



\*\*\*\*\*  
\*\*\*\*\* G A M M A S P E C T R U M A N A L Y S I S \*\*\*\*\*  
\*\*\*\*\*

Filename: C:\GENIE2K\CAMFILES\UNC 2017\IMC Samples\IMC-0226\UNC-IMC-022

Report Generated On : 5/9/2017 10:38:58 AM

Sample Title : UNC-IMC-0226-S-P-7

Sample Description :

Sample Identification : IMC-0226-S-P-7

Sample Type :

Sample Geometry : cylinder

Peak Locate Threshold : 3.00

Peak Locate Range (in channels) : 40 - 8192

Peak Area Range (in channels) : 40 - 8192

Identification Energy Tolerance : 1.000 keV

Sample Size : 3.628E+002 grams

Sample Taken On : 4/18/2017 12:00:00 AM

Acquisition Started : 5/1/2017 1:31:44 PM

Live Time : 1800.0 seconds

Real Time : 1800.4 seconds

Dead Time : 0.02 %

Energy Calibration Used Done On : 4/13/2017

Efficiency Calibration Used Done On : 5/9/2017

Efficiency ID : H-IMC-0226-S-P-7

\*\*\*\*\*  
\*\*\*\*\* P E A K A N A L Y S I S R E P O R T \*\*\*\*\*  
\*\*\*\*\*

Detector Name: 8566

Sample Title: UNC-IMC-0226-S-P-7

Peak Analysis Performed on: 5/9/2017 10:38:52 AM

Peak Analysis From Channel: 40

Peak Analysis To Channel: 8192

|   | Peak<br>No. | ROI<br>start | ROI<br>end | Peak<br>centroid | Energy<br>(keV) | FWHM<br>(keV) | Net Peak<br>Area | Net Area<br>Uncert. | Continuum<br>Counts |
|---|-------------|--------------|------------|------------------|-----------------|---------------|------------------|---------------------|---------------------|
| F | 1           | 183-         | 192        | 186.52           | 46.79           | 0.50          | 5.19E+001        | 17.08               | 5.50E+001           |
| F | 2           | 209-         | 219        | 213.11           | 53.44           | 0.55          | 3.69E+001        | 15.60               | 6.60E+001           |
| M | 3           | 284-         | 314        | 291.24           | 72.99           | 0.80          | 8.76E+001        | 49.01               | 8.71E+001           |
| m | 4           | 284-         | 314        | 299.56           | 75.07           | 0.81          | 1.41E+002        | 71.74               | 1.13E+002           |
| m | 5           | 284-         | 314        | 308.54           | 77.32           | 0.81          | 7.84E+001        | 41.35               | 1.20E+002           |
| F | 6           | 333-         | 341        | 338.53           | 84.83           | 0.22          | 8.63E+001        | 18.19               | 7.80E+001           |
| F | 7           | 356-         | 364        | 359.52           | 90.08           | 0.68          | 5.14E+001        | 16.99               | 6.45E+001           |
| F | 8           | 569-         | 583        | 574.61           | 143.90          | 0.79          | 1.31E+002        | 68.24               | 7.88E+001           |
| F | 9           | 648-         | 658        | 653.16           | 163.56          | 0.87          | 5.22E+001        | 17.21               | 6.33E+001           |
| F | 10          | 735-         | 749        | 741.73           | 185.73          | 0.98          | 5.85E+002        | 45.36               | 7.50E+001           |
| F | 11          | 814-         | 825        | 820.11           | 205.34          | 0.88          | 3.94E+001        | 15.70               | 5.10E+001           |
| F | 12          | 948-         | 958        | 952.91           | 238.57          | 0.81          | 9.99E+001        | 21.94               | 4.68E+001           |
| F | 13          | 1172-        | 1185       | 1179.27          | 295.22          | 1.11          | 4.22E+001        | 15.42               | 3.64E+001           |
| F | 14          | 1400-        | 1411       | 1404.97          | 351.70          | 1.16          | 4.78E+001        | 16.44               | 3.00E+001           |
| F | 15          | 5824-        | 5849       | 5835.39          | 1460.39         | 2.50          | 1.47E+002        | 25.15               | 1.30E+001           |

M = First peak in a multiplet region

m = Other peak in a multiplet region

F = Fitted singlet

Errors quoted at 1.960 sigma

\*\*\*\*\*  
 \*\*\*\*\* N U C L I D E I D E N T I F I C A T I O N R E P O R T \*\*\*\*\*  
 \*\*\*\*\*

Sample Title: UNC-IMC-0226-S-P-7  
 Nuclide Library Used: C:\GENIE2K\CAMFILES\UNC 2017 NLB 0328201

..... IDENTIFIED NUCLIDES .....

| Nuclide<br>Name | Id<br>Confidence | Energy<br>(keV) | Yield<br>(%) | Activity<br>(pCi/gram) | Activity<br>Uncertainty |
|-----------------|------------------|-----------------|--------------|------------------------|-------------------------|
| K-40            | 0.970            | 1460.82*        | 10.66        | 7.35542E+000           | 1.40626E+000            |
| Pb-210          | 0.990            | 46.54*          | 4.25         | 2.02657E+000           | 8.79922E-001            |
| Pb-212          | 0.997            | 74.82*          | 10.28        | 1.05136E+000           | 5.73930E-001            |
|                 |                  | 77.11*          | 17.10        | 3.41563E-001           | 1.92712E-001            |
|                 |                  | 86.83           | 2.07         |                        |                         |
|                 |                  | 87.35           | 3.97         |                        |                         |
|                 |                  | 89.78*          | 1.46         | 2.37433E+000           | 9.16939E-001            |
|                 |                  | 115.18          | 0.60         |                        |                         |
|                 |                  | 238.63*         | 43.60        | 2.19987E-001           | 5.95888E-002            |
|                 |                  | 300.09          | 3.30         |                        |                         |
| PB-214          | 0.846            | 74.82*          | 5.80         | 1.86345E+000           | 1.03082E+000            |
|                 |                  | 77.11*          | 9.70         | 6.02136E-001           | 3.44028E-001            |
|                 |                  | 86.83           | 1.70         |                        |                         |
|                 |                  | 87.35           | 2.24         |                        |                         |
|                 |                  | 89.78*          | 0.82         | 4.22747E+000           | 1.67325E+000            |
|                 |                  | 241.99          | 7.25         |                        |                         |
|                 |                  | 258.76          | 0.53         |                        |                         |
|                 |                  | 295.22*         | 18.42        | 2.70141E-001           | 1.07347E-001            |
|                 |                  | 351.93*         | 35.60        | 1.89123E-001           | 7.07386E-002            |
|                 |                  | 785.96          | 1.06         |                        |                         |
|                 |                  | 839.07          | 0.58         |                        |                         |
| Ra-226          | 0.968            | 81.07           | 0.20         |                        |                         |
|                 |                  | 83.79           | 0.32         |                        |                         |
|                 |                  | 186.21*         | 3.64         | 1.25866E+001           | 2.34417E+000            |
| U-234           | 0.993            | 53.20*          | 0.12         | 3.71563E+001           | 1.80892E+001            |
|                 |                  | 120.90          | 0.04         |                        |                         |
| U-235           | 0.744            | 89.96*          | 3.43         | 1.01063E+000           | 3.91631E-001            |
|                 |                  | 93.35           | 5.54         |                        |                         |
|                 |                  | 104.82          | 0.69         |                        |                         |
|                 |                  | 105.60          | 1.31         |                        |                         |
|                 |                  | 108.58          | 0.50         |                        |                         |
|                 |                  | 109.19          | 1.66         |                        |                         |
|                 |                  | 143.76*         | 10.96        | 8.09282E-001           | 4.50535E-001            |
|                 |                  | 163.36*         | 5.08         | 7.40220E-001           | 2.80646E-001            |
|                 |                  | 194.94          | 0.63         |                        |                         |
|                 |                  | 202.12          | 1.08         |                        |                         |
|                 |                  | 205.32*         | 5.02         | 6.63103E-001           | 2.84206E-001            |

\* = Energy line found in the spectrum.

@ = Energy line not used for Weighted Mean Activity

Energy Tolerance : 1.000 keV

Nuclide confidence index threshold = 0.10

Errors quoted at 1.960 sigma

\*\*\*\*\*  
 \*\*\*\*\* I N T E R F E R E N C E C O R R E C T E D R E P O R T \*\*\*\*\*  
 \*\*\*\*\*

| Nuclide<br>Name | Nuclide<br>Id<br>Confidence | Wt mean<br>Activity<br>(pCi/gram) | Wt mean<br>Activity<br>Uncertainty |
|-----------------|-----------------------------|-----------------------------------|------------------------------------|
| K-40            | 0.970                       | 7.355420E+000                     | 1.406260E+000                      |
| Pb-210          | 0.990                       | 2.026571E+000                     | 8.799215E-001                      |
| Pb-212          | 0.997                       | 2.277608E-001                     | 5.646234E-002                      |
| PB-214          | 0.846                       | 2.179860E-001                     | 5.815625E-002                      |
| Ra-226          | 0.968                       | 1.258658E+001                     | 2.344166E+000                      |
| U-234           | 0.993                       | 3.715632E+001                     | 1.808922E+001                      |
| U-235           | 0.744                       | 7.453584E-001                     | 1.650638E-001                      |

? = nuclide is part of an undetermined solution

X = nuclide rejected by the interference analysis

@ = nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 1.960 sigma

\*\*\*\*\* U N I D E N T I F I E D P E A K S \*\*\*\*\*

Peak Locate Performed on: 5/9/2017 10:38:52 AM  
 Peak Locate From Channel: 40  
 Peak Locate To Channel: 8192

| Peak<br>No. | Energy<br>(keV) | Peak Size in<br>Counts per Second | Peak CPS<br>% Uncertainty | Peak<br>Type | Tol.<br>Nuclide |
|-------------|-----------------|-----------------------------------|---------------------------|--------------|-----------------|
| M 3         | 72.99           | 4.8661E-002                       | 55.96                     |              |                 |
| F 6         | 84.83           | 4.7949E-002                       | 21.08                     |              |                 |

M = First peak in a multiplet region

m = Other peak in a multiplet region

F = Fitted singlet

Errors quoted at 1.960 sigma

\*\*\*\*\*  
\*\*\*\*\* N U C L I D E M D A R E P O R T \*\*\*\*\*  
\*\*\*\*\*

Detector Name: 8566  
Sample Geometry: cylinder  
Sample Title: UNC-IMC-0226-S-P-7  
Nuclide Library Used: C:\GENIE2K\CAMFILES\UNC 2017 NLB 0328201

|   | Nuclide<br>Name | Energy<br>(keV) | Yield<br>(%) | Line MDA<br>(pCi/gram) | Nuclide MDA<br>(pCi/gram) | Activity<br>(pCi/gram) | Dec. Leve<br>(pCi/gram) |
|---|-----------------|-----------------|--------------|------------------------|---------------------------|------------------------|-------------------------|
| + | K-40            | 1460.82*        | 10.66        | 1.064E+000             | 1.06E+000                 | 7.355E+000             | 4.643E-00               |
| + | Pb-210          | 46.54*          | 4.25         | 1.663E+000             | 1.66E+000                 | 2.027E+000             | 7.786E-00               |
|   | BI-212          | 727.33          | 6.67         | 1.645E+000             | 1.64E+000                 | 1.534E-001             | 7.632E-00               |
|   |                 | 785.37          | 1.10         | 9.755E+000             |                           | -2.461E+000            | 4.492E+00               |
|   |                 | 1078.62         | 0.56         | 2.217E+001             |                           | -1.352E+001            | 1.009E+00               |
|   |                 | 1620.50         | 1.47         | 9.551E+000             |                           | -1.193E-001            | 4.238E+00               |
| + | Pb-212          | 74.82*          | 10.28        | 3.871E-001             | 8.23E-002                 | 1.051E+000             | 1.835E-00               |
|   |                 | 77.11*          | 17.10        | 2.338E-001             |                           | 3.416E-001             | 1.110E-00               |
|   |                 | 86.83           | 2.07         | 2.521E+000             |                           | -6.967E-001            | 1.216E+00               |
|   |                 | 87.35           | 3.97         | 1.187E+000             |                           | -3.621E-001            | 5.701E-00               |
|   |                 | 89.78*          | 1.46         | 2.054E+000             |                           | 2.374E+000             | 9.644E-00               |
|   |                 | 115.18          | 0.60         | 6.610E+000             |                           | 4.326E+000             | 3.159E+00               |
|   |                 | 238.63*         | 43.60        | 8.233E-002             |                           | 2.200E-001             | 3.819E-00               |
|   |                 | 300.09          | 3.30         | 2.001E+000             |                           | -5.082E-001            | 9.516E-00               |
|   | BI-214          | 76.86           | 0.55         | 1.234E+001             | 2.62E-001                 | 1.863E+001             | 5.984E+00               |
|   |                 | 79.29           | 0.91         | 5.881E+000             |                           | -1.622E+000            | 2.831E+00               |
|   |                 | 609.32          | 45.49        | 2.623E-001             |                           | 1.955E-001             | 1.238E-00               |
|   |                 | 665.45          | 1.53         | 7.065E+000             |                           | 3.752E+000             | 3.295E+00               |
|   |                 | 768.36          | 4.89         | 2.358E+000             |                           | -1.059E+000            | 1.094E+00               |
|   |                 | 806.18          | 1.26         | 8.795E+000             |                           | -4.720E+000            | 4.053E+00               |
|   |                 | 934.06          | 3.11         | 4.153E+000             |                           | -3.017E-001            | 1.917E+00               |
|   |                 | 1120.29         | 14.92        | 1.047E+000             |                           | 2.075E-001             | 4.848E-00               |
|   |                 | 1155.21         | 1.63         | 9.008E+000             |                           | -1.493E+000            | 4.141E+00               |
|   |                 | 1238.11         | 5.83         | 2.912E+000             |                           | 1.711E+000             | 1.348E+00               |
|   |                 | 1280.98         | 1.43         | 9.250E+000             |                           | 1.499E+000             | 4.174E+00               |
|   |                 | 1377.67         | 3.99         | 3.851E+000             |                           | 6.651E-001             | 1.753E+00               |
|   |                 | 1385.31         | 0.79         | 1.920E+001             |                           | -2.074E+000            | 8.730E+00               |
|   |                 | 1401.52         | 1.33         | 9.505E+000             |                           | -1.292E-001            | 4.228E+00               |
|   |                 | 1407.99         | 2.39         | 5.193E+000             |                           | -1.093E+000            | 2.304E+00               |
|   |                 | 1509.21         | 2.13         | 6.194E+000             |                           | 2.449E+000             | 2.748E+00               |
|   |                 | 1583.20         | 0.70         | 1.777E+001             |                           | 4.195E+000             | 7.788E+00               |
|   |                 | 1661.27         | 1.05         | 8.569E+000             |                           | 1.912E+000             | 3.512E+00               |
|   |                 | 1729.59         | 2.88         | 4.331E+000             |                           | -1.292E-001            | 1.874E+00               |
|   |                 | 1764.49         | 15.30        | 1.109E+000             |                           | 1.114E+000             | 4.987E-00               |
|   |                 | 1847.43         | 2.03         | 6.938E+000             |                           | 2.701E+000             | 3.029E+00               |
| > |                 | 2118.51         | 1.16         | 0.000E+000             |                           | 0.000E+000             | 0.000E+00               |
| > |                 | 2204.06         | 4.92         | 0.000E+000             |                           | 0.000E+000             | 0.000E+00               |
| > |                 | 2447.70         | 1.55         | 0.000E+000             |                           | 0.000E+000             | 0.000E+00               |
| + | PB-214          | 74.82*          | 5.80         | 6.861E-001             | 1.16E-001                 | 1.863E+000             | 3.252E-00               |
|   |                 | 77.11*          | 9.70         | 4.121E-001             |                           | 6.021E-001             | 1.957E-00               |
|   |                 | 86.83           | 1.70         | 3.069E+000             |                           | -8.484E-001            | 1.480E+00               |
|   |                 | 87.35           | 2.24         | 2.104E+000             |                           | -6.418E-001            | 1.010E+00               |

|   | Nuclide Name | Energy (keV) | Yield (%) | Line MDA (pCi/gram) | Nuclide MDA (pCi/gram) | Activity (pCi/gram) | Dec. Leve (pCi/gram) |
|---|--------------|--------------|-----------|---------------------|------------------------|---------------------|----------------------|
| + | PB-214       | 89.78*       | 0.82      | 3.657E+000          | 1.16E-001              | 4.227E+000          | 1.717E+00            |
|   |              | 241.99       | 7.25      | 9.561E-001          |                        | -1.694E-001         | 4.599E-00            |
|   |              | 258.76       | 0.53      | 1.009E+001          |                        | 1.092E+000          | 4.781E+00            |
|   |              | 295.22*      | 18.42     | 2.140E-001          |                        | 2.701E-001          | 9.835E-00            |
|   |              | 351.93*      | 35.60     | 1.165E-001          |                        | 1.891E-001          | 5.289E-00            |
|   |              | 785.96       | 1.06      | 1.005E+001          |                        | -5.014E+000         | 4.622E+00            |
|   |              | 839.07       | 0.58      | 1.877E+001          |                        | -5.140E+000         | 8.610E+00            |
| + | Ra-226       | 81.07        | 0.20      | 2.397E+001          | 1.10E+000              | -4.026E+000         | 1.149E+00            |
|   |              | 83.79        | 0.32      | 1.728E+001          |                        | 2.766E+001          | 8.348E+00            |
|   |              | 186.21*      | 3.64      | 1.097E+000          |                        | 1.259E+001          | 5.193E-00            |
|   | AC-228       | 89.96        | 1.90      | 2.359E+016          | 5.04E+015              | -3.685E+016         | 1.137E+01            |
|   |              | 93.35        | 3.10      | 1.468E+016          |                        | 1.552E+016          | 7.084E+01            |
|   |              | 99.51        | 1.26      | 2.590E+016          |                        | -5.476E+015         | 1.233E+01            |
|   |              | 105.60       | 0.74      | 4.632E+016          |                        | -3.561E+016         | 2.212E+01            |
|   |              | 129.07       | 2.42      | 1.409E+016          |                        | -6.076E+015         | 6.721E+01            |
|   |              | 153.98       | 0.72      | 4.913E+016          |                        | -1.739E+016         | 2.341E+01            |
|   |              | 209.25       | 3.89      | 1.162E+016          |                        | 7.790E+014          | 5.549E+01            |
|   |              | 214.85       | 0.76      | 5.359E+016          |                        | -1.210E+016         | 2.542E+01            |
|   |              | 270.24       | 3.46      | 1.377E+016          |                        | 4.467E+015          | 6.510E+01            |
|   |              | 328.00       | 2.95      | 1.771E+016          |                        | 3.730E+015          | 8.322E+01            |
|   |              | 338.32       | 11.27     | 5.465E+015          |                        | 2.759E+015          | 2.589E+01            |
|   |              | 409.46       | 1.92      | 3.576E+016          |                        | -4.936E+015         | 1.685E+01            |
|   |              | 463.00       | 4.40      | 1.648E+016          |                        | 7.496E+015          | 7.733E+01            |
|   |              | 562.50       | 0.87      | 8.482E+016          |                        | -3.362E+016         | 3.927E+01            |
|   |              | 674.75       | 2.10      | 4.082E+016          |                        | -4.258E+015         | 1.886E+01            |
|   |              | 726.86       | 0.62      | 1.562E+017          |                        | 4.372E+016          | 7.249E+01            |
|   |              | 755.32       | 1.00      | 1.068E+017          |                        | -1.395E+016         | 4.978E+01            |
|   |              | 772.29       | 1.49      | 6.701E+016          |                        | -1.636E+016         | 3.103E+01            |
|   |              | 794.95       | 4.25      | 2.574E+016          |                        | 2.341E+016          | 1.198E+01            |
|   |              | 830.49       | 0.54      | 1.868E+017          |                        | 3.740E+016          | 8.608E+01            |
|   |              | 835.71       | 1.61      | 5.982E+016          |                        | 3.667E+016          | 2.745E+01            |
|   |              | 840.38       | 0.91      | 1.131E+017          |                        | 4.925E+016          | 5.217E+01            |
|   |              | 904.20       | 0.77      | 1.617E+017          |                        | -6.353E+016         | 7.534E+01            |
|   |              | 911.20       | 25.80     | 5.036E+015          |                        | 2.557E+015          | 2.352E+01            |
|   |              | 964.77       | 4.99      | 2.934E+016          |                        | 2.651E+016          | 1.377E+01            |
|   |              | 968.97       | 15.80     | 9.078E+015          |                        | 8.313E+015          | 4.254E+01            |
|   |              | 1247.08      | 0.50      | 2.800E+017          |                        | -5.107E+016         | 1.288E+01            |
|   |              | 1459.14      | 0.83      | 3.766E+017          |                        | 1.040E+018          | 1.806E+01            |
|   |              | 1495.91      | 0.86      | 1.015E+017          |                        | -6.343E+016         | 4.319E+01            |
|   |              | 1588.20      | 3.22      | 3.703E+016          |                        | 1.907E+016          | 1.638E+01            |
|   |              | 1630.63      | 1.51      | 6.471E+016          |                        | -6.858E+016         | 2.770E+01            |
|   | TH-230       | 67.67        | 0.38      | 1.440E+001          | 1.44E+001              | 8.500E+000          | 6.894E+00            |
|   | PA-234       | 742.81       | 0.11      | 1.125E+002          | 1.76E+001              | 1.878E+001          | 5.246E+00            |
|   |              | 766.42       | 0.32      | 3.865E+001          |                        | 2.316E+001          | 1.801E+00            |
|   |              | 1001.03      | 0.84      | 1.759E+001          |                        | 3.747E+000          | 8.170E+00            |
|   | TH-234       | 63.29        | 3.70      | 1.546E+000          | 1.55E+000              | -6.299E-002         | 7.391E-00            |
|   |              | 92.38        | 2.13      | 2.645E+000          |                        | 3.370E+000          | 1.280E+00            |
|   |              | 92.80        | 2.10      | 2.562E+000          |                        | 2.831E+000          | 1.238E+00            |
|   |              | 112.81       | 0.21      | 1.823E+001          |                        | -2.795E+001         | 8.704E+00            |
| + | U-234        | 53.20*       | 0.12      | 4.806E+001          | 4.81E+001              | 3.716E+001          | 2.266E+00            |
|   |              | 120.90       | 0.04      | 1.203E+002          |                        | 6.861E+001          | 5.765E+00            |

|   | Nuclide<br>Name | Energy<br>(keV) | Yield<br>(%) | Line MDA<br>(pCi/gram) | Nuclide MDA<br>(pCi/gram) | Activity<br>(pCi/gram) | Dec. Leve<br>(pCi/gram) |
|---|-----------------|-----------------|--------------|------------------------|---------------------------|------------------------|-------------------------|
| + | U-235           | 89.96*          | 3.43         | 8.742E-001             | 3.22E-001                 | 1.011E+000             | 4.105E-00               |
|   |                 | 93.35           | 5.54         | 9.298E-001             |                           | 9.827E-001             | 4.487E-00               |
|   |                 | 104.82          | 0.69         | 5.669E+000             |                           | 6.899E-001             | 2.707E+00               |
|   |                 | 105.60          | 1.31         | 2.962E+000             |                           | -2.277E+000            | 1.414E+00               |
|   |                 | 108.58          | 0.50         | 8.208E+000             |                           | -9.205E-001            | 3.930E+00               |
|   |                 | 109.19          | 1.66         | 2.444E+000             |                           | -8.766E-001            | 1.170E+00               |
|   |                 | 143.76*         | 10.96        | 3.222E-001             |                           | 8.093E-001             | 1.528E-00               |
|   |                 | 163.36*         | 5.08         | 6.105E-001             |                           | 7.402E-001             | 2.860E-00               |
|   |                 | 194.94          | 0.63         | 6.714E+000             |                           | -4.585E+000            | 3.183E+00               |
|   |                 | 202.12          | 1.08         | 4.696E+000             |                           | 1.071E+000             | 2.244E+00               |
|   |                 | 205.32*         | 5.02         | 6.705E-001             |                           | 6.631E-001             | 3.125E-00               |

+ = Nuclide identified during the nuclide identification

\* = Energy line found in the spectrum

> = MDA value not calculated

@ = Half-life too short to be able to perform the decay correction



\*\*\*\*\*  
 \*\*\* LINE ACTIVITY CONSISTENCY EVALUATOR \*\*\*  
 \*\*\*\*\*

=====  
 Analysis using Key Line Activities  
 =====

Filename: C:\GENIE2K\CAMFILES\UNC 2017\IMC Samples\IMC-0226\UNC-IMC-022

Equation used to calculate plot:  $\ln(\text{Ratio}) = A + B \cdot \ln(\text{Energy})$

where: Ratio = Activity/KL Activity

Notes:

'^' Denotes Key Line energy

\* All uncertainties quoted at 1.96 sigma

| Nuclide | Energy<br>(keV) |   | Activity<br>(pCi/gram) | Activity<br>%Uncert* | Ratio[%Uncert] | A     | B<br>[uncert] |
|---------|-----------------|---|------------------------|----------------------|----------------|-------|---------------|
| -----   | -----           |   | -----                  | -----                | -----          | ----- | -----         |
| K-40    | 1460.8          | ^ | 7.36E+000              | 19.119               |                |       |               |
| Pb-210  | 46.5            | ^ | 2.03E+000              | 43.419               |                |       |               |
| Pb-212  | 74.8            |   | 1.05E+000              | 54.589               | 4.779[60.940]  | 7.79  | -1.408        |
|         | 77.1            |   | 3.42E-001              | 56.421               | 1.553[62.586]  |       | [ 0.464]      |
|         | 89.8            |   | 2.37E+000              | 38.619               | 10.793[47.171] |       |               |
|         | 238.6           | ^ | 2.20E-001              | 27.087               | 1.000[38.307]  |       |               |
| PB-214  | 74.8            |   | 1.86E+000              | 55.318               | 9.853[66.776]  | 8.91  | -1.504        |
|         | 77.1            |   | 6.02E-001              | 57.135               | 3.184[68.289]  |       | [ 0.377]      |
|         | 89.8            |   | 4.23E+000              | 39.580               | 22.353[54.458] |       |               |
|         | 295.2           |   | 2.70E-001              | 39.737               | 1.428[54.572]  |       |               |
|         | 351.9           | ^ | 1.89E-001              | 37.404               | 1.000[52.897]  |       |               |
| Ra-226  | 186.2           | ^ | 1.26E+001              | 18.624               |                |       |               |
| U-234   | 53.2            | ^ | 3.72E+001              | 48.684               |                |       |               |
| U-235   | 90.0            |   | 1.01E+000              | 38.751               | 1.249[67.830]  | 2.53  | -0.513        |
|         | 143.8           | ^ | 8.09E-001              | 55.671               | 1.000[78.731]  |       | [ 1.139]      |
|         | 163.4           |   | 7.40E-001              | 37.914               | 0.915[67.355]  |       |               |
|         | 205.3           |   | 6.63E-001              | 42.860               | 0.819[70.258]  |       |               |