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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-1451\W6H-IMC-145

Report Generated On : 3/21/2017 12:23:46 PM

Sample Title : W6H-IMC-1451-S-P-3

Sample Description : UNC 2017

Sample Identification : W6H-IMC-1451-S-P

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 : 2.965E+002 GRAMS

Sample Taken On : 2/28/2017 12:00:00 PM

Acquisition Started : 3/21/2017 11:27:26 AM

Live Time : 1800.0 seconds

Real Time : 1800.7 seconds

Dead Time : 0.04 %

Energy Calibration Used Done On : 3/9/2017

Efficiency Calibration Used Done On : 3/21/2017

Efficiency ID : H-IMC-1451-S-P-3

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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: 8381

Sample Title: W6H-IMC-1451-S-P-3

Peak Analysis Performed on: 3/21/2017 12:23:43 PM

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	300.13	75.03	0.54	7.48E+001	21.03	4.90E+001
m	2	297-	313	308.72	77.17	0.55	4.00E+001	15.44	3.90E+001
F	3	948-	960	954.17	238.63	0.63	7.01E+001	19.19	4.88E+001
F	4	1401-	1413	1406.86	351.87	1.33	4.11E+001	15.92	2.47E+001
F	5	5829-	5854	5841.82	1461.26	2.39	2.03E+002	67.88	2.46E+001

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: W6H-IMC-1451-S-P-3  
 Nuclide Library Used: C:\GENIE2K\CAMFILES\UNC 2017 8381.NLB

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

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (pCi/GRAM)	Activity Uncertainty
K-40	0.970	1460.82*	10.66	1.04915E+001	3.61568E+000
PB-212	1.000	238.63*	43.60	1.93990E-001	6.13210E-002
		300.09	3.30		
PB-214	1.000	53.23	1.08		
		241.99	7.25		
		295.22	18.42		
		351.93*	35.60	1.92518E-001	7.98192E-002
		785.96	1.06		

\* = 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	0.970	1.049148E+001	3.615682E+000
PB-212	1.000	1.939904E-001	6.132096E-002
PB-214	1.000	1.925178E-001	7.981920E-002

? = 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: 3/21/2017 12:23:43 PM  
 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
M 1	75.03	4.1533E-002	28.13		
m 2	77.17	2.2211E-002	38.61		

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 M D A R E P O R T \*\*\*\*\*  
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Detector Name: 8381  
 Sample Geometry: Cylinder  
 Sample Title: W6H-IMC-1451-S-P-3  
 Nuclide Library Used: C:\GENIE2K\CAMFILES\UNC 2017 8381.NLB

	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	1.455E+000	1.46E+000	1.049E+001	6.578E-00
	CO-60	1173.23	99.85	1.698E-001	1.52E-001	-3.307E-002	7.855E-00
		1332.49	99.98	1.519E-001		-9.863E-002	6.897E-00
	CS-137	661.66	85.10	1.412E-001	1.41E-001	1.461E-002	6.593E-00
	BI-212	727.33	6.67	2.078E+000	2.08E+000	5.455E-001	9.746E-00
		785.37	1.10	1.148E+001		-2.929E+000	5.328E+00
		1620.50	1.47	7.645E+000		-6.986E+000	3.273E+00
+	PB-212	238.63*	43.60	1.104E-001	1.10E-001	1.940E-001	5.146E-00
		300.09	3.30	2.052E+000		-1.189E+000	9.664E-00
	BI-214	609.32	45.49	2.959E-001	2.96E-001	1.107E-001	1.398E-00
		665.45	1.53	7.981E+000		3.658E+000	3.731E+00
		768.36	4.89	2.946E+000		-1.445E+000	1.381E+00
		806.18	1.26	1.064E+001		-1.246E+000	4.953E+00
		934.06	3.11	4.609E+000		7.338E-001	2.135E+00
		1120.29	14.92	1.207E+000		9.209E-001	5.628E-00
		1155.21	1.63	1.153E+001		-8.072E-001	5.386E+00
		1238.12	5.83	3.213E+000		7.832E-001	1.494E+00
		1280.98	1.43	1.210E+001		-5.292E+000	5.583E+00
		1377.67	3.99	3.984E+000		2.160E+000	1.814E+00
		1401.52	1.33	1.094E+001		2.002E+000	4.929E+00
		1407.99	2.39	5.693E+000		-6.326E-001	2.544E+00
		1509.21	2.13	6.366E+000		-3.842E+000	2.824E+00
		1729.59	2.88	4.786E+000		2.033E+000	2.097E+00
		1764.49	15.30	1.296E+000		1.547E+000	5.916E-00
		1847.43	2.03	6.600E+000		-1.193E-001	2.856E+00
+	PB-214	53.23	1.08	5.038E+000	1.29E-001	1.470E-001	2.320E+00
		241.99	7.25	8.951E-001		-5.463E-002	4.248E-00
		295.22	18.42	3.972E-001		1.352E-001	1.881E-00
		351.93*	35.60	1.290E-001		1.925E-001	5.814E-00
		785.96	1.06	1.224E+001		4.866E+000	5.689E+00
	U-234	53.20	0.12	4.407E+001	4.41E+001	1.286E+000	2.030E+00
		120.90	0.04	7.675E+001		-2.063E+001	3.503E+00
	U-235	105.60	1.31	2.247E+000	7.61E-002	-1.656E-001	1.034E+00
		109.19	1.66	1.872E+000		1.224E+000	8.656E-00
		143.76	10.96	2.132E-001		-2.873E-002	9.548E-00
		163.36	5.08	5.097E-001		1.959E-001	2.296E-00
		185.71	57.00	7.610E-002		6.352E-002	3.564E-00
		202.12	1.08	3.841E+000		-1.462E+000	1.786E+00
		205.32	5.02	8.668E-001		-2.829E-001	4.042E-00
	U-238	63.29	3.70	1.329E+000	9.77E-001	4.593E-001	6.201E-00
		92.60	4.23	9.767E-001		5.720E-001	4.597E-00
		766.42	0.32	4.551E+001		6.344E+000	2.136E+00

Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/GRAM)	Nuclide MDA (pCi/GRAM)	Activity (pCi/GRAM)	Dec. Leve (pCi/GRAM)
U-238	1001.03	0.84	1.872E+001	9.77E-001	-1.117E+001	8.701E+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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\*\*\* 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-1451\W6H-IMC-145

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]
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K-40	1460.8	^	1.05E+001	34.463			
PB-212	238.6	^	1.94E-001	31.610			
PB-214	351.9	^	1.93E-001	41.461			