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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 8:32:43 AM

Sample Title : UNC-IMC-1483-S-P-2

Sample Description :

Sample Identification : IMC-1483-S-P-2

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 : 3.276E+002 grams

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

Acquisition Started : 4/21/2017 2:16:39 PM

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 : 5/4/2017

Efficiency ID : H-IMC-1483-S-P-2

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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-2

Peak Analysis Performed on: 5/4/2017 8:32:38 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	182-	191	186.08	46.68	0.61	6.98E+001	18.86	7.67E+001
F	2	208-	217	213.10	53.44	0.78	6.01E+001	68.26	5.83E+001
F	3	295-	305	299.36	75.02	0.59	7.59E+001	24.79	2.05E+002
F	4	330-	344	337.44	84.55	0.91	1.67E+002	26.39	1.58E+002
F	5	355-	364	359.46	90.06	0.50	5.08E+001	71.12	8.67E+001
F	6	366-	379	373.32	93.53	0.62	1.11E+002	75.48	1.33E+002
F	7	570-	581	574.31	143.83	0.83	2.15E+002	28.48	7.80E+001
F	8	647-	657	652.61	163.42	0.79	9.20E+001	69.62	6.05E+001
F	9	735-	752	741.91	185.77	0.88	9.01E+002	112.68	8.10E+001
F	10	814-	830	820.36	205.40	1.00	7.57E+001	18.68	6.38E+001
F	11	946-	959	953.13	238.63	0.71	3.74E+001	16.05	6.48E+001
F	12	1401-	1412	1405.74	351.89	1.15	3.49E+001	14.63	2.64E+001
F	13	2425-	2439	2432.34	608.79	1.32	3.19E+001	12.68	1.13E+001
F	14	5824-	5847	5835.93	1460.52	2.54	1.14E+002	22.04	9.33E+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: UNC-IMC-1483-S-P-2

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	0.986	1460.82*	10.66	6.60837E+000	1.39884E+000
U-234	0.993	53.20*	0.12	6.34146E+001	7.36519E+001
		120.90	0.04		
U-235	0.999	105.60	1.31		
		109.19	1.66		
		143.76*	10.96	1.49422E+000	3.55256E-001
		163.36*	5.08	1.47168E+000	1.14758E+000
		202.12	1.08		
		205.32*	5.02	1.44495E+000	4.23899E-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	0.986	6.608366E+000	1.398836E+000
U-234	0.993	6.341455E+001	7.365193E+001
U-235	0.999	1.473775E+000	2.649255E-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 8:32:38 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	46.68	3.8764E-002	27.03		
F 3	75.02	4.2194E-002	32.64		
F 4	84.55	9.2650E-002	15.82		
F 5	90.06	2.8244E-002	139.90		
F 6	93.53	6.1419E-002	68.28	Tol.	TH-234
F 9	185.77	5.0075E-001	12.50		
F 11	238.63	2.0781E-002	42.91		
F 12	351.89	1.9369E-002	41.96		
F 13	608.79	1.7717E-002	39.77		

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-2  
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	1.049E+000	1.05E+000	6.608E+000	4.461E-00
	PA-234	742.81	0.11	1.219E+002	1.83E+001	7.596E+000	5.660E+00
		766.42	0.32	4.045E+001		-2.949E+000	1.872E+00
		1001.03	0.84	1.827E+001		1.733E+000	8.411E+00
	TH-234	63.29	3.70	1.666E+000	1.67E+000	9.865E-002	7.966E-00
		92.38	2.13	3.102E+000		6.222E+000	1.505E+00
		92.80	2.10	3.014E+000		2.956E+000	1.460E+00
		112.81	0.21	2.094E+001		-3.815E+001	1.001E+00
+	U-234	53.20*	0.12	4.616E+001	4.62E+001	6.341E+001	2.165E+00
		120.90	0.04	1.300E+002		4.603E+001	6.222E+00
+	U-235	105.60	1.31	3.719E+000	3.37E-001	-2.373E+000	1.786E+00
		109.19	1.66	3.063E+000		2.651E-001	1.473E+00
		143.76*	10.96	3.375E-001		1.494E+000	1.594E-00
		163.36*	5.08	6.744E-001		1.472E+000	3.156E-00
		202.12	1.08	5.853E+000		2.988E+000	2.808E+00
		205.32*	5.02	9.381E-001		1.445E+000	4.432E-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	^	6.61E+000	21.168			
U-234	53.2	^	6.34E+001	116.14			
U-235	143.8	^	1.49E+000	23.775	1.000[33.623]	0.47	-0.094
	163.4		1.47E+000	77.978	0.985[81.522]		[ 1.417]
	205.3		1.44E+000	29.337	0.967[37.761]		