
***** 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-0074\UNC-IMC-007

Report Generated On : 5/9/2017 10:09:51 AM

Sample Title : UNC-IMC-0074-S-P-5

Sample Description :

Sample Identification : IMC-0074-S-P-5

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 : 3.638E+002 grams

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

Acquisition Started : 5/2/2017 11:12:07 AM

Live Time : 1800.0 seconds

Real Time : 1800.7 seconds

Dead Time : 0.04 %

Energy Calibration Used Done On : 4/13/2017

Efficiency Calibration Used Done On : 5/9/2017

Efficiency ID : H-IMC-0074-S-P-5

***** 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-0074-S-P-5

Peak Analysis Performed on: 5/9/2017 10:09:41 AM

Peak Analysis From Channel: 40

Peak Analysis To Channel: 8192

	Peak No.	ROI start	ROI end	Peak centroid	Energy (keV)	FWHM (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
M	1	297-	313	299.72	75.11	0.67	8.11E+001	21.25	8.84E+001
m	2	297-	313	308.61	77.34	0.67	6.77E+001	19.05	1.06E+002
F	3	567-	584	574.91	143.98	1.06	6.91E+001	67.23	8.10E+001
F	4	735-	749	741.90	185.77	0.94	2.98E+002	87.06	6.75E+001
F	5	948-	958	953.09	238.62	0.89	1.17E+002	76.19	5.36E+001
F	6	1397-	1412	1405.86	351.92	1.27	6.35E+001	18.02	4.16E+001
F	7	1902-	1914	1907.45	477.44	1.23	3.47E+001	14.37	2.17E+001
F	8	5824-	5851	5836.49	1460.66	2.72	1.75E+002	26.87	7.78E+000

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-0074-S-P-5
 Nuclide Library Used: C:\GENIE2K\CAMFILES\UNC 2017 NLB 0328201

..... IDENTIFIED NUCLIDES

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (pCi/gram)	Activity Uncertainty
K-40	0.996	1460.82*	10.66	8.22986E+000	1.44423E+000
Pb-212	0.996	74.82*	10.28	5.81190E-001	1.92282E-001
		77.11*	17.10	2.84097E-001	9.83082E-002
		86.83	2.07		
		87.35	3.97		
		89.78	1.46		
		115.18	0.60		
		238.63*	43.60	2.44525E-001	1.63676E-001
		300.09	3.30		
PB-214	0.506	74.82*	5.80	1.03011E+000	3.53047E-001
		77.11*	9.70	5.00831E-001	1.79076E-001
		86.83	1.70		
		87.35	2.24		
		89.78	0.82		
		241.99	7.25		
		258.76	0.53		
		295.22	18.42		
		351.93*	35.60	2.37837E-001	7.59209E-002
		785.96	1.06		
		839.07	0.58		
Ra-226	0.973	81.07	0.20		
		83.79	0.32		
		186.21*	3.64	6.07221E+000	2.05288E+000
U-235	0.998	89.96	3.43		
		93.35	5.54		
		104.82	0.69		
		105.60	1.31		
		108.58	0.50		
		109.19	1.66		
		143.76*	10.96	4.05956E-001	4.03132E-001
		163.36	5.08		
		194.94	0.63		
		202.12	1.08		
		205.32	5.02		

* = 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 Name	Nuclide Id Confidence	Wt mean Activity (pCi/gram)	Wt mean Activity Uncertainty
K-40	0.996	8.229857E+000	1.444235E+000
Pb-212	0.996	2.197887E-001	8.331429E-002
PB-214	0.506	2.347041E-001	7.394601E-002
Ra-226	0.973	6.072209E+000	2.052876E+000
U-235	0.998	4.059563E-001	4.031320E-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 10:09:41 AM
 Peak Locate From Channel: 40
 Peak Locate To Channel: 8192

Peak No.	Energy (keV)	Peak Size in Counts per Second	Peak CPS % Uncertainty	Peak Type	Tol. Nuclide
F 7	477.44	1.9257E-002	41.47	Sum	

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-0074-S-P-5
Nuclide Library Used: C:\GENIE2K\CAMFILES\UNC 2017 NLB 0328201

	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/gram)	Nuclide MDA (pCi/gram)	Activity (pCi/gram)	Dec. Leve (pCi/gram)
+	K-40	1460.82*	10.66	8.167E-001	8.17E-001	8.230E+000	3.448E-00
	Pb-210	46.54	4.25	2.175E+000	2.17E+000	1.268E+000	1.035E+00
	BI-212	727.33	6.67	1.672E+000	1.67E+000	-4.541E-001	7.802E-00
		785.37	1.10	1.152E+001		3.503E+000	5.399E+00
		1078.62	0.56	2.521E+001		2.426E+001	1.167E+00
		1620.50	1.47	7.952E+000		-6.528E-001	3.471E+00
+	Pb-212	74.82*	10.28	3.331E-001	8.31E-002	5.812E-001	1.568E-00
		77.11*	17.10	2.125E-001		2.841E-001	1.006E-00
		86.83	2.07	2.302E+000		4.251E-002	1.108E+00
		87.35	3.97	1.119E+000		-2.400E+000	5.369E-00
		89.78	1.46	2.915E+000		-3.404E+000	1.397E+00
		115.18	0.60	5.756E+000		4.012E+000	2.739E+00
		238.63*	43.60	8.314E-002		2.445E-001	3.875E-00
		300.09	3.30	1.753E+000		-2.180E+000	8.300E-00
	BI-214	76.86	0.55	1.152E+001	2.41E-001	-8.828E-002	5.579E+00
		79.29	0.91	5.359E+000		7.749E-001	2.575E+00
		609.32	45.49	2.410E-001		8.190E-002	1.136E-00
		665.45	1.53	6.608E+000		1.147E+000	3.080E+00
		768.36	4.89	2.496E+000		1.242E+000	1.168E+00
		806.18	1.26	8.901E+000		9.568E-001	4.127E+00
		934.06	3.11	3.906E+000		1.239E+000	1.803E+00
		1120.29	14.92	1.058E+000		4.371E-001	4.927E-00
		1155.21	1.63	9.382E+000		7.138E+000	4.350E+00
		1238.11	5.83	3.007E+000		1.495E-001	1.402E+00
		1280.98	1.43	9.083E+000		-9.387E-001	4.118E+00
		1377.67	3.99	3.471E+000		-1.794E-001	1.574E+00
		1385.31	0.79	1.729E+001		-6.008E+000	7.826E+00
		1401.52	1.33	1.026E+001		8.206E+000	4.636E+00
		1407.99	2.39	5.076E+000		2.401E+000	2.264E+00
		1509.21	2.13	5.813E+000		-4.839E-001	2.579E+00
		1583.20	0.70	1.869E+001		-1.270E+000	8.315E+00
		1661.27	1.05	1.008E+001		5.622E-001	4.315E+00
		1729.59	2.88	3.936E+000		1.151E+000	1.694E+00
		1764.49	15.30	1.091E+000		8.786E-001	4.932E-00
		1847.43	2.03	5.537E+000		2.183E+000	2.356E+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	5.904E-001	1.38E-001	1.030E+000	2.780E-00
		77.11*	9.70	3.747E-001		5.008E-001	1.773E-00
		86.83	1.70	2.803E+000		5.177E-002	1.349E+00
		87.35	2.24	1.983E+000		-4.253E+000	9.515E-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	5.190E+000	1.38E-001	-6.061E+000	2.488E+00
		241.99	7.25	9.525E-001		-5.243E-001	4.590E-00
		258.76	0.53	9.471E+000		2.955E+000	4.486E+00
		295.22	18.42	3.312E-001		1.374E-001	1.574E-00
		351.93*	35.60	1.382E-001		2.378E-001	6.403E-00
		785.96	1.06	1.199E+001		5.974E-001	5.617E+00
		839.07	0.58	2.050E+001		-1.535E-001	9.521E+00
+	Ra-226	81.07	0.20	2.029E+001	9.91E-001	-3.466E+000	9.667E+00
		83.79	0.32	1.455E+001		1.546E+001	6.993E+00
		186.21*	3.64	9.906E-001		6.072E+000	4.677E-00
	AC-228	89.96	1.90	2.429E+017	5.63E+016	-4.122E+017	1.168E+01
		93.35	3.10	1.488E+017		-2.193E+016	7.156E+01
		99.51	1.26	2.699E+017		2.263E+016	1.281E+01
		105.60	0.74	5.316E+017		2.778E+017	2.543E+01
		129.07	2.42	1.515E+017		1.535E+016	7.219E+01
		153.98	0.72	5.264E+017		1.915E+017	2.506E+01
		209.25	3.89	1.235E+017		-5.258E+016	5.889E+01
		214.85	0.76	5.648E+017		-1.403E+017	2.674E+01
		270.24	3.46	1.443E+017		-2.192E+016	6.807E+01
		328.00	2.95	1.926E+017		4.057E+016	9.051E+01
		338.32	11.27	5.626E+016		-4.038E+015	2.657E+01
		409.46	1.92	3.656E+017		1.130E+017	1.716E+01
		463.00	4.40	1.954E+017		4.903E+016	9.216E+01
		562.50	0.87	1.075E+018		6.916E+016	5.033E+01
		674.75	2.10	4.814E+017		7.809E+016	2.239E+01
		726.86	0.62	1.890E+018		3.608E+017	8.842E+01
		755.32	1.00	1.131E+018		7.118E+017	5.263E+01
		772.29	1.49	8.584E+017		2.792E+017	4.024E+01
		794.95	4.25	2.851E+017		1.479E+016	1.329E+01
		830.49	0.54	2.264E+018		-1.127E+017	1.053E+01
		835.71	1.61	7.516E+017		-7.742E+016	3.491E+01
		840.38	0.91	1.336E+018		-2.653E+017	6.208E+01
		904.20	0.77	1.750E+018		-1.902E+018	8.153E+01
		911.20	25.80	5.775E+016		3.961E+016	2.708E+01
		964.77	4.99	3.098E+017		7.835E+016	1.451E+01
		968.97	15.80	9.759E+016		3.069E+016	4.570E+01
		1247.08	0.50	3.291E+018		-4.515E+017	1.525E+01
		1459.14	0.83	4.179E+018		1.145E+019	2.007E+01
		1495.91	0.86	1.357E+018		4.130E+017	5.965E+01
		1588.20	3.22	4.571E+017		2.579E+017	2.055E+01
		1630.63	1.51	7.230E+017		-4.397E+017	3.113E+01
	TH-230	67.67	0.38	1.226E+001	1.23E+001	2.067E+000	5.837E+00
	PA-234	742.81	0.11	9.112E+001	1.36E+001	-2.972E+001	4.200E+00
		766.42	0.32	3.665E+001		-1.048E+001	1.709E+00
		1001.03	0.84	1.361E+001		-3.604E+000	6.217E+00
	TH-234	63.29	3.70	1.479E+000	1.48E+000	2.038E-001	7.062E-00
		92.38	2.13	2.255E+000		2.538E+000	1.087E+00
		92.80	2.10	2.228E+000		7.145E-001	1.073E+00
		112.81	0.21	1.523E+001		-1.289E+001	7.218E+00
	U-234	53.20	0.12	5.231E+001	5.23E+001	4.110E+001	2.481E+00
		120.90	0.04	9.015E+001		-8.636E+001	4.270E+00

	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/gram)	Nuclide MDA (pCi/gram)	Activity (pCi/gram)	Dec. Leve (pCi/gram)
+	U-235	89.96	3.43	1.324E+000	3.30E-001	-2.247E+000	6.366E-00
		93.35	5.54	8.191E-001		-1.207E-001	3.940E-00
		104.82	0.69	5.492E+000		2.401E+000	2.624E+00
		105.60	1.31	2.955E+000		1.544E+000	1.414E+00
		108.58	0.50	7.307E+000		1.351E+000	3.488E+00
		109.19	1.66	2.121E+000		-8.504E-001	1.011E+00
		143.76*	10.96	3.296E-001		4.060E-001	1.568E-00
		163.36	5.08	8.319E-001		6.956E-001	3.977E-00
		194.94	0.63	7.289E+000		-7.174E-001	3.479E+00
		202.12	1.08	4.588E+000		1.272E+000	2.195E+00
		205.32	5.02	9.937E-001		-4.387E-002	4.752E-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 ***

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 Analysis using Key Line Activities
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Filename: C:\GENIE2K\CAMFILES\UNC 2017\IMC Samples\IMC-0074\UNC-IMC-007

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 (keV)		Activity (pCi/gram)	Activity %Uncert*	Ratio[%Uncert]	A	B [uncert]
-----	-----		-----	-----	-----	-----	-----
K-40	1460.8	^	8.23E+000	17.549			
Pb-212	74.8		5.81E-001	33.084	2.377[74.666]	2.52	-0.463
	77.1		2.84E-001	34.604	1.162[75.352]		[0.947]
	238.6	^	2.45E-001	66.936	1.000[94.662]		
PB-214	74.8		1.03E+000	34.273	4.331[46.836]	4.29	-0.732
	77.1		5.01E-001	35.756	2.106[47.932]		[0.366]
	351.9	^	2.38E-001	31.921	1.000[45.144]		
Ra-226	186.2	^	6.07E+000	33.808			
U-235	143.8	^	4.06E-001	99.304			