****
***** 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-0312\W3H-IMC-000

Report Generated On : 7/6/2017 9:32:22 AM

Sample Title : UNC-IMC-000312-S-P-7
Sample Description :
Sample Identification : IMC-000312-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 : 5.026E+002 grams

Sample Taken On : 4/28/2017 12:00:00 AM
Acquisition Started : 5/3/2017 3:24:03 PM

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 : 7/6/2017
Efficiency ID : H-IMC-2002-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-000312-S-P-7
Peak Analysis Performed on: 7/6/2017 9:32:18 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	47-	58	52.57	13.27	0.52	1.14E+002	28.26	2.37E+002
F	2	58-	70	65.41	16.48	0.88	4.94E+002	129.54	2.08E+002
F	3	97-	109	103.16	25.92	0.62	1.37E+002	26.19	1.50E+002
F	4	205-	218	213.25	53.48	0.60	1.57E+002	93.00	2.50E+002
M	5	286-	314	291.64	73.09	0.83	2.01E+002	72.28	3.16E+002
m	6	286-	314	299.79	75.13	0.84	3.82E+002	119.69	3.64E+002
m	7	286-	314	308.68	77.36	0.85	1.03E+002	42.50	3.53E+002
F	8	321-	330	324.68	81.36	0.82	8.04E+001	26.90	2.58E+002
F	9	331-	343	337.25	84.51	0.89	6.09E+002	47.71	3.29E+002
F	10	355-	364	359.69	90.12	0.77	2.53E+002	34.95	2.48E+002
F	11	365-	378	373.07	93.47	0.84	3.33E+002	40.01	3.90E+002
F	12	429-	446	435.99	109.22	1.00	1.82E+002	116.53	3.75E+002
F	13	476-	487	482.73	120.91	0.70	7.95E+001	91.26	2.52E+002
F	14	567-	580	574.44	143.86	0.87	7.92E+002	147.80	2.49E+002
F	15	647-	659	652.86	163.49	0.93	3.15E+002	36.52	1.85E+002
F	16	734-	754	741.89	185.77	0.90	3.51E+003	110.27	2.21E+002
F	17	773-	784	778.56	194.94	0.66	3.50E+001	15.98	6.60E+001
M	18	800-	826	807.11	202.09	0.97	5.94E+001	17.99	6.83E+001
m	19	800-	826	820.30	205.39	0.97	2.36E+002	31.07	9.96E+001
F	20	947-	959	952.97	238.59	1.03	1.54E+002	26.65	8.45E+001
F	21	1175-	1184	1179.27	295.22	1.00	4.63E+001	16.28	2.80E+001
F	22	1397-	1411	1404.62	351.61	1.30	6.53E+001	18.28	4.20E+001
F	23	2322-	2335	2328.30	582.75	1.20	4.67E+001	16.59	2.45E+001
F	24	2426-	2442	2433.84	609.17	1.38	5.62E+001	17.24	2.55E+001
F	25	5824-	5852	5836.93	1460.77	3.00	2.16E+002	29.67	8.06E+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-000312-S-P-7
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	1.000	1460.82*	10.66	7.10389E+000	1.10443E+000
Pb-212	0.855	74.82*	10.28	1.65979E+000	5.66431E-001
		77.11*	17.10	2.63100E-001	1.14228E-001
		86.83	2.07		
		87.35	3.97		
		89.78*	1.46	6.98825E+000	1.29490E+000
		115.18	0.60		
		238.63*	43.60	2.16121E-001	4.32729E-002
		300.09	3.30		
BI-214	0.221	76.86*	0.55	8.25505E+000	3.59170E+000
		79.29	0.91		
		609.32*	45.49	1.97130E-001	6.23260E-002
		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	0.788	74.82*	5.80	2.94184E+000	1.03788E+000
		77.11*	9.70	4.63815E-001	2.05654E-001
		86.83	1.70		
		87.35	2.24		
		89.78*	0.82	1.24425E+001	2.54552E+000
		241.99	7.25		
		258.76	0.53		
		295.22*	18.42	1.89336E-001	6.87255E-002
		351.93*	35.60	1.65667E-001	4.84325E-002

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (pCi/gram)	Activity Uncertainty
PB-214	0.788	785.96	1.06		
		839.07	0.58		
Ra-226	0.966	81.07*	0.20	1.73700E+001	6.24999E+000
		83.79*	0.32	7.81815E+001	1.17158E+001
		186.21*	3.64	4.75829E+001	5.26003E+000
U-234	0.991	53.20*	0.12	8.69968E+001	5.33882E+001
		120.90*	0.04	9.02532E+001	1.07044E+002
U-235	0.998	89.96*	3.43	2.97457E+000	5.59328E-001
		93.35*	5.54	2.39768E+000	4.14935E-001
		104.82	0.69		
		105.60	1.31		
		108.58	0.50		
		109.19*	1.66	4.30375E+000	2.86847E+000
		143.76*	10.96	3.04835E+000	6.53071E-001
		163.36*	5.08	2.80770E+000	4.40900E-001
		194.94*	0.63	2.84624E+000	1.33776E+000
		202.12*	1.08	2.90307E+000	9.37001E-001
		205.32*	5.02	2.51602E+000	4.24023E-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 Name	Nuclide Id Confidence	Wt mean Activity (pCi/gram)	Wt mean Activity Uncertainty
K-40	1.000	7.103889E+000	1.104427E+000
Pb-212	0.855	2.161922E-001	4.019805E-002
BI-214	0.221	1.965757E-001	6.230311E-002
PB-214	0.788	1.735328E-001	3.890018E-002
Ra-226	0.966	3.960751E+001	3.806148E+000
U-234	0.991	8.764550E+001	4.777569E+001
U-235	0.998	2.677905E+000	2.002679E-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: 7/6/2017 9:32:18 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	13.27	6.3106E-002	24.88		
F	2	16.48	2.7442E-001	26.23		
F	3	25.92	7.6007E-002	19.14		
M	5	73.09	1.1158E-001	35.99		
F	23	582.75	2.5934E-002	35.55		

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-000312-S-P-7
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	5.849E-001	5.85E-001	7.104E+000	2.480E-00
	Pb-210	46.54	4.25	1.480E+000	1.48E+000	6.136E-001	7.116E-00
	BI-212	727.33	6.67	1.274E+000	1.27E+000	2.415E-001	5.987E-00
		785.37	1.10	7.104E+000		-7.273E+000	3.302E+00
		1078.62	0.56	1.641E+001		-1.855E+000	7.555E+00
		1620.50	1.47	6.536E+000		-4.833E-001	2.915E+00
+	Pb-212	74.82*	10.28	3.980E-001	7.25E-002	1.660E+000	1.931E-00
		77.11*	17.10	2.305E-001		2.631E-001	1.118E-00
		86.83	2.07	2.828E+000		6.170E-001	1.387E+00
		87.35	3.97	1.261E+000		3.209E-001	6.167E-00
		89.78*	1.46	2.417E+000		6.988E+000	1.171E+00
		115.18	0.60	7.261E+000		2.347E+000	3.541E+00
		238.63*	43.60	7.250E-002		2.161E-001	3.435E-00
		300.09	3.30	1.280E+000		-9.937E-001	6.087E-00
+	BI-214	76.86*	0.55	7.232E+000	1.00E-001	8.255E+000	3.507E+00
		79.29	0.91	5.633E+000		-2.846E-001	2.752E+00
		609.32*	45.49	1.001E-001		1.971E-001	4.532E-00
		665.45	1.53	5.099E+000		1.689E+000	2.396E+00
		768.36	4.89	1.890E+000		4.689E-001	8.898E-00
		806.18	1.26	6.962E+000		1.662E+000	3.258E+00
		934.06	3.11	2.877E+000		3.402E-001	1.335E+00
		1120.29	14.92	7.785E-001		3.822E-001	3.640E-00
		1155.21	1.63	6.416E+000		5.284E+000	2.971E+00
		1238.11	5.83	2.125E+000		1.234E+000	9.920E-00
		1280.98	1.43	7.091E+000		3.600E+000	3.250E+00
		1377.67	3.99	2.354E+000		1.573E+000	1.064E+00
		1385.31	0.79	9.923E+000		-2.555E+000	4.390E+00
		1401.52	1.33	6.359E+000		3.007E+000	2.835E+00
		1407.99	2.39	3.547E+000		-9.608E-001	1.582E+00
		1509.21	2.13	3.186E+000		-5.642E-001	1.364E+00
		1583.20	0.70	1.504E+001		1.274E+000	6.798E+00
		1661.27	1.05	6.804E+000		-2.720E+000	2.894E+00
		1729.59	2.88	3.019E+000		1.982E-001	1.318E+00
		1764.49	15.30	7.650E-001		5.169E-001	3.458E-00
		1847.43	2.03	4.031E+000		-1.553E+000	1.726E+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	7.055E-001	9.24E-002	2.942E+000	3.423E-00
		77.11*	9.70	4.063E-001		4.638E-001	1.971E-00
		86.83	1.70	3.443E+000		7.513E-001	1.689E+00
		87.35	2.24	2.236E+000		5.687E-001	1.093E+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	4.303E+000	9.24E-002	1.244E+001	2.085E+00
		241.99	7.25	7.219E-001		-4.699E-001	3.494E-00
		258.76	0.53	6.154E+000		9.952E-001	2.909E+00
		295.22*	18.42	1.118E-001		1.893E-001	5.035E-00
		351.93*	35.60	9.241E-002		1.657E-001	4.277E-00
		785.96	1.06	7.449E+000		-5.974E+000	3.464E+00
		839.07	0.58	1.297E+001		1.591E+000	5.982E+00
+	Ra-226	81.07*	0.20	1.924E+001	1.30E+000	1.737E+001	9.329E+00
		83.79*	0.32	1.400E+001		7.818E+001	6.825E+00
		186.21*	3.64	1.299E+000		4.758E+001	6.314E-00
	AC-228	89.96	1.90	1.253E+007	1.76E+006	1.884E+007	6.137E+00
		93.35	3.10	7.948E+006		-1.718E+007	3.898E+00
		99.51	1.26	1.277E+007		-1.345E+007	6.199E+00
		105.60	0.74	2.531E+007		1.700E+007	1.234E+00
		129.07	2.42	7.358E+006		-1.020E+006	3.580E+00
		153.98	0.72	2.456E+007		1.290E+007	1.192E+00
		209.25	3.89	4.905E+006		-9.376E+005	2.370E+00
		214.85	0.76	1.813E+007		-5.508E+006	8.631E+00
		270.24	3.46	4.847E+006		2.138E+006	2.306E+00
		328.00	2.95	6.668E+006		9.938E+005	3.166E+00
		338.32	11.27	1.759E+006		-4.030E+005	8.343E+00
		409.46	1.92	1.204E+007		6.026E+006	5.691E+00
		463.00	4.40	5.577E+006		5.336E+006	2.627E+00
		562.50	0.87	3.390E+007		-2.957E+006	1.595E+00
		674.75	2.10	1.516E+007		-5.499E+005	7.084E+00
		726.86	0.62	6.079E+007		2.933E+007	2.859E+00
		755.32	1.00	3.162E+007		-1.616E+007	1.465E+00
		772.29	1.49	2.692E+007		7.716E+006	1.267E+00
		794.95	4.25	8.563E+006		8.608E+005	3.996E+00
		830.49	0.54	5.691E+007		-2.821E+007	2.611E+00
		835.71	1.61	2.061E+007		5.216E+006	9.514E+00
		840.38	0.91	3.595E+007		-4.155E+006	1.657E+00
		904.20	0.77	5.880E+007		-2.641E+007	2.762E+00
		911.20	25.80	1.931E+006		1.734E+006	9.121E+00
		964.77	4.99	8.556E+006		-2.679E+004	3.988E+00
		968.97	15.80	2.653E+006		1.724E+006	1.234E+00
		1247.08	0.50	9.501E+007		-7.672E+007	4.390E+00
		1459.14	0.83	1.390E+008		4.302E+008	6.700E+00
		1495.91	0.86	4.267E+007		-4.235E+006	1.888E+00
		1588.20	3.22	1.462E+007		1.732E+006	6.619E+00
		1630.63	1.51	2.949E+007		1.283E+006	1.324E+00
	TH-230	67.67	0.38	1.398E+001	1.40E+001	3.969E+000	6.813E+00
	PA-234	742.81	0.11	6.806E+001	1.05E+001	2.228E+001	3.158E+00
		766.42	0.32	2.911E+001		2.095E+001	1.371E+00
		1001.03	0.84	1.050E+001		2.649E+000	4.845E+00
	TH-234	63.29	3.70	1.465E+000	1.46E+000	7.727E-001	7.130E-00
		92.38	2.13	2.976E+000		1.120E+001	1.463E+00
		92.80	2.10	2.865E+000		1.448E+000	1.407E+00
		112.81	0.21	2.069E+001		3.931E+000	1.009E+00
+	U-234	53.20*	0.12	5.419E+001	5.42E+001	8.700E+001	2.634E+00
		120.90*	0.04	9.682E+001		9.025E+001	4.687E+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	1.029E+000	3.41E-001	2.975E+000	4.985E-00
		93.35*	5.54	8.742E-001		2.398E+000	4.274E-00
		104.82	0.69	6.256E+000		5.270E+000	3.050E+00
		105.60	1.31	3.276E+000		2.201E+000	1.598E+00
		108.58	0.50	9.828E+000		-5.622E-001	4.808E+00
		109.19*	1.66	3.075E+000		4.304E+000	1.506E+00
		143.76*	10.96	3.414E-001		3.048E+000	1.655E-00
		163.36*	5.08	6.702E-001		2.808E+000	3.231E-00
		194.94*	0.63	3.661E+000		2.846E+000	1.720E+00
		202.12*	1.08	2.012E+000		2.903E+000	9.398E-00
		205.32*	5.02	5.241E-001		2.516E+000	2.476E-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

****
**** 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 ***
****

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

Filename: C:\GENIE2K\CAMFILES\UNC 2017\IMC Samples\IMC-0312\W3H-IMC-000

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	^	7.10E+000	15.547			
Pb-212	74.8		1.66E+000	34.127	7.680[39.567]	11.73	-2.109
	77.1		2.63E-001	43.416	1.217[47.811]		[0.328]
	89.8		6.99E+000	18.530	32.335[27.281]		
	238.6	^	2.16E-001	20.022	1.000[28.316]		
BI-214	76.9		8.26E+000	43.509	41.876[53.783]	11.57	-1.804
	609.3	^	1.97E-001	31.617	1.000[44.713]		[0.338]
PB-214	74.8		2.94E+000	35.280	17.757[45.819]	12.42	-2.116
	77.1		4.64E-001	44.340	2.800[53.110]		[0.286]
	89.8		1.24E+001	20.458	75.105[35.682]		
	295.2		1.89E-001	36.298	1.143[46.607]		
	351.9	^	1.66E-001	29.235	1.000[41.344]		
Ra-226	81.1		1.74E+001	35.981	0.365[37.641]	1.19	-0.227
	83.8		7.82E+001	14.985	1.643[18.622]		[0.284]
	186.2	^	4.76E+001	11.054	1.000[15.633]		
U-234	53.2	^	8.70E+001	61.368	1.000[86.787]	-0.18	0.045
	120.9		9.03E+001	118.60	1.037[133.54]		[1.940]
U-235	90.0		2.97E+000	18.804	0.976[28.505]	-0.02	-0.016
	93.3		2.40E+000	17.306	0.787[27.540]		[0.347]
	109.2		4.30E+000	66.650	1.412[70.009]		
	143.8	^	3.05E+000	21.424	1.000[30.298]		
	163.4		2.81E+000	15.703	0.921[26.563]		
	194.9		2.85E+000	47.001	0.934[51.653]		
	202.1		2.90E+000	32.276	0.952[38.739]		
	205.3		2.52E+000	16.853	0.825[27.258]		