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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-0310\W3H-ERRU-03

Report Generated On : 7/6/2017 10:03:05 AM

Sample Title : W3H-ERRU-0310-S-P-8
Sample Description :
Sample Identification : 0310-S-P-8
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 : 3.645E+002 grams

Sample Taken On : 6/1/2017 2:00:00 PM
Acquisition Started : 6/7/2017 10:46:06 AM

Live Time : 1800.0 seconds
Real Time : 1800.4 seconds

Dead Time : 0.02 %

Energy Calibration Used Done On : 4/13/2017
Efficiency Calibration Used Done On : 7/6/2017
Efficiency ID : H-IMC-2002-S-P-5

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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: W3H-ERRU-0310-S-P-8
Peak Analysis Performed on: 7/6/2017 10:03:00 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
M	1	296-	313	299.40	75.03	0.63	1.33E+002	26.41	1.32E+002
m	2	296-	313	308.27	77.25	0.64	7.14E+001	20.11	1.37E+002
F	3	332-	344	337.49	84.57	1.04	1.10E+002	92.71	1.15E+002
F	4	568-	578	574.34	143.84	0.68	7.17E+001	64.22	7.01E+001
F	5	644-	656	651.78	163.22	0.60	3.31E+001	42.13	6.99E+001
F	6	736-	748	741.53	185.68	0.97	4.01E+002	37.56	6.34E+001
F	7	815-	824	819.79	205.26	0.75	3.54E+001	14.81	3.63E+001
F	8	946-	958	952.56	238.48	0.80	1.08E+002	23.32	6.83E+001
F	9	1172-	1184	1178.74	295.08	0.98	4.88E+001	15.52	2.47E+001
F	10	1398-	1412	1405.30	351.78	1.43	8.00E+001	52.37	1.65E+001
F	11	2320-	2335	2327.58	582.58	1.03	4.22E+001	15.14	2.53E+001
F	12	2425-	2438	2431.38	608.55	1.18	3.70E+001	14.57	1.98E+001
F	13	5822-	5849	5834.27	1460.11	2.90	1.75E+002	26.42	1.56E+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: W3H-ERRU-0310-S-P-8
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	0.921	1460.82*	10.66	7.94038E+000	1.32968E+000
Pb-212	0.996	74.82*	10.28	7.98633E-001	1.91583E-001
		77.11*	17.10	2.51935E-001	7.85349E-002
		86.83	2.07		
		87.35	3.97		
		89.78	1.46		
		115.18	0.60		
		238.63*	43.60	2.09669E-001	4.97913E-002
		300.09	3.30		
BI-214	0.246	76.86*	0.55	7.90476E+000	2.47435E+000
		79.29	0.91		
		609.32*	45.49	1.78744E-001	7.17286E-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	0.850	74.82*	5.80	1.41551E+000	3.62415E-001
		77.11*	9.70	4.44133E-001	1.44107E-001
		86.83	1.70		
		87.35	2.24		
		89.78	0.82		
		241.99	7.25		
		258.76	0.53		
		295.22*	18.42	2.75036E-001	9.08955E-002
		351.93*	35.60	2.79889E-001	1.84853E-001

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (pCi/gram)	Activity Uncertainty
PB-214	0.850	785.96	1.06		
		839.07	0.58		
Ra-226	0.873	81.07	0.20		
		83.79*	0.32	1.93983E+001	1.66033E+001
		186.21*	3.64	7.49619E+000	1.06065E+000
U-235	0.999	89.96	3.43		
		93.35	5.54		
		104.82	0.69		
		105.60	1.31		
		108.58	0.50		
		109.19	1.66		
		143.76*	10.96	3.80404E-001	3.43091E-001
		163.36*	5.08	4.05516E-001	5.18670E-001
		194.94	0.63		
		202.12	1.08		
		205.32*	5.02	5.19658E-001	2.24375E-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	0.921	7.940378E+000	1.329685E+000
Pb-212	0.996	1.998636E-001	4.287003E-002
BI-214	0.246	1.759895E-001	7.169953E-002
PB-214	0.850	2.606609E-001	7.207101E-002
Ra-226	0.873	7.544564E+000	1.058491E+000
U-235	0.999	4.695489E-001	1.765676E-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 10:03:00 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 11	582.58	2.3458E-002	35.85		

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: W3H-ERRU-0310-S-P-8
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	4.198E-001	4.20E-001	7.940E+000	1.486E-00
	Pb-210	46.54	4.25	1.708E+000	1.71E+000	2.305E+000	8.145E-00
	BI-212	727.33	6.67	1.576E+000	1.58E+000	1.038E+000	7.349E-00
		785.37	1.10	8.730E+000		-2.202E+000	4.020E+00
		1078.62	0.56	1.970E+001		3.631E+000	8.956E+00
		1620.50	1.47	7.885E+000		-1.549E+000	3.455E+00
+	Pb-212	74.82*	10.28	3.376E-001	9.03E-002	7.986E-001	1.607E-00
		77.11*	17.10	2.020E-001		2.519E-001	9.622E-00
		86.83	2.07	2.134E+000		-2.093E-001	1.030E+00
		87.35	3.97	1.029E+000		-2.910E-001	4.954E-00
		89.78	1.46	2.623E+000		-3.208E+000	1.260E+00
		115.18	0.60	5.138E+000		3.388E+000	2.446E+00
		238.63*	43.60	9.034E-002		2.097E-001	4.255E-00
		300.09	3.30	1.531E+000		-1.642E+000	7.221E-00
+	BI-214	76.86*	0.55	6.338E+000	1.17E-001	7.905E+000	3.019E+00
		79.29	0.91	4.842E+000		-2.159E+000	2.333E+00
		609.32*	45.49	1.174E-001		1.787E-001	5.214E-00
		665.45	1.53	6.440E+000		-3.024E+000	3.008E+00
		768.36	4.89	2.144E+000		1.008E+000	9.961E-00
		806.18	1.26	8.953E+000		1.626E-002	4.169E+00
		934.06	3.11	3.549E+000		-4.361E-001	1.631E+00
		1120.29	14.92	1.037E+000		4.964E-001	4.836E-00
		1155.21	1.63	7.591E+000		-2.797E+000	3.468E+00
		1238.11	5.83	3.030E+000		9.293E-001	1.418E+00
		1280.98	1.43	9.668E+000		2.557E+000	4.427E+00
		1377.67	3.99	2.767E+000		-1.011E+000	1.228E+00
		1385.31	0.79	1.306E+001		-9.019E+000	5.743E+00
		1401.52	1.33	9.420E+000		5.548E+000	4.236E+00
		1407.99	2.39	5.076E+000		-2.063E-001	2.274E+00
		1509.21	2.13	4.837E+000		8.168E-001	2.103E+00
		1583.20	0.70	1.944E+001		7.519E+000	8.726E+00
		1661.27	1.05	1.040E+001		3.465E+000	4.502E+00
		1729.59	2.88	3.928E+000		-1.542E+000	1.700E+00
		1764.49	15.30	1.188E+000		1.323E+000	5.436E-00
		1847.43	2.03	5.752E+000		2.702E+000	2.477E+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	5.984E-001	8.34E-002	1.416E+000	2.848E-00
		77.11*	9.70	3.561E-001		4.441E-001	1.696E-00
		86.83	1.70	2.598E+000		-2.548E-001	1.254E+00
		87.35	2.24	1.824E+000		-5.158E-001	8.780E-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	4.670E+000	8.34E-002	-5.712E+000	2.243E+00
		241.99	7.25	9.192E-001		9.131E-002	4.436E-00
		258.76	0.53	7.513E+000		-9.778E-001	3.524E+00
		295.22*	18.42	1.551E-001		2.750E-001	6.990E-00
		351.93*	35.60	8.345E-002		2.799E-001	3.699E-00
		785.96	1.06	9.173E+000		-9.468E-002	4.228E+00
		839.07	0.58	1.788E+001		-3.399E+000	8.248E+00
+	Ra-226	81.07	0.20	1.788E+001	8.45E-001	-9.853E+000	8.535E+00
		83.79*	0.32	1.159E+001		1.940E+001	5.555E+00
		186.21*	3.64	8.447E-001		7.496E+000	3.970E-00
	AC-228	89.96	1.90	1.742E+007	4.33E+006	-1.418E+007	8.392E+00
		93.35	3.10	1.062E+007		-1.704E+006	5.116E+00
		99.51	1.26	1.950E+007		-6.894E+006	9.282E+00
		105.60	0.74	3.373E+007		-3.309E+006	1.607E+00
		129.07	2.42	9.679E+006		-2.645E+006	4.590E+00
		153.98	0.72	3.715E+007		3.332E+006	1.767E+00
		209.25	3.89	8.459E+006		7.892E+005	4.021E+00
		214.85	0.76	4.044E+007		-9.675E+006	1.913E+00
		270.24	3.46	1.106E+007		8.757E+006	5.232E+00
		328.00	2.95	1.580E+007		1.317E+007	7.477E+00
		338.32	11.27	4.330E+006		4.113E+006	2.050E+00
		409.46	1.92	2.517E+007		-5.478E+006	1.176E+00
		463.00	4.40	1.258E+007		-1.561E+006	5.882E+00
		562.50	0.87	8.078E+007		1.867E+006	3.786E+00
		674.75	2.10	3.614E+007		-5.686E+006	1.682E+00
		726.86	0.62	1.354E+008		4.207E+007	6.313E+00
		755.32	1.00	8.185E+007		1.298E+007	3.800E+00
		772.29	1.49	5.788E+007		1.482E+007	2.693E+00
		794.95	4.25	2.177E+007		1.243E+007	1.016E+00
		830.49	0.54	1.586E+008		4.373E+006	7.336E+00
		835.71	1.61	5.252E+007		1.465E+007	2.427E+00
		840.38	0.91	9.077E+007		-2.960E+007	4.183E+00
		904.20	0.77	1.441E+008		-4.422E+007	6.759E+00
		911.20	25.80	4.461E+006		-4.975E+004	2.096E+00
		964.77	4.99	2.341E+007		1.414E+007	1.097E+00
		968.97	15.80	7.376E+006		6.143E+006	3.456E+00
		1247.08	0.50	2.354E+008		-4.800E+007	1.086E+00
		1459.14	0.83	3.152E+008		8.414E+008	1.513E+00
		1495.91	0.86	9.768E+007		3.920E+007	4.264E+00
		1588.20	3.22	3.290E+007		4.301E+005	1.471E+00
		1630.63	1.51	6.324E+007		2.071E+007	2.781E+00
	TH-230	67.67	0.38	1.118E+001	1.12E+001	-1.458E+000	5.349E+00
	PA-234	742.81	0.11	8.905E+001	1.50E+001	2.483E+001	4.114E+00
		766.42	0.32	3.112E+001		-1.262E+001	1.439E+00
		1001.03	0.84	1.503E+001		5.311E+000	6.954E+00
	TH-234	63.29	3.70	1.174E+000	1.17E+000	2.969E-001	5.601E-00
		92.38	2.13	2.064E+000		2.179E+000	9.970E-00
		92.80	2.10	2.016E+000		3.941E-001	9.722E-00
		112.81	0.21	1.460E+001		-2.379E+001	6.952E+00
	U-234	53.20	0.12	4.129E+001	4.13E+001	2.626E+001	1.960E+00
		120.90	0.04	8.663E+001		2.935E+001	4.120E+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	1.208E+000	2.40E-001	-9.829E-001	5.819E-00
		93.35	5.54	7.436E-001		-1.193E-001	3.583E-00
		104.82	0.69	4.499E+000		1.448E-001	2.143E+00
		105.60	1.31	2.385E+000		-2.340E-001	1.137E+00
		108.58	0.50	6.836E+000		4.183E+000	3.271E+00
		109.19	1.66	1.976E+000		-6.952E-001	9.438E-00
		143.76*	10.96	2.396E-001		3.804E-001	1.126E-00
		163.36*	5.08	5.798E-001		4.055E-001	2.733E-00
		194.94	0.63	5.832E+000		-4.210E-002	2.764E+00
		202.12	1.08	3.855E+000		1.096E+000	1.836E+00
		205.32*	5.02	4.764E-001		5.197E-001	2.183E-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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**** 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 ***
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Analysis using Key Line Activities

Filename: C:\GENIE2K\CAMFILES\UNC 2017\IMC Samples\IMC-0310\W3H-ERRU-03

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	^	7.94E+000	16.746			
Pb-212	74.8		7.99E-001	23.989	3.809[33.755]	4.12	-0.755
	77.1		2.52E-001	31.173	1.202[39.188]		[0.368]
	238.6	^	2.10E-001	23.748	1.000[33.584]		
BI-214	76.9		7.90E+000	31.302	44.224[50.894]	11.74	-1.830
	609.3	^	1.79E-001	40.129	1.000[56.751]		[0.368]
PB-214	74.8		1.42E+000	25.603	5.057[70.834]	4.35	-0.758
	77.1		4.44E-001	32.447	1.587[73.585]		[0.540]
	295.2		2.75E-001	33.049	0.983[73.852]		
	351.9	^	2.80E-001	66.045	1.000[93.402]		
Ra-226	83.8		1.94E+001	85.592	2.588[86.753]	6.22	-1.191
	186.2	^	7.50E+000	14.149	1.000[20.010]		[1.115]
U-235	143.8	^	3.80E-001	90.191	1.000[127.54]	-4.50	0.904
	163.4		4.06E-001	127.90	1.066[156.50]		[4.421]
	205.3		5.20E-001	43.177	1.366[99.994]		