2 | 3 | 3 | 2 | 1 | 0 | 2 | 0 | 0 | 2 | 0 | 0 | 1 | 0 |
| 631: | 1 | 1 | 1 | 0 | 2 | 1 | 1 | 1 | 2 | 4 | 1 | 0 | 3 | 2 |
| 645: | 1 | 3 | 5 | 4 | 0 | 1 | 2 | 1 | 1 | 1 | 0 | 0 | 0 | 0 |
| 659: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 673: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 687: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 701: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 715: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 729: | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 743: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 757: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 771: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 785: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 799: | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 813: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 827: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 841: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 855: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 869: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 883: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 897: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 911: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 925: | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 939: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 953: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 967: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 981: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 995: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1009: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1023: | 0 | 0 | | | | | | | | | | | | |

Eberline Services
Oak Ridge Laboratory

Gross Sample Counts Within Peak Regions  Generated: 11-OCT-2005 11:01:19.95

Detector ID: 12  Acquisition Start: 11-OCT-2005 07:33:44.01
Live Time: 0 02:50:04.00  Real Time: 0 02:50:04.00
Batch Id: 0509118A-TH  Sample Id: 11
Sample Type: TH

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 3960.94 | 80 | 0 | 96.60 | 152.16 | 99 | 100 | 7.84E-03 | 11.2 | |
| 2 | 0 | 4649.90 | 183 | 0 | 72.74 | 383.01 | 307 | 103 | 1.79E-02 | 7.4 | |
| 3 | 0 | 4893.98 | 336 | 0 | 44.42 | 466.13 | 409 | 129 | 3.29E-02 | 5.5 | |
| 4 | 0 | 5372.71 | 64 | 0 | 94.60 | 631.31 | 554 | 105 | 6.27E-03 | 12.5 | |
| 5 | 0 | 5825.97 | 7 | 0 | 297.45 | 790.43 | 746 | 125 | 6.86E-04 | 37.8 | |

Background Counts Within Peak Regions  Generated: 11-OCT-2005 11:01:22.80

Acquisition Start: 7-OCT-2005 17:05:59.01
Live Time: 0 16:40:06.00  Real Time: 0 16:40:06.00

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 3953.37 | 1 | 0 | 3.06 | 148.50 | 99 | 100 | 1.67E-05 | 100.0 | |
| 2 | 0 | 4578.71 | 1 | 0 | 3.06 | 358.00 | 307 | 103 | 1.67E-05 | 100.0 | |
| 3 | 0 | 4916.44 | 2 | 0 | 48.96 | 473.00 | 409 | 129 | 3.33E-05 | 70.7 | |
| 4 | 0 | 5302.15 | 2 | 0 | 48.96 | 606.00 | 554 | 105 | 3.33E-05 | 70.7 | |
| 5 | 0 | 5877.92 | 4 | 0 | 211.14 | 808.00 | 746 | 125 | 6.67E-05 | 50.0 | |

Net Sample Counts Within Peak Regions  Generated: 11-OCT-2005 11:01:23.12

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 3960.94* | 80 | 0 | 96.60 | 152.16 | 99 | 100 | 7.82E-03 | 11.2 | |
| 2 | 0 | 4649.90* | 183 | 0 | 72.74 | 383.01 | 307 | 103 | 1.79E-02 | 7.4 | |
| 3 | 0 | 4893.98* | 336 | 0 | 44.42 | 466.13 | 409 | 129 | 3.29E-02 | 5.5 | |
| 4 | 0 | 5372.71* | 64 | 0 | 94.60 | 631.31 | 554 | 105 | 6.24E-03 | 12.6 | |
| 5 | 0 | 5825.97* | 6 | 0 | 297.45 | 790.43 | 746 | 125 | 6.19E-04 | 42.2 | |

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.0 Generated 11-OCT-2005 11:01:23

Configuration : MCA0:[AMSCOUNT]0000C192$1
Analyses by : ROIPEAK V1.2,PEAKEFF V2.2,ENBACK V1.6,NID V3.3
Sample title : VPTR092805SL0D
Sample date : 28-SEP-2005 00:00:00 Acquisition date : 11-OCT-2005 07:33:44
Sample ID : 11 Sample quantity : 1.1215 gram
Sample type : TH Sample geometry :
Detector name : 012 Detector geometry:
Elapsed live time: 0 02:50:04.00 Elapsed real time: 0 02:50:04.00 0.0%
Energy tolerance : 100.00 keV Half life ratio : 8.00
Errors propagated: Yes Systematic Error : 3.00 %
Efficiency type : Average value Efficiencies at : Peak Energy
Abundance limit : 75.00

Post-NID Peak Search Report

| It | Energy | Area | FWHM | Channel | Left | Pw | %Err | Fit | Nuclides | Activity pCi/gram |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 3960.94* | 80 | 96.60 | 152.16 | 99 | 100 | 22.4 | | TH-232 | 0.894 |
| 0 | 4649.90* | 183 | 72.74 | 383.01 | 307 | 103 | 14.8 | | TH-230 | 2.05 |
| 0 | 4893.98* | 336 | 44.42 | 466.13 | 409 | 129 | 10.9 | | TH229 | 3.78 |
| 0 | 5372.71* | 64 | 94.60 | 631.31 | 554 | 105 | 25.1 | | TH-228 | 0.723 |
| 0 | 5825.97* | 6297.45 | | 790.43 | 746 | 125 | 84.4 | | TH-227 | 7.269E-02 |

Eberline Services
Oak Ridge Laboratory

ALPHA SPECTROMETRY REPORT
11-OCT-2005 11:01:44

**********

Spectral File: ND_AMS_ARCHIVE_S:S_0509118A-TH$12_TH.CNF

**********

| | | | |
|---|---|---|---|
| BATCH ID: | 0509118A-TH | SAMPLE ID: | 12 |
| SAMPLE DATE: | 28-SEP-2005 00:00 | ALIQUOT: | 1.028E+00 gram |
| SAMPLE TITLE: | VPTR092805SL0E | DETECTOR NUMBER: | 013 |
| ACQ DATE: | 11-OCT-2005 07:34 | AVERAGE EFFICIENCY: | 21.42% |
| ELAPSED LIVE TIME: | 10202. | RECOVERY: | 80.73% |
| TRACER ID: | TH-18A | TRACER FWHM (kev): | 71.84 |
| LAMBDA VALUE: | 453. | ROI TYPE: | STANDARD |
| TRACER DPM AT SAMPLE DATE: | 10.193 | CONFIDENCE FACTOR: | 4.65 |
| SAMPLE MATRIX: | SOIL | LLD CONSTANT: | 2.71 |
| ENERGY CAL DATE: | 5-OCT-2005 05:14 | EFF CAL DATE: | 5-OCT-2005 05:14 |
| BKG FILENAME: | B_013_7OCT05 | BKG ELAPSED TIME: | 60003. |

**********

NUCLIDE ACTIVITY SUMMARY

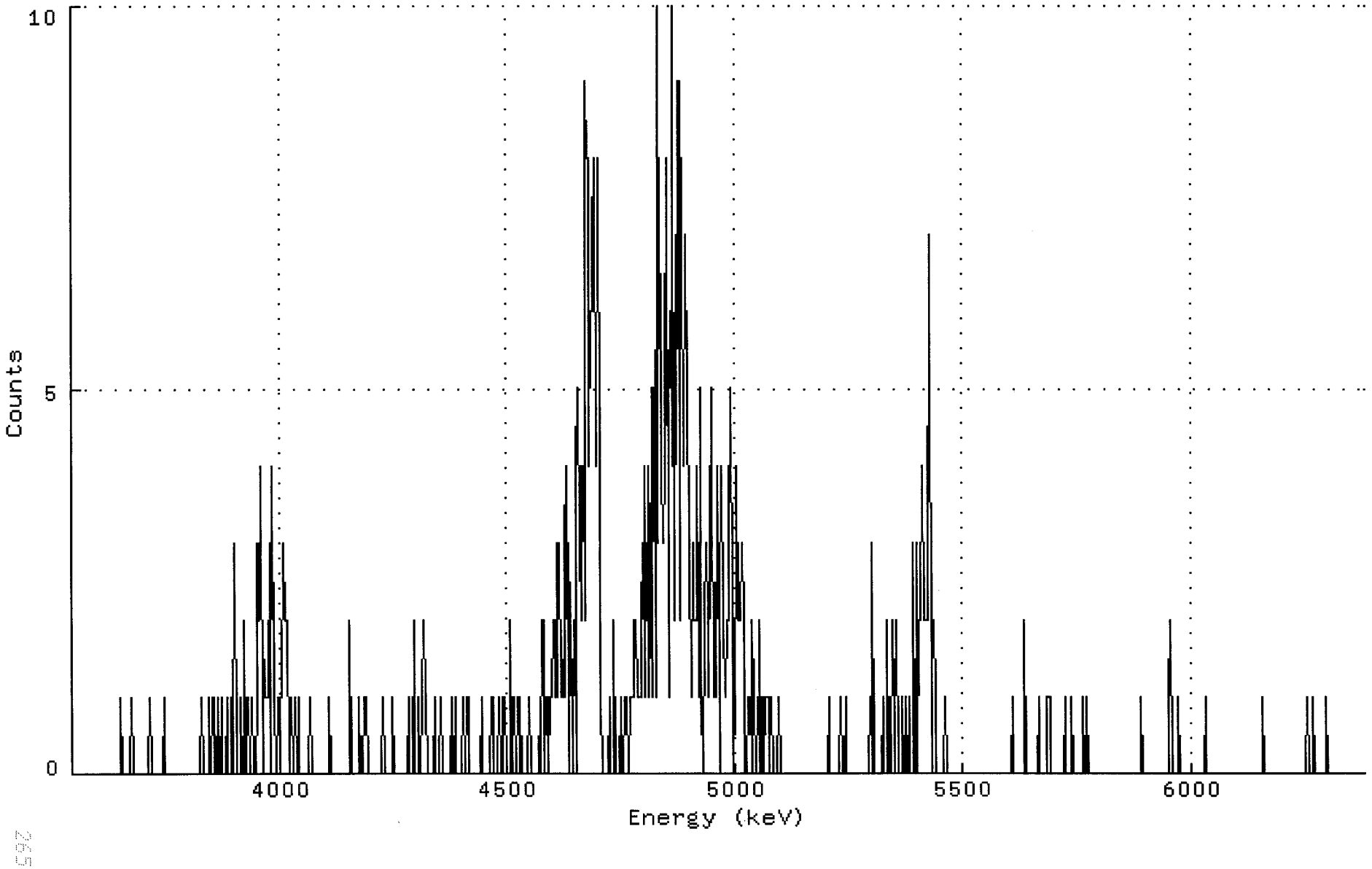
| NUCLIDE | ENERGY | NET AREA | BKG | %ABN | ACTIVITY pCi/ gram | TPU/ERROR 2-SIGMA | MDC pCi/ gram |
|---|---|---|---|---|---|---|---|
| TH-227 | 5850.0 | 8.98 | 1.02 | 97.5 | 1.373E-01 | 1.001E-01 | 1.131E-01 |
| TH-228 | 5400.0 | 55.81 | 1.19 | 99.9 | 8.428E-01 | 2.670E-01 | 1.160E-01 |
| TH229 | 4872.0 | 298.32 | 0.68 | 99.5 | 4.464E+00 | 6.639E-01 | 9.794E-02 |
| TH-230 | 4672.0 | 154.49 | 0.51 | 99.8 | 2.305E+00 | 5.303E-01 | 8.998E-02 |
| TH-232 | 3997.0 | 57.00 | 0.00 | 100.0 | 8.489E-01 | 2.645E-01 | 4.036E-02 |

**********

Analyst Jay Price 10-11-05
Date

Reviewer Allen Gregory 10/11/05
Date

Spectrum : DKA100:[ALPHA.ALUSR.ARCHIVE.S]S_0509118A-TH$12_TH.CNF;1
Title : 013
Sample Title: VPTR092805SL0E
Start Time: 11-OCT-2005 07:34 Sample Time: 28-SEP-2005 00:00 Energy Offset: 3.53235E+03
Real Time : 0 02:50:02.00 Sample ID : 12 Energy Slope : 2.92670E+00
Live Time : 0 02:50:02.00 Sample Type: TH Energy Quad : -1.43336E-04



Channel Contents for ND_AMS_ARCHIVE_S:S_0509118A-TH$12_TH

Channel

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1: | 10202 | 10202 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 29: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 43: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 57: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 71: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 85: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 99: | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 0 |
| 113: | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 |
| 127: | 3 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 2 | 0 | 1 | 0 | 0 | 1 |
| 141: | 0 | 0 | 0 | 1 | 3 | 2 | 4 | 0 | 2 | 1 | 1 | 1 | 1 | 3 |
| 155: | 0 | 4 | 1 | 0 | 0 | 1 | 0 | 1 | 1 | 3 | 3 | 2 | 2 | 0 |
| 169: | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 183: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 197: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 211: | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 225: | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 239: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 253: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 2 | 0 | 0 |
| 267: | 0 | 1 | 0 | 1 | 1 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 281: | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 295: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 0 |
| 309: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 323: | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 1 | 0 | 0 |
| 337: | 0 | 0 | 2 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 |
| 351: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 2 | 2 |
| 365: | 0 | 1 | 1 | 0 | 1 | 1 | 1 | 2 | 1 | 3 | 1 | 3 | 1 | 2 |
| 379: | 1 | 1 | 3 | 4 | 0 | 3 | 2 | 0 | 1 | 2 | 0 | 4 | 5 | 3 |
| 393: | 2 | 4 | 4 | 2 | 9 | 8 | 8 | 4 | 6 | 6 | 7 | 8 | 4 | 4 |
| 407: | 8 | 4 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 2 | 0 |
| 421: | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 |
| 435: | 2 | 2 | 1 | 1 | 1 | 1 | 2 | 3 | 1 | 4 | 2 | 4 | 1 | 2 |
| 449: | 5 | 1 | 5 | 1 | 10 | 3 | 8 | 5 | 4 | 3 | 4 | 5 | 8 | 1 |
| 463: | 5 | 6 | 4 | 10 | 2 | 6 | 5 | 9 | 2 | 9 | 7 | 4 | 4 | 7 |
| 477: | 5 | 3 | 3 | 1 | 3 | 2 | 2 | 2 | 4 | 1 | 5 | 1 | 0 | 2 |
| 491: | 2 | 3 | 2 | 1 | 3 | 5 | 4 | 1 | 1 | 1 | 4 | 0 | 2 | 4 |
| 505: | 2 | 1 | 1 | 2 | 2 | 3 | 5 | 2 | 0 | 1 | 3 | 4 | 2 | 2 |
| 519: | 2 | 3 | 2 | 0 | 0 | 1 | 1 | 1 | 0 | 2 | 1 | 0 | 0 | 1 |
| 533: | 0 | 2 | 0 | 1 | 0 | 1 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 |
| 547: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 561: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 575: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 589: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 |
| 603: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 617: | 0 | 0 | 0 | 0 | 1 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 631: | 1 | 0 | 0 | 0 | 2 | 0 | 1 | 0 | 2 | 0 | 1 | 2 | 0 | 0 |
| 645: | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 3 | 0 | 3 |
| 659: | 0 | 2 | 2 | 2 | 4 | 2 | 2 | 2 | 2 | 2 | 7 | 0 | 2 | 2 |
| 673: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 687: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 701: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 715: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 729: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 743: | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 757: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 |
| 771: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 785: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 |
| 799: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 813: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 827: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 841: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 855: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 0 | 0 | 0 | 0 | 0 |
| 869: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 883: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 897: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 911: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 925: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 939: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 953: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 967: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 981: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 995: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1009: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1023: | 0 | 0 | | | | | | | | | | | | |

Eberline Services
Oak Ridge Laboratory

Gross Sample Counts Within Peak Regions  Generated: 11-OCT-2005 11:01:28.75

Detector ID: 13  Acquisition Start: 11-OCT-2005 07:34:02.01
Live Time: 0 02:50:02.00  Real Time: 0 02:50:02.00
Batch Id: 0509118A-TH  Sample Id: 12
Sample Type: TH

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 3961.25 | 57 | 0 | 114.95 | 147.61 | 92 | 105 | 5.59E-03 | 13.2 | |
| 2 | 0 | 4647.46 | 155 | 0 | 49.82 | 388.40 | 310 | 107 | 1.52E-02 | 8.0 | |
| 3 | 0 | 4892.80 | 299 | 0 | 71.84 | 475.94 | 416 | 135 | 2.93E-02 | 5.8 | |
| 4 | 0 | 5382.65 | 57 | 0 | 19.72 | 653.11 | 569 | 110 | 5.59E-03 | 13.2 | |
| 5 | 0 | 5872.44 | 10 | 0 | 4.30 | 833.60 | 770 | 131 | 9.80E-04 | 31.6 | |

Background Counts Within Peak Regions  Generated: 11-OCT-2005 11:01:42.81

Acquisition Start: 7-OCT-2005 17:06:02.01
Live Time: 0 16:40:03.00  Real Time: 0 16:40:03.00

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 3952.40 | 0 | 0 | 0.00 | 144.00 | 92 | 105 | 0.00E+00 | 0.0 | |
| 2 | 0 | 4576.78 | 3 | 0 | 131.17 | 363.00 | 310 | 107 | 5.00E-05 | 57.7 | |
| 3 | 0 | 4913.11 | 4 | 0 | 353.69 | 483.00 | 416 | 135 | 6.67E-05 | 50.0 | |
| 4 | 0 | 5301.71 | 7 | 0 | 175.38 | 623.50 | 569 | 110 | 1.17E-04 | 37.8 | |
| 5 | 0 | 5876.09 | 6 | 0 | 154.92 | 835.00 | 770 | 131 | 1.00E-04 | 40.8 | |

Net Sample Counts Within Peak Regions  Generated: 11-OCT-2005 11:01:43.12

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 3961.25* | 57 | 0 | 114.95 | 147.61 | 92 | 105 | 5.59E-03 | 13.2 | |
| 2 | 0 | 4647.46* | 154 | 0 | 49.82 | 388.40 | 310 | 107 | 1.51E-02 | 8.1 | |
| 3 | 0 | 4892.80* | 298 | 0 | 71.84 | 475.94 | 416 | 135 | 2.92E-02 | 5.8 | |
| 4 | 0 | 5382.65* | 56 | 0 | 19.72 | 653.11 | 569 | 110 | 5.47E-03 | 13.6 | |
| 5 | 0 | 5872.44* | 9 | 0 | 4.30 | 833.60 | 770 | 131 | 8.80E-04 | 35.5 | |

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.0 Generated 11-OCT-2005 11:01:43

| | | | |
|---|---|---|---|
| Configuration | : MCA0:[AMSCOUNT]0000C192$1 | | |
| Analyses by | : ROIPEAK V1.2,PEAKEFF V2.2,ENBACK V1.6,NID V3.3 | | |
| Sample title | : VPTR092805SL0E | | |
| Sample date | : 28-SEP-2005 00:00:00 | Acquisition date | : 11-OCT-2005 07:34:02 |
| Sample ID | : 12 | Sample quantity | : 1.0285 gram |
| Sample type | : TH | Sample geometry | : |
| Detector name | : 013 | Detector geometry | : |
| Elapsed live time | : 0 02:50:02.00 | Elapsed real time | : 0 02:50:02.00 0.0% |
| Energy tolerance | : 100.00 keV | Half life ratio | : 8.00 |
| Errors propagated | : Yes | Systematic Error | : 3.00 % |
| Efficiency type | : Average value | Efficiencies at | : Peak Energy |
| Abundance limit | : 75.00 | | |

Post-NID Peak Search Report

| It | Energy | Area | FWHM | Channel | Left | Pw | %Err | Fit | Nuclides | Activity pCi/gram |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 3961.25* | 57114.95 | | 147.61 | 92 | 105 | 26.5 | | TH-232 | 0.685 |
| 0 | 4647.46* | 154 | 49.82 | 388.40 | 310 | 107 | 16.1 | | TH-230 | 1.86 |
| 0 | 4892.80* | 298 | 71.84 | 475.94 | 416 | 135 | 11.6 | | TH229 | 3.60 |
| 0 | 5382.65* | 56 | 19.72 | 653.11 | 569 | 110 | 27.1 | | TH-228 | 0.680 |
| 0 | 5872.44* | 9 | 4.30 | 833.60 | 770 | 131 | 71.0 | | TH-227 | 0.111 |

Eberline Services
Oak Ridge Laboratory

ALPHA SPECTROMETRY REPORT
11-OCT-2005 11:01:56

**********

Spectral File: ND_AMS_ARCHIVE_S:S_0509118A-TH$13_TH.CNF

**********

| | | | |
|---|---|---|---|
| BATCH ID: | 0509118A-TH | SAMPLE ID: | 13 |
| SAMPLE DATE: | 28-SEP-2005 00:00 | ALIQUOT: | 1.118E+00 gram |
| SAMPLE TITLE: | VPTR092805SL0F | DETECTOR NUMBER: | 014 |
| ACQ DATE: | 11-OCT-2005 07:34 | AVERAGE EFFICIENCY: | 20.86% |
| ELAPSED LIVE TIME: | 10201. | RECOVERY: | 85.88% |
| TRACER ID: | TH-18A | TRACER FWHM (kev): | 67.22 |
| LAMBDA VALUE: | 453. | ROI TYPE: | STANDARD |
| TRACER DPM AT SAMPLE DATE: | 10.184 | CONFIDENCE FACTOR: | 4.65 |
| SAMPLE MATRIX: | SOIL | LLD CONSTANT: | 2.71 |
| ENERGY CAL DATE: | 5-OCT-2005 05:14 | EFF CAL DATE: | 5-OCT-2005 05:14 |
| BKG FILENAME: | B_014_7OCT05 | BKG ELAPSED TIME: | 60008. |

**********

NUCLIDE ACTIVITY SUMMARY

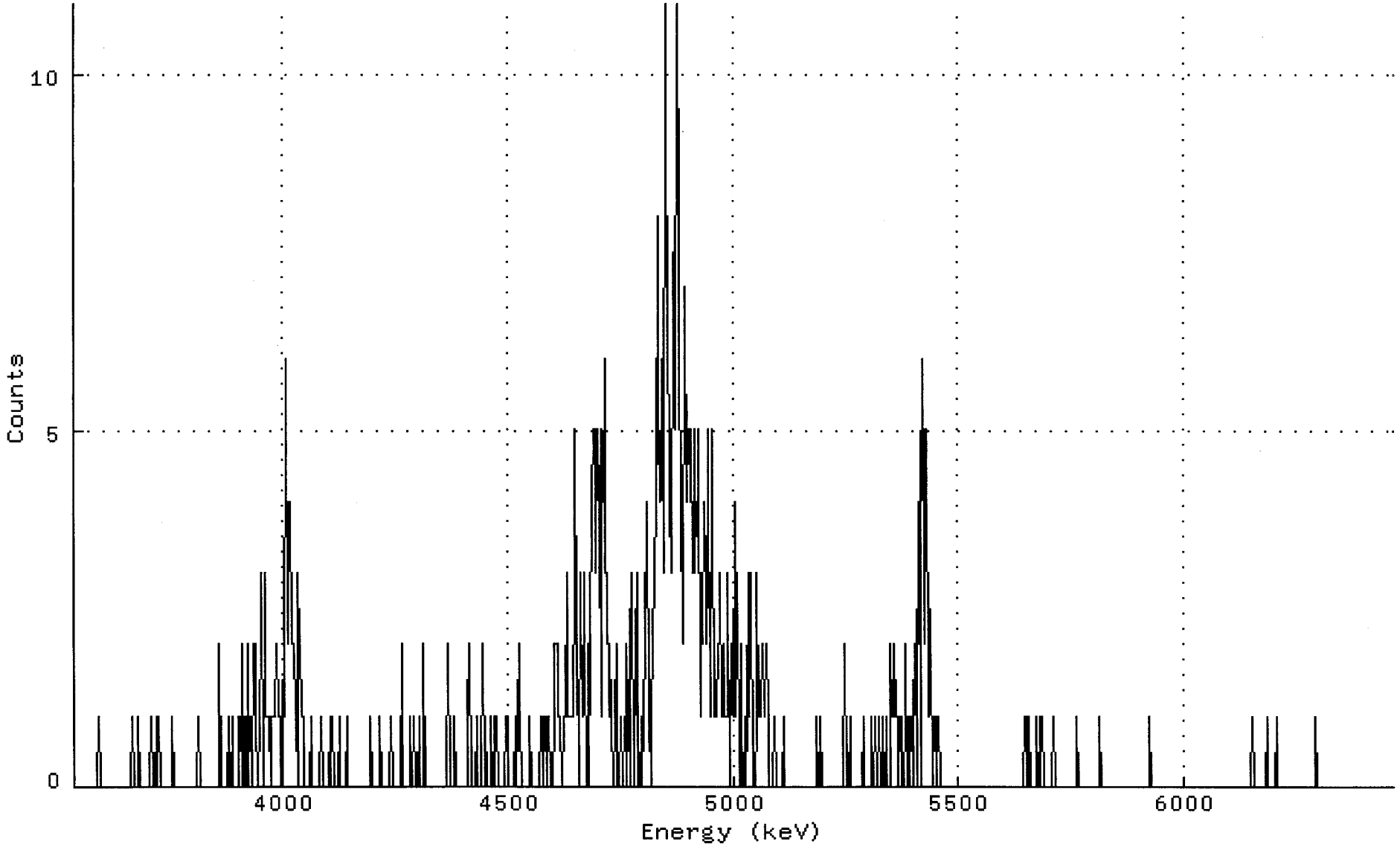
| NUCLIDE | ENERGY | NET AREA | BKG | %ABN | ACTIVITY pCi/ gram | TPU/ERROR 2-SIGMA | MDC pCi/ gram |
|---|---|---|---|---|---|---|---|
| TH-227 | 5850.0 | 3.15 | 0.85 | 97.5 | 4.280E-02 | 5.576E-02 | 9.496E-02 |
| TH-228 | 5400.0 | 64.79 | 2.21 | 99.9 | 8.693E-01 | 2.618E-01 | 1.274E-01 |
| TH229 | 4872.0 | 308.64 | 1.36 | 99.5 | 4.104E+00 | 6.046E-01 | 1.081E-01 |
| TH-230 | 4672.0 | 120.49 | 0.51 | 99.8 | 1.597E+00 | 3.909E-01 | 7.994E-02 |
| TH-232 | 3997.0 | 72.66 | 0.34 | 100.0 | 9.614E-01 | 2.751E-01 | 7.173E-02 |

**********

Analyst Jeff Price 10-11-05
Date

Reviewer Allen Gregley 10/11/05
Date

Spectrum : DKA100:[ALPHA.ALUSR.ARCHIVE.S]S_0509118A-TH$13_TH.CNF;1
Title : 014
Sample Title: VPTR092805SL0F
Start Time: 11-OCT-2005 07:34 Sample Time: 28-SEP-2005 00:00 Energy Offset: 3.52231E+03
Real Time : 0 02:50:01.00 Sample ID : 13 Energy Slope : 3.05617E+00
Live Time : 0 02:50:01.00 Sample Type: TH Energy Quad : -1.80920E-04



Channel Contents for ND_AMS_ARCHIVE_S:S_0509118A-TH$13_TH

Channel

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1: | 10201 | 10201 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 29: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 43: | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 57: | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 |
| 71: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 85: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 99: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 |
| 113: | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 1 |
| 127: | 0 | 2 | 0 | 0 | 2 | 0 | 1 | 0 | 0 | 2 | 2 | 1 | 0 | 1 |
| 141: | 2 | 3 | 0 | 3 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 2 | 1 |
| 155: | 1 | 0 | 0 | 3 | 1 | 6 | 2 | 3 | 4 | 2 | 2 | 2 | 1 | 0 |
| 169: | 3 | 2 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 183: | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 |
| 197: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 211: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 225: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 239: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 |
| 253: | 1 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 2 | 0 | 0 | 0 |
| 267: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 281: | 2 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 295: | 0 | 1 | 2 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 2 | 0 |
| 309: | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 |
| 323: | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 2 | 1 | 0 |
| 337: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 351: | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 2 | 2 | 2 | 1 |
| 365: | 1 | 0 | 1 | 1 | 1 | 3 | 1 | 1 | 1 | 1 | 1 | 3 | 5 | 2 |
| 379: | 0 | 3 | 3 | 1 | 3 | 2 | 0 | 2 | 0 | 2 | 4 | 4 | 5 | 5 |
| 393: | 3 | 5 | 4 | 1 | 5 | 4 | 6 | 3 | 3 | 1 | 2 | 1 | 0 | 0 |
| 407: | 1 | 2 | 0 | 0 | 1 | 1 | 0 | 1 | 0 | 2 | 1 | 0 | 2 | 3 |
| 421: | 0 | 0 | 2 | 3 | 0 | 0 | 1 | 0 | 1 | 2 | 2 | 4 | 1 | 0 |
| 435: | 1 | 2 | 3 | 3 | 4 | 8 | 5 | 4 | 6 | 5 | 3 | 11 | 9 | 7 |
| 449: | 4 | 4 | 3 | 7 | 8 | 5 | 11 | 8 | 6 | 4 | 2 | 2 | 7 | 4 |
| 463: | 4 | 5 | 4 | 5 | 3 | 5 | 3 | 4 | 3 | 5 | 1 | 3 | 2 | 4 |
| 477: | 2 | 5 | 4 | 1 | 5 | 4 | 1 | 1 | 1 | 2 | 2 | 3 | 1 | 2 |
| 491: | 1 | 1 | 1 | 3 | 0 | 2 | 2 | 1 | 4 | 1 | 3 | 0 | 2 | 0 |
| 505: | 0 | 1 | 0 | 1 | 3 | 1 | 3 | 0 | 1 | 0 | 1 | 3 | 1 | 1 |
| 519: | 1 | 2 | 1 | 1 | 2 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 533: | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 547: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 561: | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 575: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 1 |
| 589: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 603: | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 1 |
| 617: | 0 | 0 | 0 | 2 | 1 | 1 | 2 | 1 | 1 | 0 | 1 | 1 | 0 | 0 |
| 631: | 1 | 2 | 0 | 0 | 1 | 1 | 0 | 1 | 2 | 0 | 1 | 4 | 0 | 4 |
| 645: | 6 | 2 | 5 | 5 | 1 | 3 | 2 | 0 | 1 | 1 | 0 | 1 | 1 | 0 |
| 659: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 673: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 687: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 701: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 715: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 |
| 729: | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 0 |
| 743: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 757: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 771: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 785: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 799: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 813: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 827: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 841: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 855: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 869: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 883: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 897: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 911: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 925: | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 939: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 953: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 967: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 981: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 995: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1009: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1023: | 0 | 0 | | | | | | | | | | | | |

Eberline Services
Oak Ridge Laboratory

Gross Sample Counts Within Peak Regions  Generated: 11-OCT-2005 11:01:48.41

Detector ID: 14  Acquisition Start: 11-OCT-2005 07:34:20.01
Live Time: 0 02:50:01.00  Real Time: 0 02:50:01.00
Batch Id: 0509118A-TH  Sample Id: 13
Sample Type: TH

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 3979.71 | 73 | 0 | 12.52 | 151.01 | 91 | 101 | 7.16E-03 | 11.7 | |
| 2 | 0 | 4647.69 | 121 | 0 | 73.32 | 376.63 | 301 | 103 | 1.19E-02 | 9.1 | |
| 3 | 0 | 4894.89 | 310 | 0 | 67.22 | 461.74 | 403 | 131 | 3.04E-02 | 5.7 | |
| 4 | 0 | 5381.93 | 67 | 0 | 20.81 | 632.13 | 551 | 106 | 6.57E-03 | 12.2 | |
| 5 | 0 | 5799.52 | 4 | 0 | 238.38 | 781.25 | 745 | 128 | 3.92E-04 | 50.0 | |

Background Counts Within Peak Regions  Generated: 11-OCT-2005 11:01:53.53

Acquisition Start: 7-OCT-2005 17:06:05.01
Live Time: 0 16:40:08.00  Real Time: 0 16:40:08.00

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 3957.55 | 2 | 0 | 116.25 | 141.00 | 91 | 101 | 3.33E-05 | 70.7 | |
| 2 | 0 | 4576.59 | 3 | 0 | 0.00 | 352.00 | 301 | 103 | 5.00E-05 | 57.7 | |
| 3 | 0 | 4913.31 | 8 | 0 | 0.00 | 468.00 | 403 | 131 | 1.33E-04 | 35.4 | |
| 4 | 0 | 5303.39 | 13 | 0 | 211.63 | 603.50 | 551 | 106 | 2.17E-04 | 27.7 | |
| 5 | 0 | 5886.92 | 5 | 0 | 253.36 | 808.50 | 745 | 128 | 8.33E-05 | 44.7 | |

Net Sample Counts Within Peak Regions  Generated: 11-OCT-2005 11:01:53.84

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 3979.71* | 73 | 0 | 12.52 | 151.01 | 91 | 101 | 7.12E-03 | 11.8 | |
| 2 | 0 | 4647.69* | 120 | 0 | 73.32 | 376.63 | 301 | 103 | 1.18E-02 | 9.1 | |
| 3 | 0 | 4894.89* | 309 | 0 | 67.22 | 461.74 | 403 | 131 | 3.03E-02 | 5.7 | |
| 4 | 0 | 5381.93* | 65 | 0 | 20.81 | 632.13 | 551 | 106 | 6.35E-03 | 12.7 | |
| 5 | 0 | 5799.52* | 3 | 0 | 238.38 | 781.25 | 745 | 128 | 3.09E-04 | 64.6 | |

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.0 Generated 11-OCT-2005 11:01:55

Configuration : MCA0:[AMSCOUNT]0000C192$1
Analyses by : ROIPEAK V1.2,PEAKEFF V2.2,ENBACK V1.6,NID V3.3
Sample title : VPTR092805SL0F
Sample date : 28-SEP-2005 00:00:00 Acquisition date : 11-OCT-2005 07:34:20
Sample ID : 13 Sample quantity : 1.1179 gram
Sample type : TH Sample geometry :
Detector name : 014 Detector geometry:
Elapsed live time: 0 02:50:01.00 Elapsed real time: 0 02:50:01.00 0.0%
Energy tolerance : 100.00 keV Half life ratio : 8.00
Errors propagated: Yes Systematic Error : 3.00 %
Efficiency type : Average value Efficiencies at : Peak Energy
Abundance limit : 75.00

Post-NID Peak Search Report

| It | Energy | Area | FWHM | Channel | Left | Pw | %Err | Fit | Nuclides | Activity pCi/gram |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 3979.71* | 73 | 12.52 | 151.01 | 91 | 101 | 23.5 | | TH-232 | 0.826 |
| 0 | 4647.69* | 120 | 73.32 | 376.63 | 301 | 103 | 18.3 | | TH-230 | 1.37 |
| 0 | 4894.89* | 309 | 67.22 | 461.74 | 403 | 131 | 11.4 | | TH229 | 3.52 |
| 0 | 5381.93* | 65 | 20.81 | 632.13 | 551 | 106 | 25.3 | | TH-228 | 0.746 |
| 0 | 5799.52* | 3238.38 | | 781.25 | 745 | 128 | 129.3 | | TH-227 | 3.675E-02 |

Eberline Services
Oak Ridge Laboratory

ALPHA SPECTROMETRY REPORT
11-OCT-2005 11:02:11

**********

Spectral File: ND_AMS_ARCHIVE_S:S_0509118A-TH$14_TH.CNF

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| | | | |
|---|---|---|---|
| BATCH ID: | 0509118A-TH | SAMPLE ID: | 14 |
| SAMPLE DATE: | 28-SEP-2005 00:00 | ALIQUOT: | 1.029E+00 gram |
| SAMPLE TITLE: | VPTR092805SL0G | DETECTOR NUMBER: | 015 |
| ACQ DATE: | 11-OCT-2005 07:34 | AVERAGE EFFICIENCY: | 21.08% |
| ELAPSED LIVE TIME: | 10208. | RECOVERY: | 95.18% |
| TRACER ID: | TH-18A | TRACER FWHM (kev): | 100.33 |
| LAMBDA VALUE: | 453. | ROI TYPE: | STANDARD |
| TRACER DPM AT SAMPLE DATE: | 10.191 | CONFIDENCE FACTOR: | 4.65 |
| SAMPLE MATRIX: | SOIL | LLD CONSTANT: | 2.71 |
| ENERGY CAL DATE: | 5-OCT-2005 05:14 | EFF CAL DATE: | 5-OCT-2005 05:14 |
| BKG FILENAME: | B_015_7OCT05 | BKG ELAPSED TIME: | 60005. |

**********

NUCLIDE ACTIVITY SUMMARY

| NUCLIDE | ENERGY | NET AREA | BKG | %ABN | ACTIVITY pCi/ gram | TPU/ERROR 2-SIGMA | MDC pCi/ gram |
|---|---|---|---|---|---|---|---|
| TH-227 | 5850.0 | 8.49 | 0.51 | 97.5 | 1.118E-01 | 8.133E-02 | 7.932E-02 |
| TH-228 | 5400.0 | 66.49 | 0.51 | 99.9 | 8.644E-01 | 2.532E-01 | 7.739E-02 |
| TH229 | 4872.0 | 346.15 | 0.85 | 99.5 | 4.460E+00 | 6.349E-01 | 9.017E-02 |
| TH-230 | 4672.0 | 119.30 | 1.70 | 99.8 | 1.532E+00 | 3.728E-01 | 1.127E-01 |
| TH-232 | 3997.0 | 74.81 | 1.19 | 100.0 | 9.592E-01 | 2.706E-01 | 9.981E-02 |

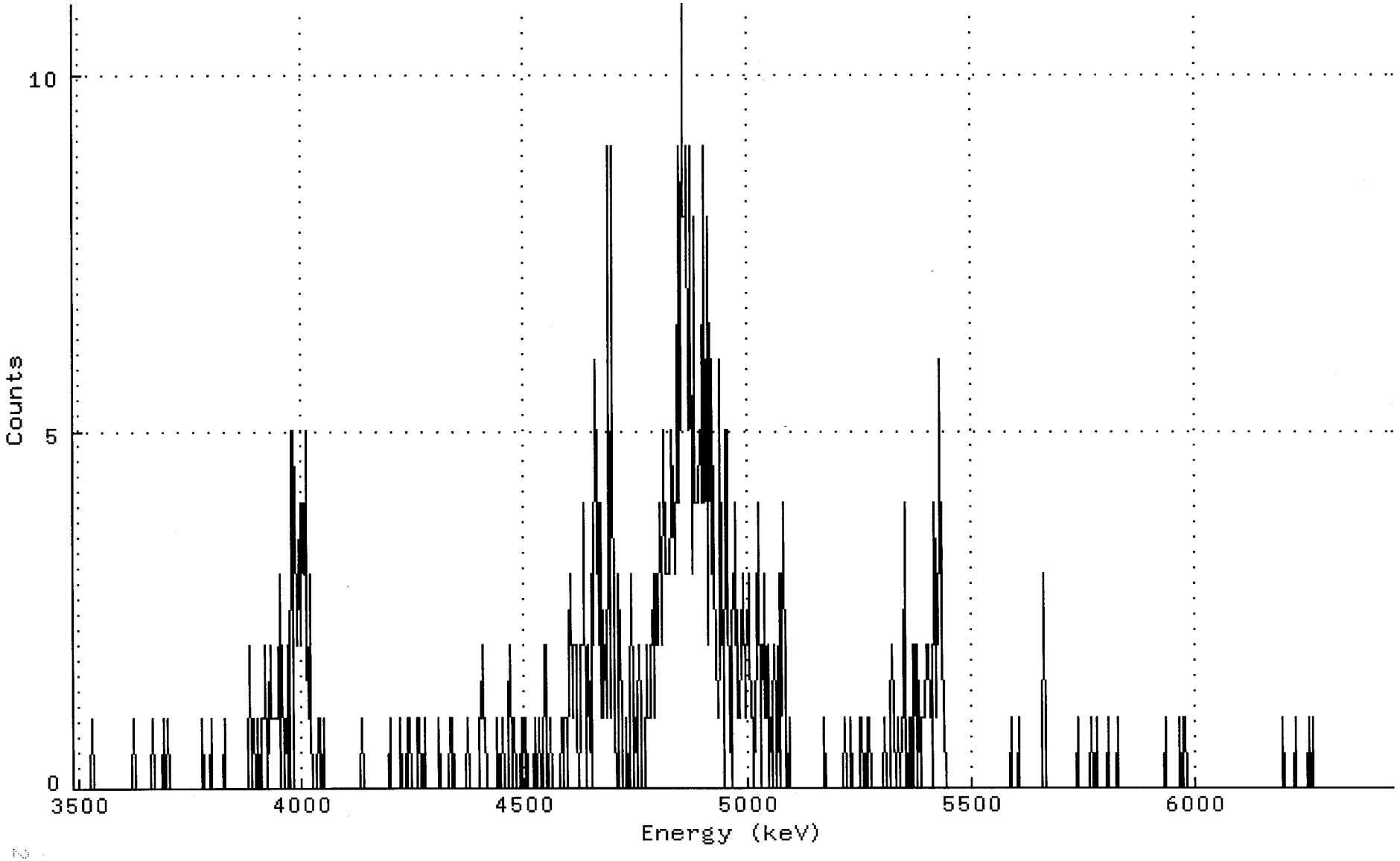
**********

*** Tracer FWHM > 80.0 Kev ***

Analyst _____ Date 10-11-05

Reviewer _____ Date 10/11/05

Spectrum : DKA100:[ALPHA.ALUSR.ARCHIVE.S]S_0509118A-TH$14_TH.CNF;1
Title : 015
Sample Title: VPTR092805SLOG
Start Time: 11-OCT-2005 07:34 Sample Time: 28-SEP-2005 00:00 Energy Offset: 3.47886E+03
Real Time : 0 02:50:08.00 Sample ID : 14 Energy Slope : 3.05785E+00
Live Time : 0 02:50:08.00 Sample Type: TH Energy Quad : -1.60260E-04



Channel Contents for ND_AMS_ARCHIVE_S:S_0509118A-TH$14_TH

Channel

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1: | 10208 | 10208 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 29: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 43: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 57: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 71: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 85: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 99: | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 113: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 127: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 0 | 1 |
| 141: | 0 | 0 | 1 | 1 | 1 | 2 | 0 | 1 | 2 | 1 | 1 | 1 | 1 | 1 |
| 155: | 1 | 3 | 0 | 2 | 0 | 0 | 1 | 0 | 2 | 0 | 5 | 0 | 5 | 4 |
| 169: | 2 | 2 | 3 | 4 | 2 | 4 | 3 | 5 | 2 | 1 | 3 | 1 | 0 | 0 |
| 183: | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 197: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 211: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 225: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 239: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| 253: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 0 |
| 267: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 281: | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 295: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 2 |
| 309: | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 323: | 1 | 0 | 0 | 0 | 0 | 1 | 2 | 0 | 1 | 1 | 0 | 0 | 0 | 0 |
| 337: | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| 351: | 1 | 0 | 0 | 0 | 2 | 2 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 |
| 365: | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 1 | 0 | 2 | 3 | 1 | 2 | 2 |
| 379: | 2 | 1 | 0 | 1 | 2 | 2 | 2 | 4 | 0 | 2 | 2 | 1 | 0 | 3 |
| 393: | 2 | 6 | 3 | 5 | 3 | 1 | 4 | 1 | 2 | 2 | 1 | 4 | 9 | 1 |
| 407: | 9 | 6 | 1 | 0 | 0 | 3 | 2 | 1 | 0 | 0 | 0 | 1 | 0 | 0 |
| 421: | 1 | 3 | 1 | 0 | 1 | 0 | 1 | 2 | 1 | 0 | 0 | 0 | 2 | 1 |
| 435: | 1 | 1 | 2 | 2 | 3 | 1 | 3 | 2 | 2 | 4 | 3 | 2 | 5 | 3 |
| 449: | 3 | 3 | 3 | 4 | 5 | 4 | 3 | 4 | 4 | 9 | 4 | 6 | 11 | 8 |
| 463: | 8 | 8 | 9 | 5 | 9 | 7 | 3 | 8 | 4 | 4 | 4 | 4 | 5 | 4 |
| 477: | 9 | 4 | 6 | 2 | 8 | 5 | 3 | 6 | 3 | 2 | 2 | 1 | 2 | 6 |
| 491: | 2 | 2 | 0 | 5 | 5 | 3 | 1 | 0 | 2 | 3 | 2 | 4 | 1 | 1 |
| 505: | 2 | 2 | 3 | 1 | 2 | 2 | 3 | 2 | 1 | 1 | 0 | 1 | 2 | 2 |
| 519: | 4 | 0 | 2 | 2 | 1 | 3 | 1 | 2 | 0 | 1 | 0 | 1 | 2 | 1 |
| 533: | 0 | 1 | 3 | 0 | 2 | 4 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 547: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 561: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 575: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 589: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 |
| 603: | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 617: | 1 | 0 | 0 | 0 | 0 | 1 | 2 | 1 | 1 | 0 | 1 | 1 | 0 | 1 |
| 631: | 1 | 1 | 4 | 0 | 0 | 1 | 0 | 0 | 2 | 0 | 2 | 0 | 2 | 1 |
| 645: | 0 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 1 | 2 | 0 | 4 | 3 | 1 |
| 659: | 3 | 3 | 6 | 2 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 673: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 687: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 701: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 715: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 729: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| 743: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 757: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 771: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 |
| 785: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 799: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 813: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 827: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 841: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| 855: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 869: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 883: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 897: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 911: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 925: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 939: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 953: | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 967: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 981: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 995: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1009: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1023: | 0 | 0 | | | | | | | | | | | | |

Eberline Services
Oak Ridge Laboratory

Gross Sample Counts Within Peak Regions  Generated: 11-OCT-2005 11:02:01.31

Detector ID: 15  Acquisition Start: 11-OCT-2005 07:34:37.01
Live Time: 0 02:50:08.00  Real Time: 0 02:50:08.00
Batch Id: 0509118A-TH  Sample Id: 14
Sample Type: TH

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 3976.79 | 76 | 0 | 71.86 | 164.25 | 106 | 100 | 7.45E-03 | 11.5 | |
| 2 | 0 | 4637.52 | 121 | 0 | 44.81 | 386.75 | 315 | 103 | 1.19E-02 | 9.1 | |
| 3 | 0 | 4896.09 | 347 | 0 | 100.33 | 475.31 | 417 | 130 | 3.40E-02 | 5.4 | |
| 4 | 0 | 5374.33 | 67 | 0 | 88.92 | 641.43 | 563 | 106 | 6.56E-03 | 12.2 | |
| 5 | 0 | 5861.76 | 9 | 0 | 266.03 | 814.00 | 756 | 127 | 8.82E-04 | 33.3 | |

Background Counts Within Peak Regions  Generated: 11-OCT-2005 11:02:09.54

Acquisition Start: 7-OCT-2005 17:06:08.01
Live Time: 0 16:40:05.00  Real Time: 0 16:40:05.00

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 3953.29 | 7 | 0 | 235.53 | 155.50 | 106 | 100 | 1.17E-04 | 37.8 | |
| 2 | 0 | 4576.00 | 10 | 0 | 3.02 | 366.00 | 315 | 103 | 1.67E-04 | 31.6 | |
| 3 | 0 | 4913.26 | 5 | 0 | 3.02 | 481.50 | 417 | 130 | 8.33E-05 | 44.7 | |
| 4 | 0 | 5300.60 | 3 | 0 | 199.29 | 615.50 | 563 | 106 | 5.00E-05 | 57.7 | |
| 5 | 0 | 5880.77 | 3 | 0 | 347.25 | 819.00 | 756 | 127 | 5.00E-05 | 57.7 | |

Net Sample Counts Within Peak Regions  Generated: 11-OCT-2005 11:02:09.85

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 3976.79* | 75 | 0 | 71.86 | 164.25 | 106 | 100 | 7.33E-03 | 11.7 | |
| 2 | 0 | 4637.52* | 119 | 0 | 44.81 | 386.75 | 315 | 103 | 1.17E-02 | 9.2 | |
| 3 | 0 | 4896.09* | 346 | 0 | 100.33 | 475.31 | 417 | 130 | 3.39E-02 | 5.4 | |
| 4 | 0 | 5374.33* | 66 | 0 | 88.92 | 641.43 | 563 | 106 | 6.51E-03 | 12.3 | |
| 5 | 0 | 5861.76* | 8 | 0 | 266.03 | 814.00 | 756 | 127 | 8.32E-04 | 35.5 | |

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.0 Generated 11-OCT-2005 11:02:10

Configuration : MCA0:[AMSCOUNT]0000C192$1
Analyses by : ROIPEAK V1.2,PEAKEFF V2.2,ENBACK V1.6,NID V3.3
Sample title : VPTR092805SL0G
Sample date : 28-SEP-2005 00:00:00 Acquisition date : 11-OCT-2005 07:34:37
Sample ID : 14 Sample quantity : 1.0293 gram
Sample type : TH Sample geometry :
Detector name : 015 Detector geometry:
Elapsed live time: 0 02:50:08.00 Elapsed real time: 0 02:50:08.00 0.0%
Energy tolerance : 100.00 keV Half life ratio : 8.00
Errors propagated: Yes Systematic Error : 3.00 %
Efficiency type : Average value Efficiencies at : Peak Energy
Abundance limit : 75.00

Post-NID Peak Search Report

| It | Energy | Area | FWHM | Channel | Left | Pw | %Err | Fit | Nuclides | Activity pCi/gram |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 3976.79* | 75 | 71.86 | 164.25 | 106 | 100 | 23.3 | | TH-232 | 0.913 |
| 0 | 4637.52* | 119 | 44.81 | 386.75 | 315 | 103 | 18.5 | | TH-230 | 1.46 |
| 0 | 4896.09* | 346 | 100.33 | 475.31 | 417 | 130 | 10.8 | | TH229 | 4.24 |
| 0 | 5374.33* | 66 | 88.92 | 641.43 | 563 | 106 | 24.6 | | TH-228 | 0.823 |
| 0 | 5861.76* | 82 | 66.03 | 814.00 | 756 | 127 | 71.0 | | TH-227 | 0.106 |

Eberline Services
Oak Ridge Laboratory

ALPHA SPECTROMETRY REPORT
11-OCT-2005 11:02:23

**********

Spectral File: ND_AMS_ARCHIVE_S:S_0509118A-TH$15_TH.CNF

**********

| | | | |
|---|---|---|---|
| BATCH ID: | 0509118A-TH | SAMPLE ID: | 15 |
| SAMPLE DATE: | 28-SEP-2005 00:00 | ALIQUOT: | 1.048E+00 gram |
| SAMPLE TITLE: | VPTR092805SL0H | DETECTOR NUMBER: | 016 |
| ACQ DATE: | 11-OCT-2005 07:34 | AVERAGE EFFICIENCY: | 20.44% |
| ELAPSED LIVE TIME: | 10205. | RECOVERY: | 94.07% |
| TRACER ID: | TH-18A | TRACER FWHM (kev): | 94.14 |
| LAMBDA VALUE: | 453. | ROI TYPE: | STANDARD |
| TRACER DPM AT SAMPLE DATE: | 10.184 | CONFIDENCE FACTOR: | 4.65 |
| SAMPLE MATRIX: | SOIL | LLD CONSTANT: | 2.71 |
| ENERGY CAL DATE: | 5-OCT-2005 05:14 | EFF CAL DATE: | 5-OCT-2005 05:14 |
| BKG FILENAME: | B_016_7OCT05 | BKG ELAPSED TIME: | 60002. |

**********

NUCLIDE ACTIVITY SUMMARY

| NUCLIDE | ENERGY | NET AREA | BKG | %ABN | ACTIVITY pCi/ gram | TPU/ERROR 2-SIGMA | MDC pCi/ gram |
|---|---|---|---|---|---|---|---|
| TH-227 | 5850.0 | 9.15 | 0.85 | 97.5 | 1.235E-01 | 8.821E-02 | 9.433E-02 |
| TH-228 | 5400.0 | 80.49 | 0.51 | 99.9 | 1.073E+00 | 2.952E-01 | 7.931E-02 |
| TH229 | 4872.0 | 331.47 | 1.53 | 99.5 | 4.377E+00 | 6.316E-01 | 1.118E-01 |
| TH-230 | 4672.0 | 102.49 | 0.51 | 99.8 | 1.349E+00 | 3.438E-01 | 7.941E-02 |
| TH-232 | 3997.0 | 84.66 | 0.34 | 100.0 | 1.113E+00 | 3.009E-01 | 7.126E-02 |

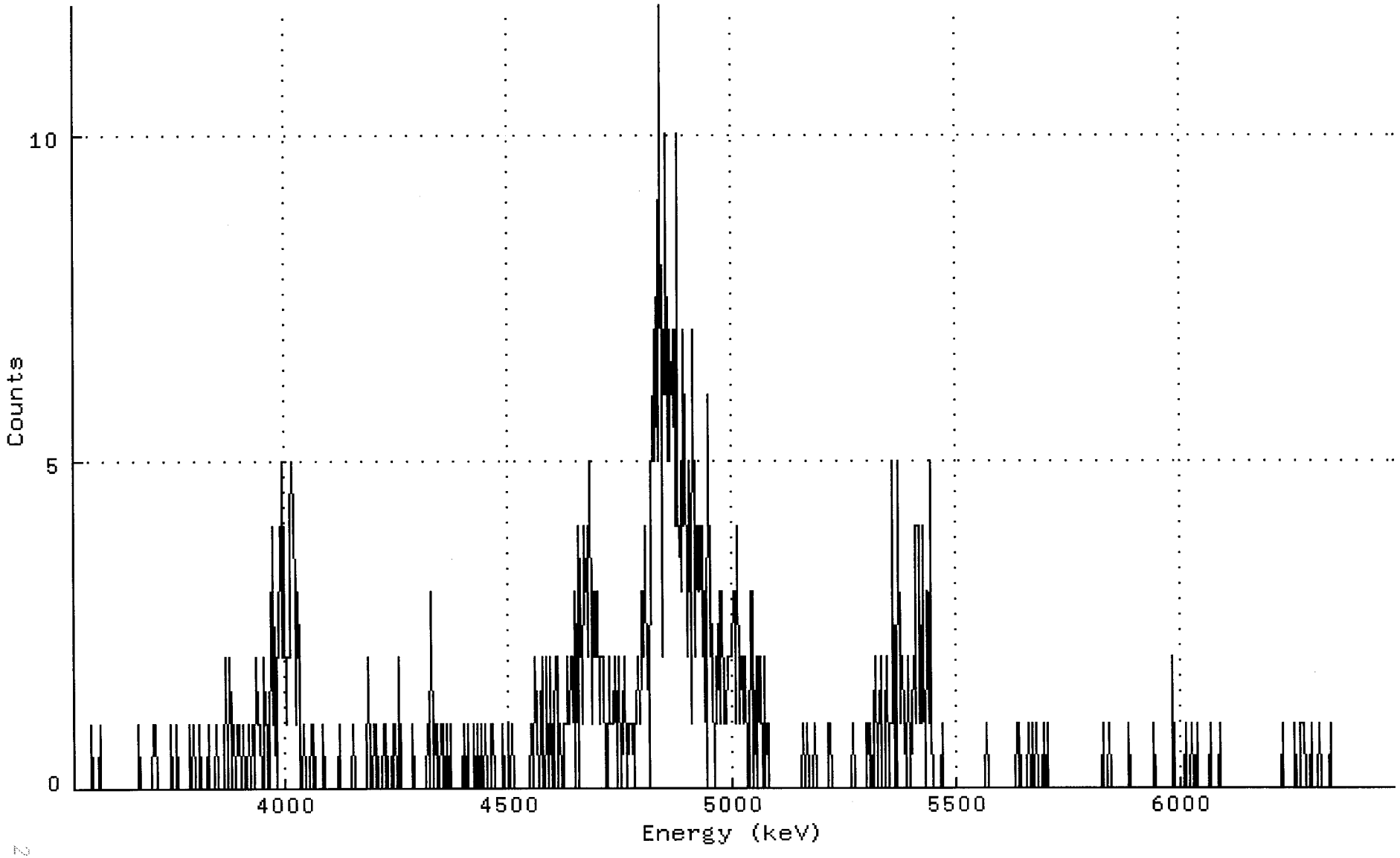
**********

*** Tracer FWHM > 80.0 Kev ***

Analyst Jeff Price 10-11-05
Date

Reviewer J Gregley 10/11/05
Date

Spectrum : DKA100:[ALPHA.ALUSR.ARCHIVE.S]S_0509118A-TH$15_TH.CNF;1
Title : 016
Sample Title: VPTR092805SL0H
Start Time: 11-OCT-2005 07:34 Sample Time: 28-SEP-2005 00:00 Energy Offset: 3.51531E+03
Real Time : 0 02:50:05.00 Sample ID : 15 Energy Slope : 3.06406E+00
Live Time : 0 02:50:05.00 Sample Type: TH Energy Quad : -1.69474E-04



Channel Contents for ND_AMS_ARCHIVE_S:S_0509118A-TH$15_TH

Channel

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1: | 10205 | 10205 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 29: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 43: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 57: | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 71: | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 85: | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 99: | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 113: | 0 | 0 | 2 | 0 | 0 | 2 | 1 | 0 | 1 | 0 | 1 | 1 | 1 | 0 |
| 127: | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 2 | 1 | 1 |
| 141: | 1 | 0 | 0 | 2 | 1 | 1 | 0 | 0 | 3 | 1 | 4 | 1 | 0 | 2 |
| 155: | 2 | 4 | 2 | 5 | 3 | 1 | 2 | 2 | 2 | 4 | 5 | 4 | 3 | 1 |
| 169: | 3 | 2 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 |
| 183: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 197: | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 211: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 |
| 225: | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 |
| 239: | 0 | 1 | 0 | 1 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 253: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 267: | 0 | 0 | 3 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 1 |
| 281: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 295: | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 0 |
| 309: | 1 | 1 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 323: | 1 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 337: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 2 | 1 | 1 | 0 |
| 351: | 1 | 2 | 0 | 0 | 1 | 2 | 0 | 1 | 2 | 0 | 0 | 1 | 2 | 2 |
| 365: | 0 | 1 | 0 | 0 | 1 | 1 | 1 | 2 | 1 | 2 | 2 | 2 | 0 | 3 |
| 379: | 2 | 0 | 4 | 3 | 1 | 4 | 4 | 3 | 4 | 2 | 5 | 2 | 1 | 3 |
| 393: | 3 | 2 | 3 | 1 | 2 | 2 | 2 | 0 | 1 | 0 | 2 | 1 | 1 | 1 |
| 407: | 1 | 2 | 0 | 1 | 2 | 0 | 0 | 1 | 2 | 2 | 0 | 1 | 1 | 1 |
| 421: | 1 | 0 | 1 | 1 | 2 | 2 | 1 | 2 | 3 | 2 | 4 | 3 | 2 | 1 |
| 435: | 0 | 5 | 5 | 7 | 5 | 6 | 9 | 5 | 12 | 2 | 8 | 6 | 6 | 10 |
| 449: | 5 | 5 | 7 | 6 | 7 | 7 | 4 | 10 | 4 | 4 | 3 | 7 | 4 | 6 |
| 463: | 2 | 3 | 5 | 1 | 2 | 7 | 3 | 2 | 4 | 3 | 4 | 4 | 2 | 4 |
| 477: | 2 | 0 | 1 | 6 | 2 | 3 | 2 | 0 | 2 | 1 | 2 | 3 | 1 | 3 |
| 491: | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 1 | 4 | 1 | 1 |
| 505: | 2 | 1 | 2 | 2 | 0 | 1 | 0 | 3 | 3 | 0 | 1 | 2 | 0 | 2 |
| 519: | 1 | 2 | 0 | 2 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 533: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 547: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 561: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 |
| 575: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 589: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 603: | 1 | 0 | 1 | 0 | 0 | 1 | 2 | 0 | 1 | 1 | 2 | 0 | 0 | 0 |
| 617: | 1 | 2 | 0 | 1 | 1 | 1 | 5 | 0 | 2 | 0 | 5 | 1 | 1 | 2 |
| 631: | 1 | 1 | 0 | 2 | 2 | 0 | 1 | 1 | 2 | 1 | 4 | 4 | 4 | 1 |
| 645: | 1 | 4 | 2 | 0 | 3 | 2 | 1 | 5 | 1 | 0 | 0 | 0 | 0 | 0 |
| 659: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 673: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 687: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 701: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 715: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 729: | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 0 |
| 743: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 757: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 771: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 785: | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 799: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 813: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 827: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 841: | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 855: | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 869: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 883: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 897: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 911: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 925: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 939: | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 0 |
| 953: | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 967: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 981: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 995: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1009: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1023: | 0 | 0 | | | | | | | | | | | | |

Eberline Services
Oak Ridge Laboratory

Gross Sample Counts Within Peak Regions  Generated: 11-OCT-2005 11:02:15.86

Detector ID: 16  Acquisition Start: 11-OCT-2005 07:34:57.01
Live Time: 0 02:50:05.00  Real Time: 0 02:50:05.00
Batch Id: 0509118A-TH  Sample Id: 15
Sample Type: TH

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 3977.06 | 85 | 0 | 63.27 | 151.98 | 93 | 101 | 8.33E-03 | 10.8 | |
| 2 | 0 | 4635.40 | 103 | 0 | 53.37 | 373.26 | 302 | 103 | 1.01E-02 | 9.9 | |
| 3 | 0 | 4889.09 | 333 | 0 | 94.14 | 460.06 | 404 | 130 | 3.26E-02 | 5.5 | |
| 4 | 0 | 5373.76 | 81 | 0 | 92.68 | 628.37 | 550 | 106 | 7.94E-03 | 11.1 | |
| 5 | 0 | 5921.41 | 10 | 0 | 3.06 | 822.70 | 744 | 126 | 9.80E-04 | 31.6 | |

Background Counts Within Peak Regions  Generated: 11-OCT-2005 11:02:21.43

Acquisition Start: 7-OCT-2005 17:06:11.01
Live Time: 0 16:40:02.00  Real Time: 0 16:40:02.00

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 3951.48 | 2 | 0 | 140.27 | 143.00 | 93 | 101 | 3.33E-05 | 70.7 | |
| 2 | 0 | 4576.26 | 3 | 0 | 131.12 | 353.00 | 302 | 103 | 5.00E-05 | 57.7 | |
| 3 | 0 | 4914.26 | 9 | 0 | 3.05 | 468.50 | 404 | 130 | 1.50E-04 | 33.3 | |
| 4 | 0 | 5301.40 | 3 | 0 | 131.12 | 602.50 | 550 | 106 | 5.00E-05 | 57.7 | |
| 5 | 0 | 5880.46 | 5 | 0 | 277.49 | 806.50 | 744 | 126 | 8.33E-05 | 44.7 | |

Net Sample Counts Within Peak Regions  Generated: 11-OCT-2005 11:02:21.71

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 3977.06* | 85 | 0 | 63.27 | 151.98 | 93 | 101 | 8.30E-03 | 10.9 | |
| 2 | 0 | 4635.40* | 102 | 0 | 53.37 | 373.26 | 302 | 103 | 1.00E-02 | 9.9 | |
| 3 | 0 | 4889.09* | 331 | 0 | 94.14 | 460.06 | 404 | 130 | 3.25E-02 | 5.5 | |
| 4 | 0 | 5373.76* | 80 | 0 | 92.68 | 628.37 | 550 | 106 | 7.89E-03 | 11.2 | |
| 5 | 0 | 5921.41* | 9 | 0 | 3.06 | 822.70 | 744 | 126 | 8.97E-04 | 34.8 | |

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.0 Generated 11-OCT-2005 11:02:22

Configuration : MCA0:[AMSCOUNT]0000C192$1
Analyses by : ROIPEAK V1.2,PEAKEFF V2.2,ENBACK V1.6,NID V3.3
Sample title : VPTR092805SL0H
Sample date : 28-SEP-2005 00:00:00 Acquisition date : 11-OCT-2005 07:34:57
Sample ID : 15 Sample quantity : 1.0480 gram
Sample type : TH Sample geometry :
Detector name : 016 Detector geometry:
Elapsed live time: 0 02:50:05.00 Elapsed real time: 0 02:50:05.00 0.0%
Energy tolerance : 100.00 keV Half life ratio : 8.00
Errors propagated: Yes Systematic Error : 3.00 %
Efficiency type : Average value Efficiencies at : Peak Energy
Abundance limit : 75.00

Post-NID Peak Search Report

| It | Energy | Area | FWHM | Channel | Left | Pw | %Err | Fit | Nuclides | Activity pCi/gram |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 3977.06* | 85 | 63.27 | 151.98 | 93 | 101 | 21.8 | | TH-232 | 1.05 |
| 0 | 4635.40* | 102 | 53.37 | 373.26 | 302 | 103 | 19.8 | | TH-230 | 1.27 |
| 0 | 4889.09* | 331 | 94.14 | 460.06 | 404 | 130 | 11.0 | | TH229 | 4.12 |
| 0 | 5373.76* | 80 | 92.68 | 628.37 | 550 | 106 | 22.4 | | TH-228 | 1.01 |
| 0 | 5921.41* | 9 | 3.06 | 822.70 | 744 | 126 | 69.6 | | TH-227 | 0.116 |

Eberline Services
Oak Ridge Laboratory

ALPHA SPECTROMETRY REPORT
11-OCT-2005 11:02:36

**********

Spectral File: ND_AMS_ARCHIVE_S:S_0509118A-TH$16_TH.CNF

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| | | | |
|---|---|---|---|
| BATCH ID: | 0509118A-TH | SAMPLE ID: | 16 |
| SAMPLE DATE: | 28-SEP-2005 00:00 | ALIQUOT: | 1.118E+00 gram |
| SAMPLE TITLE: | VPTR092805SL0I | DETECTOR NUMBER: | 045 |
| ACQ DATE: | 11-OCT-2005 07:35 | AVERAGE EFFICIENCY: | 20.51% |
| ELAPSED LIVE TIME: | 10200. | RECOVERY: | 78.79% |
| TRACER ID: | TH-18A | TRACER FWHM (kev): | 38.78 |
| LAMBDA VALUE: | 450. | ROI TYPE: | STANDARD |
| TRACER DPM AT SAMPLE DATE: | 10.121 | CONFIDENCE FACTOR: | 4.65 |
| SAMPLE MATRIX: | SOIL | LLD CONSTANT: | 2.71 |
| ENERGY CAL DATE: | 7-OCT-2005 04:44 | EFF CAL DATE: | 7-OCT-2005 04:44 |
| BKG FILENAME: | B_045_7OCT05 | BKG ELAPSED TIME: | 60000. |

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NUCLIDE ACTIVITY SUMMARY

| NUCLIDE | ENERGY | NET AREA | BKG | %ABN | ACTIVITY pCi/ gram | TPU/ERROR 2-SIGMA | MDC pCi/ gram |
|---|---|---|---|---|---|---|---|
| TH-227 | 5850.0 | 8.66 | 0.34 | 97.5 | 1.305E-01 | 9.326E-02 | 8.157E-02 |
| TH-228 | 5400.0 | 77.00 | 0.00 | 99.9 | 1.145E+00 | 3.239E-01 | 3.978E-02 |
| TH229 | 4872.0 | 276.66 | 0.34 | 99.5 | 4.078E+00 | 6.207E-01 | 7.992E-02 |
| TH-230 | 4672.0 | 112.00 | 0.00 | 99.8 | 1.646E+00 | 4.155E-01 | 3.983E-02 |
| TH-232 | 3997.0 | 78.66 | 0.34 | 100.0 | 1.154E+00 | 3.246E-01 | 7.953E-02 |

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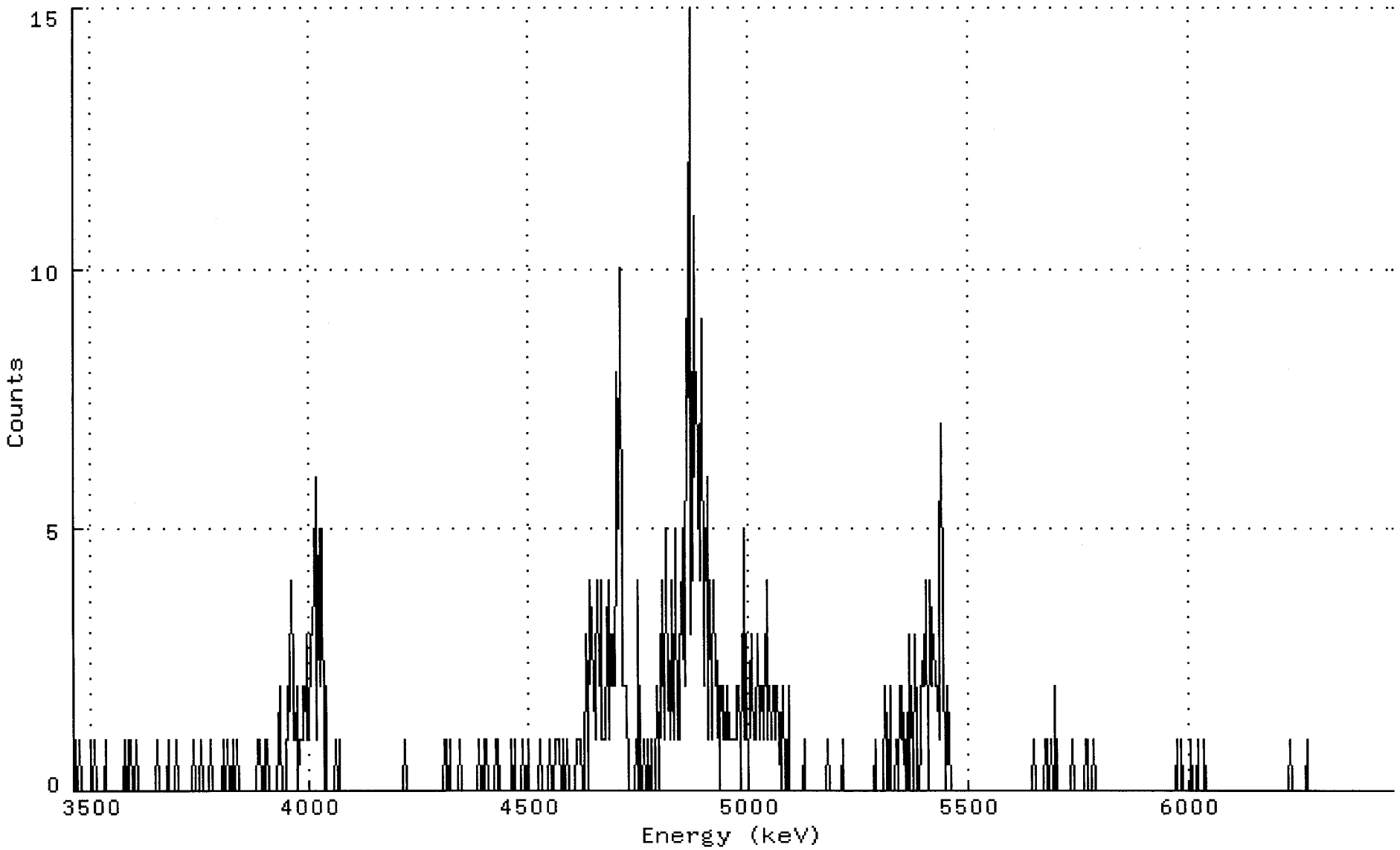
Analyst _____ Date 10-11-05

Reviewer _____ Date 10/11/05

Spectrum : DKA100:[ALPHA.ALUSR.ARCHIVE.S]S_0509118A-TH$16_TH.CNF;1
Title : 045
Sample Title: VPTR092805SL0I
Start Time: 11-OCT-2005 07:35 Sample Time: 28-SEP-2005 00:00 Energy Offset: 3.45273E+03
Real Time : 0 02:50:00.20 Sample ID : 16 Energy Slope : 3.12945E+00
Live Time : 0 02:50:00.00 Sample Type: TH Energy Quad : -1.86028E-04



Channel Contents for ND_AMS_ARCHIVE_S:S_0509118A-TH$16_TH

Channel

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1: | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15: | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 29: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 43: | 1 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 57: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 71: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 85: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 0 |
| 99: | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 113: | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 |
| 127: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| 141: | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 155: | 2 | 1 | 0 | 0 | 0 | 0 | 2 | 1 | 2 | 4 | 2 | 1 | 1 | 2 |
| 169: | 0 | 1 | 1 | 1 | 2 | 2 | 1 | 3 | 1 | 3 | 3 | 3 | 4 | 6 |
| 183: | 1 | 4 | 5 | 2 | 5 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 197: | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 211: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 225: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 239: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 253: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 267: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 |
| 281: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 |
| 295: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 |
| 309: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 |
| 323: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 337: | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 351: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 1 | 1 |
| 365: | 1 | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 379: | 1 | 1 | 1 | 0 | 1 | 0 | 3 | 2 | 0 | 4 | 3 | 3 | 2 | 1 |
| 393: | 2 | 4 | 2 | 4 | 1 | 1 | 1 | 1 | 3 | 4 | 1 | 3 | 3 | 2 |
| 407: | 2 | 5 | 8 | 5 | 10 | 3 | 2 | 2 | 2 | 2 | 0 | 0 | 0 | 0 |
| 421: | 0 | 0 | 1 | 0 | 4 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 1 |
| 435: | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 2 | 4 | 3 | 1 | 5 | 4 | 2 |
| 449: | 1 | 4 | 2 | 1 | 5 | 4 | 1 | 1 | 3 | 3 | 5 | 3 | 2 | 9 |
| 463: | 6 | 9 | 15 | 3 | 5 | 11 | 6 | 8 | 6 | 4 | 5 | 9 | 2 | 4 |
| 477: | 4 | 6 | 1 | 4 | 1 | 2 | 4 | 2 | 3 | 2 | 0 | 2 | 2 | 1 |
| 491: | 2 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 1 | 0 |
| 505: | 3 | 1 | 5 | 1 | 1 | 0 | 2 | 3 | 2 | 1 | 1 | 1 | 3 | 1 |
| 519: | 2 | 2 | 1 | 2 | 2 | 4 | 1 | 2 | 1 | 1 | 2 | 2 | 1 | 2 |
| 533: | 1 | 0 | 1 | 2 | 0 | 1 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 |
| 547: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 561: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 |
| 575: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 589: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 603: | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 1 |
| 617: | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 2 | 1 | 2 | 1 |
| 631: | 0 | 1 | 0 | 3 | 0 | 2 | 0 | 0 | 3 | 1 | 0 | 0 | 1 | 2 |
| 645: | 2 | 3 | 2 | 4 | 0 | 0 | 4 | 3 | 2 | 3 | 2 | 2 | 2 | 1 |
| 659: | 4 | 7 | 3 | 3 | 0 | 1 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 673: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 687: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 701: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 715: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 729: | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 743: | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 |
| 757: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 771: | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 785: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 799: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 813: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 827: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 841: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 855: | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 869: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 883: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 897: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 911: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 925: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 939: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 953: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 967: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 981: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 995: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1009: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1023: | 0 | 0 | | | | | | | | | | | | |

Eberline Services
Oak Ridge Laboratory

Gross Sample Counts Within Peak Regions  Generated: 11-OCT-2005 11:02:26.81

Detector ID: 45  Acquisition Start: 11-OCT-2005 07:35:17.01
Live Time: 0 02:50:00.00  Real Time: 0 02:50:00.20
Batch Id: 0509118A-TH  Sample Id: 16
Sample Type: TH

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 3984.60 | 79 | 0 | 74.62 | 171.71 | 112 | 98 | 7.75E-03 | 11.3 | |
| 2 | 0 | 4656.46 | 112 | 0 | 11.59 | 393.87 | 317 | 101 | 1.10E-02 | 9.4 | |
| 3 | 0 | 4904.55 | 277 | 0 | 38.78 | 477.47 | 417 | 128 | 2.72E-02 | 6.0 | |
| 4 | 0 | 5388.66 | 77 | 0 | 41.05 | 643.21 | 561 | 104 | 7.55E-03 | 11.4 | |
| 5 | 0 | 5894.74 | 9 | 0 | 337.98 | 820.33 | 752 | 125 | 8.82E-04 | 33.3 | |

Background Counts Within Peak Regions  Generated: 11-OCT-2005 11:02:34.68

Acquisition Start: 7-OCT-2005 17:07:35.01
Live Time: 0 16:40:00.00  Real Time: 0 16:40:00.00

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 3952.68 | 2 | 0 | 118.64 | 160.50 | 112 | 98 | 3.33E-05 | 70.7 | |
| 2 | 0 | 4577.79 | 0 | 0 | 0.00 | 367.00 | 317 | 101 | 0.00E+00 | 0.0 | |
| 3 | 0 | 4914.84 | 2 | 0 | 340.32 | 480.50 | 417 | 128 | 3.33E-05 | 70.7 | |
| 4 | 0 | 5300.99 | 0 | 0 | 0.00 | 612.50 | 561 | 104 | 0.00E+00 | 0.0 | |
| 5 | 0 | 5878.35 | 2 | 0 | 109.28 | 814.00 | 752 | 125 | 3.33E-05 | 70.7 | |

Net Sample Counts Within Peak Regions  Generated: 11-OCT-2005 11:02:34.97

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 3984.60* | 79 | 0 | 74.62 | 171.71 | 112 | 98 | 7.71E-03 | 11.3 | |
| 2 | 0 | 4656.46* | 112 | 0 | 11.59 | 393.87 | 317 | 101 | 1.10E-02 | 9.4 | |
| 3 | 0 | 4904.55* | 277 | 0 | 38.78 | 477.47 | 417 | 128 | 2.71E-02 | 6.0 | |
| 4 | 0 | 5388.66* | 77 | 0 | 41.05 | 643.21 | 561 | 104 | 7.55E-03 | 11.4 | |
| 5 | 0 | 5894.74* | 9 | 0 | 337.98 | 820.33 | 752 | 125 | 8.49E-04 | 34.8 | |

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.0 Generated 11-OCT-2005 11:02:35

Configuration : MCA0:[AMSCOUNT]0000C192$1
Analyses by : ROIPEAK V1.2,PEAKEFF V2.2,ENBACK V1.6,NID V3.3
Sample title : VPTR092805SL0I
Sample date : 28-SEP-2005 00:00:00 Acquisition date : 11-OCT-2005 07:35:17
Sample ID : 16 Sample quantity : 1.1179 gram
Sample type : TH Sample geometry :
Detector name : 045 Detector geometry:
Elapsed live time: 0 02:50:00.00 Elapsed real time: 0 02:50:00.20 0.0%
Energy tolerance : 100.00 keV Half life ratio : 8.00
Errors propagated: Yes Systematic Error : 3.00 %
Efficiency type : Average value Efficiencies at : Peak Energy
Abundance limit : 75.00

Post-NID Peak Search Report

| It | Energy | Area | FWHM | Channel | Left | Pw | %Err | Fit | Nuclides | Activity pCi/gram |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 3984.60* | 79 | 74.62 | 171.71 | 112 | 98 | 22.6 | | TH-232 | 0.909 |
| 0 | 4656.46* | 112 | 11.59 | 393.87 | 317 | 101 | 18.9 | | TH-230 | 1.30 |
| 0 | 4904.55* | 277 | 38.78 | 477.47 | 417 | 128 | 12.0 | | TH229 | 3.21 |
| 0 | 5388.66* | 77 | 41.05 | 643.21 | 561 | 104 | 22.8 | | TH-228 | 0.902 |
| 0 | 5894.74* | 9337.98 | | 820.33 | 752 | 125 | 69.5 | | TH-227 | 0.103 |

Eberline Services
Oak Ridge Laboratory

ALPHA SPECTROMETRY REPORT
11-OCT-2005 11:02:57

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Spectral File: ND_AMS_ARCHIVE_S:S_0509118A-TH$17_TH.CNF

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| | | | |
|---|---|---|---|
| BATCH ID: | 0509118A-TH | SAMPLE ID: | 17 |
| SAMPLE DATE: | 28-SEP-2005 00:00 | ALIQUOT: 1.019E+00 | gram |
| SAMPLE TITLE: | VPTR092805SL0J | DETECTOR NUMBER: | 046 |
| ACQ DATE: | 11-OCT-2005 07:35 | AVERAGE EFFICIENCY: | 21.02% |
| ELAPSED LIVE TIME: | 10200. | RECOVERY: | 85.33% |
| TRACER ID: | TH-18A | TRACER FWHM (kev): | 96.40 |
| LAMBDA VALUE: | 454. | ROI TYPE: | STANDARD |
| TRACER DPM AT SAMPLE DATE: | 10.211 | CONFIDENCE FACTOR: | 4.65 |
| SAMPLE MATRIX: | SOIL | LLD CONSTANT: | 2.71 |
| ENERGY CAL DATE: | 7-OCT-2005 04:44 | EFF CAL DATE: 7-OCT-2005 | 04:44 |
| BKG FILENAME: | B_046_7OCT05 | BKG ELAPSED TIME: | 60000. |

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NUCLIDE ACTIVITY SUMMARY

| NUCLIDE | ENERGY | NET AREA | BKG | %ABN | ACTIVITY pCi/ gram | TPU/ERROR 2-SIGMA | MDC pCi/ gram |
|---|---|---|---|---|---|---|---|
| TH-227 | 5850.0 | 2.15 | 0.85 | 97.5 | 3.201E-02 | 5.307E-02 | 1.041E-01 |
| TH-228 | 5400.0 | 74.49 | 0.51 | 99.9 | 1.095E+00 | 3.109E-01 | 8.751E-02 |
| TH229 | 4872.0 | 309.83 | 0.17 | 99.5 | 4.515E+00 | 6.634E-01 | 6.742E-02 |
| TH-230 | 4672.0 | 103.66 | 0.34 | 99.8 | 1.506E+00 | 3.844E-01 | 7.876E-02 |
| TH-232 | 3997.0 | 82.15 | 0.85 | 100.0 | 1.191E+00 | 3.278E-01 | 1.015E-01 |

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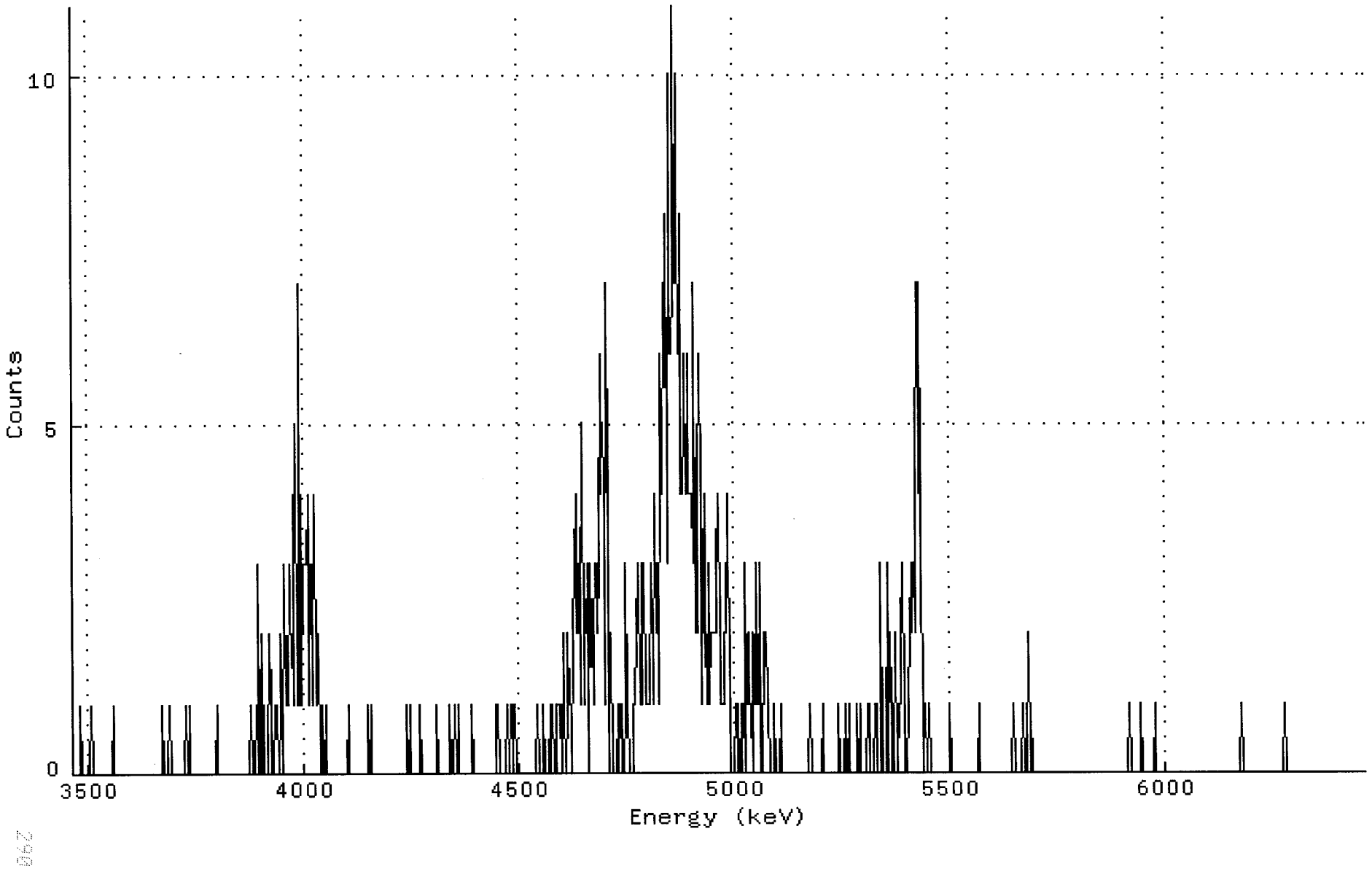
*** Tracer FWHM > 80.0 Kev ***

Analyst _____ Date 10-11-05

Reviewer _____ Date 10/11/05

Spectrum : DKA100:[ALPHA.ALUSR.ARCHIVE.S]S_0509118A-TH$17_TH.CNF;1
Title : 046
Sample Title: VPTR092805SL0J
Start Time: 11-OCT-2005 07:35 Sample Time: 28-SEP-2005 00:00 Energy Offset: 3.45373E+03
Real Time : 0 02:50:00.10 Sample ID : 17 Energy Slope : 3.13509E+00
Live Time : 0 02:50:00.00 Sample Type: TH Energy Quad : -1.95842E-04



Channel Contents for ND_AMS_ARCHIVE_S:S_0509118A-TH$17_TH

Channel

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 15: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 29: | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 43: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 57: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 71: | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 85: | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 99: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 113: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 127: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 141: | 1 | 0 | 3 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 0 |
| 155: | 1 | 1 | 1 | 0 | 1 | 2 | 0 | 3 | 1 | 1 | 1 | 3 | 2 | 2 |
| 169: | 1 | 3 | 5 | 1 | 1 | 7 | 1 | 3 | 3 | 3 | 3 | 4 | 1 | 3 |
| 183: | 1 | 2 | 4 | 1 | 2 | 2 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 |
| 197: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 211: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 225: | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 239: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 253: | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 267: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 281: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 1 |
| 295: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 309: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 323: | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 1 |
| 337: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 351: | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 365: | 1 | 0 | 1 | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 2 | 1 | 0 | 1 |
| 379: | 2 | 1 | 1 | 0 | 2 | 3 | 4 | 2 | 3 | 1 | 2 | 5 | 1 | 2 |
| 393: | 2 | 3 | 0 | 3 | 2 | 1 | 2 | 3 | 3 | 2 | 3 | 6 | 4 | 5 |
| 407: | 4 | 1 | 7 | 4 | 0 | 2 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 |
| 421: | 1 | 0 | 1 | 3 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 2 | 2 | 3 |
| 435: | 1 | 1 | 3 | 3 | 1 | 1 | 1 | 1 | 1 | 3 | 2 | 1 | 4 | 2 |
| 449: | 3 | 1 | 5 | 6 | 4 | 7 | 6 | 8 | 3 | 10 | 6 | 6 | 7 | 11 |
| 463: | 7 | 10 | 8 | 6 | 8 | 4 | 4 | 5 | 6 | 4 | 6 | 4 | 4 | 4 |
| 477: | 3 | 7 | 2 | 2 | 4 | 6 | 4 | 1 | 3 | 4 | 2 | 1 | 3 | 1 |
| 491: | 2 | 2 | 2 | 2 | 2 | 3 | 4 | 2 | 1 | 1 | 1 | 2 | 2 | 4 |
| 505: | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 3 |
| 519: | 1 | 2 | 1 | 1 | 0 | 2 | 1 | 3 | 1 | 1 | 3 | 0 | 0 | 2 |
| 533: | 1 | 2 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 |
| 547: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 561: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 575: | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 589: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 |
| 603: | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 |
| 617: | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 3 |
| 631: | 0 | 2 | 1 | 0 | 0 | 2 | 2 | 0 | 0 | 1 | 1 | 2 | 3 | 1 |
| 645: | 0 | 0 | 1 | 1 | 2 | 3 | 2 | 3 | 2 | 4 | 7 | 4 | 7 | 4 |
| 659: | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 673: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 687: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 701: | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 715: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 729: | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 |
| 743: | 0 | 2 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 757: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 771: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 785: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 799: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 813: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 827: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 841: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 855: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 869: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 883: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 897: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 911: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 925: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 939: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 953: | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 967: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 981: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 995: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1009: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1023: | 0 | 0 | | | | | | | | | | | | |

Eberline Services
Oak Ridge Laboratory

Gross Sample Counts Within Peak Regions  Generated: 11-OCT-2005 11:02:40.52

Detector ID: 46  Acquisition Start: 11-OCT-2005 07:35:37.01
Live Time: 0 02:50:00.00  Real Time: 0 02:50:00.10
Batch Id: 0509118A-TH  Sample Id: 17
Sample Type: TH

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 3981.25 | 83 | 0 | 46.77 | 170.07 | 111 | 99 | 8.14E-03 | 11.0 | |
| 2 | 0 | 4648.55 | 104 | 0 | 80.09 | 390.64 | 316 | 101 | 1.02E-02 | 9.8 | |
| 3 | 0 | 4888.39 | 310 | 0 | 96.40 | 471.50 | 417 | 128 | 3.04E-02 | 5.7 | |
| 4 | 0 | 5384.20 | 75 | 0 | 13.72 | 641.47 | 561 | 104 | 7.35E-03 | 11.5 | |
| 5 | 0 | 5941.53 | 3 | 0 | 68.97 | 837.33 | 752 | 125 | 2.94E-04 | 57.7 | |

Background Counts Within Peak Regions  Generated: 11-OCT-2005 11:02:55.50

Acquisition Start: 7-OCT-2005 17:07:38.01
Live Time: 0 16:40:00.00  Real Time: 0 16:40:00.20

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 3948.15 | 5 | 0 | 220.77 | 160.00 | 111 | 99 | 8.33E-05 | 44.7 | |
| 2 | 0 | 4574.20 | 2 | 0 | 198.70 | 366.00 | 316 | 101 | 3.33E-05 | 70.7 | |
| 3 | 0 | 4914.16 | 1 | 0 | 3.15 | 480.50 | 417 | 128 | 1.67E-05 | 100.0 | |
| 4 | 0 | 5298.98 | 3 | 0 | 75.69 | 612.50 | 561 | 104 | 5.00E-05 | 57.7 | |
| 5 | 0 | 5871.75 | 5 | 0 | 0.00 | 814.00 | 752 | 125 | 8.33E-05 | 44.7 | |

Net Sample Counts Within Peak Regions  Generated: 11-OCT-2005 11:02:55.80

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 3981.25* | 82 | 0 | 46.77 | 170.07 | 111 | 99 | 8.05E-03 | 11.1 | |
| 2 | 0 | 4648.55* | 104 | 0 | 80.09 | 390.64 | 316 | 101 | 1.02E-02 | 9.8 | |
| 3 | 0 | 4888.39* | 310 | 0 | 96.40 | 471.50 | 417 | 128 | 3.04E-02 | 5.7 | |
| 4 | 0 | 5384.20* | 74 | 0 | 13.72 | 641.47 | 561 | 104 | 7.30E-03 | 11.6 | |
| 5 | 0 | 5941.53* | 2 | 0 | 68.97 | 837.33 | 752 | 125 | 2.11E-04 | 82.5 | |

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.0 Generated 11-OCT-2005 11:02:56

| | | | |
|---|---|---|---|
| Configuration | : MCA0:[AMSCOUNT]0000C192$1 | | |
| Analyses by | : ROIPEAK V1.2,PEAKEFF V2.2,ENBACK V1.6,NID V3.3 | | |
| Sample title | : VPTR092805SL0J | | |
| Sample date | : 28-SEP-2005 00:00:00 | Acquisition date | : 11-OCT-2005 07:35:37 |
| Sample ID | : 17 | Sample quantity | : 1.0188 gram |
| Sample type | : TH | Sample geometry | : |
| Detector name | : 046 | Detector geometry: | |
| Elapsed live time | : 0 02:50:00.00 | Elapsed real time | : 0 02:50:00.10 0.0% |
| Energy tolerance | : 100.00 keV | Half life ratio | : 8.00 |
| Errors propagated | : Yes | Systematic Error | : 3.00 % |
| Efficiency type | : Average value | Efficiencies at | : Peak Energy |
| Abundance limit | : 75.00 | | |

Post-NID Peak Search Report

| It | Energy | Area | FWHM | Channel | Left | Pw | %Err | Fit | Nuclides | Activity pCi/gram |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 3981.25* | 82 | 46.77 | 170.07 | 111 | 99 | 22.2 | | TH-232 | 1.02 |
| 0 | 4648.55* | 104 | 80.09 | 390.64 | 316 | 101 | 19.7 | | TH-230 | 1.29 |
| 0 | 4888.39* | 310 | 96.40 | 471.50 | 417 | 128 | 11.4 | | TH229 | 3.85 |
| 0 | 5384.20* | 74 | 13.72 | 641.47 | 561 | 104 | 23.3 | | TH-228 | 0.935 |
| 0 | 5941.53* | 2 | 68.97 | 837.33 | 752 | 125 | 165.0 | | TH-227 | 2.732E-02 |

Eberline Services
Oak Ridge Laboratory

ALPHA SPECTROMETRY REPORT
11-OCT-2005 11:03:07

**********

Spectral File: ND_AMS_ARCHIVE_S:S_0509118A-TH$18_TH.CNF

**********

| | | | |
|---|---|---|---|
| BATCH ID: | 0509118A-TH | SAMPLE ID: | 18 |
| SAMPLE DATE: | 28-SEP-2005 00:00 | ALIQUOT: 1.034E+00 | gram |
| SAMPLE TITLE: | VPTR092805SL0K | DETECTOR NUMBER: | 047 |
| ACQ DATE: | 11-OCT-2005 07:35 | AVERAGE EFFICIENCY: | 21.13% |
| ELAPSED LIVE TIME: | 10200. | RECOVERY: | 81.72% |
| TRACER ID: | TH-18A | TRACER FWHM (kev): | 71.79 |
| LAMBDA VALUE: | 452. | ROI TYPE: | STANDARD |
| TRACER DPM AT SAMPLE DATE: | 10.152 | CONFIDENCE FACTOR: | 4.65 |
| SAMPLE MATRIX: | SOIL | LLD CONSTANT: | 2.71 |
| ENERGY CAL DATE: | 7-OCT-2005 04:44 | EFF CAL DATE: 7-OCT-2005 | 04:44 |
| BKG FILENAME: | B_047_7OCT05 | BKG ELAPSED TIME: | 60000. |

**********

NUCLIDE ACTIVITY SUMMARY

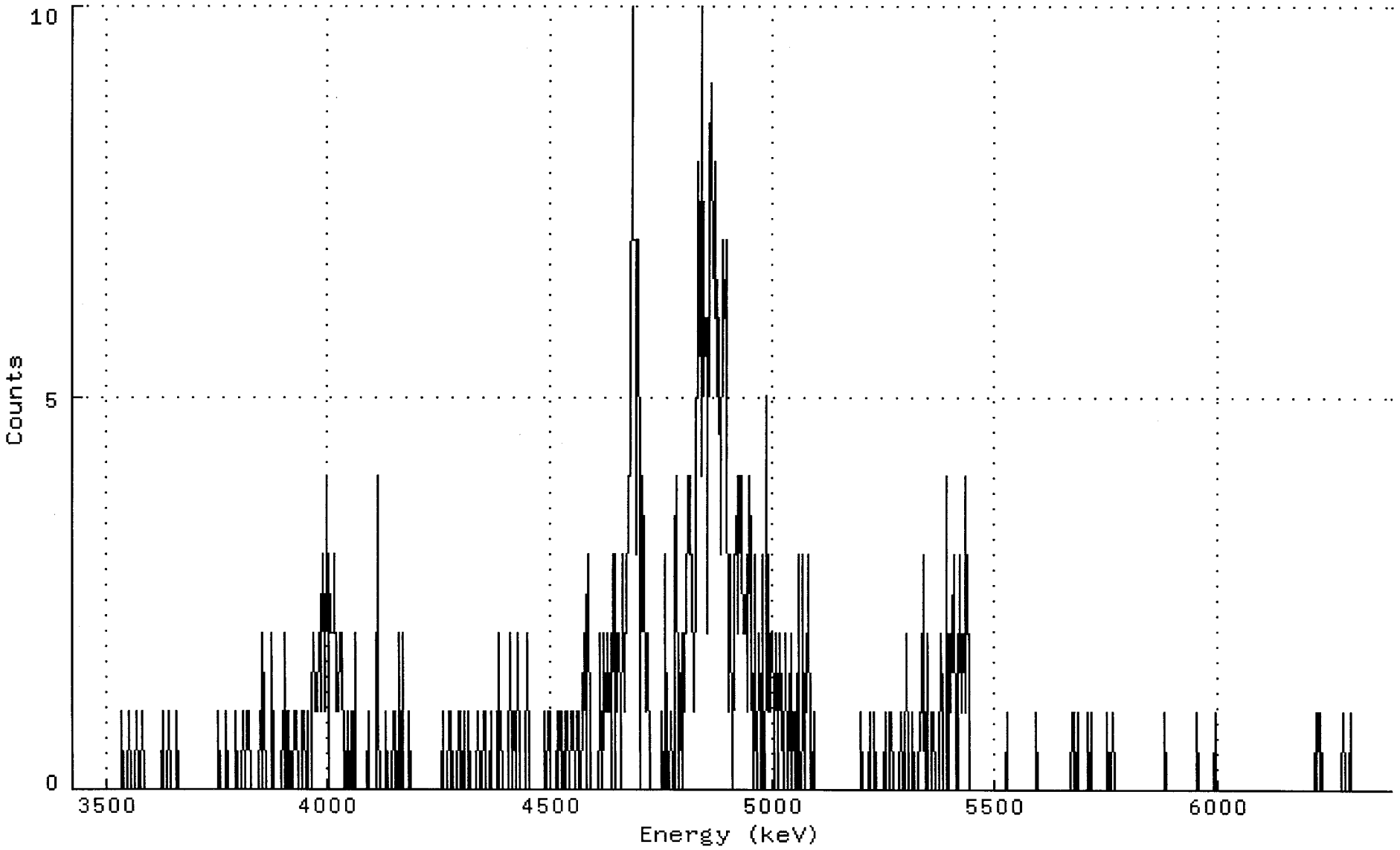
| NUCLIDE | ENERGY | NET AREA | BKG | %ABN | ACTIVITY pCi/ gram | TPU/ERROR 2-SIGMA | MDC pCi/ gram |
|---|---|---|---|---|---|---|---|
| TH-227 | 5850.0 | 6.32 | 0.68 | 97.5 | 9.629E-02 | 8.281E-02 | 9.959E-02 |
| TH-228 | 5400.0 | 57.49 | 0.51 | 99.9 | 8.649E-01 | 2.698E-01 | 8.953E-02 |
| TH229 | 4872.0 | 296.66 | 0.34 | 99.5 | 4.423E+00 | 6.587E-01 | 8.083E-02 |
| TH-230 | 4672.0 | 124.49 | 0.51 | 99.8 | 1.850E+00 | 4.506E-01 | 8.964E-02 |
| TH-232 | 3997.0 | 64.98 | 1.02 | 100.0 | 9.641E-01 | 2.888E-01 | 1.099E-01 |

**********

Analyst Jeff Price 10-11-05
Date

Reviewer Glenn Gregley 10/11/05
Date

Spectrum : DKA100:[ALPHA.ALUSR.ARCHIVE.S]S_0509118A-TH$18_TH.CNF;1
Title : 047
Sample Title: VPTR092805SL0K
Start Time: 11-OCT-2005 07:35 Sample Time: 28-SEP-2005 00:00 Energy Offset: 3.41465E+03
Real Time : 0 02:50:00.10 Sample ID : 18 Energy Slope : 3.05527E+00
Live Time : 0 02:50:00.00 Sample Type: TH Energy Quad : -1.48853E-04



Channel Contents for ND_AMS_ARCHIVE_S:S_0509118A-TH$18_TH

Channel

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 29: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 43: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 |
| 57: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 71: | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 85: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 99: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 113: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 127: | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 2 | 0 | 0 |
| 141: | 0 | 0 | 1 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 1 |
| 155: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 1 |
| 169: | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 1 | 2 |
| 183: | 2 | 1 | 1 | 1 | 2 | 1 | 2 | 3 | 1 | 1 | 4 | 0 | 3 | 2 | 0 |
| 197: | 2 | 2 | 3 | 1 | 1 | 1 | 2 | 2 | 2 | 0 | 0 | 1 | 0 | 1 | 0 |
| 211: | 1 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 225: | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 239: | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 2 | 0 | 2 | 0 | 0 | 0 |
| 253: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 267: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 281: | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 |
| 295: | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 2 |
| 309: | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 2 | 0 |
| 323: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 0 | 0 |
| 337: | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 351: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 |
| 365: | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 0 |
| 379: | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 1 | 2 | 0 | 2 | 3 | 0 | 1 |
| 393: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 0 | 1 | 2 | 1 | 1 | 2 | 2 |
| 407: | 1 | 2 | 0 | 3 | 0 | 3 | 1 | 2 | 1 | 0 | 3 | 1 | 2 | 2 | 1 |
| 421: | 4 | 4 | 4 | 10 | 7 | 7 | 7 | 3 | 7 | 3 | 0 | 4 | 3 | 1 | 0 |
| 435: | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 449: | 0 | 3 | 0 | 0 | 0 | 1 | 0 | 0 | 3 | 4 | 0 | 2 | 1 | 0 | 0 |
| 463: | 2 | 1 | 3 | 2 | 4 | 4 | 3 | 3 | 1 | 1 | 3 | 7 | 8 | 7 | 0 |
| 477: | 4 | 10 | 5 | 6 | 6 | 2 | 8 | 9 | 8 | 7 | 6 | 8 | 5 | 6 | 0 |
| 491: | 6 | 3 | 7 | 6 | 6 | 7 | 5 | 1 | 2 | 3 | 0 | 2 | 3 | 3 | 0 |
| 505: | 4 | 2 | 4 | 4 | 3 | 2 | 2 | 3 | 1 | 4 | 3 | 2 | 0 | 3 | 0 |
| 519: | 1 | 0 | 2 | 2 | 0 | 3 | 0 | 0 | 2 | 5 | 1 | 2 | 1 | 2 | 0 |
| 533: | 1 | 0 | 2 | 1 | 0 | 2 | 1 | 1 | 0 | 2 | 2 | 0 | 1 | 2 | 0 |
| 547: | 0 | 1 | 1 | 0 | 0 | 3 | 0 | 0 | 1 | 3 | 0 | 2 | 1 | 3 | 0 |
| 561: | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 575: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 589: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 603: | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 617: | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 631: | 1 | 1 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 645: | 0 | 1 | 1 | 1 | 3 | 1 | 0 | 2 | 0 | 0 | 0 | 1 | 1 | 0 | 0 |
| 659: | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 0 | 0 | 4 | 0 | 2 | 1 | 2 | 0 |
| 673: | 3 | 3 | 0 | 2 | 0 | 3 | 1 | 1 | 2 | 1 | 4 | 2 | 2 | 0 | 0 |
| 687: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 701: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 715: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 729: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 743: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 757: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 |
| 771: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 |
| 785: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 799: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 813: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 827: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 841: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 855: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 869: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 883: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 897: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 911: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 925: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 939: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 953: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 |
| 967: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 981: | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 995: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1009: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1023: | 0 | 0 | | | | | | | | | | | | | |

Eberline Services
Oak Ridge Laboratory

Gross Sample Counts Within Peak Regions  Generated: 11-OCT-2005 11:03:01.04

Detector ID: 47  Acquisition Start: 11-OCT-2005 07:35:56.01
Live Time: 0 02:50:00.00  Real Time: 0 02:50:00.10
Batch Id: 0509118A-TH  Sample Id: 18
Sample Type: TH

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 3971.14 | 66 | 0 | 32.04 | 183.79 | 127 | 101 | 6.47E-03 | 12.3 | |
| 2 | 0 | 4646.96 | 125 | 0 | 19.27 | 411.59 | 336 | 103 | 1.23E-02 | 8.9 | |
| 3 | 0 | 4892.15 | 297 | 0 | 71.79 | 495.56 | 439 | 129 | 2.91E-02 | 5.8 | |
| 4 | 0 | 5368.90 | 58 | 0 | 108.46 | 660.91 | 585 | 105 | 5.69E-03 | 13.1 | |
| 5 | 0 | 5821.89 | 7 | 0 | 311.64 | 820.71 | 777 | 126 | 6.86E-04 | 37.8 | |

Background Counts Within Peak Regions  Generated: 11-OCT-2005 11:03:05.21

Acquisition Start: 7-OCT-2005 17:07:41.01
Live Time: 0 16:40:00.00  Real Time: 0 16:40:00.10

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 3948.88 | 6 | 0 | 3.07 | 177.00 | 127 | 101 | 1.00E-04 | 40.8 | |
| 2 | 0 | 4573.80 | 3 | 0 | 233.14 | 387.00 | 336 | 103 | 5.00E-05 | 57.7 | |
| 3 | 0 | 4912.83 | 2 | 0 | 18.41 | 503.00 | 439 | 129 | 3.33E-05 | 70.7 | |
| 4 | 0 | 5299.02 | 3 | 0 | 82.83 | 637.00 | 585 | 105 | 5.00E-05 | 57.7 | |
| 5 | 0 | 5871.53 | 4 | 0 | 141.11 | 839.50 | 777 | 126 | 6.67E-05 | 50.0 | |

Net Sample Counts Within Peak Regions  Generated: 11-OCT-2005 11:03:05.75

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 3971.14* | 65 | 0 | 32.04 | 183.79 | 127 | 101 | 6.37E-03 | 12.5 | |
| 2 | 0 | 4646.96* | 124 | 0 | 19.27 | 411.59 | 336 | 103 | 1.22E-02 | 9.0 | |
| 3 | 0 | 4892.15* | 297 | 0 | 71.79 | 495.56 | 439 | 129 | 2.91E-02 | 5.8 | |
| 4 | 0 | 5368.90* | 57 | 0 | 108.46 | 660.91 | 585 | 105 | 5.64E-03 | 13.3 | |
| 5 | 0 | 5821.89* | 6 | 0 | 311.64 | 820.71 | 777 | 126 | 6.20E-04 | 42.2 | |

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.0 Generated 11-OCT-2005 11:03:06

| | | | |
|---|---|---|---|
| Configuration | : MCA0:[AMSCOUNT]0000C192$1 | | |
| Analyses by | : ROIPEAK V1.2,PEAKEFF V2.2,ENBACK V1.6,NID V3.3 | | |
| Sample title | : VPTR092805SL0K | | |
| Sample date | : 28-SEP-2005 00:00:00 | Acquisition date | : 11-OCT-2005 07:35:56 |
| Sample ID | : 18 | Sample quantity | : 1.0340 gram |
| Sample type | : TH | Sample geometry | : |
| Detector name | : 047 | Detector geometry | : |
| Elapsed live time | : 0 02:50:00.00 | Elapsed real time | : 0 02:50:00.10 0.0% |
| Energy tolerance | : 100.00 keV | Half life ratio | : 8.00 |
| Errors propagated | : Yes | Systematic Error | : 3.00 % |
| Efficiency type | : Average value | Efficiencies at | : Peak Energy |
| Abundance limit | : 75.00 | | |

Post-NID Peak Search Report

| It | Energy | Area | FWHM | Channel | Left | Pw | %Err | Fit | Nuclides | Activity pCi/gram |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 3971.14* | 65 | 32.04 | 183.79 | 127 | 101 | 25.0 | | TH-232 | 0.788 |
| 0 | 4646.96* | 124 | 19.27 | 411.59 | 336 | 103 | 18.0 | | TH-230 | 1.51 |
| 0 | 4892.15* | 297 | 71.79 | 495.56 | 439 | 129 | 11.6 | | TH229 | 3.61 |
| 0 | 5368.90* | 57 | 108.46 | 660.91 | 585 | 105 | 26.5 | | TH-228 | 0.707 |
| 0 | 5821.89* | 6 | 311.64 | 820.71 | 777 | 126 | 84.4 | | TH-227 | 7.869E-02 |

Eberline Services
Oak Ridge Laboratory

ALPHA SPECTROMETRY REPORT
11-OCT-2005 11:03:31

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Spectral File: ND_AMS_ARCHIVE_S:S_0509118A-TH$19_TH.CNF

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| | | | |
|---|---|---|---|
| BATCH ID: | 0509118A-TH | SAMPLE ID: | 19 |
| SAMPLE DATE: | 28-SEP-2005 00:00 | ALIQUOT: 1.033E+00 | gram |
| SAMPLE TITLE: | VPTR092805SL0L | DETECTOR NUMBER: | 048 |
| ACQ DATE: | 11-OCT-2005 07:36 | AVERAGE EFFICIENCY: | 20.19% |
| ELAPSED LIVE TIME: | 10200. | RECOVERY: | 92.31% |
| TRACER ID: | TH-18A | TRACER FWHM (kev): | 50.24 |
| LAMBDA VALUE: | 451. | ROI TYPE: | STANDARD |
| TRACER DPM AT SAMPLE DATE: | 10.132 | CONFIDENCE FACTOR: | 4.65 |
| SAMPLE MATRIX: | SOIL | LLD CONSTANT: | 2.71 |
| ENERGY CAL DATE: | 7-OCT-2005 04:44 | EFF CAL DATE: 7-OCT-2005 | 04:44 |
| BKG FILENAME: | B_048_7OCT05 | BKG ELAPSED TIME: | 60000. |

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NUCLIDE ACTIVITY SUMMARY

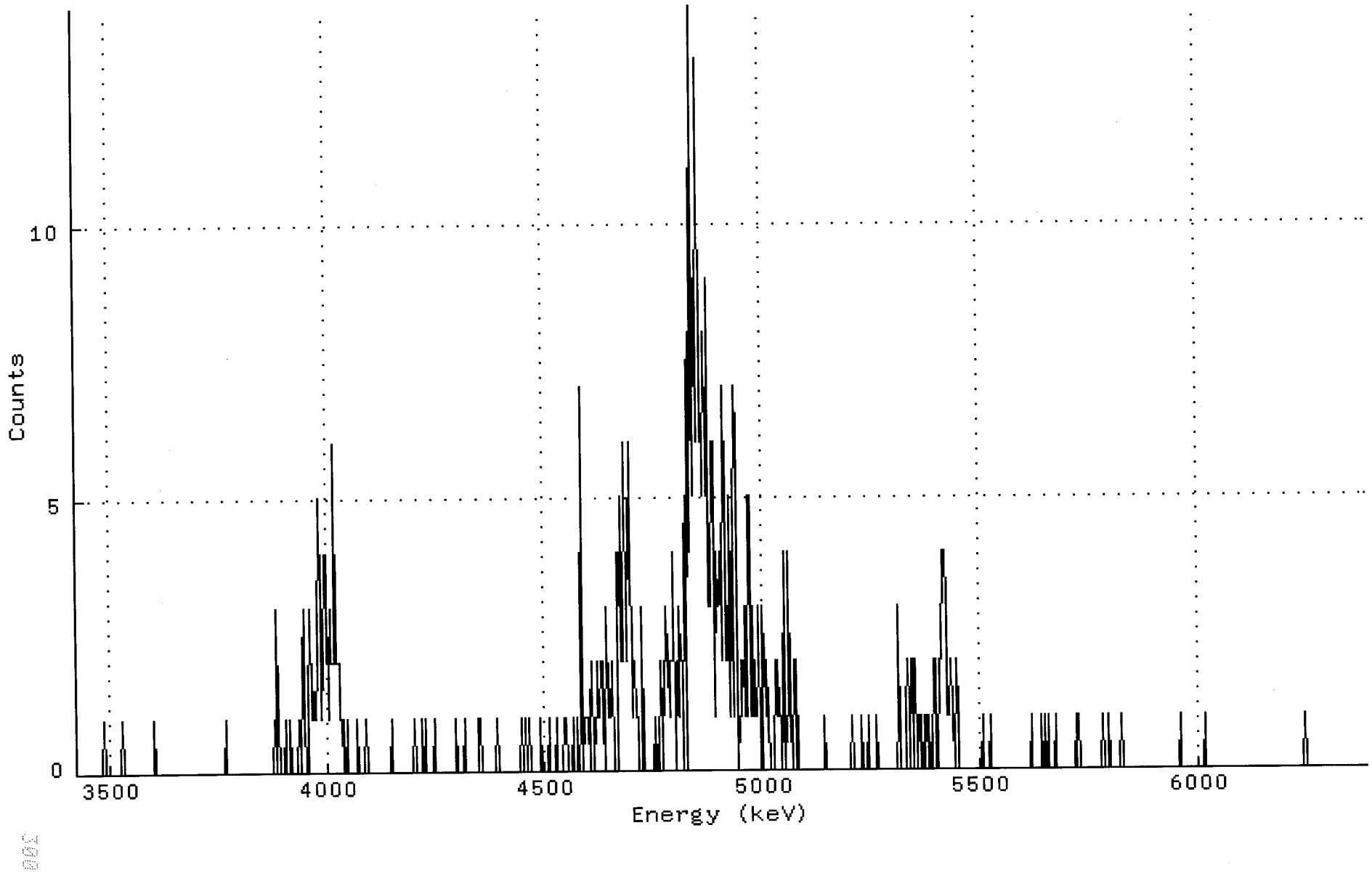
| NUCLIDE | ENERGY | NET AREA | BKG | %ABN | ACTIVITY pCi/ gram | TPU/ERROR 2-SIGMA | MDC pCi/ gram |
|---|---|---|---|---|---|---|---|
| TH-227 | 5850.0 | 6.32 | 0.68 | 97.5 | 8.932E-02 | 7.677E-02 | 9.239E-02 |
| TH-228 | 5400.0 | 57.81 | 1.19 | 99.9 | 8.068E-01 | 2.512E-01 | 1.072E-01 |
| TH229 | 4872.0 | 319.49 | 0.51 | 99.5 | 4.419E+00 | 6.439E-01 | 8.341E-02 |
| TH-230 | 4672.0 | 101.66 | 0.34 | 99.8 | 1.402E+00 | 3.590E-01 | 7.475E-02 |
| TH-232 | 3997.0 | 77.32 | 0.68 | 100.0 | 1.064E+00 | 2.979E-01 | 9.008E-02 |

**********

Analyst _____ Date 10-11-05

Reviewer _____ Date 10/11/05

Spectrum : DKA100:[ALPHA.ALUSR.ARCHIVE.S]S_0509118A-TH$19_TH.CNF;1
Title : 048
Sample Title: VPTR092805SL0L
Start Time: 11-OCT-2005 07:36 Sample Time: 28-SEP-2005 00:00 Energy Offset: 3.41236E+03
Real Time : 0 02:50:00.10 Sample ID : 19 Energy Slope : 3.08405E+00
Live Time : 0 02:50:00.00 Sample Type: TH Energy Quad : -1.79628E-04



Channel Contents for ND_AMS_ARCHIVE_S:S_0509118A-TH$19_TH

| Channel | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 29: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 43: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 57: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 71: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 85: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 99: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 113: | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 127: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 141: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 155: | 3 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 169: | 0 | 0 | 1 | 1 | 0 | 2 | 3 | 1 | 0 | 0 | 1 | 3 | 1 | 2 | |
| 183: | 1 | 1 | 2 | 2 | 5 | 3 | 1 | 2 | 4 | 2 | 4 | 1 | 3 | 2 | |
| 197: | 2 | 2 | 6 | 2 | 2 | 2 | 1 | 1 | 0 | 1 | 0 | 1 | 0 | 0 | |
| 211: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | |
| 225: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 239: | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 253: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | |
| 267: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | |
| 281: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | |
| 295: | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 309: | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 323: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 337: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 0 | |
| 351: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | |
| 365: | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | |
| 379: | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 1 | 7 | 0 | 1 | 1 | |
| 393: | 1 | 1 | 0 | 1 | 2 | 0 | 0 | 1 | 1 | 2 | 1 | 2 | 2 | 1 | |
| 407: | 0 | 3 | 3 | 1 | 1 | 1 | 2 | 0 | 0 | 0 | 0 | 4 | 4 | 2 | |
| 421: | 5 | 2 | 6 | 2 | 3 | 4 | 6 | 5 | 1 | 2 | 2 | 1 | 1 | 0 | |
| 435: | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | |
| 449: | 1 | 0 | 2 | 1 | 0 | 2 | 2 | 3 | 2 | 1 | 2 | 2 | 2 | 4 | |
| 463: | 0 | 2 | 1 | 3 | 2 | 2 | 0 | 4 | 5 | 0 | 7 | 8 | 4 | 8 | |
| 477: | 14 | 5 | 9 | 6 | 6 | 13 | 6 | 7 | 5 | 8 | 8 | 5 | 9 | 3 | |
| 491: | 3 | 6 | 6 | 1 | 4 | 3 | 3 | 4 | 2 | 2 | 7 | 5 | 2 | 3 | |
| 505: | 1 | 5 | 3 | 1 | 4 | 7 | 6 | 0 | 1 | 1 | 2 | 2 | 1 | 3 | |
| 519: | 1 | 5 | 1 | 5 | 1 | 1 | 2 | 1 | 2 | 3 | 0 | 0 | 3 | 2 | |
| 533: | 1 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 2 | 1 | 1 | 0 | |
| 547: | 1 | 4 | 0 | 1 | 1 | 4 | 1 | 0 | 0 | 2 | 0 | 2 | 0 | 0 | |
| 561: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 575: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 589: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | |
| 603: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | |
| 617: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 631: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 3 | 0 | 0 | 0 | 0 | |
| 645: | 0 | 1 | 2 | 1 | 0 | 2 | 2 | 0 | 2 | 0 | 0 | 1 | 0 | 1 | |
| 659: | 0 | 0 | 1 | 1 | 0 | 1 | 0 | 1 | 0 | 2 | 0 | 2 | 0 | 2 | |
| 673: | 2 | 2 | 4 | 4 | 4 | 3 | 1 | 1 | 2 | 2 | 1 | 0 | 0 | 2 | |
| 687: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 701: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | |
| 715: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 729: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 743: | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | |
| 757: | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | |
| 771: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | |
| 785: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 799: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | |
| 813: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 827: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 841: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 855: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 869: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 883: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 897: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 911: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 925: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 939: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 953: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 967: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 981: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 995: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 1009: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 1023: | 0 | 0 | | | | | | | | | | | | | |

Eberline Services
Oak Ridge Laboratory

Gross Sample Counts Within Peak Regions  Generated: 11-OCT-2005 11:03:11.18

Detector ID: 48  Acquisition Start: 11-OCT-2005 07:36:17.01
Live Time: 0 02:50:00.00  Real Time: 0 02:50:00.10
Batch Id: 0509118A-TH  Sample Id: 19
Sample Type: TH

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 3987.05 | 78 | 0 | 41.38 | 188.41 | 127 | 100 | 7.65E-03 | 11.3 | |
| 2 | 0 | 4641.88 | 102 | 0 | 123.23 | 408.38 | 335 | 103 | 1.00E-02 | 9.9 | |
| 3 | 0 | 4889.86 | 320 | 0 | 50.24 | 493.25 | 437 | 130 | 3.14E-02 | 5.6 | |
| 4 | 0 | 5380.11 | 59 | 0 | 119.89 | 663.69 | 583 | 106 | 5.78E-03 | 13.0 | |
| 5 | 0 | 5828.87 | 7 | 0 | 329.99 | 823.00 | 777 | 127 | 6.86E-04 | 37.8 | |

Background Counts Within Peak Regions  Generated: 11-OCT-2005 11:03:29.14

Acquisition Start: 7-OCT-2005 17:07:44.01
Live Time: 0 16:40:00.00  Real Time: 0 16:40:00.10

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 3949.71 | 4 | 0 | 3.07 | 176.50 | 127 | 100 | 6.67E-05 | 50.0 | |
| 2 | 0 | 4573.56 | 2 | 0 | 33.79 | 386.00 | 335 | 103 | 3.33E-05 | 70.7 | |
| 3 | 0 | 4911.25 | 3 | 0 | 356.29 | 501.50 | 437 | 130 | 5.00E-05 | 57.7 | |
| 4 | 0 | 5297.46 | 7 | 0 | 291.79 | 635.50 | 583 | 106 | 1.17E-04 | 37.8 | |
| 5 | 0 | 5875.35 | 4 | 0 | 211.93 | 840.00 | 777 | 127 | 6.67E-05 | 50.0 | |

Net Sample Counts Within Peak Regions  Generated: 11-OCT-2005 11:03:29.45

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 3987.05* | 77 | 0 | 41.38 | 188.41 | 127 | 100 | 7.58E-03 | 11.4 | |
| 2 | 0 | 4641.88* | 102 | 0 | 123.23 | 408.38 | 335 | 103 | 9.97E-03 | 9.9 | |
| 3 | 0 | 4889.86* | 319 | 0 | 50.24 | 493.25 | 437 | 130 | 3.13E-02 | 5.6 | |
| 4 | 0 | 5380.11* | 58 | 0 | 119.89 | 663.69 | 583 | 106 | 5.67E-03 | 13.3 | |
| 5 | 0 | 5828.87* | 6 | 0 | 329.99 | 823.00 | 777 | 127 | 6.20E-04 | 42.2 | |

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.0 Generated 11-OCT-2005 11:03:30

Configuration : MCA0:[AMSCOUNT]0000C192$1
Analyses by : ROIPEAK V1.2,PEAKEFF V2.2,ENBACK V1.6,NID V3.3
Sample title : VPTR092805SL0L
Sample date : 28-SEP-2005 00:00:00 Acquisition date : 11-OCT-2005 07:36:17
Sample ID : 19 Sample quantity : 1.0329 gram
Sample type : TH Sample geometry :
Detector name : 048 Detector geometry:
Elapsed live time: 0 02:50:00.00 Elapsed real time: 0 02:50:00.10 0.0%
Energy tolerance : 100.00 keV Half life ratio : 8.00
Errors propagated: Yes Systematic Error : 3.00 %
Efficiency type : Average value Efficiencies at : Peak Energy
Abundance limit : 75.00

Post-NID Peak Search Report

| It | Energy | Area | FWHM | Channel | Left | Pw | %Err | Fit | Nuclides | Activity pCi/gram |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 3987.05* | 77 | 41.38 | 188.41 | 127 | 100 | 22.9 | | TH-232 | 0.982 |
| 0 | 4641.88* | 102 | 123.23 | 408.38 | 335 | 103 | 19.9 | | TH-230 | 1.29 |
| 0 | 4889.86* | 319 | 50.24 | 493.25 | 437 | 130 | 11.2 | | TH229 | 4.08 |
| 0 | 5380.11* | 581 | 19.89 | 663.69 | 583 | 106 | 26.6 | | TH-228 | 0.745 |
| 0 | 5828.87* | 63 | 29.99 | 823.00 | 777 | 127 | 84.4 | | TH-227 | 8.245E-02 |

# SECTION X

# ANALYTICAL DATA (RADIUM-226)

| Work Order | 05-09118 |
|---|---|
| Analysis Code | Ra226 |
| Run | 1 |
| Date Received | 9/30/2005 |
| Lab Deadline | 10/20/2005 |
| Client | Missouri Dept. of Natural Resources |
| Project | B3Z02092 |
| Report Level | 4 |
| Activity Units | pCi |
| Aliquot Units | g |
| Matrix | SO |
| Method | EPA 903.0 Modified |
| Instrument Type | Alpha Spectroscopy |
| Radiometric Tracer | Ba-133 |
| Radiometric Sol# | Ba-6a |
| Tracer Act (dpm/g) | 1662.939 |
| Carrier | |
| Carrier Conc (mg/ml) | |
| | |
| | |
| | |

| Internal Fraction | Sample Desc | Client ID | Login CPM | Sample Date | Sample Aliquot |
|---|---|---|---|---|---|
| 01 | LCS | LCS | | 09/30/05 00:00 | 1.0000E+00 |
| 02 | MBL | BLANK | | 09/30/05 00:00 | 1.0000E+00 |
| 03 | DUP | VPBR092705SL17 | 37 | 09/27/05 11:49 | 9.9710E-01 |
| 04 | DO | VPBR092705SL17 | 37 | 09/27/05 11:49 | 1.0949E+00 |
| 05 | TRG | VPBR092705SL18 | 35 | 09/27/05 11:52 | 1.0680E+00 |
| 06 | TRG | VPBR092705SL19 | 44 | 09/27/05 11:58 | 1.0373E+00 |
| 07 | TRG | VPBR092705SL20 | 43 | 09/27/05 12:03 | 1.0027E+00 |
| 08 | TRG | VPTR092805SL0A | 63 | 09/28/05 07:40 | 9.9450E-01 |
| 09 | TRG | VPTR092805SL0B | 53 | 09/28/05 07:46 | 1.0998E+00 |
| 10 | TRG | VPTR092805SL0C | 44 | 09/28/05 07:53 | 1.0391E+00 |
| 11 | TRG | VPTR092805SL0D | 41 | 09/28/05 07:58 | 1.0020E+00 |
| 12 | TRG | VPTR092805SL0E | 45 | 09/28/05 08:03 | 1.0136E+00 |
| 13 | TRG | VPTR092805SL0F | 33 | 09/28/05 08:08 | 1.0945E+00 |
| 14 | TRG | VPTR092805SL0G | 36 | 09/28/05 08:20 | 1.0322E+00 |
| 15 | TRG | VPTR092805SL0H | 42 | 09/28/05 08:25 | 9.9750E-01 |
| 16 | TRG | VPTR092805SL0I | 45 | 09/28/05 08:36 | 1.0663E+00 |
| 17 | TRG | VPTR092805SL0J | 36 | 09/28/05 08:49 | 1.1574E+00 |
| 18 | TRG | VPTR092805SL0K | 43 | 09/28/05 08:58 | 1.0905E+00 |
| 19 | TRG | VPTR092805SL0L | 44 | 09/28/05 09:00 | 1.0125E+00 |
| | | | | | |

* SAF1 is used for Gross Alpha and all other radionuclides. SAF2 is used for Gross Beta only. ** Actual mass exceeded the calibration curve range. Results should be qualified as appropriate.

# 05-09118
## Ra226
### Run 1



| Internal Fraction | Sample Desc | Tracer Aliquot (g) | Tracer Total ACT (dpm) | Radiometric Tracer (pCi) | Radiometric % Rec | Grav Carrier Added (ml) | Grav Filter Tare (g) | Grav Filter Final (g) | Grav Filter Net (g) | Grav % Rec | Mean % Rec | SAF 1* | SAF 2* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 01 | LCS | 0.6150 | 1022.7 | 459.6 | 99.77 | | 0.0232 | 0.0298 | 0.0066 | | 99.77 | 2.37 | 1.00 |
| 02 | MBL | 0.6060 | 1007.7 | 442.2 | 97.41 | | 0.0233 | 0.0303 | 0.0070 | | 97.41 | 2.50 | 1.00 |
| 03 | DUP | 0.5968 | 992.4 | 416.6 | 93.19 | | 0.0236 | 0.0297 | 0.0061 | | 93.19 | 2.20 | 1.00 |
| 04 | DO | 0.5989 | 995.9 | 409.3 | 91.24 | | 0.0234 | 0.0294 | 0.0060 | | 91.24 | 2.16 | 1.00 |
| 05 | TRG | 0.6068 | 1009.1 | 235.6 | 51.83 | | 0.0236 | 0.0282 | 0.0046 | | 51.83 | 1.49 | 1.00 |
| 06 | TRG | 0.6007 | 998.9 | 428.8 | 95.30 | | 0.0234 | 0.0296 | 0.0062 | | 95.30 | 2.23 | 1.00 |
| 07 | TRG | 0.6018 | 1000.8 | 328.4 | 72.85 | | 0.0234 | 0.0287 | 0.0053 | | 72.85 | 1.86 | 1.00 |
| 08 | TRG | 0.6044 | 1005.1 | 407.3 | 89.96 | | 0.0237 | 0.0300 | 0.0063 | | 89.96 | 2.27 | 1.00 |
| 09 | TRG | 0.5996 | 997.1 | 311.4 | 69.33 | | 0.0237 | 0.0291 | 0.0054 | | 69.33 | 1.91 | 1.00 |
| 10 | TRG | 0.5956 | 990.4 | 396.6 | 88.89 | | 0.0235 | 0.0299 | 0.0064 | | 88.89 | 2.31 | 1.00 |
| 11 | TRG | 0.5972 | 993.1 | 378.1 | 84.52 | | 0.0235 | 0.0306 | 0.0071 | | 84.52 | 2.53 | 1.00 |
| 12 | TRG | 0.5986 | 995.4 | 467.7 | 104.31 | | 0.0231 | 0.0298 | 0.0067 | | 100.00 | 2.40 | 1.00 |
| 13 | TRG | 0.5987 | 995.6 | 409.5 | 91.31 | | 0.0233 | 0.0297 | 0.0064 | | 91.31 | 2.31 | 1.00 |
| 14 | TRG | 0.5954 | 990.1 | 425.8 | 95.47 | | 0.0236 | 0.0299 | 0.0063 | | 95.47 | 2.27 | 1.00 |
| 15 | TRG | 0.5901 | 981.3 | 417.8 | 94.52 | | 0.0235 | 0.0302 | 0.0067 | | 94.52 | 2.40 | 1.00 |
| 16 | TRG | 0.5936 | 987.1 | 447.3 | 100.60 | | 0.0236 | 0.0305 | 0.0069 | | 100.00 | 2.47 | 1.00 |
| 17 | TRG | 0.5984 | 995.1 | 475.9 | 106.17 | | 0.0238 | 0.0302 | 0.0064 | | 100.00 | 2.31 | 1.00 |
| 18 | TRG | 0.5989 | 995.9 | 393.2 | 87.65 | | 0.0234 | 0.0297 | 0.0063 | | 87.65 | 2.27 | 1.00 |
| 19 | TRG | 0.5959 | 990.9 | 407.8 | 91.36 | | 0.0239 | 0.0309 | 0.0070 | | 91.36 | 2.50 | 1.00 |
| | | | | | | | | | | | | | |

* SAF1 is used for Gross Alpha and all other radionuclides. SAF2 is used for Gross Beta only. ** Actual mass exceeded the calibration curve range. Results should be qualified as appropriate.

| Internal Fraction | Sample Desc | Rough Prep Date | Rough Prep By | Prep Date | Prep By | Sep t0 Date/Time | Sep t0 By | Sep t1 Date/Time | Sep t1 By |
|---|---|---|---|---|---|---|---|---|---|
| 01 | LCS | | | 10/05/05 09:35 | JBARNARD | | | | |
| 02 | MBL | | | 10/05/05 09:35 | JBARNARD | | | | |
| 03 | DUP | | | 10/05/05 09:35 | JBARNARD | | | | |
| 04 | DO | 10/03/05 12:31 | KSALLINGS | 10/05/05 09:35 | JBARNARD | | | | |
| 05 | TRG | 10/03/05 12:31 | KSALLINGS | 10/05/05 09:35 | JBARNARD | | | | |
| 06 | TRG | 10/03/05 12:31 | KSALLINGS | 10/05/05 09:35 | JBARNARD | | | | |
| 07 | TRG | 10/03/05 12:31 | KSALLINGS | 10/05/05 09:35 | JBARNARD | | | | |
| 08 | TRG | 10/03/05 12:31 | KSALLINGS | 10/05/05 09:35 | JBARNARD | | | | |
| 09 | TRG | 10/03/05 12:31 | KSALLINGS | 10/05/05 09:35 | JBARNARD | | | | |
| 10 | TRG | 10/03/05 12:31 | KSALLINGS | 10/05/05 09:35 | JBARNARD | | | | |
| 11 | TRG | 10/03/05 12:31 | KSALLINGS | 10/05/05 09:35 | JBARNARD | | | | |
| 12 | TRG | 10/03/05 12:31 | KSALLINGS | 10/05/05 09:35 | JBARNARD | | | | |
| 13 | TRG | 10/03/05 12:31 | KSALLINGS | 10/05/05 09:35 | JBARNARD | | | | |
| 14 | TRG | 10/03/05 12:31 | KSALLINGS | 10/05/05 09:35 | JBARNARD | | | | |
| 15 | TRG | 10/03/05 12:31 | KSALLINGS | 10/05/05 09:35 | JBARNARD | | | | |
| 16 | TRG | 10/03/05 12:31 | KSALLINGS | 10/05/05 09:35 | JBARNARD | | | | |
| 17 | TRG | 10/03/05 12:31 | KSALLINGS | 10/05/05 09:35 | JBARNARD | | | | |
| 18 | TRG | 10/03/05 12:31 | KSALLINGS | 10/05/05 09:35 | JBARNARD | | | | |
| 19 | TRG | 10/03/05 12:31 | KSALLINGS | 10/05/05 09:35 | JBARNARD | | | | |
| | | | | | | | | | |

* SAF1 is used for Gross Alpha and all other radionuclides. SAF2 is used for Gross Beta only. ** Actual mass exceeded the calibration curve range. Results should be qualified as appropriate.

**Preliminary Data Report & Analytical Calculations**

# Work Order: 05-09118-Ra226-1



| | |
|---|---|
| Run | 1 |
| Analysis Code | Ra226 |
| Eberline Services Work Order | 05-09118 |
| Client | Missouri Dept. of Natural Resources |

| Lab Fraction | Nuclide | Sample Desc | Client Identification | Activity Units | Results | Error Estimate | MDA | LCS Known | LCS %R | LCS Flag | RPD Flag | MDA Flag | Blank Flag |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 01 | RA-226 | LCS | LCS | pCi/g | 1.16E+01 | 1.43E+00 | 2.61E-01 | 1.04E+01 | 111.53 | OK | | OK | |
| 02 | RA-226 | MBL | BLANK | pCi/g | 7.74E-02 | 1.17E-01 | 2.93E-01 | | | | | OK | OK |
| 03 | RA-226 | DUP | VPBR092705SL17 | pCi/g | 1.53E+00 | 4.40E-01 | 2.82E-01 | | | | OK | OK | |
| 04 | RA-226 | DO | VPBR092705SL17 | pCi/g | 1.67E+00 | 4.44E-01 | 1.80E-01 | | | | | OK | |
| 05 | RA-226 | TRG | VPBR092705SL18 | pCi/g | 1.67E+00 | 4.96E-01 | 2.08E-01 | | | | | OK | |
| 06 | RA-226 | TRG | VPBR092705SL19 | pCi/g | 1.79E+00 | 4.97E-01 | 2.10E-01 | | | | | OK | |
| 07 | RA-226 | TRG | VPBR092705SL20 | pCi/g | 1.66E+00 | 4.88E-01 | 2.19E-01 | | | | | OK | |
| 08 | RA-226 | TRG | VPTR092805SL0A | pCi/g | 1.99E+00 | 5.26E-01 | 2.26E-01 | | | | | OK | |
| 09 | RA-226 | TRG | VPTR092805SL0B | pCi/g | 1.69E+00 | 4.73E-01 | 1.43E-01 | | | | | OK | |
| 10 | RA-226 | TRG | VPTR092805SL0C | pCi/g | 1.34E+00 | 4.19E-01 | 1.44E-01 | | | | | OK | |
| 11 | RA-226 | TRG | VPTR092805SL0D | pCi/g | 1.23E+00 | 4.44E-01 | 2.95E-01 | | | | | OK | |
| 12 | RA-226 | TRG | VPTR092805SL0E | pCi/g | 1.49E+00 | 4.41E-01 | 2.38E-01 | | | | | OK | |
| 13 | RA-226 | TRG | VPTR092805SL0F | pCi/g | 1.34E+00 | 4.12E-01 | 2.50E-01 | | | | | OK | |
| 14 | RA-226 | TRG | VPTR092805SL0G | pCi/g | 1.27E+00 | 3.98E-01 | 2.28E-01 | | | | | OK | |
| 15 | RA-226 | TRG | VPTR092805SL0H | pCi/g | 1.31E+00 | 4.39E-01 | 2.58E-01 | | | | | OK | |
| 16 | RA-226 | TRG | VPTR092805SL0I | pCi/g | 1.91E+00 | 5.06E-01 | 2.52E-01 | | | | | OK | |
| 17 | RA-226 | TRG | VPTR092805SL0J | pCi/g | 1.40E+00 | 4.10E-01 | 2.61E-01 | | | | | OK | |
| 18 | RA-226 | TRG | VPTR092805SL0K | pCi/g | 1.50E+00 | 4.56E-01 | 1.97E-01 | | | | | OK | |
| 19 | RA-226 | TRG | VPTR092805SL0L | pCi/g | 1.64E+00 | 5.25E-01 | 3.76E-01 | | | | | OK | |
| | | | | | | | | | | | | | |

# Preliminary Data Report & Analytical Calculations
# Work Order: 05-09118-Ra226-1



Run: 1
Analysis Code: Ra226
Eberline Services Work Order: 05-09118
Client: Missouri Dept. of Natural Resources

| Lab Fraction | Nuclide | Sample Desc | Sample Date | Sample Aliquot | Radiometric % Rec | Grav % Rec | Mean % Rec | SAF | Sep t0 Date/Time | Sep t1 Date/Time |
|---|---|---|---|---|---|---|---|---|---|---|
| 01 | RA-226 | LCS | 09/30/05 00:00 | 1.00E+00 | 99.77 | | 99.77 | | | |
| 02 | RA-226 | MBL | 09/30/05 00:00 | 1.00E+00 | 97.41 | | 97.41 | | | |
| 03 | RA-226 | DUP | 09/27/05 11:49 | 9.97E-01 | 93.19 | | 93.19 | | | |
| 04 | RA-226 | DO | 09/27/05 11:49 | 1.09E+00 | 91.24 | | 91.24 | | | |
| 05 | RA-226 | TRG | 09/27/05 11:52 | 1.07E+00 | 51.83 | | 51.83 | | | |
| 06 | RA-226 | TRG | 09/27/05 11:58 | 1.04E+00 | 95.30 | | 95.30 | | | |
| 07 | RA-226 | TRG | 09/27/05 12:03 | 1.00E+00 | 72.85 | | 72.85 | | | |
| 08 | RA-226 | TRG | 09/28/05 07:40 | 9.95E-01 | 89.96 | | 89.96 | | | |
| 09 | RA-226 | TRG | 09/28/05 07:46 | 1.10E+00 | 69.33 | | 69.33 | | | |
| 10 | RA-226 | TRG | 09/28/05 07:53 | 1.04E+00 | 88.89 | | 88.89 | | | |
| 11 | RA-226 | TRG | 09/28/05 07:58 | 1.00E+00 | 84.52 | | 84.52 | | | |
| 12 | RA-226 | TRG | 09/28/05 08:03 | 1.01E+00 | 100.00 | | 100.00 | | | |
| 13 | RA-226 | TRG | 09/28/05 08:08 | 1.09E+00 | 91.31 | | 91.31 | | | |
| 14 | RA-226 | TRG | 09/28/05 08:20 | 1.03E+00 | 95.47 | | 95.47 | | | |
| 15 | RA-226 | TRG | 09/28/05 08:25 | 9.98E-01 | 94.52 | | 94.52 | | | |
| 16 | RA-226 | TRG | 09/28/05 08:36 | 1.07E+00 | 100.00 | | 100.00 | | | |
| 17 | RA-226 | TRG | 09/28/05 08:49 | 1.16E+00 | 100.00 | | 100.00 | | | |
| 18 | RA-226 | TRG | 09/28/05 08:58 | 1.09E+00 | 87.65 | | 87.65 | | | |
| 19 | RA-226 | TRG | 09/28/05 09:00 | 1.01E+00 | 91.36 | | 91.36 | | | |
| | | | | | | | | | | |

| Run | Analysis Code | Eberline Services Work Order | Client |
|---|---|---|---|
| 1 | Ra226 | 05-09118 | Missouri Dept. of Natural Resources |

| Lab Fraction | Nuclide | Sample Desc | Counting Date/Time | Halflife (days) | Detect | Carrier | Count Time | Counts | Bkg CPM | Eff |
|---|---|---|---|---|---|---|---|---|---|---|
| 01 | RA-226 | LCS | 10/07/05 06:22 | | A_Spec | 1 | 170.02 | 9.27 E+02 | 1.00 E-02 | 21.2 |
| 02 | RA-226 | MBL | 10/07/05 06:22 | | A_Spec | 3 | 170.1 | 5.80 E+00 | 1.00 E-02 | 20.4 |
| 03 | RA-226 | DUP | 10/07/05 06:22 | | A_Spec | 5 | 170.08 | 1.14 E+02 | 1.30 E-02 | 21.4 |
| 04 | RA-226 | DO | 10/07/05 06:22 | | A_Spec | 6 | 170.02 | 1.31 E+02 | 4.00 E-03 | 20.9 |
| 05 | RA-226 | TRG | 10/07/05 06:22 | | A_Spec | 7 | 170.15 | 7.25 E+01 | 3.00 E-03 | 20.7 |
| 06 | RA-226 | TRG | 10/07/05 06:23 | | A_Spec | 8 | 170.1 | 1.24 E+02 | 4.00 E-03 | 18.6 |
| 07 | RA-226 | TRG | 10/07/05 06:23 | | A_Spec | 9 | 170.05 | 9.23 E+01 | 4.00 E-03 | 20.1 |
| 08 | RA-226 | TRG | 10/07/05 06:23 | | A_Spec | 10 | 170.02 | 1.40 E+02 | 5.00 E-03 | 20.9 |
| 09 | RA-226 | TRG | 10/07/05 06:23 | | A_Spec | 11 | 170.1 | 1.05 E+02 | 1.00 E-03 | 21.5 |
| 10 | RA-226 | TRG | 10/07/05 06:23 | | A_Spec | 12 | 170.07 | 9.92 E+01 | 1.00 E-03 | 21.3 |
| 11 | RA-226 | TRG | 10/07/05 06:23 | | A_Spec | 13 | 170.02 | 8.23 E+01 | 7.00 E-03 | 20.9 |
| 12 | RA-226 | TRG | 10/07/05 06:23 | | A_Spec | 14 | 170.08 | 1.16 E+02 | 7.00 E-03 | 20.5 |
| 13 | RA-226 | TRG | 10/07/05 06:23 | | A_Spec | 15 | 170.05 | 1.05 E+02 | 9.00 E-03 | 20.7 |
| 14 | RA-226 | TRG | 10/07/05 06:23 | | A_Spec | 16 | 170.1 | 9.87 E+01 | 7.00 E-03 | 20.9 |
| 15 | RA-226 | TRG | 10/07/05 04:51 | | A_Spec | 17 | 170.05 | 9.02 E+01 | 6.00 E-03 | 19.4 |
| 16 | RA-226 | TRG | 10/07/05 04:51 | | A_Spec | 18 | 170.12 | 1.52 E+02 | 8.00 E-03 | 19.8 |
| 17 | RA-226 | TRG | 10/07/05 04:52 | | A_Spec | 19 | 170.12 | 1.16 E+02 | 1.20 E-02 | 19 |
| 18 | RA-226 | TRG | 10/07/05 04:52 | | A_Spec | 20 | 170.1 | 1.04 E+02 | 3.00 E-03 | 19.2 |
| 19 | RA-226 | TRG | 10/07/05 04:52 | | A_Spec | 21 | 170.05 | 1.05 E+02 | 1.30 E-02 | 18.3 |
| | | | | | | | | | | |

**Count Room Report**
**Client: Missouri Dept. of Natural**

**05-09118-Ra226-1 (pCi/g) in SO**
**Tracer ID: Ba-6a**



1-21

| Internal Fraction | Sample Desc | Client ID | Sample Date | Sample Aliquot | Tracer Aliquot (g) | Tracer ACT (dpm) | Radiometric Tracer (pCi) | Radiometric % Rec | SAF 1* | SAF 2* |
|---|---|---|---|---|---|---|---|---|---|---|
| 01 | LCS | LCS | 09/30/05 00:00 | 1.0000 | 0.6150 | 1022.7075 | 459.6000 | 99.77 | 2.37 | 1.00 |
| 02 | MBL | BLANK | 09/30/05 00:00 | 1.0000 | 0.6060 | 1007.7410 | 442.2000 | 97.41 | 2.50 | 1.00 |
| 03 | DUP | VPBR092705SL17 | 09/27/05 11:49 | 0.9971 | 0.5968 | 992.4420 | 416.6000 | 93.19 | 2.20 | 1.00 |
| 04 | DO | VPBR092705SL17 | 09/27/05 11:49 | 1.0949 | 0.5989 | 995.9342 | 409.3000 | 91.24 | 2.16 | 1.00 |
| 05 | TRG | VPBR092705SL18 | 09/27/05 11:52 | 1.0680 | 0.6068 | 1009.0714 | 235.6000 | 51.83 | 1.49 | 1.00 |
| 06 | TRG | VPBR092705SL19 | 09/27/05 11:58 | 1.0373 | 0.6007 | 998.9275 | 428.8000 | 95.30 | 2.23 | 1.00 |
| 07 | TRG | VPBR092705SL20 | 09/27/05 12:03 | 1.0027 | 0.6018 | 1000.7567 | 328.4000 | 72.85 | 1.86 | 1.00 |
| 08 | TRG | VPTR092805SL0A | 09/28/05 07:40 | 0.9945 | 0.6044 | 1005.0803 | 407.3000 | 89.96 | 2.27 | 1.00 |
| 09 | TRG | VPTR092805SL0B | 09/28/05 07:46 | 1.0998 | 0.5996 | 997.0982 | 311.4000 | 69.33 | 1.91 | 1.00 |
| 10 | TRG | VPTR092805SL0C | 09/28/05 07:53 | 1.0391 | 0.5956 | 990.4465 | 396.6000 | 88.89 | 2.31 | 1.00 |
| 11 | TRG | VPTR092805SL0D | 09/28/05 07:58 | 1.0020 | 0.5972 | 993.1072 | 378.1000 | 84.52 | 2.53 | 1.00 |
| 12 | TRG | VPTR092805SL0E | 09/28/05 08:03 | 1.0136 | 0.5986 | 995.4353 | 467.7000 | 104.31 | 2.40 | 1.00 |
| 13 | TRG | VPTR092805SL0F | 09/28/05 08:08 | 1.0945 | 0.5987 | 995.6016 | 409.5000 | 91.31 | 2.31 | 1.00 |
| 14 | TRG | VPTR092805SL0G | 09/28/05 08:20 | 1.0322 | 0.5954 | 990.1139 | 425.8000 | 95.47 | 2.27 | 1.00 |
| 15 | TRG | VPTR092805SL0H | 09/28/05 08:25 | 0.9975 | 0.5901 | 981.3003 | 417.8000 | 94.52 | 2.40 | 1.00 |
| 16 | TRG | VPTR092805SL0I | 09/28/05 08:36 | 1.0663 | 0.5936 | 987.1206 | 447.3000 | 100.60 | 2.47 | 1.00 |
| 17 | TRG | VPTR092805SL0J | 09/28/05 08:49 | 1.1574 | 0.5984 | 995.1027 | 475.9000 | 106.17 | 2.31 | 1.00 |
| 18 | TRG | VPTR092805SL0K | 09/28/05 08:58 | 1.0905 | 0.5989 | 995.9342 | 393.2000 | 87.65 | 2.27 | 1.00 |
| 19 | TRG | VPTR092805SL0L | 09/28/05 09:00 | 1.0125 | 0.5959 | 990.9454 | 407.8000 | 91.36 | 2.50 | 1.00 |
| | | | | | | | | | | |

Eberline Services
Oak Ridge Laboratory

# Spike and Tracer Worksheet


Printed: 10/5/2005 9:35 AM

| Internal Work Order | Run | Analysis Code | Date | Technician | Technician Initials | Witness Initials |
|---|---|---|---|---|---|---|
| 05-09118 | 1 | Ra226 | 10/5/2005 9:25 | JBARNARD | | |

| LCS & Matrix Spikes | | | | | LCS | MS | LCSD | MSD | LCS | | MS | | LCSD | | MSD | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Isotope | Sol # | Activity dpm/g | Solution Date | Approx Addition | Volume Used (g) | Volume Used (g) | Volume Used (g) | Volume Used (g) | Known pCi | Error Estimate | Added pCi | Error Estimate | Known pCi | Error Estimate | Added pCi | Error Estimate |
| Ra-226 | Ra-5b | 44.216 | 10/5/2005 | 0.500 | 0.5240 | | | | 10.44 | 0.480 | 0.00 | 0.000 | 0.00 | 0.000 | 0.00 | 0.000 |
| | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |

## Tracers

| fraction | Isotope | Sol # | Activity dpm/g | Solution Date | Volume Used (g) | Approx Addition |
|---|---|---|---|---|---|---|
| 01 | Ba-133 | Ba-6a | 1662.939 | 10/5/2005 | 0.6150 | 0.6100 |
| 02 | Ba-133 | Ba-6a | 1662.939 | 10/5/2005 | 0.6060 | 0.6100 |
| 03 | Ba-133 | Ba-6a | 1662.939 | 10/5/2005 | 0.5968 | 0.6100 |
| 04 | Ba-133 | Ba-6a | 1662.939 | 10/5/2005 | 0.5989 | 0.6100 |
| 05 | Ba-133 | Ba-6a | 1662.939 | 10/5/2005 | 0.6068 | 0.6100 |
| 06 | Ba-133 | Ba-6a | 1662.939 | 10/5/2005 | 0.6007 | 0.6100 |
| 07 | Ba-133 | Ba-6a | 1662.939 | 10/5/2005 | 0.6018 | 0.6100 |
| 08 | Ba-133 | Ba-6a | 1662.939 | 10/5/2005 | 0.6044 | 0.6100 |
| 09 | Ba-133 | Ba-6a | 1662.939 | 10/5/2005 | 0.5996 | 0.6100 |
| 10 | Ba-133 | Ba-6a | 1662.939 | 10/5/2005 | 0.5956 | 0.6100 |
| 11 | Ba-133 | Ba-6a | 1662.939 | 10/5/2005 | 0.5972 | 0.6100 |
| 12 | Ba-133 | Ba-6a | 1662.939 | 10/5/2005 | 0.5986 | 0.6100 |
| 13 | Ba-133 | Ba-6a | 1662.939 | 10/5/2005 | 0.5987 | 0.6100 |
| 14 | Ba-133 | Ba-6a | 1662.939 | 10/5/2005 | 0.5954 | 0.6100 |
| 15 | Ba-133 | Ba-6a | 1662.939 | 10/5/2005 | 0.5901 | 0.6100 |
| 16 | Ba-133 | Ba-6a | 1662.939 | 10/5/2005 | 0.5936 | 0.6100 |
| 17 | Ba-133 | Ba-6a | 1662.939 | 10/5/2005 | 0.5984 | 0.6100 |
| 18 | Ba-133 | Ba-6a | 1662.939 | 10/5/2005 | 0.5989 | 0.6100 |
| 19 | Ba-133 | Ba-6a | 1662.939 | 10/5/2005 | 0.5959 | 0.6100 |
| | | | | | | |

## Balance Printer Tapes

### Tracer

0.6150 g
-0.6060 g
-0.5968 g
-0.5989 g
-0.6068 g
-0.6007 g
-0.6018 g
-0.6044 g
-0.5996 g
-0.5956 g
-0.5972 g
-0.5986 g
-0.5987 g
-0.5954 g
-0.5901 g
-0.5936 g
-0.5984 g
-0.5989 g
-0.5959 g

### LCS

0.5240 g

### Matrix Spike

Eberline Services - Oak Ridge
Version 2.0 8/1999

# Aliquot Worksheet

Printed: 10/5/2005 8:32 AM


| Work Order | Run | Analysis Code | Rpt Units | Lab Deadline | Technician |
|---|---|---|---|---|---|
| 05-09118 | 1 | Ra226 | grams | 10/20/2005 | JBARNARD |

| Lab Fraction | Missouri Dept. of Natural Resources Client ID | Sample Type | Muffle Data Ratio Post/Pre | Dilution Data No of Dils | Dil Factor | Ratio | Aliquot Data Aliquot | Net Equiv | MS Aliquot Data Aliquot | Net Equiv | H-3 Solids Only Water Added (ml) | H3 Dist Aliq |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 01 | LCS | LCS | | | | | 1.0000E+00 | 1.0000E+00 | | | | |
| 02 | BLANK | MBL | | | | | 1.0000E+00 | 1.0000E+00 | | | | |
| 03 | VPBR092705SL17 | DUP | | | | | 9.9710E-01 | 9.9710E-01 | | | | |
| 04 | VPBR092705SL17 | DO | | | | | 1.0949E+00 | 1.0949E+00 | | | | |
| 05 | VPBR092705SL18 | TRG | | | | | 1.0680E+00 | 1.0680E+00 | | | | |
| 06 | VPBR092705SL19 | TRG | | | | | 1.0373E+00 | 1.0373E+00 | | | | |
| 07 | VPBR092705SL20 | TRG | | | | | 1.0027E+00 | 1.0027E+00 | | | | |
| 08 | VPTR092805SL0A | TRG | | | | | 9.9450E-01 | 9.9450E-01 | | | | |
| 09 | VPTR092805SL0B | TRG | | | | | 1.0998E+00 | 1.0998E+00 | | | | |
| 10 | VPTR092805SL0C | TRG | | | | | 1.0391E+00 | 1.0391E+00 | | | | |
| 11 | VPTR092805SL0D | TRG | | | | | 1.0020E+00 | 1.0020E+00 | | | | |
| 12 | VPTR092805SL0E | TRG | | | | | 1.0136E+00 | 1.0136E+00 | | | | |
| 13 | VPTR092805SL0F | TRG | | | | | 1.0945E+00 | 1.0945E+00 | | | | |
| 14 | VPTR092805SL0G | TRG | | | | | 1.0322E+00 | 1.0322E+00 | | | | |
| 15 | VPTR092805SL0H | TRG | | | | | 9.9750E-01 | 9.9750E-01 | | | | |
| 16 | VPTR092805SL0I | TRG | | | | | 1.0663E+00 | 1.0663E+00 | | | | |
| 17 | VPTR092805SL0J | TRG | | | | | 1.1574E+00 | 1.1574E+00 | | | | |
| 18 | VPTR092805SL0K | TRG | | | | | 1.0905E+00 | 1.0905E+00 | | | | |
| 19 | VPTR092805SL0L | TRG | | | | | 1.0125E+00 | 1.0125E+00 | | | | |
| | | | | | | | | | | | | |

0.9971 g
1.0949 g
1.0680 g
1.0373 g
1.0027 g
0.9945 g
1.0998 g
1.0391 g
1.0020 g
1.0136 g
1.0945 g
1.0322 g
0.9975 g
1.0663 g
1.1574 g
1.0905 g
1.0125 g

| Comments | |
|---|---|

Technician: JBarnard Date: 10/5/05

Eberline Services - Oak Ridge
Version 1.0 9/1999

# Gravimetric Worksheet

Printed: 10/6/2005 12:32 PM


| Work Order | Run | Analysis Code | Gravimetric Carrier | Carrier Conc (mg/ml) | Technician |
|---|---|---|---|---|---|
| 05-09118 | 1 | Ra226 | | | DJOHNSON |

| TRetec | Missouri Dept. of Natural Resources | Sample | Carrier Data | Filter Data | | | Gravimetric |
|---|---|---|---|---|---|---|---|
| Fraction | Client ID | Type | Carrier Added (ml) | Filter Tare (g) | Filter Final (g) | Filter Net (g) | % Recovery |
| 01 | LCS | LCS | | 0.0232 | 0.0298 | 0.0066 | |
| 02 | BLANK | MBL | | 0.0233 | 0.0303 | 0.0070 | |
| 03 | DUP | DUP | | 0.0236 | 0.0297 | 0.0061 | |
| 04 | VPBR092705SL17 | DO | | 0.0234 | 0.0294 | 0.0060 | |
| 05 | VPBR092705SL18 | TRG | | 0.0236 | 0.0282 | 0.0046 | |
| 06 | VPBR092705SL19 | TRG | | 0.0234 | 0.0296 | 0.0062 | |
| 07 | VPBR092705SL20 | TRG | | 0.0234 | 0.0287 | 0.0053 | |
| 08 | VPTR092805SL0A | TRG | | 0.0237 | 0.0300 | 0.0063 | |
| 09 | VPTR092805SL0B | TRG | | 0.0237 | 0.0291 | 0.0054 | |
| 10 | VPTR092805SL0C | TRG | | 0.0235 | 0.0299 | 0.0064 | |
| 11 | VPTR092805SL0D | TRG | | 0.0235 | 0.0306 | 0.0071 | |
| 12 | VPTR092805SL0E | TRG | | 0.0231 | 0.0298 | 0.0067 | |
| 13 | VPTR092805SL0F | TRG | | 0.0233 | 0.0297 | 0.0064 | |
| 14 | VPTR092805SL0G | TRG | | 0.0236 | 0.0299 | 0.0063 | |
| 15 | VPTR092805SL0H | TRG | | 0.0235 | 0.0302 | 0.0067 | |
| 16 | VPTR092805SL0I | TRG | | 0.0236 | 0.0305 | 0.0069 | |
| 17 | VPTR092805SL0J | TRG | | 0.0238 | 0.0302 | 0.0064 | |
| 18 | VPTR092805SL0K | TRG | | 0.0234 | 0.0297 | 0.0063 | |
| 19 | VPTR092805SL0L | TRG | | 0.0239 | 0.0309 | 0.0070 | |
| | | | | | | | |

Technician: _____ Date: 10,6,05

Eberline Services - Oak Ridge
Prep Logbook
Version 2.0 8/1999

# Rough Sample Preparation Log Book

Printed: 10/3/2005 12:31 PM


| Work Order | Lab Deadline | Date Received in Prep | Date Sealed | Date Returned | Technician |
|---|---|---|---|---|---|
| 05-09118 | 10/20/2005 | 10/2/2005 | 10/3/2005 | 10/4/2005 | KSALLINGS |

| Eberline | Missouri Dept. of Natural Resources | Tare (g) | Gross (g) | | Net (g) | | Percent | | Gamma | | Special |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Fraction | Client ID | Pan Wt | Wet Wt. | Dry Wt. | Wet Wt. | Dry Wt. | Liquid | Solid | Dry Wt. | LEPS Wt. | Info |
| 04 | VPBR092705SL17 | 13.9100 | 384.6400 | 286.2100 | 370.7300 | 272.3000 | 26.55% | 73.45% | | | |
| 05 | VPBR092705SL18 | 13.7500 | 421.8800 | 327.1500 | 408.1300 | 313.4000 | 23.21% | 76.79% | | | |
| 06 | VPBR092705SL19 | 13.8600 | 374.7200 | 284.1000 | 360.8600 | 270.2400 | 25.11% | 74.89% | | | |
| 07 | VPBR092705SL20 | 13.7600 | 406.4200 | 339.1300 | 392.6600 | 325.3700 | 17.14% | 82.86% | | | |
| 08 | VPTR092805SL0A | 13.7800 | 423.8300 | 359.5400 | 410.0500 | 345.7600 | 15.68% | 84.32% | | | |
| 09 | VPTR092805SL0B | 13.8300 | 414.0700 | 333.0900 | 400.2400 | 319.2600 | 20.23% | 79.77% | | | |
| 10 | VPTR092805SL0C | 13.8000 | 372.4900 | 324.7600 | 358.6900 | 310.9600 | 13.31% | 86.69% | | | |
| 11 | VPTR092805SL0D | 13.7900 | 361.6100 | 286.7900 | 347.8200 | 273.0000 | 21.51% | 78.49% | | | |
| 12 | VPTR092805SL0E | 13.7300 | 384.1500 | 309.6000 | 370.4200 | 295.8700 | 20.13% | 79.87% | | | |
| 13 | VPTR092805SL0F | 13.7700 | 459.2100 | 388.9200 | 445.4400 | 375.1500 | 15.78% | 84.22% | | | |
| 14 | VPTR092805SL0G | 13.8600 | 488.7000 | 406.7900 | 474.8400 | 392.9300 | 17.25% | 82.75% | | | |
| 15 | VPTR092805SL0H | 13.8000 | 396.4400 | 325.6400 | 382.6400 | 311.8400 | 18.50% | 81.50% | | | |
| 16 | VPTR092805SL0I | 13.8400 | 455.3700 | 372.8600 | 441.5300 | 359.0200 | 18.69% | 81.31% | | | |
| 17 | VPTR092805SL0J | 13.8700 | 502.7000 | 418.8900 | 488.8300 | 405.0200 | 17.15% | 82.85% | | | |
| 18 | VPTR092805SL0K | 13.9100 | 363.8600 | 308.3100 | 349.9500 | 294.4000 | 15.87% | 84.13% | | | |
| 19 | VPTR092805SL0L | 13.9300 | 425.9300 | 353.2400 | 412.0000 | 339.3100 | 17.64% | 82.36% | | | |
| | | | | | | | | | | | |

| | |
|---|---|
| *Comments* | |
| *Special Codes* | **H: Hot, O: Organic Hazard, P: PCB Hazard, R: Rush, T: Other (see comments)** |

Technician: Kenny Sallings Date: **Analysis: Rough Prep Logbook**

**Analysis: Ra226 Page No. 5129**

Eberline Services
Oak Ridge Laboratory

ALPHA SPECTROMETRY REPORT
7-OCT-2005 09:29:33

Spectral File: ND_AMS_ARCHIVE_C:C_0509118A-RA$01_RA.CNF

| | | | |
|---|---|---|---|
| BATCH ID: | 0509118A-RA | SAMPLE ID: | 01 |
| SAMPLE DATE: | 7-OCT-2005 00:00 | ALIQUOT: 1.000E+00 | gram |
| SAMPLE TITLE: | SPIKE | DETECTOR NUMBER: | 001 |
| ACQ DATE: | 7-OCT-2005 06:22 | AVERAGE EFFICIENCY: | 21.15% |
| ELAPSED LIVE TIME: | 10201. | RECOVERY: | 99.77% |
| TRACER ID: | NONE | TRACER FWHM (kev): | 0.00 |
| LAMBDA VALUE: | 0. | ROI TYPE: | STANDARD |
| TRACER DPM AT SAMPLE DATE: | 0.000 | CONFIDENCE FACTOR: | 4.65 |
| SAMPLE MATRIX: | SOIL | LLD CONSTANT: | 2.71 |
| ENERGY CAL DATE: | 30-SEP-2005 08:11 | EFF CAL DATE: 30-SEP-2005 | 08:11 |
| BKG FILENAME: | B_001_1OCT05 | BKG ELAPSED TIME: | 60003. |
| | | SAF: | 2.37 |

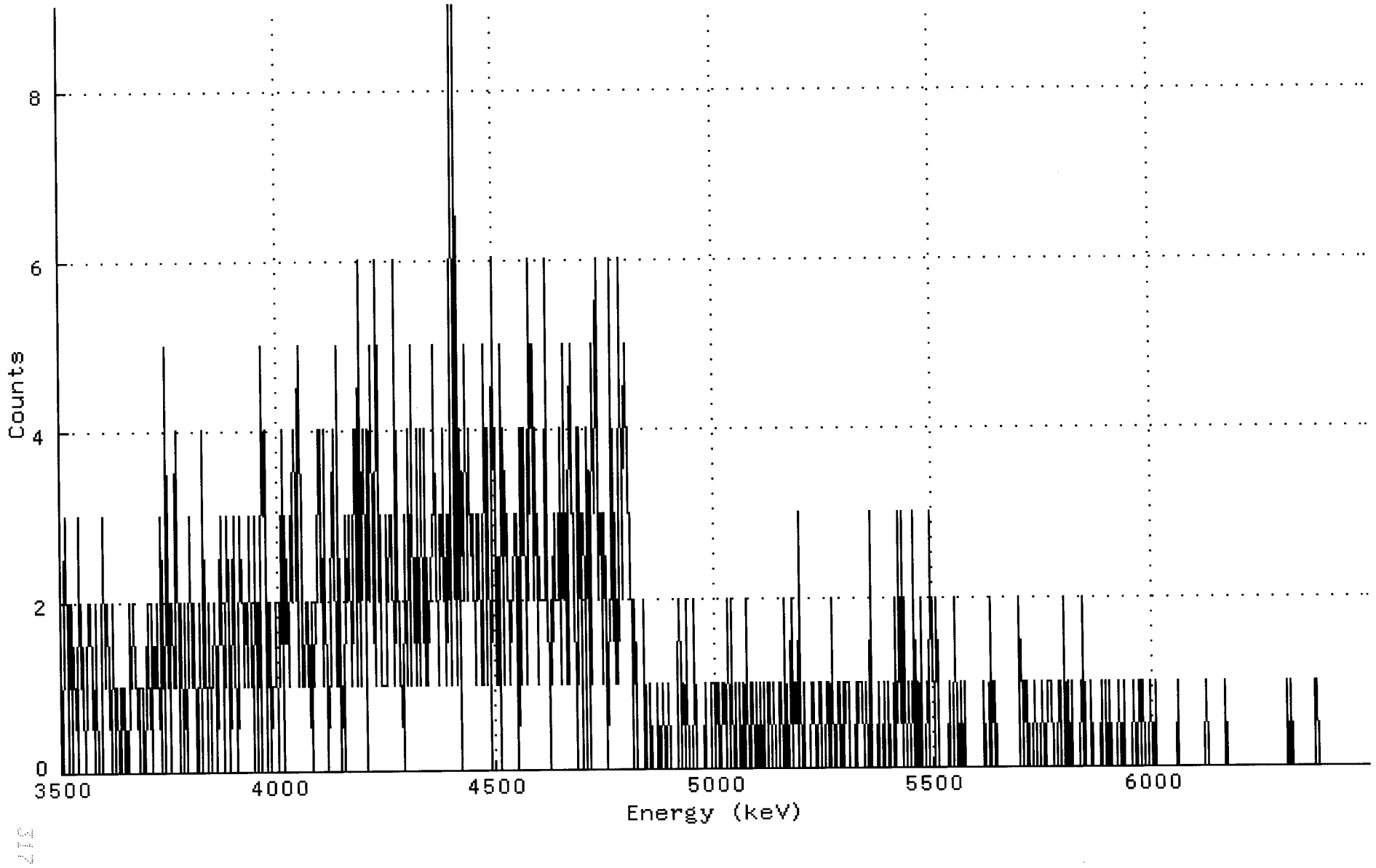
NUCLIDE ACTIVITY SUMMARY

| NUCLIDE | ENERGY | NET AREA | BKG | %ABN | ACTIVITY pCi/ gram | TPU/ERROR 2-SIGMA | MDC pCi/ gram |
|---|---|---|---|---|---|---|---|
| PO-218 | 6003.0 | 92.42 | 2.38 | 100.0 | 1.161E+00 | 3.853E-01 | 2.941E-01 |
| RN-222 | 5490.0 | 217.36 | 0.68 | 99.9 | 2.731E+00 | 6.020E-01 | 1.949E-01 |
| RA-226 | 4785.0 | 927.34 | 1.70 | 100.0 | 1.164E+01 | 1.429E+00 | 2.610E-01 |

Analyst _____ Date 10-7-05

Reviewer _____ Date 10/7/05

Spectrum : DKA100:[ALPHA.ALUSR.ARCHIVE.C]C_0509118A-RA$01_RA.CNF;1
Title : 001
Sample Title: SPIKE
Start Time: 7-OCT-2005 06:22: Sample Time: 7-OCT-2005 00:00: Energy Offset: 3.48873E+03
Real Time : 0 02:50:01.00 Sample ID : 01 Energy Slope : 3.08231E+00
Live Time : 0 02:50:01.00 Sample Type: RA Energy Quad : -1.42605E-04



Channel Contents for ND_AMS_ARCHIVE_C:C_0509118A-RA$01_RA

Channel

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1: | 10201 | 10201 | 1 | 0 | 0 | 2 | 3 | 1 | 0 | 2 | 0 | 2 | 1 | 1 |
| 15: | 0 | 0 | 3 | 1 | 2 | 1 | 0 | 1 | 1 | 2 | 2 | 1 | 1 | 0 |
| 29: | 2 | 1 | 0 | 0 | 0 | 1 | 3 | 1 | 1 | 2 | 1 | 0 | 0 | 2 |
| 43: | 0 | 1 | 1 | 0 | 0 | 1 | 1 | 0 | 1 | 0 | 0 | 1 | 2 | 1 |
| 57: | 2 | 2 | 1 | 1 | 0 | 1 | 1 | 1 | 0 | 0 | 1 | 2 | 1 | 1 |
| 71: | 0 | 2 | 1 | 1 | 2 | 1 | 1 | 0 | 3 | 2 | 0 | 3 | 5 | 2 |
| 85: | 0 | 2 | 2 | 1 | 1 | 3 | 4 | 0 | 2 | 2 | 0 | 2 | 1 | 0 |
| 99: | 2 | 1 | 3 | 1 | 1 | 2 | 0 | 1 | 0 | 2 | 0 | 2 | 4 | 1 |
| 113: | 1 | 0 | 2 | 0 | 1 | 1 | 2 | 1 | 0 | 1 | 2 | 2 | 3 | 0 |
| 127: | 2 | 1 | 3 | 2 | 0 | 1 | 2 | 3 | 2 | 0 | 1 | 1 | 3 | 2 |
| 141: | 2 | 1 | 2 | 2 | 1 | 3 | 1 | 2 | 0 | 3 | 0 | 2 | 2 | 0 |
| 155: | 1 | 5 | 3 | 4 | 0 | 2 | 2 | 0 | 1 | 1 | 1 | 2 | 0 | 2 |
| 169: | 1 | 2 | 4 | 0 | 3 | 2 | 1 | 1 | 3 | 2 | 3 | 4 | 3 | 1 |
| 183: | 4 | 5 | 2 | 1 | 1 | 2 | 1 | 2 | 1 | 0 | 2 | 1 | 2 | 2 |
| 197: | 2 | 4 | 2 | 4 | 1 | 4 | 3 | 0 | 1 | 1 | 2 | 3 | 4 | 3 |
| 211: | 1 | 1 | 5 | 0 | 1 | 1 | 0 | 3 | 2 | 2 | 3 | 1 | 1 | 2 |
| 225: | 4 | 4 | 1 | 3 | 6 | 1 | 3 | 4 | 2 | 0 | 4 | 2 | 3 | 5 |
| 239: | 2 | 2 | 1 | 6 | 2 | 5 | 1 | 1 | 1 | 1 | 1 | 3 | 2 | 3 |
| 253: | 3 | 3 | 1 | 2 | 6 | 2 | 2 | 1 | 1 | 0 | 3 | 2 | 1 | 3 |
| 267: | 4 | 1 | 5 | 3 | 2 | 1 | 4 | 2 | 1 | 4 | 3 | 2 | 1 | 4 |
| 281: | 1 | 2 | 2 | 2 | 3 | 3 | 5 | 2 | 2 | 1 | 3 | 3 | 2 | 4 |
| 295: | 1 | 2 | 3 | 3 | 1 | 3 | 9 | 3 | 1 | 9 | 4 | 0 | 4 | 3 |
| 309: | 2 | 2 | 5 | 2 | 4 | 3 | 3 | 2 | 3 | 1 | 3 | 2 | 3 | 1 |
| 323: | 1 | 1 | 5 | 1 | 4 | 4 | 0 | 0 | 3 | 6 | 1 | 4 | 1 | 1 |
| 337: | 0 | 5 | 1 | 4 | 3 | 2 | 3 | 1 | 2 | 2 | 2 | 3 | 3 | 0 |
| 351: | 1 | 4 | 1 | 4 | 4 | 1 | 2 | 2 | 6 | 3 | 5 | 5 | 2 | 4 |
| 365: | 1 | 3 | 2 | 2 | 2 | 2 | 2 | 6 | 3 | 0 | 2 | 1 | 2 | 3 |
| 379: | 2 | 2 | 2 | 4 | 1 | 3 | 2 | 5 | 1 | 1 | 3 | 4 | 5 | 3 |
| 393: | 3 | 0 | 2 | 4 | 4 | 0 | 3 | 3 | 2 | 0 | 4 | 3 | 0 | 2 |
| 407: | 5 | 3 | 3 | 5 | 6 | 2 | 3 | 3 | 1 | 3 | 2 | 0 | 1 | 2 |
| 421: | 2 | 6 | 2 | 1 | 3 | 1 | 2 | 2 | 6 | 2 | 3 | 4 | 5 | 3 |
| 435: | 4 | 2 | 2 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 |
| 449: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 |
| 463: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 1 | 0 |
| 477: | 1 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 1 | 2 | 0 | 0 | 0 | 0 |
| 491: | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 1 | 1 |
| 505: | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 2 | 0 | 2 | 1 | 0 | 1 | 0 |
| 519: | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 2 | 1 | 0 | 0 | 1 | 1 | 0 |
| 533: | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 1 | 1 | 0 | 0 |
| 547: | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 2 | 0 | 0 | 0 | 1 |
| 561: | 2 | 0 | 1 | 1 | 1 | 0 | 3 | 1 | 0 | 1 | 0 | 0 | 0 | 0 |
| 575: | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 1 |
| 589: | 1 | 0 | 0 | 2 | 1 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 0 |
| 603: | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 1 | 1 |
| 617: | 0 | 0 | 1 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 631: | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 2 | 0 | 1 |
| 645: | 1 | 3 | 1 | 0 | 3 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 3 |
| 659: | 0 | 1 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 3 | 1 |
| 673: | 1 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 687: | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 |
| 701: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 715: | 0 | 0 | 0 | 2 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 729: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 1 |
| 743: | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 |
| 757: | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 |
| 771: | 0 | 1 | 1 | 0 | 0 | 0 | 2 | 0 | 1 | 0 | 0 | 1 | 0 | 0 |
| 785: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 1 |
| 799: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 |
| 813: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 |
| 827: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 |
| 841: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 855: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 869: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 883: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 897: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 911: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 925: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 939: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 953: | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 967: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 981: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 995: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1009: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1023: | 0 | 0 | | | | | | | | | | | | |

Eberline Services
Oak Ridge Laboratory

Gross Sample Counts Within Peak Regions  Generated:  7-OCT-2005 09:29:24.36

Detector ID: 1  Acquisition Start: 7-OCT-2005 06:22:37.01
Live Time: 0 02:50:01.00  Real Time: 0 02:50:01.00
Batch Id: 0509118A-RA  Sample Id: 01
Sample Type: RA

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 4591.93 | 392 | 0 | 409.95 | 364.04 | 291 | 156 | 3.84E-02 | 5.1 | |
| 2 | 0 | 5278.61 | 92 | 0 | 504.67 | 597.20 | 509 | 175 | 9.02E-03 | 10.4 | |
| 3 | 0 | 5797.45 | 40 | 0 | 231.17 | 776.95 | 703 | 161 | 3.92E-03 | 15.8 | |

Background Counts Within Peak Regions  Generated:  7-OCT-2005 09:29:31.50

Acquisition Start: 1-OCT-2005 10:05:34.01
Live Time: 0 16:40:03.00  Real Time: 0 16:40:03.00

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 4605.20 | 10 | 0 | 3.08 | 368.50 | 291 | 156 | 1.67E-04 | 31.6 | |
| 2 | 0 | 5275.13 | 4 | 0 | 110.96 | 596.00 | 509 | 175 | 6.67E-05 | 50.0 | |
| 3 | 0 | 5814.75 | 14 | 0 | 133.98 | 783.00 | 703 | 161 | 2.33E-04 | 26.7 | |

Net Sample Counts Within Peak Regions  Generated:  7-OCT-2005 09:29:31.80

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 4591.93* | 927 | 0 | 409.95 | 364.04 | 291 | 156 | 9.09E-02 | 5.1 | |
| 2 | 0 | 5278.61* | 217 | 0 | 504.67 | 597.20 | 509 | 175 | 2.13E-02 | 10.5 | |
| 3 | 0 | 5797.45* | 92 | 0 | 231.17 | 776.95 | 703 | 161 | 9.06E-03 | 16.2 | |

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.0 Generated 7-OCT-2005 09:29:32

Configuration : MCA0:[AMSCOUNT]0000C192$1
Analyses by : ROIPEAK V1.2,PEAKEFF V2.2,ENBACK V1.6,NID V3.3
Sample title : SPIKE
Sample date : 7-OCT-2005 00:00:00 Acquisition date : 7-OCT-2005 06:22:37
Sample ID : 01 Sample quantity : 1.0000 gram
Sample type : RA Sample geometry :
Detector name : 001 Detector geometry:
Elapsed live time: 0 02:50:01.00 Elapsed real time: 0 02:50:01.00 0.0%
Energy tolerance : 100.00 keV Half life ratio : 8.00
Errors propagated: Yes Systematic Error : 3.00 %
Efficiency type : Average value Efficiencies at : Peak Energy
Abundance limit : 75.00

Post-NID Peak Search Report

| It | Energy | Area | FWHM | Channel | Left | Pw | %Err | Fit | Nuclides | Activity pCi/gram |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 4591.93* | 927409.95 | 364.04 | | 291 | 156 | 10.1 | | RA-226 | 11.6 |
| 0 | 5278.61* | 217504.67 | 597.20 | | 509 | 175 | 20.9 | | RN-222 | 2.72 |
| 0 | 5797.45* | 92231.17 | 776.95 | | 703 | 161 | 32.5 | | PO-218 | 1.16 |

Eberline Services
Oak Ridge Laboratory

ALPHA SPECTROMETRY REPORT
7-OCT-2005 09:29:59

**********

Spectral File: ND_AMS_ARCHIVE_R:R_0509118A-RA$02_RA.CNF

**********

| | | | |
|---|---|---|---|
| BATCH ID: | 0509118A-RA | SAMPLE ID: | 02 |
| SAMPLE DATE: | 7-OCT-2005 00:00 | ALIQUOT: 1.000E+00 | gram |
| SAMPLE TITLE: | BLANK | DETECTOR NUMBER: | 003 |
| ACQ DATE: | 7-OCT-2005 06:22 | AVERAGE EFFICIENCY: | 20.37% |
| ELAPSED LIVE TIME: | 10206. | RECOVERY: | 97.41% |
| TRACER ID: | NONE | TRACER FWHM (kev): | 0.00 |
| LAMBDA VALUE: | 0. | ROI TYPE: | STANDARD |
| TRACER DPM AT SAMPLE DATE: | 0.000 | CONFIDENCE FACTOR: | 4.65 |
| SAMPLE MATRIX: | SOIL | LLD CONSTANT: | 2.71 |
| ENERGY CAL DATE: | 30-SEP-2005 08:11 | EFF CAL DATE: 30-SEP-2005 | 08:11 |
| BKG FILENAME: | B_003_1OCT05 | BKG ELAPSED TIME: | 60008. |
| | | SAF: | 2.50 |

**********

NUCLIDE ACTIVITY SUMMARY

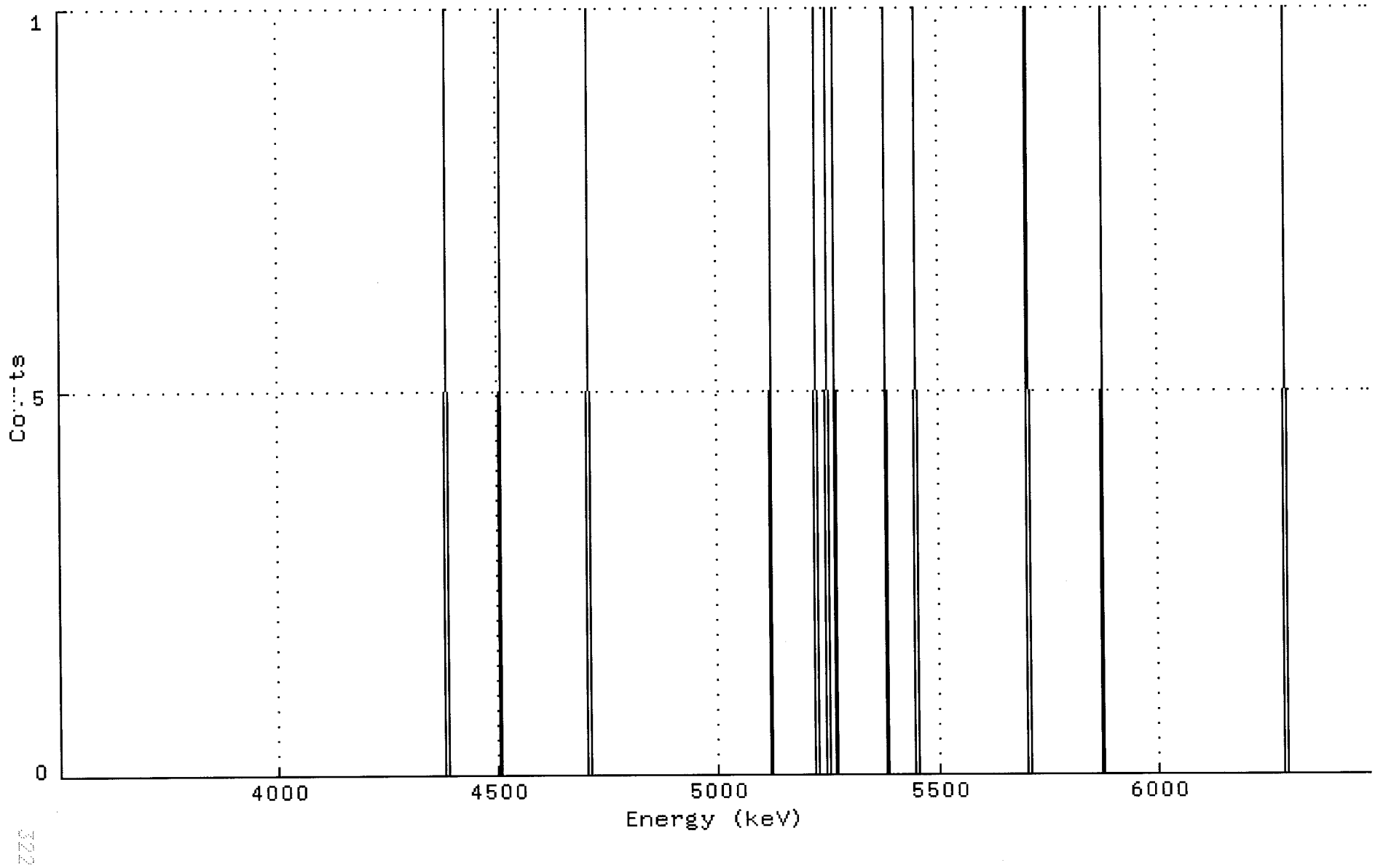
| NUCLIDE | ENERGY | NET AREA | BKG | %ABN | ACTIVITY pCi/ gram | TPU/ERROR 2-SIGMA | MDC pCi/ gram |
|---|---|---|---|---|---|---|---|
| PO-218 | 6003.0 | 4.95 | 2.55 | 100.0 | 6.607E-02 | 1.170E-01 | 3.383E-01 |
| RN-222 | 5490.0 | 15.12 | 2.38 | 99.9 | 2.020E-01 | 1.781E-01 | 3.301E-01 |
| RA-226 | 4785.0 | 5.80 | 1.70 | 100.0 | 7.741E-02 | 1.166E-01 | 2.928E-01 |

**********

Analyst _____ Date 10-7-05

Reviewer _____ Date 10/7/05

Spectrum : DKA100:[ALPHA.ALUSR.ARCHIVE.R]R_0509118A-RA$02_RA.CNF;1
Title : 003
Sample Title: BLANK
Start Time: 7-OCT-2005 06:22: Sample Time: 7-OCT-2005 00:00: Energy Offset: 3.49189E+03
Real Time : 0 02:50:06.00 Sample ID : 02 Energy Slope : 3.10457E+00
Live Time : 0 02:50:06.00 Sample Type: RA Energy Quad : -1.84000E-04




322

Channel Contents for ND_AMS_ARCHIVE_R:R_0509118A-RA$02_RA

Channel

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1: | 10206 | 10206 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 29: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 43: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 57: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 71: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 85: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 99: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 113: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 127: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 141: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 155: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 169: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 183: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 197: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 211: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 225: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 239: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 253: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 267: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 281: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 295: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 309: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 323: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 337: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 351: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 365: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 379: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 393: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 407: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 421: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 435: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 449: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 463: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 477: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 491: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 505: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 519: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 533: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 547: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 561: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 575: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 589: | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 603: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 617: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 631: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 645: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 |
| 659: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 673: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 687: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 701: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 715: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 729: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 743: | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 757: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 771: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 785: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 799: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 813: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 827: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 841: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 855: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 869: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 883: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 897: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 911: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 925: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 939: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 953: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 967: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 981: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 995: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1009: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1023: | 0 | 0 | | | | | | | | | | | | |

Eberline Services
Oak Ridge Laboratory

Gross Sample Counts Within Peak Regions  Generated:  7-OCT-2005 09:29:42.02

Detector ID: 3  Acquisition Start: 7-OCT-2005 06:22:41.01
Live Time: 0 02:50:06.00  Real Time: 0 02:50:06.00
Batch Id: 0509118A-RA  Sample Id: 02
Sample Type: RA

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 4532.13 | 3 | | 0341.50 | 342.00 | 289 | 157 | 2.94E-04 | 57.7 | |
| 2 | 0 | 5304.45 | 7 | | 0360.13 | 605.57 | 507 | 178 | 6.86E-04 | 37.8 | |
| 3 | 0 | 5758.26 | 3 | | 0192.10 | 764.67 | 703 | 164 | 2.94E-04 | 57.7 | |

Background Counts Within Peak Regions  Generated:  7-OCT-2005 09:29:57.59

Acquisition Start: 1-OCT-2005 10:05:40.01
Live Time: 0 16:40:08.00  Real Time: 0 16:40:08.00

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 4606.48 | 10 | | 0338.40 | 367.00 | 289 | 157 | 1.67E-04 | 31.6 | |
| 2 | 0 | 5275.41 | 14 | | 0 4.56 | 595.50 | 507 | 178 | 2.33E-04 | 26.7 | |
| 3 | 0 | 5814.18 | 15 | | 0 3.10 | 784.50 | 703 | 164 | 2.50E-04 | 25.8 | |

Net Sample Counts Within Peak Regions  Generated:  7-OCT-2005 09:29:57.85

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 4532.13* | 6 | | 0341.50 | 342.00 | 289 | 157 | 5.68E-04 | 75.2 | |
| 2 | 0 | 5304.45* | 15 | | 0360.13 | 605.57 | 507 | 178 | 1.48E-03 | 44.0 | |
| 3 | 0 | 5758.26* | 5 | | 0192.10 | 764.67 | 703 | 164 | 4.85E-04 | 88.5 | |

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.0 Generated 7-OCT-2005 09:29:58

| | | | |
|---|---|---|---|
| Configuration | : MCA0:[AMSCOUNT]0000C192$1 | | |
| Analyses by | : ROIPEAK V1.2,PEAKEFF V2.2,ENBACK V1.6,NID V3.3 | | |
| Sample title | : BLANK | | |
| Sample date | : 7-OCT-2005 00:00:00 | Acquisition date | : 7-OCT-2005 06:22:41 |
| Sample ID | : 02 | Sample quantity | : 1.0000 gram |
| Sample type | : RA | Sample geometry | : |
| Detector name | : 003 | Detector geometry | : |
| Elapsed live time | : 0 02:50:06.00 | Elapsed real time | : 0 02:50:06.00 0.0% |
| Energy tolerance | : 100.00 keV | Half life ratio | : 8.00 |
| Errors propagated | : Yes | Systematic Error | : 3.00 % |
| Efficiency type | : Average value | Efficiencies at | : Peak Energy |
| Abundance limit | : 75.00 | | |

Post-NID Peak Search Report

| It | Energy | Area | FWHM | Channel | Left | Pw | %Err | Fit | Nuclides | Activity pCi/gram |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 4532.13* | 6341.50 | 342.00 | | 289 | 157150.5 | | | RA-226 | 7.540E-02 |
| 0 | 5304.45* | 15360.13 | 605.57 | | 507 | 178 | 87.9 | | RN-222 | 0.197 |
| 0 | 5758.26* | 5192.10 | 764.67 | | 703 | 164177.0 | | | PO-218 | 6.436E-02 |

Eberline Services
Oak Ridge Laboratory

ALPHA SPECTROMETRY REPORT
7-OCT-2005 09:30:55

**********

Spectral File: ND_AMS_ARCHIVE_S:S_0509118A-RA$03_RA.CNF

**********

| | | | |
|---|---|---|---|
| BATCH ID: | 0509118A-RA | SAMPLE ID: | 03 |
| SAMPLE DATE: | 27-SEP-2005 00:00 | ALIQUOT: 9.971E-01 | gram |
| SAMPLE TITLE: | VPBR092705SL17 | DETECTOR NUMBER: | 005 |
| ACQ DATE: | 7-OCT-2005 06:22 | AVERAGE EFFICIENCY: | 21.37% |
| ELAPSED LIVE TIME: | 10205. | RECOVERY: | 93.19% |
| TRACER ID: | NONE | TRACER FWHM (kev): | 0.00 |
| LAMBDA VALUE: | 0. | ROI TYPE: | STANDARD |
| TRACER DPM AT SAMPLE DATE: | 0.000 | CONFIDENCE FACTOR: | 4.65 |
| SAMPLE MATRIX: | SOIL | LLD CONSTANT: | 2.71 |
| ENERGY CAL DATE: | 30-SEP-2005 08:11 | EFF CAL DATE: 30-SEP-2005 | 08:11 |
| BKG FILENAME: | B_005_1OCT05 | BKG ELAPSED TIME: | 60002. |
| | | SAF: | 2.20 |

**********

NUCLIDE ACTIVITY SUMMARY

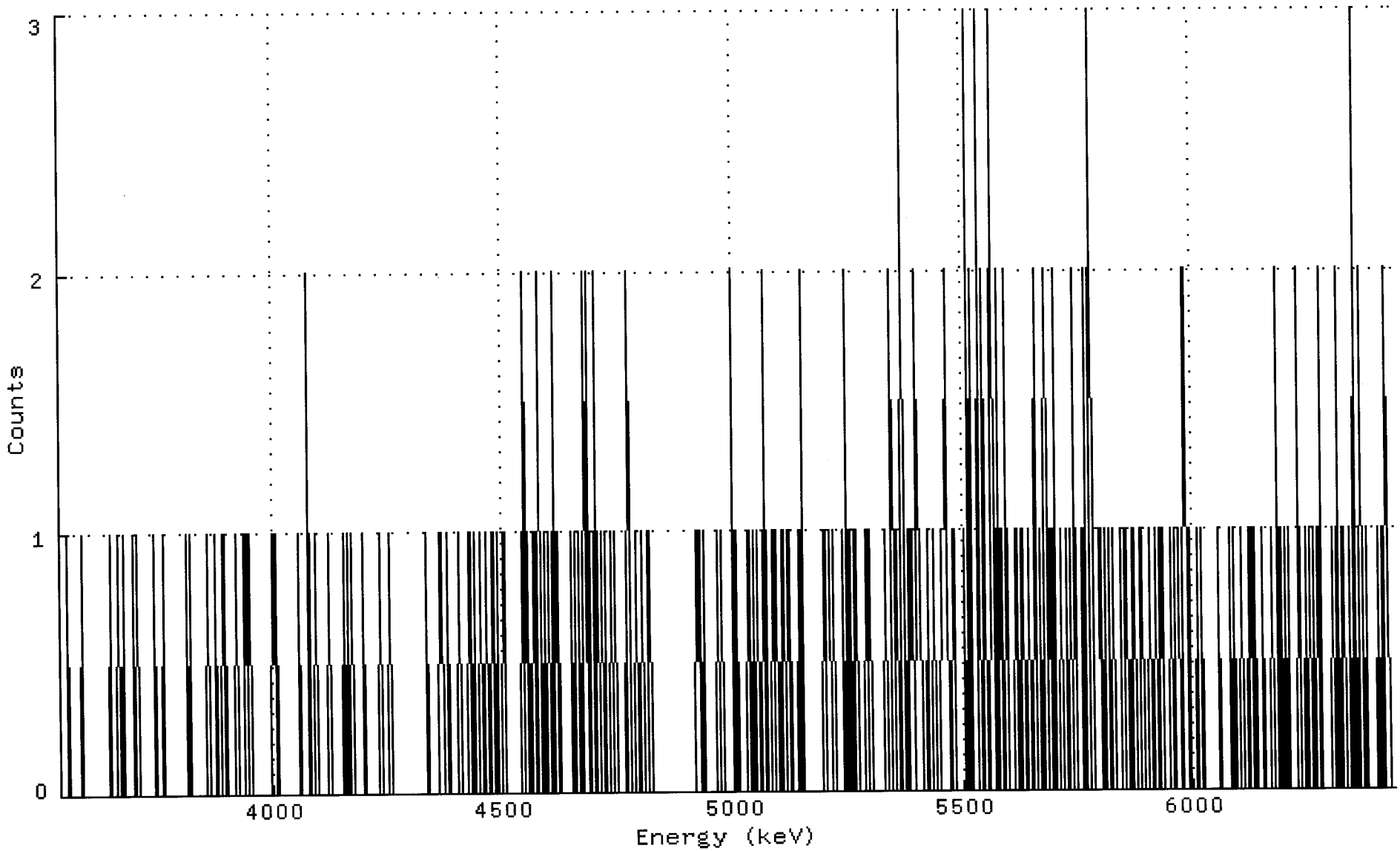
| NUCLIDE | ENERGY | NET AREA | BKG | %ABN | ACTIVITY pCi/ gram | TPU/ERROR 2-SIGMA | MDC pCi/ gram |
|---|---|---|---|---|---|---|---|
| PO-218 | 6003.0 | 164.49 | 0.51 | 100.0 | 2.194E+00 | 5.306E-01 | 1.770E-01 |
| RN-222 | 5490.0 | 148.58 | 1.02 | 99.9 | 1.983E+00 | 5.035E-01 | 2.175E-01 |
| RA-226 | 4785.0 | 114.39 | 2.21 | 100.0 | 1.525E+00 | 4.404E-01 | 2.823E-01 |

**********

Analyst _____ Date 10-7-05

Reviewer _____ Date 10/7/05

Spectrum : DKA100:[ALPHA.ALUSR.ARCHIVE.S]S_0509118A-RA$03_RA.CNF;2
Title : 005
Sample Title: VPBR092705SL17
Start Time: 7-OCT-2005 06:22: Sample Time: 27-SEP-2005 00:00 Energy Offset: 3.52561E+03
Real Time : 0 02:50:05.00 Sample ID : 03 Energy Slope : 2.98881E+00
Live Time : 0 02:50:05.00 Sample Type: RA Energy Quad : -1.42973E-04



Channel Contents for ND_AMS_ARCHIVE_S:S_0509118A-RA$03_RA

Channel

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1: | 10205 | 10205 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 15: | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 29: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 43: | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 57: | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 71: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 85: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 99: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 113: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 |
| 127: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| 141: | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 155: | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 169: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 183: | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 197: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 211: | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 225: | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 239: | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 |
| 253: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 267: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 281: | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 295: | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 |
| 309: | 0 | 1 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 323: | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 |
| 337: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 2 | 1 | 0 |
| 351: | 1 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 2 | 0 | 1 | 0 | 0 | 1 |
| 365: | 0 | 1 | 1 | 0 | 0 | 2 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 |
| 379: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 |
| 393: | 0 | 2 | 1 | 0 | 2 | 0 | 0 | 0 | 0 | 2 | 0 | 1 | 0 | 0 |
| 407: | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 |
| 421: | 0 | 0 | 0 | 0 | 1 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 1 | 0 |
| 435: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 |
| 449: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 463: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 477: | 0 | 1 | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 491: | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 505: | 0 | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 519: | 1 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 2 | 0 |
| 533: | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 1 | 0 |
| 547: | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 2 | 0 |
| 561: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 575: | 0 | 1 | 0 | 1 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 589: | 0 | 0 | 1 | 0 | 0 | 2 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 |
| 603: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 |
| 617: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 2 | 1 | 1 |
| 631: | 0 | 1 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 1 |
| 645: | 0 | 1 | 2 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 |
| 659: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 2 | 1 | 0 |
| 673: | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 687: | 3 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 3 | 1 | 0 | 0 | 2 | 1 |
| 701: | 0 | 0 | 0 | 1 | 1 | 3 | 0 | 0 | 0 | 2 | 0 | 1 | 0 | 1 |
| 715: | 0 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 |
| 729: | 1 | 1 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 2 | 0 | 0 |
| 743: | 0 | 1 | 0 | 0 | 1 | 2 | 1 | 0 | 1 | 1 | 0 | 0 | 2 | 0 |
| 757: | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 1 |
| 771: | 2 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 2 | 0 | 0 | 0 | 1 | 3 |
| 785: | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 1 |
| 799: | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 1 | 0 |
| 813: | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 |
| 827: | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 0 | 1 | 1 | 0 |
| 841: | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 0 |
| 855: | 0 | 2 | 2 | 2 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 869: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 883: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| 897: | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 |
| 911: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 925: | 0 | 1 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 0 | 1 | 0 |
| 939: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 0 | 0 | 0 | 0 |
| 953: | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 2 | 0 |
| 967: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 2 | 0 |
| 981: | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 3 | 0 |
| 995: | 0 | 1 | 0 | 2 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1009: | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 2 | 1 | 1 | 0 | 0 |
| 1023: | 0 | 0 | | | | | | | | | | | | |

Eberline Services
Oak Ridge Laboratory

Gross Sample Counts Within Peak Regions  Generated:  7-OCT-2005 09:30:47.42

Detector ID: 5  Acquisition Start: 7-OCT-2005 06:22:53.01
Live Time: 0 02:50:05.00  Real Time: 0 02:50:05.00
Batch Id: 0509118A-RA  Sample Id: 03
Sample Type: RA

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 4615.10 | 53 | | 0240.51 | 371.11 | 288 | 161 | 5.19E-03 | 13.7 | |
| 2 | 0 | 5299.51 | 68 | | 0473.73 | 611.40 | 513 | 181 | 6.66E-03 | 12.1 | |
| 3 | 0 | 5800.45 | 75 | | 0423.61 | 791.05 | 713 | 167 | 7.35E-03 | 11.5 | |

Background Counts Within Peak Regions  Generated:  7-OCT-2005 09:30:53.74

Acquisition Start: 1-OCT-2005 10:05:45.01
Live Time: 0 16:40:02.00  Real Time: 0 16:40:02.00

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 4606.13 | 13 | 0 | 0.00 | 368.00 | 288 | 161 | 2.17E-04 | 27.7 | |
| 2 | 0 | 5275.87 | 6 | | 0445.33 | 603.00 | 513 | 181 | 1.00E-04 | 40.8 | |
| 3 | 0 | 5814.11 | 3 | | 0 11.96 | 796.00 | 713 | 167 | 5.00E-05 | 57.7 | |

Net Sample Counts Within Peak Regions  Generated:  7-OCT-2005 09:30:54.06

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 4615.10* | 114 | | 0240.51 | 371.11 | 288 | 161 | 1.12E-02 | 14.0 | |
| 2 | 0 | 5299.51* | 149 | | 0473.73 | 611.40 | 513 | 181 | 1.46E-02 | 12.2 | |
| 3 | 0 | 5800.45* | 164 | | 0423.61 | 791.05 | 713 | 167 | 1.61E-02 | 11.6 | |

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.0 Generated 7-OCT-2005 09:30:55

| | | | |
|---|---|---|---|
| Configuration | : MCA0:[AMSCOUNT]0000C192$1 | | |
| Analyses by | : ROIPEAK V1.2,PEAKEFF V2.2,ENBACK V1.6,NID V3.3 | | |
| Sample title | : VPBR092705SL17 | | |
| Sample date | : 27-SEP-2005 00:00:00 | Acquisition date | : 7-OCT-2005 06:22:53 |
| Sample ID | : 03 | Sample quantity | : 0.99710 gram |
| Sample type | : RA | Sample geometry | : |
| Detector name | : 005 | Detector geometry | : |
| Elapsed live time | : 0 02:50:05.00 | Elapsed real time | : 0 02:50:05.00 0.0% |
| Energy tolerance | : 100.00 keV | Half life ratio | : 8.00 |
| Errors propagated | : Yes | Systematic Error | : 3.00 % |
| Efficiency type | : Average value | Efficiencies at | : Peak Energy |
| Abundance limit | : 75.00 | | |

Post-NID Peak Search Report

| It | Energy | Area | FWHM | Channel | Left | Pw | %Err | Fit | Nuclides | Activity pCi/gram |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 4615.10* | 114240.51 | 371.11 | 288 | 161 | | 28.0 | | RA-226 | 1.42 |
| 0 | 5299.51* | 149473.73 | 611.40 | 513 | 181 | | 24.4 | | RN-222 | 1.85 |
| 0 | 5800.45* | 164423.61 | 791.05 | 713 | 167 | | 23.2 | | PO-218 | 2.04 |

Eberline Services
Oak Ridge Laboratory

ALPHA SPECTROMETRY REPORT
7-OCT-2005 09:31:06

**********

Spectral File: ND_AMS_ARCHIVE_S:S_0509118A-RA$04_RA.CNF

**********

| | | | |
|---|---|---|---|
| BATCH ID: | 0509118A-RA | SAMPLE ID: | 04 |
| SAMPLE DATE: | 27-SEP-2005 00:00 | ALIQUOT: 1.095E+00 | gram |
| SAMPLE TITLE: | VPBR092705SL17 | DETECTOR NUMBER: | 006 |
| ACQ DATE: | 7-OCT-2005 06:22 | AVERAGE EFFICIENCY: | 20.87% |
| ELAPSED LIVE TIME: | 10201. | RECOVERY: | 91.24% |
| TRACER ID: | NONE | TRACER FWHM (kev): | 0.00 |
| LAMBDA VALUE: | 0. | ROI TYPE: | STANDARD |
| TRACER DPM AT SAMPLE DATE: | 0.000 | CONFIDENCE FACTOR: | 4.65 |
| SAMPLE MATRIX: | SOIL | LLD CONSTANT: | 2.71 |
| ENERGY CAL DATE: | 30-SEP-2005 08:11 | EFF CAL DATE: 30-SEP-2005 | 08:11 |
| BKG FILENAME: | B_006_1OCT05 | BKG ELAPSED TIME: | 60009. |
| | | SAF: | 2.16 |

**********

NUCLIDE ACTIVITY SUMMARY

| NUCLIDE | ENERGY | NET AREA | BKG | %ABN | ACTIVITY pCi/ gram | TPU/ERROR 2-SIGMA | MDC pCi/ gram |
|---|---|---|---|---|---|---|---|
| PO-218 | 6003.0 | 172.92 | 2.04 | 100.0 | 2.198E+00 | 5.175E-01 | 2.567E-01 |
| RN-222 | 5490.0 | 162.63 | 1.53 | 99.9 | 2.068E+00 | 5.003E-01 | 2.325E-01 |
| RA-226 | 4785.0 | 131.08 | 0.68 | 100.0 | 1.666E+00 | 4.442E-01 | 1.796E-01 |

**********

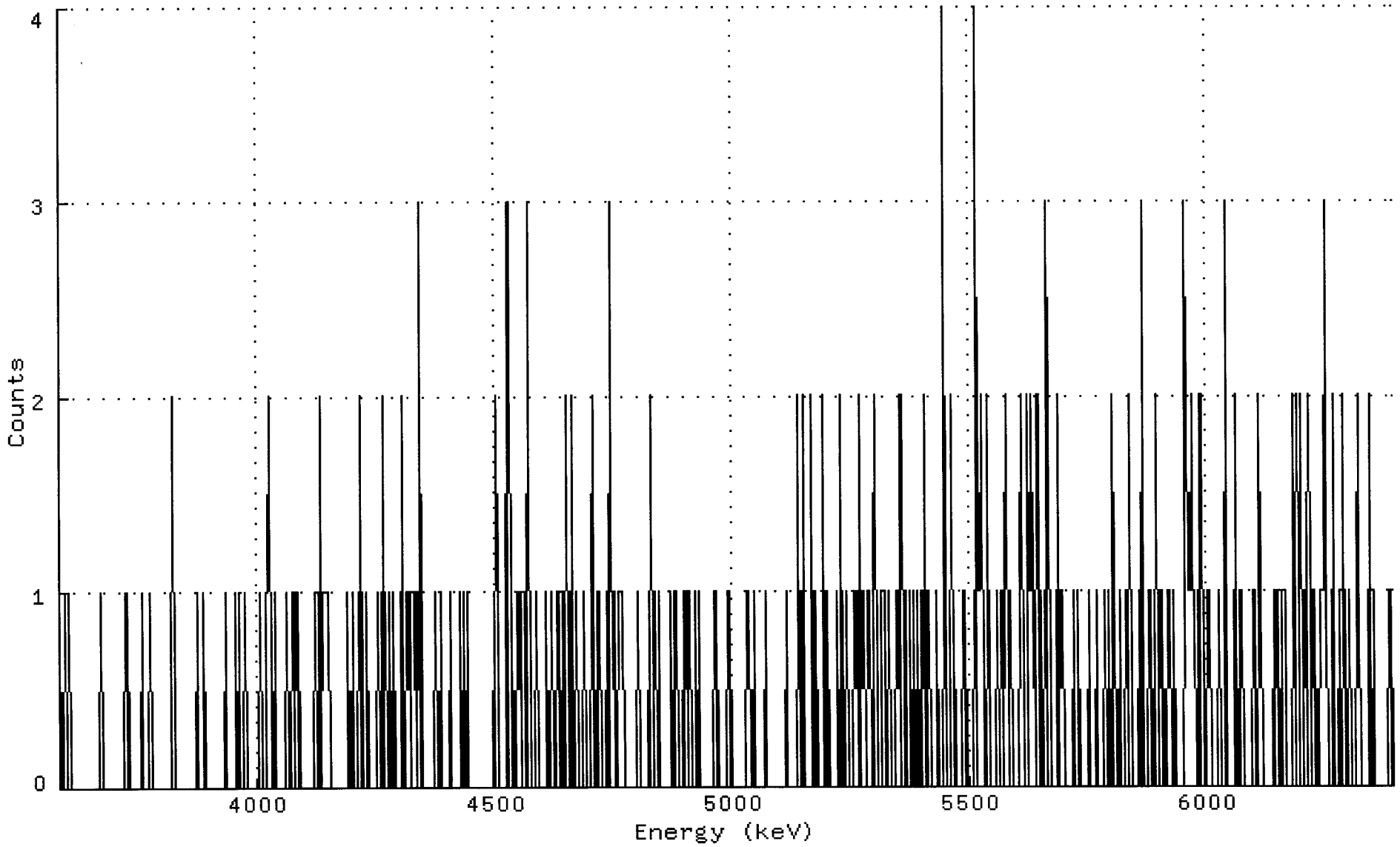
EJ Price
Analyst

10-7-05
Date

Reviewer

10/7/05
Date

Spectrum : DKA100:[ALPHA.ALUSR.ARCHIVE.S]S_0509118A-RA$04_RA.CNF;1
Title : 006
Sample Title: VPBR092705SL17
Start Time: 7-OCT-2005 06:22: Sample Time: 27-SEP-2005 00:00 Energy Offset: 3.57103E+03
Real Time : 0 02:50:01.00 Sample ID : 04 Energy Slope : 2.87809E+00
Live Time : 0 02:50:01.00 Sample Type: RA Energy Quad : -1.22023E-04



Channel Contents for ND_AMS_ARCHIVE_S:S_0509118A-RA$04_RA

Channel

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1: | 10201 | 10201 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 15: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 29: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 43: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 |
| 57: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| 71: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 85: | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 99: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 113: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 127: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 |
| 141: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 155: | 0 | 0 | 1 | 1 | 2 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 169: | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 1 | 0 |
| 183: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 197: | 2 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 211: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 |
| 225: | 0 | 1 | 0 | 2 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 239: | 0 | 1 | 0 | 0 | 0 | 2 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 |
| 253: | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 1 | 1 | 1 | 0 | 1 | 1 |
| 267: | 1 | 0 | 1 | 1 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 281: | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 295: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 |
| 309: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 323: | 0 | 0 | 0 | 0 | 1 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 337: | 3 | 0 | 3 | 0 | 1 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 1 |
| 351: | 0 | 0 | 3 | 2 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 365: | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 1 | 0 |
| 379: | 1 | 0 | 0 | 2 | 0 | 0 | 0 | 2 | 0 | 0 | 1 | 1 | 0 | 0 |
| 393: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 0 | 0 | 1 | 0 |
| 407: | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 3 | 1 | 1 | 0 | 1 | 0 |
| 421: | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 435: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 2 | 0 | 0 |
| 449: | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 463: | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 1 | 0 |
| 477: | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 491: | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 505: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 519: | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 533: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 547: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 0 |
| 561: | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 0 |
| 575: | 0 | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 589: | 0 | 0 | 2 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| 603: | 1 | 0 | 2 | 0 | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 1 |
| 617: | 2 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 1 | 1 | 0 | 0 |
| 631: | 0 | 0 | 1 | 1 | 1 | 0 | 2 | 2 | 0 | 1 | 0 | 0 | 0 | 1 |
| 645: | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 2 | 0 | 1 |
| 659: | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 4 | 0 |
| 673: | 0 | 0 | 0 | 2 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 687: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 4 | 1 | 1 | 1 | 2 |
| 701: | 0 | 1 | 0 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 715: | 1 | 1 | 0 | 1 | 2 | 2 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 729: | 1 | 1 | 2 | 0 | 0 | 0 | 0 | 2 | 1 | 1 | 2 | 1 | 0 | 0 |
| 743: | 2 | 0 | 2 | 0 | 0 | 0 | 1 | 0 | 3 | 2 | 0 | 0 | 0 | 0 |
| 757: | 0 | 0 | 2 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 771: | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 785: | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 |
| 799: | 1 | 0 | 0 | 2 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| 813: | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 3 | 0 |
| 827: | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 2 | 0 | 0 | 1 | 0 |
| 841: | 1 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 855: | 0 | 0 | 0 | 1 | 3 | 2 | 1 | 1 | 1 | 2 | 1 | 1 | 0 | 0 |
| 869: | 0 | 2 | 0 | 2 | 0 | 1 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 |
| 883: | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 |
| 897: | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 911: | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 2 | 1 | 0 | 0 | 0 | 0 | 0 |
| 925: | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 1 | 1 |
| 939: | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 0 | 1 | 2 | 1 | 0 | 2 | 0 |
| 953: | 1 | 1 | 0 | 1 | 2 | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 1 |
| 967: | 1 | 1 | 1 | 3 | 1 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 |
| 981: | 1 | 0 | 0 | 1 | 2 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 995: | 1 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 1 |
| 1009: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | |
| 1023: | 0 | 0 | | | | | | | | | | | | |

Eberline Services
Oak Ridge Laboratory

Gross Sample Counts Within Peak Regions  Generated:  7-OCT-2005 09:30:59.99

Detector ID: 6  Acquisition Start: 7-OCT-2005 06:22:57.01
Live Time: 0 02:50:01.00  Real Time: 0 02:50:01.00
Batch Id: 0509118A-RA  Sample Id: 04
Sample Type: RA

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 4623.47 | 61 | 0338.18 | | 371.52 | 283 | 166 | 5.98E-03 | 12.8 | |
| 2 | 0 | 5327.87 | 76 | 0 75.77 | | 627.09 | 515 | 187 | 7.45E-03 | 11.5 | |
| 3 | 0 | 5821.56 | 81 | 0463.13 | | 809.75 | 721 | 173 | 7.94E-03 | 11.1 | |

Background Counts Within Peak Regions  Generated:  7-OCT-2005 09:31:04.81

Acquisition Start: 1-OCT-2005 10:05:48.01
Live Time: 0 16:40:09.00  Real Time: 0 16:40:09.00

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 4606.67 | 4 | 0264.78 | | 365.50 | 283 | 166 | 6.67E-05 | 50.0 | |
| 2 | 0 | 5275.80 | 9 | 0 3.57 | | 608.00 | 515 | 187 | 1.50E-04 | 33.3 | |
| 3 | 0 | 5814.18 | 12 | 0140.97 | | 807.00 | 721 | 173 | 2.00E-04 | 28.9 | |

Net Sample Counts Within Peak Regions  Generated:  7-OCT-2005 09:31:05.06

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 4623.47* | 131 | 0338.18 | | 371.52 | 283 | 166 | 1.28E-02 | 12.9 | |
| 2 | 0 | 5327.87* | 163 | 0 75.77 | | 627.09 | 515 | 187 | 1.59E-02 | 11.6 | |
| 3 | 0 | 5821.56* | 173 | 0463.13 | | 809.75 | 721 | 173 | 1.70E-02 | 11.2 | |

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.0 Generated 7-OCT-2005 09:31:05

Configuration : MCA0:[AMSCOUNT]0000C192$1
Analyses by : ROIPEAK V1.2,PEAKEFF V2.2,ENBACK V1.6,NID V3.3
Sample title : VPBR092705SL17
Sample date : 27-SEP-2005 00:00:00 Acquisition date : 7-OCT-2005 06:22:57
Sample ID : 04 Sample quantity : 1.0949 gram
Sample type : RA Sample geometry :
Detector name : 006 Detector geometry:
Elapsed live time: 0 02:50:01.00 Elapsed real time: 0 02:50:01.00 0.0%
Energy tolerance : 100.00 keV Half life ratio : 8.00
Errors propagated: Yes Systematic Error : 3.00 %
Efficiency type : Average value Efficiencies at : Peak Energy
Abundance limit : 75.00

Post-NID Peak Search Report

| It | Energy | Area | FWHM | Channel | Left | Pw | %Err | Fit | Nuclides | Activity pCi/gram |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 4623.47* | 131338.18 | 371.52 | 283 | 166 | 25.7 | | | RA-226 | 1.52 |
| 0 | 5327.87* | 163 75.77 | 627.09 | 515 | 187 | 23.2 | | | RN-222 | 1.89 |
| 0 | 5821.56* | 173463.13 | 809.75 | 721 | 173 | 22.5 | | | PO-218 | 2.01 |

Eberline Services
Oak Ridge Laboratory

ALPHA SPECTROMETRY REPORT
7-OCT-2005 09:31:24

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Spectral File: ND_AMS_ARCHIVE_S:S_0509118A-RA$05_RA.CNF

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| | | | |
|---|---|---|---|
| BATCH ID: | 0509118A-RA | SAMPLE ID: | 05 |
| SAMPLE DATE: | 27-SEP-2005 00:00 | ALIQUOT: 1.068E+00 | gram |
| SAMPLE TITLE: | VPBR092705SL18 | DETECTOR NUMBER: | 007 |
| ACQ DATE: | 7-OCT-2005 06:22 | AVERAGE EFFICIENCY: | 20.72% |
| ELAPSED LIVE TIME: | 10209. | RECOVERY: | 51.83% |
| TRACER ID: | NONE | TRACER FWHM (kev): | 0.00 |
| LAMBDA VALUE: | 0. | ROI TYPE: | STANDARD |
| TRACER DPM AT SAMPLE DATE: | 0.000 | CONFIDENCE FACTOR: | 4.65 |
| SAMPLE MATRIX: | SOIL | LLD CONSTANT: | 2.71 |
| ENERGY CAL DATE: | 30-SEP-2005 08:11 | EFF CAL DATE: 30-SEP-2005 | 08:11 |
| BKG FILENAME: | B_007_1OCT05 | BKG ELAPSED TIME: | 60007. |
| | | SAF: | 1.49 |

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NUCLIDE ACTIVITY SUMMARY

| NUCLIDE | ENERGY | NET AREA | BKG | %ABN | ACTIVITY pCi/ gram | TPU/ERROR 2-SIGMA | MDC pCi/ gram |
|---|---|---|---|---|---|---|---|
| PO-218 | 6003.0 | 86.04 | 1.87 | 100.0 | 1.987E+00 | 5.470E-01 | 3.121E-01 |
| RN-222 | 5490.0 | 94.85 | 0.51 | 99.9 | 2.192E+00 | 5.717E-01 | 2.077E-01 |
| RA-226 | 4785.0 | 72.50 | 0.51 | 100.0 | 1.674E+00 | 4.957E-01 | 2.075E-01 |

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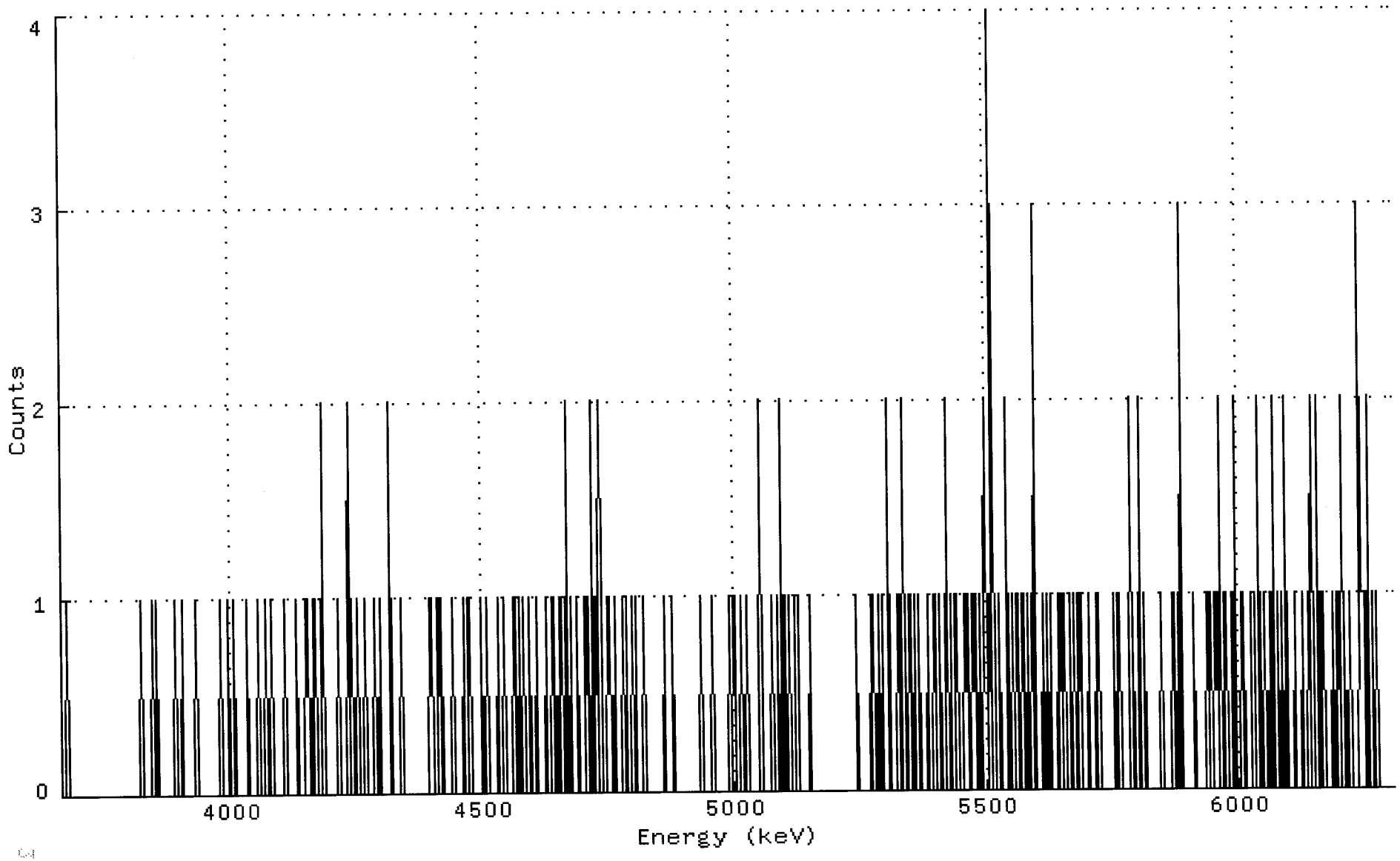
Analyst _____ 10-7-05 Date

Reviewer _____ 10/7/05 Date

Spectrum : DKA100:[ALPHA.ALUSR.ARCHIVE.S]S_0509118A-RA$05_RA.CNF;1
Title : 007
Sample Title: VPBR092705SL18
Start Time: 7-OCT-2005 06:22: Sample Time: 27-SEP-2005 00:00 Energy Offset: 3.65307E+03
Real Time : 0 02:50:09.00 Sample ID : 05 Energy Slope : 2.68906E+00
Live Time : 0 02:50:09.00 Sample Type: RA Energy Quad : -9.63223E-05



Channel Contents for ND_AMS_ARCHIVE_S:S_0509118A-RA$05_RA

Channel

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1: | 10209 | 10209 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 29: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 43: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 57: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 71: | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 85: | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 99: | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 113: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 127: | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 141: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 155: | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 169: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 183: | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 |
| 197: | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 211: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 0 | 1 | 0 | 0 | 0 | 1 |
| 225: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 239: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 |
| 253: | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 267: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| 281: | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| 295: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 |
| 309: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 |
| 323: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 |
| 337: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 |
| 351: | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 365: | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 1 |
| 379: | 0 | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 393: | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 0 | 0 | 2 | 0 | 1 | 0 | 1 |
| 407: | 2 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 1 | 0 | 0 |
| 421: | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 1 |
| 435: | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 449: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 463: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 477: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 491: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 505: | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 519: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 | 0 | 0 |
| 533: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 2 |
| 547: | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 |
| 561: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 575: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 589: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 603: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 |
| 617: | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 2 | 0 | 0 |
| 631: | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 2 | 2 | 0 | 0 | 0 | 1 |
| 645: | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| 659: | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 673: | 2 | 1 | 0 | 1 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 |
| 687: | 1 | 1 | 0 | 1 | 0 | 1 | 1 | 1 | 0 | 1 | 0 | 1 | 0 | 0 |
| 701: | 1 | 1 | 2 | 0 | 1 | 1 | 0 | 4 | 2 | 0 | 0 | 0 | 0 | 1 |
| 715: | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 |
| 729: | 1 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 3 | 0 |
| 743: | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 |
| 757: | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 0 |
| 771: | 1 | 1 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 785: | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 799: | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 813: | 0 | 0 | 0 | 2 | 0 | 1 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 |
| 827: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 841: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 0 |
| 855: | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 869: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 0 | 0 | 1 |
| 883: | 1 | 1 | 0 | 2 | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| 897: | 0 | 2 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 911: | 1 | 1 | 1 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 925: | 1 | 0 | 0 | 2 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 2 |
| 939: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 953: | 0 | 0 | 0 | 1 | 0 | 1 | 2 | 0 | 0 | 0 | 0 | 2 | 0 | 0 |
| 967: | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 1 |
| 981: | 0 | 0 | 2 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 995: | 0 | 1 | 3 | 1 | 1 | 1 | 1 | 0 | 0 | 2 | 0 | 0 | 0 | 1 |
| 1009: | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1023: | 0 | 0 | | | | | | | | | | | | |

Eberline Services
Oak Ridge Laboratory

Gross Sample Counts Within Peak Regions  Generated:  7-OCT-2005 09:31:10.59

Detector ID: 7  Acquisition Start: 7-OCT-2005 06:22:59.01
Live Time: 0 02:50:09.00  Real Time: 0 02:50:09.00
Batch Id: 0509118A-RA  Sample Id: 05
Sample Type: RA

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 4635.85 | 49 | 0 | 71.26 | 370.39 | 271 | 177 | 4.80E-03 | 14.3 | |
| 2 | 0 | 5331.45 | 64 | 0 | 3.95 | 638.77 | 518 | 199 | 6.27E-03 | 12.5 | |
| 3 | 0 | 5817.95 | 59 | 0 | 475.29 | 829.73 | 738 | 182 | 5.78E-03 | 13.0 | |

Background Counts Within Peak Regions  Generated:  7-OCT-2005 09:31:22.04

Acquisition Start: 1-OCT-2005 10:05:51.01
Live Time: 0 16:40:07.00  Real Time: 0 16:40:07.00

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 4606.03 | 3 | 0 | 371.09 | 359.00 | 271 | 177 | 5.00E-05 | 57.7 | |
| 2 | 0 | 5275.55 | 3 | 0 | 223.19 | 617.00 | 518 | 199 | 5.00E-05 | 57.7 | |
| 3 | 0 | 5814.84 | 11 | 0 | 414.12 | 828.50 | 738 | 182 | 1.83E-04 | 30.2 | |

Net Sample Counts Within Peak Regions  Generated:  7-OCT-2005 09:31:22.31

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 4635.85* | 72 | 0 | 71.26 | 370.39 | 271 | 177 | 7.10E-03 | 14.4 | |
| 2 | 0 | 5331.45* | 95 | 0 | 3.95 | 638.77 | 518 | 199 | 9.29E-03 | 12.6 | |
| 3 | 0 | 5817.95* | 86 | 0 | 475.29 | 829.73 | 738 | 182 | 8.43E-03 | 13.3 | |

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.0 Generated 7-OCT-2005 09:31:23

| | | | |
|---|---|---|---|
| Configuration | : MCA0:[AMSCOUNT]0000C192$1 | | |
| Analyses by | : ROIPEAK V1.2,PEAKEFF V2.2,ENBACK V1.6,NID V3.3 | | |
| Sample title | : VPBR092705SL18 | | |
| Sample date | : 27-SEP-2005 00:00:00 | Acquisition date | : 7-OCT-2005 06:22:59 |
| Sample ID | : 05 | Sample quantity | : 1.0680 gram |
| Sample type | : RA | Sample geometry | : |
| Detector name | : 007 | Detector geometry | : |
| Elapsed live time | : 0 02:50:09.00 | Elapsed real time | : 0 02:50:09.00 0.0% |
| Energy tolerance | : 100.00 keV | Half life ratio | : 8.00 |
| Errors propagated | : Yes | Systematic Error | : 3.00 % |
| Efficiency type | : Average value | Efficiencies at | : Peak Energy |
| Abundance limit | : 75.00 | | |

Post-NID Peak Search Report

| It | Energy | Area | FWHM | Channel | Left | Pw | %Err | Fit | Nuclides | Activity pCi/gram |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 4635.85* | 72 | 71.26 | 370.39 | 271 | 177 | 28.8 | | RA-226 | 0.868 |
| 0 | 5331.45* | 95 | 3.95 | 638.77 | 518 | 199 | 25.1 | | RN-222 | 1.14 |
| 0 | 5817.95* | 864 | 75.29 | 829.73 | 738 | 182 | 26.6 | | PO-218 | 1.03 |

Eberline Services
Oak Ridge Laboratory

ALPHA SPECTROMETRY REPORT
7-OCT-2005 09:31:41

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Spectral File: ND_AMS_ARCHIVE_S:S_0509118A-RA$06_RA.CNF

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| | | | |
|---|---|---|---|
| BATCH ID: | 0509118A-RA | SAMPLE ID: | 06 |
| SAMPLE DATE: | 27-SEP-2005 00:00 | ALIQUOT: 1.037E+00 | gram |
| SAMPLE TITLE: | VPBR092705SL19 | DETECTOR NUMBER: | 008 |
| ACQ DATE: | 7-OCT-2005 06:23 | AVERAGE EFFICIENCY: | 18.60% |
| ELAPSED LIVE TIME: | 10206. | RECOVERY: | 95.30% |
| TRACER ID: | NONE | TRACER FWHM (kev): | 0.00 |
| LAMBDA VALUE: | 0. | ROI TYPE: | STANDARD |
| TRACER DPM AT SAMPLE DATE: | 0.000 | CONFIDENCE FACTOR: | 4.65 |
| SAMPLE MATRIX: | SOIL | LLD CONSTANT: | 2.71 |
| ENERGY CAL DATE: | 30-SEP-2005 08:11 | EFF CAL DATE: | 30-SEP-2005 08:11 |
| BKG FILENAME: | B_008_1OCT05 | BKG ELAPSED TIME: | 60004. |
| | | SAF: | 2.23 |

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NUCLIDE ACTIVITY SUMMARY

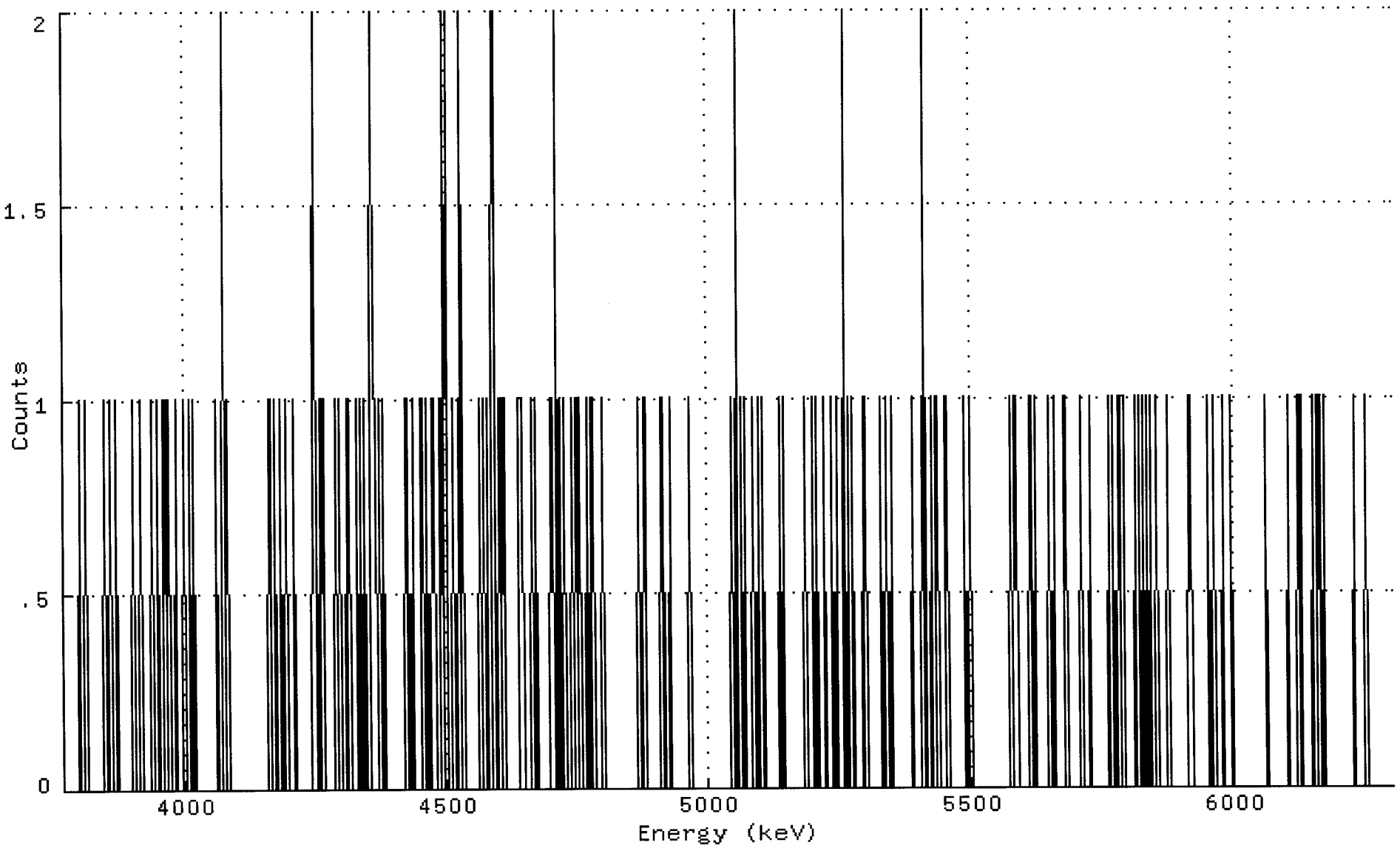
| NUCLIDE | ENERGY | NET AREA | BKG | %ABN | ACTIVITY pCi/ gram | TPU/ERROR 2-SIGMA | MDC pCi/ gram |
|---|---|---|---|---|---|---|---|
| PO-218 | 6003.0 | 66.56 | 0.34 | 100.0 | 9.588E-01 | 3.583E-01 | 1.742E-01 |
| RN-222 | 5490.0 | 79.60 | 0.68 | 99.9 | 1.147E+00 | 3.941E-01 | 2.104E-01 |
| RA-226 | 4785.0 | 124.20 | 0.68 | 100.0 | 1.789E+00 | 4.967E-01 | 2.102E-01 |

**********

Analyst _____ Date 10-7-05

Reviewer _____ Date 10/7/05

Spectrum : DKA100:[ALPHA.ALUSR.ARCHIVE.S]S_0509118A-RA$06_RA.CNF;1
Title : 008
Sample Title: VPBR092705SL19
Start Time: 7-OCT-2005 06:23: Sample Time: 27-SEP-2005 00:00 Energy Offset: 3.76020E+03
Real Time : 0 02:50:06.00 Sample ID : 06 Energy Slope : 2.57875E+00
Live Time : 0 02:50:06.00 Sample Type: RA Energy Quad : -9.50722E-05



Channel Contents for ND_AMS_ARCHIVE_S:S_0509118A-RA$06_RA

Channel

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1: | 10206 | 10206 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15: | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 29: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 43: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 57: | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 71: | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 1 |
| 85: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 99: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 113: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 |
| 127: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 141: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 155: | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 169: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 0 | 0 | 0 | 1 | 0 | 1 |
| 183: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 |
| 197: | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 |
| 211: | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 225: | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 2 | 1 | 1 | 1 | 0 | 0 |
| 239: | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 253: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 1 | 0 |
| 267: | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| 281: | 1 | 1 | 0 | 0 | 0 | 1 | 1 | 0 | 2 | 1 | 2 | 0 | 0 | 0 | 0 |
| 295: | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 0 |
| 309: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 |
| 323: | 0 | 0 | 1 | 2 | 2 | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 0 |
| 337: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 0 | 0 |
| 351: | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 365: | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 0 |
| 379: | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 0 |
| 393: | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 |
| 407: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 421: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 435: | 0 | 1 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 449: | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 463: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 477: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 491: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 505: | 0 | 0 | 1 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 |
| 519: | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 1 |
| 533: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 |
| 547: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 561: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 |
| 575: | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 |
| 589: | 0 | 0 | 0 | 0 | 2 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 603: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| 617: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 631: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 2 | 0 | 0 |
| 645: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| 659: | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 673: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 687: | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 701: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 715: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 1 | 0 |
| 729: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 0 |
| 743: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 |
| 757: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 |
| 771: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 785: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 799: | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 1 | 0 |
| 813: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 1 | 0 |
| 827: | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 841: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 855: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 |
| 869: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 |
| 883: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 897: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 911: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 925: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 939: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 0 |
| 953: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 1 | 0 |
| 967: | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 981: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 995: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 |
| 1009: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1023: | 0 | 0 | | | | | | | | | | | | | |

Eberline Services
Oak Ridge Laboratory

Gross Sample Counts Within Peak Regions  Generated:  7-OCT-2005 09:31:27.77

Detector ID: 8  Acquisition Start: 7-OCT-2005 06:23:02.01
Live Time: 0 02:50:06.00  Real Time: 0 02:50:06.00
Batch Id: 0509118A-RA  Sample Id: 06
Sample Type: RA

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 4596.61 | 56 | | 0221.72 | 328.32 | 241 | 184 | 5.49E-03 | 13.4 | |
| 2 | 0 | 5265.63 | 36 | | 0376.50 | 596.92 | 498 | 207 | 3.53E-03 | 16.7 | |
| 3 | 0 | 5788.96 | 30 | | 0 0.00 | 810.97 | 727 | 190 | 2.94E-03 | 18.3 | |

Background Counts Within Peak Regions  Generated:  7-OCT-2005 09:31:39.23

Acquisition Start: 1-OCT-2005 10:05:54.01
Live Time: 0 16:40:04.00  Real Time: 0 16:40:04.00

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 4607.13 | 4 | | 0265.61 | 332.50 | 241 | 184 | 6.67E-05 | 50.0 | |
| 2 | 0 | 5275.69 | 4 | | 0345.55 | 601.00 | 498 | 207 | 6.67E-05 | 50.0 | |
| 3 | 0 | 5814.49 | 2 | | 0275.93 | 821.50 | 727 | 190 | 3.33E-05 | 70.7 | |

Net Sample Counts Within Peak Regions  Generated:  7-OCT-2005 09:31:39.50

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 4596.61* | 124 | | 0221.72 | 328.32 | 241 | 184 | 1.22E-02 | 13.4 | |
| 2 | 0 | 5265.63* | 80 | | 0376.50 | 596.92 | 498 | 207 | 7.80E-03 | 16.8 | |
| 3 | 0 | 5788.96* | 67 | | 0 0.00 | 810.97 | 727 | 190 | 6.52E-03 | 18.4 | |

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.0 Generated 7-OCT-2005 09:31:40

| | | | |
|---|---|---|---|
| Configuration | : MCA0:[AMSCOUNT]0000C192$1 | | |
| Analyses by | : ROIPEAK V1.2,PEAKEFF V2.2,ENBACK V1.6,NID V3.3 | | |
| Sample title | : VPBR092705SL19 | | |
| Sample date | : 27-SEP-2005 00:00:00 | Acquisition date | : 7-OCT-2005 06:23:02 |
| Sample ID | : 06 | Sample quantity | : 1.0373 gram |
| Sample type | : RA | Sample geometry | : |
| Detector name | : 008 | Detector geometry | : |
| Elapsed live time | : 0 02:50:06.00 | Elapsed real time | : 0 02:50:06.00 0.0% |
| Energy tolerance | : 100.00 keV | Half life ratio | : 8.00 |
| Errors propagated | : Yes | Systematic Error | : 3.00 % |
| Efficiency type | : Average value | Efficiencies at | : Peak Energy |
| Abundance limit | : 75.00 | | |

Post-NID Peak Search Report

| It | Energy | Area | FWHM | Channel | Left | Pw | %Err | Fit | Nuclides | Activity pCi/gram |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 4596.61* | 124221.72 | 328.32 | 241 | 184 | 26.9 | | | RA-226 | 1.70 |
| 0 | 5265.63* | 80376.50 | 596.92 | 498 | 207 | 33.6 | | | RN-222 | 1.09 |
| 0 | 5788.96* | 67 | 0.00 | 810.97 | 727 | 190 | 36.7 | | PO-218 | 0.914 |

Eberline Services
Oak Ridge Laboratory

ALPHA SPECTROMETRY REPORT
7-OCT-2005 09:32:03

**********

Spectral File: ND_AMS_ARCHIVE_S:S_0509118A-RA$07_RA.CNF

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| | | | |
|---|---|---|---|
| BATCH ID: | 0509118A-RA | SAMPLE ID: | 07 |
| SAMPLE DATE: | 27-SEP-2005 00:00 | ALIQUOT: 1.003E+00 | gram |
| SAMPLE TITLE: | VPBR092705SL20 | DETECTOR NUMBER: | 009 |
| ACQ DATE: | 7-OCT-2005 06:23 | AVERAGE EFFICIENCY: | 20.14% |
| ELAPSED LIVE TIME: | 10203. | RECOVERY: | 72.85% |
| TRACER ID: | NONE | TRACER FWHM (kev): | 0.00 |
| LAMBDA VALUE: | 0. | ROI TYPE: | STANDARD |
| TRACER DPM AT SAMPLE DATE: | 0.000 | CONFIDENCE FACTOR: | 4.65 |
| SAMPLE MATRIX: | SOIL | LLD CONSTANT: | 2.71 |
| ENERGY CAL DATE: | 30-SEP-2005 08:11 | EFF CAL DATE: 30-SEP-2005 | 08:11 |
| BKG FILENAME: | B_009_1OCT05 | BKG ELAPSED TIME: | 60008. |
| | | SAF: | 1.86 |

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NUCLIDE ACTIVITY SUMMARY

| NUCLIDE | ENERGY | NET AREA | BKG | %ABN | ACTIVITY pCi/ gram | TPU/ERROR 2-SIGMA | MDC pCi/ gram |
|---|---|---|---|---|---|---|---|
| PO-218 | 6003.0 | 104.32 | 1.70 | 100.0 | 1.879E+00 | 5.229E-01 | 2.939E-01 |
| RN-222 | 5490.0 | 94.17 | 2.55 | 99.9 | 1.697E+00 | 4.983E-01 | 3.398E-01 |
| RA-226 | 4785.0 | 92.32 | 0.68 | 100.0 | 1.663E+00 | 4.878E-01 | 2.192E-01 |

**********

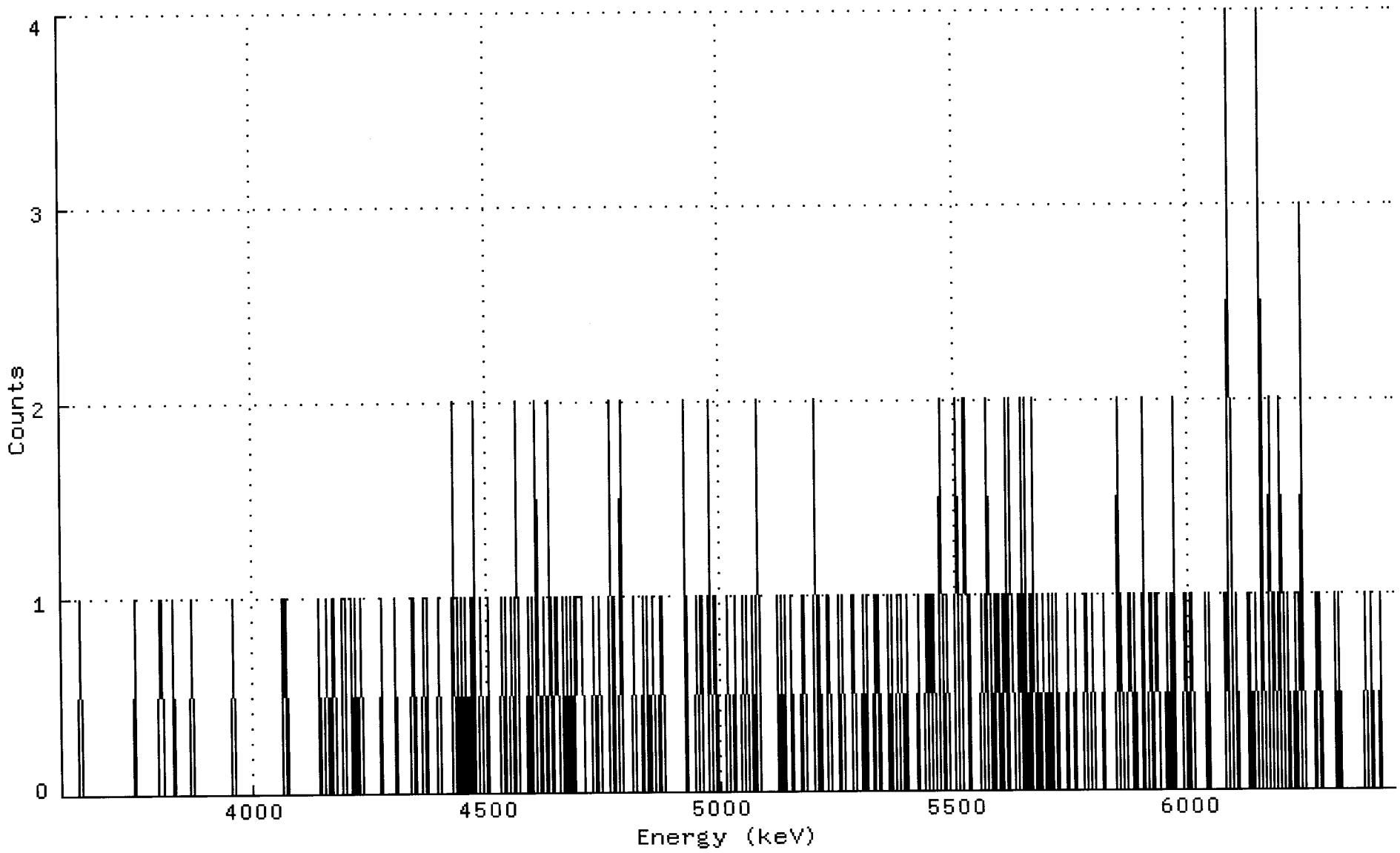
EJ Price
Analyst

10-7-05
Date

Reviewer

10/7/05
Date

Spectrum : DKA100:[ALPHA.ALUSR.ARCHIVE.S]S_0509118A-RA$07_RA.CNF;1
Title : 009
Sample Title: VPBR092705SL20
Start Time: 7-OCT-2005 06:23: Sample Time: 27-SEP-2005 00:00 Energy Offset: 3.57783E+03
Real Time : 0 02:50:03.00 Sample ID : 07 Energy Slope : 2.91977E+00
Live Time : 0 02:50:03.00 Sample Type: RA Energy Quad : -1.26314E-04



Channel Contents for ND_AMS_ARCHIVE_S:S_0509118A-RA$07_RA

Channel

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1: | 10203 | 10203 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 29: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 43: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 57: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 71: | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 85: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 99: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 113: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 127: | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 141: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 155: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 169: | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 183: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 197: | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 |
| 211: | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 |
| 225: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 239: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 253: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 |
| 267: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 281: | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 295: | 2 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 |
| 309: | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 |
| 323: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 0 | 0 |
| 337: | 0 | 0 | 1 | 0 | 1 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 351: | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 2 | 1 | 0 | 0 | 0 | 1 | 0 |
| 365: | 0 | 0 | 1 | 2 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 1 |
| 379: | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 1 |
| 393: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 |
| 407: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 1 | 0 | 0 | 0 | 0 |
| 421: | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 435: | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 0 |
| 449: | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 463: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 |
| 477: | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 2 | 1 |
| 491: | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 |
| 505: | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 |
| 519: | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 |
| 533: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 1 |
| 547: | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 561: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 1 | 0 |
| 575: | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 589: | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 |
| 603: | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 617: | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 |
| 631: | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 645: | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 |
| 659: | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 2 | 0 | 1 | 0 | 1 | 1 |
| 673: | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 2 | 1 |
| 687: | 2 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 |
| 701: | 1 | 0 | 2 | 1 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 715: | 0 | 1 | 0 | 2 | 0 | 2 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 1 |
| 729: | 0 | 2 | 0 | 2 | 0 | 0 | 1 | 0 | 0 | 2 | 1 | 0 | 0 | 1 |
| 743: | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 |
| 757: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 771: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 1 |
| 785: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 799: | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 813: | 1 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 |
| 827: | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 |
| 841: | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 |
| 855: | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 |
| 869: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 883: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 4 | 0 | 0 | 0 |
| 897: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 |
| 911: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 4 | 1 | 0 | 0 | 0 | 0 | 1 |
| 925: | 2 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 2 | 1 | 1 | 0 | 0 | 0 |
| 939: | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 3 | 1 | 0 |
| 953: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 0 |
| 967: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| 981: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 995: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 1009: | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1023: | 0 | 0 | | | | | | | | | | | | |

Eberline Services
Oak Ridge Laboratory

Gross Sample Counts Within Peak Regions  Generated: 7-OCT-2005 09:31:45.06

Detector ID: 9  Acquisition Start: 7-OCT-2005 06:23:05.01
Live Time: 0 02:50:03.00  Real Time: 0 02:50:03.00
Batch Id: 0509118A-RA  Sample Id: 07
Sample Type: RA

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 4614.39 | 50 | | 0373.67 | 360.64 | 276 | 164 | 4.90E-03 | 14.1 | |
| 2 | 0 | 5321.52 | 52 | | 0473.00 | 613.48 | 505 | 184 | 5.10E-03 | 13.9 | |
| 3 | 0 | 5784.19 | 57 | | 0385.41 | 782.12 | 709 | 170 | 5.59E-03 | 13.2 | |

Background Counts Within Peak Regions  Generated: 7-OCT-2005 09:32:01.10

Acquisition Start: 1-OCT-2005 10:05:56.01
Live Time: 0 16:40:08.00  Real Time: 0 16:40:08.00

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 4605.51 | 4 | | 0309.50 | 357.50 | 276 | 164 | 6.67E-05 | 50.0 | |
| 2 | 0 | 5274.53 | 15 | | 0 78.83 | 596.50 | 505 | 184 | 2.50E-04 | 25.8 | |
| 3 | 0 | 5815.14 | 10 | | 0379.57 | 793.50 | 709 | 170 | 1.67E-04 | 31.6 | |

Net Sample Counts Within Peak Regions  Generated: 7-OCT-2005 09:32:01.35

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 4614.39* | 92 | | 0373.67 | 360.64 | 276 | 164 | 9.05E-03 | 14.3 | |
| 2 | 0 | 5321.52* | 94 | | 0473.00 | 613.48 | 505 | 184 | 9.23E-03 | 14.3 | |
| 3 | 0 | 5784.19* | 104 | | 0385.41 | 782.12 | 709 | 170 | 1.02E-02 | 13.5 | |

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.0 Generated 7-OCT-2005 09:32:02

| | | | |
|---|---|---|---|
| Configuration | : MCA0:[AMSCOUNT]0000C192$1 | | |
| Analyses by | : ROIPEAK V1.2,PEAKEFF V2.2,ENBACK V1.6,NID V3.3 | | |
| Sample title | : VPBR092705SL20 | | |
| Sample date | : 27-SEP-2005 00:00:00 | Acquisition date | : 7-OCT-2005 06:23:05 |
| Sample ID | : 07 | Sample quantity | : 1.0027 gram |
| Sample type | : RA | Sample geometry | : |
| Detector name | : 009 | Detector geometry | : |
| Elapsed live time | : 0 02:50:03.00 | Elapsed real time | : 0 02:50:03.00 0.0% |
| Energy tolerance | : 100.00 keV | Half life ratio | : 8.00 |
| Errors propagated | : Yes | Systematic Error | : 3.00 % |
| Efficiency type | : Average value | Efficiencies at | : Peak Energy |
| Abundance limit | : 75.00 | | |

Post-NID Peak Search Report

| It | Energy | Area | FWHM | Channel | Left | Pw | %Err | Fit | Nuclides | Activity pCi/gram |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 4614.39* | 92373.67 | 360.64 | 276 | 164 | 28.5 | | | RA-226 | 1.21 |
| 0 | 5321.52* | 94473.00 | 613.48 | 505 | 184 | 28.5 | | | RN-222 | 1.24 |
| 0 | 5784.19* | 104385.41 | 782.12 | 709 | 170 | 26.9 | | | PO-218 | 1.37 |

Eberline Services
Oak Ridge Laboratory

ALPHA SPECTROMETRY REPORT
7-OCT-2005 09:32:47

**********
Spectral File: ND_AMS_ARCHIVE_S:S_0509118A-RA$08_RA.CNF
**********

| | | | |
|---|---|---|---|
| BATCH ID: | 0509118A-RA | SAMPLE ID: | 08 |
| SAMPLE DATE: | 28-SEP-2005 00:00 | ALIQUOT: | 9.945E-01 gram |
| SAMPLE TITLE: | VPTR092805SL0A | DETECTOR NUMBER: | 010 |
| ACQ DATE: | 7-OCT-2005 06:23 | AVERAGE EFFICIENCY: | 20.85% |
| ELAPSED LIVE TIME: | 10201. | RECOVERY: | 89.96% |
| TRACER ID: | NONE | TRACER FWHM (kev): | 0.00 |
| LAMBDA VALUE: | 0. | ROI TYPE: | STANDARD |
| TRACER DPM AT SAMPLE DATE: | 0.000 | CONFIDENCE FACTOR: | 4.65 |
| SAMPLE MATRIX: | SOIL | LLD CONSTANT: | 2.71 |
| ENERGY CAL DATE: | 30-SEP-2005 08:11 | EFF CAL DATE: | 30-SEP-2005 08:11 |
| BKG FILENAME: | B_010_1OCT05 | BKG ELAPSED TIME: | 60005. |
| | | SAF: | 2.27 |

**********

NUCLIDE ACTIVITY SUMMARY

| NUCLIDE | ENERGY | NET AREA | BKG | %ABN | ACTIVITY pCi/ gram | TPU/ERROR 2-SIGMA | MDC pCi/ gram |
|---|---|---|---|---|---|---|---|
| PO-218 | 6003.0 | 137.00 | 3.74 | 100.0 | 1.946E+00 | 5.259E-01 | 3.773E-01 |
| RN-222 | 5490.0 | 133.59 | 0.34 | 99.9 | 1.899E+00 | 5.129E-01 | 1.749E-01 |
| RA-226 | 4785.0 | 139.89 | 0.85 | 100.0 | 1.986E+00 | 5.262E-01 | 2.255E-01 |

**********

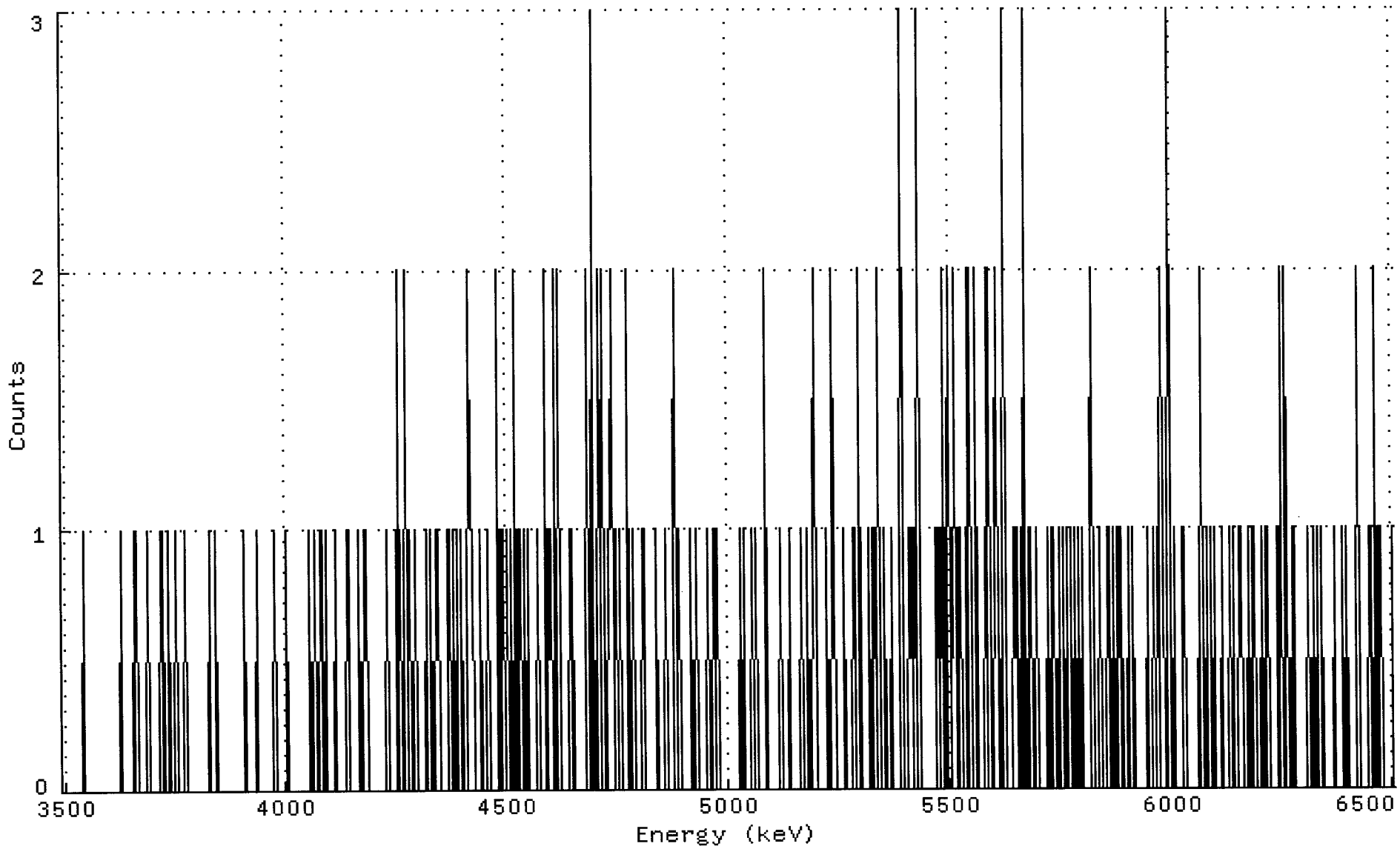
Jeff Price
Analyst

10-7-05
Date

Alan Gregory
Reviewer

10/7/05
Date

Spectrum : DKA100:[ALPHA.ALUSR.ARCHIVE.S]S_0509118A-RA$08_RA.CNF;1
Title : 010
Sample Title: VPTR092805SL0A
Start Time: 7-OCT-2005 06:23: Sample Time: 28-SEP-2005 00:00 Energy Offset: 3.48043E+03
Real Time : 0 02:50:01.00 Sample ID : 08 Energy Slope : 3.10271E+00
Live Time : 0 02:50:01.00 Sample Type: RA Energy Quad : -1.48131E-04



Channel Contents for ND_AMS_ARCHIVE_S:S_0509118A-RA$08_RA

Channel

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1: | 10201 | 10201 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15: | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 29: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 43: | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 57: | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 71: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 1 | 0 |
| 85: | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 99: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 113: | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 127: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 141: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 155: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 169: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 183: | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 1 |
| 197: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 211: | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 225: | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 239: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 253: | 2 | 0 | 1 | 0 | 1 | 0 | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 1 |
| 267: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 |
| 281: | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 |
| 295: | 1 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 2 | 1 | 1 |
| 309: | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 0 |
| 323: | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 0 |
| 337: | 0 | 1 | 0 | 0 | 2 | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 1 |
| 351: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 2 |
| 365: | 0 | 1 | 1 | 1 | 0 | 0 | 2 | 0 | 2 | 2 | 0 | 0 | 0 | 0 |
| 379: | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 393: | 0 | 0 | 2 | 0 | 1 | 0 | 3 | 0 | 0 | 1 | 0 | 2 | 1 | 0 |
| 407: | 2 | 0 | 0 | 0 | 1 | 1 | 1 | 2 | 0 | 0 | 1 | 0 | 0 | 1 |
| 421: | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 435: | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 449: | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 2 |
| 463: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 477: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 |
| 491: | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 505: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 519: | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 |
| 533: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 547: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 561: | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 2 | 2 | 0 | 0 | 0 | 0 | 0 |
| 575: | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 2 | 1 | 0 | 0 | 0 | 0 | 0 |
| 589: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 |
| 603: | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 0 |
| 617: | 2 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 631: | 0 | 0 | 0 | 0 | 3 | 1 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 1 |
| 645: | 1 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 659: | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 2 | 0 | 0 | 1 | 2 |
| 673: | 0 | 0 | 1 | 1 | 2 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 2 |
| 687: | 0 | 2 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 701: | 0 | 2 | 2 | 0 | 0 | 0 | 1 | 1 | 2 | 0 | 0 | 0 | 1 | 0 |
| 715: | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 1 | 0 | 1 |
| 729: | 0 | 0 | 3 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 1 | 1 | 0 |
| 743: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 0 |
| 757: | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 1 |
| 771: | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 |
| 785: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 |
| 799: | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| 813: | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 827: | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 2 | 1 | 1 |
| 841: | 0 | 0 | 0 | 3 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 855: | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 869: | 0 | 2 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 |
| 883: | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 0 |
| 897: | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| 911: | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 |
| 925: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 2 | 1 | 0 | 0 | 2 | 1 |
| 939: | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 953: | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 1 |
| 967: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 981: | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 995: | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 |
| 1009: | 2 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1023: | 0 | 0 | | | | | | | | | | | | |

Eberline Services
Oak Ridge Laboratory

Gross Sample Counts Within Peak Regions  Generated:  7-OCT-2005 09:32:07.25

Detector ID: 10  Acquisition Start: 7-OCT-2005 06:23:07.01
Live Time: 0 02:50:01.00  Real Time: 0 02:50:01.00
Batch Id: 0509118A-RA  Sample Id: 08
Sample Type: RA

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 4601.20 | 62 | | 0373.88 | 367.68 | 292 | 155 | 6.08E-03 | 12.7 | |
| 2 | 0 | 5326.92 | 59 | | 0454.51 | 613.07 | 509 | 174 | 5.78E-03 | 13.0 | |
| 3 | 0 | 5787.29 | 62 | | 0443.69 | 771.95 | 701 | 161 | 6.08E-03 | 12.7 | |

Background Counts Within Peak Regions  Generated:  7-OCT-2005 09:32:45.78

Acquisition Start: 1-OCT-2005 10:05:59.01
Live Time: 0 16:40:05.00  Real Time: 0 16:40:05.00

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 4605.16 | 5 | | 0167.55 | 369.00 | 292 | 155 | 8.33E-05 | 44.7 | |
| 2 | 0 | 5275.56 | 2 | | 0443.69 | 595.50 | 509 | 174 | 3.33E-05 | 70.7 | |
| 3 | 0 | 5813.29 | 22 | | 0 0.00 | 781.00 | 701 | 161 | 3.67E-04 | 21.3 | |

Net Sample Counts Within Peak Regions  Generated:  7-OCT-2005 09:32:46.03

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 4601.20* | 140 | | 0373.88 | 367.68 | 292 | 155 | 1.37E-02 | 12.8 | |
| 2 | 0 | 5326.92* | 134 | | 0454.51 | 613.07 | 509 | 174 | 1.31E-02 | 13.1 | |
| 3 | 0 | 5787.29* | 137 | | 0443.69 | 771.95 | 701 | 161 | 1.34E-02 | 13.1 | |

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.0 Generated 7-OCT-2005 09:32:47

| | | | |
|---|---|---|---|
| Configuration | : MCA0:[AMSCOUNT]0000C192$1 | | |
| Analyses by | : ROIPEAK V1.2,PEAKEFF V2.2,ENBACK V1.6,NID V3.3 | | |
| Sample title | : VPTR092805SL0A | | |
| Sample date | : 28-SEP-2005 00:00:00 | Acquisition date | : 7-OCT-2005 06:23:07 |
| Sample ID | : 08 | Sample quantity | : 0.99450 gram |
| Sample type | : RA | Sample geometry | : |
| Detector name | : 010 | Detector geometry | : |
| Elapsed live time | : 0 02:50:01.00 | Elapsed real time | : 0 02:50:01.00 0.0% |
| Energy tolerance | : 100.00 keV | Half life ratio | : 8.00 |
| Errors propagated | : Yes | Systematic Error | : 3.00 % |
| Efficiency type | : Average value | Efficiencies at | : Peak Energy |
| Abundance limit | : 75.00 | | |

Post-NID Peak Search Report

| It | Energy | Area | FWHM | Channel | Left | Pw | %Err | Fit | Nuclides | Activity pCi/gram |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 4601.20* | 140373.88 | 367.68 | | 292 | 155 | 25.6 | | RA-226 | 1.79 |
| 0 | 5326.92* | 134454.51 | 613.07 | | 509 | 174 | 26.1 | | RN-222 | 1.71 |
| 0 | 5787.29* | 137443.69 | 771.95 | | 701 | 161 | 26.1 | | PO-218 | 1.75 |

Eberline Services
Oak Ridge Laboratory

ALPHA SPECTROMETRY REPORT
7-OCT-2005 09:33:00

**********
Spectral File: ND_AMS_ARCHIVE_S:S_0509118A-RA$09_RA.CNF
**********

| | | | |
|---|---|---|---|
| BATCH ID: | 0509118A-RA | SAMPLE ID: | 09 |
| SAMPLE DATE: | 28-SEP-2005 00:00 | ALIQUOT: 1.100E+00 | gram |
| SAMPLE TITLE: | VPTR092805SL0B | DETECTOR NUMBER: | 011 |
| ACQ DATE: | 7-OCT-2005 06:23 | AVERAGE EFFICIENCY: | 21.50% |
| ELAPSED LIVE TIME: | 10206. | RECOVERY: | 69.33% |
| TRACER ID: | NONE | TRACER FWHM (kev): | 0.00 |
| LAMBDA VALUE: | 0. | ROI TYPE: | STANDARD |
| TRACER DPM AT SAMPLE DATE: | 0.000 | CONFIDENCE FACTOR: | 4.65 |
| SAMPLE MATRIX: | SOIL | LLD CONSTANT: | 2.71 |
| ENERGY CAL DATE: | 30-SEP-2005 08:11 | EFF CAL DATE: 30-SEP-2005 | 08:11 |
| BKG FILENAME: | B_011_1OCT05 | BKG ELAPSED TIME: | 60002. |
| | | SAF: | 1.91 |

**********

NUCLIDE ACTIVITY SUMMARY

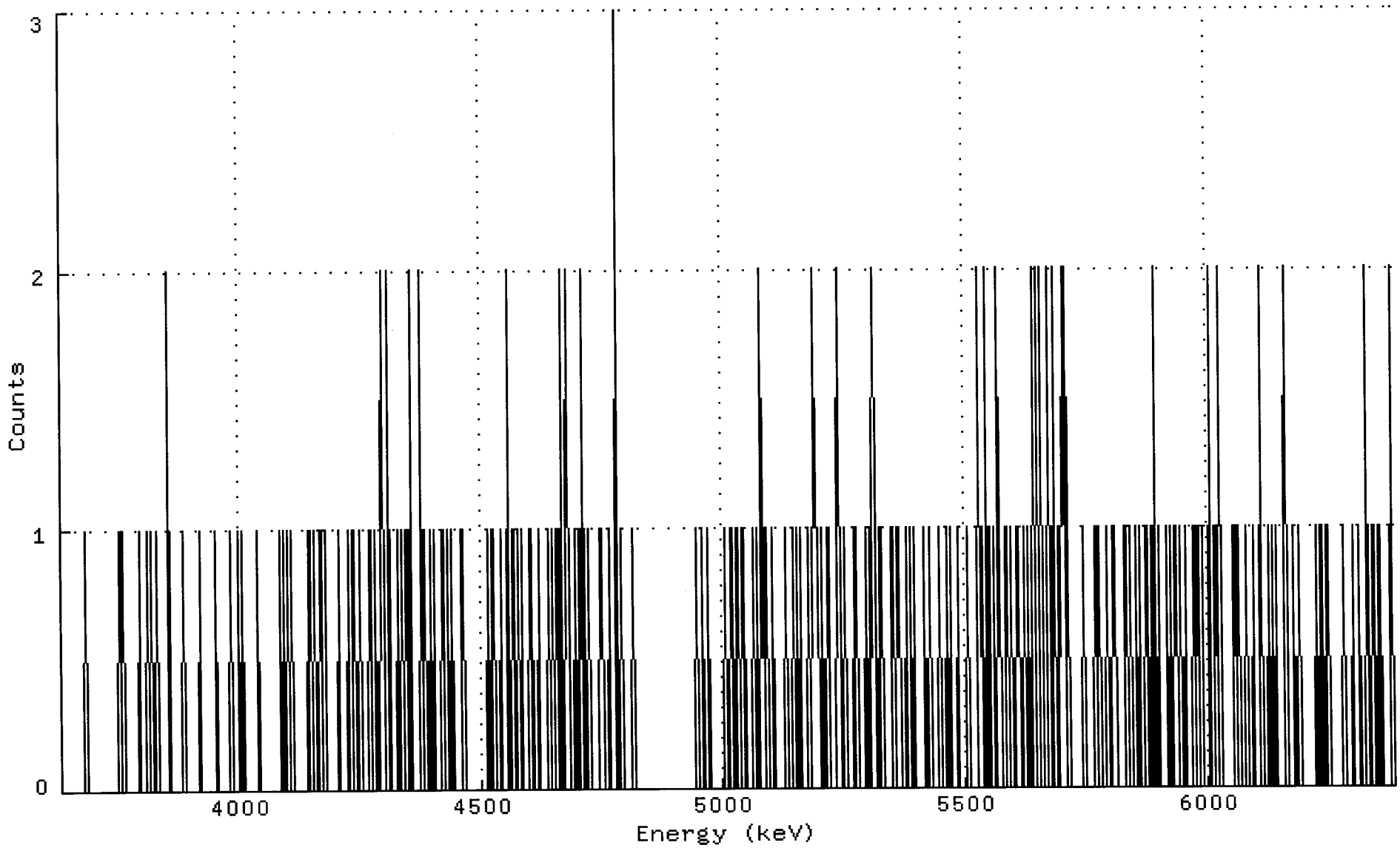
| NUCLIDE | ENERGY | NET AREA | BKG | %ABN | ACTIVITY pCi/ gram | TPU/ERROR 2-SIGMA | MDC pCi/ gram |
|---|---|---|---|---|---|---|---|
| PO-218 | 6003.0 | 129.03 | 0.85 | 100.0 | 2.085E+00 | 5.293E-01 | 2.159E-01 |
| RN-222 | 5490.0 | 122.62 | 1.53 | 99.9 | 1.982E+00 | 5.168E-01 | 2.613E-01 |
| RA-226 | 4785.0 | 104.88 | 0.17 | 100.0 | 1.694E+00 | 4.725E-01 | 1.428E-01 |

**********

Analyst _____ Date 10-7-05

Reviewer _____ Date 10/7/05

Spectrum : DKA100:[ALPHA.ALUSR.ARCHIVE.S]S_0509118A-RA$09_RA.CNF;1
Title : 011
Sample Title: VPTR092805SL0B
Start Time: 7-OCT-2005 06:23: Sample Time: 28-SEP-2005 00:00 Energy Offset: 3.62038E+03
Real Time : 0 02:50:06.00 Sample ID : 09 Energy Slope : 2.83546E+00
Live Time : 0 02:50:06.00 Sample Type: RA Energy Quad : -1.33998E-04



Channel Contents for ND_AMS_ARCHIVE_S:S_0509118A-RA$09_RA

Channel

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1: | 10206 | 10206 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 29: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 43: | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 57: | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| 71: | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 |
| 85: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 99: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 113: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 127: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 |
| 141: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 155: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 169: | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 183: | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 |
| 197: | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 211: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 |
| 225: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 0 |
| 239: | 0 | 1 | 1 | 2 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 |
| 253: | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 2 | 0 | 0 | 0 |
| 267: | 0 | 0 | 0 | 1 | 2 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 1 |
| 281: | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| 295: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 309: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 323: | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 2 |
| 337: | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 |
| 351: | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 365: | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 1 | 0 | 1 | 0 | 2 | 0 | 0 |
| 379: | 1 | 1 | 2 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 |
| 393: | 2 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| 407: | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 |
| 421: | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 435: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 449: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 463: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 477: | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 491: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 |
| 505: | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 |
| 519: | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 2 | 1 | 0 | 1 | 1 |
| 533: | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 547: | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 0 |
| 561: | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 2 | 1 | 1 | 1 | 0 | 0 |
| 575: | 1 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 2 |
| 589: | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 |
| 603: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 2 | 1 | 0 |
| 617: | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 |
| 631: | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 |
| 645: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 |
| 659: | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 673: | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 687: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 1 | 0 | 1 | 0 |
| 701: | 0 | 2 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 1 | 2 | 1 | 0 | 0 |
| 715: | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 1 | 1 | 0 |
| 729: | 0 | 0 | 1 | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 2 | 0 | 0 | 2 |
| 743: | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 2 | 1 |
| 757: | 0 | 1 | 0 | 1 | 1 | 1 | 2 | 0 | 2 | 1 | 0 | 0 | 0 | 0 |
| 771: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 785: | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 799: | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 |
| 813: | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| 827: | 0 | 1 | 0 | 1 | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 841: | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 1 | 1 | 0 | 0 | 1 | 0 |
| 855: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 0 |
| 869: | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 1 | 1 |
| 883: | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 897: | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 |
| 911: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 1 |
| 925: | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 |
| 939: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 953: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 |
| 967: | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 981: | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 995: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 2 | 0 | 0 | 0 | 1 | 0 |
| 1009: | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| 1023: | 0 | 0 | | | | | | | | | | | | |

Eberline Services
Oak Ridge Laboratory

Gross Sample Counts Within Peak Regions  Generated: 7-OCT-2005 09:32:51.62

Detector ID: 11
Live Time: 0 02:50:06.00
Batch Id: 0509118A-RA
Sample Type: RA

Acquisition Start: 7-OCT-2005 06:23:10.01
Real Time: 0 02:50:06.00
Sample Id: 09

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 4604.95 | 55 | 0 | 419.65 | 353.13 | 270 | 169 | 5.39E-03 | 13.5 | |
| 2 | 0 | 5251.89 | 65 | 0 | 479.19 | 591.95 | 506 | 191 | 6.37E-03 | 12.4 | |
| 3 | 0 | 5795.09 | 68 | 0 | 416.81 | 796.99 | 717 | 176 | 6.66E-03 | 12.1 | |

Background Counts Within Peak Regions  Generated: 7-OCT-2005 09:32:58.69

Live Time: 0 16:40:02.00

Acquisition Start: 1-OCT-2005 10:06:02.01
Real Time: 0 16:40:02.00

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 4607.34 | 1 | 0 | 2.84 | 354.00 | 270 | 169 | 1.67E-05 | 100.0 | |
| 2 | 0 | 5276.10 | 9 | 0 | 2.84 | 601.00 | 506 | 191 | 1.50E-04 | 33.3 | |
| 3 | 0 | 5814.79 | 5 | 0 | 391.29 | 804.50 | 717 | 176 | 8.33E-05 | 44.7 | |

Net Sample Counts Within Peak Regions  Generated: 7-OCT-2005 09:32:58.97

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 4604.95* | 105 | 0 | 419.65 | 353.13 | 270 | 169 | 1.03E-02 | 13.5 | |
| 2 | 0 | 5251.89* | 123 | 0 | 479.19 | 591.95 | 506 | 191 | 1.20E-02 | 12.6 | |
| 3 | 0 | 5795.09* | 129 | 0 | 416.81 | 796.99 | 717 | 176 | 1.26E-02 | 12.2 | |

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.0 Generated 7-OCT-2005 09:32:59

| | | | |
|---|---|---|---|
| Configuration | : MCA0:[AMSCOUNT]0000C192$1 | | |
| Analyses by | : ROIPEAK V1.2,PEAKEFF V2.2,ENBACK V1.6,NID V3.3 | | |
| Sample title | : VPTR092805SL0B | | |
| Sample date | : 28-SEP-2005 00:00:00 | Acquisition date | : 7-OCT-2005 06:23:10 |
| Sample ID | : 09 | Sample quantity | : 1.0998 gram |
| Sample type | : RA | Sample geometry | : |
| Detector name | : 011 | Detector geometry | : |
| Elapsed live time | : 0 02:50:06.00 | Elapsed real time | : 0 02:50:06.00 0.0% |
| Energy tolerance | : 100.00 keV | Half life ratio | : 8.00 |
| Errors propagated | : Yes | Systematic Error | : 3.00 % |
| Efficiency type | : Average value | Efficiencies at | : Peak Energy |
| Abundance limit | : 75.00 | | |

Post-NID Peak Search Report

| It | Energy | Area | FWHM | Channel | Left | Pw | %Err | Fit | Nuclides | Activity pCi/gram |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 4604.95* | 105419.65 | 353.13 | 270 | 169 | 27.0 | | | RA-226 | 1.17 |
| 0 | 5251.89* | 123479.19 | 591.95 | 506 | 191 | 25.1 | | | RN-222 | 1.37 |
| 0 | 5795.09* | 129416.81 | 796.99 | 717 | 176 | 24.4 | | | PO-218 | 1.45 |

Eberline Services
Oak Ridge Laboratory

ALPHA SPECTROMETRY REPORT
7-OCT-2005 09:33:27

**********

Spectral File: ND_AMS_ARCHIVE_S:S_0509118A-RA$10_RA.CNF

**********

| | | | |
|---|---|---|---|
| BATCH ID: | 0509118A-RA | SAMPLE ID: | 10 |
| SAMPLE DATE: | 28-SEP-2005 00:00 | ALIQUOT: 1.039E+00 | gram |
| SAMPLE TITLE: | VPTR092805SL0C | DETECTOR NUMBER: | 012 |
| ACQ DATE: | 7-OCT-2005 06:23 | AVERAGE EFFICIENCY: | 21.27% |
| ELAPSED LIVE TIME: | 10204. | RECOVERY: | 88.89% |
| TRACER ID: | NONE | TRACER FWHM (kev): | 0.00 |
| LAMBDA VALUE: | 0. | ROI TYPE: | STANDARD |
| TRACER DPM AT SAMPLE DATE: | 0.000 | CONFIDENCE FACTOR: | 4.65 |
| SAMPLE MATRIX: | SOIL | LLD CONSTANT: | 2.71 |
| ENERGY CAL DATE: | 30-SEP-2005 08:11 | EFF CAL DATE: 30-SEP-2005 | 08:11 |
| BKG FILENAME: | B_012_1OCT05 | BKG ELAPSED TIME: | 60008. |
| | | SAF: | 2.31 |

**********

NUCLIDE ACTIVITY SUMMARY

| NUCLIDE | ENERGY | NET AREA | BKG | %ABN | ACTIVITY pCi/ gram | TPU/ERROR 2-SIGMA | MDC pCi/ gram |
|---|---|---|---|---|---|---|---|
| PO-218 | 6003.0 | 91.72 | 0.68 | 100.0 | 1.237E+00 | 4.034E-01 | 2.039E-01 |
| RN-222 | 5490.0 | 100.62 | 1.02 | 99.9 | 1.358E+00 | 4.242E-01 | 2.308E-01 |
| RA-226 | 4785.0 | 99.16 | 0.17 | 100.0 | 1.337E+00 | 4.189E-01 | 1.441E-01 |

**********

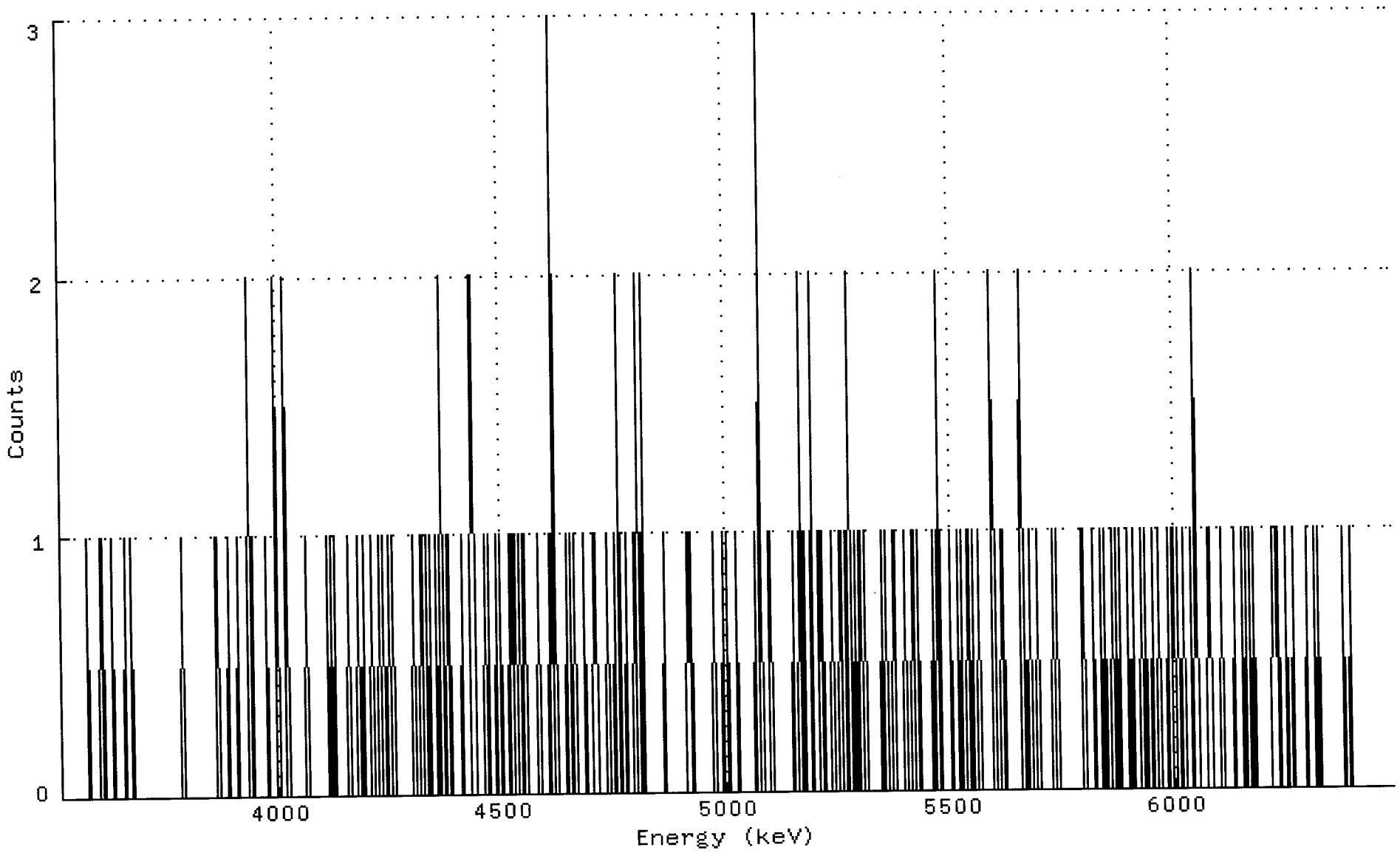
Jay Price
Analyst

10-7-05
Date

Glen Jaegley
Reviewer

10/7/05
Date

Spectrum : DKA100:[ALPHA.ALUSR.ARCHIVE.S]S_0509118A-RA$10_RA.CNF;1
Title : 012
Sample Title: VPTR092805SL0C
Start Time: 7-OCT-2005 06:23: Sample Time: 28-SEP-2005 00:00 Energy Offset: 3.50222E+03
Real Time : 0 02:50:04.00 Sample ID : 10 Energy Slope : 3.06003E+00
Live Time : 0 02:50:04.00 Sample Type: RA Energy Quad : -1.48274E-04



Channel Contents for ND_AMS_ARCHIVE_S:S_0509118A-RA$10_RA

Channel

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1: | 10204 | 10204 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 29: | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 43: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 |
| 57: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 71: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 85: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 99: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 113: | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 127: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 141: | 0 | 0 | 2 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 155: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 0 | 0 | 0 |
| 169: | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 183: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 197: | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 |
| 211: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| 225: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 239: | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 |
| 253: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 |
| 267: | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 |
| 281: | 0 | 1 | 0 | 1 | 0 | 2 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 0 |
| 295: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 309: | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 |
| 323: | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 337: | 1 | 0 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 1 | 0 | 1 | 0 |
| 351: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 365: | 0 | 0 | 1 | 0 | 1 | 0 | 3 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 379: | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 |
| 393: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 |
| 407: | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 2 |
| 421: | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 2 |
| 435: | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 449: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 463: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 0 |
| 477: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 491: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 |
| 505: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 519: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 3 | 1 | 0 | 0 | 0 |
| 533: | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 547: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 2 |
| 561: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 1 | 1 |
| 575: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 589: | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 2 | 0 | 0 | 0 | 1 | 0 | 0 |
| 603: | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 617: | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 1 |
| 631: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 645: | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 659: | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 |
| 673: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 |
| 687: | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 701: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 1 | 0 | 0 | 0 | 0 |
| 715: | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 729: | 0 | 1 | 2 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 743: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 757: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 771: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 |
| 785: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 |
| 799: | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 813: | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 |
| 827: | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 841: | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 0 |
| 855: | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 2 | 1 |
| 869: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 |
| 883: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 897: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 |
| 911: | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 925: | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 |
| 939: | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 953: | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| 967: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 981: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 995: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1009: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1023: | 0 | 0 | | | | | | | | | | | | |

Eberline Services
Oak Ridge Laboratory

Gross Sample Counts Within Peak Regions  Generated:  7-OCT-2005 09:33:04.32

Detector ID: 12  Acquisition Start: 7-OCT-2005 06:23:12.01
Live Time: 0 02:50:04.00  Real Time: 0 02:50:04.00
Batch Id: 0509118A-RA  Sample Id: 10
Sample Type: RA

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 4602.74 | 43 | 0 | 396.24 | 366.14 | 289 | 157 | 4.21E-03 | 15.2 | |
| 2 | 0 | 5274.44 | 44 | 0 | 424.55 | 596.39 | 509 | 177 | 4.31E-03 | 15.1 | |
| 3 | 0 | 5833.39 | 40 | 0 | 0.00 | 792.22 | 704 | 164 | 3.92E-03 | 15.8 | |

Background Counts Within Peak Regions  Generated:  7-OCT-2005 09:33:25.40

Acquisition Start: 1-OCT-2005 10:06:05.01
Live Time: 0 16:40:08.00  Real Time: 0 16:40:08.00

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 4605.28 | 1 | 0 | 3.06 | 367.00 | 289 | 157 | 1.67E-05 | 100.0 | |
| 2 | 0 | 5276.21 | 6 | 0 | 351.90 | 597.00 | 509 | 177 | 1.00E-04 | 40.8 | |
| 3 | 0 | 5814.39 | 4 | 0 | 382.50 | 785.50 | 704 | 164 | 6.67E-05 | 50.0 | |

Net Sample Counts Within Peak Regions  Generated:  7-OCT-2005 09:33:25.67

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 4602.74* | 99 | 0 | 396.24 | 366.14 | 289 | 157 | 9.72E-03 | 15.3 | |
| 2 | 0 | 5274.44* | 101 | 0 | 424.55 | 596.39 | 509 | 177 | 9.86E-03 | 15.2 | |
| 3 | 0 | 5833.39* | 92 | 0 | 0.00 | 792.22 | 704 | 164 | 8.99E-03 | 15.9 | |

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.0 Generated 7-OCT-2005 09:33:26

| | | | |
|---|---|---|---|
| Configuration | : MCA0:[AMSCOUNT]0000C192$1 | | |
| Analyses by | : ROIPEAK V1.2,PEAKEFF V2.2,ENBACK V1.6,NID V3.3 | | |
| Sample title | : VPTR092805SL0C | | |
| Sample date | : 28-SEP-2005 00:00:00 | Acquisition date | : 7-OCT-2005 06:23:12 |
| Sample ID | : 10 | Sample quantity | : 1.0391 gram |
| Sample type | : RA | Sample geometry | : |
| Detector name | : 012 | Detector geometry | : |
| Elapsed live time | : 0 02:50:04.00 | Elapsed real time | : 0 02:50:04.00 0.0% |
| Energy tolerance | : 100.00 keV | Half life ratio | : 8.00 |
| Errors propagated | : Yes | Systematic Error | : 3.00 % |
| Efficiency type | : Average value | Efficiencies at | : Peak Energy |
| Abundance limit | : 75.00 | | |

Post-NID Peak Search Report

| It | Energy | Area | FWHM | Channel | Left | Pw | %Err | Fit | Nuclides | Activity pCi/gram |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 4602.74* | 99396.24 | | 366.14 | 289 | 157 | 30.6 | | RA-226 | 1.19 |
| 0 | 5274.44* | 101424.55 | | 596.39 | 509 | 177 | 30.5 | | RN-222 | 1.21 |
| 0 | 5833.39* | 92 | 0.00 | 792.22 | 704 | 164 | 31.9 | | PO-218 | 1.10 |

Eberline Services
Oak Ridge Laboratory

ALPHA SPECTROMETRY REPORT
7-OCT-2005 09:33:48

**********

Spectral File: ND_AMS_ARCHIVE_S:S_0509118A-RA$11_RA.CNF

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| | | | |
|---|---|---|---|
| BATCH ID: | 0509118A-RA | SAMPLE ID: | 11 |
| SAMPLE DATE: | 28-SEP-2005 00:00 | ALIQUOT: 1.002E+00 | gram |
| SAMPLE TITLE: | VPTR092805SL0D | DETECTOR NUMBER: | 013 |
| ACQ DATE: | 7-OCT-2005 06:23 | AVERAGE EFFICIENCY: | 20.89% |
| ELAPSED LIVE TIME: | 10201. | RECOVERY: | 84.52% |
| TRACER ID: | NONE | TRACER FWHM (kev): | 0.00 |
| LAMBDA VALUE: | 0. | ROI TYPE: | STANDARD |
| TRACER DPM AT SAMPLE DATE: | 0.000 | CONFIDENCE FACTOR: | 4.65 |
| SAMPLE MATRIX: | SOIL | LLD CONSTANT: | 2.71 |
| ENERGY CAL DATE: | 30-SEP-2005 08:11 | EFF CAL DATE: 30-SEP-2005 | 08:11 |
| BKG FILENAME: | B_013_1OCT05 | BKG ELAPSED TIME: | 60005. |
| | | SAF: | 2.53 |

**********

NUCLIDE ACTIVITY SUMMARY

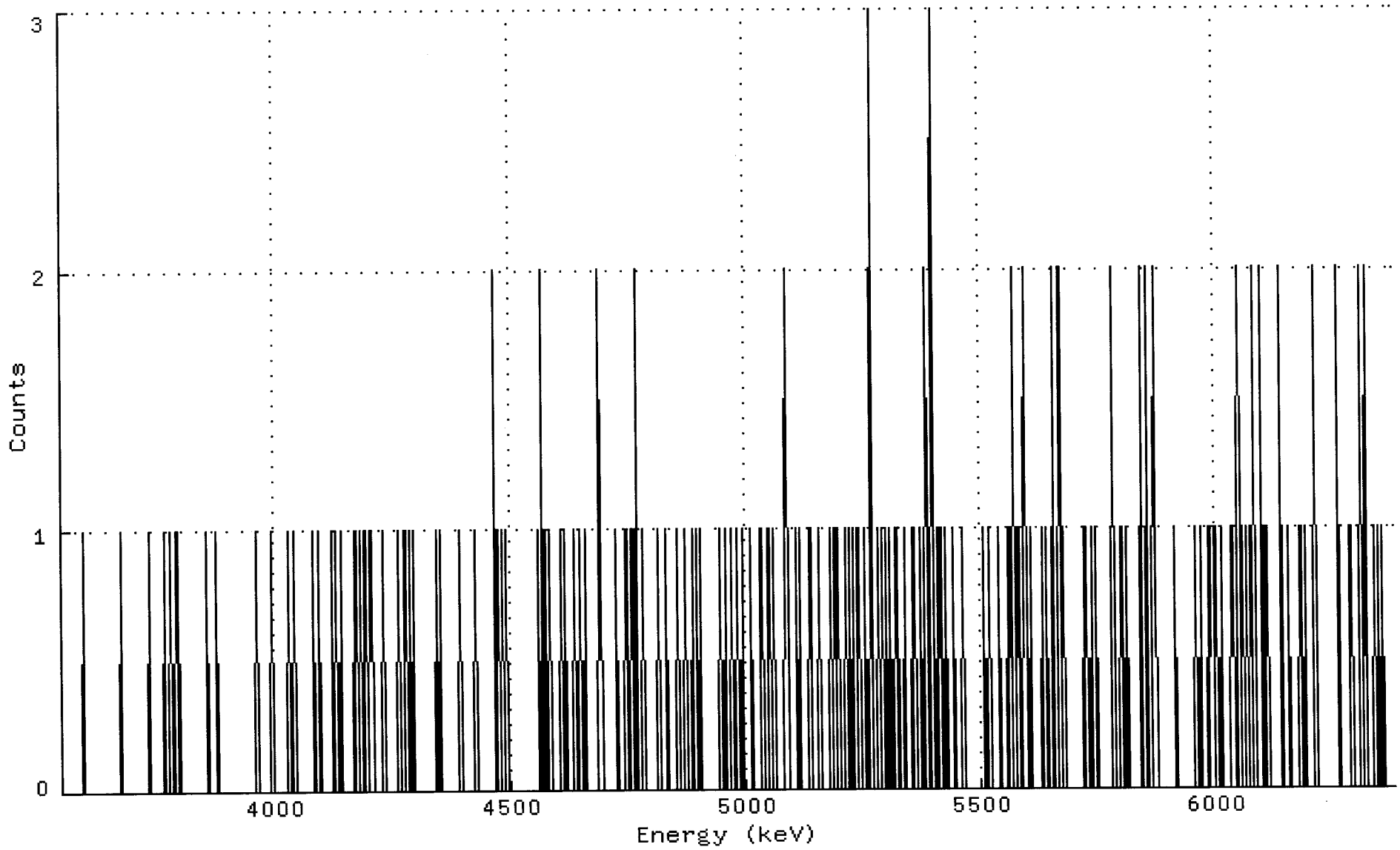
| NUCLIDE | ENERGY | NET AREA | BKG | %ABN | ACTIVITY pCi/ gram | TPU/ERROR 2-SIGMA | MDC pCi/ gram |
|---|---|---|---|---|---|---|---|
| PO-218 | 6003.0 | 117.21 | 1.70 | 100.0 | 1.756E+00 | 5.341E-01 | 3.325E-01 |
| RN-222 | 5490.0 | 132.90 | 1.19 | 99.9 | 1.992E+00 | 5.695E-01 | 2.952E-01 |
| RA-226 | 4785.0 | 82.30 | 1.19 | 100.0 | 1.233E+00 | 4.440E-01 | 2.949E-01 |

**********

Analyst _____ Date 10-7-05

Reviewer _____ Date 10/7/05

Spectrum : DKA100:[ALPHA.ALUSR.ARCHIVE.S]S_0509118A-RA$11_RA.CNF;1
Title : 013
Sample Title: VPTR092805SL0D
Start Time: 7-OCT-2005 06:23: Sample Time: 28-SEP-2005 00:00 Energy Offset: 3.53443E+03
Real Time : 0 02:50:01.00 Sample ID : 11 Energy Slope : 2.92308E+00
Live Time : 0 02:50:01.00 Sample Type: RA Energy Quad : -1.42148E-04



Channel Contents for ND_AMS_ARCHIVE_S:S_0509118A-RA$11_RA

Channel

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1: | 10201 | 10201 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15: | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 29: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 43: | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 57: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 71: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| 85: | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 99: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 113: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 127: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 141: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 155: | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 169: | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 183: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 |
| 197: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 1 |
| 211: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 |
| 225: | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 |
| 239: | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 253: | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 0 |
| 267: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 281: | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 295: | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 309: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 323: | 0 | 0 | 2 | 0 | 1 | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 |
| 337: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 351: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 2 | 0 | 1 | 0 |
| 365: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| 379: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 393: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 1 | 0 |
| 407: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 421: | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 2 | 0 | 0 |
| 435: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 449: | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 463: | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 477: | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 491: | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| 505: | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 519: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 1 |
| 533: | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 |
| 547: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 |
| 561: | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 575: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 1 | 0 | 0 |
| 589: | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 1 |
| 603: | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 3 | 0 | 0 | 0 | 1 |
| 617: | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 1 |
| 631: | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 645: | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 2 | 1 | 0 | 0 | 2 |
| 659: | 3 | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 |
| 673: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 687: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 701: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 715: | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 1 | 0 |
| 729: | 1 | 1 | 2 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 743: | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 |
| 757: | 0 | 2 | 2 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 771: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 1 | 0 |
| 785: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 799: | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 0 |
| 813: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 |
| 827: | 2 | 0 | 0 | 0 | 1 | 1 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 841: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 855: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 869: | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 1 | 0 | 0 | 1 |
| 883: | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 |
| 897: | 0 | 0 | 1 | 2 | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 1 | 1 |
| 911: | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 1 | 1 | 0 |
| 925: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 |
| 939: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 |
| 953: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 |
| 967: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| 981: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 |
| 995: | 0 | 0 | 0 | 2 | 0 | 0 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 1 |
| 1009: | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1023: | 0 | 0 | | | | | | | | | | | | |

Eberline Services
Oak Ridge Laboratory

Gross Sample Counts Within Peak Regions  Generated:  7-OCT-2005 09:33:31.28

Detector ID: 13  Acquisition Start:  7-OCT-2005 06:23:15.01
Live Time:  0 02:50:01.00  Real Time:  0 02:50:01.00
Batch Id:  0509118A-RA  Sample Id:  11
Sample Type: RA

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 4638.23 | 33 | | 0315.69 | 384.82 | 292 | 164 | 3.23E-03 | 17.4 | |
| 2 | 0 | 5272.08 | 53 | | 0333.18 | 612.72 | 521 | 186 | 5.20E-03 | 13.7 | |
| 3 | 0 | 5801.75 | 47 | | 0303.88 | 807.36 | 727 | 171 | 4.61E-03 | 14.6 | |

Background Counts Within Peak Regions  Generated:  7-OCT-2005 09:33:46.15

Acquisition Start:  1-OCT-2005 10:06:07.01
Live Time:  0 16:40:05.00  Real Time:  0 16:40:05.00

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 4606.37 | 7 | | 0324.46 | 373.50 | 292 | 164 | 1.17E-04 | 37.8 | |
| 2 | 0 | 5274.24 | 7 | | 0382.92 | 613.50 | 521 | 186 | 1.17E-04 | 37.8 | |
| 3 | 0 | 5814.25 | 10 | | 0315.69 | 812.00 | 727 | 171 | 1.67E-04 | 31.6 | |

Net Sample Counts Within Peak Regions  Generated:  7-OCT-2005 09:33:46.42

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 4638.23* | 82 | | 0315.69 | 384.82 | 292 | 164 | 8.07E-03 | 17.7 | |
| 2 | 0 | 5272.08* | 133 | | 0333.18 | 612.72 | 521 | 186 | 1.30E-02 | 13.9 | |
| 3 | 0 | 5801.75* | 117 | | 0303.88 | 807.36 | 727 | 171 | 1.15E-02 | 14.8 | |

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.0 Generated 7-OCT-2005 09:33:47

Configuration : MCA0:[AMSCOUNT]0000C192$1
Analyses by : ROIPEAK V1.2,PEAKEFF V2.2,ENBACK V1.6,NID V3.3
Sample title : VPTR092805SL0D
Sample date : 28-SEP-2005 00:00:00 Acquisition date : 7-OCT-2005 06:23:15
Sample ID : 11 Sample quantity : 1.0020 gram
Sample type : RA Sample geometry :
Detector name : 013 Detector geometry:
Elapsed live time: 0 02:50:01.00 Elapsed real time: 0 02:50:01.00 0.0%
Energy tolerance : 100.00 keV Half life ratio : 8.00
Errors propagated: Yes Systematic Error : 3.00 %
Efficiency type : Average value Efficiencies at : Peak Energy
Abundance limit : 75.00

Post-NID Peak Search Report

| It | Energy | Area | FWHM | Channel | Left | Pw | %Err | Fit | Nuclides | Activity pCi/gram |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 4638.23* | 82315.69 | 384.82 | 292 | 164 | 35.3 | | | RA-226 | 1.04 |
| 0 | 5272.08* | 133333.18 | 612.72 | 521 | 186 | 27.7 | | | RN-222 | 1.68 |
| 0 | 5801.75* | 117303.88 | 807.36 | 727 | 171 | 29.6 | | | PO-218 | 1.48 |

Eberline Services
Oak Ridge Laboratory

ALPHA SPECTROMETRY REPORT
7-OCT-2005 09:34:04

Spectral File: ND_AMS_ARCHIVE_S:S_0509118A-RA$12_RA.CNF

| | | | |
|---|---|---|---|
| BATCH ID: | 0509118A-RA | SAMPLE ID: | 12 |
| SAMPLE DATE: | 28-SEP-2005 00:00 | ALIQUOT: | 1.014E+00 gram |
| SAMPLE TITLE: | VPTR092805SL0E | DETECTOR NUMBER: | 014 |
| ACQ DATE: | 7-OCT-2005 06:23 | AVERAGE EFFICIENCY: | 20.47% |
| ELAPSED LIVE TIME: | 10205. | RECOVERY: | 100.00% |
| TRACER ID: | NONE | TRACER FWHM (kev): | 0.00 |
| LAMBDA VALUE: | 0. | ROI TYPE: | STANDARD |
| TRACER DPM AT SAMPLE DATE: | 0.000 | CONFIDENCE FACTOR: | 4.65 |
| SAMPLE MATRIX: | SOIL | LLD CONSTANT: | 2.71 |
| ENERGY CAL DATE: | 30-SEP-2005 08:11 | EFF CAL DATE: | 30-SEP-2005 08:11 |
| BKG FILENAME: | B_014_1OCT05 | BKG ELAPSED TIME: | 60002. |
| | | SAF: | 2.40 |

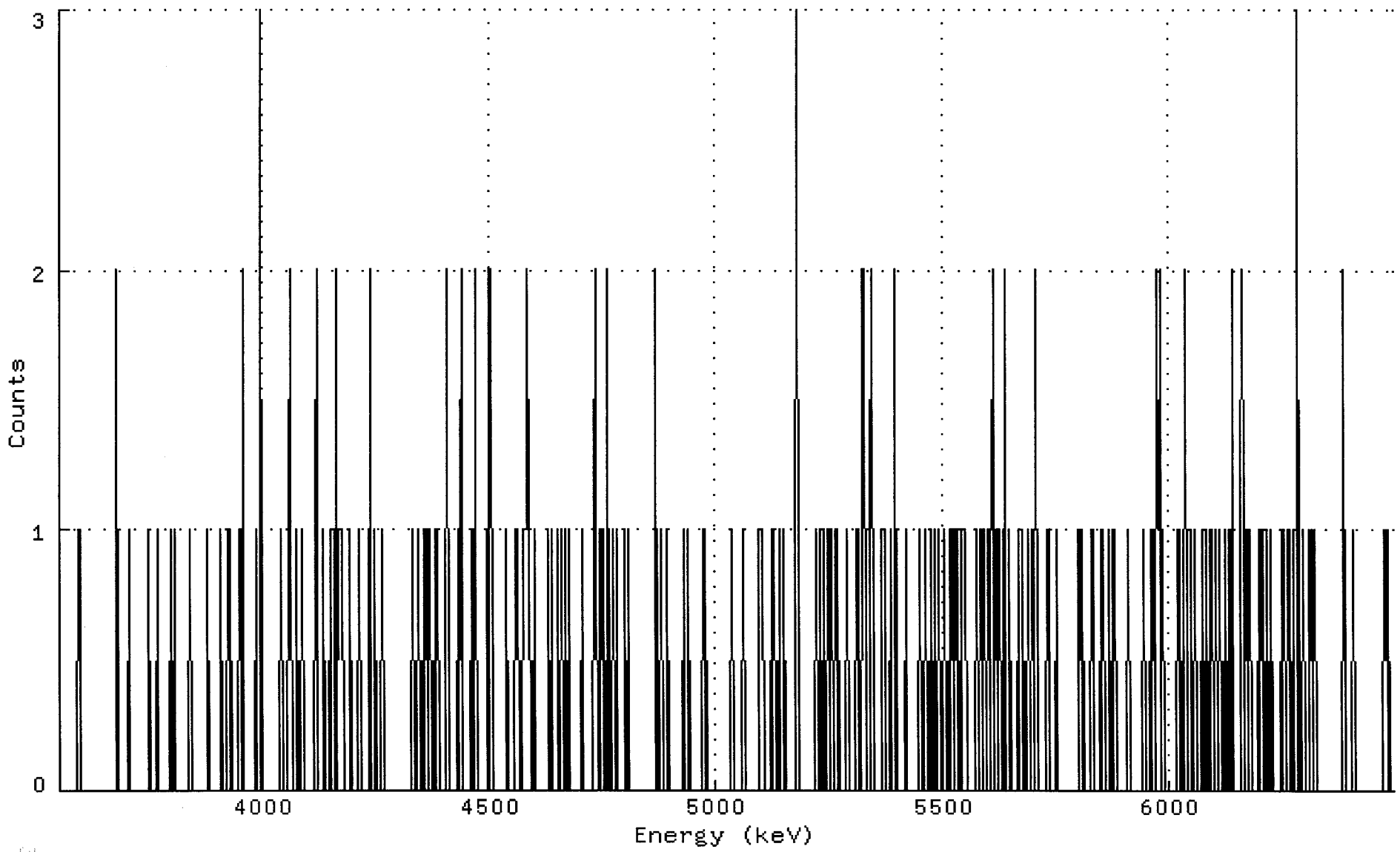
NUCLIDE ACTIVITY SUMMARY

| NUCLIDE | ENERGY | NET AREA | BKG | %ABN | ACTIVITY pCi/ gram | TPU/ERROR 2-SIGMA | MDC pCi/ gram |
|---|---|---|---|---|---|---|---|
| PO-218 | 6003.0 | 123.44 | 1.36 | 100.0 | 1.576E+00 | 4.554E-01 | 2.492E-01 |
| RN-222 | 5490.0 | 119.17 | 3.23 | 99.9 | 1.522E+00 | 4.509E-01 | 3.393E-01 |
| RA-226 | 4785.0 | 116.41 | 1.19 | 100.0 | 1.486E+00 | 4.413E-01 | 2.384E-01 |

Analyst Jeff Price 10-7-05
Date

Reviewer Glen Gregley 10/7/05
Date

Spectrum : DKA100:[ALPHA.ALUSR.ARCHIVE.S]S_0509118A-RA$12_RA.CNF;1
Title : 014
Sample Title: VPTR092805SL0E
Start Time: 7-OCT-2005 06:23: Sample Time: 28-SEP-2005 00:00 Energy Offset: 3.53916E+03
Real Time : 0 02:50:05.00 Sample ID : 12 Energy Slope : 2.98073E+00
Live Time : 0 02:50:05.00 Sample Type: RA Energy Quad : -9.50894E-05



Channel Contents for ND_AMS_ARCHIVE_S:S_0509118A-RA$12_RA

Channel

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1: | 10205 | 10205 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15: | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 29: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 43: | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 57: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 71: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 85: | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 99: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 113: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 127: | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 2 |
| 141: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 3 |
| 155: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 169: | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 1 | 0 | 0 | 0 | 1 | 0 |
| 183: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 |
| 197: | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 2 |
| 211: | 0 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 225: | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 |
| 239: | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 253: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 267: | 0 | 1 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 1 | 1 | 0 |
| 281: | 1 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| 295: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 2 | 0 | 0 | 0 |
| 309: | 0 | 0 | 0 | 1 | 0 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 323: | 0 | 0 | 2 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 337: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 |
| 351: | 1 | 1 | 1 | 1 | 2 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 365: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| 379: | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 393: | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 |
| 407: | 1 | 0 | 0 | 1 | 1 | 0 | 1 | 0 | 0 | 2 | 0 | 0 | 0 | 1 |
| 421: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 |
| 435: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 449: | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 |
| 463: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 477: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 |
| 491: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 505: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 519: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| 533: | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 1 |
| 547: | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| 561: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 575: | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 1 | 0 | 0 |
| 589: | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 603: | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 2 | 2 | 0 | 0 | 0 | 0 | 1 |
| 617: | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 |
| 631: | 1 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 645: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 |
| 659: | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 0 |
| 673: | 1 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 1 | 0 | 1 | 0 | 0 |
| 687: | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 701: | 1 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 1 | 1 | 2 | 0 | 1 | 0 |
| 715: | 1 | 1 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 729: | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 1 |
| 743: | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 |
| 757: | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 771: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 |
| 785: | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 |
| 799: | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 813: | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 827: | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 2 | 1 | 2 |
| 841: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 855: | 0 | 1 | 0 | 0 | 0 | 2 | 0 | 1 | 1 | 1 | 0 | 0 | 1 | 1 |
| 869: | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 |
| 883: | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 |
| 897: | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 1 | 0 | 1 | 0 | 1 |
| 911: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 0 |
| 925: | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 |
| 939: | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 3 | 0 | 0 | 0 |
| 953: | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 |
| 967: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 981: | 0 | 0 | 0 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 |
| 995: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1009: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 1 | 0 | 0 |
| 1023: | 0 | 0 | | | | | | | | | | | | |

Eberline Services
Oak Ridge Laboratory

Gross Sample Counts Within Peak Regions  Generated:  7-OCT-2005 09:33:51.85

Detector ID: 14  Acquisition Start: 7-OCT-2005 06:23:19.01
Live Time: 0 02:50:05.00  Real Time: 0 02:50:05.00
Batch Id: 0509118A-RA  Sample Id: 12
Sample Type: RA

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 4597.22 | 49 | | 0366.63 | 359.08 | 283 | 159 | 4.80E-03 | 14.3 | |
| 2 | 0 | 5302.13 | 51 | | 0225.79 | 603.06 | 505 | 178 | 5.00E-03 | 14.0 | |
| 3 | 0 | 5809.71 | 52 | | 0448.51 | 781.21 | 702 | 163 | 5.10E-03 | 13.9 | |

Background Counts Within Peak Regions  Generated:  7-OCT-2005 09:34:02.37

Acquisition Start: 1-OCT-2005 10:06:10.01
Live Time: 0 16:40:02.00  Real Time: 0 16:40:02.00

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 4605.72 | 7 | | 0330.86 | 362.00 | 283 | 159 | 1.17E-04 | 37.8 | |
| 2 | 0 | 5274.73 | 19 | | 0 3.69 | 593.50 | 505 | 178 | 3.17E-04 | 22.9 | |
| 3 | 0 | 5814.77 | 8 | | 0473.94 | 783.00 | 702 | 163 | 1.33E-04 | 35.4 | |

Net Sample Counts Within Peak Regions  Generated:  7-OCT-2005 09:34:02.65

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 4597.22* | 116 | | 0366.63 | 359.08 | 283 | 159 | 1.14E-02 | 14.4 | |
| 2 | 0 | 5302.13* | 119 | | 0225.79 | 603.06 | 505 | 178 | 1.17E-02 | 14.4 | |
| 3 | 0 | 5809.71* | 123 | | 0448.51 | 781.21 | 702 | 163 | 1.21E-02 | 14.0 | |

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.0 Generated 7-OCT-2005 09:34:03

Configuration : MCA0:[AMSCOUNT]0000C192$1
Analyses by : ROIPEAK V1.2,PEAKEFF V2.2,ENBACK V1.6,NID V3.3
Sample title : VPTR092805SL0E
Sample date : 28-SEP-2005 00:00:00 Acquisition date : 7-OCT-2005 06:23:19
Sample ID : 12 Sample quantity : 1.0136 gram
Sample type : RA Sample geometry :
Detector name : 014 Detector geometry:
Elapsed live time: 0 02:50:05.00 Elapsed real time: 0 02:50:05.00 0.0%
Energy tolerance : 100.00 keV Half life ratio : 8.00
Errors propagated: Yes Systematic Error : 3.00 %
Efficiency type : Average value Efficiencies at : Peak Energy
Abundance limit : 75.00

Post-NID Peak Search Report

| It | Energy | Area | FWHM | Channel | Left | Pw | %Err | Fit | Nuclides | Activity pCi/gram |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 4597.22* | 116366.63 | 359.08 | 283 | 159 | 28.9 | | | RA-226 | 1.49 |
| 0 | 5302.13* | 119225.79 | 603.06 | 505 | 178 | 28.8 | | | RN-222 | 1.52 |
| 0 | 5809.71* | 123448.51 | 781.21 | 702 | 163 | 28.1 | | | PO-218 | 1.58 |

Eberline Services
Oak Ridge Laboratory

ALPHA SPECTROMETRY REPORT
7-OCT-2005 09:34:22

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Spectral File: ND_AMS_ARCHIVE_S:S_0509118A-RA$13_RA.CNF

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| | | | |
|---|---|---|---|
| BATCH ID: | 0509118A-RA | SAMPLE ID: | 13 |
| SAMPLE DATE: | 28-SEP-2005 00:00 | ALIQUOT: | 1.094E+00 gram |
| SAMPLE TITLE: | VPTR092805SL0F | DETECTOR NUMBER: | 015 |
| ACQ DATE: | 7-OCT-2005 06:23 | AVERAGE EFFICIENCY: | 20.73% |
| ELAPSED LIVE TIME: | 10203. | RECOVERY: | 91.31% |
| TRACER ID: | NONE | TRACER FWHM (kev): | 0.00 |
| LAMBDA VALUE: | 0. | ROI TYPE: | STANDARD |
| TRACER DPM AT SAMPLE DATE: | 0.000 | CONFIDENCE FACTOR: | 4.65 |
| SAMPLE MATRIX: | SOIL | LLD CONSTANT: | 2.71 |
| ENERGY CAL DATE: | 30-SEP-2005 08:11 | EFF CAL DATE: | 30-SEP-2005 08:11 |
| BKG FILENAME: | B_015_1OCT05 | BKG ELAPSED TIME: | 60008. |
| | | SAF: | 2.31 |

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NUCLIDE ACTIVITY SUMMARY

| NUCLIDE | ENERGY | NET AREA | BKG | %ABN | ACTIVITY pCi/ gram | TPU/ERROR 2-SIGMA | MDC pCi/ gram |
|---|---|---|---|---|---|---|---|
| PO-218 | 6003.0 | 153.92 | 0.85 | 100.0 | 1.968E+00 | 5.027E-01 | 2.067E-01 |
| RN-222 | 5490.0 | 123.21 | 1.53 | 99.9 | 1.577E+00 | 4.482E-01 | 2.501E-01 |
| RA-226 | 4785.0 | 104.73 | 1.53 | 100.0 | 1.339E+00 | 4.115E-01 | 2.499E-01 |

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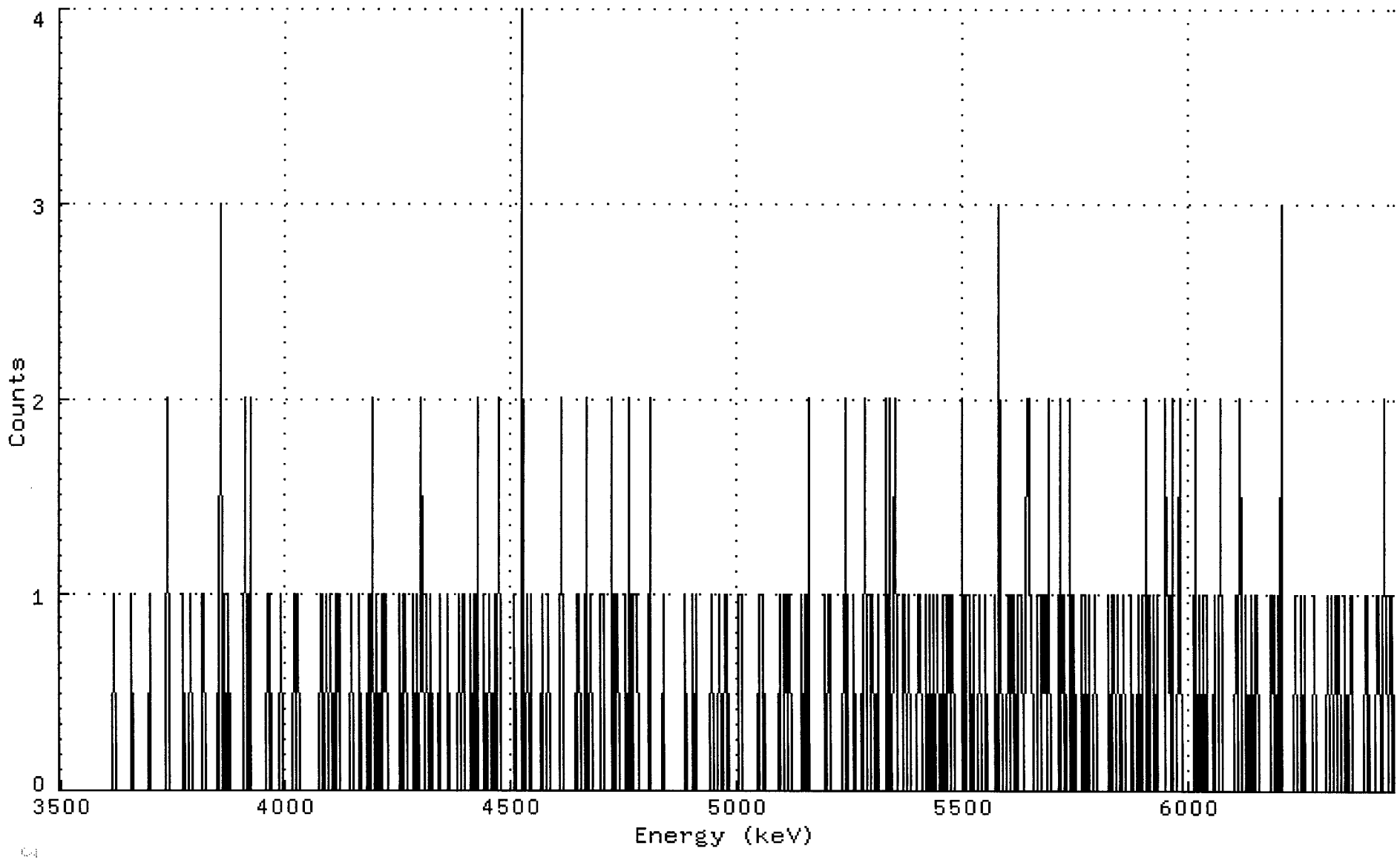
Analyst _____ Date 10-7-05

Reviewer _____ Date 10/7/05

Spectrum : DKA100:[ALPHA.ALUSR.ARCHIVE.S]S_0509118A-RA$13_RA.CNF;1
Title : 015
Sample Title: VPTR092805SLOF
Start Time: 7-OCT-2005 06:23: Sample Time: 28-SEP-2005 00:00 Energy Offset: 3.48659E+03
Real Time : 0 02:50:03.00 Sample ID : 13 Energy Slope : 3.01956E+00
Live Time : 0 02:50:03.00 Sample Type: RA Energy Quad : -1.17544E-04



Channel Contents for ND_AMS_ARCHIVE_S:S_0509118A-RA$13_RA

Channel

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1: | 10203 | 10203 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 29: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 43: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 57: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 71: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 |
| 85: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 99: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 |
| 113: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 3 | 0 | 0 | 1 |
| 127: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 141: | 2 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 155: | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 169: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 0 |
| 183: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 197: | 0 | 1 | 1 | 0 | 0 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 1 | 0 |
| 211: | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 225: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 2 | 1 | 0 |
| 239: | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 |
| 253: | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 |
| 267: | 1 | 0 | 0 | 1 | 0 | 1 | 2 | 1 | 0 | 1 | 1 | 0 | 0 | 1 |
| 281: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 295: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 0 |
| 309: | 0 | 1 | 0 | 1 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 323: | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 |
| 337: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 4 | 0 |
| 351: | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 365: | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 379: | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 |
| 393: | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 |
| 407: | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 1 | 0 |
| 421: | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 2 | 0 | 0 | 1 | 1 |
| 435: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 |
| 449: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 463: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 477: | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 491: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 1 |
| 505: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 |
| 519: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 |
| 533: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 547: | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 561: | 1 | 0 | 1 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 575: | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 589: | 0 | 0 | 0 | 0 | 1 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 603: | 0 | 0 | 0 | 0 | 1 | 0 | 2 | 0 | 0 | 0 | 0 | 1 | 1 | 0 |
| 617: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 2 | 0 | 0 |
| 631: | 1 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 0 |
| 645: | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 0 |
| 659: | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 1 |
| 673: | 0 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 |
| 687: | 0 | 1 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 701: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 3 | 1 |
| 715: | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 1 |
| 729: | 1 | 1 | 1 | 0 | 1 | 1 | 2 | 2 | 1 | 1 | 0 | 0 | 0 | 0 |
| 743: | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 0 | 2 | 1 | 0 | 0 | 0 | 0 |
| 757: | 0 | 0 | 0 | 2 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 2 | 0 | 0 |
| 771: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 |
| 785: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 799: | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 1 | 0 | 0 |
| 813: | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 |
| 827: | 0 | 2 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 |
| 841: | 0 | 0 | 2 | 1 | 1 | 1 | 0 | 2 | 0 | 0 | 0 | 0 | 1 | 2 |
| 855: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 |
| 869: | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 883: | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 897: | 0 | 1 | 0 | 0 | 2 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 |
| 911: | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 925: | 0 | 1 | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 3 | 0 | 0 | 0 | 0 |
| 939: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 1 |
| 953: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 967: | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 1 |
| 981: | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 |
| 995: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 1009: | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 2 | 1 | 1 | 0 | 0 | 1 | 0 |
| 1023: | 0 | 0 | | | | | | | | | | | | |

Eberline Services
Oak Ridge Laboratory

Gross Sample Counts Within Peak Regions  Generated:  7-OCT-2005 09:34:08.03

Detector ID: 15  Acquisition Start: 7-OCT-2005 06:23:22.01
Live Time: 0 02:50:03.00  Real Time: 0 02:50:03.00
Batch Id: 0509118A-RA  Sample Id: 13
Sample Type: RA

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 4606.47 | 46 | 0 | 3.02 | 376.39 | 298 | 158 | 4.51E-03 | 14.7 | |
| 2 | 0 | 5318.80 | 54 | 0 | 362.35 | 621.83 | 518 | 178 | 5.29E-03 | 13.6 | |
| 3 | 0 | 5790.48 | 67 | 0 | 399.81 | 787.10 | 714 | 164 | 6.57E-03 | 12.2 | |

Background Counts Within Peak Regions  Generated:  7-OCT-2005 09:34:19.74

Acquisition Start: 1-OCT-2005 10:06:13.01
Live Time: 0 16:40:08.00  Real Time: 0 16:40:08.00

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 4606.79 | 9 | 0 | 4.43 | 376.50 | 298 | 158 | 1.50E-04 | 33.3 | |
| 2 | 0 | 5274.71 | 9 | 0 | 452.93 | 606.50 | 518 | 178 | 1.50E-04 | 33.3 | |
| 3 | 0 | 5814.27 | 5 | 0 | 4.43 | 795.50 | 714 | 164 | 8.33E-05 | 44.7 | |

Net Sample Counts Within Peak Regions  Generated:  7-OCT-2005 09:34:20.01

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 4606.47* | 105 | 0 | 3.02 | 376.39 | 298 | 158 | 1.03E-02 | 15.0 | |
| 2 | 0 | 5318.80* | 123 | 0 | 362.35 | 621.83 | 518 | 178 | 1.21E-02 | 13.8 | |
| 3 | 0 | 5790.48* | 154 | 0 | 399.81 | 787.10 | 714 | 164 | 1.51E-02 | 12.3 | |

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.0 Generated 7-OCT-2005 09:34:20

Configuration : MCA0:[AMSCOUNT]0000C192$1
Analyses by : ROIPEAK V1.2,PEAKEFF V2.2,ENBACK V1.6,NID V3.3
Sample title : VPTR092805SL0F
Sample date : 28-SEP-2005 00:00:00 Acquisition date : 7-OCT-2005 06:23:22
Sample ID : 13 Sample quantity : 1.0945 gram
Sample type : RA Sample geometry :
Detector name : 015 Detector geometry:
Elapsed live time: 0 02:50:03.00 Elapsed real time: 0 02:50:03.00 0.0%
Energy tolerance : 100.00 keV Half life ratio : 8.00
Errors propagated: Yes Systematic Error : 3.00 %
Efficiency type : Average value Efficiencies at : Peak Energy
Abundance limit : 75.00

Post-NID Peak Search Report

| It | Energy | Area | FWHM | Channel | Left | Pw | %Err | Fit | Nuclides | Activity pCi/gram |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 4606.47* | 105 | 3.02 | 376.39 | 298 | 158 | 29.9 | | RA-226 | 1.22 |
| 0 | 5318.80* | 123 | 62.35 | 621.83 | 518 | 178 | 27.6 | | RN-222 | 1.44 |
| 0 | 5790.48* | 154 | 399.81 | 787.10 | 714 | 164 | 24.6 | | PO-218 | 1.80 |

Eberline Services
Oak Ridge Laboratory

ALPHA SPECTROMETRY REPORT
7-OCT-2005 09:34:47

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Spectral File: ND_AMS_ARCHIVE_S:S_0509118A-RA$14_RA.CNF

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| | | | |
|---|---|---|---|
| BATCH ID: | 0509118A-RA | SAMPLE ID: | 14 |
| SAMPLE DATE: | 28-SEP-2005 00:00 | ALIQUOT: 1.032E+00 | gram |
| SAMPLE TITLE: | VPTR092805SL0G | DETECTOR NUMBER: | 016 |
| ACQ DATE: | 7-OCT-2005 06:23 | AVERAGE EFFICIENCY: | 20.86% |
| ELAPSED LIVE TIME: | 10206. | RECOVERY: | 95.47% |
| TRACER ID: | NONE | TRACER FWHM (kev): | 0.00 |
| LAMBDA VALUE: | 0. | ROI TYPE: | STANDARD |
| TRACER DPM AT SAMPLE DATE: | 0.000 | CONFIDENCE FACTOR: | 4.65 |
| SAMPLE MATRIX: | SOIL | LLD CONSTANT: | 2.71 |
| ENERGY CAL DATE: | 30-SEP-2005 08:11 | EFF CAL DATE: 30-SEP-2005 | 08:11 |
| BKG FILENAME: | B_016_1OCT05 | BKG ELAPSED TIME: | 60005. |
| | | SAF: | 2.27 |

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NUCLIDE ACTIVITY SUMMARY

| NUCLIDE | ENERGY | NET AREA | BKG | %ABN | ACTIVITY pCi/ gram | TPU/ERROR 2-SIGMA | MDC pCi/ gram |
|---|---|---|---|---|---|---|---|
| PO-218 | 6003.0 | 158.79 | 2.38 | 100.0 | 2.046E+00 | 5.133E-01 | 2.892E-01 |
| RN-222 | 5490.0 | 135.92 | 2.55 | 99.9 | 1.752E+00 | 4.735E-01 | 2.967E-01 |
| RA-226 | 4785.0 | 98.69 | 1.19 | 100.0 | 1.271E+00 | 3.981E-01 | 2.276E-01 |

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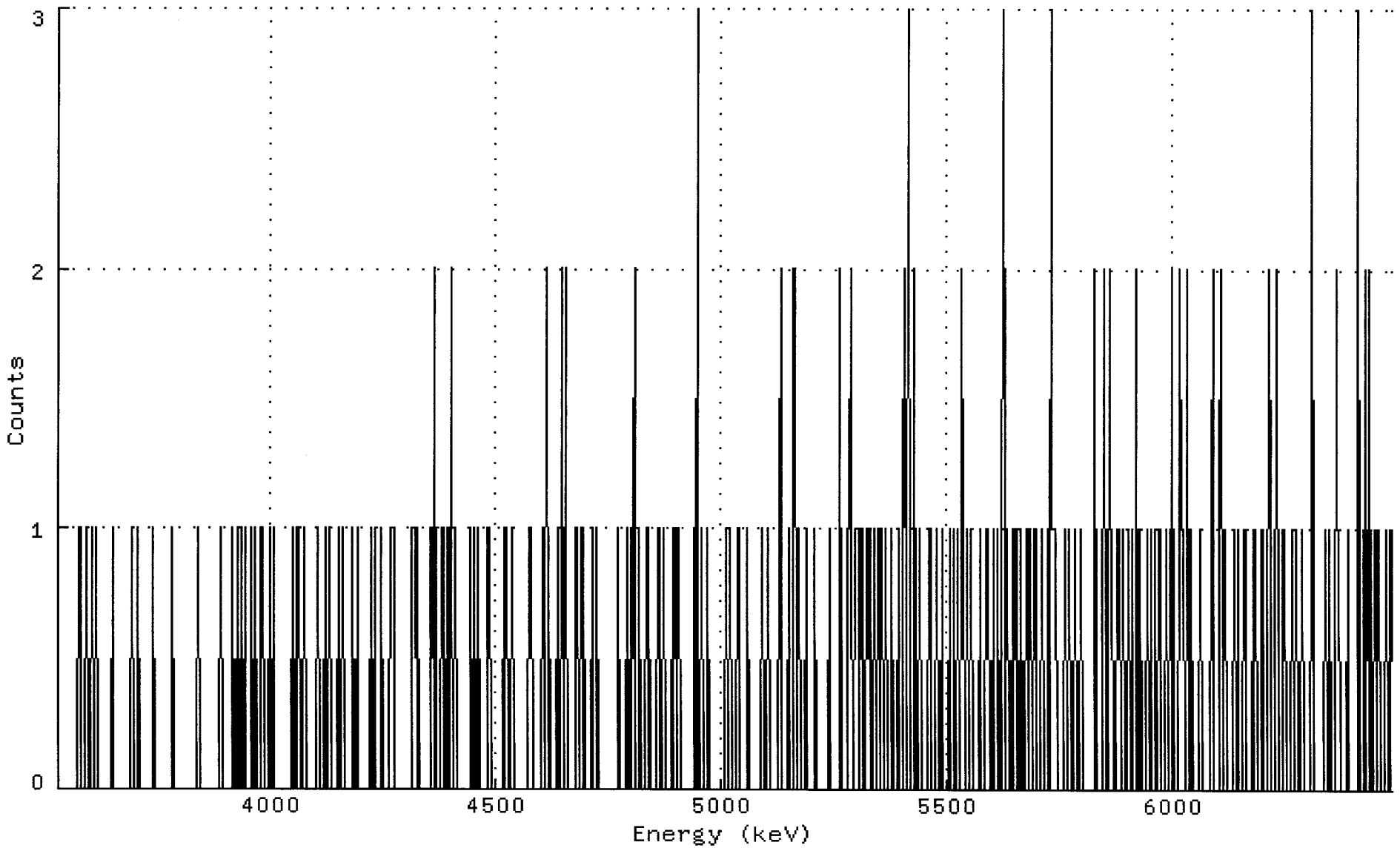
Analyst _____ Date 10-7-05

Reviewer _____ Date 10/7/05

Spectrum : DKA100:[ALPHA.ALUSR.ARCHIVE.S]S_0509118A-RA$14_RA.CNF;1
Title : 016
Sample Title: VPTR092805SLOG
Start Time: 7-OCT-2005 06:23: Sample Time: 28-SEP-2005 00:00 Energy Offset: 3.51848E+03
Real Time : 0 02:50:06.00 Sample ID : 14 Energy Slope : 3.04936E+00
Live Time : 0 02:50:06.00 Sample Type: RA Energy Quad : -1.49632E-04



Channel Contents for ND_AMS_ARCHIVE_S:S_0509118A-RA$14_RA

Channel

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1: | 10206 | 10206 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15: | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 |
| 29: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 43: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 57: | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 71: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 85: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 99: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 113: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 127: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 |
| 141: | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 1 |
| 155: | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 169: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 |
| 183: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 197: | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| 211: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| 225: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 |
| 239: | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 |
| 253: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| 267: | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| 281: | 0 | 2 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 2 |
| 295: | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 309: | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 323: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 |
| 337: | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 351: | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| 365: | 0 | 2 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 2 |
| 379: | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 1 |
| 393: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 |
| 407: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 421: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 2 | 0 | 0 |
| 435: | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 449: | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 463: | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 477: | 0 | 1 | 0 | 3 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 0 |
| 491: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 505: | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 519: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 533: | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 0 | 0 |
| 547: | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 2 | 2 | 0 | 0 | 1 | 0 | 0 |
| 561: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 575: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 589: | 2 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 2 | 1 | 0 | 1 | 1 | 1 |
| 603: | 1 | 0 | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 0 | 1 | 0 | 1 | 0 |
| 617: | 0 | 1 | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 |
| 631: | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 2 | 0 | 0 | 3 | 0 | 0 |
| 645: | 0 | 0 | 2 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 659: | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 673: | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 1 | 2 | 1 | 0 |
| 687: | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 701: | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 |
| 715: | 0 | 3 | 1 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 0 |
| 729: | 0 | 1 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 0 | 0 | 1 | 1 | 0 |
| 743: | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 3 | 1 | 1 | 1 |
| 757: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 |
| 771: | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 785: | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 2 |
| 799: | 1 | 1 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 0 |
| 813: | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 0 | 0 |
| 827: | 0 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 0 |
| 841: | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 2 | 0 | 0 | 0 | 0 | 1 |
| 855: | 2 | 1 | 1 | 1 | 0 | 1 | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 869: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 0 |
| 883: | 0 | 0 | 0 | 0 | 1 | 2 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 |
| 897: | 0 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 |
| 911: | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 |
| 925: | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 1 | 1 |
| 939: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| 953: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 3 | 0 | 0 | 0 | 0 | 0 | 0 |
| 967: | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 2 | 1 |
| 981: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 995: | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 2 | 0 | 1 | 0 | 2 | 0 | 0 |
| 1009: | 0 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 |
| 1023: | 0 | 0 | | | | | | | | | | | | |

Eberline Services
Oak Ridge Laboratory

Gross Sample Counts Within Peak Regions  Generated:  7-OCT-2005 09:34:26.05

Detector ID: 16  Acquisition Start: 7-OCT-2005 06:23:26.01
Live Time: 0 02:50:06.00  Real Time: 0 02:50:06.00
Batch Id: 0509118A-RA  Sample Id: 14
Sample Type: RA

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 4606.89 | 44 | | 0423.80 | 363.41 | 285 | 158 | 4.31E-03 | 15.1 | |
| 2 | 0 | 5298.79 | 61 | | 0316.37 | 601.59 | 505 | 178 | 5.98E-03 | 12.8 | |
| 3 | 0 | 5822.20 | 71 | | 0444.41 | 785.77 | 702 | 164 | 6.96E-03 | 11.9 | |

Background Counts Within Peak Regions  Generated:  7-OCT-2005 09:34:45.78

Acquisition Start: 1-OCT-2005 10:06:16.01
Live Time: 0 16:40:05.00  Real Time: 0 16:40:05.00

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 4607.15 | 7 | | 0326.28 | 363.50 | 285 | 158 | 1.17E-04 | 37.8 | |
| 2 | 0 | 5275.57 | 15 | | 0469.60 | 593.50 | 505 | 178 | 2.50E-04 | 25.8 | |
| 3 | 0 | 5815.80 | 14 | | 0436.06 | 783.50 | 702 | 164 | 2.33E-04 | 26.7 | |

Net Sample Counts Within Peak Regions  Generated:  7-OCT-2005 09:34:46.05

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 4606.89* | 99 | | 0423.80 | 363.41 | 285 | 158 | 9.67E-03 | 15.3 | |
| 2 | 0 | 5298.79* | 136 | | 0316.37 | 601.59 | 505 | 178 | 1.33E-02 | 13.1 | |
| 3 | 0 | 5822.20* | 159 | | 0444.41 | 785.77 | 702 | 164 | 1.56E-02 | 12.1 | |

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.0 Generated 7-OCT-2005 09:34:47

| | | | |
|---|---|---|---|
| Configuration | : MCA0:[AMSCOUNT]0000C192$1 | | |
| Analyses by | : ROIPEAK V1.2,PEAKEFF V2.2,ENBACK V1.6,NID V3.3 | | |
| Sample title | : VPTR092805SL0G | | |
| Sample date | : 28-SEP-2005 00:00:00 | Acquisition date | : 7-OCT-2005 06:23:26 |
| Sample ID | : 14 | Sample quantity | : 1.0322 gram |
| Sample type | : RA | Sample geometry | : |
| Detector name | : 016 | Detector geometry | : |
| Elapsed live time | : 0 02:50:06.00 | Elapsed real time | : 0 02:50:06.00 0.0% |
| Energy tolerance | : 100.00 keV | Half life ratio | : 8.00 |
| Errors propagated | : Yes | Systematic Error | : 3.00 % |
| Efficiency type | : Average value | Efficiencies at | : Peak Energy |
| Abundance limit | : 75.00 | | |

Post-NID Peak Search Report

| It | Energy | Area | FWHM | Channel | Left | Pw | %Err | Fit | Nuclides | Activity pCi/gram |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 4606.89* | 99423.80 | 363.41 | 285 | 158 | 30.5 | | | RA-226 | 1.21 |
| 0 | 5298.79* | 136316.37 | 601.59 | 505 | 178 | 26.1 | | | RN-222 | 1.67 |
| 0 | 5822.20* | 159444.41 | 785.77 | 702 | 164 | 24.1 | | | PO-218 | 1.95 |

Eberline Services
Oak Ridge Laboratory

ALPHA SPECTROMETRY REPORT
7-OCT-2005 09:35:22

**********

Spectral File: ND_AMS_ARCHIVE_S:S_0509118A-RA$15_RA.CNF

**********

| | | | |
|---|---|---|---|
| BATCH ID: | 0509118A-RA | SAMPLE ID: | 15 |
| SAMPLE DATE: | 28-SEP-2005 00:00 | ALIQUOT: 9.975E-01 | gram |
| SAMPLE TITLE: | VPTR092805SL0H | DETECTOR NUMBER: | 017 |
| ACQ DATE: | 7-OCT-2005 04:51 | AVERAGE EFFICIENCY: | 19.37% |
| ELAPSED LIVE TIME: | 10203. | RECOVERY: | 94.52% |
| TRACER ID: | NONE | TRACER FWHM (kev): | 0.00 |
| LAMBDA VALUE: | 0. | ROI TYPE: | STANDARD |
| TRACER DPM AT SAMPLE DATE: | 0.000 | CONFIDENCE FACTOR: | 4.65 |
| SAMPLE MATRIX: | SOIL | LLD CONSTANT: | 2.71 |
| ENERGY CAL DATE: | 29-SEP-2005 13:20 | EFF CAL DATE: 29-SEP-2005 | 13:20 |
| BKG FILENAME: | B_017_1OCT05 | BKG ELAPSED TIME: | 60004. |
| | | SAF: | 2.40 |

**********

NUCLIDE ACTIVITY SUMMARY

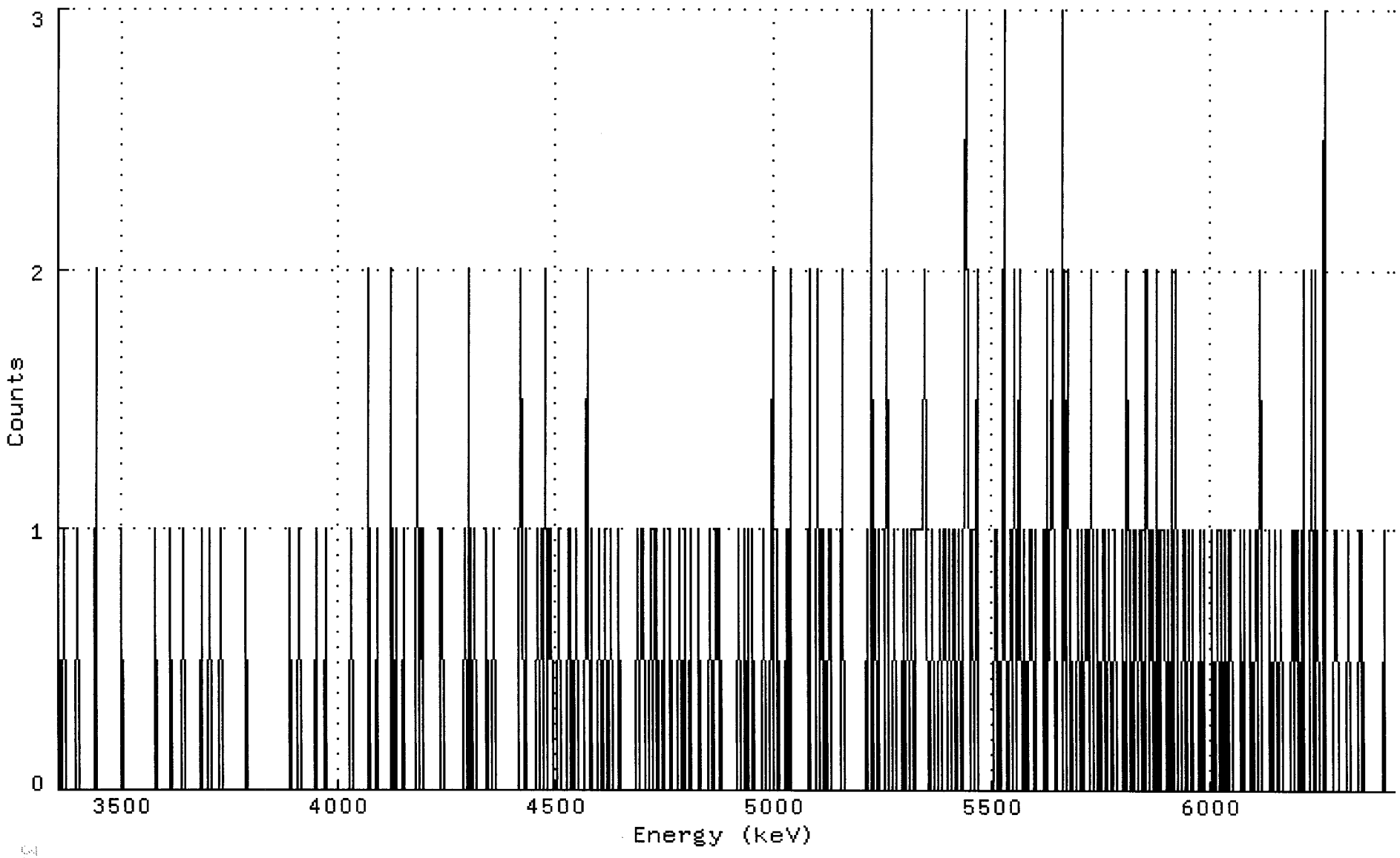
| NUCLIDE | ENERGY | NET AREA | BKG | %ABN | ACTIVITY pCi/ gram | TPU/ERROR 2-SIGMA | MDC pCi/ gram |
|---|---|---|---|---|---|---|---|
| PO-218 | 6003.0 | 184.48 | 2.72 | 100.0 | 2.676E+00 | 6.429E-01 | 3.614E-01 |
| RN-222 | 5490.0 | 166.30 | 1.70 | 99.9 | 2.414E+00 | 6.069E-01 | 3.056E-01 |
| RA-226 | 4785.0 | 90.18 | 1.02 | 100.0 | 1.308E+00 | 4.389E-01 | 2.578E-01 |

**********

Analyst _____ Date 10-7-05

Reviewer _____ Date 10/7/05

Spectrum : DKA100:[ALPHA.ALUSR.ARCHIVE.S]S_0509118A-RA$15_RA.CNF;1
Title : 017
Sample Title: VPTR092805SLOH
Start Time: 7-OCT-2005 04:51: Sample Time: 28-SEP-2005 00:00 Energy Offset: 3.34436E+03
Real Time : 0 02:50:03.00 Sample ID : 15 Energy Slope : 3.17970E+00
Live Time : 0 02:50:03.00 Sample Type: RA Energy Quad : -1.76830E-04



Channel Contents for ND_AMS_ARCHIVE_S:S_0509118A-RA$15_RA

Channel

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1: | 10203 | 10203 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 29: | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 43: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 57: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 71: | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 85: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 |
| 99: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 113: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 127: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 141: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 155: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 169: | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 183: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 197: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 211: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 225: | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 239: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 1 | 0 |
| 253: | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 267: | 2 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 281: | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 295: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 2 | 0 | 0 |
| 309: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 323: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 337: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 1 | 0 | 1 | 0 | 0 |
| 351: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 2 | 0 |
| 365: | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 379: | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 393: | 1 | 2 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 407: | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 421: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 435: | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 |
| 449: | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 463: | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 477: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 491: | 1 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 505: | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 |
| 519: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 533: | 0 | 1 | 2 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 547: | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 561: | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 1 |
| 575: | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| 589: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 603: | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 3 | 0 | 1 | 1 | 0 | 1 |
| 617: | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 631: | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 0 |
| 645: | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 0 | 0 | 0 | 1 |
| 659: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 0 |
| 673: | 0 | 1 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 2 | 3 | 2 | 2 |
| 687: | 0 | 0 | 1 | 0 | 0 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 701: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 1 | 3 |
| 715: | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 2 | 0 | 0 | 1 | 2 | 1 | 0 |
| 729: | 0 | 1 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 |
| 743: | 0 | 0 | 1 | 0 | 2 | 0 | 1 | 1 | 1 | 2 | 0 | 1 | 0 | 0 |
| 757: | 0 | 0 | 0 | 3 | 1 | 0 | 1 | 2 | 0 | 1 | 0 | 0 | 0 | 0 |
| 771: | 1 | 1 | 0 | 1 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 2 | 0 | 0 |
| 785: | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 1 | 0 | 0 |
| 799: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 2 | 1 | 1 |
| 813: | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 2 | 2 |
| 827: | 0 | 1 | 1 | 0 | 1 | 0 | 0 | 2 | 0 | 0 | 1 | 1 | 1 | 1 |
| 841: | 0 | 0 | 1 | 0 | 0 | 2 | 0 | 2 | 2 | 0 | 0 | 0 | 0 | 0 |
| 855: | 1 | 1 | 0 | 0 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| 869: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 |
| 883: | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 |
| 897: | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 911: | 0 | 0 | 1 | 1 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 925: | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 939: | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 2 | 0 |
| 953: | 0 | 0 | 0 | 0 | 2 | 2 | 0 | 2 | 0 | 1 | 0 | 0 | 0 | 0 |
| 967: | 2 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 |
| 981: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 995: | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1009: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1023: | 0 | 0 | | | | | | | | | | | | |

Eberline Services
Oak Ridge Laboratory

Gross Sample Counts Within Peak Regions  Generated:  7-OCT-2005 09:34:51.69

Detector ID: 17  Acquisition Start: 7-OCT-2005 04:51:19.01
Live Time: 0 02:50:03.00  Real Time: 0 02:50:03.00
Batch Id: 0509118A-RA  Sample Id: 15
Sample Type: RA

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 4596.82 | 38 | 0 | 163.66 | 402.92 | 330 | 153 | 3.72E-03 | 16.2 | |
| 2 | 0 | 5317.06 | 70 | 0 | 531.01 | 643.43 | 543 | 173 | 6.86E-03 | 12.0 | |
| 3 | 0 | 5799.45 | 78 | 0 | 325.88 | 808.46 | 734 | 160 | 7.64E-03 | 11.3 | |

Background Counts Within Peak Regions  Generated:  7-OCT-2005 09:35:20.07

Acquisition Start: 1-OCT-2005 10:06:19.01
Live Time: 0 16:40:04.00  Real Time: 0 16:40:04.00

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 4606.17 | 6 | 0 | 324.33 | 406.00 | 330 | 153 | 1.00E-04 | 40.8 | |
| 2 | 0 | 5274.43 | 10 | 0 | 3.18 | 629.00 | 543 | 173 | 1.67E-04 | 31.6 | |
| 3 | 0 | 5814.02 | 16 | 0 | 3.94 | 813.50 | 734 | 160 | 2.67E-04 | 25.0 | |

Net Sample Counts Within Peak Regions  Generated:  7-OCT-2005 09:35:20.33

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 4596.82* | 90 | 0 | 163.66 | 402.92 | 330 | 153 | 8.84E-03 | 16.4 | |
| 2 | 0 | 5317.06* | 166 | 0 | 531.01 | 643.43 | 543 | 173 | 1.63E-02 | 12.1 | |
| 3 | 0 | 5799.45* | 184 | 0 | 325.88 | 808.46 | 734 | 160 | 1.81E-02 | 11.5 | |

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.0 Generated 7-OCT-2005 09:35:21

Configuration : MCA0:[AMSCOUNT]0000C192$1
Analyses by : ROIPEAK V1.2,PEAKEFF V2.2,ENBACK V1.6,NID V3.3
Sample title : VPTR092805SL0H
Sample date : 28-SEP-2005 00:00:00 Acquisition date : 7-OCT-2005 04:51:19
Sample ID : 15 Sample quantity : 0.99750 gram
Sample type : RA Sample geometry :
Detector name : 017 Detector geometry:
Elapsed live time: 0 02:50:03.00 Elapsed real time: 0 02:50:03.00 0.0%
Energy tolerance : 100.00 keV Half life ratio : 8.00
Errors propagated: Yes Systematic Error : 3.00 %
Efficiency type : Average value Efficiencies at : Peak Energy
Abundance limit : 75.00

Post-NID Peak Search Report

| It | Energy | Area | FWHM | Channel | Left | Pw | %Err | Fit | Nuclides | Activity pCi/gram |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 4596.82* | 90163.66 | 402.92 | | 330 | 153 | 32.8 | | RA-226 | 1.24 |
| 0 | 5317.06* | 166531.01 | 643.43 | | 543 | 173 | 24.2 | | RN-222 | 2.28 |
| 0 | 5799.45* | 184325.88 | 808.46 | | 734 | 160 | 23.0 | | PO-218 | 2.53 |

Eberline Services
Oak Ridge Laboratory

ALPHA SPECTROMETRY REPORT
7-OCT-2005 09:35:41

**********
Spectral File: ND_AMS_ARCHIVE_S:S_0509118A-RA$16_RA.CNF
**********

| | | | |
|---|---|---|---|
| BATCH ID: | 0509118A-RA | SAMPLE ID: | 16 |
| SAMPLE DATE: | 28-SEP-2005 00:00 | ALIQUOT: | 1.066E+00 gram |
| SAMPLE TITLE: | VPTR092805SL0I | DETECTOR NUMBER: | 018 |
| ACQ DATE: | 7-OCT-2005 04:51 | AVERAGE EFFICIENCY: | 19.78% |
| ELAPSED LIVE TIME: | 10207. | RECOVERY: | 100.00% |
| TRACER ID: | NONE | TRACER FWHM (kev): | 0.00 |
| LAMBDA VALUE: | 0. | ROI TYPE: | STANDARD |
| TRACER DPM AT SAMPLE DATE: | 0.000 | CONFIDENCE FACTOR: | 4.65 |
| SAMPLE MATRIX: | SOIL | LLD CONSTANT: | 2.71 |
| ENERGY CAL DATE: | 29-SEP-2005 13:20 | EFF CAL DATE: | 29-SEP-2005 13:20 |
| BKG FILENAME: | B_018_1OCT05 | BKG ELAPSED TIME: | 60001. |
| | | SAF: | 2.47 |

**********

NUCLIDE ACTIVITY SUMMARY

| NUCLIDE | ENERGY | NET AREA | BKG | %ABN | ACTIVITY pCi/ gram | TPU/ERROR 2-SIGMA | MDC pCi/ gram |
|---|---|---|---|---|---|---|---|
| PO-218 | 6003.0 | 154.25 | 1.36 | 100.0 | 1.937E+00 | 5.107E-01 | 2.523E-01 |
| RN-222 | 5490.0 | 157.06 | 1.02 | 99.9 | 1.974E+00 | 5.154E-01 | 2.299E-01 |
| RA-226 | 4785.0 | 151.78 | 1.36 | 100.0 | 1.906E+00 | 5.062E-01 | 2.523E-01 |

**********

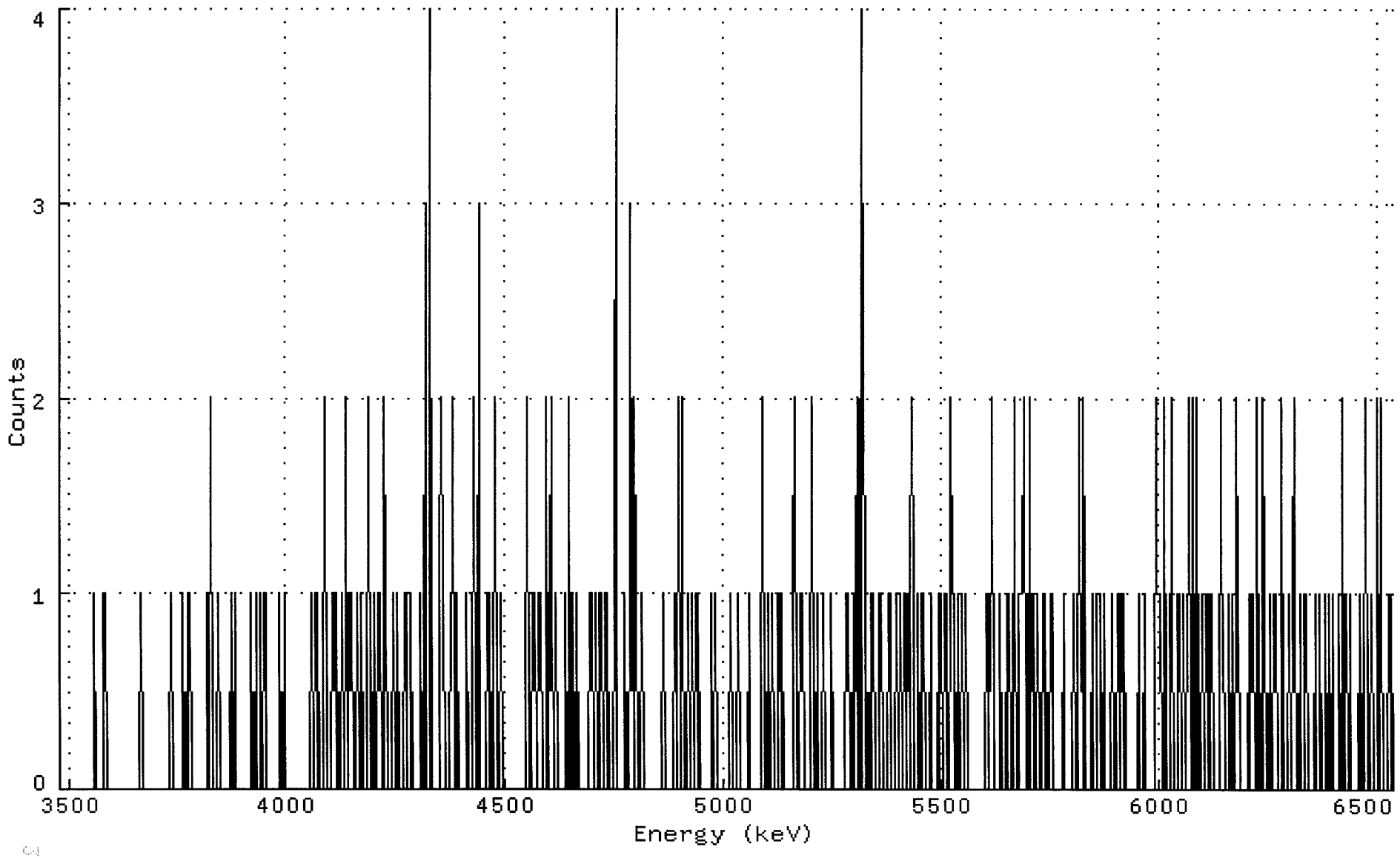
Jeff Price
Analyst

10-7-05
Date

Alan Gregsley
Reviewer

10/7/05
Date

Spectrum : DKA100:[ALPHA.ALUSR.ARCHIVE.S]S_0509118A-RA$16_RA.CNF;1
Title : 018
Sample Title: VPTR092805SL0I
Start Time: 7-OCT-2005 04:51: Sample Time: 28-SEP-2005 00:00 Energy Offset: 3.46899E+03
Real Time : 0 02:50:06.00 Sample ID : 16 Energy Slope : 3.19213E+00
Live Time : 0 02:50:07.00 Sample Type: RA Energy Quad : -1.96300E-04



Channel Contents for ND_AMS_ARCHIVE_S:S_0509118A-RA$16_RA

Channel

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1: | 10206 | 10207 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 29: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 43: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 57: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 71: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 85: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 1 |
| 99: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 113: | 2 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 127: | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 141: | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 0 |
| 155: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 |
| 169: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 183: | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 |
| 197: | 2 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 1 | 0 | 0 | 1 | 1 |
| 211: | 0 | 1 | 2 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| 225: | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 1 |
| 239: | 0 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 0 |
| 253: | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 267: | 0 | 1 | 0 | 0 | 3 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 |
| 281: | 0 | 1 | 2 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 2 | 0 | 0 |
| 295: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 2 | 0 |
| 309: | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 |
| 323: | 2 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 337: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 1 | 0 |
| 351: | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 2 | 0 | 1 |
| 365: | 2 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 379: | 2 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 393: | 0 | 1 | 1 | 1 | 0 | 1 | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 1 |
| 407: | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 4 | 0 | 0 | 0 | 0 | 0 | 0 |
| 421: | 1 | 0 | 0 | 1 | 3 | 1 | 0 | 2 | 1 | 0 | 0 | 0 | 1 | 0 |
| 435: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 449: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 2 | 0 |
| 463: | 2 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 1 |
| 477: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 0 |
| 491: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 505: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 519: | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 1 | 0 | 1 | 0 | 0 | 1 |
| 533: | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 547: | 0 | 0 | 1 | 2 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 |
| 561: | 0 | 0 | 2 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 575: | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 589: | 1 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 1 | 2 | 0 | 0 | 4 | 0 |
| 603: | 3 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 1 |
| 617: | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 631: | 1 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 1 | 2 | 1 | 0 | 0 | 0 |
| 645: | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 659: | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 2 | 1 | 1 |
| 673: | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 |
| 687: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 |
| 701: | 1 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| 715: | 0 | 1 | 0 | 0 | 0 | 2 | 1 | 0 | 0 | 1 | 1 | 1 | 1 | 2 |
| 729: | 0 | 0 | 0 | 2 | 0 | 1 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 0 |
| 743: | 1 | 0 | 1 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 757: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 771: | 2 | 1 | 1 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 785: | 0 | 1 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| 799: | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 813: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 827: | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 1 | 1 | 1 | 0 | 0 | 2 | 0 |
| 841: | 0 | 0 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 1 |
| 855: | 0 | 0 | 1 | 1 | 2 | 0 | 0 | 2 | 0 | 0 | 2 | 0 | 0 | 0 |
| 869: | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 |
| 883: | 0 | 2 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 1 |
| 897: | 2 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 |
| 911: | 1 | 0 | 0 | 2 | 0 | 1 | 0 | 0 | 2 | 1 | 0 | 0 | 0 | 1 |
| 925: | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 |
| 939: | 0 | 1 | 0 | 0 | 1 | 2 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 953: | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 |
| 967: | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 981: | 1 | 0 | 0 | 2 | 0 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 995: | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 2 | 0 | 1 | 0 | 0 | 1 | 0 |
| 1009: | 0 | 0 | 0 | 2 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 1023: | 0 | 0 | | | | | | | | | | | | |

Eberline Services
Oak Ridge Laboratory

Gross Sample Counts Within Peak Regions  Generated:  7-OCT-2005 09:35:25.86

Detector ID: 18  Acquisition Start: 7-OCT-2005 04:51:41.01
Live Time: 0 02:50:07.00  Real Time: 0 02:50:06.00
Batch Id: 0509118A-RA  Sample Id: 16
Sample Type: RA

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 4618.29 | 62 | 0 | 366.54 | 368.39 | 289 | 152 | 6.07E-03 | 12.7 | |
| 2 | 0 | 5314.85 | 64 | 0 | 9.04 | 600.42 | 501 | 173 | 6.27E-03 | 12.5 | |
| 3 | 0 | 5810.23 | 63 | 0 | 456.34 | 769.89 | 692 | 160 | 6.17E-03 | 12.6 | |

Background Counts Within Peak Regions  Generated:  7-OCT-2005 09:35:39.41

Acquisition Start: 1-OCT-2005 10:06:21.01
Live Time: 0 16:40:01.00  Real Time: 0 16:40:01.00

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 4606.44 | 8 | 0 | 12.77 | 364.50 | 289 | 152 | 1.33E-04 | 35.4 | |
| 2 | 0 | 5275.13 | 6 | 0 | 303.25 | 587.00 | 501 | 173 | 1.00E-04 | 40.8 | |
| 3 | 0 | 5814.88 | 8 | 0 | 414.98 | 771.50 | 692 | 160 | 1.33E-04 | 35.4 | |

Net Sample Counts Within Peak Regions  Generated:  7-OCT-2005 09:35:39.66

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 4618.29* | 152 | 0 | 366.54 | 368.39 | 289 | 152 | 1.49E-02 | 12.8 | |
| 2 | 0 | 5314.85* | 157 | 0 | 9.04 | 600.42 | 501 | 173 | 1.54E-02 | 12.6 | |
| 3 | 0 | 5810.23* | 154 | 0 | 456.34 | 769.89 | 692 | 160 | 1.51E-02 | 12.7 | |

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.0 Generated 7-OCT-2005 09:35:40

| | | | |
|---|---|---|---|
| Configuration | : MCA0:[AMSCOUNT]0000C192$1 | | |
| Analyses by | : ROIPEAK V1.2,PEAKEFF V2.2,ENBACK V1.6,NID V3.3 | | |
| Sample title | : VPTR092805SL0I | | |
| Sample date | : 28-SEP-2005 00:00:00 | Acquisition date | : 7-OCT-2005 04:51:41 |
| Sample ID | : 16 | Sample quantity | : 1.0663 gram |
| Sample type | : RA | Sample geometry | : |
| Detector name | : 018 | Detector geometry | : |
| Elapsed live time | : 0 02:50:07.00 | Elapsed real time | : 0 02:50:06.00 0.0% |
| Energy tolerance | : 100.00 keV | Half life ratio | : 8.00 |
| Errors propagated | : Yes | Systematic Error | : 3.00 % |
| Efficiency type | : Average value | Efficiencies at | : Peak Energy |
| Abundance limit | : 75.00 | | |

Post-NID Peak Search Report

| It | Energy | Area | FWHM | Channel | Left | Pw | %Err | Fit | Nuclides | Activity pCi/gram |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 4618.29* | 152366.54 | | 368.39 | 289 | 152 | 25.6 | | RA-226 | 1.91 |
| 0 | 5314.85* | 157 | 9.04 | 600.42 | 501 | 173 | 25.2 | | RN-222 | 1.97 |
| 0 | 5810.23* | 154456.34 | | 769.89 | 692 | 160 | 25.4 | | PO-218 | 1.94 |

Eberline Services
Oak Ridge Laboratory

ALPHA SPECTROMETRY REPORT
7-OCT-2005 09:35:57

Spectral File: ND_AMS_ARCHIVE_S:S_0509118A-RA$17_RA.CNF

| | | | |
|---|---|---|---|
| BATCH ID: | 0509118A-RA | SAMPLE ID: | 17 |
| SAMPLE DATE: | 28-SEP-2005 00:00 | ALIQUOT: | 1.157E+00 gram |
| SAMPLE TITLE: | VPTR092805SL0J | DETECTOR NUMBER: | 019 |
| ACQ DATE: | 7-OCT-2005 04:52 | AVERAGE EFFICIENCY: | 18.97% |
| ELAPSED LIVE TIME: | 10207. | RECOVERY: | 100.00% |
| TRACER ID: | NONE | TRACER FWHM (kev): | 0.00 |
| LAMBDA VALUE: | 0. | ROI TYPE: | STANDARD |
| TRACER DPM AT SAMPLE DATE: | 0.000 | CONFIDENCE FACTOR: | 4.65 |
| SAMPLE MATRIX: | SOIL | LLD CONSTANT: | 2.71 |
| ENERGY CAL DATE: | 29-SEP-2005 13:20 | EFF CAL DATE: | 29-SEP-2005 13:20 |
| BKG FILENAME: | B_019_1OCT05 | BKG ELAPSED TIME: | 60005. |
| | | SAF: | 2.31 |

NUCLIDE ACTIVITY SUMMARY

| NUCLIDE | ENERGY | NET AREA | BKG | %ABN | ACTIVITY pCi/ gram | TPU/ERROR 2-SIGMA | MDC pCi/ gram |
|---|---|---|---|---|---|---|---|
| PO-218 | 6003.0 | 178.99 | 1.19 | 100.0 | 2.159E+00 | 5.149E-01 | 2.169E-01 |
| RN-222 | 5490.0 | 142.81 | 2.72 | 99.9 | 1.724E+00 | 4.590E-01 | 2.895E-01 |
| RA-226 | 4785.0 | 115.77 | 2.04 | 100.0 | 1.396E+00 | 4.099E-01 | 2.606E-01 |

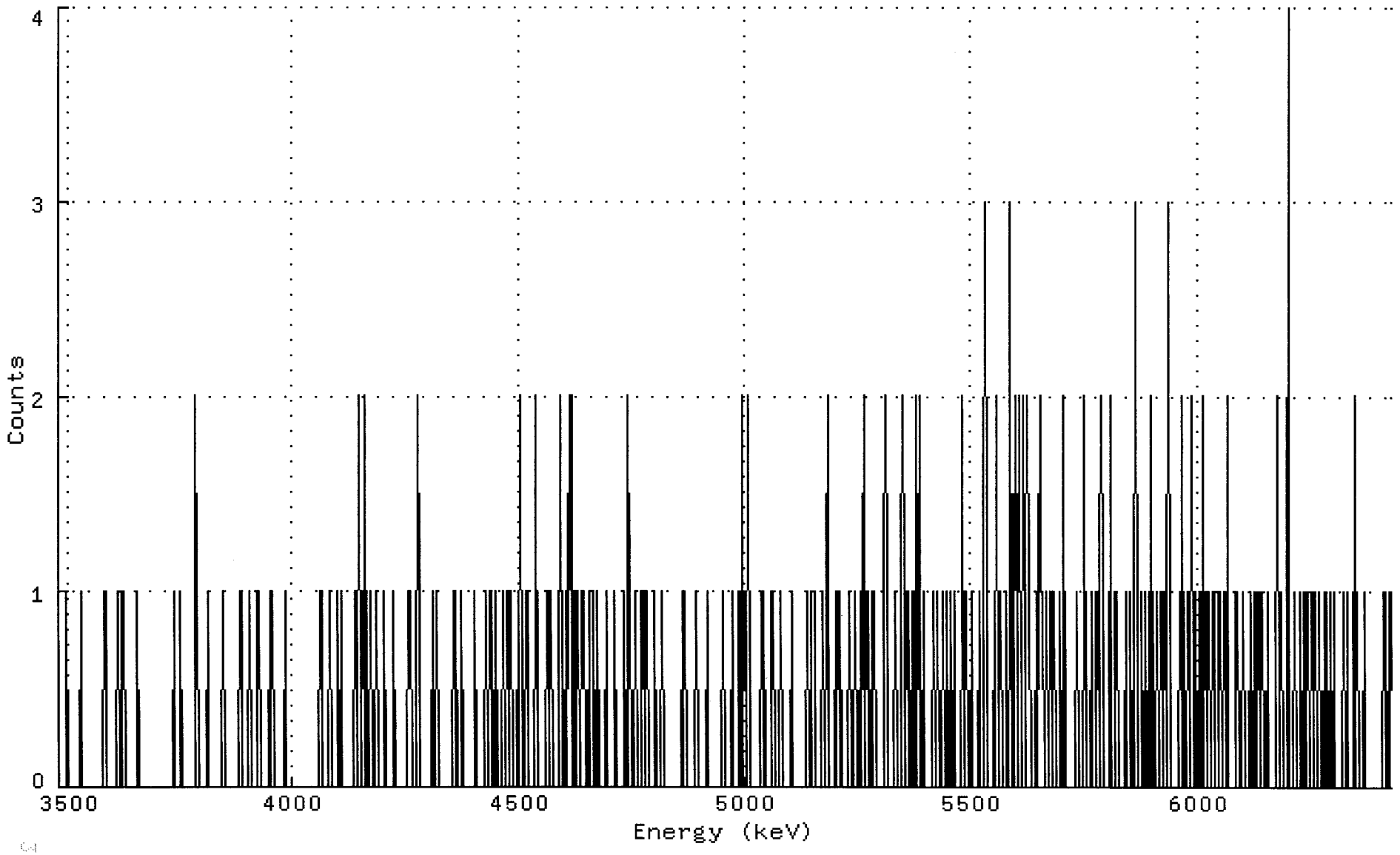
EH Price
Analyst

10.7.05
Date

Reviewer

10/7/05
Date

Spectrum : DKA100:[ALPHA.ALUSR.ARCHIVE.S]S_0509118A-RA$17_RA.CNF;1
Title : 019
Sample Title: VPTR092805SL0J
Start Time: 7-OCT-2005 04:52: Sample Time: 28-SEP-2005 00:00 Energy Offset: 3.46966E+03
Real Time : 0 02:50:06.00 Sample ID : 17 Energy Slope : 3.06748E+00
Live Time : 0 02:50:07.00 Sample Type: RA Energy Quad : -1.74918E-04



Channel Contents for ND_AMS_ARCHIVE_S:S_0509118A-RA$17_RA

Channel

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1: | 10206 | 10207 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 15: | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 29: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 |
| 43: | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 57: | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 71: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 85: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 99: | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 113: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 |
| 127: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 |
| 141: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 |
| 155: | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 169: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 183: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| 197: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 |
| 211: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 2 | 0 |
| 225: | 0 | 1 | 0 | 2 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 0 |
| 239: | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 253: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 |
| 267: | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 281: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 295: | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 309: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 |
| 323: | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 0 |
| 337: | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 2 | 0 | 0 | 0 | 1 | 1 | 0 |
| 351: | 0 | 0 | 0 | 0 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 365: | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 1 | 0 | 1 |
| 379: | 0 | 1 | 2 | 0 | 2 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 1 | 0 |
| 393: | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 407: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 421: | 0 | 1 | 0 | 0 | 2 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 435: | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 449: | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 463: | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 477: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 491: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 505: | 0 | 0 | 0 | 0 | 1 | 0 | 2 | 0 | 1 | 0 | 0 | 2 | 0 | 0 |
| 519: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 |
| 533: | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 547: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 561: | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 575: | 0 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 0 |
| 589: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 |
| 603: | 0 | 1 | 2 | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 0 |
| 617: | 0 | 0 | 0 | 0 | 1 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 631: | 0 | 0 | 0 | 1 | 2 | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 0 |
| 645: | 2 | 0 | 1 | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 659: | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 0 |
| 673: | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 0 | 1 | 0 | 0 |
| 687: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 3 | 1 |
| 701: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 2 | 0 | 0 | 1 | 0 | 0 | 0 |
| 715: | 0 | 1 | 0 | 1 | 3 | 0 | 0 | 1 | 2 | 0 | 1 | 2 | 0 | 0 |
| 729: | 2 | 0 | 1 | 2 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 2 |
| 743: | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 0 |
| 757: | 0 | 1 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 771: | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 0 | 0 | 0 | 0 | 1 | 0 |
| 785: | 0 | 0 | 1 | 1 | 0 | 1 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 2 |
| 799: | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 813: | 0 | 1 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| 827: | 0 | 0 | 1 | 0 | 2 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 1 |
| 841: | 1 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 855: | 2 | 0 | 0 | 0 | 1 | 0 | 0 | 2 | 0 | 0 | 0 | 1 | 0 | 1 |
| 869: | 0 | 0 | 2 | 0 | 1 | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 1 |
| 883: | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 |
| 897: | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 0 |
| 911: | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 0 |
| 925: | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 1 | 1 | 0 | 0 | 0 | 0 |
| 939: | 0 | 4 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 1 |
| 953: | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 1 | 0 |
| 967: | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 |
| 981: | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 2 |
| 995: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1009: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 0 | 1 |
| 1023: | 0 | 0 | | | | | | | | | | | | |

Eberline Services
Oak Ridge Laboratory

Gross Sample Counts Within Peak Regions  Generated:  7-OCT-2005 09:35:45.14

Detector ID: 19  Acquisition Start:  7-OCT-2005 04:52:05.01
Live Time:  0 02:50:07.00  Real Time:  0 02:50:06.00
Batch Id:  0509118A-RA  Sample Id:  17
Sample Type: RA

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 4607.17 | 51 | 0 | 253.07 | 379.02 | 300 | 158 | 5.00E-03 | 14.0 | |
| 2 | 0 | 5309.73 | 63 | 0 | 0.00 | 621.92 | 521 | 179 | 6.17E-03 | 12.6 | |
| 3 | 0 | 5799.40 | 78 | 0 | 0.00 | 795.59 | 719 | 165 | 7.64E-03 | 11.3 | |

Background Counts Within Peak Regions  Generated:  7-OCT-2005 09:35:55.61

Acquisition Start:  1-OCT-2005 10:06:24.01
Live Time:  0 16:40:05.00  Real Time:  0 16:40:05.00

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 4605.64 | 12 | 0 | 251.53 | 378.50 | 300 | 158 | 2.00E-04 | 28.9 | |
| 2 | 0 | 5275.74 | 16 | 0 | 4.51 | 610.00 | 521 | 179 | 2.67E-04 | 25.0 | |
| 3 | 0 | 5814.49 | 7 | 0 | 377.30 | 801.00 | 719 | 165 | 1.17E-04 | 37.8 | |

Net Sample Counts Within Peak Regions  Generated:  7-OCT-2005 09:35:55.85

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 4607.17* | 116 | 0 | 253.07 | 379.02 | 300 | 158 | 1.13E-02 | 14.3 | |
| 2 | 0 | 5309.73* | 143 | 0 | 0.00 | 621.92 | 521 | 179 | 1.40E-02 | 12.8 | |
| 3 | 0 | 5799.40* | 179 | 0 | 0.00 | 795.59 | 719 | 165 | 1.75E-02 | 11.4 | |

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.0 Generated 7-OCT-2005 09:35:56

| | | | |
|---|---|---|---|
| Configuration | : MCA0:[AMSCOUNT]0000C192$1 | | |
| Analyses by | : ROIPEAK V1.2,PEAKEFF V2.2,ENBACK V1.6,NID V3.3 | | |
| Sample title | : VPTR092805SL0J | | |
| Sample date | : 28-SEP-2005 00:00:00 | Acquisition date | : 7-OCT-2005 04:52:05 |
| Sample ID | : 17 | Sample quantity | : 1.1574 gram |
| Sample type | : RA | Sample geometry | : |
| Detector name | : 019 | Detector geometry | : |
| Elapsed live time | : 0 02:50:07.00 | Elapsed real time | : 0 02:50:06.00 0.0% |
| Energy tolerance | : 100.00 keV | Half life ratio | : 8.00 |
| Errors propagated | : Yes | Systematic Error | : 3.00 % |
| Efficiency type | : Average value | Efficiencies at | : Peak Energy |
| Abundance limit | : 75.00 | | |

Post-NID Peak Search Report

| It | Energy | Area | FWHM | Channel | Left | Pw | %Err | Fit | Nuclides | Activity pCi/gram |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 4607.17* | 116253.07 | | 379.02 | 300 | 158 | 28.5 | | RA-226 | 1.40 |
| 0 | 5309.73* | 143 | 0.00 | 621.92 | 521 | 179 | 25.7 | | RN-222 | 1.72 |
| 0 | 5799.40* | 179 | 0.00 | 795.59 | 719 | 165 | 22.8 | | PO-218 | 2.16 |

Eberline Services
Oak Ridge Laboratory

ALPHA SPECTROMETRY REPORT
7-OCT-2005 09:36:20

**********
Spectral File: ND_AMS_ARCHIVE_S:S_0509118A-RA$18_RA.CNF
**********

| | | | |
|---|---|---|---|
| BATCH ID: | 0509118A-RA | SAMPLE ID: | 18 |
| SAMPLE DATE: | 28-SEP-2005 00:00 | ALIQUOT: | 1.090E+00 gram |
| SAMPLE TITLE: | VPTR092805SL0K | DETECTOR NUMBER: | 020 |
| ACQ DATE: | 7-OCT-2005 04:52 | AVERAGE EFFICIENCY: | 19.24% |
| ELAPSED LIVE TIME: | 10206. | RECOVERY: | 87.65% |
| TRACER ID: | NONE | TRACER FWHM (kev): | 0.00 |
| LAMBDA VALUE: | 0. | ROI TYPE: | STANDARD |
| TRACER DPM AT SAMPLE DATE: | 0.000 | CONFIDENCE FACTOR: | 4.65 |
| SAMPLE MATRIX: | SOIL | LLD CONSTANT: | 2.71 |
| ENERGY CAL DATE: | 29-SEP-2005 13:20 | EFF CAL DATE: | 29-SEP-2005 13:20 |
| BKG FILENAME: | B_020_1OCT05 | BKG ELAPSED TIME: | 60002. |
| | | SAF: | 2.27 |

**********

NUCLIDE ACTIVITY SUMMARY

| NUCLIDE | ENERGY | NET AREA | BKG | %ABN | ACTIVITY pCi/ gram | TPU/ERROR 2-SIGMA | MDC pCi/ gram |
|---|---|---|---|---|---|---|---|
| PO-218 | 6003.0 | 81.95 | 2.04 | 100.0 | 1.180E+00 | 4.066E-01 | 3.058E-01 |
| RN-222 | 5490.0 | 102.21 | 2.21 | 99.9 | 1.473E+00 | 4.559E-01 | 3.149E-01 |
| RA-226 | 4785.0 | 103.91 | 0.51 | 100.0 | 1.496E+00 | 4.556E-01 | 1.972E-01 |

**********

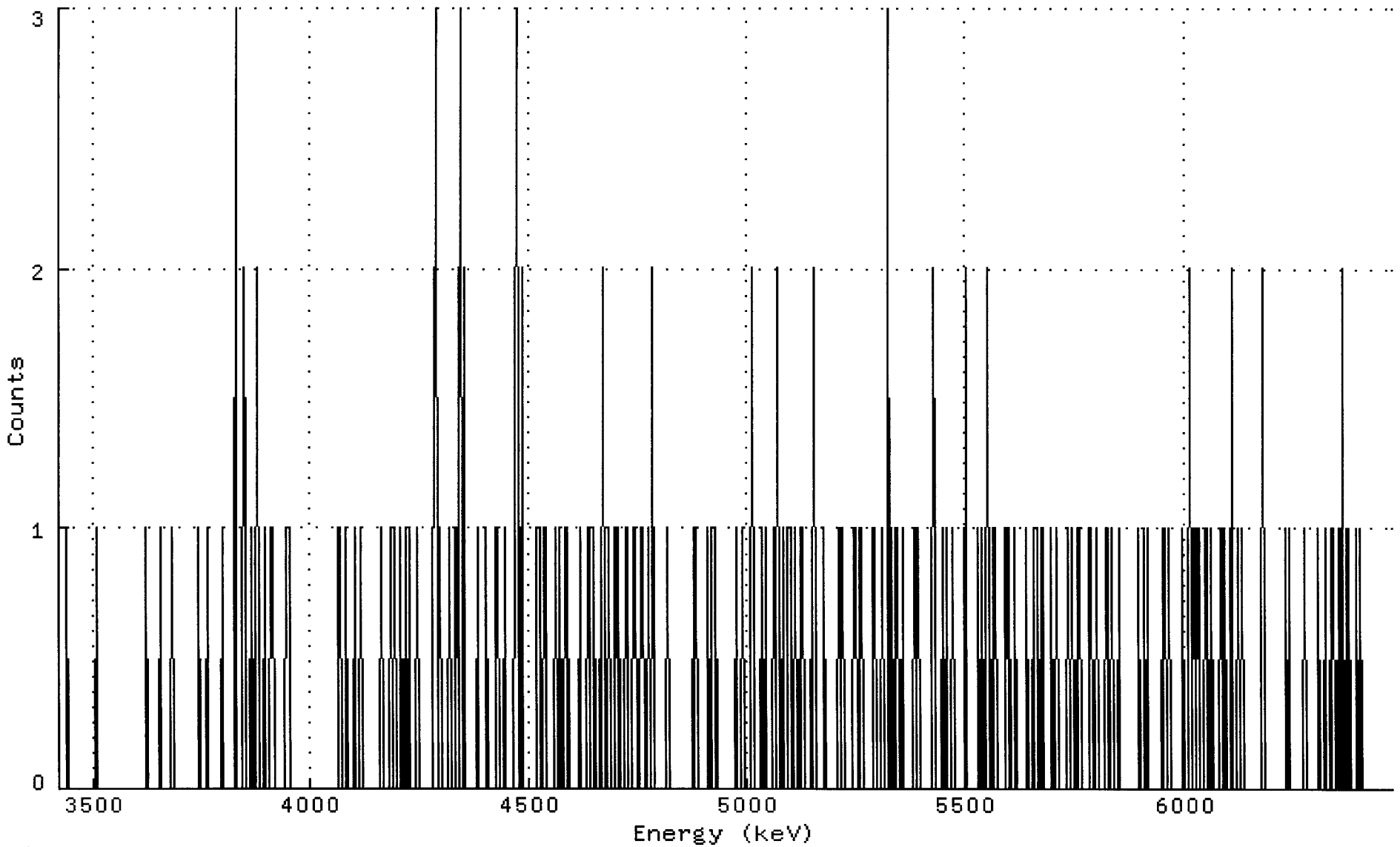
Jeff Price
Analyst

10-7-05
Date

Alan Gregley
Reviewer

10/7/05
Date

Spectrum : DKA100:[ALPHA.ALUSR.ARCHIVE.S]S_0509118A-RA$18_RA.CNF;1
Title : 020
Sample Title: VPTR092805SLOK
Start Time: 7-OCT-2005 04:52: Sample Time: 28-SEP-2005 00:00 Energy Offset: 3.41197E+03
Real Time : 0 02:50:06.00 Sample ID : 18 Energy Slope : 3.17319E+00
Live Time : 0 02:50:06.00 Sample Type: RA Energy Quad : -1.79439E-04



Channel Contents for ND_AMS_ARCHIVE_S:S_0509118A-RA$18_RA

Channel

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1: | 10206 | 10206 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 15: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 29: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 43: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 57: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 71: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 85: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 99: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| 113: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 127: | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 2 | 1 |
| 141: | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 2 | 0 | 0 | 0 | 0 | 1 |
| 155: | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 169: | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 183: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 197: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 |
| 211: | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 |
| 225: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 239: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 |
| 253: | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 267: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| 281: | 3 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 295: | 0 | 1 | 1 | 0 | 1 | 3 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 |
| 309: | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 323: | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 337: | 0 | 0 | 0 | 1 | 3 | 1 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 |
| 351: | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 1 | 1 | 0 | 0 |
| 365: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 |
| 379: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 393: | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 2 |
| 407: | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 0 | 0 |
| 421: | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 1 |
| 435: | 1 | 1 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 2 | 0 | 0 | 0 | 0 |
| 449: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 463: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 477: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 |
| 491: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 505: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 519: | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 |
| 533: | 0 | 0 | 1 | 0 | 0 | 2 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 |
| 547: | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 |
| 561: | 0 | 0 | 0 | 1 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 575: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 |
| 589: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 1 | 0 |
| 603: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 |
| 617: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 3 | 0 | 1 | 0 | 0 | 1 | 0 |
| 631: | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 645: | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 659: | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 |
| 673: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 |
| 687: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 |
| 701: | 2 | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 715: | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 729: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 1 |
| 743: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 |
| 757: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 |
| 771: | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 |
| 785: | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 1 |
| 799: | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 813: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 |
| 827: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 841: | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 855: | 1 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 1 | 1 | 0 | 1 | 1 |
| 869: | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 883: | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 2 | 0 | 0 |
| 897: | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 911: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 |
| 925: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 939: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 953: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 967: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 1 |
| 981: | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 995: | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1009: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1023: | 0 | 0 | | | | | | | | | | | | |

Eberline Services
Oak Ridge Laboratory

Gross Sample Counts Within Peak Regions  Generated:  7-OCT-2005 09:36:01.46

Detector ID: 20  Acquisition Start: 7-OCT-2005 04:52:29.01
Live Time: 0 02:50:06.00  Real Time: 0 02:50:06.00
Batch Id: 0509118A-RA  Sample Id: 18
Sample Type: RA

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 4617.21 | 46 | 0 | 330.01 | 388.35 | 309 | 153 | 4.51E-03 | 14.7 | |
| 2 | 0 | 5261.70 | 46 | 0 | 464.87 | 603.52 | 522 | 173 | 4.51E-03 | 14.7 | |
| 3 | 0 | 5812.89 | 37 | 0 | 3.17 | 792.11 | 713 | 160 | 3.63E-03 | 16.4 | |

Background Counts Within Peak Regions  Generated:  7-OCT-2005 09:36:18.50

Acquisition Start: 1-OCT-2005 10:06:27.01
Live Time: 0 16:40:02.00  Real Time: 0 16:40:02.00

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 4607.05 | 3 | 0 | 342.70 | 385.00 | 309 | 153 | 5.00E-05 | 57.7 | |
| 2 | 0 | 5274.94 | 13 | 0 | 3.17 | 608.00 | 522 | 173 | 2.17E-04 | 27.7 | |
| 3 | 0 | 5814.03 | 12 | 0 | 3.17 | 792.50 | 713 | 160 | 2.00E-04 | 28.9 | |

Net Sample Counts Within Peak Regions  Generated:  7-OCT-2005 09:36:18.74

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 4617.21* | 104 | 0 | 330.01 | 388.35 | 309 | 153 | 1.02E-02 | 14.8 | |
| 2 | 0 | 5261.70* | 102 | 0 | 464.87 | 603.52 | 522 | 173 | 1.00E-02 | 15.1 | |
| 3 | 0 | 5812.89* | 82 | 0 | 3.17 | 792.11 | 713 | 160 | 8.03E-03 | 16.9 | |

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.0 Generated 7-OCT-2005 09:36:19

| | | | |
|---|---|---|---|
| Configuration | : MCA0:[AMSCOUNT]0000C192$1 | | |
| Analyses by | : ROIPEAK V1.2,PEAKEFF V2.2,ENBACK V1.6,NID V3.3 | | |
| Sample title | : VPTR092805SL0K | | |
| Sample date | : 28-SEP-2005 00:00:00 | Acquisition date | : 7-OCT-2005 04:52:29 |
| Sample ID | : 18 | Sample quantity | : 1.0905 gram |
| Sample type | : RA | Sample geometry | : |
| Detector name | : 020 | Detector geometry | : |
| Elapsed live time | : 0 02:50:06.00 | Elapsed real time | : 0 02:50:06.00 0.0% |
| Energy tolerance | : 100.00 keV | Half life ratio | : 8.00 |
| Errors propagated | : Yes | Systematic Error | : 3.00 % |
| Efficiency type | : Average value | Efficiencies at | : Peak Energy |
| Abundance limit | : 75.00 | | |

Post-NID Peak Search Report

| It | Energy | Area | FWHM | Channel | Left | Pw | %Err | Fit | Nuclides | Activity pCi/gram |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 4617.21* | 104330.01 | 388.35 | | 309 | 153 | 29.6 | | RA-226 | 1.31 |
| 0 | 5261.70* | 102464.87 | 603.52 | | 522 | 173 | 30.2 | | RN-222 | 1.29 |
| 0 | 5812.89* | 82 | 3.17 | 792.11 | 713 | 160 | 33.7 | | PO-218 | 1.03 |

Eberline Services
Oak Ridge Laboratory

ALPHA SPECTROMETRY REPORT
7-OCT-2005 09:36:51

Spectral File: ND_AMS_ARCHIVE_S:S_0509118A-RA$19_RA.CNF

| | | | |
|---|---|---|---|
| BATCH ID: | 0509118A-RA | SAMPLE ID: | 19 |
| SAMPLE DATE: | 28-SEP-2005 00:00 | ALIQUOT: 1.013E+00 | gram |
| SAMPLE TITLE: | VPTR092805SL0L | DETECTOR NUMBER: | 021 |
| ACQ DATE: | 7-OCT-2005 04:52 | AVERAGE EFFICIENCY: | 18.34% |
| ELAPSED LIVE TIME: | 10203. | RECOVERY: | 91.36% |
| TRACER ID: | NONE | TRACER FWHM (kev): | 0.00 |
| LAMBDA VALUE: | 0. | ROI TYPE: | STANDARD |
| TRACER DPM AT SAMPLE DATE: | 0.000 | CONFIDENCE FACTOR: | 4.65 |
| SAMPLE MATRIX: | SOIL | LLD CONSTANT: | 2.71 |
| ENERGY CAL DATE: | 29-SEP-2005 13:20 | EFF CAL DATE: 29-SEP-2005 | 13:20 |
| BKG FILENAME: | B_021_1OCT05 | BKG ELAPSED TIME: | 60005. |
| | | SAF: | 2.50 |

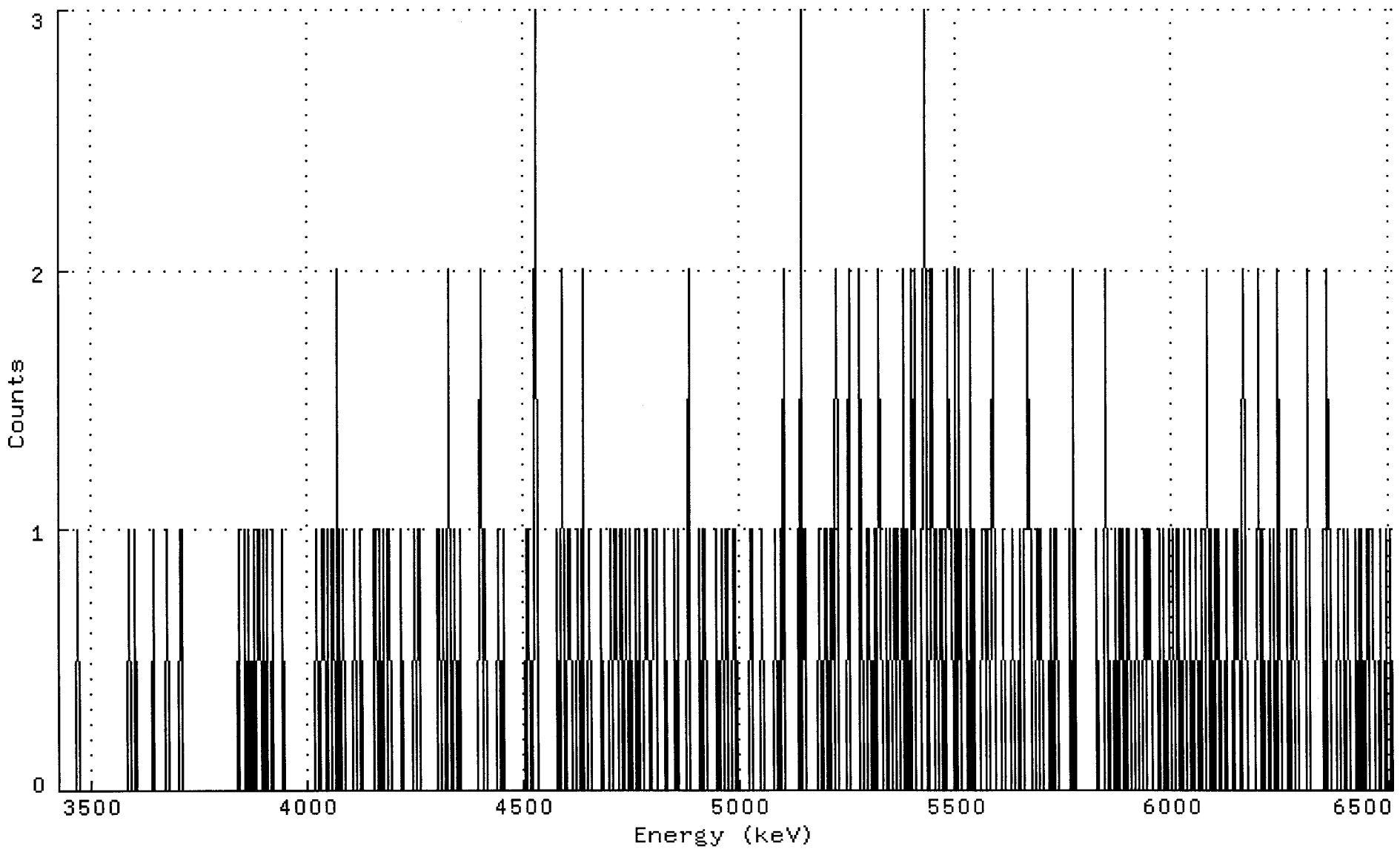
NUCLIDE ACTIVITY SUMMARY

| NUCLIDE | ENERGY | NET AREA | BKG | %ABN | ACTIVITY pCi/ gram | TPU/ERROR 2-SIGMA | MDC pCi/ gram |
|---|---|---|---|---|---|---|---|
| PO-218 | 6003.0 | 118.47 | 1.53 | 100.0 | 1.850E+00 | 5.564E-01 | 3.303E-01 |
| RN-222 | 5490.0 | 198.13 | 1.87 | 99.9 | 3.096E+00 | 7.316E-01 | 3.543E-01 |
| RA-226 | 4785.0 | 105.29 | 2.21 | 100.0 | 1.644E+00 | 5.249E-01 | 3.756E-01 |

Analyst _____ Date 10-7-05

Reviewer _____ Date 10/7/05

Spectrum : DKA100:[ALPHA.ALUSR.ARCHIVE.S]S_0509118A-RA$19_RA.CNF;1
Title : 021
Sample Title: VPTR092805SL0L
Start Time: 7-OCT-2005 04:52: Sample Time: 28-SEP-2005 00:00 Energy Offset: 3.41384E+03
Real Time : 0 02:50:02.00 Sample ID : 19 Energy Slope : 3.18885E+00
Live Time : 0 02:50:03.00 Sample Type: RA Energy Quad : -1.65046E-04



Channel Contents for ND_AMS_ARCHIVE_S:S_0509118A-RA$19_RA

Channel

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1: | 10202 | 10203 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 29: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 43: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 |
| 57: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 71: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 85: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 |
| 99: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 113: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 127: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| 141: | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 1 | 0 | 1 | 0 |
| 155: | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 169: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 183: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 197: | 1 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 2 | 0 |
| 211: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 225: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 |
| 239: | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 |
| 253: | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 267: | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 281: | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 2 | 0 | 0 | 0 |
| 295: | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 309: | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 323: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 337: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 351: | 1 | 0 | 0 | 0 | 1 | 1 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 365: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 2 | 0 |
| 379: | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 2 |
| 393: | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 407: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 1 |
| 421: | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 1 |
| 435: | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 1 | 1 | 1 | 0 |
| 449: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 463: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 0 | 0 | 0 | 0 |
| 477: | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 491: | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 0 |
| 505: | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 519: | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 533: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 1 | 2 | 0 |
| 547: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 3 | 0 | 1 |
| 561: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 575: | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 2 | 1 | 0 | 0 |
| 589: | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 603: | 2 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 0 |
| 617: | 2 | 2 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 1 | 1 |
| 631: | 0 | 1 | 0 | 0 | 1 | 0 | 2 | 0 | 0 | 1 | 0 | 0 | 2 | 1 |
| 645: | 2 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 3 | 1 | 0 | 0 | 1 | 2 |
| 659: | 2 | 0 | 1 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 2 | 1 |
| 673: | 1 | 1 | 0 | 0 | 2 | 0 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 1 |
| 687: | 0 | 0 | 2 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 |
| 701: | 0 | 1 | 0 | 0 | 1 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 715: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 0 |
| 729: | 0 | 0 | 1 | 1 | 1 | 2 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 1 |
| 743: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 1 |
| 757: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 2 |
| 771: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 785: | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 1 | 0 |
| 799: | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 1 |
| 813: | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| 827: | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 841: | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 |
| 855: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 |
| 869: | 0 | 1 | 0 | 0 | 0 | 0 | 2 | 0 | 1 | 0 | 1 | 0 | 1 | 0 |
| 883: | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| 897: | 0 | 1 | 1 | 1 | 0 | 0 | 1 | 2 | 1 | 1 | 0 | 0 | 0 | 0 |
| 911: | 0 | 0 | 0 | 0 | 1 | 1 | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 925: | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 0 |
| 939: | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 953: | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 967: | 0 | 0 | 1 | 0 | 0 | 2 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 981: | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 |
| 995: | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 1 |
| 1009: | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 1023: | 0 | 0 | | | | | | | | | | | | |

Eberline Services
Oak Ridge Laboratory

Gross Sample Counts Within Peak Regions  Generated:  7-OCT-2005 09:36:24.06

Detector ID: 21  Acquisition Start:  7-OCT-2005 04:52:50.01
Live Time:  0 02:50:03.00  Real Time:  0 02:50:02.00
Batch Id:  0509118A-RA  Sample Id:  19
Sample Type: RA

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 4631.53 | 43 | 0 | 247.87 | 389.72 | 306 | 152 | 4.21E-03 | 15.2 | |
| 2 | 0 | 5324.99 | 80 | 0 | 432.89 | 619.16 | 518 | 170 | 7.84E-03 | 11.2 | |
| 3 | 0 | 5799.14 | 48 | 0 | 0.00 | 779.46 | 706 | 158 | 4.70E-03 | 14.4 | |

Background Counts Within Peak Regions  Generated:  7-OCT-2005 09:36:48.81

Acquisition Start:  1-OCT-2005 10:06:29.01
Live Time:  0 16:40:05.00  Real Time:  0 16:40:05.00

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 4606.37 | 13 | 0 | 382.66 | 381.50 | 306 | 152 | 2.17E-04 | 27.7 | |
| 2 | 0 | 5275.21 | 11 | 0 | 3.19 | 602.50 | 518 | 170 | 1.83E-04 | 30.2 | |
| 3 | 0 | 5813.92 | 9 | 0 | 274.24 | 784.50 | 706 | 158 | 1.50E-04 | 33.3 | |

Net Sample Counts Within Peak Regions  Generated:  7-OCT-2005 09:36:49.07

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 4631.53* | 105 | 0 | 247.87 | 389.72 | 306 | 152 | 1.03E-02 | 15.6 | |
| 2 | 0 | 5324.99* | 198 | 0 | 432.89 | 619.16 | 518 | 170 | 1.94E-02 | 11.3 | |
| 3 | 0 | 5799.14* | 118 | 0 | 0.00 | 779.46 | 706 | 158 | 1.16E-02 | 14.6 | |

Flag: "*" = Peak area was modified by background subtraction

VMS Nuclide Identification Report V3.0 Generated 7-OCT-2005 09:36:50

Configuration : MCA0:[AMSCOUNT]0000C192$1
Analyses by : ROIPEAK V1.2,PEAKEFF V2.2,ENBACK V1.6,NID V3.3
Sample title : VPTR092805SL0L
Sample date : 28-SEP-2005 00:00:00 Acquisition date : 7-OCT-2005 04:52:50
Sample ID : 19 Sample quantity : 1.0125 gram
Sample type : RA Sample geometry :
Detector name : 021 Detector geometry:
Elapsed live time: 0 02:50:03.00 Elapsed real time: 0 02:50:02.00 0.0%
Energy tolerance : 100.00 keV Half life ratio : 8.00
Errors propagated: Yes Systematic Error : 3.00 %
Efficiency type : Average value Efficiencies at : Peak Energy
Abundance limit : 75.00

Post-NID Peak Search Report

| It | Energy | Area | FWHM | Channel | Left | Pw | %Err | Fit | Nuclides | Activity pCi/gram |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 4631.53* | 105247.87 | 389.72 | 306 | 152 | 31.2 | | | RA-226 | 1.50 |
| 0 | 5324.99* | 198432.89 | 619.16 | 518 | 170 | 22.6 | | | RN-222 | 2.83 |
| 0 | 5799.14* | 118 | 0.00 | 779.46 | 706 | 158 | 29.3 | | PO-218 | 1.69 |

MR 10/6/05

VAX/VMS Peak Search Report Generated 6-OCT-2005 13:39:24.92

Configuration : DKA100:[GAMMA.SCUSR.ARCHIVE]SMP_050911801_GE5_BAFIL_88885.CNF
Analyses by : PEAK V16.9 PEAKEFF V2.2
Client ID : SPIKE
Deposition Date :
Sample Date : 6-OCT-2005 00:00:00. Acquisition date : 6-OCT-2005 13:29:05.
Sample ID : 0509118-01 Sample Quantity : 1.00000E+00 FILTER
Sample type : FILTER Sample Geometry : 0
Detector name : GE5 Detector Geometry: BAFIL
Elapsed live time: 0 00:10:00.00 Elapsed real time: 0 00:10:00.84 0.1%
Start channel : 25 End channel : 4096
Sensitivity : 3.00000 Gaussian : 10.00000
Critical level : No

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 5.25 | 10 | 10 | 0.41 | 47.81 | 41 | 11 | 1.62E-02 | 72.7 | |
| 2 | 0 | 21.12 | 76 | 29 | 0.60 | 200.68 | 192 | 18 | 1.27E-01 | 18.8 | |
| 3 | 0 | 30.94 | 1588 | 50 | 0.81 | 295.38 | 282 | 30 | 2.65E+00 | 2.8 | |
| 4 | 2 | 34.99 | 343 | 14 | 0.81 | 334.36 | 325 | 27 | 5.71E-01 | 5.9 | 2.59E+00 |
| 5 | 2 | 35.82 | 98 | 9 | 0.74 | 342.35 | 325 | 27 | 1.64E-01 | 19.7 | |
| 6 | 0 | 53.66 | 12 | 27 | 0.34 | 514.32 | 502 | 16 | 2.06E-02 | 85.1 | |
| 7 | 0 | 61.83 | 178 | 39 | 0.44 | 593.03 | 581 | 24 | 2.96E-01 | 10.9 | |
| 8 | 0 | 66.08 | 84 | 25 | 0.82 | 633.93 | 620 | 31 | 1.40E-01 | 18.6 | |
| 9 | 0 | 81.13 | 580 | 69 | 0.65 | 779.00 | 767 | 24 | 9.66E-01 | 5.3 | |
| 10 | 0 | 111.95 | 151 | 28 | 0.79 | 1075.98 | 1063 | 24 | 2.52E-01 | 11.3 | |
| 11 | 0 | 303.00 | 112 | 6 | 0.81 | 2917.04 | 2903 | 25 | 1.86E-01 | 10.5 | |
| 12 | 0 | 333.64 | 30 | 4 | 1.06 | 3212.31 | 3196 | 25 | 4.93E-02 | 24.8 | |
| 13 | 0 | 356.14 | 258 | 25 | 0.87 | 3429.17 | 3414 | 27 | 4.29E-01 | 7.5 | |
| 14 | 0 | 383.82 | 43 | 5 | 1.01 | 3695.91 | 3681 | 24 | 7.25E-02 | 18.7 | |
| 15 | 3 | 386.32 | 60 | 2 | 1.02 | 3720.00 | 3712 | 24 | 9.97E-02 | 14.5 | 4.74E+00 |
| 16 | 3 | 387.02 | 87 | 8 | 0.74 | 3726.76 | 3712 | 24 | 1.45E-01 | 13.3 | |
| 17 | 3 | 387.57 | 10 | 6 | 1.02 | 3732.00 | 3712 | 24 | 1.75E-02 | 73.2 | |

Sample ID : 0509118-01 Acquisition date : 6-OCT-2005 13:29:05

Total number of lines in spectrum 17
Number of unidentified lines 12
Number of lines tentatively identified by NID 5 29.41%

Nuclide Type : FISSION

| Nuclide | Hlife | Decay | Wtd Mean Uncorrected pCi/FILTER | Wtd Mean Decay Corr pCi/FILTER | Decay Corr 2-Sigma Error | 2-Sigma %Error | Flags |
|---|---|---|---|---|---|---|---|
| BA-133 | 10.50Y | 1.00 | 4.596E+02 | 4.596E+02 | 0.770E+02 | 16.74 | |
| | Total Activity : | | 4.596E+02 | 4.596E+02 | | | |

Nuclide Type : NATURAL

| Nuclide | Hlife | Decay | Wtd Mean Uncorrected pCi/FILTER | Wtd Mean Decay Corr pCi/FILTER | Decay Corr 2-Sigma Error | 2-Sigma %Error | Flags |
|---|---|---|---|---|---|---|---|
| TH-234 | 4.47E+09Y | 1.00 | 2.110E+03 | 2.110E+03 | 0.529E+03 | 25.09 | |
| | Total Activity : | | 2.110E+03 | 2.110E+03 | | | |

Grand Total Activity : 2.569E+03 2.569E+03

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : 0509118-01 Acquisition date : 6-OCT-2005 13:29:05

Nuclide Type: FISSION

| Nuclide | Energy | %Abn | %Eff | Uncorrected pCi/FILTER | Decay Corr pCi/FILTER | 2-Sigma %Error | Status |
|---|---|---|---|---|---|---|---|
| BA-133 | 81.00 | 33.00* | 1.839E+01 | 4.304E+02 | 4.304E+02 | 18.59 | OK |
| | 302.84 | 17.80 | 3.440E+00 | 8.221E+02 | 8.222E+02 | 34.28 | OK |
| | 356.01 | 60.00 | 1.579E+00 | 1.224E+03 | 1.225E+03 | 33.31 | <<WM N-Sigma |

Final Mean for 2 Valid Peaks = 4.596E+02+/- 7.697E+01 ( 16.74%)

Nuclide Type: NATURAL

| Nuclide | Energy | %Abn | %Eff | Uncorrected pCi/FILTER | Decay Corr pCi/FILTER | 2-Sigma %Error | Status |
|---|---|---|---|---|---|---|---|
| TH-234 | 63.29 | 3.80* | 9.987E+00 | 2.110E+03 | 2.110E+03 | 25.09 | OK |

Final Mean for 1 Valid Peaks = 2.110E+03+/- 5.294E+02 ( 25.09%)

Flag: "*" = Keyline

Sample ID : 0509118-01 Acquisition date : 6-OCT-2005 13:29:05

---- Identified Nuclides ----

| Nuclide | Activity (pCi/FILTER) | Act error | MDA (pCi/FILTER) | MDA error | Act/MDA |
|---|---|---|---|---|---|
| BA-133 | 4.596E+02 | 7.697E+01 | 2.167E+01 | 3.200E+00 | 21.207 |
| TH-234 | 2.110E+03 | 5.294E+02 | 3.410E+02 | 3.980E+01 | 6.188 |

---- Non-Identified Nuclides ----

| Nuclide | Key-Line Activity (pCi/FILTER) | K.L. Ided | Act error | MDA (pCi/FILTER) | MDA error | Act/MDA |
|---|---|---|---|---|---|---|
| CO-57 | -3.629E-01 | | 2.249E+00 | 4.164E+00 | 1.732E-01 | -0.087 |
| CD-109 | -1.130E+01 | | 7.226E+01 | 1.314E+02 | 7.180E+00 | -0.086 |
| PA-231 | -1.320E+06 | | 3.739E+11 | 5.527E+07 | 1.565E+13 | -0.024 |
| PA-234 | 2.162E+04 | + | 1.032E+06 | 1.282E+04 | 6.117E+05 | 1.686 |
| NP-237 | 1.966E+00 | | 2.215E+01 | 4.167E+01 | 2.343E+00 | 0.047 |
| AM-241 | 2.648E+01 | | 2.711E+01 | 4.796E+01 | 6.811E+00 | 0.552 |

MR 10.6.05

VAX/VMS Peak Search Report Generated 6-OCT-2005 14:32:58.57

Configuration : DKA100:[GAMMA.SCUSR.ARCHIVE]SMP_050911802_GE5_BAFIL_88892.CNF
Analyses by : PEAK V16.9 PEAKEFF V2.2
Client ID : BLANK
Deposition Date :
Sample Date : 6-OCT-2005 00:00:00. Acquisition date : 6-OCT-2005 14:22:35.
Sample ID : 0509118-02 Sample Quantity : 1.00000E+00 FILTER
Sample type : FILTER Sample Geometry : 0
Detector name : GE5 Detector Geometry: BAFIL
Elapsed live time: 0 00:10:00.00 Elapsed real time: 0 00:10:00.79 0.1%
Start channel : 25 End channel : 4096
Sensitivity : 3.00000 Gaussian : 10.00000
Critical level : No

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 6.46 | 8 | 12 | 0.14 | 59.42 | 44 | 17 | 1.30E-02 | 110.8 | |
| 2 | 0 | 21.30 | 47 | 32 | 0.76 | 202.45 | 193 | 19 | 7.90E-02 | 30.5 | |
| 3 | 0 | 30.94 | 1558 | 56 | 0.85 | 295.38 | 283 | 24 | 2.60E+00 | 2.8 | |
| 4 | 2 | 35.09 | 334 | 14 | 0.81 | 335.36 | 325 | 27 | 5.57E-01 | 6.0 | 9.21E-01 |
| 5 | 2 | 36.13 | 57 | 9 | 0.74 | 345.35 | 325 | 27 | 9.46E-02 | 19.3 | |
| 6 | 0 | 53.24 | 45 | 22 | 0.35 | 510.23 | 499 | 19 | 7.55E-02 | 25.9 | |
| 7 | 0 | 61.70 | 175 | 21 | 0.98 | 591.73 | 574 | 27 | 2.91E-01 | 9.9 | |
| 8 | 0 | 81.09 | 569 | 55 | 0.72 | 778.64 | 766 | 23 | 9.48E-01 | 5.1 | |
| 9 | 0 | 92.85 | 7 | 6 | 0.38 | 891.89 | 884 | 12 | 1.14E-02 | 73.0 | |
| 10 | 0 | 112.05 | 115 | 44 | 0.73 | 1076.97 | 1065 | 20 | 1.92E-01 | 15.2 | |
| 11 | 0 | 116.03 | 26 | 17 | 0.59 | 1115.33 | 1104 | 20 | 4.40E-02 | 37.6 | |
| 12 | 0 | 160.62 | 24 | 10 | 0.89 | 1544.98 | 1528 | 25 | 4.03E-02 | 32.9 | |
| 13 | 0 | 197.61 | 14 | 4 | 0.25 | 1901.48 | 1894 | 14 | 2.25E-02 | 35.6 | |
| 14 | 0 | 276.44 | 24 | 2 | 0.67 | 2661.13 | 2650 | 19 | 4.01E-02 | 23.4 | |
| 15 | 0 | 302.88 | 79 | 0 | 0.61 | 2915.90 | 2903 | 23 | 1.32E-01 | 11.3 | |
| 16 | 1 | 333.71 | 50 | 7 | 0.98 | 3213.00 | 3200 | 26 | 8.32E-02 | 17.3 | 1.38E+00 |
| 17 | 1 | 334.33 | 16 | 1 | 0.88 | 3218.95 | 3200 | 26 | 2.68E-02 | 42.2 | |
| 18 | 0 | 356.10 | 301 | 3 | 0.77 | 3428.75 | 3414 | 27 | 5.02E-01 | 5.9 | |
| 19 | 7 | 383.83 | 65 | 2 | 1.11 | 3696.01 | 3684 | 22 | 1.09E-01 | 13.6 | 4.08E-01 |
| 20 | 7 | 384.57 | 17 | 1 | 0.49 | 3703.07 | 3684 | 22 | 2.83E-02 | 26.7 | |
| 21 | 0 | 386.96 | 88 | 20 | 1.07 | 3726.19 | 3711 | 27 | 1.46E-01 | 15.1 | |
| 22 | 0 | 391.09 | 25 | 4 | 0.58 | 3765.92 | 3752 | 22 | 4.11E-02 | 27.0 | |

Sample ID : 0509118-02 Acquisition date : 6-OCT-2005 14:22:35

Total number of lines in spectrum 22
Number of unidentified lines 16
Number of lines tentatively identified by NID 6 27.27%

Nuclide Type : FISSION

| Nuclide | Hlife | Decay | Wtd Mean Uncorrected pCi/FILTER | Wtd Mean Decay Corr pCi/FILTER | Decay Corr 2-Sigma Error | 2-Sigma %Error | Flags |
|---|---|---|---|---|---|---|---|
| BA-133 | 10.50Y | 1.00 | 4.422E+02 | 4.422E+02 | 0.725E+02 | 16.39 | |
| Total Activity : | | | 4.422E+02 | 4.422E+02 | | | |

Nuclide Type : NATURAL

| Nuclide | Hlife | Decay | Wtd Mean Uncorrected pCi/FILTER | Wtd Mean Decay Corr pCi/FILTER | Decay Corr 2-Sigma Error | 2-Sigma %Error | Flags |
|---|---|---|---|---|---|---|---|
| TH-234 | 4.47E+09Y | 1.00 | 2.074E+03 | 2.074E+03 | 0.483E+03 | 23.27 | |
| Total Activity : | | | 2.074E+03 | 2.074E+03 | | | |

Grand Total Activity : 2.516E+03 2.516E+03

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : 0509118-02 Acquisition date : 6-OCT-2005 14:22:35

Nuclide Type: FISSION

| Nuclide | Energy | %Abn | %Eff | Uncorrected pCi/FILTER | Decay Corr pCi/FILTER | 2-Sigma %Error | Status |
|---|---|---|---|---|---|---|---|
| BA-133 | 81.00 | 33.00* | 1.839E+01 | 4.223E+02 | 4.223E+02 | 18.34 | OK |
| | 302.84 | 17.80 | 3.440E+00 | 5.812E+02 | 5.812E+02 | 35.23 | OK |
| | 356.01 | 60.00 | 1.579E+00 | 1.431E+03 | 1.431E+03 | 31.99 | <<WM N-Sigma |

Final Mean for 2 Valid Peaks = 4.422E+02+/- 7.246E+01 ( 16.39%)

Nuclide Type: NATURAL

| Nuclide | Energy | %Abn | %Eff | Uncorrected pCi/FILTER | Decay Corr pCi/FILTER | 2-Sigma %Error | Status |
|---|---|---|---|---|---|---|---|
| TH-234 | 63.29 | 3.80* | 9.987E+00 | 2.074E+03 | 2.074E+03 | 23.27 | OK |

Final Mean for 1 Valid Peaks = 2.074E+03+/- 4.827E+02 ( 23.27%)

Flag: "*" = Keyline

Sample ID : 0509118-02 Acquisition date : 6-OCT-2005 14:22:35

---- Identified Nuclides ----

| Nuclide | Activity (pCi/FILTER) | Act error | MDA (pCi/FILTER) | MDA error | Act/MDA |
|---|---|---|---|---|---|
| BA-133 | 4.422E+02 | 7.246E+01 | 1.807E+01 | 2.667E+00 | 24.480 |
| TH-234 | 2.074E+03 | 4.827E+02 | 4.046E+02 | 4.723E+01 | 5.126 |

---- Non-Identified Nuclides ----

| Nuclide | Key-Line Activity (pCi/FILTER) | K.L. Ided | Act error | MDA (pCi/FILTER) | MDA error | Act/MDA |
|---|---|---|---|---|---|---|
| CO-57 | 8.723E-01 | | 1.990E+00 | 4.104E+00 | 1.708E-01 | 0.213 |
| CD-109 | 6.274E+01 | | 6.376E+01 | 1.373E+02 | 7.501E+00 | 0.457 |
| PA-231 | -2.437E+07 | | 6.901E+12 | 3.909E+07 | 1.107E+13 | -0.623 |
| PA-234 | 1.346E+04 | + | 6.422E+05 | 1.126E+04 | 5.372E+05 | 1.195 |
| NP-237 | -1.534E+01 | | 2.161E+01 | 3.595E+01 | 2.021E+00 | -0.427 |
| AM-241 | 1.360E-01 | | 2.363E+01 | 3.654E+01 | 5.190E+00 | 0.004 |

VAX/VMS Peak Search Report Generated 6-OCT-2005 14:44:57.66 MR 10-6-05

Configuration : DKA100:[GAMMA.SCUSR.ARCHIVE]SMP_050911803_GE5_BAFIL_88894.CNF
Analyses by : PEAK V16.9 PEAKEFF V2.2
Client ID : VPBR092705SL17
Deposition Date :
Sample Date : 6-OCT-2005 00:00:00. Acquisition date : 6-OCT-2005 14:34:31.
Sample ID : 0509118-03 Sample Quantity : 1.00000E+00 FILTER
Sample type : FILTER Sample Geometry : 0
Detector name : GE5 Detector Geometry: BAFIL
Elapsed live time: 0 00:10:00.00 Elapsed real time: 0 00:10:00.79 0.1%
Start channel : 25 End channel : 4096
Sensitivity : 3.00000 Gaussian : 10.00000
Critical level : No

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 21.21 | 51 | 24 | 0.43 | 201.60 | 192 | 16 | 8.46E-02 | 23.2 | |
| 2 | 1 | 28.45 | 54 | 21 | 0.72 | 271.37 | 258 | 53 | 9.07E-02 | 21.7 | 5.36E+00 |
| 3 | 1 | 29.04 | 31 | 19 | 0.66 | 277.00 | 258 | 53 | 5.10E-02 | 38.5 | |
| 4 | 1 | 30.99 | 1271 | 17 | 0.73 | 295.82 | 258 | 53 | 2.12E+00 | 3.0 | |
| 5 | 2 | 35.06 | 338 | 4 | 0.73 | 335.06 | 324 | 31 | 5.64E-01 | 5.6 | 2.05E+00 |
| 6 | 2 | 35.89 | 64 | 1 | 0.67 | 343.00 | 324 | 31 | 1.06E-01 | 28.1 | |
| 7 | 1 | 61.31 | 47 | 20 | 0.72 | 588.00 | 579 | 29 | 7.81E-02 | 31.1 | 1.72E+00 |
| 8 | 1 | 61.93 | 144 | 16 | 0.72 | 594.00 | 579 | 29 | 2.39E-01 | 10.9 | |
| 9 | 0 | 66.16 | 89 | 12 | 0.42 | 634.70 | 623 | 24 | 1.49E-01 | 13.7 | |
| 10 | 6 | 79.87 | 34 | 0 | 0.76 | 766.84 | 762 | 28 | 5.69E-02 | 18.1 | 1.31E+00 |
| 11 | 6 | 81.09 | 560 | 0 | 0.72 | 778.62 | 762 | 28 | 9.34E-01 | 4.3 | |
| 12 | 0 | 111.77 | 145 | 15 | 0.46 | 1074.29 | 1058 | 28 | 2.41E-01 | 10.4 | |
| 13 | 0 | 116.08 | 35 | 11 | 0.49 | 1115.77 | 1106 | 17 | 5.85E-02 | 25.2 | |
| 14 | 4 | 301.89 | 14 | 2 | 1.05 | 2906.36 | 2903 | 23 | 2.29E-02 | 17.4 | 5.03E-01 |
| 15 | 4 | 302.96 | 57 | 7 | 0.90 | 2916.70 | 2903 | 23 | 9.54E-02 | 16.9 | |
| 16 | 0 | 333.77 | 43 | 9 | 0.77 | 3213.53 | 3195 | 26 | 7.23E-02 | 21.1 | |
| 17 | 0 | 356.10 | 250 | 12 | 0.89 | 3428.77 | 3414 | 27 | 4.17E-01 | 7.0 | |
| 18 | 1 | 383.62 | 161 | 2 | 1.01 | 3694.00 | 3682 | 25 | 2.68E-01 | 6.1 | 1.46E+01 |
| 19 | 1 | 384.25 | 10 | 2 | 1.01 | 3700.00 | 3682 | 25 | 1.73E-02 | 88.7 | |
| 20 | 0 | 386.96 | 101 | 13 | 0.63 | 3726.17 | 3712 | 25 | 1.68E-01 | 12.3 | |

Sample ID : 0509118-03 Acquisition date : 6-OCT-2005 14:34:31

Total number of lines in spectrum 20
Number of unidentified lines 14
Number of lines tentatively identified by NID 6 30.00%

Nuclide Type : FISSION

| Nuclide | Hlife | Decay | Wtd Mean Uncorrected pCi/FILTER | Wtd Mean Decay Corr pCi/FILTER | Decay Corr 2-Sigma Error | 2-Sigma %Error | Flags |
|---|---|---|---|---|---|---|---|
| BA-133 | 10.50Y | 1.00 | 4.166E+02 | 4.166E+02 | 0.677E+02 | 16.25 | |
| | Total Activity : | | 4.166E+02 | 4.166E+02 | | | |

Nuclide Type : NATURAL

| Nuclide | Hlife | Decay | Wtd Mean Uncorrected pCi/FILTER | Wtd Mean Decay Corr pCi/FILTER | Decay Corr 2-Sigma Error | 2-Sigma %Error | Flags |
|---|---|---|---|---|---|---|---|
| TH-234 | 4.47E+09Y | 1.00 | 1.704E+03 | 1.704E+03 | 0.426E+03 | 25.03 | |
| AM-241 | 432.20Y | 1.00 | 7.165E+01 | 7.165E+01 | 4.587E+01 | 64.02 | |
| | Total Activity : | | 1.776E+03 | 1.776E+03 | | | |

Grand Total Activity : 2.192E+03 2.192E+03

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : 0509118-03 Acquisition date : 6-OCT-2005 14:34:31

Nuclide Type: FISSION

| Nuclide | Energy | %Abn | %Eff | Uncorrected pCi/FILTER | Decay Corr pCi/FILTER | 2-Sigma %Error | Status |
|---|---|---|---|---|---|---|---|
| BA-133 | 81.00 | 33.00* | 1.839E+01 | 4.159E+02 | 4.159E+02 | 17.53 | OK |
| | 302.84 | 17.80 | 3.440E+00 | 4.210E+02 | 4.210E+02 | 43.28 | OK |
| | 356.01 | 60.00 | 1.579E+00 | 1.188E+03 | 1.188E+03 | 32.88 | <<WM N-Sigma |

Final Mean for 2 Valid Peaks = 4.166E+02+/- 6.769E+01 ( 16.25%)

Nuclide Type: NATURAL

| Nuclide | Energy | %Abn | %Eff | Uncorrected pCi/FILTER | Decay Corr pCi/FILTER | 2-Sigma %Error | Status |
|---|---|---|---|---|---|---|---|
| TH-234 | 63.29 | 3.80* | 9.987E+00 | 1.704E+03 | 1.704E+03 | 25.03 | OK |

Final Mean for 1 Valid Peaks = 1.704E+03+/- 4.264E+02 ( 25.03%)

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| AM-241 | 59.54 | 35.90* | 8.208E+00 | 7.165E+01 | 7.165E+01 | 64.02 | OK |

Final Mean for 1 Valid Peaks = 7.165E+01+/- 4.587E+01 ( 64.02%)

Flag: "*" = Keyline

Sample ID : 0509118-03 Acquisition date : 6-OCT-2005 14:34:31

---- Identified Nuclides ----

| Nuclide | Activity (pCi/FILTER) | Act error | MDA (pCi/FILTER) | MDA error | Act/MDA |
|---|---|---|---|---|---|
| BA-133 | 4.166E+02 | 6.769E+01 | 1.482E+01 | 2.188E+00 | 28.117 |
| TH-234 | 1.704E+03 | 4.264E+02 | 2.576E+02 | 3.007E+01 | 6.614 |
| AM-241 | 7.165E+01 | 4.587E+01 | 3.497E+01 | 4.966E+00 | 2.049 |

---- Non-Identified Nuclides ----

| Nuclide | Key-Line Activity (pCi/FILTER) | K.L. Ided | Act error | MDA (pCi/FILTER) | MDA error | Act/MDA |
|---|---|---|---|---|---|---|
| CO-57 | -3.759E-02 | | 2.173E+00 | 4.131E+00 | 1.719E-01 | -0.009 |
| CD-109 | 3.423E+01 | | 7.230E+01 | 1.430E+02 | 7.812E+00 | 0.239 |
| PA-231 | -2.355E+07 | | 6.667E+12 | 4.752E+07 | 1.346E+13 | -0.496 |
| PA-234 | 1.441E+04 | + | 6.873E+05 | 1.138E+04 | 5.430E+05 | 1.266 |
| NP-237 | 8.373E-01 | | 2.086E+01 | 3.927E+01 | 2.208E+00 | 0.021 |

VAX/VMS Peak Search Report Generated 6-OCT-2005 15:48:12.86 MR 10.6.05

Configuration : DKA100:[GAMMA.SCUSR.ARCHIVE]SMP_050911804_GE5_BAFIL_88902.CNF
Analyses by : PEAK V16.9 PEAKEFF V2.2
Client ID : VPBR0927005SL17
Deposition Date :
Sample Date : 6-OCT-2005 00:00:00. Acquisition date : 6-OCT-2005 15:37:54.
Sample ID : 0509118-04 Sample Quantity : 1.00000E+00 FILTER
Sample type : FILTER Sample Geometry : 0
Detector name : GE5 Detector Geometry: BAFIL
Elapsed live time: 0 00:10:00.00 Elapsed real time: 0 00:10:00.79 0.1%
Start channel : 25 End channel : 4096
Sensitivity : 3.00000 Gaussian : 10.00000
Critical level : No

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 6.76 | 10 | 14 | 0.65 | 62.35 | 46 | 19 | 1.71E-02 | 93.4 | |
| 2 | 0 | 8.54 | 9 | 0 | 0.15 | 79.44 | 75 | 10 | 1.50E-02 | 33.3 | |
| 3 | 0 | 10.23 | 9 | 3 | 0.12 | 95.79 | 90 | 11 | 1.56E-02 | 47.2 | |
| 4 | 1 | 20.94 | 19 | 38 | 0.64 | 199.00 | 191 | 18 | 3.18E-02 | 68.8 | 1.61E+00 |
| 5 | 1 | 21.41 | 16 | 19 | 0.65 | 203.52 | 191 | 18 | 2.63E-02 | 62.4 | |
| 6 | 0 | 30.96 | 1426 | 69 | 0.75 | 295.57 | 283 | 32 | 2.38E+00 | 3.1 | |
| 7 | 4 | 35.09 | 264 | 32 | 0.77 | 335.30 | 324 | 27 | 4.40E-01 | 8.0 | 1.52E+00 |
| 8 | 4 | 35.85 | 69 | 16 | 0.81 | 342.70 | 324 | 27 | 1.16E-01 | 26.1 | |
| 9 | 0 | 53.36 | 28 | 7 | 0.79 | 511.43 | 504 | 15 | 4.73E-02 | 25.8 | |
| 10 | 0 | 61.79 | 196 | 11 | 0.87 | 592.67 | 582 | 22 | 3.27E-01 | 8.0 | |
| 11 | 1 | 65.56 | 42 | 11 | 0.73 | 629.00 | 621 | 27 | 7.03E-02 | 28.2 | 3.37E+00 |
| 12 | 1 | 66.19 | 93 | 14 | 0.73 | 635.00 | 621 | 27 | 1.56E-01 | 13.9 | |
| 13 | 1 | 79.62 | 39 | 9 | 0.68 | 764.40 | 758 | 32 | 6.57E-02 | 20.4 | 8.93E-01 |
| 14 | 1 | 81.09 | 551 | 14 | 0.74 | 778.59 | 758 | 32 | 9.19E-01 | 4.5 | |
| 15 | 0 | 111.87 | 149 | 19 | 0.74 | 1075.27 | 1060 | 28 | 2.48E-01 | 10.7 | |
| 16 | 2 | 116.09 | 56 | 24 | 0.96 | 1115.92 | 1104 | 29 | 9.41E-02 | 22.2 | 4.63E+00 |
| 17 | 2 | 116.93 | 30 | 17 | 0.79 | 1124.00 | 1104 | 29 | 5.03E-02 | 30.6 | |
| 18 | 0 | 156.15 | 7 | 13 | 0.38 | 1501.90 | 1483 | 21 | 1.19E-02 | 103.8 | |
| 19 | 0 | 302.96 | 67 | 0 | 0.64 | 2916.64 | 2903 | 23 | 1.12E-01 | 12.2 | |
| 20 | 2 | 333.09 | 21 | 5 | 0.98 | 3207.00 | 3201 | 23 | 3.43E-02 | 20.9 | 2.08E+00 |
| 21 | 2 | 333.84 | 28 | 5 | 0.97 | 3214.27 | 3201 | 23 | 4.65E-02 | 26.0 | |
| 22 | 0 | 356.13 | 255 | 8 | 0.94 | 3429.02 | 3415 | 25 | 4.25E-01 | 6.7 | |
| 23 | 0 | 383.96 | 50 | 10 | 0.90 | 3697.26 | 3681 | 26 | 8.34E-02 | 20.2 | |
| 24 | 1 | 386.84 | 94 | 18 | 1.02 | 3725.00 | 3711 | 28 | 1.57E-01 | 13.9 | 2.03E+00 |
| 25 | 1 | 387.36 | 26 | 9 | 1.12 | 3729.98 | 3711 | 28 | 4.26E-02 | 44.3 | |

Sample ID : 0509118-04 Acquisition date : 6-OCT-2005 15:37:54

Total number of lines in spectrum 25
Number of unidentified lines 18
Number of lines tentatively identified by NID 7 28.00%

Nuclide Type : FISSION

| Nuclide | Hlife | Decay | Wtd Mean Uncorrected pCi/FILTER | Wtd Mean Decay Corr pCi/FILTER | Decay Corr 2-Sigma Error | 2-Sigma %Error | Flags |
|---|---|---|---|---|---|---|---|
| BA-133 | 10.50Y | 1.00 | 4.092E+02 | 4.093E+02 | 0.725E+02 | 17.72 | |
| | Total Activity : | | 4.092E+02 | 4.093E+02 | | | |

Nuclide Type : NATURAL

| Nuclide | Hlife | Decay | Wtd Mean Uncorrected pCi/FILTER | Wtd Mean Decay Corr pCi/FILTER | Decay Corr 2-Sigma Error | 2-Sigma %Error | Flags |
|---|---|---|---|---|---|---|---|
| PA-231 | 3.28E+04Y | 1.00 | 2.345E+07 | 2.345E+07 | ********** | ********** | |
| PA-234 | 4.47E+09Y | 1.00 | 4.481E+03 | 4.481E+03 | 213.8E+03 | 4771.52 | |
| TH-234 | 4.47E+09Y | 1.00 | 2.328E+03 | 2.328E+03 | 0.471E+03 | 20.23 | |
| | Total Activity : | | 2.345E+07 | 2.345E+07 | | | |
| | Grand Total Activity : | | 2.345E+07 | 2.345E+07 | | | |

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Nuclide Type: FISSION

| Nuclide | Energy | %Abn | %Eff | Uncorrected pCi/FILTER | Decay Corr pCi/FILTER | 2-Sigma %Error | Status |
|---|---|---|---|---|---|---|---|
| BA-133 | 81.00 | 33.00* | 1.839E+01 | 4.092E+02 | 4.093E+02 | 17.72 | OK |
| | 302.84 | 17.80 | 3.440E+00 | 4.929E+02 | 4.929E+02 | 36.49 | <<WM Interf |
| | 356.01 | 60.00 | 1.579E+00 | 1.211E+03 | 1.211E+03 | 32.62 | <<WM N-Sigma |

Final Mean for 1 Valid Peaks = 4.093E+02+/- 7.252E+01 ( 17.72%)

Nuclide Type: NATURAL

| Nuclide | Energy | %Abn | %Eff | Uncorrected pCi/FILTER | Decay Corr pCi/FILTER | 2-Sigma %Error | Status |
|---|---|---|---|---|---|---|---|
| PA-231 | 9.28 | 42.00* | 4.117E-06 | 2.345E+07 | 2.345E+07****** | | OK |
| | 10.11 | 20.20 | 1.155E-05 | 1.810E+07 | 1.810E+07****** | | <<WM Interf |
| | 283.67 | 1.60 | 4.548E+00 | ----- Line Not Found | | ----- | Absent |
| | 302.67 | 2.30 | 3.449E+00 | 3.805E+03 | 3.805E+03 | 35.03 | <<WM Interf |

Final Mean for 1 Valid Peaks = 2.345E+07+/- 6.639E+12 (******%)

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| PA-234 | 9.89 | 89.00 | 8.893E-06 | 5.335E+06 | 5.335E+06****** | | <<WM Interf |
| | 21.72 | 64.90* | 2.444E-02 | 4.481E+03 | 4.481E+034771.52 | | OK |
| | 37.93 | 23.75 | 1.111E+00 | ----- Line Not Found | | ----- | Absent |
| | 131.42 | 20.40 | 2.613E+01 | ----- Line Not Found | | ----- | Absent |

Final Mean for 1 Valid Peaks = 4.481E+03+/- 2.138E+05 (******%)

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| TH-234 | 63.29 | 3.80* | 9.987E+00 | 2.328E+03 | 2.328E+03 | 20.23 | OK |

Final Mean for 1 Valid Peaks = 2.328E+03+/- 4.711E+02 ( 20.23%)

Flag: "*" = Keyline

Sample ID : 0509118-04 Acquisition date : 6-OCT-2005 15:37:54

---- Identified Nuclides ----

| Nuclide | Activity (pCi/FILTER) | Act error | MDA (pCi/FILTER) | MDA error | Act/MDA |
|---|---|---|---|---|---|
| BA-133 | 4.093E+02 | 7.252E+01 | 1.843E+01 | 2.720E+00 | 22.212 |
| PA-231 | 2.345E+07 | 6.639E+12 | 7.041E+06 | 1.994E+12 | 3.330 |
| PA-234 | 4.481E+03 | 2.138E+05 | 6.446E+03 | 3.075E+05 | 0.695 |
| TH-234 | 2.328E+03 | 4.711E+02 | 2.380E+02 | 2.778E+01 | 9.783 |

---- Non-Identified Nuclides ----

| Nuclide | Key-Line Activity (pCi/FILTER) | K.L. Ided | Act error | MDA (pCi/FILTER) | MDA error | Act/MDA |
|---|---|---|---|---|---|---|
| CO-57 | 1.917E-01 | | 1.928E+00 | 3.797E+00 | 1.580E-01 | 0.050 |
| CD-109 | -1.784E+01 | | 5.923E+01 | 1.071E+02 | 5.851E+00 | -0.167 |
| NP-237 | -1.600E+01 | | 1.853E+01 | 2.977E+01 | 1.673E+00 | -0.538 |
| AM-241 | 1.609E+01 | | 2.142E+01 | 3.874E+01 | 5.501E+00 | 0.415 |

VAX/VMS Peak Search Report Generated 6-OCT-2005 16:05:13.91 MR 10.6.05

Configuration : DKA100:[GAMMA.SCUSR.ARCHIVE]SMP_050911805_GE5_BAFIL_88903.CNF
Analyses by : PEAK V16.9 PEAKEFF V2.2
Client ID : VPBR092705SL18
Deposition Date :
Sample Date : 6-OCT-2005 00:00:00. Acquisition date : 6-OCT-2005 15:54:59.
Sample ID : 0509118-05 Sample Quantity : 1.00000E+00 FILTER
Sample type : FILTER Sample Geometry : 0
Detector name : GE5 Detector Geometry: BAFIL
Elapsed live time: 0 00:10:00.00 Elapsed real time: 0 00:10:00.78 0.1%
Start channel : 25 End channel : 4096
Sensitivity : 3.00000 Gaussian : 10.00000
Critical level : No

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 21.11 | 38 | 4 | 0.44 | 200.60 | 195 | 14 | 6.40E-02 | 18.9 | |
| 2 | 0 | 30.93 | 867 | 19 | 0.72 | 295.21 | 280 | 26 | 1.45E+00 | 3.6 | |
| 3 | 1 | 34.23 | 33 | 1 | 0.67 | 327.00 | 325 | 28 | 5.55E-02 | 9.7 | 2.56E+00 |
| 4 | 1 | 35.01 | 168 | 6 | 0.73 | 334.60 | 325 | 28 | 2.80E-01 | 9.7 | |
| 5 | 1 | 35.82 | 46 | 7 | 0.74 | 342.35 | 325 | 28 | 7.72E-02 | 34.6 | |
| 6 | 0 | 61.77 | 102 | 25 | 0.64 | 592.46 | 577 | 25 | 1.70E-01 | 14.9 | |
| 7 | 1 | 65.88 | 53 | 25 | 0.73 | 632.00 | 621 | 22 | 8.88E-02 | 24.2 | 7.30E-01 |
| 8 | 1 | 66.36 | 13 | 18 | 0.80 | 636.70 | 621 | 22 | 2.10E-02 | 77.2 | |
| 9 | 0 | 81.15 | 308 | 35 | 0.72 | 779.22 | 767 | 22 | 5.14E-01 | 7.0 | |
| 10 | 0 | 111.94 | 84 | 23 | 0.65 | 1075.91 | 1060 | 27 | 1.40E-01 | 17.2 | |
| 11 | 1 | 302.79 | 41 | 4 | 0.96 | 2915.00 | 2903 | 23 | 6.90E-02 | 21.1 | 2.63E+00 |
| 12 | 1 | 303.41 | 51 | 4 | 0.96 | 2921.00 | 2903 | 23 | 8.55E-02 | 13.2 | |
| 13 | 2 | 355.16 | 15 | 1 | 1.10 | 3419.72 | 3413 | 26 | 2.42E-02 | 53.0 | 1.55E+00 |
| 14 | 2 | 356.04 | 181 | 8 | 1.09 | 3428.22 | 3413 | 26 | 3.02E-01 | 7.7 | |
| 15 | 0 | 383.91 | 20 | 12 | 0.91 | 3696.80 | 3684 | 24 | 3.36E-02 | 40.8 | |
| 16 | 6 | 386.94 | 87 | 10 | 1.02 | 3726.00 | 3708 | 30 | 1.46E-01 | 11.3 | 1.79E+00 |
| 17 | 6 | 387.90 | 9 | 0 | 0.54 | 3735.21 | 3708 | 30 | 1.54E-02 | 36.9 | |

Sample ID : 0509118-05 Acquisition date : 6-OCT-2005 15:54:59

Total number of lines in spectrum 17
Number of unidentified lines 12
Number of lines tentatively identified by NID 5 29.41%

Nuclide Type : FISSION

| Nuclide | Hlife | Decay | Wtd Mean Uncorrected pCi/FILTER | Wtd Mean Decay Corr pCi/FILTER | Decay Corr 2-Sigma Error | 2-Sigma %Error | Flags |
|---|---|---|---|---|---|---|---|
| BA-133 | 10.50Y | 1.00 | 2.356E+02 | 2.356E+02 | 0.453E+02 | 19.22 | |
| | Total Activity : | | 2.356E+02 | 2.356E+02 | | | |

Nuclide Type : NATURAL

| Nuclide | Hlife | Decay | Wtd Mean Uncorrected pCi/FILTER | Wtd Mean Decay Corr pCi/FILTER | Decay Corr 2-Sigma Error | 2-Sigma %Error | Flags |
|---|---|---|---|---|---|---|---|
| TH-234 | 4.47E+09Y | 1.00 | 1.211E+03 | 1.211E+03 | 0.391E+03 | 32.26 | |
| | Total Activity : | | 1.211E+03 | 1.211E+03 | | | |

Grand Total Activity : 1.446E+03 1.446E+03

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : 0509118-05 Acquisition date : 6-OCT-2005 15:54:59

Nuclide Type: FISSION

| Nuclide | Energy | %Abn | %Eff | Uncorrected pCi/FILTER | Decay Corr pCi/FILTER | 2-Sigma %Error | Status |
|---|---|---|---|---|---|---|---|
| BA-133 | 81.00 | 33.00* | 1.839E+01 | 2.290E+02 | 2.290E+02 | 20.71 | OK |
| | 302.84 | 17.80 | 3.440E+00 | 3.044E+02 | 3.044E+02 | 50.13 | OK |
| | 356.01 | 60.00 | 1.579E+00 | 8.613E+02 | 8.614E+02 | 33.46 | <<WM N-Sigma |

Final Mean for 2 Valid Peaks = 2.356E+02+/- 4.530E+01 ( 19.22%)

Nuclide Type: NATURAL

| Nuclide | Energy | %Abn | %Eff | Uncorrected pCi/FILTER | Decay Corr pCi/FILTER | 2-Sigma %Error | Status |
|---|---|---|---|---|---|---|---|
| TH-234 | 63.29 | 3.80* | 9.987E+00 | 1.211E+03 | 1.211E+03 | 32.26 | OK |

Final Mean for 1 Valid Peaks = 1.211E+03+/- 3.906E+02 ( 32.26%)

Flag: "*" = Keyline

Sample ID : 0509118-05 Acquisition date : 6-OCT-2005 15:54:59

---- Identified Nuclides ----

| Nuclide | Activity (pCi/FILTER) | Act error | MDA (pCi/FILTER) | MDA error | Act/MDA |
|---|---|---|---|---|---|
| BA-133 | 2.356E+02 | 4.530E+01 | 1.807E+01 | 2.667E+00 | 13.044 |
| TH-234 | 1.211E+03 | 3.906E+02 | 2.843E+02 | 3.318E+01 | 4.259 |

---- Non-Identified Nuclides ----

| Nuclide | Key-Line Activity (pCi/FILTER) | K.L. Ided | Act error | MDA (pCi/FILTER) | MDA error | Act/MDA |
|---|---|---|---|---|---|---|
| CO-57 | -1.880E-01 | | 1.848E+00 | 3.537E+00 | 1.472E-01 | -0.053 |
| CD-109 | 3.426E+01 | | 5.603E+01 | 1.185E+02 | 6.472E+00 | 0.289 |
| PA-231 | 1.535E+07 | | 4.347E+12 | 5.325E+07 | 1.508E+13 | 0.288 |
| PA-234 | 1.091E+04 | + | 5.204E+05 | 9.191E+03 | 4.384E+05 | 1.187 |
| NP-237 | -1.505E+00 | | 1.661E+01 | 3.152E+01 | 1.772E+00 | -0.048 |
| AM-241 | 1.848E+01 | | 1.934E+01 | 3.709E+01 | 5.267E+00 | 0.498 |

VAX/VMS Peak Search Report Generated 6-OCT-2005 16:16:54.04 MR 10-6-05

Configuration : DKA100:[GAMMA.SCUSR.ARCHIVE]SMP_050911806_GE5_BAFIL_88906.CNF
Analyses by : PEAK V16.9 PEAKEFF V2.2
Client ID : VPBR092705SL19
Deposition Date :
Sample Date : 6-OCT-2005 00:00:00. Acquisition date : 6-OCT-2005 16:06:28.
Sample ID : 0509118-06 Sample Quantity : 1.00000E+00 FILTER
Sample type : FILTER Sample Geometry : 0
Detector name : GE5 Detector Geometry: BAFIL
Elapsed live time: 0 00:10:00.00 Elapsed real time: 0 00:10:00.80 0.1%
Start channel : 25 End channel : 4096
Sensitivity : 3.00000 Gaussian : 10.00000
Critical level : No

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 20.94 | 88 | 7 | 1.38 | 198.93 | 189 | 20 | 1.47E-01 | 12.3 | |
| 2 | 0 | 30.97 | 1392 | 47 | 0.80 | 295.58 | 284 | 27 | 2.32E+00 | 2.9 | |
| 3 | 1 | 35.02 | 268 | 15 | 0.68 | 334.69 | 322 | 31 | 4.46E-01 | 7.5 | 5.90E-01 |
| 4 | 1 | 35.89 | 85 | 6 | 0.67 | 343.00 | 322 | 31 | 1.41E-01 | 22.5 | |
| 5 | 0 | 53.23 | 33 | 10 | 0.87 | 510.17 | 502 | 15 | 5.56E-02 | 24.7 | |
| 6 | 0 | 61.78 | 201 | 21 | 0.80 | 592.54 | 578 | 26 | 3.35E-01 | 8.9 | |
| 7 | 0 | 66.01 | 84 | 22 | 0.72 | 633.32 | 622 | 22 | 1.40E-01 | 16.2 | |
| 8 | 0 | 70.45 | 18 | 10 | 0.81 | 676.06 | 661 | 19 | 2.97E-02 | 42.8 | |
| 9 | 0 | 81.07 | 548 | 30 | 0.56 | 778.39 | 765 | 24 | 9.13E-01 | 4.8 | |
| 10 | 0 | 112.04 | 156 | 17 | 0.65 | 1076.86 | 1065 | 29 | 2.59E-01 | 10.5 | |
| 11 | 8 | 115.79 | 26 | 18 | 0.79 | 1113.00 | 1106 | 16 | 4.31E-02 | 36.5 | 1.72E+00 |
| 12 | 8 | 116.43 | 8 | 5 | 0.39 | 1119.14 | 1106 | 16 | 1.39E-02 | 50.7 | |
| 13 | 0 | 160.50 | 22 | 12 | 0.31 | 1543.83 | 1533 | 20 | 3.66E-02 | 36.8 | |
| 14 | 0 | 276.47 | 32 | 6 | 0.64 | 2661.44 | 2648 | 22 | 5.25E-02 | 22.9 | |
| 15 | 7 | 302.24 | 14 | 0 | 0.81 | 2909.70 | 2900 | 28 | 2.39E-02 | 52.7 | 2.12E+00 |
| 16 | 7 | 302.94 | 83 | 0 | 1.19 | 2916.44 | 2900 | 28 | 1.38E-01 | 10.5 | |
| 17 | 0 | 356.16 | 292 | 0 | 0.93 | 3429.32 | 3413 | 34 | 4.87E-01 | 5.9 | |
| 18 | 1 | 383.31 | 15 | 3 | 1.01 | 3691.00 | 3680 | 27 | 2.55E-02 | 49.6 | 8.52E-01 |
| 19 | 1 | 383.83 | 30 | 8 | 1.01 | 3696.00 | 3680 | 27 | 5.06E-02 | 28.7 | |
| 20 | 1 | 386.32 | 10 | 6 | 1.02 | 3720.00 | 3713 | 24 | 1.73E-02 | 65.3 | 1.18E+01 |
| 21 | 1 | 386.94 | 189 | 9 | 1.02 | 3726.00 | 3713 | 24 | 3.16E-01 | 6.0 | |
| 22 | 1 | 387.57 | 10 | 3 | 1.02 | 3732.00 | 3713 | 24 | 1.73E-02 | 81.0 | |
| 23 | 5 | 414.62 | 20 | 0 | 1.33 | 3992.71 | 3984 | 18 | 3.31E-02 | 24.1 | 1.67E-01 |
| 24 | 5 | 415.06 | 18 | 0 | 0.74 | 3996.98 | 3984 | 18 | 2.92E-02 | 26.2 | |

Sample ID : 0509118-06 Acquisition date : 6-OCT-2005 16:06:28

Total number of lines in spectrum 24
Number of unidentified lines 19
Number of lines tentatively identified by NID 5 20.83%

Nuclide Type : FISSION

| Nuclide | Hlife | Decay | Wtd Mean Uncorrected pCi/FILTER | Wtd Mean Decay Corr pCi/FILTER | Decay Corr 2-Sigma Error | 2-Sigma %Error | Flags |
|---|---|---|---|---|---|---|---|
| BA-133 | 10.50Y | 1.00 | 4.288E+02 | 4.288E+02 | 0.693E+02 | 16.15 | |
| | Total Activity : | | 4.288E+02 | 4.288E+02 | | | |

Nuclide Type : NATURAL

| Nuclide | Hlife | Decay | Wtd Mean Uncorrected pCi/FILTER | Wtd Mean Decay Corr pCi/FILTER | Decay Corr 2-Sigma Error | 2-Sigma %Error | Flags |
|---|---|---|---|---|---|---|---|
| TH-234 | 4.47E+09Y | 1.00 | 2.383E+03 | 2.383E+03 | 0.514E+03 | 21.58 | |
| | Total Activity : | | 2.383E+03 | 2.383E+03 | | | |
| | Grand Total Activity : | | 2.812E+03 | 2.812E+03 | | | |

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Nuclide Type: FISSION

| Nuclide | Energy | %Abn | %Eff | Uncorrected pCi/FILTER | Decay Corr pCi/FILTER | 2-Sigma %Error | Status |
|---|---|---|---|---|---|---|---|
| BA-133 | 81.00 | 33.00* | 1.839E+01 | 4.065E+02 | 4.066E+02 | 18.06 | OK |
| | 302.84 | 17.80 | 3.440E+00 | 6.092E+02 | 6.093E+02 | 34.32 | OK |
| | 356.01 | 60.00 | 1.579E+00 | 1.388E+03 | 1.388E+03 | 31.95 | <<WM N-Sigma |

Final Mean for 2 Valid Peaks = 4.288E+02+/- 6.927E+01 ( 16.15%)

Nuclide Type: NATURAL

| Nuclide | Energy | %Abn | %Eff | Uncorrected pCi/FILTER | Decay Corr pCi/FILTER | 2-Sigma %Error | Status |
|---|---|---|---|---|---|---|---|
| TH-234 | 63.29 | 3.80* | 9.987E+00 | 2.383E+03 | 2.383E+03 | 21.58 | OK |

Final Mean for 1 Valid Peaks = 2.383E+03+/- 5.143E+02 ( 21.58%)

Flag: "*" = Keyline

---- Identified Nuclides ----

| Nuclide | Activity (pCi/FILTER) | Act error | MDA (pCi/FILTER) | MDA error | Act/MDA |
|---|---|---|---|---|---|
| BA-133 | 4.288E+02 | 6.927E+01 | 1.427E+01 | 2.107E+00 | 30.047 |
| TH-234 | 2.383E+03 | 5.143E+02 | 2.843E+02 | 3.318E+01 | 8.383 |

---- Non-Identified Nuclides ----

| Nuclide | Key-Line Activity (pCi/FILTER) | K.L. Ided | Act error | MDA (pCi/FILTER) | MDA error | Act/MDA |
|---|---|---|---|---|---|---|
| CO-57 | 5.655E-01 | | 2.528E+00 | 4.870E+00 | 2.026E-01 | 0.116 |
| CD-109 | 1.128E+01 | | 6.256E+01 | 1.218E+02 | 6.652E+00 | 0.093 |
| PA-231 | -9.711E+06 | | 2.750E+12 | 5.325E+07 | 1.508E+13 | -0.182 |
| PA-234 | 2.509E+04 | + | 1.197E+06 | 1.168E+04 | 5.573E+05 | 2.147 |
| NP-237 | -9.657E+00 | | 1.967E+01 | 3.413E+01 | 1.919E+00 | -0.283 |
| AM-241 | 1.038E+01 | | 2.497E+01 | 4.140E+01 | 5.880E+00 | 0.251 |

MR 10.6.05

VAX/VMS Peak Search Report Generated 6-OCT-2005 16:51:07.29

Configuration : DKA100:[GAMMA.SCUSR.ARCHIVE]SMP_050911807_GE5_BAFIL_88912.CNF
Analyses by : PEAK V16.9 PEAKEFF V2.2
Client ID : VPBR092705SL20
Deposition Date :
Sample Date : 6-OCT-2005 00:00:00. Acquisition date : 6-OCT-2005 16:40:44.
Sample ID : 0509118-07 Sample Quantity : 1.00000E+00 FILTER
Sample type : FILTER Sample Geometry : 0
Detector name : GE5 Detector Geometry: BAFIL
Elapsed live time: 0 00:10:00.00 Elapsed real time: 0 00:10:00.80 0.1%
Start channel : 25 End channel : 4096
Sensitivity : 3.00000 Gaussian : 10.00000
Critical level : No

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 21.16 | 47 | 22 | 0.58 | 201.11 | 190 | 19 | 7.80E-02 | 25.2 | |
| 2 | 0 | 30.95 | 1105 | 47 | 0.78 | 295.44 | 282 | 25 | 1.84E+00 | 3.3 | |
| 3 | 4 | 35.02 | 197 | 23 | 0.74 | 334.67 | 323 | 25 | 3.28E-01 | 9.3 | 9.58E-01 |
| 4 | 4 | 36.07 | 37 | 11 | 0.44 | 344.76 | 323 | 25 | 6.20E-02 | 19.7 | |
| 5 | 0 | 53.30 | 21 | 6 | 0.44 | 510.85 | 504 | 14 | 3.51E-02 | 31.3 | |
| 6 | 2 | 61.61 | 97 | 14 | 0.81 | 590.93 | 580 | 24 | 1.62E-01 | 15.1 | 3.03E+00 |
| 7 | 2 | 62.16 | 75 | 11 | 0.76 | 596.21 | 580 | 24 | 1.25E-01 | 17.6 | |
| 8 | 1 | 65.77 | 32 | 8 | 0.73 | 631.00 | 623 | 24 | 5.31E-02 | 28.6 | 8.25E-01 |
| 9 | 1 | 66.50 | 31 | 11 | 0.73 | 638.00 | 623 | 24 | 5.12E-02 | 31.6 | |
| 10 | 0 | 81.13 | 422 | 29 | 0.57 | 778.96 | 769 | 20 | 7.04E-01 | 5.6 | |
| 11 | 0 | 111.96 | 100 | 35 | 0.62 | 1076.08 | 1064 | 21 | 1.67E-01 | 16.0 | |
| 12 | 1 | 302.48 | 28 | 5 | 1.05 | 2912.08 | 2903 | 24 | 4.64E-02 | 29.6 | 1.36E+00 |
| 13 | 1 | 303.10 | 63 | 5 | 0.96 | 2918.00 | 2903 | 24 | 1.06E-01 | 13.8 | |
| 14 | 0 | 333.76 | 36 | 2 | 0.99 | 3213.50 | 3199 | 24 | 5.93E-02 | 19.3 | |
| 15 | 3 | 355.50 | 15 | 1 | 1.00 | 3423.00 | 3414 | 28 | 2.48E-02 | 90.1 | 1.24E+00 |
| 16 | 3 | 356.10 | 176 | 2 | 0.73 | 3428.79 | 3414 | 28 | 2.93E-01 | 8.4 | |
| 17 | 3 | 357.06 | 18 | 2 | 0.73 | 3438.01 | 3414 | 28 | 2.98E-02 | 26.1 | |
| 18 | 0 | 384.14 | 43 | 3 | 0.16 | 3699.00 | 3683 | 27 | 7.21E-02 | 17.5 | |
| 19 | 0 | 386.99 | 66 | 9 | 0.68 | 3726.44 | 3713 | 24 | 1.10E-01 | 15.2 | |

Sample ID : 0509118-07 Acquisition date : 6-OCT-2005 16:40:44

Total number of lines in spectrum 19
Number of unidentified lines 12
Number of lines tentatively identified by NID 7 36.84%

Nuclide Type : FISSION

| Nuclide | Hlife | Decay | Wtd Mean Uncorrected pCi/FILTER | Wtd Mean Decay Corr pCi/FILTER | Decay Corr 2-Sigma Error | 2-Sigma %Error | Flags |
|---|---|---|---|---|---|---|---|
| BA-133 | 10.50Y | 1.00 | 3.283E+02 | 3.284E+02 | 0.563E+02 | 17.15 | |
| | Total Activity : | | 3.283E+02 | 3.284E+02 | | | |

Nuclide Type : NATURAL

| Nuclide | Hlife | Decay | Wtd Mean Uncorrected pCi/FILTER | Wtd Mean Decay Corr pCi/FILTER | Decay Corr 2-Sigma Error | 2-Sigma %Error | Flags |
|---|---|---|---|---|---|---|---|
| TH-234 | 4.47E+09Y | 1.00 | 8.870E+02 | 8.870E+02 | 3.304E+02 | 37.25 | |
| | Total Activity : | | 8.870E+02 | 8.870E+02 | | | |

Grand Total Activity : 1.215E+03 1.215E+03

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Nuclide Type: FISSION

| Nuclide | Energy | %Abn | %Eff | Uncorrected pCi/FILTER | Decay Corr pCi/FILTER | 2-Sigma %Error | Status |
|---|---|---|---|---|---|---|---|
| BA-133 | 81.00 | 33.00* | 1.839E+01 | 3.134E+02 | 3.134E+02 | 18.91 | OK |
| | 302.84 | 17.80 | 3.440E+00 | 4.667E+02 | 4.667E+02 | 38.62 | OK |
| | 356.01 | 60.00 | 1.579E+00 | 8.347E+02 | 8.348E+02 | 34.12 | <<WM N-Sigma |

Final Mean for 2 Valid Peaks = 3.284E+02+/- 5.631E+01 ( 17.15%)

Nuclide Type: NATURAL

| Nuclide | Energy | %Abn | %Eff | Uncorrected pCi/FILTER | Decay Corr pCi/FILTER | 2-Sigma %Error | Status |
|---|---|---|---|---|---|---|---|
| TH-234 | 63.29 | 3.80* | 9.987E+00 | 8.870E+02 | 8.870E+02 | 37.25 | OK |

Final Mean for 1 Valid Peaks = 8.870E+02+/- 3.304E+02 ( 37.25%)

Flag: "*" = Keyline

Sample ID : 0509118-07 Acquisition date : 6-OCT-2005 16:40:44

---- Identified Nuclides ----

| Nuclide | Activity (pCi/FILTER) | Act error | MDA (pCi/FILTER) | MDA error | Act/MDA |
|---|---|---|---|---|---|
| BA-133 | 3.284E+02 | 5.631E+01 | 1.980E+01 | 2.923E+00 | 16.587 |
| TH-234 | 8.870E+02 | 3.304E+02 | 2.576E+02 | 3.007E+01 | 3.443 |

---- Non-Identified Nuclides ----

| Nuclide | Key-Line Activity (pCi/FILTER) | K.L. Ided | Act error | MDA (pCi/FILTER) | MDA error | Act/MDA |
|---|---|---|---|---|---|---|
| CO-57 | 8.966E-01 | | 1.996E+00 | 4.119E+00 | 1.714E-01 | 0.218 |
| CD-109 | -2.262E+01 | | 5.364E+01 | 9.541E+01 | 5.213E+00 | -0.237 |
| PA-231 | -3.461E+07 | | 9.800E+12 | 4.679E+07 | 1.325E+13 | -0.740 |
| PA-234 | 1.329E+04 | + | 6.340E+05 | 1.084E+04 | 5.169E+05 | 1.226 |
| NP-237 | -3.897E+00 | | 1.819E+01 | 3.340E+01 | 1.878E+00 | -0.117 |
| AM-241 | 5.755E+00 | | 2.330E+01 | 3.791E+01 | 5.384E+00 | 0.152 |

VAX/VMS Peak Search Report Generated 6-OCT-2005 17:05:38.46 MR 10.6.05

Configuration : DKA100:[GAMMA.SCUSR.ARCHIVE]SMP_050911808_GE5_BAFIL_88913.CNF
Analyses by : PEAK V16.9 PEAKEFF V2.2
Client ID : VPTR092805SL0A
Deposition Date :
Sample Date : 6-OCT-2005 00:00:00. Acquisition date : 6-OCT-2005 16:55:21.
Sample ID : 0509118-08 Sample Quantity : 1.00000E+00 FILTER
Sample type : FILTER Sample Geometry : 0
Detector name : GE5 Detector Geometry: BAFIL
Elapsed live time: 0 00:10:00.00 Elapsed real time: 0 00:10:00.78 0.1%
Start channel : 25 End channel : 4096
Sensitivity : 3.00000 Gaussian : 10.00000
Critical level : No

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 4.59 | 13 | 13 | 0.14 | 41.37 | 33 | 14 | 2.14E-02 | 67.4 | |
| 2 | 0 | 21.32 | 51 | 36 | 0.31 | 202.61 | 191 | 20 | 8.42E-02 | 29.4 | |
| 3 | 0 | 30.96 | 1445 | 34 | 0.82 | 295.52 | 281 | 31 | 2.41E+00 | 2.8 | |
| 4 | 1 | 34.99 | 253 | 15 | 0.70 | 334.39 | 322 | 28 | 4.22E-01 | 7.6 | 1.11E+00 |
| 5 | 1 | 36.03 | 76 | 5 | 0.71 | 344.35 | 322 | 28 | 1.27E-01 | 15.7 | |
| 6 | 0 | 53.29 | 26 | 13 | 0.62 | 510.73 | 504 | 14 | 4.27E-02 | 33.0 | |
| 7 | 0 | 61.78 | 185 | 16 | 0.78 | 592.49 | 579 | 23 | 3.08E-01 | 8.7 | |
| 8 | 0 | 81.13 | 531 | 53 | 0.62 | 778.97 | 767 | 23 | 8.84E-01 | 5.3 | |
| 9 | 0 | 112.11 | 118 | 49 | 0.64 | 1077.56 | 1062 | 23 | 1.97E-01 | 15.6 | |
| 10 | 0 | 116.49 | 13 | 27 | 0.53 | 1119.79 | 1107 | 18 | 2.25E-02 | 81.6 | |
| 11 | 0 | 276.70 | 21 | 13 | 0.63 | 2663.65 | 2649 | 22 | 3.56E-02 | 39.6 | |
| 12 | 1 | 302.47 | 26 | 2 | 0.96 | 2912.00 | 2904 | 27 | 4.35E-02 | 32.3 | 1.79E+00 |
| 13 | 1 | 303.10 | 70 | 7 | 0.96 | 2918.00 | 2904 | 27 | 1.17E-01 | 15.0 | |
| 14 | 1 | 303.56 | 11 | 7 | 0.91 | 2922.47 | 2904 | 27 | 1.85E-02 | 84.8 | |
| 15 | 1 | 333.29 | 21 | 0 | 0.98 | 3209.00 | 3200 | 25 | 3.47E-02 | 28.0 | 2.21E+00 |
| 16 | 1 | 334.13 | 67 | 0 | 0.98 | 3217.00 | 3200 | 25 | 1.12E-01 | 9.3 | |
| 17 | 0 | 356.13 | 254 | 12 | 0.69 | 3429.01 | 3414 | 25 | 4.23E-01 | 7.0 | |
| 18 | 0 | 384.13 | 55 | 4 | 1.10 | 3698.85 | 3684 | 23 | 9.15E-02 | 15.8 | |
| 19 | 6 | 386.75 | 98 | 6 | 1.08 | 3724.11 | 3712 | 27 | 1.64E-01 | 12.1 | 1.83E+00 |
| 20 | 6 | 387.18 | 48 | 6 | 1.10 | 3728.23 | 3712 | 27 | 8.01E-02 | 24.2 | |
| 21 | 0 | 391.33 | 22 | 7 | 0.56 | 3768.27 | 3753 | 23 | 3.71E-02 | 32.9 | |

Sample ID : 0509118-08 Acquisition date : 6-OCT-2005 16:55:21

Total number of lines in spectrum 21
Number of unidentified lines 14
Number of lines tentatively identified by NID 7 33.33%

Nuclide Type : FISSION

| Nuclide | Hlife | Decay | Wtd Mean Uncorrected pCi/FILTER | Wtd Mean Decay Corr pCi/FILTER | Decay Corr 2-Sigma Error | 2-Sigma %Error | Flags |
|---|---|---|---|---|---|---|---|
| BA-133 | 10.50Y | 1.00 | 4.073E+02 | 4.073E+02 | 0.692E+02 | 16.98 | |
| Total Activity : | | | 4.073E+02 | 4.073E+02 | | | |

Nuclide Type : NATURAL

| Nuclide | Hlife | Decay | Wtd Mean Uncorrected pCi/FILTER | Wtd Mean Decay Corr pCi/FILTER | Decay Corr 2-Sigma Error | 2-Sigma %Error | Flags |
|---|---|---|---|---|---|---|---|
| TH-234 | 4.47E+09Y | 1.00 | 2.191E+03 | 2.191E+03 | 0.469E+03 | 21.38 | |
| Total Activity : | | | 2.191E+03 | 2.191E+03 | | | |

Grand Total Activity : 2.599E+03 2.599E+03

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Nuclide Type: FISSION

| Nuclide | Energy | %Abn | %Eff | Uncorrected pCi/FILTER | Decay Corr pCi/FILTER | 2-Sigma %Error | Status |
|---|---|---|---|---|---|---|---|
| BA-133 | 81.00 | 33.00* | 1.839E+01 | 3.939E+02 | 3.940E+02 | 18.61 | OK |
| | 302.84 | 17.80 | 3.440E+00 | 5.157E+02 | 5.158E+02 | 40.49 | OK |
| | 356.01 | 60.00 | 1.579E+00 | 1.205E+03 | 1.206E+03 | 32.86 | <<WM N-Sigma |

Final Mean for 2 Valid Peaks = 4.073E+02+/- 6.916E+01 ( 16.98%)

Nuclide Type: NATURAL

| Nuclide | Energy | %Abn | %Eff | Uncorrected pCi/FILTER | Decay Corr pCi/FILTER | 2-Sigma %Error | Status |
|---|---|---|---|---|---|---|---|
| TH-234 | 63.29 | 3.80* | 9.987E+00 | 2.191E+03 | 2.191E+03 | 21.38 | OK |

Final Mean for 1 Valid Peaks = 2.191E+03+/- 4.685E+02 ( 21.38%)

Flag: "*" = Keyline

---- Identified Nuclides ----

| Nuclide | Activity (pCi/FILTER) | Act error | MDA (pCi/FILTER) | MDA error | Act/MDA |
|---|---|---|---|---|---|
| BA-133 | 4.073E+02 | 6.916E+01 | 2.311E+01 | 3.412E+00 | 17.625 |
| TH-234 | 2.191E+03 | 4.685E+02 | 3.887E+02 | 4.537E+01 | 5.637 |

---- Non-Identified Nuclides ----

| Nuclide | Key-Line Activity (pCi/FILTER) | K.L. Ided | Act error | MDA (pCi/FILTER) | MDA error | Act/MDA |
|---|---|---|---|---|---|---|
| CO-57 | 1.827E+00 | | 1.801E+00 | 4.105E+00 | 1.708E-01 | 0.445 |
| CD-109 | -1.752E+01 | | 5.930E+01 | 1.073E+02 | 5.864E+00 | -0.163 |
| PA-231 | 7.734E+06 | | 2.190E+12 | 5.164E+07 | 1.462E+13 | 0.150 |
| PA-234 | 1.435E+04 | + | 6.845E+05 | 1.193E+04 | 5.689E+05 | 1.203 |
| NP-237 | -1.370E+01 | | 1.696E+01 | 2.752E+01 | 1.547E+00 | -0.498 |
| AM-241 | 1.106E+01 | | 2.701E+01 | 4.415E+01 | 6.270E+00 | 0.250 |

VAX/VMS Peak Search Report Generated 6-OCT-2005 17:16:43.78 MR 10.6.05

Configuration : DKA100:[GAMMA.SCUSR.ARCHIVE]SMP_050911809_GE5_BAFIL_88914.CNF
Analyses by : PEAK V16.9 PEAKEFF V2.2
Client ID : VPTR092805SL0B
Deposition Date :
Sample Date : 6-OCT-2005 00:00:00. Acquisition date : 6-OCT-2005 17:06:25.
Sample ID : 0509118-09 Sample Quantity : 1.00000E+00 FILTER
Sample type : FILTER Sample Geometry : 0
Detector name : GE5 Detector Geometry: BAFIL
Elapsed live time: 0 00:10:00.00 Elapsed real time: 0 00:10:00.76 0.1%
Start channel : 25 End channel : 4096
Sensitivity : 3.00000 Gaussian : 10.00000
Critical level : No

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 4.39 | 13 | 5 | 0.23 | 39.45 | 34 | 11 | 2.23E-02 | 43.0 | |
| 2 | 8 | 21.22 | 57 | 15 | 0.98 | 201.68 | 192 | 18 | 9.46E-02 | 17.9 | 4.44E+00 |
| 3 | 8 | 21.77 | 12 | 4 | 0.70 | 206.99 | 192 | 18 | 2.05E-02 | 34.5 | |
| 4 | 0 | 30.98 | 1109 | 60 | 0.85 | 295.77 | 282 | 29 | 1.85E+00 | 3.5 | |
| 5 | 3 | 35.03 | 186 | 12 | 0.76 | 334.79 | 321 | 32 | 3.10E-01 | 9.2 | 1.33E+00 |
| 6 | 3 | 36.09 | 73 | 7 | 0.67 | 345.00 | 321 | 32 | 1.21E-01 | 18.2 | |
| 7 | 0 | 53.43 | 26 | 9 | 0.33 | 512.02 | 504 | 15 | 4.35E-02 | 29.7 | |
| 8 | 1 | 61.21 | 7 | 14 | 0.72 | 587.00 | 578 | 25 | 1.22E-02 | 187.8 | 1.43E+00 |
| 9 | 1 | 61.75 | 138 | 18 | 0.79 | 592.24 | 578 | 25 | 2.30E-01 | 10.7 | |
| 10 | 1 | 65.15 | 40 | 1 | 0.73 | 625.00 | 621 | 28 | 6.60E-02 | 12.7 | 2.71E+00 |
| 11 | 1 | 65.88 | 69 | 6 | 0.73 | 632.00 | 621 | 28 | 1.15E-01 | 14.7 | |
| 12 | 0 | 81.11 | 401 | 38 | 0.73 | 778.81 | 769 | 19 | 6.69E-01 | 5.9 | |
| 13 | 0 | 101.90 | 16 | 3 | 1.14 | 979.11 | 969 | 18 | 2.71E-02 | 32.6 | |
| 14 | 5 | 111.64 | 86 | 15 | 0.79 | 1073.00 | 1066 | 19 | 1.43E-01 | 15.1 | 2.65E+00 |
| 15 | 5 | 112.23 | 62 | 8 | 0.47 | 1078.65 | 1066 | 19 | 1.03E-01 | 19.9 | |
| 16 | 1 | 302.58 | 61 | 2 | 0.96 | 2913.00 | 2902 | 24 | 1.02E-01 | 14.8 | 3.22E+00 |
| 17 | 1 | 303.10 | 59 | 3 | 0.96 | 2918.00 | 2902 | 24 | 9.85E-02 | 14.7 | |
| 18 | 2 | 333.50 | 23 | 0 | 0.98 | 3211.00 | 3200 | 26 | 3.77E-02 | 26.5 | 9.76E-01 |
| 19 | 2 | 334.14 | 27 | 0 | 1.19 | 3217.10 | 3200 | 26 | 4.52E-02 | 22.4 | |
| 20 | 0 | 356.16 | 213 | 3 | 0.86 | 3429.33 | 3415 | 26 | 3.55E-01 | 7.1 | |
| 21 | 1 | 383.83 | 32 | 8 | 1.01 | 3696.00 | 3681 | 25 | 5.42E-02 | 23.4 | 1.14E+00 |
| 22 | 1 | 384.45 | 15 | 4 | 1.01 | 3702.00 | 3681 | 25 | 2.45E-02 | 33.2 | |
| 23 | 0 | 386.91 | 80 | 4 | 0.82 | 3725.70 | 3710 | 29 | 1.34E-01 | 12.3 | |

Sample ID : 0509118-09 Acquisition date : 6-OCT-2005 17:06:25

Total number of lines in spectrum 23
Number of unidentified lines 15
Number of lines tentatively identified by NID 8 34.78%

Nuclide Type : FISSION

| Nuclide | Hlife | Decay | Wtd Mean Uncorrected pCi/FILTER | Wtd Mean Decay Corr pCi/FILTER | Decay Corr 2-Sigma Error | 2-Sigma %Error | Flags |
|---|---|---|---|---|---|---|---|
| BA-133 | 10.50Y | 1.00 | 3.113E+02 | 3.114E+02 | 0.546E+02 | 17.54 | |
| | Total Activity : | | 3.113E+02 | 3.114E+02 | | | |

Nuclide Type : NATURAL

| Nuclide | Hlife | Decay | Wtd Mean Uncorrected pCi/FILTER | Wtd Mean Decay Corr pCi/FILTER | Decay Corr 2-Sigma Error | 2-Sigma %Error | Flags |
|---|---|---|---|---|---|---|---|
| TH-234 | 4.47E+09Y | 1.00 | 1.638E+03 | 1.638E+03 | 0.405E+03 | 24.75 | |
| AM-241 | 432.20Y | 1.00 | 1.122E+01 | 1.122E+01 | 4.219E+01 | 375.86 | |
| | Total Activity : | | 1.649E+03 | 1.649E+03 | | | |

Grand Total Activity : 1.961E+03 1.961E+03

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : 0509118-09 Acquisition date : 6-OCT-2005 17:06:25

Nuclide Type: FISSION

| Nuclide | Energy | %Abn | %Eff | Uncorrected pCi/FILTER | Decay Corr pCi/FILTER | 2-Sigma %Error | Status |
|---|---|---|---|---|---|---|---|
| BA-133 | 81.00 | 33.00* | 1.839E+01 | 2.978E+02 | 2.978E+02 | 19.31 | OK |
| | 302.84 | 17.80 | 3.440E+00 | 4.348E+02 | 4.348E+02 | 39.92 | OK |
| | 356.01 | 60.00 | 1.579E+00 | 1.013E+03 | 1.013E+03 | 32.92 | <<WM N-Sigma |

Final Mean for 2 Valid Peaks = 3.114E+02+/- 5.460E+01 ( 17.54%)

Nuclide Type: NATURAL

| Nuclide | Energy | %Abn | %Eff | Uncorrected pCi/FILTER | Decay Corr pCi/FILTER | 2-Sigma %Error | Status |
|---|---|---|---|---|---|---|---|
| TH-234 | 63.29 | 3.80* | 9.987E+00 | 1.638E+03 | 1.638E+03 | 24.75 | OK |

Final Mean for 1 Valid Peaks = 1.638E+03+/- 4.055E+02 ( 24.75%)

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| AM-241 | 59.54 | 35.90* | 8.208E+00 | 1.122E+01 | 1.122E+01 | 375.86 | OK |

Final Mean for 1 Valid Peaks = 1.122E+01+/- 4.219E+01 (375.86%)

Flag: "*" = Keyline

Sample ID : 0509118-09 Acquisition date : 6-OCT-2005 17:06:25

---- Identified Nuclides ----

| Nuclide | Activity (pCi/FILTER) | Act error | MDA (pCi/FILTER) | MDA error | Act/MDA |
|---|---|---|---|---|---|
| BA-133 | 3.114E+02 | 5.460E+01 | 2.167E+01 | 3.200E+00 | 14.365 |
| TH-234 | 1.638E+03 | 4.055E+02 | 2.380E+02 | 2.778E+01 | 6.882 |
| AM-241 | 1.122E+01 | 4.219E+01 | 3.171E+01 | 4.504E+00 | 0.354 |

---- Non-Identified Nuclides ----

| Nuclide | Key-Line Activity (pCi/FILTER) | K.L. Ided | Act error | MDA (pCi/FILTER) | MDA error | Act/MDA |
|---|---|---|---|---|---|---|
| CO-57 | -4.138E-01 | | 1.715E+00 | 3.224E+00 | 1.342E-01 | -0.128 |
| CD-109 | 5.085E+01 | | 6.363E+01 | 1.341E+02 | 7.328E+00 | 0.379 |
| PA-231 | 3.478E+06 | | 9.849E+11 | 5.514E+07 | 1.561E+13 | 0.063 |
| PA-234 | 3.488E+03 | + | 1.664E+05 | 1.046E+04 | 4.991E+05 | 0.333 |
| NP-237 | 2.204E+00 | | 1.993E+01 | 3.813E+01 | 2.143E+00 | 0.058 |

VAX/VMS Peak Search Report Generated 6-OCT-2005 17:33:35.84 MR 10.6.5

Configuration : DKA100:[GAMMA.SCUSR.ARCHIVE]SMP_050911810_GE5_BAFIL_88917.CNF
Analyses by : PEAK V16.9 PEAKEFF V2.2
Client ID : VPTR092805SL0C
Deposition Date :
Sample Date : 6-OCT-2005 00:00:00. Acquisition date : 6-OCT-2005 17:23:20.
Sample ID : 0509118-10 Sample Quantity : 1.00000E+00 FILTER
Sample type : FILTER Sample Geometry : 0
Detector name : GE5 Detector Geometry: BAFIL
Elapsed live time: 0 00:10:00.00 Elapsed real time: 0 00:10:00.81 0.1%
Start channel : 25 End channel : 4096
Sensitivity : 3.00000 Gaussian : 10.00000
Critical level : No

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 21.04 | 60 | 28 | 0.50 | 199.96 | 187 | 19 | 1.00E-01 | 22.2 | |
| 2 | 0 | 30.94 | 1467 | 59 | 0.83 | 295.37 | 282 | 25 | 2.44E+00 | 2.9 | |
| 3 | 3 | 35.08 | 300 | 23 | 0.79 | 335.18 | 324 | 27 | 5.00E-01 | 7.0 | 1.77E+00 |
| 4 | 3 | 36.13 | 43 | 7 | 0.61 | 345.35 | 324 | 27 | 7.17E-02 | 20.3 | |
| 5 | 0 | 53.39 | 20 | 18 | 0.26 | 511.70 | 501 | 20 | 3.36E-02 | 50.7 | |
| 6 | 0 | 60.44 | 6 | 15 | 0.14 | 579.61 | 569 | 13 | 9.29E-03 | 131.7 | |
| 7 | 0 | 61.75 | 197 | 19 | 0.79 | 592.20 | 581 | 23 | 3.28E-01 | 8.7 | |
| 8 | 0 | 65.86 | 56 | 20 | 0.49 | 631.80 | 622 | 18 | 9.25E-02 | 21.2 | |
| 9 | 0 | 81.12 | 526 | 46 | 0.60 | 778.93 | 768 | 21 | 8.77E-01 | 5.1 | |
| 10 | 0 | 111.96 | 125 | 30 | 0.98 | 1076.11 | 1064 | 24 | 2.08E-01 | 13.5 | |
| 11 | 0 | 116.12 | 55 | 8 | 0.34 | 1116.18 | 1103 | 25 | 9.13E-02 | 18.1 | |
| 12 | 0 | 160.92 | 13 | 13 | 0.46 | 1547.90 | 1536 | 17 | 2.23E-02 | 54.5 | |
| 13 | 1 | 302.68 | 59 | 4 | 0.96 | 2914.00 | 2903 | 23 | 9.81E-02 | 15.8 | 6.48E-01 |
| 14 | 1 | 303.31 | 27 | 4 | 0.96 | 2920.00 | 2903 | 23 | 4.45E-02 | 29.4 | |
| 15 | 4 | 333.50 | 33 | 0 | 0.90 | 3210.97 | 3202 | 25 | 5.55E-02 | 19.9 | 5.12E-01 |
| 16 | 4 | 334.25 | 37 | 0 | 1.02 | 3218.22 | 3202 | 25 | 6.11E-02 | 19.8 | |
| 17 | 4 | 356.20 | 267 | 3 | 0.98 | 3429.72 | 3414 | 27 | 4.45E-01 | 6.4 | 1.65E+00 |
| 18 | 4 | 357.05 | 36 | 2 | 0.81 | 3437.88 | 3414 | 27 | 6.07E-02 | 21.0 | |
| 19 | 0 | 384.23 | 43 | 10 | 1.42 | 3699.79 | 3684 | 26 | 7.14E-02 | 21.5 | |
| 20 | 0 | 387.03 | 102 | 0 | 1.09 | 3726.83 | 3714 | 24 | 1.70E-01 | 9.9 | |

Sample ID : 0509118-10 Acquisition date : 6-OCT-2005 17:23:20

Total number of lines in spectrum 20
Number of unidentified lines 13
Number of lines tentatively identified by NID 7 35.00%

Nuclide Type : FISSION

| Nuclide | Hlife | Decay | Wtd Mean Uncorrected pCi/FILTER | Wtd Mean Decay Corr pCi/FILTER | Decay Corr 2-Sigma Error | 2-Sigma %Error | Flags |
|---|---|---|---|---|---|---|---|
| BA-133 | 10.50Y | 1.00 | 3.965E+02 | 3.966E+02 | 0.669E+02 | 16.86 | |
| | Total Activity : | | 3.965E+02 | 3.966E+02 | | | |

Nuclide Type : NATURAL

| Nuclide | Hlife | Decay | Wtd Mean Uncorrected pCi/FILTER | Wtd Mean Decay Corr pCi/FILTER | Decay Corr 2-Sigma Error | 2-Sigma %Error | Flags |
|---|---|---|---|---|---|---|---|
| TH-234 | 4.47E+09Y | 1.00 | 2.334E+03 | 2.334E+03 | 0.496E+03 | 21.25 | |
| AM-241 | 432.20Y | 1.00 | 8.516E+00 | 8.516E+00 | 22.47E+00 | 263.86 | |
| | Total Activity : | | 2.342E+03 | 2.342E+03 | | | |

Grand Total Activity : 2.739E+03 2.739E+03

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Nuclide Type: FISSION

| Nuclide | Energy | %Abn | %Eff | Uncorrected pCi/FILTER | Decay Corr pCi/FILTER | 2-Sigma %Error | Status |
|---|---|---|---|---|---|---|---|
| BA-133 | 81.00 | 33.00* | 1.839E+01 | 3.907E+02 | 3.908E+02 | 18.43 | OK |
| | 302.84 | 17.80 | 3.440E+00 | 4.328E+02 | 4.328E+02 | 41.60 | OK |
| | 356.01 | 60.00 | 1.579E+00 | 1.270E+03 | 1.271E+03 | 32.34 | <<WM N-Sigma |

Final Mean for 2 Valid Peaks = 3.966E+02+/- 6.686E+01 ( 16.86%)

Nuclide Type: NATURAL

| Nuclide | Energy | %Abn | %Eff | Uncorrected pCi/FILTER | Decay Corr pCi/FILTER | 2-Sigma %Error | Status |
|---|---|---|---|---|---|---|---|
| TH-234 | 63.29 | 3.80* | 9.987E+00 | 2.334E+03 | 2.334E+03 | 21.25 | OK |

Final Mean for 1 Valid Peaks = 2.334E+03+/- 4.960E+02 ( 21.25%)

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| AM-241 | 59.54 | 35.90* | 8.208E+00 | 8.516E+00 | 8.516E+00 | 263.86 | OK |

Final Mean for 1 Valid Peaks = 8.516E+00+/- 2.247E+01 (263.86%)

Flag: "*" = Keyline

Sample ID : 0509118-10 Acquisition date : 6-OCT-2005 17:23:20

---- Identified Nuclides ----

| Nuclide | Activity (pCi/FILTER) | Act error | MDA (pCi/FILTER) | MDA error | Act/MDA |
|---|---|---|---|---|---|
| BA-133 | 3.966E+02 | 6.686E+01 | 2.044E+01 | 3.018E+00 | 19.399 |
| TH-234 | 2.334E+03 | 4.960E+02 | 2.505E+02 | 2.924E+01 | 9.317 |
| AM-241 | 8.516E+00 | 2.247E+01 | 3.647E+01 | 5.180E+00 | 0.233 |

---- Non-Identified Nuclides ----

| Nuclide | Key-Line Activity (pCi/FILTER) | K.L. Ided | Act error | MDA (pCi/FILTER) | MDA error | Act/MDA |
|---|---|---|---|---|---|---|
| CO-57 | 9.687E-01 | | 1.689E+00 | 3.679E+00 | 1.531E-01 | 0.263 |
| CD-109 | 1.189E-01 | | 5.828E+01 | 1.114E+02 | 6.088E+00 | 0.001 |
| PA-231 | 1.243E+07 | | 3.520E+12 | 5.597E+07 | 1.585E+13 | 0.222 |
| PA-234 | 1.708E+04 | + | 8.148E+05 | 1.181E+04 | 5.633E+05 | 1.446 |
| NP-237 | -2.575E+01 | | 2.052E+01 | 3.021E+01 | 1.698E+00 | -0.852 |

MR 10-6-05

VAX/VMS Peak Search Report Generated 6-OCT-2005 17:45:26.50

Configuration : DKA100:[GAMMA.SCUSR.ARCHIVE]SMP_050911811_GE5_BAFIL_88918.CNF
Analyses by : PEAK V16.9 PEAKEFF V2.2
Client ID : VPTR092805SL0D
Deposition Date :
Sample Date : 6-OCT-2005 00:00:00. Acquisition date : 6-OCT-2005 17:35:09.
Sample ID : 0509118-11 Sample Quantity : 1.00000E+00 FILTER
Sample type : FILTER Sample Geometry : 0
Detector name : GE5 Detector Geometry: BAFIL
Elapsed live time: 0 00:10:00.00 Elapsed real time: 0 00:10:00.78 0.1%
Start channel : 25 End channel : 4096
Sensitivity : 3.00000 Gaussian : 10.00000
Critical level : No

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 21.02 | 39 | 9 | 0.59 | 199.73 | 190 | 18 | 6.55E-02 | 22.0 | |
| 2 | 0 | 30.96 | 1249 | 61 | 0.71 | 295.56 | 280 | 31 | 2.08E+00 | 3.2 | |
| 3 | 1 | 35.12 | 286 | 30 | 0.68 | 335.65 | 321 | 30 | 4.76E-01 | 7.1 | 3.03E+00 |
| 4 | 1 | 35.99 | 77 | 24 | 0.67 | 344.00 | 321 | 30 | 1.28E-01 | 20.1 | |
| 5 | 0 | 53.33 | 22 | 19 | 0.39 | 511.05 | 504 | 15 | 3.66E-02 | 43.4 | |
| 6 | 8 | 61.03 | 31 | 12 | 0.98 | 585.29 | 579 | 23 | 5.16E-02 | 29.4 | 2.24E+00 |
| 7 | 8 | 61.93 | 129 | 18 | 0.72 | 594.00 | 579 | 23 | 2.16E-01 | 10.7 | |
| 8 | 8 | 62.44 | 10 | 9 | 0.66 | 598.88 | 579 | 23 | 1.74E-02 | 75.1 | |
| 9 | 0 | 81.11 | 489 | 49 | 0.56 | 778.84 | 768 | 21 | 8.16E-01 | 5.4 | |
| 10 | 0 | 84.59 | 7 | 10 | 0.17 | 812.35 | 797 | 17 | 1.10E-02 | 106.4 | |
| 11 | 4 | 111.43 | 18 | 5 | 0.79 | 1071.00 | 1067 | 20 | 2.98E-02 | 40.1 | 5.16E-01 |
| 12 | 4 | 112.07 | 104 | 6 | 0.91 | 1077.16 | 1067 | 20 | 1.73E-01 | 11.6 | |
| 13 | 0 | 276.68 | 26 | 0 | 0.16 | 2663.46 | 2650 | 23 | 4.33E-02 | 19.6 | |
| 14 | 2 | 302.96 | 67 | 5 | 1.03 | 2916.65 | 2903 | 23 | 1.11E-01 | 13.6 | 8.39E-01 |
| 15 | 2 | 303.41 | 21 | 3 | 0.96 | 2921.00 | 2903 | 23 | 3.56E-02 | 33.1 | |
| 16 | 0 | 333.91 | 28 | 8 | 1.36 | 3214.92 | 3199 | 24 | 4.60E-02 | 28.7 | |
| 17 | 0 | 356.17 | 188 | 23 | 0.95 | 3429.44 | 3414 | 28 | 3.14E-01 | 9.1 | |
| 18 | 1 | 383.52 | 14 | 1 | 1.12 | 3693.02 | 3683 | 24 | 2.35E-02 | 47.1 | 5.07E+00 |
| 19 | 1 | 384.24 | 70 | 2 | 0.91 | 3699.98 | 3683 | 24 | 1.17E-01 | 9.2 | |
| 20 | 0 | 387.03 | 61 | 27 | 0.56 | 3726.85 | 3710 | 26 | 1.01E-01 | 22.3 | |

Sample ID : 0509118-11 Acquisition date : 6-OCT-2005 17:35:09

Total number of lines in spectrum 20
Number of unidentified lines 12
Number of lines tentatively identified by NID 8 40.00%

Nuclide Type : FISSION

| Nuclide | Hlife | Decay | Wtd Mean Uncorrected pCi/FILTER | Wtd Mean Decay Corr pCi/FILTER | Decay Corr 2-Sigma Error | 2-Sigma %Error | Flags |
|---|---|---|---|---|---|---|---|
| BA-133 | 10.50Y | 1.00 | 3.781E+02 | 3.781E+02 | 0.641E+02 | 16.96 | |
| NP-237 | 2.14E+06Y | 1.00 | 1.143E+01 | 1.143E+01 | 2.434E+01 | 212.85 | |
| | Total Activity : | | 3.895E+02 | 3.896E+02 | | | |

Nuclide Type : NATURAL

| Nuclide | Hlife | Decay | Wtd Mean Uncorrected pCi/FILTER | Wtd Mean Decay Corr pCi/FILTER | Decay Corr 2-Sigma Error | 2-Sigma %Error | Flags |
|---|---|---|---|---|---|---|---|
| TH-234 | 4.47E+09Y | 1.00 | 1.240E+02 | 1.240E+02 | 1.868E+02 | 150.72 | |
| AM-241 | 432.20Y | 1.00 | 4.734E+01 | 4.734E+01 | 2.871E+01 | 60.66 | |
| | Total Activity : | | 1.713E+02 | 1.713E+02 | | | |

Grand Total Activity : 5.608E+02 5.609E+02

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Nuclide Type: FISSION

| Nuclide | Energy | %Abn | %Eff | Uncorrected pCi/FILTER | Decay Corr pCi/FILTER | 2-Sigma %Error | Status |
|---|---|---|---|---|---|---|---|
| BA-133 | 81.00 | 33.00* | 1.839E+01 | 3.632E+02 | 3.633E+02 | 18.78 | OK |
| | 302.84 | 17.80 | 3.440E+00 | 4.914E+02 | 4.915E+02 | 38.35 | OK |
| | 356.01 | 60.00 | 1.579E+00 | 8.951E+02 | 8.952E+02 | 34.91 | <<WM N-Sigma |
| | Final Mean for 2 Valid Peaks = 3.781E+02+/- 6.414E+01 ( 16.96%) | | | | | | |
| NP-237 | 86.50 | 12.60* | 2.060E+01 | 1.143E+01 | 1.143E+01 | 212.85 | OK |
| | Final Mean for 1 Valid Peaks = 1.143E+01+/- 2.434E+01 (212.85%) | | | | | | |

Nuclide Type: NATURAL

| Nuclide | Energy | %Abn | %Eff | Uncorrected pCi/FILTER | Decay Corr pCi/FILTER | 2-Sigma %Error | Status |
|---|---|---|---|---|---|---|---|
| TH-234 | 63.29 | 3.80* | 9.987E+00 | 1.240E+02 | 1.240E+02 | 150.72 | OK |
| | Final Mean for 1 Valid Peaks = 1.240E+02+/- 1.868E+02 (150.72%) | | | | | | |
| AM-241 | 59.54 | 35.90* | 8.208E+00 | 4.734E+01 | 4.734E+01 | 60.66 | OK |
| | Final Mean for 1 Valid Peaks = 4.734E+01+/- 2.871E+01 ( 60.66%) | | | | | | |

Flag: "*" = Keyline

Sample ID : 0509118-11 Acquisition date : 6-OCT-2005 17:35:09

---- Identified Nuclides ----

| Nuclide | Activity (pCi/FILTER) | Act error | MDA (pCi/FILTER) | MDA error | Act/MDA |
|---|---|---|---|---|---|
| BA-133 | 3.781E+02 | 6.414E+01 | 2.167E+01 | 3.200E+00 | 17.446 |
| TH-234 | 1.240E+02 | 1.868E+02 | 3.887E+02 | 4.537E+01 | 0.319 |
| NP-237 | 1.143E+01 | 2.434E+01 | 4.351E+01 | 2.446E+00 | 0.263 |
| AM-241 | 4.734E+01 | 2.871E+01 | 2.993E+01 | 4.251E+00 | 1.582 |

---- Non-Identified Nuclides ----

| Nuclide | Key-Line Activity (pCi/FILTER) | K.L. Ided | Act error | MDA (pCi/FILTER) | MDA error | Act/MDA |
|---|---|---|---|---|---|---|
| CO-57 | 5.771E-01 | | 1.931E+00 | 3.923E+00 | 1.633E-01 | 0.147 |
| CD-109 | 1.102E+01 | | 6.850E+01 | 1.312E+02 | 7.167E+00 | 0.084 |
| PA-231 | -9.084E+06 | | 2.572E+12 | 5.050E+07 | 1.430E+13 | -0.180 |
| PA-234 | 1.116E+04 | + | 5.323E+05 | 8.736E+03 | 4.167E+05 | 1.277 |

VAX/VMS Peak Search Report Generated 6-OCT-2005 18:04:12.54 MR 10.6.05

Configuration : DKA100:[GAMMA.SCUSR.ARCHIVE]SMP_050911812_GE5_BAFIL_88924.CNF
Analyses by : PEAK V16.9 PEAKEFF V2.2
Client ID : VPTR092805SL0E
Deposition Date :
Sample Date : 6-OCT-2005 00:00:00. Acquisition date : 6-OCT-2005 17:53:54.
Sample ID : 0509118-12 Sample Quantity : 1.00000E+00 FILTER
Sample type : FILTER Sample Geometry : 0
Detector name : GE5 Detector Geometry: BAFIL
Elapsed live time: 0 00:10:00.00 Elapsed real time: 0 00:10:00.85 0.1%
Start channel : 25 End channel : 4096
Sensitivity : 3.00000 Gaussian : 10.00000
Critical level : No

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 21.24 | 56 | 26 | 0.36 | 201.88 | 194 | 15 | 9.38E-02 | 22.3 | |
| 2 | 0 | 30.94 | 1526 | 39 | 0.75 | 295.32 | 280 | 28 | 2.54E+00 | 2.7 | |
| 3 | 5 | 35.04 | 313 | 4 | 0.77 | 334.87 | 325 | 27 | 5.22E-01 | 6.0 | 1.27E+00 |
| 4 | 5 | 36.02 | 59 | 1 | 0.67 | 344.29 | 325 | 27 | 9.83E-02 | 20.9 | |
| 5 | 0 | 53.64 | 25 | 24 | 0.27 | 514.09 | 502 | 20 | 4.15E-02 | 47.2 | |
| 6 | 1 | 61.80 | 170 | 14 | 0.79 | 592.69 | 578 | 25 | 2.83E-01 | 9.2 | 3.38E+00 |
| 7 | 1 | 62.54 | 53 | 5 | 0.65 | 599.82 | 578 | 25 | 8.80E-02 | 13.8 | |
| 8 | 0 | 66.14 | 110 | 14 | 1.21 | 634.57 | 622 | 28 | 1.83E-01 | 12.6 | |
| 9 | 0 | 81.12 | 591 | 47 | 0.71 | 778.95 | 766 | 29 | 9.84E-01 | 5.1 | |
| 10 | 3 | 111.54 | 51 | 25 | 0.79 | 1072.00 | 1063 | 23 | 8.58E-02 | 28.2 | 1.19E+00 |
| 11 | 3 | 112.14 | 67 | 16 | 0.71 | 1077.82 | 1063 | 23 | 1.11E-01 | 20.1 | |
| 12 | 1 | 115.48 | 24 | 5 | 0.79 | 1110.00 | 1106 | 26 | 4.02E-02 | 19.7 | 2.11E+00 |
| 13 | 1 | 116.21 | 35 | 8 | 0.79 | 1117.00 | 1106 | 26 | 5.87E-02 | 27.0 | |
| 14 | 0 | 160.74 | 18 | 13 | 0.53 | 1546.14 | 1536 | 17 | 3.04E-02 | 41.8 | |
| 15 | 0 | 276.63 | 36 | 11 | 0.48 | 2662.92 | 2650 | 20 | 6.05E-02 | 23.4 | |
| 16 | 4 | 302.77 | 100 | 7 | 1.17 | 2914.80 | 2904 | 27 | 1.66E-01 | 9.5 | 5.16E+00 |
| 17 | 4 | 303.40 | 18 | 3 | 1.16 | 2920.94 | 2904 | 27 | 2.96E-02 | 53.2 | |
| 18 | 0 | 333.80 | 56 | 3 | 0.62 | 3213.89 | 3198 | 28 | 9.33E-02 | 15.1 | |
| 19 | 3 | 355.50 | 52 | 9 | 1.00 | 3423.00 | 3415 | 26 | 8.71E-02 | 28.5 | 7.43E-01 |
| 20 | 3 | 356.20 | 219 | 14 | 0.89 | 3429.77 | 3415 | 26 | 3.64E-01 | 8.1 | |
| 21 | 0 | 384.05 | 52 | 2 | 0.90 | 3698.08 | 3685 | 22 | 8.63E-02 | 15.2 | |
| 22 | 7 | 386.74 | 123 | 0 | 1.23 | 3724.06 | 3711 | 27 | 2.05E-01 | 8.9 | 4.31E+00 |
| 23 | 7 | 387.07 | 17 | 0 | 1.35 | 3727.21 | 3711 | 27 | 2.86E-02 | 62.7 | |
| 24 | 7 | 387.60 | 30 | 0 | 0.54 | 3732.32 | 3711 | 27 | 5.06E-02 | 22.1 | |

Sample ID : 0509118-12 Acquisition date : 6-OCT-2005 17:53:54

Total number of lines in spectrum 24
Number of unidentified lines 18
Number of lines tentatively identified by NID 6 25.00%

Nuclide Type : FISSION

| Nuclide | Hlife | Decay | Wtd Mean Uncorrected pCi/FILTER | Wtd Mean Decay Corr pCi/FILTER | Decay Corr 2-Sigma Error | 2-Sigma %Error | Flags |
|---|---|---|---|---|---|---|---|
| BA-133 | 10.50Y | 1.00 | 4.677E+02 | 4.677E+02 | 0.764E+02 | 16.33 | |
| | Total Activity : | | 4.677E+02 | 4.677E+02 | | | |

Nuclide Type : NATURAL

| Nuclide | Hlife | Decay | Wtd Mean Uncorrected pCi/FILTER | Wtd Mean Decay Corr pCi/FILTER | Decay Corr 2-Sigma Error | 2-Sigma %Error | Flags |
|---|---|---|---|---|---|---|---|
| TH-234 | 4.47E+09Y | 1.00 | 6.266E+02 | 6.266E+02 | 1.900E+02 | 30.32 | |
| | Total Activity : | | 6.266E+02 | 6.266E+02 | | | |
| | Grand Total Activity : | | 1.094E+03 | 1.094E+03 | | | |

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : 0509118-12 Acquisition date : 6-OCT-2005 17:53:54

Nuclide Type: FISSION

| Nuclide | Energy | %Abn | %Eff | Uncorrected pCi/FILTER | Decay Corr pCi/FILTER | 2-Sigma %Error | Status |
|---|---|---|---|---|---|---|---|
| BA-133 | 81.00 | 33.00* | 1.839E+01 | 4.385E+02 | 4.386E+02 | 18.35 | OK |
| | 302.84 | 17.80 | 3.440E+00 | 7.325E+02 | 7.326E+02 | 33.08 | OK |
| | 356.01 | 60.00 | 1.579E+00 | 1.039E+03 | 1.039E+03 | 33.82 | <<WM N-Sigma |

Final Mean for 2 Valid Peaks = 4.677E+02+/- 7.636E+01 ( 16.33%)

Nuclide Type: NATURAL

| Nuclide | Energy | %Abn | %Eff | Uncorrected pCi/FILTER | Decay Corr pCi/FILTER | 2-Sigma %Error | Status |
|---|---|---|---|---|---|---|---|
| TH-234 | 63.29 | 3.80* | 9.987E+00 | 6.266E+02 | 6.266E+02 | 30.32 | OK |

Final Mean for 1 Valid Peaks = 6.266E+02+/- 1.900E+02 ( 30.32%)

Flag: "*" = Keyline

Sample ID : 0509118-12 Acquisition date : 6-OCT-2005 17:53:54

---- Identified Nuclides ----

| Nuclide | Activity (pCi/FILTER) | Act error | MDA (pCi/FILTER) | MDA error | Act/MDA |
|---|---|---|---|---|---|
| BA-133 | 4.677E+02 | 7.636E+01 | 2.339E+01 | 3.453E+00 | 19.999 |
| TH-234 | 6.266E+02 | 1.900E+02 | 2.843E+02 | 3.318E+01 | 2.204 |

---- Non-Identified Nuclides ----

| Nuclide | Key-Line Activity (pCi/FILTER) | K.L. Ided | Act error | MDA (pCi/FILTER) | MDA error | Act/MDA |
|---|---|---|---|---|---|---|
| CO-57 | 2.121E-01 | | 1.933E+00 | 3.811E+00 | 1.586E-01 | 0.056 |
| CD-109 | 9.134E+01 | | 6.292E+01 | 1.430E+02 | 7.814E+00 | 0.639 |
| PA-231 | -7.403E+06 | | 2.096E+12 | 7.325E+07 | 2.074E+13 | -0.101 |
| PA-234 | 1.599E+04 | + | 7.626E+05 | 1.212E+04 | 5.780E+05 | 1.319 |
| NP-237 | -1.191E+01 | | 2.047E+01 | 3.489E+01 | 1.961E+00 | -0.341 |
| AM-241 | 8.540E+00 | | 2.473E+01 | 4.058E+01 | 5.763E+00 | 0.210 |

MR 10.6.05

VAX/VMS Peak Search Report Generated 6-OCT-2005 18:14:48.67

Configuration : DKA100:[GAMMA.SCUSR.ARCHIVE]SMP_050911813_GE5_BAFIL_88925.CNF
Analyses by : PEAK V16.9 PEAKEFF V2.2
Client ID : VPTR092805SL0F
Deposition Date :
Sample Date : 6-OCT-2005 00:00:00. Acquisition date : 6-OCT-2005 18:04:35.
Sample ID : 0509118-13 Sample Quantity : 1.00000E+00 FILTER
Sample type : FILTER Sample Geometry : 0
Detector name : GE5 Detector Geometry: BAFIL
Elapsed live time: 0 00:10:00.00 Elapsed real time: 0 00:10:00.85 0.1%
Start channel : 25 End channel : 4096
Sensitivity : 3.00000 Gaussian : 10.00000
Critical level : No

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 21.19 | 54 | 32 | 0.73 | 201.42 | 192 | 17 | 8.99E-02 | 25.6 | |
| 2 | 0 | 25.34 | 24 | 17 | 0.18 | 241.41 | 227 | 25 | 4.06E-02 | 43.2 | |
| 3 | 0 | 30.96 | 1490 | 73 | 0.66 | 295.51 | 285 | 27 | 2.48E+00 | 3.0 | |
| 4 | 3 | 35.04 | 302 | 24 | 0.65 | 334.86 | 324 | 29 | 5.03E-01 | 6.9 | 8.17E-01 |
| 5 | 3 | 35.95 | 96 | 15 | 0.81 | 343.64 | 324 | 29 | 1.60E-01 | 18.9 | |
| 6 | 1 | 61.31 | 59 | 25 | 0.72 | 588.00 | 579 | 28 | 9.79E-02 | 26.4 | 2.08E+00 |
| 7 | 1 | 61.93 | 143 | 16 | 0.72 | 594.00 | 579 | 28 | 2.38E-01 | 11.4 | |
| 8 | 0 | 66.09 | 80 | 35 | 0.81 | 634.05 | 619 | 30 | 1.33E-01 | 21.3 | |
| 9 | 0 | 81.15 | 517 | 65 | 0.69 | 779.23 | 767 | 23 | 8.61E-01 | 5.6 | |
| 10 | 0 | 110.36 | 20 | 4 | 0.59 | 1060.64 | 1053 | 13 | 3.39E-02 | 28.4 | |
| 11 | 0 | 111.98 | 152 | 18 | 0.73 | 1076.26 | 1066 | 23 | 2.54E-01 | 10.2 | |
| 12 | 0 | 276.44 | 32 | 4 | 0.45 | 2661.16 | 2650 | 19 | 5.34E-02 | 21.5 | |
| 13 | 9 | 301.96 | 10 | 0 | 0.96 | 2907.00 | 2902 | 25 | 1.63E-02 | 25.0 | 5.38E+00 |
| 14 | 9 | 302.58 | 83 | 0 | 0.96 | 2913.00 | 2902 | 25 | 1.38E-01 | 9.6 | |
| 15 | 9 | 303.17 | 11 | 0 | 0.41 | 2918.65 | 2902 | 25 | 1.88E-02 | 65.2 | |
| 16 | 2 | 355.40 | 44 | 5 | 1.00 | 3422.00 | 3415 | 26 | 7.34E-02 | 28.0 | 1.54E+00 |
| 17 | 2 | 356.24 | 249 | 11 | 0.93 | 3430.16 | 3415 | 26 | 4.15E-01 | 7.1 | |
| 18 | 0 | 383.89 | 58 | 2 | 1.29 | 3696.54 | 3682 | 24 | 9.61E-02 | 14.4 | |
| 19 | 1 | 386.53 | 45 | 4 | 1.02 | 3722.00 | 3711 | 29 | 7.58E-02 | 21.1 | 6.03E-01 |
| 20 | 1 | 387.26 | 61 | 2 | 1.02 | 3729.00 | 3711 | 29 | 1.02E-01 | 17.2 | |

Sample ID : 0509118-13 Acquisition date : 6-OCT-2005 18:04:35

Total number of lines in spectrum 20
Number of unidentified lines 13
Number of lines tentatively identified by NID 7 35.00%

Nuclide Type : FISSION

| Nuclide | Hlife | Decay | Wtd Mean Uncorrected pCi/FILTER | Wtd Mean Decay Corr pCi/FILTER | Decay Corr 2-Sigma Error | 2-Sigma %Error | Flags |
|---|---|---|---|---|---|---|---|
| BA-133 | 10.50Y | 1.00 | 4.095E+02 | 4.095E+02 | 0.684E+02 | 16.70 | |
| | Total Activity : | | 4.095E+02 | 4.095E+02 | | | |

Nuclide Type : NATURAL

| Nuclide | Hlife | Decay | Wtd Mean Uncorrected pCi/FILTER | Wtd Mean Decay Corr pCi/FILTER | Decay Corr 2-Sigma Error | 2-Sigma %Error | Flags |
|---|---|---|---|---|---|---|---|
| TH-234 | 4.47E+09Y | 1.00 | 1.697E+03 | 1.697E+03 | 0.439E+03 | 25.85 | |
| AM-241 | 432.20Y | 1.00 | 8.978E+01 | 8.978E+01 | 4.919E+01 | 54.80 | |
| | Total Activity : | | 1.786E+03 | 1.786E+03 | | | |

Grand Total Activity : 2.196E+03 2.196E+03

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : 0509118-13 Acquisition date : 6-OCT-2005 18:04:35

Nuclide Type: FISSION

| Nuclide | Energy | %Abn | %Eff | Uncorrected pCi/FILTER | Decay Corr pCi/FILTER | 2-Sigma %Error | Status |
|---|---|---|---|---|---|---|---|
| BA-133 | 81.00 | 33.00* | 1.839E+01 | 3.836E+02 | 3.837E+02 | 18.94 | OK |
| | 302.84 | 17.80 | 3.440E+00 | 6.104E+02 | 6.105E+02 | 33.18 | OK |
| | 356.01 | 60.00 | 1.579E+00 | 1.182E+03 | 1.183E+03 | 32.98 | <<WM N-Sigma |

Final Mean for 2 Valid Peaks = 4.095E+02+/- 6.839E+01 ( 16.70%)

Nuclide Type: NATURAL

| Nuclide | Energy | %Abn | %Eff | Uncorrected pCi/FILTER | Decay Corr pCi/FILTER | 2-Sigma %Error | Status |
|---|---|---|---|---|---|---|---|
| TH-234 | 63.29 | 3.80* | 9.987E+00 | 1.697E+03 | 1.697E+03 | 25.85 | OK |

Final Mean for 1 Valid Peaks = 1.697E+03+/- 4.385E+02 ( 25.85%)

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| AM-241 | 59.54 | 35.90* | 8.208E+00 | 8.978E+01 | 8.978E+01 | 54.80 | OK |

Final Mean for 1 Valid Peaks = 8.978E+01+/- 4.919E+01 ( 54.80%)

Flag: "*" = Keyline

Sample ID : 0509118-13 Acquisition date : 6-OCT-2005 18:04:35

---- Identified Nuclides ----

| Nuclide | Activity (pCi/FILTER) | Act error | MDA (pCi/FILTER) | MDA error | Act/MDA |
|---|---|---|---|---|---|
| BA-133 | 4.095E+02 | 6.839E+01 | 2.339E+01 | 3.453E+00 | 17.510 |
| TH-234 | 1.697E+03 | 4.385E+02 | 3.208E+01 | 3.745E+00 | 52.888 |
| AM-241 | 8.978E+01 | 4.919E+01 | 3.791E+01 | 5.384E+00 | 2.368 |

---- Non-Identified Nuclides ----

| Nuclide | Key-Line Activity (pCi/FILTER) | K.L. Ided | Act error | MDA (pCi/FILTER) | MDA error | Act/MDA |
|---|---|---|---|---|---|---|
| CO-57 | 4.931E-01 | | 1.834E+00 | 3.745E+00 | 1.558E-01 | 0.132 |
| CD-109 | -5.125E+01 | | 4.993E+01 | 7.507E+01 | 4.101E+00 | -0.683 |
| PA-231 | 6.830E+06 | | 1.934E+12 | 7.397E+07 | 2.094E+13 | 0.092 |
| PA-234 | 1.532E+04 | + | 7.309E+05 | 1.132E+04 | 5.400E+05 | 1.353 |
| NP-237 | 5.045E+00 | | 1.503E+01 | 3.128E+01 | 1.758E+00 | 0.161 |

VAX/VMS Peak Search Report Generated 6-OCT-2005 18:27:12.55 NR 10.6.05

Configuration : DKA100:[GAMMA.SCUSR.ARCHIVE]SMP_050911814_GE5_BAFIL_88926.CNF
Analyses by : PEAK V16.9 PEAKEFF V2.2
Client ID : VPTR092805SL0G
Deposition Date :
Sample Date : 6-OCT-2005 00:00:00. Acquisition date : 6-OCT-2005 18:16:54.
Sample ID : 0509118-14 Sample Quantity : 1.00000E+00 FILTER
Sample type : FILTER Sample Geometry : 0
Detector name : GE5 Detector Geometry: BAFIL
Elapsed live time: 0 00:10:00.00 Elapsed real time: 0 00:10:00.80 0.1%
Start channel : 25 End channel : 4096
Sensitivity : 3.00000 Gaussian : 10.00000
Critical level : No

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 21.13 | 58 | 26 | 0.31 | 200.83 | 192 | 19 | 9.67E-02 | 22.8 | |
| 2 | 0 | 30.95 | 1455 | 50 | 0.79 | 295.39 | 282 | 30 | 2.43E+00 | 2.9 | |
| 3 | 2 | 35.17 | 285 | 22 | 0.81 | 336.07 | 322 | 29 | 4.75E-01 | 7.1 | 4.22E+00 |
| 4 | 2 | 35.95 | 87 | 18 | 0.61 | 343.65 | 322 | 29 | 1.45E-01 | 16.1 | |
| 5 | 0 | 53.26 | 32 | 35 | 0.46 | 510.39 | 498 | 21 | 5.37E-02 | 42.7 | |
| 6 | 1 | 60.95 | 29 | 16 | 0.65 | 584.49 | 581 | 25 | 4.80E-02 | 22.0 | 2.44E+00 |
| 7 | 1 | 61.80 | 125 | 44 | 0.76 | 592.69 | 581 | 25 | 2.09E-01 | 14.8 | |
| 8 | 5 | 65.96 | 90 | 21 | 1.01 | 632.82 | 622 | 21 | 1.50E-01 | 15.2 | 1.59E+00 |
| 9 | 5 | 66.53 | 16 | 9 | 0.80 | 638.30 | 622 | 21 | 2.70E-02 | 46.0 | |
| 10 | 0 | 79.77 | 29 | 23 | 0.47 | 765.85 | 758 | 13 | 4.79E-02 | 36.2 | |
| 11 | 0 | 81.11 | 549 | 36 | 0.71 | 778.85 | 770 | 20 | 9.14E-01 | 4.9 | |
| 12 | 0 | 111.92 | 152 | 19 | 0.65 | 1075.68 | 1061 | 28 | 2.54E-01 | 10.5 | |
| 13 | 0 | 116.28 | 37 | 14 | 0.93 | 1117.68 | 1104 | 22 | 6.23E-02 | 27.4 | |
| 14 | 0 | 160.93 | 14 | 7 | 0.13 | 1548.00 | 1536 | 18 | 2.36E-02 | 42.4 | |
| 15 | 0 | 302.95 | 76 | 0 | 0.88 | 2916.54 | 2903 | 25 | 1.27E-01 | 11.5 | |
| 16 | 0 | 333.82 | 42 | 6 | 1.62 | 3214.01 | 3199 | 24 | 7.00E-02 | 19.3 | |
| 17 | 7 | 356.00 | 198 | 14 | 0.75 | 3427.81 | 3414 | 28 | 3.30E-01 | 8.9 | 1.60E+00 |
| 18 | 7 | 356.75 | 78 | 7 | 1.00 | 3435.00 | 3414 | 28 | 1.29E-01 | 16.0 | |
| 19 | 0 | 384.11 | 47 | 7 | 1.29 | 3698.68 | 3683 | 26 | 7.75E-02 | 18.5 | |
| 20 | 1 | 386.53 | 16 | 7 | 1.12 | 3722.02 | 3711 | 28 | 2.67E-02 | 67.6 | 1.83E+00 |
| 21 | 1 | 387.15 | 127 | 9 | 1.02 | 3728.00 | 3711 | 28 | 2.11E-01 | 8.9 | |

Sample ID : 0509118-14 Acquisition date : 6-OCT-2005 18:16:54

Total number of lines in spectrum 21
Number of unidentified lines 14
Number of lines tentatively identified by NID 7 33.33%

Nuclide Type : FISSION

| Nuclide | Hlife | Decay | Wtd Mean Uncorrected pCi/FILTER | Wtd Mean Decay Corr pCi/FILTER | Decay Corr 2-Sigma Error | 2-Sigma %Error | Flags |
|---|---|---|---|---|---|---|---|
| BA-133 | 10.50Y | 1.00 | 4.257E+02 | 4.258E+02 | 0.693E+02 | 16.27 | |
| | Total Activity : | | 4.257E+02 | 4.258E+02 | | | |

Nuclide Type : NATURAL

| Nuclide | Hlife | Decay | Wtd Mean Uncorrected pCi/FILTER | Wtd Mean Decay Corr pCi/FILTER | Decay Corr 2-Sigma Error | 2-Sigma %Error | Flags |
|---|---|---|---|---|---|---|---|
| TH-234 | 4.47E+09Y | 1.00 | 1.489E+03 | 1.489E+03 | 0.477E+03 | 32.02 | |
| AM-241 | 432.20Y | 1.00 | 4.403E+01 | 4.403E+01 | 2.047E+01 | 46.50 | |
| | Total Activity : | | 1.533E+03 | 1.533E+03 | | | |

Grand Total Activity : 1.958E+03 1.959E+03

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Nuclide Type: FISSION

| Nuclide | Energy | %Abn | %Eff | Uncorrected pCi/FILTER | Decay Corr pCi/FILTER | 2-Sigma %Error | Status |
|---|---|---|---|---|---|---|---|
| BA-133 | 81.00 | 33.00* | 1.839E+01 | 4.072E+02 | 4.073E+02 | 18.15 | OK |
| | 302.84 | 17.80 | 3.440E+00 | 5.591E+02 | 5.592E+02 | 35.51 | OK |
| | 356.01 | 60.00 | 1.579E+00 | 9.402E+02 | 9.403E+02 | 34.65 | <<WM N-Sigma |

Final Mean for 2 Valid Peaks = 4.258E+02+/- 6.928E+01 ( 16.27%)

Nuclide Type: NATURAL

| Nuclide | Energy | %Abn | %Eff | Uncorrected pCi/FILTER | Decay Corr pCi/FILTER | 2-Sigma %Error | Status |
|---|---|---|---|---|---|---|---|
| TH-234 | 63.29 | 3.80* | 9.987E+00 | 1.489E+03 | 1.489E+03 | 32.02 | OK |

Final Mean for 1 Valid Peaks = 1.489E+03+/- 4.767E+02 ( 32.02%)

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| AM-241 | 59.54 | 35.90* | 8.208E+00 | 4.403E+01 | 4.403E+01 | 46.50 | OK |

Final Mean for 1 Valid Peaks = 4.403E+01+/- 2.047E+01 ( 46.50%)

Flag: "*" = Keyline

Sample ID : 0509118-14 Acquisition date : 6-OCT-2005 18:16:54

---- Identified Nuclides ----

| Nuclide | Activity (pCi/FILTER) | Act error | MDA (pCi/FILTER) | MDA error | Act/MDA |
|---|---|---|---|---|---|
| BA-133 | 4.258E+02 | 6.928E+01 | 1.738E+01 | 2.566E+00 | 24.496 |
| TH-234 | 1.489E+03 | 4.767E+02 | 2.843E+02 | 3.318E+01 | 5.237 |
| AM-241 | 4.403E+01 | 2.047E+01 | 3.339E+01 | 4.741E+00 | 1.319 |

---- Non-Identified Nuclides ----

| Nuclide | Key-Line Activity (pCi/FILTER) | K.L. Ided | Act error | MDA (pCi/FILTER) | MDA error | Act/MDA |
|---|---|---|---|---|---|---|
| CO-57 | -6.406E-01 | | 2.395E+00 | 4.336E+00 | 1.804E-01 | -0.148 |
| CD-109 | 2.239E+01 | | 6.253E+01 | 1.249E+02 | 6.823E+00 | 0.179 |
| PA-231 | -1.303E+07 | | 3.688E+12 | 4.956E+07 | 1.403E+13 | -0.263 |
| PA-234 | 1.648E+04 | + | 7.860E+05 | 1.171E+04 | 5.586E+05 | 1.407 |
| NP-237 | -1.191E+01 | | 2.047E+01 | 3.489E+01 | 1.961E+00 | -0.341 |

MR 10.6.05

VAX/VMS Peak Search Report Generated 6-OCT-2005 18:37:32.57

Configuration : DKA100:[GAMMA.SCUSR.ARCHIVE]SMP_050911815_GE3_BAFIL_88927.CNF
Analyses by : PEAK V16.9 PEAKEFF V2.2
Client ID : VPTR092805SL0H
Deposition Date :
Sample Date : 6-OCT-2005 00:00:00. Acquisition date : 6-OCT-2005 18:32:19.
Sample ID : 0509118-15 Sample Quantity : 1.00000E+00 FILTER
Sample type : FILTER Sample Geometry : 0
Detector name : GE3 Detector Geometry: BAFIL
Elapsed live time: 0 00:05:00.00 Elapsed real time: 0 00:05:00.21 0.1%
Start channel : 25 End channel : 4096
Sensitivity : 3.00000 Gaussian : 10.00000
Critical level : No

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1 | 62.16 | 81 | 21 | 1.32 | 62.98 | 58 | 14 | 2.69E-01 | 13.9 | 1.16E+00 |
| 2 | 1 | 66.31 | 37 | 17 | 1.33 | 67.12 | 58 | 14 | 1.23E-01 | 24.1 | |
| 3 | 1 | 81.19 | 249 | 16 | 1.37 | 81.98 | 78 | 13 | 8.30E-01 | 7.0 | 5.36E+00 |
| 4 | 1 | 84.20 | 9 | 13 | 1.25 | 85.00 | 78 | 13 | 3.05E-02 | 106.5 | |
| 5 | 0 | 112.47 | 72 | 50 | 1.26 | 113.24 | 109 | 8 | 2.39E-01 | 20.8 | |
| 6 | 0 | 223.78 | 9 | 15 | 2.74 | 224.46 | 221 | 8 | 3.02E-02 | 79.6 | |
| 7 | 0 | 258.68 | 13 | 2 | 4.60 | 259.33 | 255 | 9 | 4.33E-02 | 34.5 | |
| 8 | 0 | 277.10 | 28 | 3 | 1.68 | 277.74 | 274 | 9 | 9.48E-02 | 21.1 | |
| 9 | 4 | 303.54 | 63 | 7 | 1.99 | 304.16 | 299 | 13 | 2.11E-01 | 14.5 | 2.65E+00 |
| 10 | 4 | 308.13 | 19 | 4 | 2.34 | 308.74 | 299 | 13 | 6.18E-02 | 37.5 | |
| 11 | 0 | 334.24 | 22 | 8 | 1.85 | 334.82 | 332 | 6 | 7.22E-02 | 29.6 | |
| 12 | 0 | 356.57 | 166 | 8 | 1.29 | 357.13 | 353 | 8 | 5.53E-01 | 8.3 | |
| 13 | 1 | 384.29 | 26 | 5 | 1.85 | 384.83 | 383 | 9 | 8.50E-02 | 23.9 | 1.56E+01 |
| 14 | 1 | 387.54 | 63 | 20 | 1.85 | 388.08 | 383 | 9 | 2.10E-01 | 16.9 | |
| 15 | 0 | 391.99 | 10 | 6 | 1.45 | 392.53 | 391 | 5 | 3.44E-02 | 47.3 | |
| 16 | 0 | 417.16 | 31 | 0 | 5.93 | 417.68 | 412 | 13 | 1.03E-01 | 18.0 | |
| 17 | 0 | 437.75 | 29 | 6 | 1.38 | 438.25 | 435 | 6 | 9.70E-02 | 22.8 | |

Sample ID : 0509118-15 Acquisition date : 6-OCT-2005 18:32:19

Total number of lines in spectrum 17
Number of unidentified lines 13
Number of lines tentatively identified by NID 4 23.53%

Nuclide Type : FISSION

| Nuclide | Hlife | Decay | Wtd Mean Uncorrected pCi/FILTER | Wtd Mean Decay Corr pCi/FILTER | Decay Corr 2-Sigma Error | 2-Sigma %Error | Flags |
|---|---|---|---|---|---|---|---|
| BA-133 | 10.50Y | 1.00 | 4.178E+02 | 4.178E+02 | 0.617E+02 | 14.77 | |
| | Total Activity : | | 4.178E+02 | 4.178E+02 | | | |

Nuclide Type : NATURAL

| Nuclide | Hlife | Decay | Wtd Mean Uncorrected pCi/FILTER | Wtd Mean Decay Corr pCi/FILTER | Decay Corr 2-Sigma Error | 2-Sigma %Error | Flags |
|---|---|---|---|---|---|---|---|
| TH-234 | 4.47E+09Y | 1.00 | 9.355E+02 | 9.355E+02 | 2.759E+02 | 29.50 | |
| | Total Activity : | | 9.355E+02 | 9.355E+02 | | | |

Grand Total Activity : 1.353E+03 1.353E+03

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : 0509118-15 Acquisition date : 6-OCT-2005 18:32:19

Nuclide Type: FISSION

| Nuclide | Energy | %Abn | %Eff | Uncorrected pCi/FILTER | Decay Corr pCi/FILTER | 2-Sigma %Error | Status |
|---|---|---|---|---|---|---|---|
| BA-133 | 81.00 | 33.00* | 1.711E+01 | 3.973E+02 | 3.973E+02 | 22.37 | OK |
| | 302.84 | 17.80 | 6.608E+00 | 4.856E+02 | 4.856E+02 | 37.78 | OK |
| | 356.01 | 60.00 | 5.887E+00 | 4.233E+02 | 4.233E+02 | 22.92 | OK |

Final Mean for 3 Valid Peaks = 4.178E+02+/- 6.172E+01 ( 14.77%)

Nuclide Type: NATURAL

| Nuclide | Energy | %Abn | %Eff | Uncorrected pCi/FILTER | Decay Corr pCi/FILTER | 2-Sigma %Error | Status |
|---|---|---|---|---|---|---|---|
| TH-234 | 63.29 | 3.80* | 2.049E+01 | 9.355E+02 | 9.355E+02 | 29.50 | OK |

Final Mean for 1 Valid Peaks = 9.355E+02+/- 2.759E+02 ( 29.50%)

Flag: "*" = Keyline

Sample ID : 0509118-15 Acquisition date : 6-OCT-2005 18:32:19

---- Identified Nuclides ----

| Nuclide | Activity (pCi/FILTER) | Act error | MDA (pCi/FILTER) | MDA error | Act/MDA |
|---|---|---|---|---|---|
| BA-133 | 4.178E+02 | 6.172E+01 | 3.795E+01 | 6.436E+00 | 11.011 |
| TH-234 | 9.355E+02 | 2.759E+02 | 2.655E+02 | 2.324E+01 | 3.524 |

---- Non-Identified Nuclides ----

| Nuclide | Key-Line Activity (pCi/FILTER) | K.L. Ided | Act error | MDA (pCi/FILTER) | MDA error | Act/MDA |
|---|---|---|---|---|---|---|
| CO-57 | 2.227E+00 | | 8.890E+00 | 1.753E+01 | 2.384E+00 | 0.127 |
| CD-109 | -1.369E+02 | | 1.897E+02 | 2.867E+02 | 3.173E+01 | -0.477 |
| PA-231 | 0.000E+00 | | 0.000E+00 | 6.818E-01 | 1.438E-02 | 0.000 |
| PA-234 | 0.000E+00 | | 0.000E+00 | 8.328E-01 | 3.316E-02 | 0.000 |
| NP-237 | -1.671E+01 | | 5.302E+01 | 9.574E+01 | 1.048E+01 | -0.175 |
| AM-241 | 1.466E+01 | | 1.631E+01 | 3.364E+01 | 2.817E+00 | 0.436 |

VAX/VMS Peak Search Report Generated 6-OCT-2005 18:43:26.82 MR 10-6-05

Configuration : DKA100:[GAMMA.SCUSR.ARCHIVE]SMP_050918816_GE5_BAFIL_88928.CNF
Analyses by : PEAK V16.9 PEAKEFF V2.2
Client ID : VPTR092805SL0I
Deposition Date :
Sample Date : 6-OCT-2005 00:00:00. Acquisition date : 6-OCT-2005 18:33:10.
Sample ID : 0509188-16 Sample Quantity : 1.00000E+00 FILTER
Sample type : FILTER Sample Geometry : 0
Detector name : GE5 Detector Geometry: BAFIL
Elapsed live time: 0 00:10:00.00 Elapsed real time: 0 00:10:00.83 0.1%
Start channel : 25 End channel : 4096
Sensitivity : 3.00000 Gaussian : 10.00000
Critical level : No

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 21.02 | 67 | 25 | 0.86 | 199.73 | 188 | 22 | 1.12E-01 | 20.2 | |
| 2 | 0 | 30.95 | 1378 | 88 | 0.67 | 295.40 | 282 | 30 | 2.30E+00 | 3.2 | |
| 3 | 1 | 35.12 | 355 | 39 | 0.74 | 335.65 | 321 | 33 | 5.92E-01 | 6.3 | 6.69E+00 |
| 4 | 1 | 35.89 | 142 | 33 | 0.67 | 343.00 | 321 | 33 | 2.37E-01 | 14.9 | |
| 5 | 0 | 53.40 | 22 | 21 | 0.27 | 511.75 | 504 | 16 | 3.71E-02 | 44.9 | |
| 6 | 3 | 61.55 | 152 | 27 | 0.96 | 590.29 | 580 | 29 | 2.53E-01 | 11.4 | 5.25E+00 |
| 7 | 3 | 62.45 | 56 | 25 | 0.72 | 599.00 | 580 | 29 | 9.40E-02 | 27.9 | |
| 8 | 0 | 76.94 | 18 | 3 | 1.27 | 738.60 | 729 | 17 | 3.02E-02 | 29.7 | |
| 9 | 1 | 79.60 | 47 | 14 | 0.81 | 764.28 | 754 | 35 | 7.86E-02 | 24.4 | 9.35E-01 |
| 10 | 1 | 81.10 | 573 | 10 | 0.70 | 778.72 | 754 | 35 | 9.55E-01 | 4.3 | |
| 11 | 0 | 111.74 | 174 | 11 | 0.47 | 1073.99 | 1055 | 33 | 2.90E-01 | 9.0 | |
| 12 | 0 | 116.41 | 14 | 27 | 0.14 | 1118.98 | 1106 | 18 | 2.31E-02 | 79.6 | |
| 13 | 0 | 160.94 | 15 | 10 | 0.54 | 1548.07 | 1535 | 20 | 2.50E-02 | 47.1 | |
| 14 | 1 | 302.79 | 91 | 5 | 0.96 | 2915.00 | 2902 | 24 | 1.51E-01 | 11.4 | 2.23E+00 |
| 15 | 1 | 303.31 | 34 | 4 | 0.96 | 2920.00 | 2902 | 24 | 5.65E-02 | 27.0 | |
| 16 | 0 | 333.81 | 50 | 5 | 0.59 | 3213.94 | 3200 | 24 | 8.34E-02 | 17.1 | |
| 17 | 0 | 356.16 | 255 | 13 | 0.96 | 3429.31 | 3414 | 26 | 4.25E-01 | 7.0 | |
| 18 | 1 | 383.73 | 13 | 2 | 1.12 | 3695.02 | 3683 | 27 | 2.17E-02 | 67.8 | 5.78E+00 |
| 19 | 1 | 384.25 | 115 | 3 | 1.01 | 3700.00 | 3683 | 27 | 1.92E-01 | 7.7 | |
| 20 | 1 | 386.53 | 10 | 5 | 1.02 | 3722.00 | 3713 | 25 | 1.73E-02 | 92.7 | 1.72E+00 |
| 21 | 1 | 387.15 | 98 | 8 | 1.02 | 3728.00 | 3713 | 25 | 1.64E-01 | 11.6 | |

Sample ID : 0509188-16 Acquisition date : 6-OCT-2005 18:33:10

Total number of lines in spectrum 21
Number of unidentified lines 16
Number of lines tentatively identified by NID 5 23.81%

Nuclide Type : FISSION

| Nuclide | Hlife | Decay | Wtd Mean Uncorrected pCi/FILTER | Wtd Mean Decay Corr pCi/FILTER | Decay Corr 2-Sigma Error | 2-Sigma %Error | Flags |
|---|---|---|---|---|---|---|---|
| BA-133 | 10.50Y | 1.00 | 4.472E+02 | 4.473E+02 | 0.713E+02 | 15.94 | |
| | Total Activity : | | 4.472E+02 | 4.473E+02 | | | |

Nuclide Type : NATURAL

| Nuclide | Hlife | Decay | Wtd Mean Uncorrected pCi/FILTER | Wtd Mean Decay Corr pCi/FILTER | Decay Corr 2-Sigma Error | 2-Sigma %Error | Flags |
|---|---|---|---|---|---|---|---|
| TH-234 | 4.47E+09Y | 1.00 | 6.691E+02 | 6.691E+02 | 3.830E+02 | 57.24 | |
| | Total Activity : | | 6.691E+02 | 6.691E+02 | | | |

Grand Total Activity : 1.116E+03 1.116E+03

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Nuclide Type: FISSION

| Nuclide | Energy | %Abn | %Eff | Uncorrected pCi/FILTER | Decay Corr pCi/FILTER | 2-Sigma %Error | Status |
|---|---|---|---|---|---|---|---|
| BA-133 | 81.00 | 33.00* | 1.839E+01 | 4.252E+02 | 4.253E+02 | 17.58 | OK |
| | 302.84 | 17.80 | 3.440E+00 | 6.683E+02 | 6.683E+02 | 35.48 | OK |
| | 356.01 | 60.00 | 1.579E+00 | 1.211E+03 | 1.211E+03 | 32.89 | <<WM N-Sigma |

Final Mean for 2 Valid Peaks = 4.473E+02+/- 7.131E+01 ( 15.94%)

Nuclide Type: NATURAL

| Nuclide | Energy | %Abn | %Eff | Uncorrected pCi/FILTER | Decay Corr pCi/FILTER | 2-Sigma %Error | Status |
|---|---|---|---|---|---|---|---|
| TH-234 | 63.29 | 3.80* | 9.987E+00 | 6.691E+02 | 6.691E+02 | 57.24 | OK |

Final Mean for 1 Valid Peaks = 6.691E+02+/- 3.830E+02 ( 57.24%)

Flag: "*" = Keyline

Sample ID : 0509188-16 Acquisition date : 6-OCT-2005 18:33:10

---- Identified Nuclides ----

| Nuclide | Activity (pCi/FILTER) | Act error | MDA (pCi/FILTER) | MDA error | Act/MDA |
|---|---|---|---|---|---|
| BA-133 | 4.473E+02 | 7.131E+01 | 1.336E+01 | 1.973E+00 | 33.472 |
| TH-234 | 6.691E+02 | 3.830E+02 | 4.198E+02 | 4.900E+01 | 1.594 |

---- Non-Identified Nuclides ----

| Nuclide | Key-Line Activity (pCi/FILTER) | K.L. Ided | Act error | MDA (pCi/FILTER) | MDA error | Act/MDA |
|---|---|---|---|---|---|---|
| CO-57 | 6.376E-01 | | 2.294E+00 | 4.514E+00 | 1.878E-01 | 0.141 |
| CD-109 | -2.267E+01 | | 6.667E+01 | 1.186E+02 | 6.478E+00 | -0.191 |
| PA-231 | 2.820E+06 | | 7.986E+11 | 5.325E+07 | 1.508E+13 | 0.053 |
| PA-234 | 1.916E+04 | + | 9.141E+05 | 1.089E+04 | 5.194E+05 | 1.760 |
| NP-237 | 3.678E+00 | | 2.133E+01 | 4.078E+01 | 2.293E+00 | 0.090 |
| AM-241 | 1.421E+01 | | 1.989E+01 | 3.638E+01 | 5.167E+00 | 0.390 |

VAX/VMS Peak Search Report Generated 6-OCT-2005 18:51:09.76 MR 10.6.05

Configuration : DKA100:[GAMMA.SCUSR.ARCHIVE]SMP_050911817_GE3_BAFIL_88929.CNF
Analyses by : PEAK V16.9 PEAKEFF V2.2
Client ID : VPTR092805SL0J
Deposition Date :
Sample Date : 6-OCT-2005 00:00:00. Acquisition date : 6-OCT-2005 18:45:39.
Sample ID : 0509118-17 Sample Quantity : 1.00000E+00 FILTER
Sample type : FILTER Sample Geometry : 0
Detector name : GE3 Detector Geometry: BAFIL
Elapsed live time: 0 00:05:14.81 Elapsed real time: 0 00:05:15.07 0.1%
Start channel : 25 End channel : 4096
Sensitivity : 3.00000 Gaussian : 10.00000
Critical level : No

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1 | 62.30 | 87 | 11 | 1.32 | 63.12 | 59 | 19 | 2.77E-01 | 12.4 | 3.54E+00 |
| 2 | 1 | 66.31 | 49 | 11 | 1.33 | 67.12 | 59 | 19 | 1.55E-01 | 20.1 | |
| 3 | 1 | 70.19 | 10 | 10 | 1.22 | 71.00 | 59 | 19 | 3.06E-02 | 64.0 | |
| 4 | 0 | 81.24 | 329 | 32 | 1.26 | 82.04 | 78 | 8 | 1.05E+00 | 6.3 | |
| 5 | 0 | 94.38 | 4 | 41 | 2.61 | 95.17 | 93 | 7 | 1.32E-02 | 257.9 | |
| 6 | 0 | 112.16 | 74 | 14 | 1.28 | 112.94 | 111 | 5 | 2.36E-01 | 13.9 | |
| 7 | 0 | 116.95 | 24 | 16 | 1.72 | 117.72 | 116 | 5 | 7.53E-02 | 32.3 | |
| 8 | 0 | 142.66 | 14 | 10 | 1.44 | 143.41 | 140 | 6 | 4.31E-02 | 46.4 | |
| 9 | 5 | 158.41 | 7 | 14 | 2.24 | 159.14 | 157 | 10 | 2.36E-02 | 81.9 | 8.39E-01 |
| 10 | 5 | 162.12 | 17 | 13 | 2.25 | 162.85 | 157 | 10 | 5.35E-02 | 49.9 | |
| 11 | 0 | 265.02 | 5 | 19 | 1.86 | 265.67 | 260 | 9 | 1.51E-02 | 169.1 | |
| 12 | 0 | 277.54 | 22 | 10 | 1.64 | 278.17 | 274 | 8 | 6.84E-02 | 33.5 | |
| 13 | 1 | 303.35 | 55 | 9 | 1.75 | 303.96 | 299 | 12 | 1.76E-01 | 14.4 | 2.28E+00 |
| 14 | 1 | 307.54 | 12 | 1 | 1.76 | 308.15 | 299 | 12 | 3.66E-02 | 40.2 | |
| 15 | 0 | 333.95 | 30 | 10 | 1.47 | 334.53 | 330 | 7 | 9.60E-02 | 25.3 | |
| 16 | 0 | 356.45 | 200 | 0 | 1.32 | 357.02 | 353 | 8 | 6.35E-01 | 7.1 | |
| 17 | 1 | 384.29 | 37 | 6 | 1.85 | 384.83 | 382 | 9 | 1.18E-01 | 23.2 | 2.27E+00 |
| 18 | 1 | 387.42 | 85 | 5 | 1.68 | 387.96 | 382 | 9 | 2.71E-01 | 13.0 | |
| 19 | 0 | 391.71 | 24 | 5 | 1.27 | 392.25 | 391 | 5 | 7.62E-02 | 24.7 | |
| 20 | 0 | 416.37 | 19 | 6 | 1.91 | 416.89 | 412 | 11 | 6.04E-02 | 33.3 | |
| 21 | 0 | 437.58 | 45 | 2 | 1.35 | 438.08 | 434 | 8 | 1.43E-01 | 15.9 | |

Sample ID : 0509118-17 Acquisition date : 6-OCT-2005 18:45:39

Total number of lines in spectrum 21
Number of unidentified lines 17
Number of lines tentatively identified by NID 4 19.05%

Nuclide Type : FISSION

| Nuclide | Hlife | Decay | Wtd Mean Uncorrected pCi/FILTER | Wtd Mean Decay Corr pCi/FILTER | Decay Corr 2-Sigma Error | 2-Sigma %Error | Flags |
|---|---|---|---|---|---|---|---|
| BA-133 | 10.50Y | 1.00 | 4.759E+02 | 4.759E+02 | 0.668E+02 | 14.04 | |
| | Total Activity : | | 4.759E+02 | 4.759E+02 | | | |

Nuclide Type : NATURAL

| Nuclide | Hlife | Decay | Wtd Mean Uncorrected pCi/FILTER | Wtd Mean Decay Corr pCi/FILTER | Decay Corr 2-Sigma Error | 2-Sigma %Error | Flags |
|---|---|---|---|---|---|---|---|
| TH-234 | 4.47E+09Y | 1.00 | 9.609E+02 | 9.609E+02 | 2.559E+02 | 26.63 | |
| | Total Activity : | | 9.609E+02 | 9.609E+02 | | | |

Grand Total Activity : 1.437E+03 1.437E+03

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : 0509118-17 Acquisition date : 6-OCT-2005 18:45:39

Nuclide Type: FISSION

| Nuclide | Energy | %Abn | %Eff | Uncorrected pCi/FILTER | Decay Corr pCi/FILTER | 2-Sigma %Error | Status |
|---|---|---|---|---|---|---|---|
| BA-133 | 81.00 | 33.00* | 1.711E+01 | 5.003E+02 | 5.004E+02 | 21.46 | OK |
| | 302.84 | 17.80 | 6.608E+00 | 4.044E+02 | 4.045E+02 | 37.64 | OK |
| | 356.01 | 60.00 | 5.887E+00 | 4.861E+02 | 4.862E+02 | 21.20 | OK |

Final Mean for 3 Valid Peaks = 4.759E+02+/- 6.681E+01 ( 14.04%)

Nuclide Type: NATURAL

| Nuclide | Energy | %Abn | %Eff | Uncorrected pCi/FILTER | Decay Corr pCi/FILTER | 2-Sigma %Error | Status |
|---|---|---|---|---|---|---|---|
| TH-234 | 63.29 | 3.80* | 2.049E+01 | 9.609E+02 | 9.609E+02 | 26.63 | OK |

Final Mean for 1 Valid Peaks = 9.609E+02+/- 2.559E+02 ( 26.63%)

Flag: "*" = Keyline

Sample ID : 0509118-17 Acquisition date : 6-OCT-2005 18:45:39

---- Identified Nuclides ----

| Nuclide | Activity (pCi/FILTER) | Act error | MDA (pCi/FILTER) | MDA error | Act/MDA |
|---|---|---|---|---|---|
| BA-133 | 4.759E+02 | 6.681E+01 | 2.643E+01 | 4.482E+00 | 18.008 |
| TH-234 | 9.609E+02 | 2.559E+02 | 2.246E+02 | 1.966E+01 | 4.278 |

---- Non-Identified Nuclides ----

| Nuclide | Key-Line Activity (pCi/FILTER) | K.L. Ided | Act error | MDA (pCi/FILTER) | MDA error | Act/MDA |
|---|---|---|---|---|---|---|
| CO-57 | 1.872E+00 | | 8.715E+00 | 1.608E+01 | 2.187E+00 | 0.116 |
| CD-109 | 2.054E+01 | | 1.680E+02 | 2.773E+02 | 3.069E+01 | 0.074 |
| PA-231 | 0.000E+00 | | 0.000E+00 | 6.497E-01 | 1.370E-02 | 0.000 |
| PA-234 | 0.000E+00 | | 0.000E+00 | 7.936E-01 | 3.160E-02 | 0.000 |
| NP-237 | -7.241E+00 | | 4.752E+01 | 8.229E+01 | 9.004E+00 | -0.088 |
| AM-241 | 1.027E+01 | | 1.425E+01 | 2.818E+01 | 2.360E+00 | 0.364 |

VAX/VMS Peak Search Report Generated 6-OCT-2005 19:01:42.15 MR 10.6.05

Configuration : DKA100:[GAMMA.SCUSR.ARCHIVE]SMP_050911818_GE5_BAFIL_88930.CNF
Analyses by : PEAK V16.9 PEAKEFF V2.2
Client ID : VPTR092805SL0K
Deposition Date :
Sample Date : 6-OCT-2005 00:00:00. Acquisition date : 6-OCT-2005 18:51:26.
Sample ID : 0509118-18 Sample Quantity : 1.00000E+00 FILTER
Sample type : FILTER Sample Geometry : 0
Detector name : GE5 Detector Geometry: BAFIL
Elapsed live time: 0 00:10:00.00 Elapsed real time: 0 00:10:00.83 0.1%
Start channel : 25 End channel : 4096
Sensitivity : 3.00000 Gaussian : 10.00000
Critical level : No

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 6.07 | 27 | 41 | 1.05 | 55.63 | 40 | 23 | 4.45E-02 | 71.6 | |
| 2 | 0 | 21.08 | 69 | 16 | 0.69 | 200.32 | 189 | 19 | 1.15E-01 | 16.9 | |
| 3 | 2 | 28.28 | 33 | 7 | 0.79 | 269.67 | 260 | 47 | 5.55E-02 | 34.1 | 1.44E+00 |
| 4 | 2 | 29.24 | 24 | 7 | 0.66 | 279.00 | 260 | 47 | 3.98E-02 | 49.3 | |
| 5 | 2 | 30.97 | 1457 | 24 | 0.80 | 295.62 | 260 | 47 | 2.43E+00 | 2.7 | |
| 6 | 4 | 35.06 | 252 | 34 | 0.98 | 335.00 | 324 | 27 | 4.20E-01 | 8.7 | 3.03E+00 |
| 7 | 4 | 35.99 | 57 | 16 | 0.63 | 344.03 | 324 | 27 | 9.52E-02 | 25.4 | |
| 8 | 0 | 51.79 | 16 | 13 | 0.39 | 496.27 | 490 | 13 | 2.65E-02 | 47.6 | |
| 9 | 0 | 53.32 | 27 | 21 | 0.38 | 510.96 | 503 | 16 | 4.44E-02 | 38.4 | |
| 10 | 0 | 61.80 | 144 | 29 | 0.66 | 592.71 | 581 | 25 | 2.39E-01 | 12.0 | |
| 11 | 0 | 66.01 | 71 | 25 | 0.43 | 633.34 | 621 | 22 | 1.19E-01 | 19.4 | |
| 12 | 0 | 81.16 | 491 | 74 | 0.70 | 779.28 | 767 | 24 | 8.19E-01 | 6.0 | |
| 13 | 1 | 111.54 | 15 | 17 | 0.79 | 1072.00 | 1058 | 29 | 2.47E-02 | 106.8 | 1.95E+00 |
| 14 | 1 | 112.05 | 148 | 18 | 0.79 | 1077.00 | 1058 | 29 | 2.47E-01 | 9.7 | |
| 15 | 0 | 116.06 | 26 | 17 | 0.46 | 1115.59 | 1103 | 20 | 4.37E-02 | 37.9 | |
| 16 | 0 | 276.48 | 30 | 2 | 0.55 | 2661.51 | 2652 | 18 | 4.98E-02 | 20.4 | |
| 17 | 2 | 302.30 | 16 | 1 | 0.78 | 2910.34 | 2903 | 25 | 2.70E-02 | 42.8 | 3.83E+00 |
| 18 | 2 | 303.10 | 104 | 8 | 0.96 | 2918.00 | 2903 | 25 | 1.74E-01 | 9.9 | |
| 19 | 0 | 333.78 | 55 | 4 | 0.64 | 3213.67 | 3198 | 27 | 9.20E-02 | 15.2 | |
| 20 | 5 | 356.17 | 207 | 22 | 1.00 | 3429.47 | 3413 | 26 | 3.46E-01 | 8.4 | 3.25E+00 |
| 21 | 5 | 356.64 | 74 | 13 | 1.00 | 3434.00 | 3413 | 26 | 1.24E-01 | 15.5 | |
| 22 | 0 | 384.12 | 55 | 7 | 0.72 | 3698.76 | 3683 | 26 | 9.08E-02 | 16.6 | |
| 23 | 0 | 387.05 | 110 | 18 | 0.83 | 3727.05 | 3713 | 29 | 1.83E-01 | 12.7 | |

Sample ID : 0509118-18 Acquisition date : 6-OCT-2005 18:51:26

Total number of lines in spectrum 23
Number of unidentified lines 16
Number of lines tentatively identified by NID 7 30.43%

Nuclide Type : FISSION

| Nuclide | Hlife | Decay | Wtd Mean Uncorrected pCi/FILTER | Wtd Mean Decay Corr pCi/FILTER | Decay Corr 2-Sigma Error | 2-Sigma %Error | Flags |
|---|---|---|---|---|---|---|---|
| BA-133 | 10.50Y | 1.00 | 3.932E+02 | 3.932E+02 | 0.684E+02 | 17.39 | |
| | Total Activity : | | 3.932E+02 | 3.932E+02 | | | |

Nuclide Type : NATURAL

| Nuclide | Hlife | Decay | Wtd Mean Uncorrected pCi/FILTER | Wtd Mean Decay Corr pCi/FILTER | Decay Corr 2-Sigma Error | 2-Sigma %Error | Flags |
|---|---|---|---|---|---|---|---|
| TH-234 | 4.47E+09Y | 1.00 | 1.704E+03 | 1.704E+03 | 0.458E+03 | 26.91 | |
| | Total Activity : | | 1.704E+03 | 1.704E+03 | | | |

Grand Total Activity : 2.097E+03 2.097E+03

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : 0509118-18 Acquisition date : 6-OCT-2005 18:51:26

Nuclide Type: FISSION

| Nuclide | Energy | %Abn | %Eff | Uncorrected pCi/FILTER | Decay Corr pCi/FILTER | 2-Sigma %Error | Status |
|---|---|---|---|---|---|---|---|
| BA-133 | 81.00 | 33.00* | 1.839E+01 | 3.648E+02 | 3.649E+02 | 19.44 | OK |
| | 302.84 | 17.80 | 3.440E+00 | 7.673E+02 | 7.674E+02 | 33.58 | OK |
| | 356.01 | 60.00 | 1.579E+00 | 9.858E+02 | 9.859E+02 | 34.17 | <<WM N-Sigma |

Final Mean for 2 Valid Peaks = 3.932E+02+/- 6.839E+01 ( 17.39%)

Nuclide Type: NATURAL

| Nuclide | Energy | %Abn | %Eff | Uncorrected pCi/FILTER | Decay Corr pCi/FILTER | 2-Sigma %Error | Status |
|---|---|---|---|---|---|---|---|
| TH-234 | 63.29 | 3.80* | 9.987E+00 | 1.704E+03 | 1.704E+03 | 26.91 | OK |

Final Mean for 1 Valid Peaks = 1.704E+03+/- 4.584E+02 ( 26.91%)

Flag: "*" = Keyline

Sample ID : 0509118-18 Acquisition date : 6-OCT-2005 18:51:26

---- Identified Nuclides ----

| Nuclide | Activity (pCi/FILTER) | Act error | MDA (pCi/FILTER) | MDA error | Act/MDA |
|---|---|---|---|---|---|
| BA-133 | 3.932E+02 | 6.839E+01 | 2.076E+01 | 3.065E+00 | 18.942 |
| TH-234 | 1.704E+03 | 4.584E+02 | 2.843E+02 | 3.318E+01 | 5.994 |

---- Non-Identified Nuclides ----

| Nuclide | Key-Line Activity (pCi/FILTER) | K.L. Ided | Act error | MDA (pCi/FILTER) | MDA error | Act/MDA |
|---|---|---|---|---|---|---|
| CO-57 | -1.107E+00 | | 2.381E+00 | 4.178E+00 | 1.738E-01 | -0.265 |
| CD-109 | 7.985E+01 | | 7.066E+01 | 1.511E+02 | 8.253E+00 | 0.529 |
| PA-231 | 8.886E+06 | | 2.516E+12 | 6.090E+07 | 1.724E+13 | 0.146 |
| PA-234 | 1.954E+04 | + | 9.322E+05 | 1.161E+04 | 5.538E+05 | 1.683 |
| NP-237 | -3.053E+01 | | 2.358E+01 | 3.510E+01 | 1.973E+00 | -0.870 |
| AM-241 | 2.082E+01 | | 2.100E+01 | 3.961E+01 | 5.625E+00 | 0.526 |

MR 10-6-05

VAX/VMS Peak Search Report Generated 6-OCT-2005 18:58:01.45

Configuration : DKA100:[GAMMA.SCUSR.ARCHIVE]SMP_050911819_GE3_BAFIL_88931.CNF
Analyses by : PEAK V16.9 PEAKEFF V2.2
Client ID : VPTR092805SL0L
Deposition Date :
Sample Date : 6-OCT-2005 00:00:00. Acquisition date : 6-OCT-2005 18:52:43.
Sample ID : 0509118-19 Sample Quantity : 1.00000E+00 FILTER
Sample type : FILTER Sample Geometry : 0
Detector name : GE3 Detector Geometry: BAFIL
Elapsed live time: 0 00:05:00.00 Elapsed real time: 0 00:05:00.22 0.1%
Start channel : 25 End channel : 4096
Sensitivity : 3.00000 Gaussian : 10.00000
Critical level : No

| Pk | It | Energy | Area | Bkgnd | FWHM | Channel | Left | Pw | Cts/Sec | %Err | Fit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1 | 62.23 | 54 | 22 | 1.32 | 63.05 | 58 | 14 | 1.80E-01 | 20.2 | 1.77E+00 |
| 2 | 1 | 66.31 | 41 | 18 | 1.33 | 67.12 | 58 | 14 | 1.38E-01 | 21.7 | |
| 3 | 0 | 81.08 | 232 | 72 | 1.15 | 81.88 | 78 | 7 | 7.74E-01 | 8.1 | |
| 4 | 0 | 97.12 | 13 | 17 | 1.30 | 97.91 | 95 | 6 | 4.18E-02 | 60.2 | |
| 5 | 0 | 111.59 | 67 | 30 | 1.43 | 112.36 | 108 | 8 | 2.25E-01 | 18.6 | |
| 6 | 4 | 161.25 | 15 | 11 | 2.05 | 161.99 | 158 | 23 | 5.07E-02 | 45.3 | 1.14E+00 |
| 7 | 4 | 169.93 | 9 | 8 | 2.07 | 170.65 | 158 | 23 | 2.94E-02 | 67.5 | |
| 8 | 0 | 277.13 | 39 | 2 | 2.06 | 277.76 | 273 | 10 | 1.29E-01 | 17.8 | |
| 9 | 4 | 300.23 | 6 | 2 | 2.33 | 300.84 | 299 | 13 | 1.87E-02 | 46.2 | 5.68E+00 |
| 10 | 4 | 303.09 | 54 | 5 | 2.33 | 303.70 | 299 | 13 | 1.79E-01 | 14.8 | |
| 11 | 4 | 307.90 | 8 | 7 | 2.34 | 308.51 | 299 | 13 | 2.72E-02 | 67.4 | |
| 12 | 2 | 333.75 | 22 | 9 | 1.97 | 334.34 | 331 | 15 | 7.34E-02 | 31.6 | 8.96E-01 |
| 13 | 2 | 338.62 | 9 | 5 | 1.98 | 339.21 | 331 | 15 | 2.94E-02 | 61.2 | |
| 14 | 0 | 356.68 | 181 | 18 | 1.21 | 357.25 | 353 | 8 | 6.03E-01 | 8.5 | |
| 15 | 1 | 384.29 | 44 | 14 | 1.85 | 384.83 | 381 | 11 | 1.47E-01 | 23.0 | 7.43E+00 |
| 16 | 1 | 387.48 | 65 | 29 | 1.85 | 388.02 | 381 | 11 | 2.18E-01 | 18.2 | |
| 17 | 0 | 392.03 | 16 | 5 | 1.21 | 392.57 | 391 | 6 | 5.17E-02 | 34.7 | |
| 18 | 1 | 415.31 | 22 | 0 | 1.89 | 415.83 | 412 | 10 | 7.19E-02 | 21.7 | 1.74E+00 |
| 19 | 1 | 418.66 | 14 | 0 | 1.89 | 419.17 | 412 | 10 | 4.80E-02 | 35.4 | |
| 20 | 0 | 437.70 | 29 | 3 | 1.48 | 438.20 | 435 | 6 | 9.68E-02 | 20.8 | |
| 21 | 0 | 469.42 | 5 | 4 | 2.25 | 469.89 | 465 | 7 | 1.50E-02 | 83.5 | |
| 22 | 0 | 512.68 | 4 | 3 | 1.82 | 513.12 | 510 | 6 | 1.24E-02 | 91.3 | |

Sample ID : 0509118-19 Acquisition date : 6-OCT-2005 18:52:43

Total number of lines in spectrum 22
Number of unidentified lines 18
Number of lines tentatively identified by NID 4 18.18%

Nuclide Type : FISSION

| Nuclide | Hlife | Decay | Wtd Mean Uncorrected pCi/FILTER | Wtd Mean Decay Corr pCi/FILTER | Decay Corr 2-Sigma Error | 2-Sigma %Error | Flags |
|---|---|---|---|---|---|---|---|
| BA-133 | 10.50Y | 1.00 | 4.077E+02 | 4.078E+02 | 0.624E+02 | 15.29 | |
| | Total Activity : | | 4.077E+02 | 4.078E+02 | | | |

Nuclide Type : NATURAL

| Nuclide | Hlife | Decay | Wtd Mean Uncorrected pCi/FILTER | Wtd Mean Decay Corr pCi/FILTER | Decay Corr 2-Sigma Error | 2-Sigma %Error | Flags |
|---|---|---|---|---|---|---|---|
| TH-234 | 4.47E+09Y | 1.00 | 6.234E+02 | 6.234E+02 | 2.585E+02 | 41.46 | |
| | Total Activity : | | 6.234E+02 | 6.234E+02 | | | |

Grand Total Activity : 1.031E+03 1.031E+03

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : 0509118-19 Acquisition date : 6-OCT-2005 18:52:43

Nuclide Type: FISSION

| Nuclide | Energy | %Abn | %Eff | Uncorrected pCi/FILTER | Decay Corr pCi/FILTER | 2-Sigma %Error | Status |
|---|---|---|---|---|---|---|---|
| BA-133 | 81.00 | 33.00* | 1.711E+01 | 3.703E+02 | 3.703E+02 | 23.74 | OK |
| | 302.84 | 17.80 | 6.608E+00 | 4.115E+02 | 4.116E+02 | 38.30 | OK |
| | 356.01 | 60.00 | 5.887E+00 | 4.614E+02 | 4.614E+02 | 23.16 | OK |

Final Mean for 3 Valid Peaks = 4.078E+02+/- 6.236E+01 ( 15.29%)

Nuclide Type: NATURAL

| Nuclide | Energy | %Abn | %Eff | Uncorrected pCi/FILTER | Decay Corr pCi/FILTER | 2-Sigma %Error | Status |
|---|---|---|---|---|---|---|---|
| TH-234 | 63.29 | 3.80* | 2.049E+01 | 6.234E+02 | 6.234E+02 | 41.46 | OK |

Final Mean for 1 Valid Peaks = 6.234E+02+/- 2.585E+02 ( 41.46%)

Flag: "*" = Keyline

Sample ID : 0509118-19 Acquisition date : 6-OCT-2005 18:52:43

---- Identified Nuclides ----

| Nuclide | Activity (pCi/FILTER) | Act error | MDA (pCi/FILTER) | MDA error | Act/MDA |
|---|---|---|---|---|---|
| BA-133 | 4.078E+02 | 6.236E+01 | 3.870E+01 | 6.564E+00 | 10.536 |
| TH-234 | 6.234E+02 | 2.585E+02 | 2.481E+02 | 2.172E+01 | 2.513 |

---- Non-Identified Nuclides ----

| Nuclide | Key-Line Activity (pCi/FILTER) | K.L. Ided | Act error | MDA (pCi/FILTER) | MDA error | Act/MDA |
|---|---|---|---|---|---|---|
| CO-57 | 2.766E-01 | | 6.704E+00 | 1.339E+01 | 1.820E+00 | 0.021 |
| CD-109 | -4.598E+01 | | 1.702E+02 | 3.111E+02 | 3.443E+01 | -0.148 |
| PA-231 | 0.000E+00 | | 0.000E+00 | 6.818E-01 | 1.438E-02 | 0.000 |
| PA-234 | 0.000E+00 | | 0.000E+00 | 8.328E-01 | 3.316E-02 | 0.000 |
| NP-237 | 2.920E+01 | | 5.408E+01 | 1.041E+02 | 1.139E+01 | 0.280 |
| AM-241 | 2.428E+01 | | 1.692E+01 | 3.622E+01 | 3.033E+00 | 0.670 |