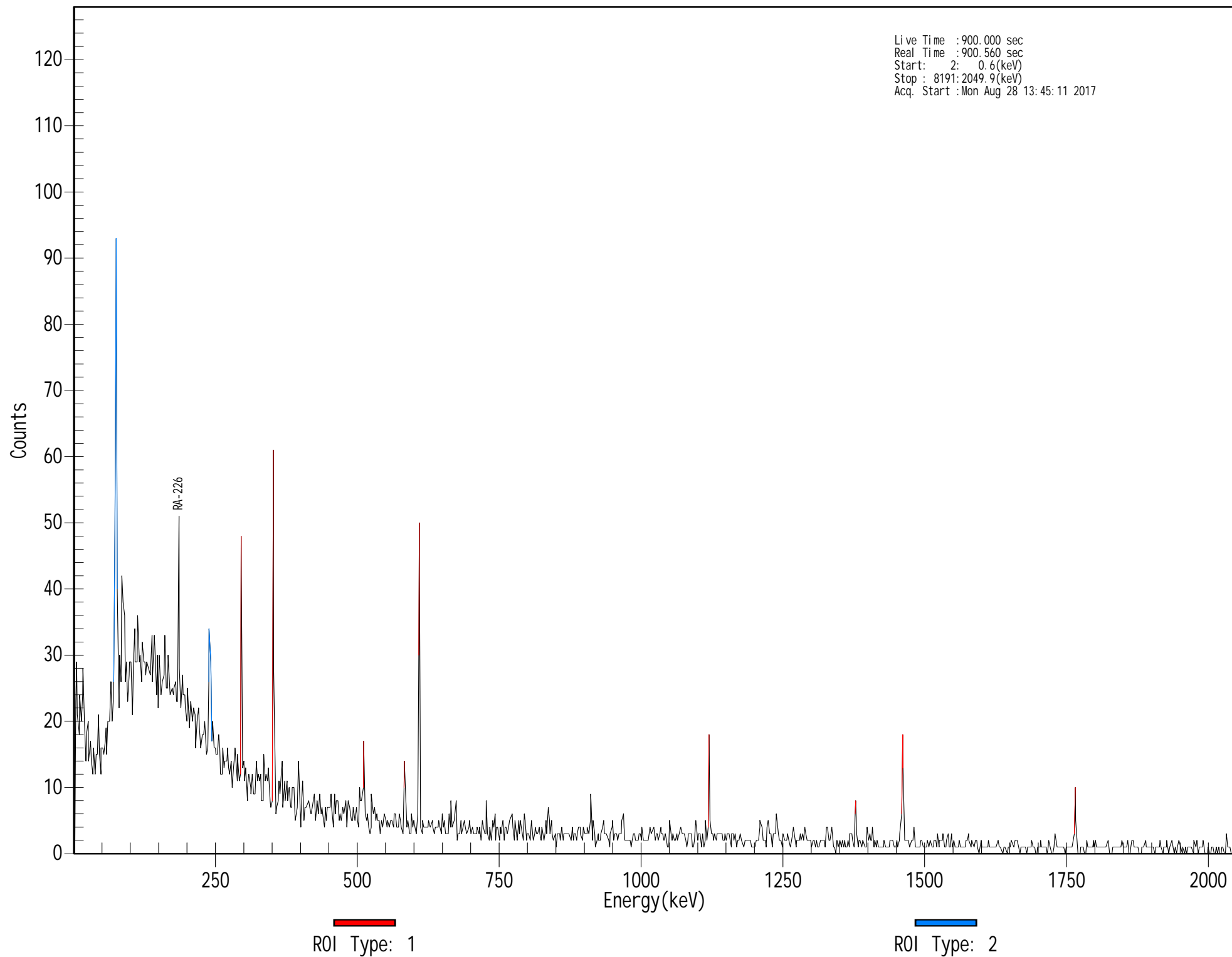


3H VAULT.CNF



***** G A M M A S P E C T R U M A N A L Y S I S *****

Filename: C:\GENIE2K\CAMFILES\UNC 2017\INSITU\3H Vault.CNF

Report Generated On : 10/4/2017 3:01:33 PM

Sample Title : 3H Vault Wall
Sample Description :
Sample Identification : 3H Vault Wall
Sample Type :
Sample Geometry : wall

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 : 1.000E+000 g

Sample Taken On : 8/28/2017 2:00:00 PM
Acquisition Started : 8/28/2017 1:45:11 PM

Live Time : 900.0 seconds
Real Time : 900.6 seconds

Dead Time : 0.06 %

Energy Calibration Used Done On : 4/13/2017
Efficiency Calibration Used Done On : 10/4/2017
Efficiency ID :

***** P E A K A N A L Y S I S R E P O R T *****

Detector Name: 8566

Sample Title: 3H Vault Wall

Peak Analysis Performed on: 10/4/2017 3:01:24 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	286-	315	308.92	77.42	0.85	1.01E+002	6.75	2.66E+002
F	2	738-	749	742.57	185.94	0.60	8.51E+001	13.47	2.12E+002
M	3	947-	976	953.52	238.72	0.96	1.08E+002	36.47	1.39E+002
m	4	947-	976	966.74	242.03	0.97	8.22E+001	25.54	1.99E+002
F	5	1169-	1186	1179.60	295.30	0.92	1.56E+002	42.20	1.51E+002
F	6	1398-	1415	1406.04	351.96	1.35	3.04E+002	49.23	1.01E+002
F	7	2036-	2050	2042.05	511.12	1.37	4.75E+001	9.23	4.50E+001
F	8	2322-	2337	2329.34	583.01	1.06	4.69E+001	27.29	4.93E+001
F	9	2425-	2446	2434.18	609.25	1.32	2.72E+002	17.26	4.22E+001
F	10	4468-	4487	4476.69	1120.38	1.78	7.14E+001	9.58	2.00E+001
F	11	5499-	5514	5506.46	1378.07	1.96	2.42E+001	5.86	7.11E+000
F	12	7044-	7062	7053.42	1765.19	2.73	6.57E+001	8.46	2.85E+000

M = First peak in a multiplet region

m = Other peak in a multiplet region

F = Fitted singlet

Errors quoted at 1.000 sigma

***** P E A K L O C A T E R E P O R T *****

Detector Name: 8566

Sample Title: 3H Vault Wall

Peak Locate Performed on: 10/4/2017 3:01:24 PM

Peak Locate From Channel: 40

Peak Locate To Channel: 8192

Peak Search Sensitivity: 3.00

Peak No.	Centroid Channel	Centroid Uncertainty	Energy (keV)	Peak Significance
1	308.95	0.3340	77.42	3.89
2	742.58	0.2513	185.94	5.38
3	953.29	0.2558	238.72	4.47
4	966.74	0.3171	242.03	3.30
5	1179.63	0.1995	295.30	7.55
6	1406.10	0.1680	351.96	8.69
7	2041.94	0.2590	511.12	3.53
8	2329.43	0.2399	583.01	4.02
9	2434.10	0.1421	609.25	10.86
10	4476.64	0.1805	1120.38	5.39
11	5506.54	0.2241	1378.07	3.19
12	7053.22	0.1708	1765.19	4.27

? = Adjacent peak noted

Errors quoted at 1.960 sigma

 ***** 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 *****

Sample Title: 3H Vault Wall
 Nuclide Library Used: C:\GENIE2K\CAMFILES\UNC 2017 NLB 0328201

..... IDENTIFIED NUCLIDES

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (pCi/g)	Activity Uncertainty
PB-214	0.998	74.82	5.80		
		77.11*	9.70	8.77653E+002	1.61332E+002
		86.83	1.70		
		87.35	2.24		
		89.78	0.82		
		241.99*	7.25	1.50736E+003	9.24193E+002
		258.76	0.53		
		295.22*	18.42	1.26840E+003	6.79120E+002
		351.93*	35.60	1.09584E+003	4.73924E+002
		785.96	1.06		
Ra-226	0.989	839.07	0.58		
		81.07	0.20		
		83.79	0.32		
		186.21*	3.64	2.67517E+003	8.57141E+002

* = Energy line found in the spectrum.

@ = Energy line not used for Weighted Mean Activity

Energy Tolerance : 1.000 keV

Nuclide confidence index threshold = 0.60

Errors quoted at 1.960 sigma

 ***** 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 *****

	Nuclide Name	Nuclide Id Confidence	Wt mean Activity (pCi/g)	Wt mean Activity Uncertainty
X	Pb-212	0.996		
	PB-214	0.998	9.329627E+002	1.471042E+002
	Ra-226	0.989	2.675169E+003	8.571411E+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: 10/4/2017 3:01:24 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	3	238.72	6.1201E-002	138.84		
F	7	511.12	5.2762E-002	38.10		
F	8	583.01	5.2113E-002	114.05		
F	9	609.25	3.0182E-001	12.45		
F	10	1120.38	7.9281E-002	26.32		
F	11	1378.07	2.6851E-002	47.56		
F	12	1765.19	7.2993E-002	25.25		

M = First peak in a multiplet region

m = Other peak in a multiplet region

F = Fitted singlet

Errors quoted at 1.960 sigma

***** N U C L I D E M D A R E P O R T *****

Detector Name: 8566
Sample Geometry: wall
Sample Title: 3H Vault Wall
Nuclide Library Used: C:\GENIE2K\CAMFILES\UNC 2017 NLB 0328201

Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/g)	Nuclide MDA (pCi/g)	Activity (pCi/g)	Dec. Leve (pCi/g)
K-40	1460.82	10.66	2.505E+003	2.51E+003	5.224E+003	1.199E+00
Pb-210	46.54	4.25	1.359E+003	1.36E+003	-8.406E+002	6.493E+00
BI-212	727.33	6.67	1.879E+003	1.88E+003	2.794E+002	8.857E+00
	785.37	1.10	1.064E+004		-6.020E+003	4.976E+00
	1078.62	0.56	2.271E+004		-7.743E+003	1.053E+00
	1620.50	1.47	6.940E+003		-4.313E+003	3.052E+00
Pb-212	74.82	10.28	1.053E+003	2.36E+002	1.843E+003	5.152E+00
	77.11*	17.10	3.880E+002		4.979E+002	1.873E+00
	86.83	2.07	4.573E+003		3.690E+003	2.231E+00
	87.35	3.97	2.308E+003		-1.512E+003	1.125E+00
	89.78	1.46	5.727E+003		-4.024E+003	2.784E+00
	115.18	0.60	1.698E+004		2.571E+001	8.283E+00
	238.63*	43.60	2.359E+002		1.666E+002	1.139E+00
	300.09	3.30	3.957E+003		-1.465E+003	1.917E+00
BI-214	76.86	0.55	1.889E+004	4.77E+002	4.620E+004	9.233E+00
	79.29	0.91	9.201E+003		2.301E+003	4.474E+00
	609.32	45.49	4.771E+002		1.465E+003	2.315E+00
	665.45	1.53	8.673E+003		2.510E+003	4.114E+00
	768.36	4.89	2.903E+003		3.120E+003	1.375E+00
	806.18	1.26	9.918E+003		1.383E+003	4.654E+00
	934.06	3.11	4.251E+003		3.792E+003	1.989E+00
	1120.29	14.92	1.403E+003		2.239E+003	6.696E+00
	1155.21	1.63	8.614E+003		8.411E+002	4.009E+00
	1238.11	5.83	3.109E+003		3.599E+003	1.467E+00
	1280.98	1.43	9.851E+003		2.963E+003	4.561E+00
	1377.67	3.99	4.093E+003		2.069E+003	1.909E+00
	1385.31	0.79	1.975E+004		-2.620E+004	9.180E+00
	1401.52	1.33	1.079E+004		6.776E+003	4.977E+00
	1407.99	2.39	6.127E+003		3.480E+003	2.831E+00
	1509.21	2.13	6.293E+003		2.841E+003	2.872E+00
	1583.20	0.70	2.194E+004		1.480E+004	1.011E+00
	1661.27	1.05	1.062E+004		-3.976E+002	4.710E+00
	1729.59	2.88	4.447E+003		2.051E+003	2.000E+00
	1764.49	15.30	1.407E+003		2.212E+003	6.610E+00
	1847.43	2.03	7.159E+003		5.044E+003	3.246E+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	1.866E+003	3.65E+002	3.266E+003	9.132E+00
	77.11*	9.70	6.840E+002		8.777E+002	3.302E+00
	86.83	1.70	5.569E+003		4.493E+003	2.716E+00
	87.35	2.24	4.090E+003		-2.681E+003	1.993E+00

	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/g)	Nuclide MDA (pCi/g)	Activity (pCi/g)	Dec. Leve (pCi/g)
+	PB-214	89.78	0.82	1.020E+004	3.65E+002	-7.165E+003	4.957E+00
		241.99*	7.25	1.253E+003		1.507E+003	6.019E+00
		258.76	0.53	2.099E+004		-1.105E+004	1.014E+00
		295.22*	18.42	5.733E+002		1.268E+003	2.756E+00
		351.93*	35.60	3.648E+002		1.096E+003	1.760E+00
		785.96	1.06	1.092E+004		-4.866E+003	5.102E+00
		839.07	0.58	2.284E+004		6.082E+003	1.074E+00
+	Ra-226	81.07	0.20	3.935E+004	2.46E+003	-1.802E+003	1.909E+00
		83.79	0.32	2.792E+004		1.558E+004	1.361E+00
		186.21*	3.64	2.462E+003		2.675E+003	1.189E+00
	AC-228	89.96	1.90	4.547E+003	6.04E+002	-5.670E+003	2.213E+00
		93.35	3.10	2.722E+003		-1.089E+003	1.323E+00
		99.51	1.26	6.942E+003		5.334E+003	3.378E+00
		105.60	0.74	1.268E+004		4.408E+003	6.179E+00
		129.07	2.42	4.235E+003		-2.234E+003	2.065E+00
		153.98	0.72	1.549E+004		4.734E+003	7.553E+00
		209.25	3.89	3.089E+003		0.000E+000	1.503E+00
		214.85	0.76	1.561E+004		2.213E+002	7.589E+00
		270.24	3.46	3.257E+003		0.000E+000	1.574E+00
		328.00	2.95	3.972E+003		2.704E+003	1.913E+00
		338.32	11.27	1.129E+003		6.930E+002	5.452E+00
		409.46	1.92	5.929E+003		-1.637E+003	2.837E+00
		463.00	4.40	2.571E+003		8.672E+002	1.225E+00
		562.50	0.87	1.340E+004		4.221E+003	6.355E+00
		674.75	2.10	5.522E+003		4.850E+002	2.600E+00
		726.86	0.62	2.004E+004		3.387E+003	9.446E+00
		755.32	1.00	1.097E+004		-7.457E+003	5.123E+00
		772.29	1.49	9.104E+003		4.004E+003	4.304E+00
		794.95	4.25	2.796E+003		7.478E+001	1.310E+00
		830.49	0.54	2.292E+004		1.665E+003	1.074E+00
		835.71	1.61	8.445E+003		4.715E+003	3.981E+00
		840.38	0.91	1.429E+004		7.830E+003	6.715E+00
		904.20	0.77	1.709E+004		-3.764E+004	8.016E+00
		911.20	25.80	6.040E+002		5.435E+002	2.861E+00
		964.77	4.99	2.946E+003		2.699E+003	1.387E+00
		968.97	15.80	8.822E+002		5.118E+002	4.140E+00
		1247.08	0.50	2.899E+004		-7.000E+004	1.348E+00
		1459.14	0.83	3.171E+004		7.173E+004	1.518E+00
		1495.91	0.86	1.133E+004		2.026E+003	4.997E+00
		1588.20	3.22	4.095E+003		-1.830E+003	1.862E+00
		1630.63	1.51	7.314E+003		1.267E+003	3.254E+00
	TH-230	67.67	0.38	1.873E+004	1.87E+004	8.910E+003	9.065E+00
	PA-234	742.81	0.11	1.135E+005	1.59E+004	1.523E+005	5.333E+00
		766.42	0.32	4.377E+004		8.935E+003	2.071E+00
		1001.03	0.84	1.587E+004		9.437E+003	7.410E+00
	TH-234	63.29	3.70	1.766E+003	1.77E+003	-1.053E+003	8.517E+00
		92.38	2.13	4.120E+003		6.899E+002	2.005E+00
		92.80	2.10	4.142E+003		9.064E+002	2.015E+00
		112.81	0.21	4.662E+004		-1.876E+004	2.272E+00
	U-234	53.20	0.12	4.905E+004	4.91E+004	9.204E+003	2.354E+00
		120.90	0.04	2.891E+005		-4.009E+004	1.410E+00

Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/g)	Nuclide MDA (pCi/g)	Activity (pCi/g)	Dec. Leve (pCi/g
U-235	89.96	3.43	2.554E+003	1.01E+003	-3.184E+003	1.243E+00
	93.35	5.54	1.544E+003		-6.177E+002	7.508E+00
	104.82	0.69	1.347E+004		-1.879E+004	6.560E+00
	105.60	1.31	7.262E+003		2.525E+003	3.539E+00
	108.58	0.50	1.974E+004		1.139E+004	9.628E+00
	109.19	1.66	5.913E+003		-5.440E+002	2.883E+00
	143.76	10.96	1.012E+003		3.440E+001	4.936E+00
	163.36	5.08	2.204E+003		-2.109E+003	1.074E+00
	194.94	0.63	1.963E+004		1.171E+004	9.565E+00
	202.12	1.08	1.137E+004		3.978E+003	5.533E+00
	205.32	5.02	2.435E+003		3.129E+002	1.185E+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

*** LINE ACTIVITY CONSISTENCY EVALUATOR ***

=====
Analysis using Key Line Activities
=====

Filename: C:\GENIE2K\CAMFILES\UNC 2017\INSITU\3H Vault.CNF

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/g)	Activity %Uncert*	Ratio[%Uncert]	A	B [uncert]
-----	-----	-----	-----	-----	-----	-----
PB-214	77.1	8.78E+002	18.382	0.801[46.992]	-1.19	0.228
	242.0	1.51E+003	61.312	1.376[75.030]		[0.442]
	295.2	1.27E+003	53.541	1.157[68.826]		
	351.9 ^	1.10E+003	43.248	1.000[61.161]		
Ra-226	186.2 ^	2.68E+003	32.041			