
***** 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-2002\UNC-IMC-200

Report Generated On : 5/15/2017 10:37:57 AM

Sample Title : W3H-IMC-2002-S-P-1

Sample Description :

Sample Identification : IMC-2002-S-P-1

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 : 2.910E+002 grams

Sample Taken On : 5/3/2017 12:00:00 AM

Acquisition Started : 5/9/2017 9:36:51 AM

Live Time : 1800.0 seconds

Real Time : 1800.5 seconds

Dead Time : 0.03 %

Energy Calibration Used Done On : 4/13/2017

Efficiency Calibration Used Done On : 5/15/2017

Efficiency ID : H-IMC-2002-S-P-1

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

Detector Name: 8566

Sample Title: W3H-IMC-2002-S-P-1

Peak Analysis Performed on: 5/15/2017 10:37:47 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
F	1	48-	58	52.85	13.34	0.47	9.15E+001	24.24	1.62E+002
F	2	58-	71	65.73	16.56	0.73	4.90E+002	40.69	1.72E+002
F	3	97-	109	103.00	25.89	0.53	8.07E+001	21.59	1.24E+002
F	4	205-	219	213.33	53.49	0.79	1.87E+002	78.76	1.05E+002
M	5	285-	314	291.02	72.94	0.75	1.50E+002	26.16	1.69E+002
m	6	285-	314	299.64	75.09	0.76	2.62E+002	32.39	2.20E+002
m	7	285-	314	308.34	77.27	0.77	6.97E+001	22.06	2.10E+002
F	8	331-	344	337.34	84.53	0.84	4.26E+002	39.66	2.22E+002
M	9	345-	365	349.76	87.64	0.81	3.97E+001	30.46	1.39E+002
m	10	345-	365	359.79	90.15	0.82	1.64E+002	92.38	1.86E+002
F	11	365-	379	373.26	93.52	0.96	2.54E+002	32.97	2.43E+002
F	12	431-	441	436.62	109.37	0.45	9.55E+001	73.40	1.39E+002
F	13	569-	582	574.45	143.86	0.83	5.45E+002	44.78	1.14E+002
F	14	648-	657	652.83	163.48	0.88	2.27E+002	30.24	8.25E+001
F	15	736-	755	741.89	185.77	0.91	2.30E+003	88.80	1.00E+002
M	16	802-	827	808.35	202.40	0.94	4.55E+001	15.66	3.91E+001
m	17	802-	827	819.86	205.28	0.94	2.06E+002	44.40	3.68E+001
F	18	946-	958	952.90	238.57	1.02	1.01E+002	67.85	5.85E+001
F	19	1400-	1411	1405.24	351.76	0.91	4.07E+001	15.52	3.00E+001
F	20	5824-	5848	5835.64	1460.45	2.41	1.72E+002	26.70	9.72E+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: W3H-IMC-2002-S-P-1
 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	0.978	1460.82*	10.66	1.04844E+001	1.85739E+000
Pb-212	0.996	74.82*	10.28	2.15960E+000	5.10948E-001
		77.11*	17.10	3.37851E-001	1.26769E-001
		86.83	2.07		
		87.35*	3.97	7.69694E-001	6.11222E-001
		89.78*	1.46	8.58136E+000	5.11785E+000
		115.18	0.60		
		238.63*	43.60	2.63262E-001	1.82239E-001
		300.09	3.30		
PB-214	0.510	74.82*	5.80	3.82770E+000	9.68208E-001
		77.11*	9.70	5.95592E-001	2.29822E-001
		86.83	1.70		
		87.35*	2.24	1.36414E+000	1.08953E+000
		89.78*	0.82	1.52790E+001	9.20809E+000
		241.99	7.25		
		258.76	0.53		
		295.22	18.42		
		351.93*	35.60	1.92420E-001	7.86240E-002
		785.96	1.06		
		839.07	0.58		
Ra-226	0.886	81.07	0.20		
		83.79*	0.32	1.03339E+002	2.28511E+001
		186.21*	3.64	5.81922E+001	1.01079E+001
U-234	0.550	53.20*	0.12	1.98449E+002	9.63620E+001
		120.90	0.04		
U-235	0.997	89.96*	3.43	3.65268E+000	2.18156E+000
		93.35*	5.54	3.45473E+000	8.29742E-001
		104.82	0.69		
		105.60	1.31		
		108.58	0.50		
		109.19*	1.66	4.24239E+000	3.42703E+000
		143.76*	10.96	3.92659E+000	8.40256E-001
		163.36*	5.08	3.77911E+000	8.67303E-001
		194.94	0.63		
		202.12*	1.08	4.15542E+000	1.58173E+000
		205.32*	5.02	4.09473E+000	1.09597E+000

* = 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	0.978	1.048444E+001	1.857394E+000
Pb-212	0.996	3.208456E-001	1.045385E-001
PB-214	0.510	1.983605E-001	7.702558E-002
Ra-226	0.886	6.558021E+001	9.243901E+000
U-234	0.550	1.984486E+002	9.636201E+001
U-235	0.997	3.798277E+000	4.138181E-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: 5/15/2017 10:37:47 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	1	13.34	5.0831E-002	26.50		
F	2	16.56	2.7196E-001	8.31		
F	3	25.89	4.4843E-002	26.74		
M	5	72.94	8.3448E-002	17.41		

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: W3H-IMC-2002-S-P-1
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	1.132E+000	1.13E+000	1.048E+001	4.837E-00
	Pb-210	46.54	4.25	2.612E+000	2.61E+000	2.405E+000	1.251E+00
	BI-212	727.33	6.67	2.064E+000	2.06E+000	2.644E-001	9.607E-00
		785.37	1.10	1.201E+001		-7.293E+000	5.541E+00
		1078.62	0.56	3.168E+001		-1.257E+001	1.464E+00
		1620.50	1.47	1.088E+001		-1.600E+000	4.786E+00
+	Pb-212	74.82*	10.28	5.915E-001	1.14E-001	2.160E+000	2.846E-00
		77.11*	17.10	3.403E-001		3.379E-001	1.636E-00
		86.83	2.07	4.358E+000		-8.505E+000	2.128E+00
		87.35*	3.97	1.118E+000		7.697E-001	5.327E-00
		89.78*	1.46	3.456E+000		8.581E+000	1.657E+00
		115.18	0.60	9.863E+000		4.738E+000	4.763E+00
		238.63*	43.60	1.137E-001		2.633E-001	5.330E-00
		300.09	3.30	2.170E+000		-3.677E+000	1.026E+00
	BI-214	76.86	0.55	1.801E+001	3.05E-001	3.849E+001	8.797E+00
		79.29	0.91	8.639E+000		2.993E-001	4.198E+00
		609.32	45.49	3.045E-001		2.140E-001	1.434E-00
		665.45	1.53	8.632E+000		4.943E+000	4.030E+00
		768.36	4.89	3.262E+000		2.373E+000	1.528E+00
		806.18	1.26	1.031E+001		-5.504E+000	4.737E+00
		934.06	3.11	4.785E+000		1.372E+000	2.200E+00
		1120.29	14.92	1.417E+000		2.085E-001	6.617E-00
		1155.21	1.63	1.139E+001		1.976E+000	5.253E+00
		1238.11	5.83	3.570E+000		1.034E+000	1.654E+00
		1280.98	1.43	1.125E+001		-1.013E+000	5.077E+00
		1377.67	3.99	4.437E+000		1.344E+000	2.009E+00
		1385.31	0.79	2.209E+001		1.741E-001	9.984E+00
		1401.52	1.33	1.110E+001		2.412E+000	4.910E+00
		1407.99	2.39	5.455E+000		-3.890E+000	2.371E+00
		1509.21	2.13	5.914E+000		-2.252E+000	2.532E+00
		1583.20	0.70	2.276E+001		-7.152E-001	1.004E+00
		1661.27	1.05	1.484E+001		3.516E+000	6.479E+00
		1729.59	2.88	3.946E+000		-7.884E-002	1.617E+00
		1764.49	15.30	1.542E+000		1.261E+000	7.029E-00
		1847.43	2.03	7.480E+000		1.788E-001	3.202E+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	1.048E+000	1.39E-001	3.828E+000	5.044E-00
		77.11*	9.70	6.000E-001		5.956E-001	2.884E-00
		86.83	1.70	5.307E+000		-1.036E+001	2.592E+00
		87.35*	2.24	1.981E+000		1.364E+000	9.442E-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	6.153E+000	1.39E-001	1.528E+001	2.951E+00
		241.99	7.25	1.162E+000		-6.512E-001	5.597E-00
		258.76	0.53	1.142E+001		8.813E+000	5.395E+00
		295.22	18.42	3.909E-001		7.623E-002	1.851E-00
		351.93*	35.60	1.392E-001		1.924E-001	6.320E-00
		785.96	1.06	1.285E+001		-6.514E+000	5.942E+00
		839.07	0.58	2.435E+001		-1.381E+000	1.124E+00
+	Ra-226	81.07	0.20	3.625E+001	1.63E+000	2.580E+001	1.757E+00
		83.79*	0.32	2.236E+001		1.033E+002	1.085E+00
		186.21*	3.64	1.629E+000		5.819E+001	7.802E-00
	AC-228	89.96	1.90	1.439E+008	2.23E+007	-2.605E+008	7.009E+00
		93.35	3.10	9.451E+007		-9.867E+007	4.614E+00
		99.51	1.26	1.439E+008		-2.162E+008	6.924E+00
		105.60	0.74	2.876E+008		-5.590E+007	1.392E+00
		129.07	2.42	7.648E+007		-3.711E+007	3.680E+00
		153.98	0.72	2.764E+008		-3.941E+007	1.330E+00
		209.25	3.89	5.457E+007		-1.108E+006	2.608E+00
		214.85	0.76	2.317E+008		7.425E+007	1.096E+00
		270.24	3.46	6.214E+007		8.834E+006	2.936E+00
		328.00	2.95	7.943E+007		-2.704E+006	3.728E+00
		338.32	11.27	2.235E+007		6.092E+006	1.051E+00
		409.46	1.92	1.586E+008		1.028E+008	7.456E+00
		463.00	4.40	7.179E+007		-1.664E+007	3.354E+00
		562.50	0.87	4.752E+008		1.340E+008	2.231E+00
		674.75	2.10	1.977E+008		-1.101E+007	9.168E+00
		726.86	0.62	7.486E+008		-1.256E+008	3.481E+00
		755.32	1.00	4.698E+008		2.927E+007	2.181E+00
		772.29	1.49	3.589E+008		1.477E+008	1.679E+00
		794.95	4.25	1.214E+008		2.560E+007	5.656E+00
		830.49	0.54	9.493E+008		-1.237E+008	4.407E+00
		835.71	1.61	3.041E+008		-1.233E+008	1.406E+00
		840.38	0.91	5.408E+008		2.741E+008	2.500E+00
		904.20	0.77	7.693E+008		-2.388E+008	3.590E+00
		911.20	25.80	2.423E+007		-5.422E+006	1.134E+00
		964.77	4.99	1.155E+008		-2.832E+007	5.354E+00
		968.97	15.80	3.928E+007		4.193E+007	1.831E+00
		1247.08	0.50	1.310E+009		-8.687E+007	6.025E+00
		1459.14	0.83	1.818E+009		4.701E+009	8.732E+00
		1495.91	0.86	5.744E+008		-2.376E+008	2.517E+00
		1588.20	3.22	1.775E+008		6.773E+007	7.877E+00
		1630.63	1.51	4.114E+008		1.008E+008	1.839E+00
	TH-230	67.67	0.38	1.968E+001	1.97E+001	-1.702E+001	9.509E+00
	PA-234	742.81	0.11	1.277E+002	2.03E+001	3.254E+001	5.927E+00
		766.42	0.32	4.929E+001		1.177E+001	2.306E+00
		1001.03	0.84	2.026E+001		-8.033E-001	9.375E+00
	TH-234	63.29	3.70	2.109E+000	2.11E+000	-1.367E-002	1.018E+00
		92.38	2.13	4.497E+000		1.380E+001	2.200E+00
		92.80	2.10	4.336E+000		3.862E+000	2.119E+00
		112.81	0.21	2.764E+001		-1.102E+001	1.334E+00
+	U-234	53.20*	0.12	6.991E+001	6.99E+001	1.984E+002	3.351E+00
		120.90	0.04	1.788E+002		1.536E+002	8.654E+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	1.471E+000	4.39E-001	3.653E+000	7.055E-00
		93.35*	5.54	1.339E+000		3.455E+000	6.512E-00
		104.82	0.69	9.273E+000		9.391E+000	4.490E+00
		105.60	1.31	4.780E+000		-9.292E-001	2.314E+00
		108.58	0.50	1.398E+001		3.539E+000	6.792E+00
		109.19*	1.66	3.024E+000		4.242E+000	1.452E+00
		143.76*	10.96	4.387E-001		3.927E+000	2.096E-00
		163.36*	5.08	7.913E-001		3.779E+000	3.731E-00
		194.94	0.63	8.897E+000		4.807E+000	4.243E+00
		202.12*	1.08	2.906E+000		4.155E+000	1.329E+00
		205.32*	5.02	6.154E-001		4.095E+000	2.808E-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
 =====

Filename: C:\GENIE2K\CAMFILES\UNC 2017\IMC Samples\IMC-2002\UNC-IMC-200

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 ^	1.05E+001	17.716			
Pb-212	74.8	2.16E+000	23.659	8.203[73.155]	7.34	-1.297
	77.1	3.38E-001	37.522	1.283[78.739]		[0.966]
	87.3	7.70E-001	79.411	2.924[105.34]		
	89.8	8.58E+000	59.639	32.596[91.371]		
	238.6 ^	2.63E-001	69.224	1.000[97.897]		
PB-214	74.8	3.83E+000	25.295	19.892[48.056]	9.66	-1.630
	77.1	5.96E-001	38.587	3.095[56.201]		[0.437]
	87.3	1.36E+000	79.869	7.089[89.714]		
	89.8	1.53E+001	60.266	79.404[72.812]		
	351.9 ^	1.92E-001	40.861	1.000[57.786]		
Ra-226	83.8	1.03E+002	22.113	1.776[28.119]	3.76	-0.719
	186.2 ^	5.82E+001	17.370	1.000[24.565]		[0.468]
U-234	53.2 ^	1.98E+002	48.558			
U-235	90.0	3.65E+000	59.725	0.930[63.443]	-0.92	0.180
	93.3	3.45E+000	24.018	0.880[32.168]		[0.482]
	109.2	4.24E+000	80.781	1.080[83.567]		
	143.8 ^	3.93E+000	21.399	1.000[30.263]		
	163.4	3.78E+000	22.950	0.962[31.379]		
	202.1	4.16E+000	38.064	1.058[43.667]		
	205.3	4.09E+000	26.765	1.043[34.268]		