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REC-103 10/15 AM 09:08

August 3, 2015

Mr. Marc Ferdas
Decommissioning And Technical Support Branch Chief, Region I
US Nuclear Regulatory Commission
2100 Renaissance Blvd, Suite 100
King of Prussia, PA 19406-2713

Docket Number NRC-0000-1501-1626

Mr. Ferdas,

Thank you for your time in our July 17, 2015 call between the Connecticut Department of Energy and Environmental Protection (henceforth, the Agency) and the Nuclear Regulatory Commission (NRC) Regional representatives to discuss the state's concerns with the radiological remediation of the former naval nuclear program fuel manufacturing site at 79 Shelton Avenue in New Haven, CT [United Nuclear Corp New Haven (UNC NH), license number SNM-386, docket no. 70-371].

I recognize that the Department of Energy (DOE) has primary responsibility for site's remediation and that the NRC provides oversight. The State of Connecticut, however, maintains a very serious interest in radiological matters that could affect the health and safety of the public and the natural resources of the state. The Agency has a broad statutory charge to ensure that the state's citizens and natural resources, particularly surface water resources, are fully protected from any potential contamination of radioisotopes from release from both current and former nuclear facilities in or near Connecticut. In addition, the Agency is committed to maintain independence and transparency of the regulatory oversight process and to the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the implementation and enforcement of environmental laws, regulations, and policies.

As we discussed on the phone, the Agency remains concerned that the radiological contamination at the UNC NH site has not been fully characterized. Until an adequate and complete characterization is performed, the Agency believes that adequate remediation cannot be accomplished and that risk remains for release of radiological contamination to the environment. After reviewing the current characterization and remediation of the site, the Agency is specifically concerned that:

1. The Oak Ridge Associated Universities (ORAU), operating under the Oak Ridge Institute for Science and Education (ORISE), report that you referenced ("Independent Confirmatory Survey Results For The Utility Trench Characterization, United Nuclear Corporation Naval Products Site, New Haven, Connecticut," April 2015) provides independent confirmatory investigations and analysis *only* of the soils beneath the utility trenches.
2. Site survey maps indicate "Hot Waste Processing," "Met Lab," and other radiological controlled areas were located in the basements of the buildings 9H, 10H, and 11H (Figure 1). The

foundations of these buildings remain and appear to have been filled in (Figure 2). The Agency is not aware of any radiological survey that properly characterized these basement areas.

3. The facility appears to have ventilation ducting in the processing areas of building 3H that is of the type typically used for isolated radiological work (i.e. "hot box" or "glove bag") (Figure 3). The Agency is not aware of any record of a radiological survey or assessment of this ventilation ducting. The Agency believes that a complete characterization should determine the degree of radiological contamination of the ventilation system.
4. The entire floor surface has not been scanned due to debris that has not been moved and room access that has been sealed. Debris and equipment storage has not been removed to systematically survey the floor surface of buildings 3H and 6H (Figure 4). Portions of the facility have been closed off by building modifications to prevent trespass into previously unsecured areas (Figure 5). The Agency is concerned that these areas are not accessible for survey and characterization. In 2012, the Agency conducted limited in situ radiation measurements and identified a localized area of concern in an unrestricted area. A concrete core bore was taken and sent for laboratory radiological analysis (Figure 6). This gamma spectrum analysis indicated that the average residual total uranium concentration $\left(\frac{1.06 \times 10^7 \text{ pCi}}{3539.2 \text{ g}} = 3000 \frac{\text{pCi}}{\text{g}}\right)$ of this core bore was more than six times the derived concentration guideline of 435 picoCuries per gram (pCi/g) required to comply with the state of Connecticut's 19 millirem per year site release criterion (Enclosure 1). Based upon our limited independent survey and analysis, the Agency is concerned that undetected contamination (i.e. "hot spots") may remain.

Given the proximity of the site to residential housing in the City of New Haven, it is self-evident that the Agency will need to be promptly informed of the NRC's response to items 1 through 4 above. This level of communication between relevant government agencies will measurably enhance our efforts to keep all members of the public safe and informed, as well as to preserve and protect the state's important natural resources and environment.

I appreciate this opportunity to express the public safety and environmental interests of the state. I look forward to your response.

Sincerely,



Jeff Semancik

Radiation Division Director, Bureau of Air Management
Department of Energy and Environmental Protection

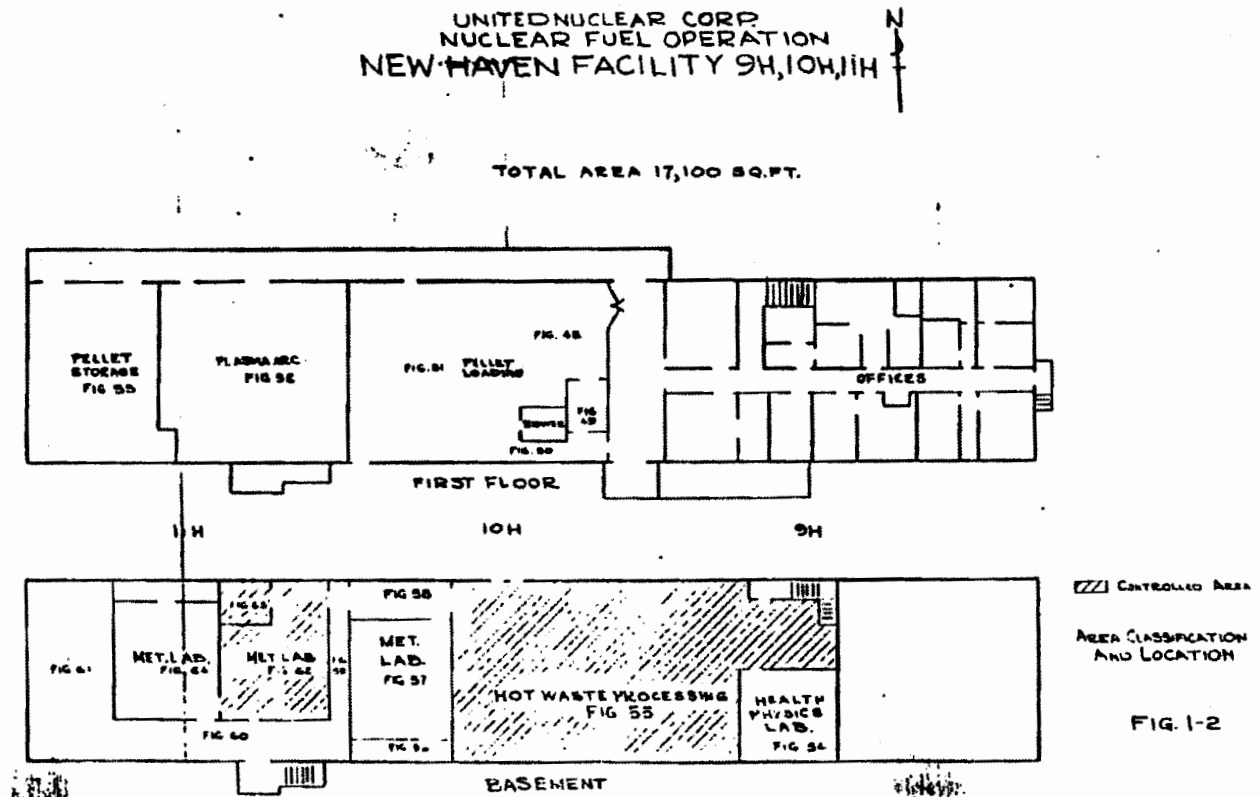


Figure 1
Site Map of Buildings 9H, 10H, and 11H



Figure 2
Photographs of Footings for Buildings 9H, 10H, and 11H

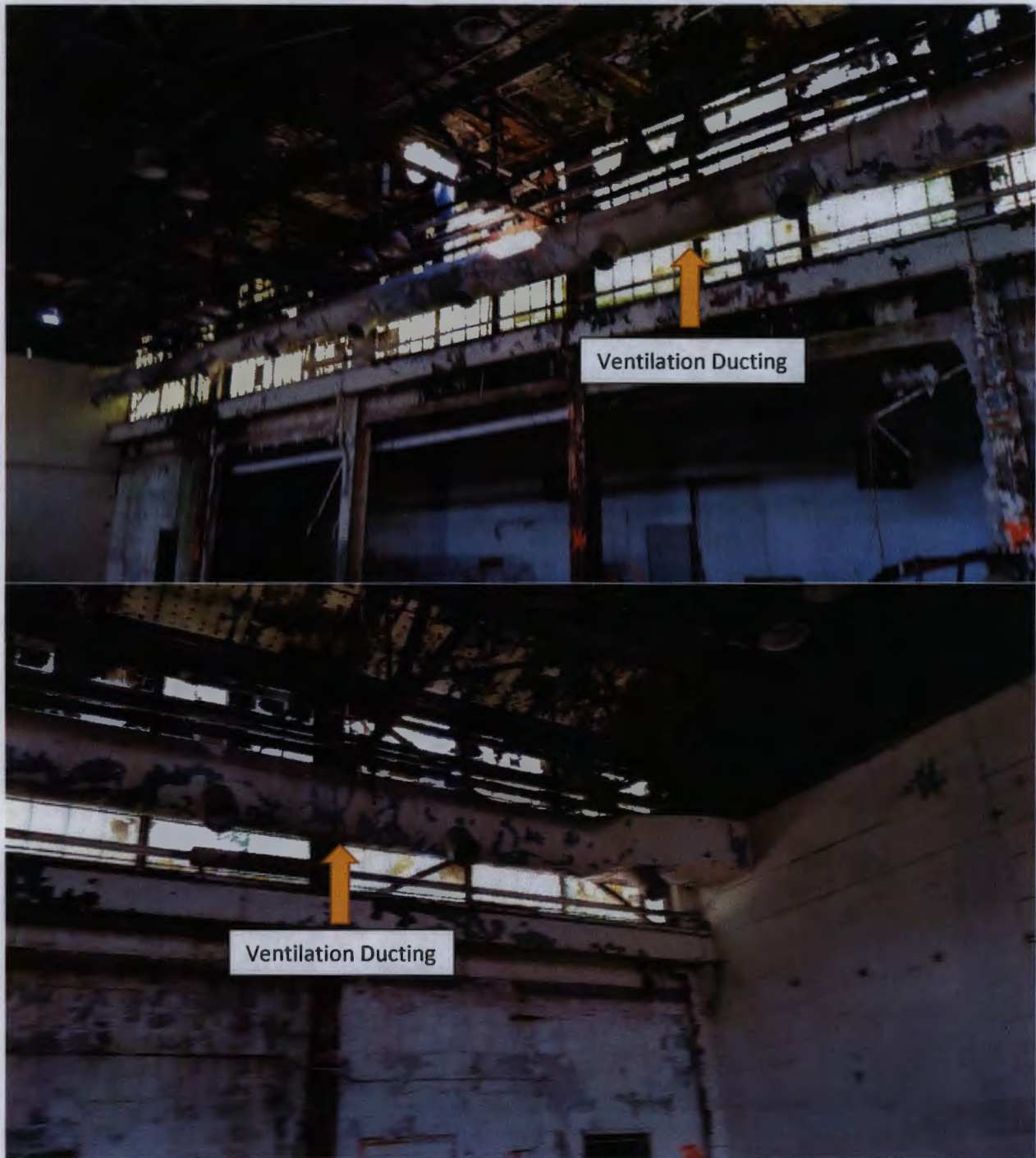


Figure 3
Duct Work



Figure 4
Debris Interference

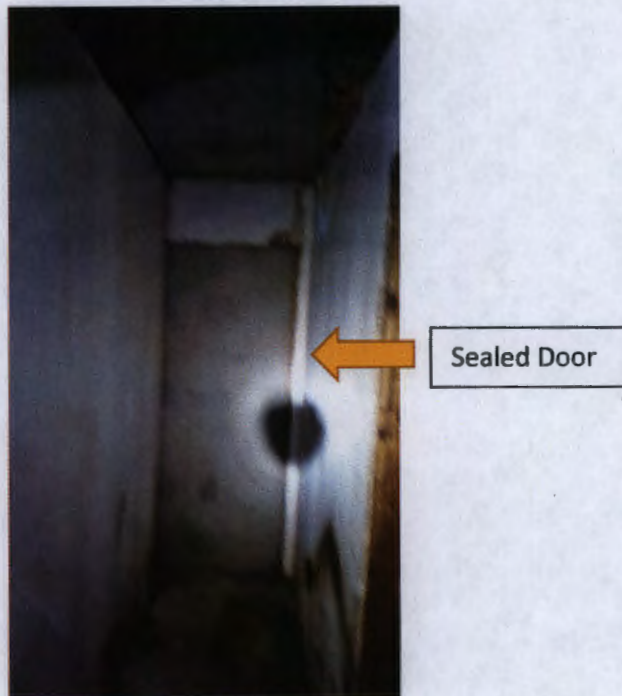


Figure 5
Sealed Door



Figure 6
Core Bore Location

Enclosure 1 to Letter to NRC, Mr. Marc Ferdas
Docket No. NRC-0000-501-1626
July 24, 2015

Estimate of Total Uranium Activity on Concrete Spot Removed From Former
United Nuclear Corporation Manufacturing Facility, New Haven, CT

ESTIMATE of TOTAL URANIUM ACTIVITY ON CONCRETE SPOT REMOVED FROM FORMER UNITED
NUCLEAR CORPORATION MANUFACTURING FACILITY, NEW HAVEN CT

The Connecticut Department of Energy and Environmental Protection (DEEP) identified a spot of radioactivity on the floor of the former United Nuclear Corporation during July 18-19, 2012. The spot was removed on July 24, 2012 by core boring equipment and counted with an In-Situ Object Counting System (ISOCS) gamma spectroscopy system and a Ludlum 43-93 alpha-beta scintillator counting equipment. Survey results and pictures of the concrete plug are shown in Attachment A.

Based on Investigative Survey RWP# 10-1007.00 and Survey# 381-2, dated Aug 2, 2012 with a Ludlum 2224-1 ratemeter and 43-93 probe the spot has alpha activity in excess of background contamination measured as 32,060 dpm/100 cm². The subject uranium activity was limited to the top surface of the 5.75 inch diameter concrete core plug. The area presented by the contaminated area for this evaluation was estimated as a 6 inch-wide circle.

The concrete plug was analyzed using Genie2000 spectroscopy software. Efficiency of the counting geometry was obtained using ISOCS software and assuming a uniform contamination concentration over the surface of the concrete disk with dimensions of 6 inches diameter and a 0.0001 mm thickness. The ISOCS gamma spectrum analysis (Attachment B) includes an interference corrected report, a portion of which is shown below. Information from that report and calculated isotopic activity percentages and uranium mass are shown in Table 1:

TABLE 1

ISOTOPE	Wt MEAN ACTIVITY, pCi	ACTIVITY PERCENT	TOTAL MASS, mg
Uranium 234	1.03E+7	97.00	1.65
Uranium 235	3.16E+5	2.98	146
Uranium 238	4.14E+3*	0.039	12.3
Total	1.06E+7	~1.000	~160

*U-238 not identified in Wt Mean Activity Report due to low value less than MDA; MDA used as a measure of the U-238 present

The individual uranium activity percent shown in Table 1 agrees well with like values of uranium described in a June 23, 2008 document from Robert Bonito to Raymond K. Larson, U.S. Nuclear Regulatory Commission. The attached report to that document, *"Derived Concentration Guideline Levels for Decommissioning the Former UNC Manufacturing Facility"*, provides the expected relative alpha activity presented by the uranium isotopes at the site as:

ISOTOPE	UNIT ACTIVITY, pCi/g	ACTIVITY PERCENT
Uranium 234	1	95.7
Uranium 235	0.037	3.5
Uranium 238	0.0085	0.8

Based on the information in this evaluation, the surficial uranium activity concentration on the removed concrete plug is estimated to be approximately 10 microcuries of total high enriched uranium. The mass of this uranium is approximately 160 mg. The uranium is associated with previous facility operations. The concrete plug was disposed with other similar waste contaminated with uranium at a facility licensed to receive this material.

ATTACHMENT A

SURVEY# 381-2

Location: New Haven, CT
Site: Former UNC Manufacturing Facility

RWP#	10-1007.00
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Survey Type: Investigative

pg. 1 of 1

CPM/100 cm ²					
Static			Smear		
No.	α	β	No.	α	β
1	6572.0	7352.0	1	300.0	91.0
2	12.0	1424.0	2	0.0	40.0
3	58.0	1266.0	3	7.0	48.0
4	20.0	1331.0	4	1.0	61.0
5			5		
6			6		
7			7		
8			8		
9			9		
10			10		
11			11		
12			12		

DPM/100 cm ²					
1	32059.5	23234.4	1	841.9	168.7
2	-2.9	191.7	2	-0.8	-53.0
3	42.0	88.7	3	18.8	-18.3
4	4.9	131.1	4	2.0	38.3
5			5		
6			6		
7			7		
8			8		
9			9		
10			10		
11			11		
12			12		



Top



Bottom



Side

Weight 3539.2 Grams

Comments	Surveyed By:	Date:	Instrument	Serial #	α Eff.	β Eff.	α Bkg.	β Bkg	γ Bkg	Cal. Due	Key	
Static # 1 = 1 minute count		02-Aug-12	2224-1/43-93	227246/PR24 4549	0.205	0.307	3.0	226	N/A	07-Sep-12		
Statics 2-4 = 5 minute count	Steve Devlin	02-Aug-12	3030/ 43-10-1	217611/PR23 2046	0.356	0.230	0.3	52.2	N/A	30-Apr-13	<input type="radio"/>	Smear
											<input type="radio"/>	Direct Reading CPM/direct frisk
	Reviewed By:	Date:									<input type="checkbox"/>	Dose Rate _____ /hr
	<i>H.W. Devlin</i>	<i>8/22/12</i>									<input type="checkbox"/>	Grab Sample

ATTACHMENT B

GAMMA SPECTRUM ANALYSIS

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

Filename: C:\GENIE2K\GE UNC PROJECT\CNF Files\UNC-INV-XY-062.CNF

Report Generated On : 8/22/2012 2:02:31 PM

Sample Title : UNC-INV-XY-062
Sample Description :
Sample Identification : UNC-INV-XY-062
Sample Type : 8566
Sample Geometry : DISK

Peak Locate Threshold : 3.00
Peak Locate Range (in channels) : 40 - 16384
Peak Area Range (in channels) : 40 - 16384
Identification Energy Tolerance : 1.500 FWHM

Sample Size : 1.000E+000

Sample Taken On :
Acquisition Started : 7/31/2012 11:26:02 AM

Live Time : 3600.0 seconds
Real Time : 3745.8 seconds

Dead Time : 3.89 %

Energy Calibration Used Done On : 7/18/2012
Efficiency Calibration Used Done On : 7/31/2012
Efficiency ID : UNC-INV-XY-62

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

Detector Name: 8566DSA

Sample Title: UNC-INV-XY-062

Peak Locate Performed on: 8/22/2012 2:02:24 PM

Peak Locate From Channel: 40

Peak Locate To Channel: 16384

Peak Search Sensitivity: 3.00

Peak No.	Centroid Channel	Centroid Uncertainty	Energy (keV)	Peak Significance
1	51.31	0.0562	6.23	98.00
2	79.65	0.1088	9.44	31.32
3	104.53	0.0320	12.96	259.17
4	130.12	0.0278	16.11	362.54
5	152.50	0.0415	18.94	164.47
6	205.77	0.0371	25.60	200.75
7	253.51	0.2946	31.57	3.42
8	312.62	0.2163	38.97	5.76
9	339.84	0.1661	42.37	5.56
10	426.64	0.0349	53.23	202.62
11	469.26	0.0717	58.56	49.71
12	509.91	0.2813	63.64	3.28
13	582.72	0.0758	72.76	43.38
14	599.87	0.0743	74.88	43.19
15	618.33	0.2652	77.06	3.05
16	650.25	0.0614	81.27	67.78
17	674.30	0.0288	84.20	278.26
18	720.06	0.0342	89.93	189.53
19	747.20	0.0341	93.31	194.95
20	758.58	0.4049	94.59	3.55
21	767.83	0.0688	95.85	53.02
22	787.76	0.0576	98.42	68.07
23	818.49	0.0681	102.24	48.85
24	844.71	0.0581	105.41	58.21
25	873.30	0.0467	109.02	93.68
26	891.14	0.1060	111.36	20.17
27	916.78	0.1733	114.32	6.49
28	967.30	0.0459	120.85	102.75
29	1000.23	0.1415	124.96	10.22
30	1071.01	0.2050	133.86	5.21
31	1085.21	0.1416	135.61	10.73
32	1125.93	0.0790	140.67	34.40
33	1149.98	0.0232	143.69	376.95
34	1167.38	0.2770	145.73	4.92
35	1207.63	0.1396	150.90	10.19
36	1253.43	0.1390	156.61	10.10
37	1278.09	0.1313	159.70	11.94
38	1306.38	0.0277	163.26	248.01
39	1392.55	0.1897	174.05	6.30
40	1406.89	0.1972	175.74	4.83
41	1435.85	0.1564	179.41	7.06

Peak No.	Centroid Channel	Centroid Uncertainty	Energy (keV)	Peak Significance
42	1460.15	0.0668	182.53	39.65
43	1485.03	0.0153	185.60	812.02
44	1509.22	0.1564	188.48	8.02
45	1532.94	0.1796	191.53	4.91
46	1558.67	0.0478	194.81	80.69
47	1588.88	0.0697	198.59	36.38
48	1615.75	0.0440	201.93	92.97
49	1641.57	0.0280	205.18	230.40
50	1688.47	0.2198	211.08	3.15
51	1720.89	0.1467	215.08	7.96
52	1742.61	0.1097	217.81	13.03
53	1770.10	0.0752	221.25	31.69
54	1867.63	0.0955	233.44	18.59
55	1894.67	0.1343	236.86	13.25
56	1908.08	0.0874	238.47	25.79
57	1925.99	0.0893	240.76	22.44
58	1973.45	0.1090	246.69	14.96
59	1992.43	0.1929	248.98	4.52
60	2050.47	0.1757	256.34	5.69
61	2083.17	0.2382	260.30	3.36
62	2155.37	0.1730	269.44	5.58
63	2203.31	0.0697	275.44	33.51
64	2230.68	0.0615	278.86	42.79
65	2328.51	0.0940	290.97	15.62
66	2356.93	0.1142	294.60	7.33
67	2399.53	0.1841	299.69	5.98
68	2484.05	0.2119	310.54	4.36
69	2607.70	0.1544	326.06	6.93
70	2633.42	0.1531	329.22	6.98
71	2690.22	0.1807	336.40	5.80
72	2704.90	0.1664	338.13	7.27
73	2764.47	0.0847	345.61	21.26
74	2789.55	0.1803	348.76	5.72
75	2812.08	0.1241	351.52	10.01
76	2943.16	0.0922	367.97	18.11
77	2967.39	0.1067	371.00	12.78
78	3099.59	0.0653	387.52	34.84
79	3123.81	0.1913	390.42	3.88
80	3457.66	0.2097	432.31	3.12
81	3700.66	0.2110	462.70	3.29
82	4082.24	0.1469	510.43	5.77
83	4661.37	0.0973	582.86	13.04
84	4868.88	0.1180	608.81	8.32
85	5812.08	0.1414	726.77	5.95
86	6879.45	0.1655	860.27	4.08
87	7283.73	0.1173	910.83	7.58
88	7714.46	0.1628	964.62	4.06
89	7745.82	0.1365	968.64	4.61
90	8956.07	0.1632	1119.99	3.17
91	11680.89	0.0733	1460.78	15.01

Peak No.	Centroid Channel	Centroid Uncertainty	Energy (keV)	Peak Significance
92	14114.64	0.1489	1765.16	3.53

? = Adjacent peak noted

Errors quoted at 1.960 sigma

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

Detector Name: 8566DSA

Sample Title: UNC-INV-XY-062

Peak Analysis Performed on: 8/22/2012 2:02:25 PM

Peak Analysis From Channel: 40

Peak Analysis To Channel: 16384

	Peak No.	ROI start	ROI end	Peak centroid	Energy (keV)	FWHM (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
M	1	34-	138	50.89	6.23	0.72	1.31E+005	855.32	9.75E+004
m	2	34-	138	76.52	9.44	0.74	9.20E+003	491.02	1.03E+005
m	3	34-	138	104.66	12.96	0.76	4.66E+005	1509.40	1.04E+005
m	4	34-	138	129.85	16.11	0.78	1.30E+006	2317.08	1.07E+005
	5	145-	160	152.50	18.94	0.76	2.92E+005	1356.81	7.95E+004
	6	197-	214	205.77	25.60	0.61	1.64E+005	938.92	2.85E+004
	7	236-	262	253.51	31.57	0.49	6.73E+002	666.24	3.92E+004
	8	303-	322	312.62	38.97	0.61	8.36E+002	470.84	2.34E+004
	9	330-	365	339.84	42.37	1.26	5.15E+003	824.51	4.77E+004
	10	416-	436	426.64	53.23	0.65	1.43E+005	914.61	3.23E+004
	11	458-	478	469.26	58.56	0.65	1.58E+004	634.26	3.83E+004
	12	499-	514	509.91	63.64	0.13	6.97E+002	569.99	4.14E+004
M	13	571-	629	582.81	72.76	0.82	1.99E+004	509.65	7.43E+004
m	14	571-	629	599.76	74.88	0.83	2.17E+004	516.05	7.18E+004
m	15	571-	629	617.21	77.06	0.83	3.15E+003	390.47	6.95E+004
M	16	639-	799	650.89	81.27	0.73	4.07E+004	578.95	5.81E+004
m	17	639-	799	674.31	84.20	0.74	1.41E+005	1023.58	6.04E+004
m	18	639-	799	720.08	89.93	0.75	3.13E+004	416.77	5.92E+004
m	19	639-	799	747.11	93.31	0.75	1.93E+005	1015.12	5.83E+004
m	20	639-	799	757.40	94.59	0.76	1.79E+004	362.55	5.78E+004
m	21	639-	799	767.43	95.85	0.76	1.95E+004	349.48	5.76E+004
m	22	639-	799	787.99	98.42	0.77	3.82E+004	563.32	6.03E+004
M	23	808-	947	818.50	102.24	1.37	1.83E+004	542.88	8.25E+004
m	24	808-	947	843.87	105.41	1.37	6.57E+004	710.92	1.06E+005
m	25	808-	947	872.72	109.02	1.38	1.17E+005	868.57	1.09E+005
m	26	808-	947	891.42	111.36	1.38	3.44E+004	609.58	1.15E+005
m	27	808-	947	915.16	114.32	1.39	1.96E+004	563.38	1.14E+005
	28	955-	979	967.30	120.85	0.76	4.97E+004	954.76	7.84E+004
	29	991-	1012	1000.23	124.96	0.87	3.67E+003	688.21	5.68E+004
M	30	1063-	1098	1071.34	133.86	0.84	1.27E+003	294.00	3.51E+004
m	31	1063-	1098	1085.36	135.61	0.85	2.93E+003	331.10	3.61E+004
M	32	1115-	1180	1125.84	140.67	0.77	7.25E+003	302.52	3.07E+004
m	33	1115-	1180	1149.99	143.69	0.77	3.93E+005	1266.21	2.65E+004
m	34	1115-	1180	1166.30	145.73	0.78	1.71E+003	227.71	2.27E+004
	35	1200-	1221	1207.63	150.90	0.81	1.65E+003	442.61	2.34E+004
M	36	1246-	1319	1253.27	156.61	0.79	1.44E+003	211.49	1.64E+004
m	37	1246-	1319	1277.94	159.70	0.80	1.59E+003	208.08	1.88E+004
m	38	1246-	1319	1306.39	163.26	0.80	1.71E+005	845.12	1.68E+004
M	39	1378-	1656	1392.69	174.05	0.81	8.33E+002	74.22	1.30E+004
m	40	1378-	1656	1406.19	175.74	0.81	6.74E+002	73.82	1.23E+004
m	41	1378-	1656	1435.59	179.41	0.82	5.27E+002	73.78	1.29E+004
m	42	1378-	1656	1460.52	182.53	0.82	9.98E+003	93.10	1.27E+004

	Peak No.	ROI start	ROI end	Peak centroid	Energy (keV)	FWHM (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
m	43	1378-	1656	1485.02	185.60	0.83	1.75E+006	3072.25	7.43E+003
m	44	1378-	1656	1508.08	188.48	0.83	1.02E+003	57.25	2.91E+003
m	45	1378-	1656	1532.46	191.53	0.84	4.21E+002	53.54	2.89E+003
m	46	1378-	1656	1558.70	194.81	0.84	1.86E+004	101.80	2.82E+003
m	47	1378-	1656	1588.94	198.59	0.85	5.26E+003	74.70	2.86E+003
m	48	1378-	1656	1615.64	201.93	0.85	2.77E+004	116.32	2.61E+003
m	49	1378-	1656	1641.58	205.18	0.86	1.43E+005	292.15	2.13E+003
M	50	1681-	1782	1688.77	211.08	0.88	1.42E+002	63.98	1.51E+003
m	51	1681-	1782	1720.79	215.08	0.88	6.35E+002	82.34	1.68E+003
m	52	1681-	1782	1742.56	217.81	0.88	1.17E+003	92.77	1.69E+003
m	53	1681-	1782	1770.09	221.25	0.89	3.17E+003	128.65	1.51E+003
M	54	1854-	1940	1867.59	233.44	0.92	1.45E+003	92.08	1.17E+003
m	55	1854-	1940	1894.89	236.86	0.93	1.46E+003	92.47	1.18E+003
m	56	1854-	1940	1907.81	238.47	0.93	2.47E+003	112.98	1.10E+003
m	57	1854-	1940	1926.05	240.76	0.93	1.85E+003	99.43	1.10E+003
M	58	1962-	2006	1973.48	246.69	0.91	9.32E+002	83.70	1.17E+003
m	59	1962-	2006	1991.80	248.98	0.91	2.49E+002	60.77	1.31E+003
M	60	2038-	2093	2050.70	256.34	1.00	3.29E+002	74.67	1.53E+003
m	61	2038-	2093	2082.28	260.30	1.01	1.43E+002	60.16	1.34E+003
	62	2146-	2166	2155.37	269.44	0.89	3.10E+002	98.37	1.18E+003
M	63	2187-	2246	2203.34	275.44	1.00	3.88E+003	135.66	1.28E+003
m	64	2187-	2246	2230.69	278.86	1.00	5.87E+003	160.47	1.07E+003
M	65	2312-	2407	2327.56	290.97	1.55	2.59E+003	118.19	1.26E+003
m	66	2312-	2407	2356.60	294.60	1.56	1.23E+003	89.89	1.38E+003
m	67	2312-	2407	2397.27	299.69	1.56	2.19E+002	59.78	1.05E+003
	68	2474-	2492	2484.05	310.54	0.37	1.09E+002	63.62	5.45E+002
M	69	2598-	2645	2608.14	326.06	1.12	2.51E+002	47.42	4.56E+002
m	70	2598-	2645	2633.36	329.22	1.12	3.15E+002	49.75	4.60E+002
M	71	2680-	2716	2690.81	336.40	0.81	1.59E+002	38.11	3.44E+002
m	72	2680-	2716	2704.62	338.13	0.81	1.88E+002	39.02	3.25E+002
M	73	2752-	2825	2764.45	345.61	1.00	1.29E+003	77.67	3.26E+002
m	74	2752-	2825	2789.58	348.76	1.00	1.34E+002	34.37	3.03E+002
m	75	2752-	2825	2811.70	351.52	1.01	4.42E+002	49.03	2.90E+002
M	76	2925-	2981	2943.23	367.97	1.05	9.51E+002	66.17	2.45E+002
m	77	2925-	2981	2967.44	371.00	1.06	5.87E+002	53.57	2.38E+002
M	78	3083-	3135	3099.53	387.52	1.05	3.19E+003	113.68	1.91E+002
m	79	3083-	3135	3122.71	390.42	1.05	1.23E+002	28.88	1.67E+002
	80	3449-	3468	3457.66	432.31	0.54	7.91E+001	34.79	1.37E+002
	81	3693-	3710	3700.66	462.70	0.40	5.72E+001	28.80	9.88E+001
	82	4069-	4096	4082.24	510.43	1.24	2.33E+002	44.60	1.47E+002
	83	4647-	4678	4661.37	582.86	1.38	6.06E+002	57.42	1.26E+002
	84	4856-	4887	4868.88	608.81	1.36	3.33E+002	45.35	1.00E+002
	85	5800-	5822	5812.08	726.77	0.23	1.24E+002	30.25	6.83E+001
	86	6870-	6889	6879.45	860.27	0.18	5.41E+001	22.30	4.79E+001
	87	7269-	7297	7283.73	910.83	0.60	2.09E+002	35.37	6.64E+001
M	88	7704-	7757	7713.81	964.62	1.56	5.03E+001	18.37	4.77E+001
m	89	7704-	7757	7745.95	968.64	1.56	1.14E+002	25.25	5.16E+001
	90	8946-	8967	8956.07	1119.99	0.16	7.51E+001	23.05	3.99E+001
	91	11657-	11706	11680.89	1460.78	1.75	1.08E+003	65.61	2.17E+001
	92	14101-	14128	14114.64	1765.16	0.25	5.32E+001	16.07	8.80E+000

Peak No.	ROI start	ROI end	Peak centroid	Energy (keV)	FWHM (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
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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 I D E N T I F I C A T I O N R E P O R T *****

Sample Title: UNC-INV-XY-062
 Nuclide Library Used: E:\GE-UNC-(SLDA based).NLB

..... IDENTIFIED NUCLIDES

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (pCi/)	Activity Uncertainty
K-40	1.000	1460.82*	10.66	7.30055E+003	7.64463E+002
Tl-208	0.997	510.77*	22.60	2.84698E+002	6.42246E+001
		583.19*	85.00	2.23961E+002	3.38680E+001
		860.56*	12.50	1.95512E+002	8.29141E+001
Pb-212	0.999	238.63*	43.60	7.29384E+002	1.20238E+002
		300.09*	3.30	1.06044E+003	3.35225E+002
Pb-214	0.960	241.99*	7.25	3.30862E+003	5.48606E+002
		258.86*	0.53	3.75344E+003	1.69044E+003
		274.80*	0.35	1.61190E+005	2.73828E+004
Ac-228	0.886	129.07	2.42		
		209.25	3.89		
		270.24*	3.46	1.29308E+003	4.60248E+002
		328.00*	2.95	1.88207E+003	4.37936E+002
		338.32*	11.27	3.02346E+002	7.79484E+001
		409.46	1.92		
		463.00*	4.40	3.25729E+002	1.69182E+002
		755.32	1.00		
		772.29	1.49		
		794.95	4.25		
		835.71	1.61		
		911.20*	25.80	3.84990E+002	7.48338E+001
		964.77*	4.99	5.05831E+002	1.90216E+002
		968.97*	15.80	3.63512E+002	8.58800E+001
U-232	0.590	57.78*	0.20	6.28489E+005	1.32025E+005
		129.08	0.07		
Pa-233	0.719	75.27*	1.32	1.29081E+005	2.61263E+004
		86.60 @	1.95		
		300.13* @	6.63	5.27822E+002	1.66645E+002
		311.90*	38.50	4.70322E+001	2.84008E+001
		340.48	4.45		
		415.76	1.73		
U-234	1.000	53.20* @	0.12	9.36229E+006	2.26979E+006
		120.90*	0.04	1.03386E+007	3.24985E+006
U-235	1.000	143.76*	10.96	3.14353E+005	6.21222E+004
		163.33*	5.08	3.17394E+005	5.93878E+004
		185.71*	57.20	3.15710E+005	5.37722E+004
		202.11* @	1.08	2.80913E+005	4.52272E+004
		205.31*	5.01	3.17171E+005	5.04893E+004

* = Energy line found in the spectrum.

@ = Energy line not used for Weighted Mean Activity

Energy Tolerance : 1.500 FWHM

Nuclide confidence index threshold = 0.30

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/)	Wt mean Activity Uncertainty
K-40	1.000	7.300555E+003	7.644633E+002
Tl-208	0.997	2.323648E+002	2.817509E+001
Pb-212	0.999	7.553319E+002	1.123839E+002
X Bi-214	0.988		
Pb-214	0.960	3.408305E+003	5.217193E+002
Ac-228	0.886	3.792726E+002	4.259183E+001
U-232	0.590	6.284893E+005	1.320248E+005
Pa-233 @	0.719	5.015247E+001	2.802504E+001
U-234 @	1.000	1.033862E+007	3.249846E+006
U-235 @	1.000	3.162557E+005	2.794224E+004

? = 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

***** UNIDENTIFIED PEAKS *****

Peak Locate Performed on: 8/22/2012 2:02:24 PM
 Peak Locate From Channel: 40
 Peak Locate To Channel: 16384

Peak No.	Energy (keV)	Peak Size in Counts per Second	Peak CPS % Uncertainty	Peak Type	Tol. Nuclide
M 1	6.23	3.6313E+001	0.65		
m 2	9.44	2.5546E+000	5.34		
m 3	12.96	1.2945E+002	0.32		
m 4	16.11	3.5997E+002	0.18		
5	18.94	8.1236E+001	0.46		
6	25.60	4.5665E+001	0.57		
7	31.57	1.8694E-001	99.00		
8	38.97	2.3235E-001	56.29		
9	42.37	1.4309E+000	16.01		
12	63.64	1.9357E-001	81.79		
M 13	72.76	5.5201E+000	2.56		
m 15	77.06	8.7366E-001	12.41		
M 16	81.27	1.1296E+001	1.42		
m 17	84.20	3.9119E+001	0.73		
m 18	89.93	8.6825E+000	1.33		
m 19	93.31	5.3604E+001	0.53		
m 20	94.59	4.9836E+000	2.02	Tol.	PU-241
m 21	95.85	5.4147E+000	1.79		
m 22	98.42	1.0616E+001	1.47		
M 23	102.24	5.0890E+000	2.96	Tol.	Th-229
m 24	105.41	1.8256E+001	1.08		
m 25	109.02	3.2405E+001	0.74		
m 26	111.36	9.5597E+000	1.77	Sum	
m 27	114.32	5.4455E+000	2.87		
29	124.96	1.0183E+000	18.77		
M 30	133.86	3.5321E-001	23.12	Sum	
m 31	135.61	8.1288E-001	11.31		
M 32	140.67	2.0127E+000	4.18		
m 34	145.73	4.7587E-001	13.29		
35	150.90	4.5771E-001	26.86		
M 36	156.61	4.0014E-001	14.68	Tol.	Th-229
m 37	159.70	4.4279E-001	13.05	Tol.	PU-240
M 39	174.05	2.3134E-001	8.91	Sum	
m 40	175.74	1.8715E-001	10.96		
m 41	179.41	1.4645E-001	14.00	Sum	
m 42	182.53	2.7726E+000	0.93		
m 44	188.48	2.8435E-001	5.59		
m 45	191.53	1.1702E-001	12.71		
m 46	194.81	5.1696E+000	0.55	Sum	
m 47	198.59	1.4625E+000	1.42		
M 50	211.08	3.9484E-002	45.01	Tol.	Th-229
m 51	215.08	1.7643E-001	12.96		
m 52	217.81	3.2562E-001	7.91	Sum	
m 53	221.25	8.7925E-001	4.06	Sum	
M 54	233.44	4.0180E-001	6.37		
m 55	236.86	4.0487E-001	6.34		

Peak No.	Energy (keV)	Peak Size in Counts per Second	Peak CPS % Uncertainty	Peak Type	Tol. Nuclide
M 58	246.69	2.5893E-001	8.98		
m 59	248.98	6.9195E-002	24.39		
M 60	256.34	9.1480E-002	22.67		
m 64	278.86	1.6309E+000	2.73		
M 65	290.97	7.2057E-001	4.56	Sum	
m 66	294.60	3.4065E-001	7.33	Sum	
M 69	326.06	6.9587E-002	18.93	Sum	
M 71	336.40	4.4036E-002	24.04		
M 73	345.61	3.5862E-001	6.02	Sum	
m 74	348.76	3.7355E-002	25.56	Sum	
m 75	351.52	1.2270E-001	11.10		
M 76	367.97	2.6413E-001	6.96	Sum	
m 77	371.00	1.6318E-001	9.12	Sum	
M 78	387.52	8.8514E-001	3.57	Sum	
m 79	390.42	3.4085E-002	23.54	Sum	
80	432.31	2.1964E-002	44.00	Sum	
84	608.81	9.2483E-002	13.62		
85	726.77	3.4372E-002	24.45	Sum	
90	1119.99	2.0856E-002	30.70	Sum	
92	1765.16	1.4777E-002	30.21		

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: 8566DSA
 Sample Geometry: DISK
 Sample Title: UNC-INV-XY-062
 Nuclide Library Used: E:\GE-UNC-(SLDA based).NLB

	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/)	Nuclide MDA (pCi/)	Activity (pCi/)	Dec. Leve (pCi/)
+	K-40	1460.82*	10.66	1.686E+002	1.69E+002	7.301E+003	7.513E+00
+	Tl-208	510.77*	22.60	7.131E+001	2.03E+001	2.847E+002	3.400E+00
		583.19*	85.00	2.034E+001		2.240E+002	9.671E+00
		860.56*	12.50	1.131E+002		1.955E+002	5.168E+00
	Bi-212	288.20	0.34	1.472E+004	6.86E+003	-4.910E+004	7.296E+00
		328.03	0.13	2.756E+004		8.320E+004	1.359E+00
		452.98	0.36	6.858E+003		6.053E+003	3.337E+00
+	Pb-212	238.63*	43.60	4.621E+001	4.62E+001	7.294E+002	2.271E+00
		300.09*	3.30	7.450E+002		1.060E+003	3.659E+00
	Bi-213	440.45	25.94	9.079E+001	9.08E+001	-2.155E+001	4.415E+00
	Bi-214	186.21*	3.64	1.142E+003	1.14E+003	4.961E+006	5.672E+00
		262.27	0.00	7.569E+005		-4.955E+005	3.746E+00
+	Pb-214	241.99*	7.25	2.810E+002	2.81E+002	3.309E+003	1.381E+00
		258.86*	0.53	4.562E+003		3.753E+003	2.245E+00
		274.80*	0.35	7.028E+003		1.612E+005	3.458E+00
+	Ac-228	129.07	2.42	5.139E+003	7.07E+001	-6.486E+003	2.565E+00
		209.25	3.89	1.412E+003		-3.741E+004	7.023E+00
		270.24*	3.46	6.571E+002		1.293E+003	3.229E+00
		328.00*	2.95	6.129E+002		1.882E+003	2.984E+00
		338.32*	11.27	1.392E+002		3.023E+002	6.743E+00
		409.46	1.92	1.234E+003		7.990E+002	6.017E+00
		463.00*	4.40	2.513E+002		3.257E+002	1.179E+00
		755.32	1.00	2.981E+003		-5.541E+001	1.436E+00
		772.29	1.49	2.095E+003		6.234E+002	1.010E+00
		794.95	4.25	7.783E+002		5.275E+002	3.757E+00
		835.71	1.61	2.094E+003		1.847E+003	1.010E+00
		911.20*	25.80	7.069E+001		3.850E+002	3.285E+00
		964.77*	4.99	3.501E+002		5.058E+002	1.615E+00
		968.97*	15.80	1.151E+002		3.635E+002	5.326E+00
	Th-229	85.43	14.70	1.546E+003	7.79E+002	1.289E+005	7.725E+00
		88.47	23.90	7.794E+002		3.148E+004	3.892E+00
		99.43	2.93	5.099E+003		-1.442E+004	2.546E+00
		100.13	5.61	2.751E+003		-7.535E+003	1.374E+00
		102.50	2.28	6.432E+003		-1.867E+004	3.211E+00
		136.99	1.18	9.707E+003		-1.600E+004	4.843E+00
		156.41	1.19	7.883E+003		-7.718E+003	3.931E+00
		193.52	4.41	1.813E+003		4.028E+004	9.034E+00
		210.85	2.80	1.277E+003		-1.122E+004	6.330E+00
+	U-232	57.78*	0.20	3.919E+004	3.92E+004	6.285E+005	1.954E+00
		129.08	0.07	1.824E+005		-2.302E+005	9.101E+00
+	Pa-233	75.27*	1.32	7.436E+003	4.48E+001	1.291E+005	3.710E+00
		86.60	1.95	1.073E+004		-1.046E+006	5.361E+00

	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/)	Nuclide MDA (pCi/)	Activity (pCi/)	Dec. Leve (pCi/)
+	Pa-233	300.13*	6.63	3.708E+002	4.48E+001	5.278E+002	1.821E+00
		311.90*	38.50	4.477E+001		4.703E+001	2.180E+00
		340.48	4.45	6.786E+002		-4.359E+003	3.337E+00
		415.76	1.73	1.273E+003		-8.722E+002	6.187E+00
	Pa-234	258.23	0.08	5.309E+004	4.14E+003	9.283E+004	2.630E+00
		766.42	0.32	1.006E+004		3.296E+003	4.855E+00
		1001.03	0.84	4.138E+003		1.730E+003	1.986E+00
+	U-234	53.20*	0.12	5.906E+004	5.91E+004	9.362E+006	2.944E+00
		120.90*	0.04	2.969E+005		1.034E+007	1.482E+00
+	U-235	143.76*	10.96	6.074E+002	7.27E+001	3.144E+005	3.026E+00
		163.33*	5.08	1.123E+003		3.174E+005	5.592E+00
		185.71*	57.20	7.268E+001		3.157E+005	3.609E+00
		202.11*	1.08	2.439E+003		2.809E+005	1.206E+00
		205.31*	5.01	4.821E+002		3.172E+005	2.380E+00
	PU-238	43.50	0.04	2.222E+005	2.22E+005	1.059E+006	1.108E+00
		152.72	0.00	1.031E+007		-1.083E+007	5.142E+00
	PU-239	129.30	0.01	1.967E+006	1.55E+006	-2.620E+006	9.816E+00
		203.55	0.00	3.808E+007		3.226E+009	1.901E+00
		375.05	0.00	1.965E+006		-5.831E+006	9.651E+00
		413.71	0.00	1.547E+006		-7.192E+005	7.527E+00
	PU-240	45.24	0.04	1.938E+005	1.94E+005	1.473E+004	9.663E+00
		160.31	0.00	4.311E+007		1.148E+009	2.153E+00
	AM-241	59.54	35.90	3.064E+002	3.06E+002	-1.190E+003	1.529E+00
	PU-241	94.65	0.00	7.041E+007	9.33E+002	5.043E+009	3.517E+00
		111.30	0.00	1.735E+008		5.342E+009	8.667E+00
		148.57	0.00	5.231E+007		-7.788E+007	2.609E+00
		208.00	21.20	9.329E+002		-6.826E+003	4.657E+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\GE UNC PROJECT\CNF Files\UNC-INV-XY-062.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 1.00 sigma

Nuclide	Energy (keV)	Activity (pCi/)	Activity %Uncert*	Ratio[%Uncert]	A	B [uncert]
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K-40	1460.8	7.30E+003	*****			
Tl-208	510.8	2.85E+002	*****			
	583.2	2.24E+002	*****			
	860.6	1.96E+002	*****			
Pb-212	238.6 ^	7.29E+002	8.411	1.000[11.894]	-8.94	1.633
	300.1	1.06E+003	16.128	1.454[18.190]		[0.948]
Pb-214	242.0 ^	3.31E+003	8.460	1.000[11.964]	-166.	30.332
	258.9	3.75E+003	22.978	1.134[24.486]		[1.339]
	274.8	1.61E+005	8.667	48.718[12.112]		
Ac-228	270.2	1.29E+003	18.160	3.359[20.691]	5.13	-0.752
	328.0	1.88E+003	11.872	4.889[15.469]		[0.124]
	338.3	3.02E+002	13.154	0.785[16.473]		
	463.0	3.26E+002	26.500	0.846[28.295]		
	911.2 ^	3.85E+002	9.917	1.000[14.025]		
	964.8	5.06E+002	19.186	1.314[21.598]		
	969.0	3.64E+002	12.054	0.944[15.609]		
U-232	57.8	6.28E+005	*****			
Pa-233	75.3	1.29E+005	10.327	2744.5[32.494]	27.95	-4.632
	300.1	5.28E+002	16.108	11.223[34.766]		[0.303]
	311.9 ^	4.70E+001	30.809	1.000[43.571]		
U-234	53.2	9.36E+006	12.369	0.906[20.254]	-0.58	0.121
	120.9 ^	1.03E+007	16.038	1.000[22.681]		[0.370]
U-235	143.8 ^	3.14E+005	10.083	1.000[14.259]	0.77	-0.151
	163.3	3.17E+005	9.546	1.010[13.885]		[0.454]
	185.7	3.16E+005	8.690	1.004[13.311]		
	202.1	2.81E+005	8.214	0.894[13.005]		
	205.3	3.17E+005	8.122	1.009[12.947]		