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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 3:28:58 PM

Sample Title : W6H-IMC-1451-S-P-4

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 : 2.796E+002 GRAMS

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

Acquisition Started : 3/21/2017 12:16:30 PM

Live Time : 1800.0 seconds

Real Time : 1800.6 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-4

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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-4

Peak Analysis Performed on: 3/21/2017 3:28:53 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	296-	315	299.81	74.95	0.63	8.90E+001	21.60	3.51E+001
m	2	296-	315	308.40	77.09	0.64	4.16E+001	15.74	3.77E+001
F	3	949-	961	954.22	238.64	0.92	6.97E+001	19.01	3.09E+001
F	4	1402-	1412	1407.21	351.96	0.89	2.31E+001	13.92	3.19E+001
F	5	2428-	2442	2435.46	609.17	1.55	3.81E+001	14.89	1.88E+001
F	6	5828-	5855	5842.06	1461.32	2.79	2.24E+002	69.83	2.02E+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-4  
 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	0.962	1460.82*	10.66	9.61974E+000	3.11100E+000
PB-212	1.000	238.63*	43.60	1.58385E-001	4.99399E-002
		300.09	3.30		
BI-214	0.998	609.32*	45.49	1.88359E-001	7.68842E-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		
		1238.12	5.83		
		1280.98	1.43		
		1377.67	3.99		
		1401.52	1.33		
		1407.99	2.39		
		1509.21	2.13		
		1729.59	2.88		
		1764.49	15.30		
		1847.43	2.03		
PB-214	1.000	53.23	1.08		
		241.99	7.25		
		295.22	18.42		
		351.93*	35.60	8.94795E-002	5.53801E-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	0.962	9.619738E+000	3.110999E+000
PB-212	1.000	1.583854E-001	4.993985E-002
BI-214	0.998	1.883593E-001	7.688422E-002
PB-214	1.000	8.947950E-002	5.538007E-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 3:28:53 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	74.95	4.9447E-002	24.27		
m 2	77.09	2.3092E-002	37.87		

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-4  
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	1.133E+000	1.13E+000	9.620E+000	5.083E-00
	CO-60	1173.23	99.85	1.360E-001	1.25E-001	2.919E-003	6.273E-00
		1332.49	99.98	1.246E-001		2.553E-002	5.651E-00
	CS-137	661.66	85.10	1.267E-001	1.27E-001	4.904E-002	5.952E-00
	BI-212	727.33	6.67	1.635E+000	1.63E+000	-4.123E-001	7.642E-00
		785.37	1.10	9.511E+000		4.960E+000	4.412E+00
		1620.50	1.47	6.807E+000		1.032E+000	2.946E+00
+	PB-212	238.63*	43.60	7.343E-002	7.34E-002	1.584E-001	3.364E-00
		300.09	3.30	1.578E+000		-1.414E+000	7.400E-00
+	BI-214	609.32*	45.49	1.190E-001	1.19E-001	1.884E-001	5.282E-00
		665.45	1.53	7.351E+000		-9.515E-001	3.461E+00
		768.36	4.89	2.286E+000		4.883E-001	1.067E+00
		806.18	1.26	8.613E+000		7.581E-001	4.001E+00
		934.06	3.11	3.888E+000		-2.389E+000	1.804E+00
		1120.29	14.92	9.809E-001		3.101E-001	4.567E-00
		1155.21	1.63	7.668E+000		-5.819E+000	3.518E+00
		1238.12	5.83	2.588E+000		-1.226E-001	1.201E+00
		1280.98	1.43	9.872E+000		-1.761E+000	4.546E+00
		1377.67	3.99	3.643E+000		1.859E+000	1.673E+00
		1401.52	1.33	9.538E+000		2.667E+000	4.318E+00
		1407.99	2.39	5.546E+000		2.045E+000	2.521E+00
		1509.21	2.13	4.439E+000		-1.611E+000	1.921E+00
		1729.59	2.88	4.189E+000		2.059E+000	1.848E+00
		1764.49	15.30	9.522E-001		3.049E-001	4.290E-00
		1847.43	2.03	5.669E+000		1.156E+000	2.464E+00
+	PB-214	53.23	1.08	3.386E+000	1.15E-001	2.837E-002	1.539E+00
		241.99	7.25	6.830E-001		2.037E-001	3.228E-00
		295.22	18.42	3.108E-001		2.265E-001	1.467E-00
		351.93*	35.60	1.146E-001		8.948E-002	5.206E-00
		785.96	1.06	9.811E+000		2.976E+000	4.549E+00
	U-234	53.20	0.12	2.962E+001	2.96E+001	2.482E-001	1.347E+00
		120.90	0.04	6.496E+001		1.399E+001	2.978E+00
	U-235	105.60	1.31	1.670E+000	4.94E-002	-3.723E-001	7.628E-00
		109.19	1.66	1.478E+000		6.286E-002	6.824E-00
		143.76	10.96	1.990E-001		-9.003E-002	9.046E-00
		163.36	5.08	3.414E-001		1.141E-001	1.501E-00
		185.71	57.00	4.940E-002		1.529E-002	2.273E-00
		202.12	1.08	2.357E+000		2.639E-001	1.069E+00
		205.32	5.02	5.476E-001		-2.296E-001	2.499E-00
	U-238	63.29	3.70	1.115E+000	8.56E-001	5.571E-001	5.229E-00
		92.60	4.23	8.556E-001		7.143E-001	4.049E-00
		766.42	0.32	3.464E+001		3.482E+000	1.616E+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	1.578E+001	8.56E-001	1.313E+001	7.343E+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	^	9.62E+000	32.340			
PB-212	238.6	^	1.58E-001	31.531			
BI-214	609.3	^	1.88E-001	40.818			
PB-214	351.9	^	8.95E-002	61.891			