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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-1483\UNC-IMC-148

Report Generated On : 5/4/2017 8:31:42 AM

Sample Title : UNC-IMC-1483-S-P-1

Sample Description :

Sample Identification : IMC-1483-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 : 5.422E+002 grams

Sample Taken On : 4/10/2017 12:00:00 AM

Acquisition Started : 4/21/2017 1:20:40 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 : 5/4/2017

Efficiency ID : H-IMC-1483-S-P-1

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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: UNC-IMC-1483-S-P-1

Peak Analysis Performed on: 5/4/2017 8:31:38 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	52.72	13.30	0.64	2.40E+002	102.44	1.87E+002
F	2	58-	70	65.51	16.50	0.70	6.26E+002	47.49	2.57E+002
F	3	72-	85	77.02	19.38	1.24	3.32E+002	34.51	1.75E+002
F	4	97-	108	102.98	25.88	0.68	1.43E+002	26.83	1.59E+002
F	5	208-	221	213.50	53.54	0.72	1.86E+002	30.19	2.52E+002
M	6	285-	317	291.02	72.94	0.77	1.71E+002	32.59	3.69E+002
m	7	285-	317	299.58	75.08	0.78	3.31E+002	40.51	4.97E+002
m	8	285-	317	308.53	77.32	0.79	1.52E+002	31.31	4.87E+002
F	9	332-	344	337.17	84.49	0.89	5.13E+002	207.69	4.59E+002
F	10	354-	366	359.67	90.12	0.71	2.04E+002	95.97	4.36E+002
M	11	366-	387	372.75	93.39	1.11	3.89E+002	165.75	3.48E+002
m	12	366-	387	382.80	95.90	1.12	6.28E+001	36.48	3.60E+002
F	13	429-	442	435.85	109.18	1.02	1.67E+002	33.23	3.78E+002
F	14	477-	487	483.14	121.02	0.81	7.97E+001	120.98	2.81E+002
M	15	558-	585	562.48	140.87	0.90	3.70E+001	24.59	1.85E+002
m	16	558-	585	574.38	143.85	0.91	7.85E+002	144.16	2.27E+002
F	17	647-	660	652.61	163.42	0.93	3.47E+002	38.57	2.28E+002
F	18	734-	749	741.77	185.73	0.94	3.38E+003	217.57	2.08E+002
F	19	770-	784	777.86	194.77	0.60	2.89E+001	15.62	9.00E+001
M	20	803-	829	807.83	202.27	1.06	4.43E+001	16.57	5.84E+001
m	21	803-	829	819.90	205.29	1.07	3.15E+002	33.88	8.56E+001
F	22	946-	958	952.91	238.57	0.88	1.71E+002	28.67	9.75E+001
F	23	1173-	1184	1178.93	295.13	1.03	5.51E+001	18.56	5.40E+001
F	24	1398-	1413	1405.12	351.73	1.18	1.19E+002	23.18	4.64E+001
F	25	2030-	2048	2038.17	510.15	1.58	5.36E+001	17.15	3.80E+001
F	26	2320-	2337	2328.03	582.69	1.52	5.89E+001	17.70	3.00E+001
F	27	2424-	2440	2432.88	608.92	1.43	5.72E+001	17.11	2.27E+001
F	28	5823-	5849	5835.87	1460.51	2.52	2.26E+002	30.59	1.35E+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: UNC-IMC-1483-S-P-1  
 Nuclide Library Used: C:\GENIE2K\CAMFILES\GE\_UNC\_U-NLB.NLB

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

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (pCi/gram)	Activity Uncertainty
K-40	0.984	1460.82*	10.66	7.54536E+000	1.20743E+000
U-234	0.985	53.20*	0.12	1.71668E+002	4.97650E+001
		120.90*	0.04	1.12684E+002	1.75338E+002
U-235	0.913	105.60	1.31		
		109.19*	1.66	5.03682E+000	1.60520E+000
		143.76*	10.96	3.63215E+000	9.79975E-001
		163.36*	5.08	3.63935E+000	7.91426E-001
		202.12*	1.08	2.48209E+000	1.01263E+000
		205.32*	5.02	3.84697E+000	7.36628E-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	0.984	7.545355E+000	1.207430E+000
U-234	0.985	1.672705E+002	4.787407E+001
U-235	0.913	3.603231E+000	4.136598E-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: 5/4/2017 8:31:38 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	13.30	1.3339E-001	42.67		
F 2	16.50	3.4773E-001	7.59		
F 3	19.38	1.8442E-001	10.40		
F 4	25.88	7.9325E-002	18.79		
M 6	72.94	9.4990E-002	19.06		
m 7	75.08	1.8389E-001	12.24		
m 8	77.32	8.4171E-002	20.67		
F 9	84.49	2.8484E-001	40.51		
F 10	90.12	1.1307E-001	47.15		
M 11	93.39	2.1584E-001	42.66	Tol.	TH-234
m 12	95.90	3.4880E-002	58.10		
M 15	140.87	2.0547E-002	66.48		
F 18	185.73	1.8761E+000	6.44		
F 19	194.77	1.6062E-002	54.04		
F 22	238.57	9.5033E-002	16.76		
F 23	295.13	3.0593E-002	33.70		
F 24	351.73	6.6268E-002	19.43		
F 25	510.15	2.9759E-002	32.01		
F 26	582.69	3.2722E-002	30.06		
F 27	608.92	3.1786E-002	29.91		

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: 8566  
 Sample Geometry: cylinder  
 Sample Title: UNC-IMC-1483-S-P-1  
 Nuclide Library Used: C:\GENIE2K\CAMFILES\GE\_UNC\_U-NLB.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	7.293E-001	7.29E-001	7.545E+000	3.194E-00
	PA-234	742.81	0.11	7.143E+001	1.20E+001	2.866E+001	3.312E+00
		766.42	0.32	2.571E+001		-6.113E+000	1.196E+00
		1001.03	0.84	1.202E+001		2.852E+000	5.586E+00
	TH-234	63.29	3.70	2.363E+000	2.36E+000	-5.004E-001	1.152E+00
		92.38	2.13	4.040E+000		1.269E+001	1.986E+00
		92.80	2.10	3.916E+000		6.869E-001	1.923E+00
		112.81	0.21	2.801E+001		1.698E+000	1.368E+00
+	U-234	53.20*	0.12	9.037E+001	9.04E+001	1.717E+002	4.394E+00
		120.90*	0.04	1.239E+002		1.127E+002	6.003E+00
+	U-235	105.60	1.31	4.869E+000	3.37E-001	2.595E+000	2.383E+00
		109.19*	1.66	3.604E+000		5.037E+000	1.761E+00
		143.76*	10.96	3.372E-001		3.632E+000	1.623E-00
		163.36*	5.08	8.914E-001		3.639E+000	4.315E-00
		202.12*	1.08	2.145E+000		2.482E+000	9.968E-00
		205.32*	5.02	5.579E-001		3.847E+000	2.625E-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-1483\UNC-IMC-148

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	^	7.55E+000	16.002			
U-234	53.2	^	1.72E+002	28.989	1.000[40.997]	2.04	-0.513
	120.9		1.13E+002	155.60	0.656[158.27]		[ 1.992]
U-235	109.2		5.04E+000	31.869	1.387[41.756]	2.91	-0.567
	143.8	^	3.63E+000	26.981	1.000[38.156]		[ 0.765]
	163.4		3.64E+000	21.746	1.002[34.653]		
	202.1		2.48E+000	40.797	0.683[48.912]		
	205.3		3.85E+000	19.148	1.059[33.085]		