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***** G A M M A S P E C T R U M A N A L Y S I S *****
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Filename: C:\GENIE2K\CAMFILES\UNC 2017\IMC Samples\IMC-2002\UNC-IMC-200

Report Generated On : 5/15/2017 10:44:31 AM

Sample Title : W3H-IMC-2002-S-P-5
Sample Description :
Sample Identification : IMC-2002-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 : 2.594E+002 grams

Sample Taken On : 5/1/2017 12:00:00 AM
Acquisition Started : 5/10/2017 11:26:42 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-5

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***** P E A K A N A L Y S I S R E P O R T *****
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Detector Name: 8566
Sample Title: W3H-IMC-2002-S-P-5
Peak Analysis Performed on: 5/15/2017 10:44:18 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	59-	70	65.36	16.47	0.81	4.99E+002	122.99	1.83E+002
F	2	97-	109	102.98	25.88	0.59	1.06E+002	21.90	9.75E+001
F	3	209-	219	213.24	53.47	0.70	1.26E+002	22.39	9.17E+001
M	4	286-	313	291.53	73.06	0.87	1.48E+002	66.89	1.55E+002
m	5	286-	313	299.55	75.07	0.87	2.55E+002	101.78	1.87E+002
m	6	286-	313	308.14	77.22	0.88	9.97E+001	44.23	1.74E+002
F	7	332-	344	337.29	84.52	0.81	3.29E+002	35.27	1.95E+002
F	8	354-	364	359.98	90.19	0.82	1.39E+002	89.83	1.32E+002
F	9	365-	378	373.76	93.64	0.60	1.63E+002	87.03	2.08E+002
F	10	480-	489	483.92	121.21	0.55	4.49E+001	60.99	1.05E+002
F	11	570-	581	574.62	143.91	0.81	4.03E+002	39.06	1.01E+002
F	12	647-	659	652.46	163.38	0.83	1.65E+002	89.19	1.11E+002
F	13	735-	751	741.97	185.78	0.90	1.89E+003	81.76	1.15E+002
F	14	815-	826	820.12	205.34	0.85	1.38E+002	24.05	4.65E+001
F	15	946-	959	953.37	238.69	0.96	1.00E+002	69.65	6.48E+001
F	16	1175-	1184	1178.70	295.07	0.60	3.17E+001	13.42	2.40E+001
F	17	1401-	1411	1405.83	351.91	0.95	4.38E+001	16.50	3.19E+001
F	18	2427-	2441	2433.61	609.11	1.35	4.08E+001	14.88	1.75E+001
F	19	5825-	5849	5836.61	1460.69	2.43	1.43E+002	24.45	6.94E+000

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 1.960 sigma

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***** 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 *****
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Sample Title: W3H-IMC-2002-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	0.997	1460.82*	10.66	9.08051E+000	1.73808E+000
Pb-212	0.910	74.82*	10.28	2.14597E+000	9.61113E-001
		77.11*	17.10	4.95018E-001	2.41084E-001
		86.83	2.07		
		87.35	3.97		
		89.78*	1.46	7.45971E+000	5.03940E+000
		115.18	0.60		
		238.63*	43.60	2.72019E-001	1.94144E-001
		300.09	3.30		
BI-214	0.220	76.86*	0.55	1.55318E+001	7.57717E+000
		79.29	0.91		
		609.32*	45.49	2.77350E-001	1.06320E-001
		665.45	1.53		
		768.36	4.89		
		806.18	1.26		
		934.06	3.11		
		1120.29	14.92		
		1155.21	1.63		
		1238.11	5.83		
		1280.98	1.43		
		1377.67	3.99		
		1385.31	0.79		
		1401.52	1.33		
		1407.99	2.39		
		1509.21	2.13		
		1583.20	0.70		
		1661.27	1.05		
		1729.59	2.88		
		1764.49	15.30		
		1847.43	2.03		
		2118.51	1.16		
		2204.06	4.92		
		2447.70	1.55		
PB-214	0.795	74.82*	5.80	3.80354E+000	1.73715E+000
		77.11*	9.70	8.72661E-001	4.32205E-001
		86.83	1.70		
		87.35	2.24		
		89.78*	0.82	1.32819E+001	9.04620E+000
		241.99	7.25		
		258.76	0.53		
		295.22*	18.42	2.50814E-001	1.13328E-001
		351.93*	35.60	2.15608E-001	8.71331E-002

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (pCi/gram)	Activity Uncertainty
PB-214	0.795	785.96	1.06		
		839.07	0.58		
Ra-226	0.888	81.07	0.20		
		83.79*	0.32	8.18253E+001	1.86106E+001
		186.21*	3.64	4.98206E+001	8.70549E+000
U-234	0.987	53.20*	0.12	1.35211E+002	4.04897E+001
		120.90*	0.04	9.88570E+001	1.38415E+002
U-235	0.996	89.96*	3.43	3.17524E+000	2.14743E+000
		93.35*	5.54	2.28079E+000	1.29950E+000
		104.82	0.69		
		105.60	1.31		
		108.58	0.50		
		109.19	1.66		
		143.76*	10.96	3.00311E+000	6.61040E-001
		163.36*	5.08	2.85244E+000	1.62817E+000
		194.94	0.63		
		202.12	1.08		
		205.32*	5.02	2.85334E+000	6.71810E-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

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***** 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 *****
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Nuclide Name	Nuclide Id Confidence	Wt mean Activity (pCi/gram)	Wt mean Activity Uncertainty
K-40	0.997	9.080512E+000	1.738081E+000
Pb-212	0.910	3.460324E-001	1.498456E-001
BI-214	0.220	2.773965E-001	1.062963E-001
PB-214	0.795	2.339807E-001	6.850283E-002
Ra-226	0.888	5.556628E+001	7.885426E+000
U-234	0.987	1.323458E+002	3.886110E+001
U-235	0.996	2.858756E+000	4.170746E-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 10:44:18 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	16.47	2.7738E-001	24.63		
F	2	25.88	5.8809E-002	20.69		
M	4	73.06	8.2070E-002	45.28		

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-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	1.026E+000	1.03E+000	9.081E+000	4.267E-00
	Pb-210	46.54	4.25	2.692E+000	2.69E+000	2.994E+000	1.291E+00
	BI-212	727.33	6.67	2.014E+000	2.01E+000	-7.433E-001	9.325E-00
		785.37	1.10	1.355E+001		2.148E+000	6.289E+00
		1078.62	0.56	3.082E+001		-3.073E+000	1.415E+00
		1620.50	1.47	1.108E+001		1.417E+000	4.855E+00
+	Pb-212	74.82*	10.28	5.596E-001	1.27E-001	2.146E+000	2.684E-00
		77.11*	17.10	3.182E-001		4.950E-001	1.524E-00
		86.83	2.07	4.158E+000		1.304E+000	2.027E+00
		87.35	3.97	1.810E+000		6.783E-001	8.781E-00
		89.78*	1.46	3.554E+000		7.460E+000	1.705E+00
		115.18	0.60	1.023E+001		-1.601E+000	4.942E+00
		238.63*	43.60	1.267E-001		2.720E-001	5.966E-00
		300.09	3.30	2.204E+000		4.498E-003	1.041E+00
+	BI-214	76.86*	0.55	9.984E+000	1.59E-001	1.553E+001	4.781E+00
		79.29	0.91	8.249E+000		-3.860E+000	4.000E+00
		609.32*	45.49	1.588E-001		2.774E-001	7.019E-00
		665.45	1.53	8.668E+000		1.826E+000	4.036E+00
		768.36	4.89	3.376E+000		3.544E+000	1.581E+00
		806.18	1.26	1.200E+001		7.423E+000	5.567E+00
		934.06	3.11	4.934E+000		-1.782E+000	2.266E+00
		1120.29	14.92	1.337E+000		7.133E-001	6.194E-00
		1155.21	1.63	1.176E+001		-8.709E-001	5.420E+00
		1238.11	5.83	3.493E+000		-8.201E-001	1.610E+00
		1280.98	1.43	1.374E+001		2.537E+000	6.298E+00
		1377.67	3.99	4.697E+000		9.619E-001	2.129E+00
		1385.31	0.79	2.123E+001		-3.906E+000	9.511E+00
		1401.52	1.33	1.256E+001		8.207E-001	5.612E+00
		1407.99	2.39	7.505E+000		-4.883E-001	3.381E+00
		1509.21	2.13	7.538E+000		3.717E+000	3.325E+00
		1583.20	0.70	2.636E+001		4.422E+000	1.178E+00
		1661.27	1.05	1.506E+001		2.907E-001	6.549E+00
		1729.59	2.88	5.686E+000		3.114E+000	2.472E+00
		1764.49	15.30	1.460E+000		3.733E-001	6.587E-00
		1847.43	2.03	7.227E+000		9.543E-001	3.052E+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	9.918E-001	1.46E-001	3.804E+000	4.757E-00
		77.11*	9.70	5.610E-001		8.727E-001	2.686E-00
		86.83	1.70	5.063E+000		1.588E+000	2.468E+00
		87.35	2.24	3.208E+000		1.202E+000	1.556E+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	6.328E+000	1.46E-001	1.328E+001	3.035E+00
		241.99	7.25	1.200E+000		-2.856E-001	5.777E-00
		258.76	0.53	1.043E+001		-8.581E+000	4.888E+00
		295.22*	18.42	2.020E-001		2.508E-001	9.028E-00
		351.93*	35.60	1.458E-001		2.156E-001	6.626E-00
		785.96	1.06	1.421E+001		-1.064E-001	6.600E+00
		839.07	0.58	2.337E+001		-1.505E+001	1.071E+00
+	Ra-226	81.07	0.20	3.472E+001	1.71E+000	2.098E+000	1.679E+00
		83.79*	0.32	2.102E+001		8.183E+001	1.017E+00
		186.21*	3.64	1.710E+000		4.982E+001	8.194E-00
	AC-228	89.96	1.90	5.691E+011	9.97E+010	6.429E+011	2.767E+01
		93.35	3.10	3.601E+011		-5.197E+011	1.753E+01
		99.51	1.26	5.411E+011		-6.986E+011	2.591E+01
		105.60	0.74	1.229E+012		-2.224E+011	5.952E+01
		129.07	2.42	3.340E+011		-5.990E+010	1.609E+01
		153.98	0.72	1.061E+012		2.537E+011	5.081E+01
		209.25	3.89	2.356E+011		-1.357E+011	1.127E+01
		214.85	0.76	9.613E+011		-7.354E+011	4.538E+01
		270.24	3.46	2.513E+011		2.858E+010	1.183E+01
		328.00	2.95	3.230E+011		7.706E+009	1.511E+01
		338.32	11.27	1.073E+011		8.334E+010	5.084E+01
		409.46	1.92	6.781E+011		-4.351E+011	3.188E+01
		463.00	4.40	3.007E+011		8.414E+010	1.403E+01
		562.50	0.87	1.960E+012		1.674E+012	9.179E+01
		674.75	2.10	9.531E+011		3.931E+011	4.458E+01
		726.86	0.62	2.971E+012		-1.571E+012	1.374E+01
		755.32	1.00	2.043E+012		8.125E+011	9.498E+01
		772.29	1.49	1.444E+012		-6.243E+011	6.725E+01
		794.95	4.25	4.962E+011		7.869E+010	2.303E+01
		830.49	0.54	4.321E+012		3.070E+012	2.015E+01
		835.71	1.61	1.278E+012		-2.045E+011	5.902E+01
		840.38	0.91	2.047E+012		-1.243E+012	9.362E+01
		904.20	0.77	3.102E+012		-2.952E+012	1.441E+01
		911.20	25.80	9.971E+010		5.814E+010	4.655E+01
		964.77	4.99	5.269E+011		2.218E+011	2.455E+01
		968.97	15.80	1.594E+011		1.501E+010	7.402E+01
		1247.08	0.50	6.055E+012		3.000E+011	2.803E+01
		1459.14	0.83	7.334E+012		1.743E+013	3.513E+01
		1495.91	0.86	2.042E+012		-1.276E+012	8.686E+01
		1588.20	3.22	7.776E+011		-3.029E+011	3.459E+01
		1630.63	1.51	1.515E+012		-5.434E+011	6.639E+01
	TH-230	67.67	0.38	1.826E+001	1.83E+001	-1.839E+000	8.790E+00
	PA-234	742.81	0.11	1.319E+002	2.00E+001	-8.032E+000	6.118E+00
		766.42	0.32	4.998E+001		2.955E+000	2.334E+00
		1001.03	0.84	1.996E+001		1.893E+000	9.191E+00
	TH-234	63.29	3.70	1.910E+000	1.91E+000	-3.986E-001	9.172E-00
		92.38	2.13	4.169E+000		1.041E+001	2.035E+00
		92.80	2.10	4.092E+000		4.172E+000	1.996E+00
		112.81	0.21	2.856E+001		-4.220E+001	1.379E+00
+	U-234	53.20*	0.12	5.994E+001	5.99E+001	1.352E+002	2.851E+00
		120.90*	0.04	1.172E+002		9.886E+001	5.564E+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	1.513E+000	4.09E-001	3.175E+000	7.256E-00
		93.35*	5.54	1.246E+000		2.281E+000	6.042E-00
		104.82	0.69	9.407E+000		9.415E+000	4.553E+00
		105.60	1.31	4.971E+000		-8.993E-001	2.407E+00
		108.58	0.50	1.374E+001		-2.559E+000	6.663E+00
		109.19	1.66	4.058E+000		-1.061E+000	1.967E+00
		143.76*	10.96	4.091E-001		3.003E+000	1.945E-00
		163.36*	5.08	1.013E+000		2.852E+000	4.833E-00
		194.94	0.63	8.828E+000		1.223E+000	4.200E+00
		202.12	1.08	7.213E+000		-2.724E+000	3.478E+00
		205.32*	5.02	7.886E-001		2.853E+000	3.663E-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

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**** L I N E A C T I V I T Y C O N S I S T E N C Y E V A L U A T O R ***
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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(Ratio) = A + B*ln(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	^	9.08E+000	19.141			
Pb-212	74.8		2.15E+000	44.787	7.889[84.260]	8.18	-1.453
	77.1		4.95E-001	48.702	1.820[86.405]		[1.019]
	89.8		7.46E+000	67.555	27.424[98.273]		
	238.6	^	2.72E-001	71.371	1.000[100.93]		
BI-214	76.9		1.55E+001	48.785	56.001[62.044]	12.47	-1.944
	609.3	^	2.77E-001	38.334	1.000[54.213]		[0.398]
PB-214	74.8		3.80E+000	45.672	17.641[60.985]	10.20	-1.742
	77.1		8.73E-001	49.527	4.047[63.923]		[0.399]
	89.8		1.33E+001	68.109	61.602[79.196]		
	295.2		2.51E-001	45.184	1.163[60.620]		
	351.9	^	2.16E-001	40.413	1.000[57.152]		
Ra-226	83.8		8.18E+001	22.744	1.642[28.682]	3.25	-0.621
	186.2	^	4.98E+001	17.474	1.000[24.712]		[0.474]
U-234	53.2	^	1.35E+002	29.945	1.000[42.349]	1.52	-0.381
	120.9		9.89E+001	140.01	0.731[143.18]		[1.819]
U-235	90.0		3.18E+000	67.631	1.057[71.122]	-0.41	0.072
	93.3		2.28E+000	56.976	0.759[61.080]		[0.691]
	143.8	^	3.00E+000	22.012	1.000[31.129]		
	163.4		2.85E+000	57.080	0.950[61.177]		
	205.3		2.85E+000	23.545	0.950[32.232]		