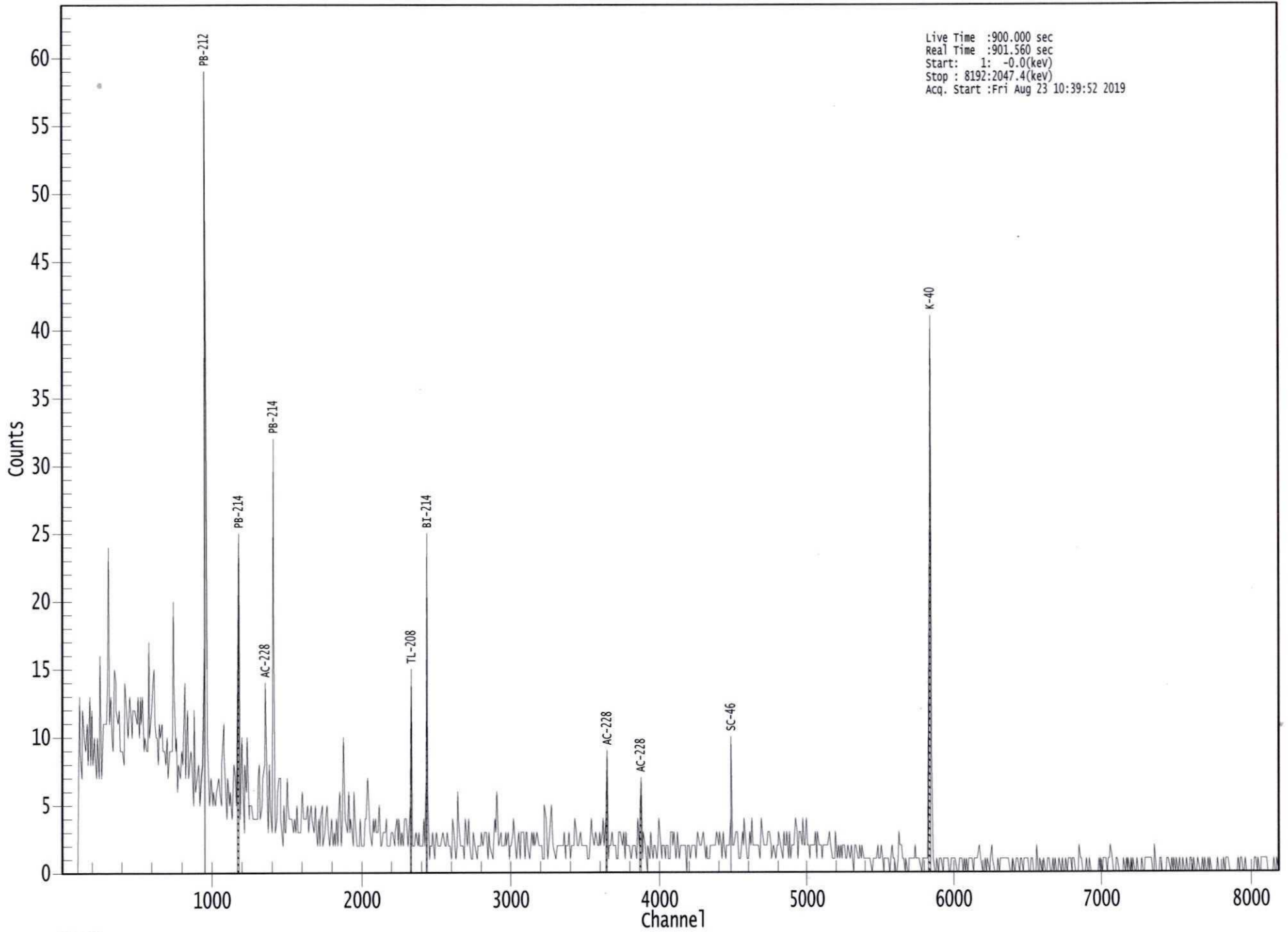


0000079069.CNF



 ROI Type: 1

Analysis Report for 26-Aug-19-10011  
L1-10207C-RIGS-004SS

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## GAMMA SPECTRUM ANALYSIS

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Sample Identification : 26-Aug-19-10011  
Sample Description : L1-10207C-RIGS-004SS  
Sample Type : Soil  
Unit :  
Sample Point :  
  
Sample Size : 1.417E+03 grams  
Facility : Default  
  
Sample Taken On : 8/22/2019 1:10:00PM  
Acquisition Started : 8/26/2019 10:27:12AM  
  
Procedure : 130G\_SOIL\_1  
Operator : Administrator  
Detector Name : P11314  
Geometry : 130G\_SOIL\_1  
Live Time : 900.0 seconds  
Real Time : 900.4 seconds  
  
Dead Time : 0.04 %  
  
Peak Locate Threshold : 3.00  
Peak Locate Range (in channels) : 120 - 8192  
Peak Area Range (in channels) : 120 - 8192  
Identification Energy Tolerance : 1.000 keV  
  
Energy Calibration Used Done On : 1/24/2019  
Efficiency Calibration Used Done On : 8/26/2019  
Efficiency Calibration Description :  
  
Sample Number : 79102  
Fill Height : 1416.88 gram  
Certificate Name : Eu155-Na22  
Certificate Date : 12/22/2008 12:00:00PM

*J. M. [Signature]*  
8-26-19

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## PEAK ANALYSIS REPORT

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Peak Analysis Performed on : 8/26/2019 10:42:23AM

Peak Analysis From Channel : 120  
Peak Analysis To Channel : 8192

*J. M. [Signature]*  
8-26-19

Analysis Report for 26-Aug-19-10011

L1-10207C-RIGS-004SS

	Peak No.	Energy (keV)	ROI start	ROI end	Peak Centroid	Net Peak Area	Net Area Uncertainty	Continuum Counts	FWHM (keV)
M	1	75.01	296 -	315	300.60	6.04E+01	11.01	9.83E+01	0.81
m	2	77.38	296 -	315	310.06	6.51E+01	11.62	1.19E+02	0.82
M	3	238.78	946 -	975	954.69	2.39E+02	15.72	5.72E+01	1.09
m	4	242.15	946 -	975	968.17	5.81E+01	8.74	4.70E+01	1.09
	5	295.37	1176 -	1189	1180.78	9.55E+01	15.17	4.85E+01	1.09
	6	352.09	1400 -	1414	1407.38	1.33E+02	16.31	4.65E+01	1.17
	7	558.45	2227 -	2236	2231.98	1.70E+01	7.30	1.60E+01	0.38
	8	582.93	2322 -	2337	2329.83	7.00E+01	11.42	2.00E+01	0.60
	9	608.94	2426 -	2444	2433.79	1.33E+02	13.53	1.53E+01	1.39
	10	661.13	2637 -	2648	2642.43	3.75E+01	7.51	7.54E+00	1.22
	11	910.83	3634 -	3647	3640.78	5.33E+01	9.54	1.37E+01	1.36
	12	968.54	3865 -	3879	3871.59	3.51E+01	8.50	1.29E+01	0.37
	13	1460.04	5825 -	5849	5838.10	4.58E+02	21.99	6.25E+00	1.80

M = First peak in a multiplet region

m = Other peak in a multiplet region

F = Fitted singlet

Errors quoted at 1.000sigma

No background subtract performed on this spectrum.

## NUCLIDE IDENTIFICATION REPORT

Nuclide Library Used : C:\Canberra\Apex\Root\Default\Library\ZION LIB-BNL.NLB

### IDENTIFIED NUCLIDES

Nuclide Name	Id Confidence	Energy (keV)	Yield(%)	Activity (pCi/grams)	Activity Uncertainty
K-40	0.90	1460.82	* 10.66	1.05E+01	6.81E-01
Cs-137	0.95	661.66	* 85.10	6.26E-02	1.31E-02
Tl-208	0.98	583.19	* 85.00	1.07E-01	1.87E-02
Pb-212	0.99	115.18	0.60		

Analysis Report for 26-Aug-19-10011

L1-10207C-RIGS-004SS

<b>Nuclide Name</b>	<b>Id Confidence</b>	<b>Energy (keV)</b>		<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Activity Uncertainty</b>
Pb-212	0.99	238.63	*	43.60	3.86E-01	4.02E-02
		300.09		3.30		
Pb212-XR	0.99	74.82	*	10.28	7.76E-01	1.62E-01
		77.11	*	17.10	4.60E-01	9.47E-02
		87.35		3.97		
		89.78		1.46		
Bi-214	0.99	609.32	*	45.49	3.92E-01	4.64E-02
		768.36		4.89		
		806.18		1.26		
		934.06		3.11		
		1120.29		14.92		
		1155.21		1.63		
		1238.12		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		
		1661.27		1.05		
		1729.59		2.88		
		1764.49		15.30		
		1847.43		2.03		
		2118.51		1.16		
Pb-214	0.99	241.99	*	7.25	5.68E-01	9.68E-02
		295.22	*	18.42	4.15E-01	7.39E-02
		351.93	*	35.60	3.40E-01	4.99E-02
		785.96		1.06		
Ac-228	0.98	129.07		2.42		
		209.25		3.89		
		270.24		3.46		
		328.00		2.95		
		338.32		11.27		
		409.46		1.92		
		463.00		4.40		
		794.95		4.25		
		911.20	*	25.80	3.66E-01	6.74E-02
		964.77		4.99		
		968.97	*	15.80	4.10E-01	1.01E-01
		1588.20		3.22		

\* = Energy line found in the spectrum.

- = Manually added nuclide.

? = Manually edited nuclide.

@ = Energy line not used for Weighted Mean Activity

Energy Tolerance : 1.000 keV

Nuclide confidence index threshold = 0.30

Errors quoted at 1.000sigma

Analysis Report for 26-Aug-19-10011

L1-10207C-RIGS-004SS

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## INTERFERENCE CORRECTED REPORT

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<b>Nuclide Name</b>	<b>Nuclide Id Confidence</b>	<b>Wt mean Activity (pCi/grams)</b>	<b>Wt mean Activity Uncertainty</b>	<b>Comments</b>
K-40	0.907	1.05E+01	6.81E-01	
Cs-137	0.957	6.26E-02	1.31E-02	
Tl-208	0.989	1.07E-01	1.87E-02	
Pb-212	0.997	3.86E-01	4.02E-02	
Pb212-XR	0.992	5.40E-01	8.18E-02	
Bi-214	0.991	3.92E-01	4.64E-02	
Pb-214	0.996	3.95E-01	3.80E-02	
X Pb214-XR	0.992			
Ac-228	0.988	3.80E-01	5.61E-02	

? = 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 1.000sigma

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Analysis Report for 26-Aug-19-10011  
L1-10207C-RIGS-004SS

## UNIDENTIFIED PEAKS

Peak Locate Performed on : 8/26/2019 10:42:23AM  
Peak Locate From Channel : 120  
Peak Locate To Channel : 8192

Peak No.	Energy (keV)	Peak Size (CPS)	Peak CPS (%) Uncertainty	Peak Type	Tolerance Nuclide
7	558.45	1.88889E-02	42.97		NQPF

SPW  
8-26-19

M = First peak in a multiplet region  
m = Other peak in a multiplet region  
F = Fitted singlet  
Errors quoted at 1.000sigma

## NUCLIDE MDA REPORT

Nuclide Library Used : C:\Canberra\Apex\Root\Default\Library\ZION LIB-BNL.NLB

Nuclide Name	Energy (keV)	Yield(%)	Activity (pCi/grams)	Nuclide MDA (pCi/grams)	Line MDA (pCi/grams)
An Pk	511.00	100.00	6.40E-02	6.21E-02	6.21E-02
BE-7	477.60	10.44	-4.07E-02	4.13E-01	4.13E-01
+ K-40	1460.82	* 10.66	1.05E+01	4.62E-01	4.62E-01
Mn-54	834.85	99.98	-1.33E-02	5.65E-02	5.65E-02
Co-60	1173.23	99.85	9.42E-03	6.25E-02	7.74E-02
	1332.49	99.98	3.21E-03		6.25E-02
Nb-94	702.65	99.81	2.01E-02	5.30E-02	5.37E-02
	871.09	99.89	-6.19E-03		5.30E-02
Ag-108m	79.13	6.60	-2.63E-01	4.76E-02	1.42E+00
	433.94	90.50	1.57E-02		4.76E-02
	614.28	89.80	-2.66E-02		6.52E-02
	722.94	90.80	6.04E-02		7.02E-02
Sb-125	176.31	6.84	-1.16E-01	1.37E-01	5.36E-01
	380.45	1.52	1.04E+00		2.60E+00
	427.87	29.60	-7.01E-02		1.37E-01
	463.36	10.49	1.38E-01		4.38E-01
	600.60	17.65	8.43E-02		2.96E-01
	606.71	4.98	-2.68E-01		1.80E+00

Analysis Report for 26-Aug-19-10011  
L1-10207C-RIGS-004SS

<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Nuclide MDA (pCi/grams)</b>	<b>Line MDA (pCi/grams)</b>
Sb-125	635.95	11.22	7.62E-02	1.37E-01	4.34E-01
	671.44	1.79	2.62E-01		2.61E+00
Ba-133	79.61	2.65	-4.13E-01	9.00E-02	3.50E+00
	81.00	32.90	-1.34E-01		2.25E-01
	276.40	7.16	-4.60E-02		5.28E-01
	302.85	18.34	5.27E-03		2.00E-01
	356.01	62.05	-1.56E-02		9.00E-02
	383.85	8.94	2.79E-01		4.52E-01
Cs-134	475.36	1.48	1.80E+00	6.07E-02	2.93E+00
	563.25	8.34	-3.09E-01		5.80E-01
	569.33	15.37	-6.05E-02		3.20E-01
	604.72	97.62	9.78E-03		8.23E-02
	795.86	85.46	1.12E-02		6.07E-02
	801.95	8.69	4.32E-01		6.08E-01
	1038.61	0.99	-6.81E+00		5.80E+00
	1167.97	1.79	4.16E+00		4.66E+00
	1365.19	3.02	-6.58E-01		1.40E+00
+ Cs-137	661.66	* 85.10	6.26E-02	2.95E-02	2.95E-02
Eu-152	121.78	28.67	-3.63E-02	1.41E-01	1.41E-01
	244.70	7.61	2.60E-02		5.93E-01
	295.94	0.45	1.80E+01		1.25E+01
	344.28	26.60	-7.66E-02		1.46E-01
	367.79	0.86	-1.31E+00		4.02E+00
	411.12	2.24	-2.29E-01		1.84E+00
	443.96	2.83	-4.76E-02		1.53E+00
	488.68	0.42	2.26E+00		8.48E+00
	563.99	0.49	-3.31E+00		9.39E+00
	586.26	0.46	-4.19E+00		1.54E+01
	678.62	0.47	-4.93E-01		9.34E+00
	688.67	0.86	4.14E-01		5.97E+00
	719.35	0.28	1.47E+00		1.97E+01
	778.90	12.96	3.90E-02		3.98E-01
	810.45	0.32	1.37E+01		1.71E+01
	867.37	4.26	9.44E-01		1.32E+00
	919.33	0.43	-1.84E+00		1.30E+01
	964.08	14.65	-5.83E-02		5.66E-01
	1085.87	10.24	-1.20E-01		5.68E-01
	1089.74	1.73	-1.58E+00		3.56E+00
	1112.07	13.69	-5.08E-01		4.68E-01
	1212.95	1.43	-1.57E+00		5.93E+00
	1249.94	0.19	9.88E+00		4.34E+01
	1299.14	1.63	-2.03E-01		4.21E+00
	1408.01	21.07	-3.43E-02		2.50E-01
	1457.64	0.50	2.19E+02		5.20E+01
	1528.10	0.28	3.25E+00		1.55E+01
Eu-154	123.07	40.40	-4.54E-03	1.02E-01	1.02E-01
	247.93	6.89	2.79E-01		5.41E-01
	591.76	4.95	2.23E-01		1.01E+00
	692.42	1.78	9.92E-01		3.07E+00
	723.30	20.06	1.96E-01		3.18E-01
	756.80	4.52	-1.04E-01		1.12E+00

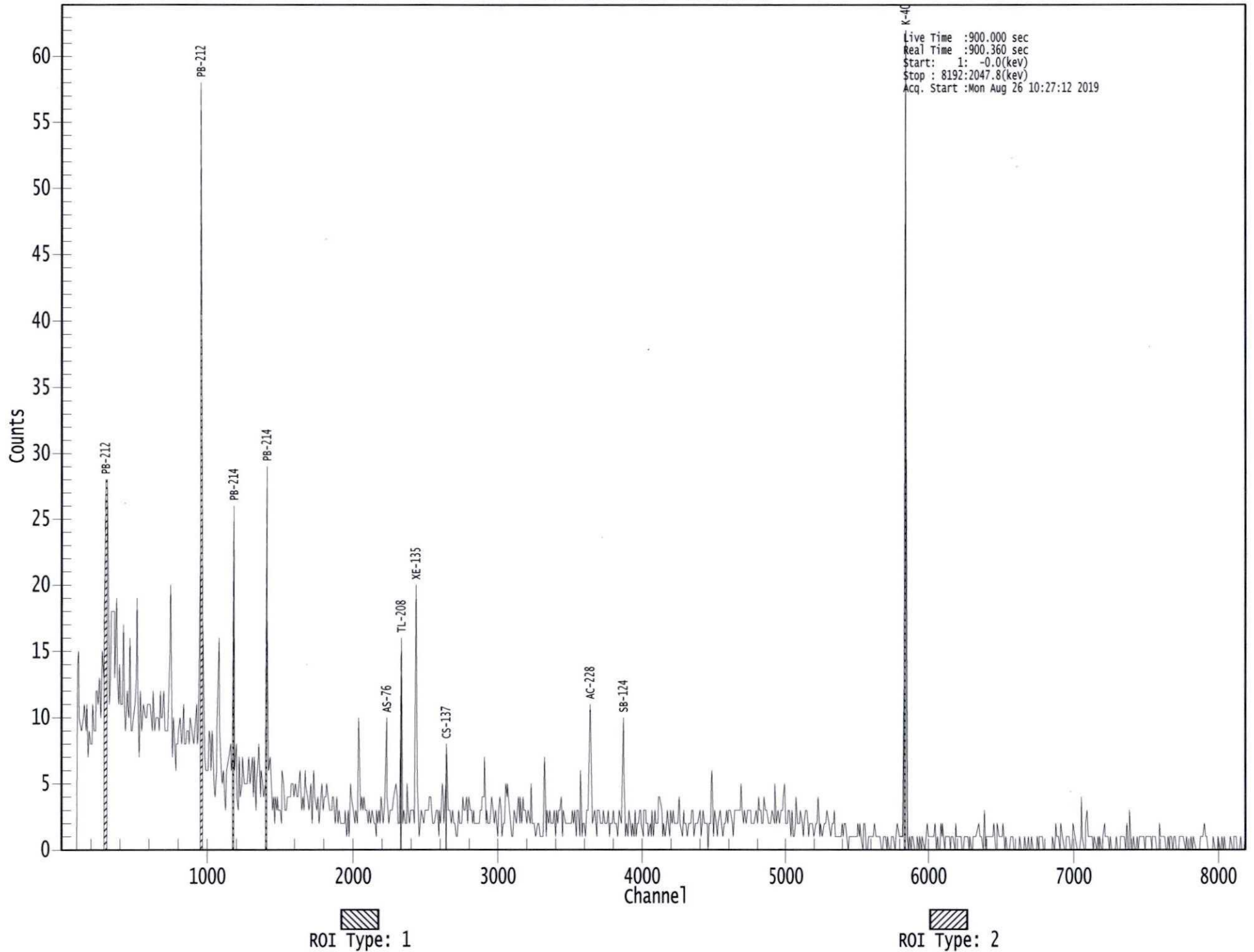
Analysis Report for 26-Aug-19-10011  
L1-10207C-RIGS-004SS

<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Nuclide MDA (pCi/grams)</b>	<b>Line MDA (pCi/grams)</b>
Eu-154	873.18	12.08	5.07E-02	1.02E-01	4.45E-01
	996.29	10.48	2.84E-01		5.84E-01
	1004.76	18.01	-2.17E-01		3.41E-01
	1274.43	34.80	8.80E-02		2.07E-01
	1596.48	1.80	-5.48E-01		2.64E+00
Eu-155	45.30	1.31	1.68E-01	2.25E-01	1.27E+01
	60.01	1.22	3.22E+00		1.55E+01
	86.55	30.70	1.03E-02		2.25E-01
	105.31	21.10	-4.77E-04		2.25E-01
Ra-226	186.21	3.64	5.98E-01	1.17E+00	1.17E+00
Pa-231	27.36	10.30	1.22E+00	1.43E+00	1.43E+00
	283.69	1.70	-1.13E-01		2.08E+00
	300.07	2.47	-7.61E-02		1.51E+00
	302.65	2.20	2.23E-01		1.69E+00
	330.06	1.40	2.41E-02		3.02E+00
U-235	143.76	10.96	6.31E-02	7.61E-02	3.75E-01
	163.33	5.08	3.84E-01		7.63E-01
	185.71	57.20	7.19E-02		7.61E-02
	202.11	1.08	6.70E-01		3.52E+00
	205.31	5.01	-2.14E-01		7.32E-01
Am-241	59.54	35.90	-4.79E-02	5.27E-01	5.27E-01

- + = 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  
 ? = CAUTION: MDA value is inconsistent with Currie MDA at 95% confidence level



000079102.CNF



Analysis Report for 26-Aug-19-10012  
L1-10207C-RIGS-005SS

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## GAMMA SPECTRUM ANALYSIS

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Sample Identification : 26-Aug-19-10012  
Sample Description : L1-10207C-RIGS-005SS  
Sample Type : Soil  
Unit :  
Sample Point :  
  
Sample Size : 1.194E+03 grams  
Facility : Default  
  
Sample Taken On : 8/22/2019 1:12:00PM  
Acquisition Started : 8/26/2019 10:27:20AM  
  
Procedure : 130G\_SOIL\_1  
Operator : Administrator  
Detector Name : 352  
Geometry : 130G\_SOIL\_1  
Live Time : 900.0 seconds  
Real Time : 900.3 seconds  
  
Dead Time : 0.03 %  
  
Peak Locate Threshold : 3.00  
Peak Locate Range (in channels) : 120 - 8192  
Peak Area Range (in channels) : 120 - 8192  
Identification Energy Tolerance : 1.000 keV  
  
Energy Calibration Used Done On : 9/29/2018  
Efficiency Calibration Used Done On : 8/26/2019  
Efficiency Calibration Description :  
  
Sample Number : 79103  
Fill Height : 1194.11 gram  
Certificate Name : Eu155-Na22  
Certificate Date : 1/7/2013 12:00:00PM

*J. M. Miller*  
8-26-19

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## PEAK ANALYSIS REPORT

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Peak Analysis Performed on : 8/26/2019 10:42:26AM  
Peak Analysis From Channel : 120  
Peak Analysis To Channel : 8192

*J. M. Miller*  
8-26-19

Analysis Report for 26-Aug-19-10012  
L1-10207C-RIGS-005SS

Peak No.	Energy (keV)	ROI start	ROI end	Peak Centroid	Net Peak Area	Net Area Uncertainty	Continuum Counts	FWHM (keV)
1	77.14	307 -	317	309.88	5.75E+01	14.08	5.75E+01	0.64
2	185.93	738 -	750	744.46	6.75E+01	13.69	4.55E+01	0.78
3	238.56	950 -	962	954.70	1.30E+02	20.42	1.02E+02	0.98
4	295.23	1172 -	1189	1181.14	1.04E+02	15.31	4.03E+01	0.63
5	338.25	1348 -	1358	1353.04	4.24E+01	9.69	2.16E+01	0.56
6	351.86	1401 -	1414	1407.45	1.40E+02	14.65	2.73E+01	1.13
7	583.26	2325 -	2340	2332.35	6.70E+01	10.15	1.20E+01	1.46
8	609.31	2427 -	2445	2436.51	1.15E+02	13.76	2.16E+01	0.82
9	911.00	3636 -	3651	3643.05	5.26E+01	9.55	1.24E+01	0.52
10	969.00	3870 -	3881	3875.08	1.97E+01	6.98	1.13E+01	0.70
11	1460.72	5830 -	5855	5843.24	3.73E+02	20.69	1.30E+01	1.76

M = First peak in a multiplet region  
m = Other peak in a multiplet region  
F = Fitted singlet  
Errors quoted at 1.000sigma

No background subtract performed on this spectrum.

## NUCLIDE IDENTIFICATION REPORT

Nuclide Library Used : C:\Canberra\Apex\Root\Default\Library\ZION LIB-BNL.NLB

### IDENTIFIED NUCLIDES

Nuclide Name	Id Confidence	Energy (keV)	Yield(%)	Activity (pCi/grams)	Activity Uncertainty
K-40	0.99	1460.82 *	10.66	8.49E+00	5.98E-01
Tl-208	0.99	583.19 *	85.00	1.03E-01	1.68E-02
Pb-212	0.99	115.18	0.60		
		238.63 *	43.60	2.15E-01	3.81E-02
		300.09	3.30		
Pb212-XR	1.00	74.82	10.28		

Analysis Report for 26-Aug-19-10012

L1-10207C-RIGS-005SS

<b>Nuclide Name</b>	<b>Id Confidence</b>	<b>Energy (keV)</b>		<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Activity Uncertainty</b>
Pb212-XR	1.00	77.11	*	17.10	5.57E-01	1.48E-01
		87.35		3.97		
		89.78		1.46		
Bi-214	1.00	609.32	*	45.49	3.41E-01	4.55E-02
		768.36		4.89		
		806.18		1.26		
		934.06		3.11		
		1120.29		14.92		
		1155.21		1.63		
		1238.12		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		
		1661.27		1.05		
		1729.59		2.88		
		1764.49		15.30		
		1847.43		2.03		
		2118.51		1.16		
Pb-214	1.00	241.99		7.25		
		295.22	*	18.42	4.59E-01	7.70E-02
		351.93	*	35.60	3.62E-01	4.78E-02
		785.96		1.06		
Pb214-XR	1.00	74.82		5.80		
		77.11	*	9.70	9.81E-01	2.64E-01
		87.35		2.24		
		89.78		0.82		
Ra-226	0.98	186.21	*	3.64	1.20E+00	2.61E-01
Ac-228	0.99	129.07		2.42		
		209.25		3.89		
		270.24		3.46		
		328.00		2.95		
		338.32	*	11.27	3.37E-01	8.19E-02
		409.46		1.92		
		463.00		4.40		
		794.95		4.25		
		911.20	*	25.80	3.59E-01	6.70E-02
		964.77		4.99		
		968.97	*	15.80	2.29E-01	8.17E-02
		1588.20		3.22		
U-235	0.99	143.76		10.96		
		163.33		5.08		
		185.71	*	57.20	7.61E-02	1.66E-02
		202.11		1.08		
		205.31		5.01		

Analysis Report for 26-Aug-19-10012  
L1-10207C-RIGS-005SS

\* = Energy line found in the spectrum.  
 - = Manually added nuclide.  
 ? = Manually edited nuclide.  
 @ = Energy line not used for Weighted Mean Activity  
 Energy Tolerance : 1.000 keV  
 Nuclide confidence index threshold = 0.30  
 Errors quoted at 1.000sigma

## INTERFERENCE CORRECTED REPORT

	<b>Nuclide Name</b>	<b>Nuclide Id Confidence</b>	<b>Wt mean Activity (pCi/grams)</b>	<b>Wt mean Activity Uncertainty</b>	<b>Comments</b>
	K-40	0.998	8.49E+00	5.98E-01	
	Tl-208	0.999	1.03E-01	1.68E-02	
X	Bi-211	0.904			
	Pb-212	0.999	2.15E-01	3.81E-02	
?	Pb212-XR	1.000	5.57E-01	1.48E-01	
	Bi-214	1.000	3.41E-01	4.55E-02	
	Pb-214	1.000	3.89E-01	4.06E-02	
?	Pb214-XR	1.000	9.81E-01	2.64E-01	
?	Ra-226	0.988	1.20E+00	2.61E-01	
	Ac-228	0.998	3.15E-01	4.38E-02	
?	<del>U-235</del> <i>Ra-226</i>	<del>0.995</del>	<del>7.61E-02</del>	<del>1.66E-02</del>	

? = 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 1.000sigma

*u-235 only 1 Peak*

*JPW  
8-26-19*

Analysis Report for 26-Aug-19-10012  
L1-10207C-RIGS-005SS

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## UNIDENTIFIED PEAKS

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Peak Locate Performed on : 8/26/2019 10:42:26AM  
Peak Locate From Channel : 120  
Peak Locate To Channel : 8192

Peak No.	Energy (keV)	Peak Size (CPS)	Peak CPS (%) Uncertainty	Peak Type	Tolerance Nuclide
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All peaks were identified.

M = First peak in a multiplet region

m = Other peak in a multiplet region

F = Fitted singlet

Errors quoted at 1.000sigma

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## NUCLIDE MDA REPORT

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Nuclide Library Used : C:\Canberra\Apex\Root\Default\Library\ZION LIB-BNL.NLB

Nuclide Name	Energy (keV)	Yield(%)	Activity (pCi/grams)	Nuclide MDA (pCi/grams)	Line MDA (pCi/grams)
An Pk	511.00	100.00	6.43E-02	6.35E-02	6.35E-02
BE-7	477.60	10.44	-1.66E-01	3.77E-01	3.77E-01
+ K-40	1460.82	* 10.66	8.49E+00	6.39E-01	6.39E-01
Mn-54	834.85	99.98	1.27E-02	5.43E-02	5.43E-02
Co-60	1173.23	99.85	5.32E-02	7.18E-02	7.88E-02
	1332.49	99.98	5.27E-02		7.18E-02
Nb-94	702.65	99.81	7.19E-04	4.57E-02	4.57E-02
	871.09	99.89	2.02E-02		5.86E-02
Ag-108m	79.13	6.60	8.86E-01	4.90E-02	1.66E+00
	433.94	90.50	2.52E-02		4.90E-02
	614.28	89.80	-1.43E-03		9.09E-02
	722.94	90.80	1.13E-02		5.45E-02
Sb-125	176.31	6.84	4.43E-01	1.41E-01	6.26E-01
	380.45	1.52	7.69E-01		2.81E+00
	427.87	29.60	-5.39E-02		1.41E-01
	463.36	10.49	9.17E-02		4.30E-01
	600.60	17.65	1.44E-01		2.76E-01
	606.71	4.98	3.20E+00		1.73E+00
	635.95	11.22	-9.19E-02		3.76E-01

Analysis Report for 26-Aug-19-10012  
L1-10207C-RIGS-005SS

<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Nuclide MDA (pCi/grams)</b>	<b>Line MDA (pCi/grams)</b>
Sb-125	671.44	1.79	-3.92E-01	1.41E-01	2.44E+00
Ba-133	79.61	2.65	-1.96E-01	9.85E-02	4.01E+00
	81.00	32.90	-7.30E-02		2.76E-01
	276.40	7.16	4.01E-01		5.99E-01
	302.85	18.34	1.22E-01		2.27E-01
	356.01	62.05	-5.82E-02		9.85E-02
	383.85	8.94	-1.21E-01		4.73E-01
Cs-134	475.36	1.48	7.52E-01	6.19E-02	2.53E+00
	563.25	8.34	-8.53E-02		5.09E-01
	569.33	15.37	6.34E-03		2.69E-01
	604.72	97.62	7.05E-03		8.19E-02
	795.86	85.46	1.08E-02		6.19E-02
	801.95	8.69	-6.26E-01		6.05E-01
	1038.61	0.99	8.76E-01		6.16E+00
	1167.97	1.79	1.51E+00		4.32E+00
	1365.19	3.02	-6.95E-01		1.50E+00
Cs-137	661.66	85.10	6.59E-02	6.79E-02	6.79E-02
Eu-152	121.78	28.67	-4.88E-02	1.54E-01	1.58E-01
	244.70	7.61	3.93E-01		6.15E-01
	295.94	0.45	1.41E+01		1.26E+01
	344.28	26.60	-5.86E-02		1.54E-01
	367.79	0.86	-1.23E+00		4.36E+00
	411.12	2.24	-7.57E-01		2.06E+00
	443.96	2.83	-1.11E-01		1.42E+00
	488.68	0.42	-4.61E+00		9.47E+00
	563.99	0.49	9.85E-01		8.53E+00
	586.26	0.46	1.71E+01		1.45E+01
	678.62	0.47	2.88E+00		9.93E+00
	688.67	0.86	9.47E-01		5.64E+00
	719.35	0.28	1.06E+01		1.59E+01
	778.90	12.96	-1.01E-01		4.06E-01
	810.45	0.32	1.36E+01		1.83E+01
	867.37	4.26	-1.98E+00		1.16E+00
	919.33	0.43	-5.91E+00		1.17E+01
	964.08	14.65	-1.62E-01		5.44E-01
	1085.87	10.24	-8.90E-01		6.27E-01
	1089.74	1.73	1.66E+00		3.85E+00
	1112.07	13.69	-4.04E-01		4.70E-01
	1212.95	1.43	-3.43E+00		5.28E+00
	1249.94	0.19	-1.68E+01		3.54E+01
	1299.14	1.63	2.89E-01		3.68E+00
	1408.01	21.07	1.79E-01		2.47E-01
	1457.64	0.50	1.82E+02		4.71E+01
	1528.10	0.28	-3.62E-01		1.47E+01
Eu-154	123.07	40.40	4.12E-02	1.12E-01	1.12E-01
	247.93	6.89	-4.04E-01		5.33E-01
	591.76	4.95	-4.63E-02		8.75E-01
	692.42	1.78	-5.03E-01		2.40E+00
	723.30	20.06	7.32E-02		2.47E-01
	756.80	4.52	-7.01E-01		1.12E+00
	873.18	12.08	1.36E-01		4.86E-01

Analysis Report for 26-Aug-19-10012

L1-10207C-RIGS-005SS

<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Nuclide MDA (pCi/grams)</b>	<b>Line MDA (pCi/grams)</b>
Eu-154	996.29	10.48	3.12E-01	1.12E-01	6.13E-01
	1004.76	18.01	9.05E-02		3.62E-01
	1274.43	34.80	6.64E-02		2.05E-01
	1596.48	1.80	-2.77E-01		2.82E+00
Eu-155	45.30	1.31	1.03E+01	2.56E-01	2.34E+01
	60.01	1.22	8.24E+00		2.44E+01
	86.55	30.70	1.14E-01		2.56E-01
	105.31	21.10	5.87E-02		2.58E-01
+ Ra-226	186.21	* 3.64	1.20E+00	7.09E-01	7.09E-01
Pa-231	27.36	10.30	2.20E+00	1.81E+00	2.65E+00
	283.69	1.70	4.57E-02		2.49E+00
	300.07	2.47	7.09E-02		1.81E+00
	302.65	2.20	1.94E+00		1.91E+00
	330.06	1.40	3.92E-01		2.85E+00
+ U-235	143.76	10.96	-4.80E-02	4.51E-02	4.19E-01
U-235	163.33	5.08	2.25E-01	4.51E-02	8.29E-01
	185.71	* 57.20	7.61E-02		4.51E-02
	202.11	1.08	-9.31E-01		3.62E+00
	205.31	5.01	-8.65E-01		7.64E-01
Am-241	59.54	35.90	1.50E-01	8.51E-01	8.51E-01

+ = Nuclide identified during the nuclide identification

\* = Energy line found in the spectrum

&gt; = MDA value not calculated

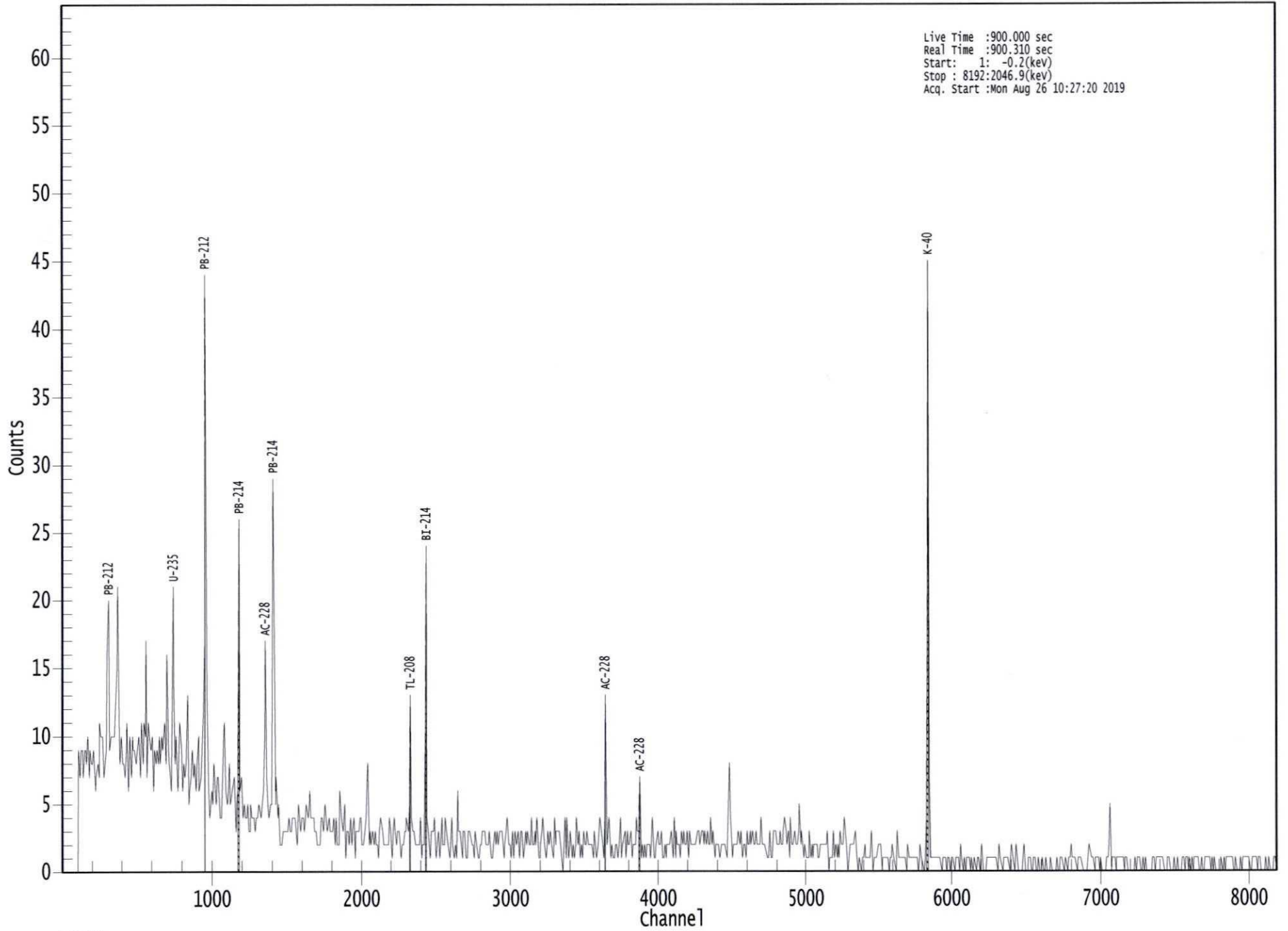
@ = Half-life too short to be able to perform the decay correction

? = CAUTION: MDA value is inconsistent with Currie MDA at 95% confidence level



000079103.CNF

Live Time :900.000 sec  
Real Time :900.310 sec  
Start: 1: -0.2(keV)  
Stop : 8192:2046.9(keV)  
Acq. Start :Mon Aug 26 10:27:20 2019



ROI Type: 1

Analysis Report for 26-Aug-19-10013  
L1-10207C-RIGS-006SS

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## GAMMA SPECTRUM ANALYSIS

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Sample Identification : 26-Aug-19-10013  
Sample Description : L1-10207C-RIGS-006SS  
Sample Type : Soil  
Unit :  
Sample Point :  
  
Sample Size : 1.300E+03 grams  
Facility : Default  
  
Sample Taken On : 8/22/2019 1:14:00PM  
Acquisition Started : 8/26/2019 10:54:50AM  
  
Procedure : 130G\_SOIL\_1  
Operator : Administrator  
Detector Name : 324  
Geometry : 130G\_SOIL\_1  
Live Time : 900.0 seconds  
Real Time : 900.4 seconds  
  
Dead Time : 0.04 %  
  
Peak Locate Threshold : 3.00  
Peak Locate Range (in channels) : 120 - 4096  
Peak Area Range (in channels) : 120 - 4096  
Identification Energy Tolerance : 1.000 keV  
  
Energy Calibration Used Done On : 9/29/2018  
Efficiency Calibration Used Done On : 8/26/2019  
Efficiency Calibration Description :  
  
Sample Number : 79104  
Fill Height : 1299.99 gram  
Certificate Name : Eu155-Na22  
Certificate Date : 1/30/2013 12:00:00PM

*J.P. M...  
8-26-19*

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## PEAK ANALYSIS REPORT

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Peak Analysis Performed on : 8/26/2019 11:09:53AM  
Peak Analysis From Channel : 120  
Peak Analysis To Channel : 4096

*J.P. M...  
8-26-19*

Analysis Report for 26-Aug-19-10013  
L1-10207C-RIGS-006SS

Peak No.	Energy (keV)	ROI start	ROI end	Peak Centroid	Net Peak Area	Net Area Uncertainty	Continuum Counts	FWHM (keV)
1	238.57	472 -	481	477.32	1.68E+02	24.81	1.89E+02	1.09
2	295.21	587 -	594	590.48	6.79E+01	14.87	7.61E+01	1.13
3	351.71	698 -	708	703.37	1.94E+02	17.64	4.95E+01	1.17
4	583.04	1161 -	1170	1165.68	5.18E+01	11.72	3.72E+01	0.94
5	609.05	1211 -	1223	1217.67	1.40E+02	13.50	1.62E+01	1.21
6	661.22	1317 -	1327	1321.98	4.28E+01	10.73	2.92E+01	1.29
7	910.75	1816 -	1826	1820.95	5.13E+01	10.50	2.48E+01	1.69
8	1460.24	2913 -	2928	2920.53	4.71E+02	21.85	2.08E+00	2.01
9	1763.84	3523 -	3533	3528.54	3.08E+01	6.40	4.21E+00	1.45

M = First peak in a multiplet region  
m = Other peak in a multiplet region  
F = Fitted singlet  
Errors quoted at 1.000sigma

No background subtract performed on this spectrum.

## NUCLIDE IDENTIFICATION REPORT

Nuclide Library Used : C:\Canberra\Apex\Root\Default\Library\ZION LIB-BNL.NLB

### IDENTIFIED NUCLIDES

Nuclide Name	Id Confidence	Energy (keV)		Yield(%)	Activity (pCi/grams)	Activity Uncertainty
K-40	0.94	1460.82	*	10.66	9.32E+00	5.92E-01
Cs-137	0.97	661.66	*	85.10	6.26E-02	1.61E-02
Tl-208	0.99	583.19	*	85.00	6.97E-02	1.63E-02
Bi-211	0.93	351.07	*	13.02	1.20E+00	1.47E-01
Pb-212	0.99	115.18		0.60		
		238.63	*	43.60	2.43E-01	4.10E-02
		300.09		3.30		
Bi-214	0.98	609.32	*	45.49	3.62E-01	4.12E-02

Analysis Report for 26-Aug-19-10013

L1-10207C-RIGS-006SS

<b>Nuclide Name</b>	<b>Id Confidence</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Activity Uncertainty</b>
Bi-214	0.98	768.36	4.89		
		806.18	1.26		
		934.06	3.11		
		1120.29	14.92		
		1155.21	1.63		
		1238.12	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		
		1661.27	1.05		
		1729.59	2.88		
		1764.49 *	15.30	4.90E-01	1.04E-01
		1847.43	2.03		
2118.51	1.16				
Pb-214	0.99	241.99	7.25		
		295.22 *	18.42	2.64E-01	6.15E-02
		351.93 *	35.60	4.40E-01	5.34E-02
Ac-228	0.99	785.96	1.06		
		129.07	2.42		
		209.25	3.89		
		270.24	3.46		
		328.00	2.95		
		338.32	11.27		
		409.46	1.92		
		463.00	4.40		
		794.95	4.25		
		911.20 *	25.80	3.06E-01	6.41E-02
		964.77	4.99		
		968.97	15.80		
1588.20	3.22				

\* = Energy line found in the spectrum.

- = Manually added nuclide.

? = Manually edited nuclide.

@ = Energy line not used for Weighted Mean Activity

Energy Tolerance : 1.000 keV

Nuclide confidence index threshold = 0.30

Errors quoted at 1.000sigma

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**INTERFERENCE CORRECTED REPORT**

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Analysis Report for 26-Aug-19-10013

L1-10207C-RIGS-006SS

<b>Nuclide Name</b>	<b>Nuclide Id Confidence</b>	<b>Wt mean Activity (pCi/grams)</b>	<b>Wt mean Activity Uncertainty</b>	<b>Comments</b>
K-40	0.947	9.32E+00	5.92E-01	
Cs-137	0.970	6.26E-02	1.61E-02	
Tl-208	0.996	6.97E-02	1.63E-02	
Bi-211	0.936	4.83E-01	2.23E-01	
Pb-212	0.999	2.43E-01	4.10E-02	
Bi-214	0.986	3.79E-01	3.83E-02	
Pb-214	0.996	2.64E-01	6.15E-02	
Ac-228	0.990	3.06E-01	6.41E-02	

- ? = 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 1.000sigma

Analysis Report for 26-Aug-19-10013  
L1-10207C-RIGS-006SS

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## UNIDENTIFIED PEAKS

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Peak Locate Performed on : 8/26/2019 11:09:53AM  
Peak Locate From Channel : 120  
Peak Locate To Channel : 4096

Peak No.	Energy (keV)	Peak Size (CPS)	Peak CPS (%) Uncertainty	Peak Type	Tolerance Nuclide
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All peaks were identified.

M = First peak in a multiplet region  
m = Other peak in a multiplet region  
F = Fitted singlet  
Errors quoted at 1.000sigma

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## NUCLIDE MDA REPORT

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Nuclide Library Used : C:\Canberra\Apex\Root\Default\Library\ZION LIB-BNL.NLB

Nuclide Name	Energy (keV)	Yield(%)	Activity (pCi/grams)	Nuclide MDA (pCi/grams)	Line MDA (pCi/grams)
An Pk	511.00	100.00	1.06E-01	6.43E-02	6.43E-02
BE-7	477.60	10.44	-4.79E-02	4.03E-01	4.03E-01
+ K-40	1460.82	* 10.66	9.32E+00	2.27E-01	2.27E-01
Mn-54	834.85	99.98	5.88E-03	4.86E-02	4.86E-02
Co-60	1173.23	99.85	2.49E-02	4.90E-02	7.22E-02
	1332.49	99.98	-1.97E-02		4.90E-02
Nb-94	702.65	99.81	-3.67E-03	4.50E-02	4.50E-02
	871.09	99.89	1.86E-02		4.79E-02
Ag-108m	79.13	6.60	9.11E-01	4.08E-02	1.40E+00
	433.94	90.50	-3.02E-02		4.08E-02
	614.28	89.80	-1.37E-02		5.97E-02
	722.94	90.80	2.44E-02		6.41E-02
Sb-125	176.31	6.84	-1.06E-01	1.33E-01	5.39E-01
	380.45	1.52	-1.52E-01		2.40E+00
	427.87	29.60	3.38E-02		1.33E-01
	463.36	10.49	2.31E-01		4.13E-01
	600.60	17.65	-1.37E-02		2.10E-01
	606.71	4.98	4.57E-02		1.54E+00
	635.95	11.22	-3.05E-02		3.51E-01

Analysis Report for 26-Aug-19-10013  
L1-10207C-RIGS-006SS

<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Nuclide MDA (pCi/grams)</b>	<b>Line MDA (pCi/grams)</b>
Sb-125	671.44	1.79	-1.16E+00	1.33E-01	2.47E+00
Ba-133	79.61	2.65	1.63E+00	8.17E-02	3.30E+00
	81.00	32.90	-2.57E-01		2.19E-01
	276.40	7.16	-1.53E-01		4.68E-01
	302.85	18.34	-1.92E-02		2.03E-01
	356.01	62.05	-3.52E-02		8.17E-02
	383.85	8.94	1.31E-01		3.98E-01
Cs-134	475.36	1.48	-1.11E-01	6.45E-02	2.71E+00
	563.25	8.34	-7.06E-02		4.26E-01
	569.33	15.37	-2.21E-03		2.41E-01
	604.72	97.62	-4.04E-03		7.11E-02
	795.86	85.46	6.27E-02		6.45E-02
	801.95	8.69	8.80E-02		5.48E-01
	1038.61	0.99	-9.35E-01		4.88E+00
	1167.97	1.79	8.46E-01		4.18E+00
	1365.19	3.02	-1.61E-01		1.69E+00
+ Cs-137	661.66	* 85.10	6.26E-02	4.63E-02	4.63E-02
Eu-152	121.78	28.67	3.98E-02	1.32E-01	1.32E-01
	244.70	7.61	2.08E-02		5.85E-01
	295.94	0.45	1.04E+01		1.11E+01
	344.28	26.60	-1.18E-01		1.45E-01
	367.79	0.86	-7.42E-01		4.12E+00
	411.12	2.24	6.21E-01		1.70E+00
	443.96	2.83	-4.31E-01		1.39E+00
	488.68	0.42	-6.52E-01		9.30E+00
	563.99	0.49	-3.66E+00		6.84E+00
	586.26	0.46	-3.54E+00		1.33E+01
	678.62	0.47	-1.68E+00		9.50E+00
	688.67	0.86	3.13E+00		5.91E+00
	719.35	0.28	9.09E+00		1.92E+01
	778.90	12.96	1.34E-02		3.71E-01
	810.45	0.32	-2.77E+00		1.23E+01
	867.37	4.26	4.91E-02		1.05E+00
	919.33	0.43	3.65E+00		1.15E+01
	964.08	14.65	-1.10E-01		4.37E-01
	1085.87	10.24	-7.21E-02		5.53E-01
	1089.74	1.73	8.29E-01		3.20E+00
	1112.07	13.69	9.34E-02		4.15E-01
	1212.95	1.43	9.23E-01		4.74E+00
	1249.94	0.19	1.62E+01		3.47E+01
	1299.14	1.63	-4.94E-01		3.58E+00
	1408.01	21.07	1.02E-01		2.52E-01
	1457.64	0.50	-5.45E+00		4.50E+01
	1528.10	0.28	-4.26E+00		1.21E+01
Eu-154	123.07	40.40	3.51E-02	9.36E-02	9.36E-02
	247.93	6.89	6.34E-02		5.45E-01
	591.76	4.95	5.90E-01		8.52E-01
	692.42	1.78	8.38E-01		2.82E+00
	723.30	20.06	1.83E-01		2.94E-01
	756.80	4.52	-3.00E-01		1.00E+00
	873.18	12.08	3.95E-02		3.92E-01

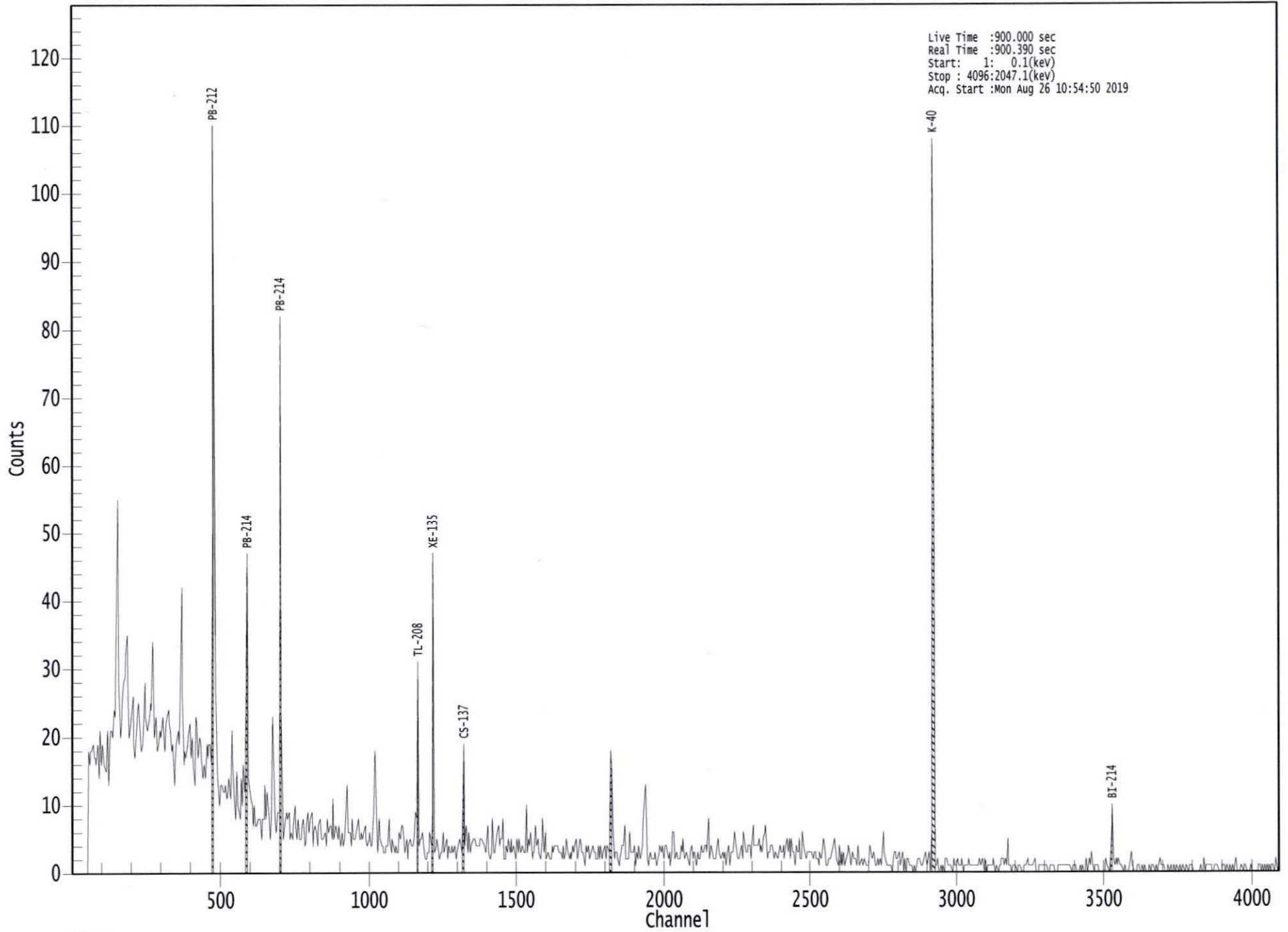
Analysis Report for 26-Aug-19-10013  
L1-10207C-RIGS-006SS

<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Nuclide MDA (pCi/grams)</b>	<b>Line MDA (pCi/grams)</b>
Eu-154	996.29	10.48	2.10E-01	9.36E-02	5.35E-01
	1004.76	18.01	4.49E-02		2.96E-01
	1274.43	34.80	-5.53E-02		1.55E-01
	1596.48	1.80	3.46E-01		2.17E+00
Eu-155	45.30	1.31	4.70E+00	2.02E-01	1.38E+01
	60.01	1.22	1.87E+00		1.39E+01
	86.55	30.70	-1.89E-03		2.02E-01
	105.31	21.10	1.91E-02		2.06E-01
Ra-226	186.21	3.64	6.97E-01	1.20E+00	1.20E+00
Pa-231	27.36	10.30	8.00E-01	1.30E+00	1.30E+00
	283.69	1.70	-1.26E+00		1.92E+00
	300.07	2.47	-7.04E-01		1.54E+00
	302.65	2.20	-1.59E-01		1.69E+00
	330.06	1.40	-5.59E-01		2.65E+00
	143.76	10.96	5.31E-02		7.78E-02
163.33	5.08	-2.42E-02	8.23E-01		
185.71	57.20	7.76E-02	7.78E-02		
202.11	1.08	8.43E-01	3.70E+00		
205.31	5.01	-2.88E-01	7.78E-01		
Am-241	59.54	35.90	1.17E-01	4.90E-01	4.90E-01

- + = 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  
 ? = CAUTION: MDA value is inconsistent with Currie MDA at 95% confidence level



# 0000079104.CNF



 ROI Type: 1

Analysis Report for 26-Aug-19-10014  
L1-10207C-RIGS-007SS

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## GAMMA SPECTRUM ANALYSIS

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Sample Identification : 26-Aug-19-10014  
Sample Description : L1-10207C-RIGS-007SS  
Sample Type : Soil  
Unit :  
Sample Point :  
  
Sample Size : 1.438E+03 grams  
Facility : Default  
  
Sample Taken On : 8/22/2019 1:16:00PM  
Acquisition Started : 8/26/2019 10:54:56AM  
  
Procedure : 130G\_SOIL\_1  
Operator : Administrator  
Detector Name : P40818B  
Geometry : 130G\_SOIL\_1  
Live Time : 900.0 seconds  
Real Time : 901.7 seconds  
  
Dead Time : 0.19 %  
  
Peak Locate Threshold : 3.00  
Peak Locate Range (in channels) : 120 - 8192  
Peak Area Range (in channels) : 120 - 8192  
Identification Energy Tolerance : 1.000 keV  
  
Energy Calibration Used Done On : 1/29/2019  
Efficiency Calibration Used Done On : 8/26/2019  
Efficiency Calibration Description :  
  
Sample Number : 79105  
Fill Height : 1437.87 gram  
Certificate Name : Eu155-Na22  
Certificate Date : 1/30/2012 12:00:00PM

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8-26-19

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## PEAK ANALYSIS REPORT

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Peak Analysis Performed on : 8/26/2019 11:10:01AM  
Peak Analysis From Channel : 120  
Peak Analysis To Channel : 8192

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8-26-19

Analysis Report for 26-Aug-19-10014  
L1-10207C-RIGS-007SS

Peak No.	Energy (keV)	ROI start	ROI end	Peak Centroid	Net Peak Area	Net Area Uncertainty	Continuum Counts	FWHM (keV)
1	186.02	738 -	749	744.37	4.94E+01	15.22	7.26E+01	1.07
2	238.69	946 -	960	954.87	1.98E+02	20.64	7.99E+01	0.97
3	295.36	1176 -	1186	1181.35	6.45E+01	13.34	4.75E+01	0.84
4	338.16	1348 -	1360	1352.41	4.71E+01	11.08	2.79E+01	0.87
5	351.97	1398 -	1415	1407.60	1.44E+02	15.46	2.90E+01	0.78
6	583.19	2327 -	2339	2331.99	7.39E+01	10.16	1.11E+01	0.87
7	609.37	2430 -	2443	2436.64	8.18E+01	11.36	1.72E+01	1.57
8	661.51	2638 -	2651	2645.13	3.34E+01	7.94	1.06E+01	0.81
9	911.36	3637 -	3652	3644.40	5.52E+01	9.19	9.82E+00	1.27
10	1120.18	4474 -	4486	4479.83	1.86E+01	6.99	1.14E+01	0.34
11	1377.57	5504 -	5515	5509.89	1.05E+01	3.80	1.48E+00	0.27
12	1460.85	5831 -	5855	5843.25	3.55E+02	20.15	1.25E+01	1.12

M = First peak in a multiplet region  
m = Other peak in a multiplet region  
F = Fitted singlet  
Errors quoted at 1.000sigma

No background subtract performed on this spectrum.

## NUCLIDE IDENTIFICATION REPORT

Nuclide Library Used : C:\Canberra\Apex\Root\Default\Library\ZION LIB-BNL.NLB

### IDENTIFIED NUCLIDES

Nuclide Name	Id Confidence	Energy (keV)	Yield(%)	Activity (pCi/grams)	Activity Uncertainty
K-40	1.00	1460.82 *	10.66	9.01E+00	6.45E-01
Cs-137	0.99	661.66 *	85.10	6.17E-02	1.51E-02
Tl-208	1.00	583.19 *	85.00	1.25E-01	1.88E-02
Pb-212	0.99	115.18 *	0.60		
		238.63 *	43.60	3.59E-01	4.73E-02

Analysis Report for 26-Aug-19-10014

L1-10207C-RIGS-007SS

<b>Nuclide Name</b>	<b>Id Confidence</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Activity Uncertainty</b>
Pb-212	0.99	300.09	3.30		
Bi-214	1.00	609.32 *	45.49	2.67E-01	4.04E-02
		768.36	4.89		
		806.18	1.26		
		934.06	3.11		
		1120.29 *	14.92	2.80E-01	1.06E-01
		1155.21	1.63		
		1238.12	5.83		
		1280.98	1.43		
		1377.67 *	3.99	6.83E-01	2.48E-01
		1385.31	0.79		
		1401.52	1.33		
		1407.99	2.39		
		1509.21	2.13		
		1661.27	1.05		
		1729.59	2.88		
		1764.49	15.30		
		1847.43	2.03		
		2118.51	1.16		
Pb-214	0.99	241.99	7.25		
		295.22 *	18.42	3.12E-01	6.91E-02
		351.93 *	35.60	4.09E-01	5.48E-02
		785.96	1.06		
Ra-226	0.99	186.21 *	3.64	9.54E-01	3.04E-01
Ac-228	0.99	129.07	2.42		
		209.25	3.89		
		270.24	3.46		
		328.00	2.95		
		338.32 *	11.27	4.10E-01	1.02E-01
		409.46	1.92		
		463.00	4.40		
		794.95	4.25		
		911.20 *	25.80	4.19E-01	7.20E-02
		964.77	4.99		
		968.97	15.80		
		1588.20	3.22		
U-235	0.98	143.76	10.96		
		163.33	5.08		
		185.71 *	57.20	6.07E-02	1.94E-02
		202.11	1.08		
		205.31	5.01		

\* = Energy line found in the spectrum.

- = Manually added nuclide.

? = Manually edited nuclide.

@ = Energy line not used for Weighted Mean Activity

Energy Tolerance : 1.000 keV

Nuclide confidence index threshold = 0.30

Errors quoted at 1.000sigma

Analysis Report for 26-Aug-19-10014  
L1-10207C-RIGS-007SS

## INTERFERENCE CORRECTED REPORT

	Nuclide Name	Nuclide Id Confidence	Wt mean Activity (pCi/grams)	Wt mean Activity Uncertainty	Comments
	K-40	1.000	9.01E+00	6.45E-01	
	Cs-137	0.996	6.17E-02	1.51E-02	
	Tl-208	1.000	1.25E-01	1.88E-02	
X	Bi-211	0.879			
	Pb-212	0.999	3.59E-01	4.73E-02	
	Bi-214	1.000	2.78E-01	3.73E-02	
	Pb-214	0.999	3.72E-01	4.29E-02	
?	Ra-226	0.994	9.54E-01	3.04E-01	
	Ac-228	0.998	4.16E-01	5.89E-02	
?	<del>U-235</del> <i>Ra-226</i>	<del>0.989</del>	<del>6.07E-02</del>	<del>1.94E-02</del>	

- ? = 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 1.000sigma

*u-235 only 1 peak*

*JDW  
8-26-19*

Analysis Report for 26-Aug-19-10014  
L1-10207C-RIGS-007SS

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## UNIDENTIFIED PEAKS

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Peak Locate Performed on : 8/26/2019 11:10:01AM  
Peak Locate From Channel : 120  
Peak Locate To Channel : 8192

Peak No.	Energy (keV)	Peak Size (CPS)	Peak CPS (%) Uncertainty	Peak Type	Tolerance Nuclide
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All peaks were identified.

M = First peak in a multiplet region  
m = Other peak in a multiplet region  
F = Fitted singlet  
Errors quoted at 1.000sigma

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## NUCLIDE MDA REPORT

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Nuclide Library Used : C:\Canberra\Apex\Root\Default\Library\ZION LIB-BNL.NLB

Nuclide Name	Energy (keV)	Yield(%)	Activity (pCi/grams)	Nuclide MDA (pCi/grams)	Line MDA (pCi/grams)
An Pk	511.00	100.00	4.95E-02	6.62E-02	6.62E-02
BE-7	477.60	10.44	-1.13E-01	4.57E-01	4.57E-01
+ K-40	1460.82	* 10.66	9.01E+00	6.93E-01	6.93E-01
Mn-54	834.85	99.98	-9.02E-03	4.62E-02	4.62E-02
Co-60	1173.23	99.85	-8.72E-03	7.26E-02	7.63E-02
	1332.49	99.98	2.57E-02		7.26E-02
Nb-94	702.65	99.81	3.16E-02	5.85E-02	6.04E-02
	871.09	99.89	-6.35E-02		5.85E-02
Ag-108m	79.13	6.60	1.69E+00	4.77E-02	2.33E+00
	433.94	90.50	-1.64E-02		4.77E-02
	614.28	89.80	-5.83E-02		8.09E-02
	722.94	90.80	2.75E-02		6.38E-02
Sb-125	176.31	6.84	5.88E-01	1.50E-01	6.97E-01
	380.45	1.52	8.85E-01		3.00E+00
	427.87	29.60	1.47E-01		1.50E-01
	463.36	10.49	5.71E-02		5.12E-01
	600.60	17.65	4.97E-02		2.74E-01
	606.71	4.98	2.78E+00		1.65E+00
	635.95	11.22	1.06E-01		4.38E-01

Analysis Report for 26-Aug-19-10014  
L1-10207C-RIGS-007SS

<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Nuclide MDA (pCi/grams)</b>	<b>Line MDA (pCi/grams)</b>
Sb-125	671.44	1.79	-1.51E+00	1.50E-01	3.45E+00
Ba-133	79.61	2.65	-3.22E+00	9.60E-02	5.36E+00
	81.00	32.90	-1.93E-01		3.74E-01
	276.40	7.16	2.56E-01		7.17E-01
	302.85	18.34	1.06E-01		2.51E-01
	356.01	62.05	-1.09E-03		9.60E-02
	383.85	8.94	-3.59E-01		5.01E-01
Cs-134	475.36	1.48	-1.22E+00	6.54E-02	3.18E+00
	563.25	8.34	-2.02E-01		5.56E-01
	569.33	15.37	-1.29E-01		2.97E-01
	604.72	97.62	-7.38E-02		7.47E-02
	795.86	85.46	8.89E-03		6.54E-02
	801.95	8.69	-3.53E-01		5.94E-01
	1038.61	0.99	-9.35E+00		6.51E+00
	1167.97	1.79	-3.14E+00		4.15E+00
	1365.19	3.02	-1.27E+00		1.99E+00
+ Cs-137	661.66	* 85.10	6.17E-02	3.95E-02	3.95E-02
Eu-152	121.78	28.67	-1.22E-03	1.68E-01	1.80E-01
	244.70	7.61	2.31E-02		7.00E-01
	295.94	0.45	1.36E+01		1.31E+01
	344.28	26.60	-1.87E-03		1.68E-01
	367.79	0.86	8.48E-01		5.18E+00
	411.12	2.24	8.85E-02		2.26E+00
	443.96	2.83	-1.04E+00		1.84E+00
	488.68	0.42	-3.44E+00		1.17E+01
	563.99	0.49	3.08E+00		9.86E+00
	586.26	0.46	2.09E+01		1.72E+01
	678.62	0.47	1.63E+00		1.13E+01
	688.67	0.86	3.27E+00		6.11E+00
	719.35	0.28	5.51E+00		1.89E+01
	778.90	12.96	2.37E-02		4.60E-01
	810.45	0.32	8.15E+00		1.76E+01
	867.37	4.26	-7.68E-01		1.47E+00
	919.33	0.43	2.21E-01		1.49E+01
	964.08	14.65	-1.39E-02		5.69E-01
	1085.87	10.24	-2.74E-01		6.09E-01
	1089.74	1.73	-2.31E+00		4.15E+00
	1112.07	13.69	3.45E-02		5.31E-01
	1212.95	1.43	2.09E+00		6.01E+00
	1249.94	0.19	2.68E+01		4.10E+01
	1299.14	1.63	-3.15E+00		3.96E+00
	1408.01	21.07	1.49E-01		2.91E-01
	1457.64	0.50	2.03E+02		5.17E+01
	1528.10	0.28	2.17E+00		1.55E+01
Eu-154	123.07	40.40	-4.10E-02	1.25E-01	1.25E-01
	247.93	6.89	5.89E-01		6.75E-01
	591.76	4.95	1.85E-01		1.05E+00
	692.42	1.78	-4.68E-01		2.93E+00
	723.30	20.06	1.99E-01		2.95E-01
	756.80	4.52	-5.21E-01		9.87E-01
	873.18	12.08	-3.92E-02		5.04E-01

Analysis Report for 26-Aug-19-10014

L1-10207C-RIGS-007SS

<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Nuclide MDA (pCi/grams)</b>	<b>Line MDA (pCi/grams)</b>
Eu-154	996.29	10.48	4.12E-01	1.25E-01	5.96E-01
	1004.76	18.01	-3.05E-02		3.07E-01
	1274.43	34.80	-1.67E-01		2.11E-01
	1596.48	1.80	-3.52E+00		3.04E+00
Eu-155	45.30	1.31	7.09E-01	3.12E-01	3.72E+01
	60.01	1.22	-1.21E+01		3.72E+01
	86.55	30.70	4.53E-02		3.14E-01
	105.31	21.10	-1.83E-01		3.12E-01
+ Ra-226	186.21	* 3.64	9.54E-01	9.41E-01	9.41E-01
Pa-231	27.36	10.30	3.73E+00	1.90E+00	3.80E+00
	283.69	1.70	-6.93E-01		2.64E+00
	300.07	2.47	-1.76E+00		1.90E+00
	302.65	2.20	1.54E-01		2.07E+00
	330.06	1.40	1.91E+00		3.47E+00
	+ U-235	143.76	10.96		3.06E-01
U-235	163.33	5.08	4.60E-01	5.99E-02	8.94E-01
	185.71	* 57.20	6.07E-02		5.99E-02
	202.11	1.08	-2.25E+00		4.02E+00
	205.31	5.01	-4.84E-01		8.77E-01
Am-241	59.54	35.90	-3.29E-01	1.32E+00	1.32E+00

+ = Nuclide identified during the nuclide identification

\* = Energy line found in the spectrum

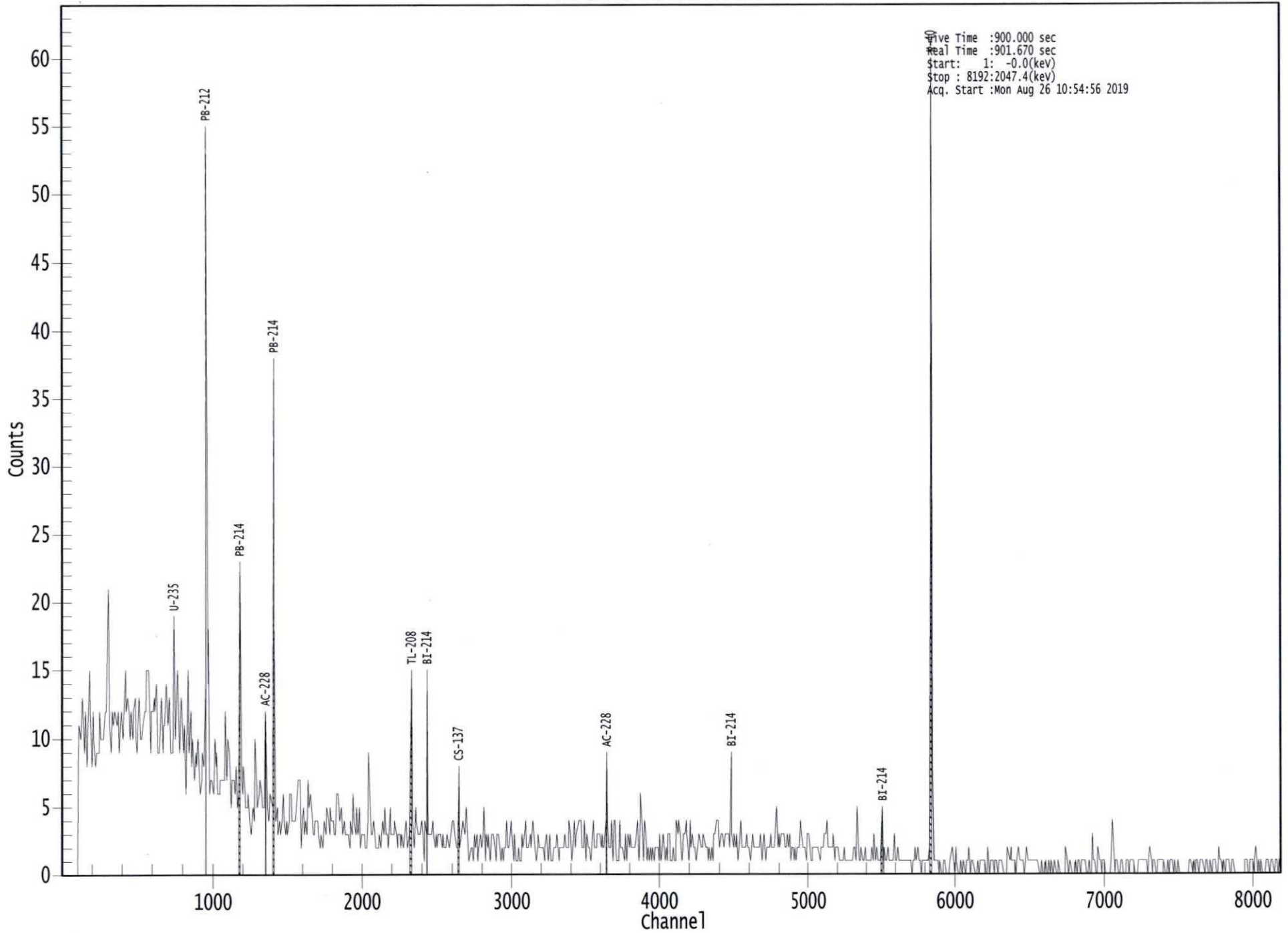
&gt; = MDA value not calculated

@ = Half-life too short to be able to perform the decay correction

? = CAUTION: MDA value is inconsistent with Currie MDA at 95% confidence level



0000079105.CNF



Live Time : 900.000 sec  
Real Time : 901.670 sec  
Start : 1: -0.0(kev)  
Stop : 8192:2047.4(kev)  
Acq. Start : Mon Aug 26 10:54:56 2019

ROI Type: 1

Analysis Report for 26-Aug-19-10015  
L1-10207C-RIGS-008SS

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## GAMMA SPECTRUM ANALYSIS

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Sample Identification : 26-Aug-19-10015  
Sample Description : L1-10207C-RIGS-008SS  
Sample Type : Soil  
Unit :  
Sample Point :  
  
Sample Size : 1.473E+03 grams  
Facility : Default  
  
Sample Taken On : 8/22/2019 1:18:00PM  
Acquisition Started : 8/26/2019 10:55:03AM  
  
Procedure : 130G\_SOIL\_1  
Operator : Administrator  
Detector Name : P11314  
Geometry : 130G\_SOIL\_1  
Live Time : 900.0 seconds  
Real Time : 900.3 seconds  
  
Dead Time : 0.03 %  
  
Peak Locate Threshold : 3.00  
Peak Locate Range (in channels) : 120 - 8192  
Peak Area Range (in channels) : 120 - 8192  
Identification Energy Tolerance : 1.000 keV  
  
Energy Calibration Used Done On : 1/24/2019  
Efficiency Calibration Used Done On : 8/26/2019  
Efficiency Calibration Description :  
  
Sample Number : 79106  
Fill Height : 1472.67 gram  
Certificate Name : Eu155-Na22  
Certificate Date : 12/22/2008 12:00:00PM

*J.P. Welch*  
8-26-19

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## PEAK ANALYSIS REPORT

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Peak Analysis Performed on : 8/26/2019 11:10:17AM

Peak Analysis From Channel : 120  
Peak Analysis To Channel : 8192

*J.P. Welch*  
8-26-19

Analysis Report for 26-Aug-19-10015

L1-10207C-RIGS-008SS

Peak No.	Energy (keV)	ROI start	ROI end	Peak Centroid	Net Peak Area	Net Area Uncertainty	Continuum Counts	FWHM (keV)
1	77.18	305 -	315	309.26	7.58E+01	17.74	9.82E+01	0.61
2	128.80	512 -	522	515.41	2.49E+01	13.79	6.91E+01	0.56
3	238.73	951 -	960	954.50	1.85E+02	18.63	6.82E+01	1.03
4	295.26	1173 -	1188	1180.31	8.09E+01	12.72	2.71E+01	0.86
5	338.40	1347 -	1359	1352.67	4.76E+01	10.95	2.74E+01	0.92
6	352.12	1399 -	1414	1407.51	1.19E+02	15.26	3.76E+01	1.27
7	583.09	2320 -	2338	2330.48	7.02E+01	11.28	1.68E+01	0.95
8	609.16	2428 -	2442	2434.68	7.52E+01	11.65	2.08E+01	1.23
9	911.05	3635 -	3649	3641.68	5.64E+01	10.22	1.66E+01	0.58
10	1460.08	5826 -	5849	5838.26	3.95E+02	20.17	2.99E+00	1.76

M = First peak in a multiplet region

m = Other peak in a multiplet region

F = Fitted singlet

Errors quoted at 1.000sigma

No background subtract performed on this spectrum.

## NUCLIDE IDENTIFICATION REPORT

Nuclide Library Used : C:\Canberra\Apex\Root\Default\Library\ZION LIB-BNL.NLB

### IDENTIFIED NUCLIDES

Nuclide Name	Id Confidence	Energy (keV)	Yield(%)	Activity (pCi/grams)	Activity Uncertainty
K-40	0.91	1460.82 *	10.66	8.96E+00	6.01E-01
Tl-208	0.99	583.19 *	85.00	1.07E-01	1.83E-02
Pb-212	0.99	115.18	0.60		
		238.63 *	43.60	2.96E-01	3.82E-02
		300.09	3.30		
Pb212-XR	1.00	74.82	10.28		
		77.11 *	17.10	5.37E-01	1.37E-01

Analysis Report for 26-Aug-19-10015  
L1-10207C-RIGS-008SS

<b>Nuclide Name</b>	<b>Id Confidence</b>	<b>Energy (keV)</b>		<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Activity Uncertainty</b>
Pb212-XR	1.00	87.35		3.97		
		89.78		1.46		
Bi-214	0.99	609.32	*	45.49	2.20E-01	3.65E-02
		768.36		4.89		
		806.18		1.26		
		934.06		3.11		
		1120.29		14.92		
		1155.21		1.63		
		1238.12		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		
		1661.27		1.05		
		1729.59		2.88		
		1764.49		15.30		
		1847.43		2.03		
		2118.51		1.16		
Pb-214	0.99	241.99		7.25		
		295.22	*	18.42	3.49E-01	6.15E-02
		351.93	*	35.60	3.03E-01	4.57E-02
		785.96		1.06		
Pb214-XR	1.00	74.82		5.80		
		77.11	*	9.70	9.47E-01	2.46E-01
		87.35		2.24		
		89.78		0.82		
Ac-228	0.74	129.07	*	2.42	6.34E-01	3.57E-01
		209.25		3.89		
		270.24		3.46		
		328.00		2.95		
		338.32	*	11.27	3.71E-01	9.05E-02
		409.46		1.92		
		463.00		4.40		
		794.95		4.25		
		911.20	*	25.80	3.83E-01	7.13E-02
		964.77		4.99		
		968.97		15.80		
		1588.20		3.22		

\* = Energy line found in the spectrum.

- = Manually added nuclide.

? = Manually edited nuclide.

@ = Energy line not used for Weighted Mean Activity

Energy Tolerance : 1.000 keV

Nuclide confidence index threshold = 0.30

Errors quoted at 1.000sigma

Analysis Report for 26-Aug-19-10015

L1-10207C-RIGS-008SS

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## INTERFERENCE CORRECTED REPORT

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<b>Nuclide Name</b>	<b>Nuclide Id Confidence</b>	<b>Wt mean Activity (pCi/grams)</b>	<b>Wt mean Activity Uncertainty</b>	<b>Comments</b>
K-40	0.916	8.96E+00	6.01E-01	
Tl-208	0.999	1.07E-01	1.83E-02	
Pb-212	0.999	2.96E-01	3.82E-02	
? Pb212-XR	1.000	5.37E-01	1.37E-01	
Bi-214	0.998	2.20E-01	3.65E-02	
Pb-214	0.997	3.19E-01	3.67E-02	
? Pb214-XR	1.000	9.47E-01	2.46E-01	
Ac-228	0.744	3.84E-01	5.53E-02	

- ? = 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 1.000sigma

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Analysis Report for 26-Aug-19-10015  
L1-10207C-RIGS-008SS

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## UNIDENTIFIED PEAKS

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Peak Locate Performed on : 8/26/2019 11:10:17AM  
Peak Locate From Channel : 120  
Peak Locate To Channel : 8192

Peak No.	Energy (keV)	Peak Size (CPS)	Peak CPS (%) Uncertainty	Peak Type	Tolerance Nuclide
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All peaks were identified.

M = First peak in a multiplet region  
m = Other peak in a multiplet region  
F = Fitted singlet  
Errors quoted at 1.000sigma

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## NUCLIDE MDA REPORT

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Nuclide Library Used : C:\Canberra\Apex\Root\Default\Library\ZION LIB-BNL.NLB

Nuclide Name	Energy (keV)	Yield(%)	Activity (pCi/grams)	Nuclide MDA (pCi/grams)	Line MDA (pCi/grams)
An Pk	511.00	100.00	5.45E-02	5.93E-02	5.93E-02
BE-7	477.60	10.44	-7.37E-02	3.85E-01	3.85E-01
+ K-40	1460.82	* 10.66	8.96E+00	3.32E-01	3.32E-01
Mn-54	834.85	99.98	4.05E-02	5.20E-02	5.20E-02
Co-60	1173.23	99.85	4.69E-03	5.96E-02	6.82E-02
	1332.49	99.98	2.05E-02		5.96E-02
Nb-94	702.65	99.81	8.60E-04	4.87E-02	5.26E-02
	871.09	99.89	-1.15E-02		4.87E-02
Ag-108m	79.13	6.60	-3.44E-01	4.35E-02	1.34E+00
	433.94	90.50	9.42E-03		4.35E-02
	614.28	89.80	-2.73E-02		6.50E-02
	722.94	90.80	3.17E-02		6.06E-02
Sb-125	176.31	6.84	1.23E-01	1.37E-01	5.00E-01
	380.45	1.52	1.14E+00		2.67E+00
	427.87	29.60	4.33E-02		1.37E-01
	463.36	10.49	3.08E-01		4.46E-01
	600.60	17.65	-2.59E-01		2.46E-01
	606.71	4.98	2.32E+00		1.52E+00
	635.95	11.22	2.36E-04		4.02E-01

Analysis Report for 26-Aug-19-10015  
L1-10207C-RIGS-008SS

<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Nuclide MDA (pCi/grams)</b>	<b>Line MDA (pCi/grams)</b>
Sb-125	671.44	1.79	1.80E+00	1.37E-01	2.71E+00
Ba-133	79.61	2.65	-4.14E-01	7.75E-02	3.24E+00
	81.00	32.90	-1.50E-01		1.95E-01
	276.40	7.16	3.94E-01		5.59E-01
	302.85	18.34	1.96E-01		2.24E-01
	356.01	62.05	-2.14E-02		7.75E-02
	383.85	8.94	1.35E-02		4.28E-01
Cs-134	475.36	1.48	1.06E+00	5.62E-02	2.85E+00
	563.25	8.34	2.26E-01		5.74E-01
	569.33	15.37	2.07E-03		2.63E-01
	604.72	97.62	-1.62E-02		6.72E-02
	795.86	85.46	2.16E-02		5.62E-02
	801.95	8.69	2.07E-01		5.07E-01
	1038.61	0.99	-3.39E-01		5.82E+00
	1167.97	1.79	5.67E-01		4.18E+00
	1365.19	3.02	8.70E-02		1.32E+00
Cs-137	661.66	85.10	4.47E-02	6.93E-02	6.93E-02
Eu-152	121.78	28.67	-6.95E-04	1.23E-01	1.23E-01
	244.70	7.61	-2.25E-01		5.59E-01
	295.94	0.45	8.59E+00		1.07E+01
	344.28	26.60	-1.96E-02		1.38E-01
	367.79	0.86	-3.33E+00		3.99E+00
	411.12	2.24	6.40E-01		1.69E+00
	443.96	2.83	9.97E-01		1.36E+00
	488.68	0.42	4.55E+00		9.34E+00
	563.99	0.49	-1.06E+01		8.92E+00
	586.26	0.46	3.91E+00		1.54E+01
	678.62	0.47	-4.44E+00		9.37E+00
	688.67	0.86	-3.02E+00		4.61E+00
	719.35	0.28	-4.81E+00		1.60E+01
	778.90	12.96	-2.67E-01		3.54E-01
	810.45	0.32	-2.79E+00		1.17E+01
	867.37	4.26	3.27E-01		1.23E+00
	919.33	0.43	6.18E-01		1.09E+01
	964.08	14.65	7.53E-01		5.82E-01
	1085.87	10.24	-1.51E-01		5.26E-01
	1089.74	1.73	2.26E+00		3.84E+00
	1112.07	13.69	-1.32E-01		4.75E-01
	1212.95	1.43	-8.05E-02		5.37E+00
	1249.94	0.19	3.72E+00		3.80E+01
	1299.14	1.63	2.49E+00		4.04E+00
	1408.01	21.07	8.23E-02		2.25E-01
	1457.64	0.50	1.90E+02		4.77E+01
	1528.10	0.28	8.00E+00		1.54E+01
Eu-154	123.07	40.40	-4.36E-02	8.65E-02	8.65E-02
	247.93	6.89	1.69E-01		5.44E-01
	591.76	4.95	-3.87E-01		9.25E-01
	692.42	1.78	2.80E-01		2.46E+00
	723.30	20.06	1.74E-01		2.75E-01
	756.80	4.52	-4.69E-01		9.34E-01
	873.18	12.08	6.11E-02		4.28E-01

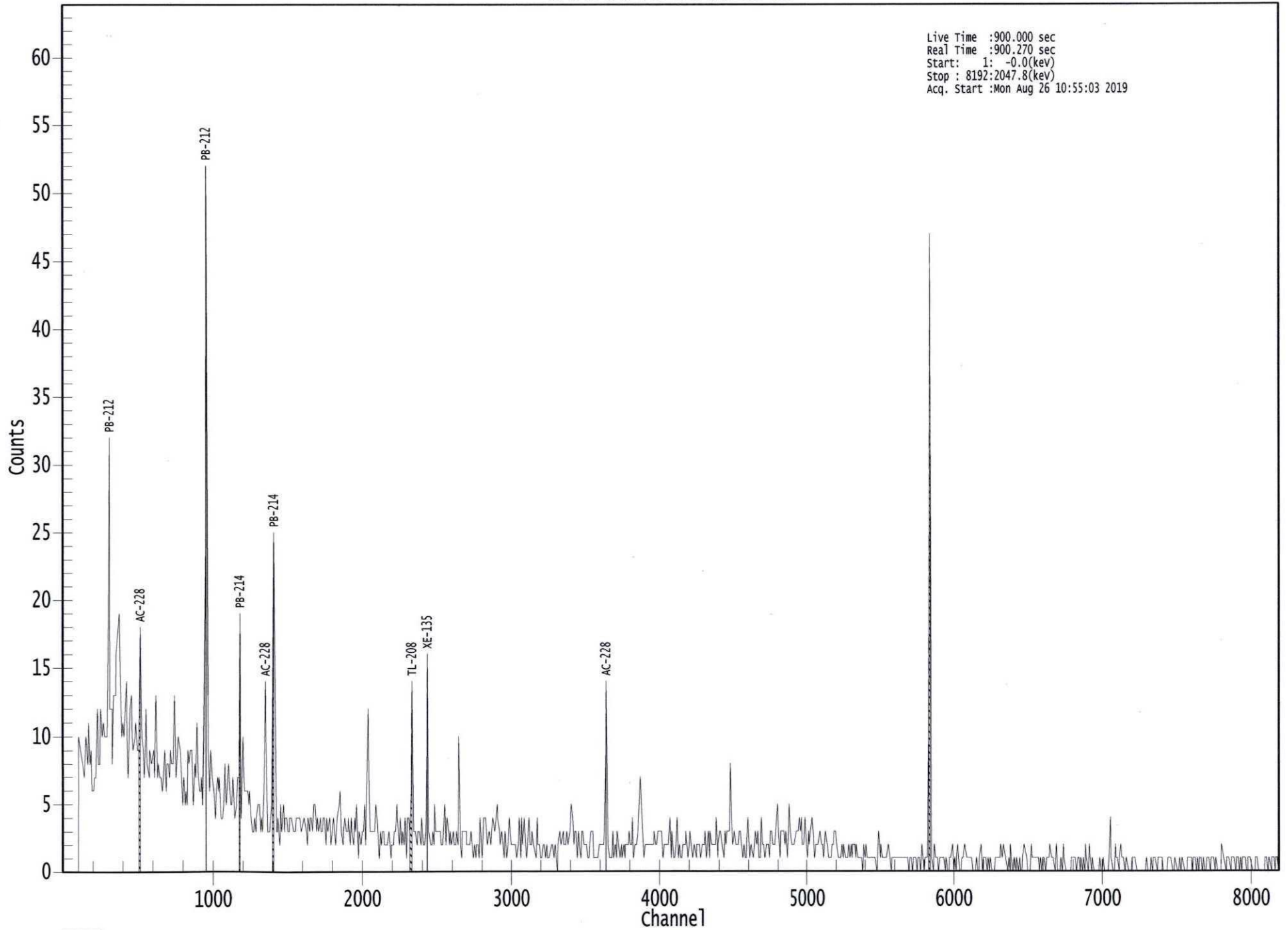
Analysis Report for 26-Aug-19-10015  
L1-10207C-RIGS-008SS

<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Nuclide MDA (pCi/grams)</b>	<b>Line MDA (pCi/grams)</b>
Eu-154	996.29	10.48	1.41E-01	8.65E-02	5.56E-01
	1004.76	18.01	-3.12E-01		2.99E-01
	1274.43	34.80	-9.22E-02		1.89E-01
	1596.48	1.80	8.66E-01		2.11E+00
Eu-155	45.30	1.31	4.78E+00	2.11E-01	1.39E+01
	60.01	1.22	-6.19E+00		1.36E+01
	86.55	30.70	1.23E-01		2.11E-01
	105.31	21.10	3.20E-02		2.14E-01
Ra-226	186.21	3.64	1.38E+00	1.10E+00	1.10E+00
Pa-231	27.36	10.30	1.17E+00	1.48E+00	1.48E+00
	283.69	1.70	-7.67E-01		1.97E+00
	300.07	2.47	8.74E-01		1.60E+00
	302.65	2.20	1.31E+00		1.87E+00
	330.06	1.40	-6.57E-01		2.58E+00
	U-235	143.76	10.96		4.62E-03
	163.33	5.08	-5.67E-02	6.45E-01	
	185.71	57.20	8.06E-02	6.95E-02	
	202.11	1.08	9.89E-01	2.94E+00	
	205.31	5.01	-6.98E-01	6.22E-01	
Am-241	59.54	35.90	7.81E-02	4.88E-01	4.88E-01

- + = 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  
 ? = CAUTION: MDA value is inconsistent with Currie MDA at 95% confidence level



Live Time : 900.000 sec  
Real Time : 900.270 sec  
Start: 1: -0.0(keV)  
Stop : 8192:2047.8(keV)  
Acq. Start : Mon Aug 26 10:55:03 2019



ROI Type: 1

Analysis Report for 26-Jun-19-10031  
L1-10208D-RIGS-001SS

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## GAMMA SPECTRUM ANALYSIS

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Sample Identification : 26-Jun-19-10031  
Sample Description : L1-10208D-RIGS-001SS  
Sample Type : Soil  
Unit :  
Sample Point :  
  
Sample Size : 1.335E+03 grams  
Facility : Default  
  
Sample Taken On : 6/25/2019 12:50:00PM  
Acquisition Started : 6/26/2019 10:38:02AM  
  
Procedure : 130G\_SOIL\_1  
Operator : Administrator  
Detector Name : 352  
Geometry : 130G\_SOIL\_1  
Live Time : 900.0 seconds  
Real Time : 900.4 seconds  
  
Dead Time : 0.05 %  
  
Peak Locate Threshold : 3.00  
Peak Locate Range (in channels) : 120 - 8192  
Peak Area Range (in channels) : 120 - 8192  
Identification Energy Tolerance : 1.000 keV  
  
Energy Calibration Used Done On : 9/29/2018  
Efficiency Calibration Used Done On : 6/26/2019  
Efficiency Calibration Description :  
  
Sample Number : 77639  
Fill Height : 1334.56 gram  
Certificate Name : Eu155-Na22  
Certificate Date : 1/7/2013 12:00:00PM

*Wood*  
6-30-19

*at*  
6-26-19

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## PEAK ANALYSIS REPORT

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Peak Analysis Performed on : 6/26/2019 10:53:06AM  
Peak Analysis From Channel : 120  
Peak Analysis To Channel : 8192

Analysis Report for 26-Jun-19-10031

L1-10208D-RIGS-001SS

Peak No.	Energy (keV)	ROI start	ROI end	Peak Centroid	Net Peak Area	Net Area Uncertainty	Continuum Counts	FWHM (keV)
1	76.87	305 -	315	308.78	7.75E+01	18.53	1.11E+02	1.05
2	92.91	365 -	376	372.86	3.83E+01	19.90	1.43E+02	0.72
3	129.04	514 -	521	517.20	2.87E+01	13.49	7.63E+01	0.38
4	185.91	738 -	752	744.37	9.25E+01	22.49	1.43E+02	0.77
M	5	947 -	976	954.97	4.27E+02	21.24	1.11E+02	1.17
m	6	947 -	976	967.69	9.07E+01	11.40	1.01E+02	1.17
7	295.18	1176 -	1190	1180.94	1.50E+02	17.37	5.17E+01	0.92
8	338.37	1345 -	1360	1353.52	9.00E+01	14.91	4.40E+01	1.02
9	351.85	1398 -	1416	1407.41	2.36E+02	21.83	7.13E+01	1.43
10	583.03	2322 -	2342	2331.44	1.61E+02	14.98	1.77E+01	0.91
11	609.27	2426 -	2446	2436.34	1.64E+02	16.96	3.41E+01	1.31
12	727.27	2901 -	2915	2908.16	5.11E+01	9.07	1.09E+01	0.55
13	794.74	3171 -	3183	3178.00	1.38E+01	7.93	1.82E+01	0.33
14	911.12	3634 -	3652	3643.50	1.01E+02	13.45	2.36E+01	1.69
15	968.75	3867 -	3881	3874.06	3.55E+01	12.13	3.65E+01	1.21
16	1460.59	5828 -	5855	5842.75	7.44E+02	28.99	2.12E+01	2.10

M = First peak in a multiplet region  
 m = Other peak in a multiplet region  
 F = Fitted singlet  
 Errors quoted at 1.000sigma

No background subtract performed on this spectrum.

## NUCLIDE IDENTIFICATION REPORT

Nuclide Library Used : C:\Canberra\Apex\Root\Default\Library\ZION LIB-BNL.NLB

### IDENTIFIED NUCLIDES

Nuclide Name	Id Confidence	Energy (keV)	Yield(%)	Activity (pCi/grams)	Activity Uncertainty
K-40	0.99	1460.82 *	10.66	1.62E+01	9.47E-01

Analysis Report for 26-Jun-19-10031

L1-10208D-RIGS-001SS

<b>Nuclide Name</b>	<b>Id Confidence</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Activity Uncertainty</b>
Tl-208	0.99	583.19 *	85.00	2.39E-01	2.64E-02
Bi-212	1.00	39.86	1.06		
		727.33 *	6.67	1.12E+00	2.09E-01
		785.37	1.10		
		1620.50	1.47		
Pb-212	1.00	115.18	0.60		
		238.63 *	43.60	6.88E-01	6.53E-02
		300.09	3.30		
Pb212-XR	0.99	74.82	10.28		
		77.11 *	17.10	7.45E-01	1.94E-01
		87.35	3.97		
		89.78	1.46		
Bi-214	1.00	609.32 *	45.49	4.67E-01	5.59E-02
		768.36	4.89		
		806.18	1.26		
		934.06	3.11		
		1120.29	14.92		
		1155.21	1.63		
		1238.12	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		
		1661.27	1.05		
		1729.59	2.88		
		1764.49	15.30		
		1847.43	2.03		
		2118.51	1.16		
Pb-214	0.99	241.99 *	7.25	8.84E-01	1.32E-01
		295.22 *	18.42	6.44E-01	9.05E-02
		351.93 *	35.60	5.92E-01	7.24E-02
		785.96	1.06		
Pb214-XR	0.99	74.82	5.80		
		77.11 *	9.70	1.31E+00	3.47E-01
		87.35	2.24		
		89.78	0.82		
Ra-226	0.98	186.21 *	3.64	1.59E+00	4.08E-01
Ac-228	0.99	129.07 *	2.42	7.90E-01	3.81E-01
		209.25	3.89		
		270.24	3.46		
		328.00	2.95		
		338.32 *	11.27	6.94E-01	1.28E-01
		409.46	1.92		
		463.00	4.40		
		794.95 *	4.25	5.04E-01	2.90E-01
		911.20 *	25.80	6.66E-01	9.28E-02
		964.77	4.99		
		968.97 *	15.80	3.97E-01	1.37E-01
		1588.20	3.22		
Ac228-XR	0.98	89.96	1.90		
		93.35 *	3.10	1.23E+00	6.68E-01

Analysis Report for 26-Jun-19-10031

L1-10208D-RIGS-001SS

Nuclide Name	Id Confidence	Energy (keV)	Yield(%)	Activity (pCi/grams)	Activity Uncertainty
Th-234	0.99	92.38	2.13	1.86E+00	9.99E-01
		92.80 *	2.10		
		112.81	0.21		
U-235	0.99	143.76	10.96	1.01E-01	2.60E-02
		163.33	5.08		
		185.71 *	57.20		
		202.11	1.08		
		205.31	5.01		
U235-XR	0.98	89.96	3.47	6.79E-01	3.59E-01
		93.35 *	5.60		
		105.60	1.32		

\* = Energy line found in the spectrum.  
 - = Manually added nuclide.  
 ? = Manually edited nuclide.  
 @ = Energy line not used for Weighted Mean Activity  
 Energy Tolerance : 1.000 keV  
 Nuclide confidence index threshold = 0.30  
 Errors quoted at 1.000sigma

## INTERFERENCE CORRECTED REPORT

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (pCi/grams)	Wt mean Activity Uncertainty	Comments
K-40	0.992	1.62E+01	9.47E-01	
Tl-208	0.996	2.39E-01	2.64E-02	
X Bi-211	0.906			
Bi-212	1.000	1.12E+00	2.09E-01	
Pb-212	1.000	6.88E-01	6.53E-02	
? Pb212-XR	0.995	7.45E-01	1.94E-01	
Bi-214	1.000	4.67E-01	5.59E-02	
Pb-214	0.999	6.54E-01	5.20E-02	
? Pb214-XR	0.995	1.31E+00	3.47E-01	
? Ra-226	0.986	1.59E+00	4.08E-01	
Ac-228	0.998	6.11E-01	6.33E-02	
? Ac228-XR	0.981	1.23E+00	6.68E-01	
? Th-234	0.999	1.86E+00	9.99E-01	
? <del>U-235</del> Ra-226	0.996	1.01E-01	2.60E-02	
? <del>U235-XR</del> Pb212/Pb214	0.983	6.79E-01	3.59E-01	

U-235 only one peak.  
 U-235XR only one peak.

AS  
 6-26-19

Analysis Report for 26-Jun-19-10031

L1-10208D-RIGS-001SS

- 
- ? = 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 1.000sigma

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Analysis Report for 26-Jun-19-10031  
L1-10208D-RIGS-001SS

## UNIDENTIFIED PEAKS

Peak Locate Performed on : 6/26/2019 10:53:06AM  
Peak Locate From Channel : 120  
Peak Locate To Channel : 8192

Peak No.	Energy (keV)	Peak Size (CPS)	Peak CPS (%) Uncertainty	Peak Type	Tolerance Nuclide
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All peaks were identified.

M = First peak in a multiplet region

m = Other peak in a multiplet region

F = Fitted singlet

Errors quoted at 1.000sigma

## NUCLIDE MDA REPORT

Nuclide Library Used : C:\Canberra\Apex\Root\Default\Library\ZION LIB-BNL.NLB

Nuclide Name	Energy (keV)	Yield(%)	Activity (pCi/grams)	Nuclide MDA (pCi/grams)	Line MDA (pCi/grams)
An Pk	511.00	100.00	8.97E-02	6.76E-02	6.76E-02
BE-7	477.60	10.44	9.18E-02	5.27E-01	5.27E-01
+ K-40	1460.82	* 10.66	1.62E+01	7.90E-01	7.90E-01
Mn-54	834.85	99.98	6.57E-02	7.02E-02	7.02E-02
Co-60	1173.23	99.85	1.03E-02	7.38E-02	9.21E-02
	1332.49	99.98	7.86E-02		7.38E-02
Nb-94	702.65	99.81	2.56E-02	6.54E-02	6.54E-02
	871.09	99.89	7.23E-02		7.02E-02
Ag-108m	79.13	6.60	2.13E-02	5.60E-02	2.04E+00
	433.94	90.50	-5.58E-03		5.60E-02
	614.28	89.80	-3.48E-02		1.06E-01
	722.94	90.80	-1.98E-02		7.98E-02
Sb-125	176.31	6.84	-3.66E-01	1.80E-01	7.05E-01
	380.45	1.52	2.57E-01		3.33E+00
	427.87	29.60	7.88E-02		1.80E-01
	463.36	10.49	5.53E-01		5.66E-01
	600.60	17.65	2.70E-01		3.35E-01
	606.71	4.98	4.87E+00		2.02E+00
	635.95	11.22	2.05E-01		5.25E-01

Analysis Report for 26-Jun-19-10031

L1-10208D-RIGS-001SS

<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Nuclide MDA (pCi/grams)</b>	<b>Line MDA (pCi/grams)</b>
Sb-125	671.44	1.79	-1.18E+00	1.80E-01	3.30E+00
Ba-133	79.61	2.65	-1.47E+00	1.16E-01	5.02E+00
	81.00	32.90	-1.88E-01		3.37E-01
	276.40	7.16	-1.32E-01		7.34E-01
	302.85	18.34	1.79E-01		2.94E-01
	356.01	62.05	-3.92E-02		1.16E-01
	383.85	8.94	2.75E-01		5.63E-01
Cs-134	475.36	1.48	8.15E-01	8.11E-02	3.73E+00
	563.25	8.34	-3.59E-01		6.26E-01
	569.33	15.37	1.08E-01		3.47E-01
	604.72	97.62	2.91E-02		9.42E-02
	795.86	85.46	-9.98E-03		8.11E-02
	801.95	8.69	-1.87E-01		7.50E-01
	1038.61	0.99	1.87E-01		6.99E+00
	1167.97	1.79	1.92E+00		5.27E+00
	1365.19	3.02	1.23E+00		2.17E+00
Cs-137	661.66	85.10	2.01E-03	7.37E-02	7.37E-02
Eu-152	121.78	28.67	-1.83E-02	1.77E-01	2.01E-01
	244.70	7.61	-1.30E-01		7.47E-01
	295.94	0.45	1.91E+01		1.53E+01
	344.28	26.60	-1.24E-01		1.77E-01
	367.79	0.86	3.78E+00		5.81E+00
	411.12	2.24	-9.75E-01		2.25E+00
	443.96	2.83	1.06E-02		1.72E+00
	488.68	0.42	3.98E+00		1.14E+01
	563.99	0.49	-2.62E+00		1.09E+01
	586.26	0.46	-1.66E+00		1.94E+01
	678.62	0.47	-1.09E+00		1.21E+01
	688.67	0.86	-5.09E+00		6.85E+00
	719.35	0.28	-1.26E+01		1.87E+01
	778.90	12.96	1.09E-01		5.00E-01
	810.45	0.32	-8.06E+00		1.86E+01
	867.37	4.26	-2.83E+00		1.77E+00
	919.33	0.43	7.19E-01		1.42E+01
	964.08	14.65	-2.24E-01		6.78E-01
	1085.87	10.24	-7.52E-01		7.87E-01
	1089.74	1.73	3.18E-01		4.70E+00
	1112.07	13.69	-9.85E-01		5.73E-01
	1212.95	1.43	5.66E+00		6.82E+00
	1249.94	0.19	-3.97E+01		4.64E+01
	1299.14	1.63	-2.07E+00		4.79E+00
	1408.01	21.07	-1.61E-02		2.99E-01
	1457.64	0.50	3.51E+02		6.30E+01
	1528.10	0.28	1.28E+01		1.83E+01
Eu-154	123.07	40.40	-4.13E-02	1.42E-01	1.42E-01
	247.93	6.89	-2.64E-02		6.61E-01
	591.76	4.95	2.09E-01		9.96E-01
	692.42	1.78	2.89E-01		3.57E+00
	723.30	20.06	-1.11E-01		3.63E-01
	756.80	4.52	-2.21E-01		1.36E+00
	873.18	12.08	-5.14E-02		5.89E-01



Analysis Report for 26-Jun-19-10031

L1-10208D-RIGS-001SS

<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Nuclide MDA (pCi/grams)</b>	<b>Line MDA (pCi/grams)</b>
Eu-154	996.29	10.48	-7.69E-02	1.42E-01	6.13E-01
	1004.76	18.01	-1.15E-01		3.62E-01
	1274.43	34.80	4.83E-02		2.45E-01
	1596.48	1.80	-7.18E+00		3.37E+00
Eu-155	45.30	1.31	1.60E+00	3.08E-01	2.75E+01
	60.01	1.22	-2.07E+01		3.00E+01
	86.55	30.70	1.44E-01		3.32E-01
	105.31	21.10	5.62E-02		3.08E-01
+ Ra-226	186.21	* 3.64	1.59E+00	1.24E+00	1.24E+00
Pa-231	27.36	10.30	3.81E+00	2.31E+00	3.24E+00
	283.69	1.70	-1.55E+00		2.79E+00
	300.07	2.47	1.32E-01		2.31E+00
	302.65	2.20	1.18E+00		2.44E+00
	330.06	1.40	3.41E+00		3.90E+00
	+ U-235	143.76	10.96		-6.08E-02
U-235	163.33	5.08	-6.39E-01	7.87E-02	9.87E-01
	185.71	* 57.20	1.01E-01		7.87E-02
	202.11	1.08	-8.00E-01		4.85E+00
	205.31	5.01	-8.90E-01		1.05E+00
Am-241	59.54	35.90	-5.31E-01	1.05E+00	1.05E+00

+ = Nuclide identified during the nuclide identification

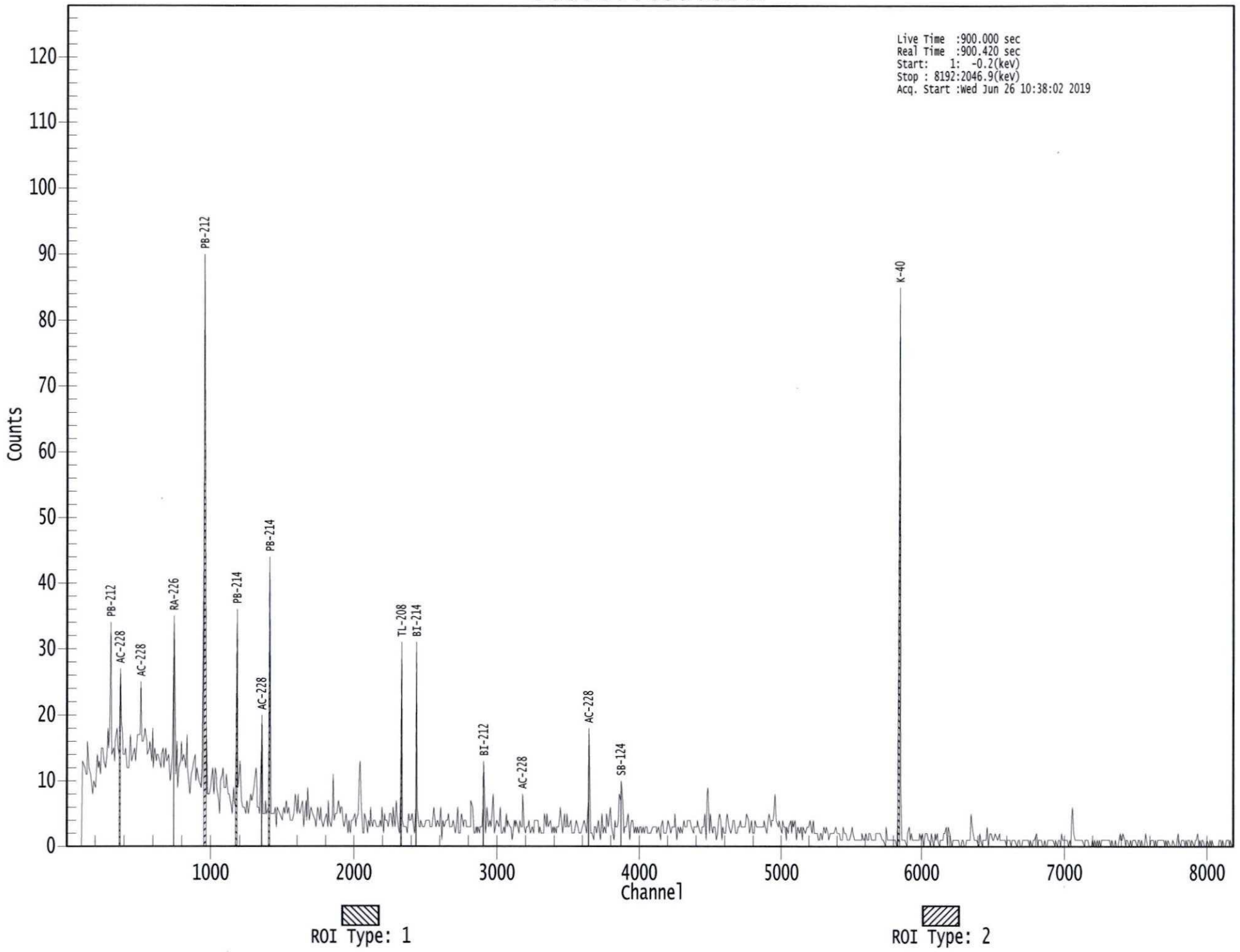
\* = Energy line found in the spectrum

&gt; = MDA value not calculated

@ = Half-life too short to be able to perform the decay correction

? = CAUTION: MDA value is inconsistent with Currie MDA at 95% confidence level

# 000077639.CNF



Analysis Report for 26-Jun-19-10032  
L1-10208D-RIGS-002SS

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## GAMMA SPECTRUM ANALYSIS

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Sample Identification : 26-Jun-19-10032  
Sample Description : L1-10208D-RIGS-002SS  
Sample Type : Soil  
Unit :  
Sample Point :  
  
Sample Size : 1.288E+03 grams  
Facility : Default  
  
Sample Taken On : 6/25/2019 12:52:00PM  
Acquisition Started : 6/26/2019 10:54:38AM  
  
Procedure : 130G\_SOIL\_1  
Operator : Administrator  
Detector Name : 324  
Geometry : 130G\_SOIL\_1  
Live Time : 900.0 seconds  
Real Time : 900.4 seconds  
  
Dead Time : 0.04 %  
  
Peak Locate Threshold : 3.00  
Peak Locate Range (in channels) : 120 - 4096  
Peak Area Range (in channels) : 120 - 4096  
Identification Energy Tolerance : 1.000 keV  
  
Energy Calibration Used Done On : 9/29/2018  
Efficiency Calibration Used Done On : 6/26/2019  
Efficiency Calibration Description :  
  
Sample Number : 77640  
Fill Height : 1288.32 gram  
Certificate Name : Eu155-Na22  
Certificate Date : 1/30/2013 12:00:00PM

*Michael*  
6-30-19

*at*  
6-26-19

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## PEAK ANALYSIS REPORT

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Peak Analysis Performed on : 6/26/2019 11:09:41AM

Peak Analysis From Channel : 120  
Peak Analysis To Channel : 4096

Analysis Report for 26-Jun-19-10032

L1-10208D-RIGS-002SS

Peak No.	Energy (keV)	ROI start	ROI end	Peak Centroid	Net Peak Area	Net Area Uncertainty	Continuum Counts	FWHM (keV)
1	186.33	369 -	377	372.96	4.30E+01	18.71	1.44E+02	0.76
2	238.71	473 -	481	477.59	2.46E+02	25.23	1.77E+02	1.28
3	295.33	587 -	594	590.71	8.76E+01	15.67	7.84E+01	1.41
4	351.96	698 -	708	703.86	2.04E+02	18.83	6.30E+01	1.20
5	583.29	1161 -	1171	1166.19	7.32E+01	12.96	3.98E+01	1.31
6	609.41	1212 -	1224	1218.39	1.60E+02	14.67	2.10E+01	1.59
7	911.49	1818 -	1828	1822.43	6.10E+01	11.10	2.60E+01	1.62
8	969.32	1933 -	1942	1938.11	4.25E+01	9.93	2.35E+01	1.13
9	1461.02	2915 -	2929	2922.10	5.74E+02	24.82	1.47E+01	2.17

M = First peak in a multiplet region  
m = Other peak in a multiplet region  
F = Fitted singlet  
Errors quoted at 1.000sigma

No background subtract performed on this spectrum.

## NUCLIDE IDENTIFICATION REPORT

Nuclide Library Used : C:\Canberra\Apex\Root\Default\Library\ZION LIB-BNL.NLB

### IDENTIFIED NUCLIDES

Nuclide Name	Id Confidence	Energy (keV)	Yield(%)	Activity (pCi/grams)	Activity Uncertainty
K-40	0.99	1460.82 *	10.66	1.14E+01	6.99E-01
Tl-208	0.99	583.19 *	85.00	9.89E-02	1.85E-02
Pb-212	0.99	115.18	0.60		
		238.63 *	43.60	3.59E-01	4.68E-02
		300.09	3.30		
Bi-214	1.00	609.32 *	45.49	4.15E-01	4.56E-02
		768.36	4.89		
		806.18	1.26		

Analysis Report for 26-Jun-19-10032

L1-10208D-RIGS-002SS

<b>Nuclide Name</b>	<b>Id Confidence</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Activity Uncertainty</b>
Bi-214	1.00	934.06	3.11		
		1120.29	14.92		
		1155.21	1.63		
		1238.12	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		
		1661.27	1.05		
		1729.59	2.88		
		1764.49	15.30		
		1847.43	2.03		
		2118.51	1.16		
Pb-214	0.99	241.99	7.25		
		295.22 *	18.42	3.41E-01	6.68E-02
		351.93 *	35.60	4.66E-01	5.69E-02
		785.96	1.06		
Ra-226	0.99	186.21 *	3.64	6.64E-01	2.94E-01
Ac-228	0.99	129.07	2.42		
		209.25	3.89		
		270.24	3.46		
		328.00	2.95		
		338.32	11.27		
		409.46	1.92		
		463.00	4.40		
		794.95	4.25		
		911.20 *	25.80	3.65E-01	6.83E-02
		964.77	4.99		
		968.97 *	15.80	4.33E-01	1.03E-01
		1588.20	3.22		
		U-235	0.95	143.76	10.96
163.33	5.08				
185.71 *	57.20			4.22E-02	1.87E-02
202.11	1.08				
205.31	5.01				

\* = Energy line found in the spectrum.

- = Manually added nuclide.

? = Manually edited nuclide.

@ = Energy line not used for Weighted Mean Activity

Energy Tolerance : 1.000 keV

Nuclide confidence index threshold = 0.30

Errors quoted at 1.000sigma

Analysis Report for 26-Jun-19-10032

L1-10208D-RIGS-002SS

## INTERFERENCE CORRECTED REPORT

	<b>Nuclide Name</b>	<b>Nuclide Id Confidence</b>	<b>Wt mean Activity (pCi/grams)</b>	<b>Wt mean Activity Uncertainty</b>	<b>Comments</b>
	K-40	0.994	1.14E+01	6.99E-01	
	Tl-208	0.998	9.89E-02	1.85E-02	
X	Bi-211	0.882			
	Pb-212	0.999	3.59E-01	4.68E-02	
	Bi-214	1.000	4.15E-01	4.56E-02	
	Pb-214	0.999	4.13E-01	4.33E-02	
?	Ra-226	0.998	6.64E-01	2.94E-01	
	Ac-228	0.992	3.86E-01	5.69E-02	
?	<del>U-235</del> Ra-226	<del>0.958</del>	4.22E-02	<del>1.87E-02</del>	

- ? = nuclide is part of an undetermined solution
- X = nuclide rejected by the interference analysis
- @ = nuclide contains energy lines not used in Weighted Mean Activity

AS  
6-26-19

Errors quoted at 1.000sigma

U-235 only one peak.

Analysis Report for 26-Jun-19-10032  
L1-10208D-RIGS-002SS

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## UNIDENTIFIED PEAKS

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Peak Locate Performed on : 6/26/2019 11:09:41AM  
Peak Locate From Channel : 120  
Peak Locate To Channel : 4096

Peak No.	Energy (keV)	Peak Size (CPS)	Peak CPS (%) Uncertainty	Peak Type	Tolerance Nuclide
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All peaks were identified.

M = First peak in a multiplet region  
m = Other peak in a multiplet region  
F = Fitted singlet  
Errors quoted at 1.000sigma

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## NUCLIDE MDA REPORT

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Nuclide Library Used : C:\Canberra\Apex\Root\Default\Library\ZION LIB-BNL.NLB

Nuclide Name	Energy (keV)	Yield(%)	Activity (pCi/grams)	Nuclide MDA (pCi/grams)	Line MDA (pCi/grams)
An Pk	511.00	100.00	8.54E-02	6.09E-02	6.09E-02
BE-7	477.60	10.44	1.65E-01	4.37E-01	4.37E-01
+ K-40	1460.82	* 10.66	1.14E+01	4.93E-01	4.93E-01
Mn-54	834.85	99.98	1.01E-02	5.46E-02	5.46E-02
Co-60	1173.23	99.85	-6.19E-04	5.98E-02	5.98E-02
	1332.49	99.98	2.85E-02		6.64E-02
Nb-94	702.65	99.81	-2.40E-02	4.32E-02	4.32E-02
	871.09	99.89	3.27E-02		4.97E-02
Ag-108m	79.13	6.60	7.64E-01	4.31E-02	1.47E+00
	433.94	90.50	1.58E-02		4.31E-02
	614.28	89.80	-1.34E-02		7.15E-02
	722.94	90.80	2.00E-02		5.74E-02
Sb-125	176.31	6.84	-1.06E-01	1.34E-01	5.80E-01
	380.45	1.52	-7.88E-01		2.39E+00
	427.87	29.60	4.85E-02		1.34E-01
	463.36	10.49	2.99E-01		4.29E-01
	600.60	17.65	5.89E-02		2.46E-01
	606.71	4.98	5.57E-03		1.65E+00
	635.95	11.22	-4.20E-02		3.47E-01

Analysis Report for 26-Jun-19-10032

L1-10208D-RIGS-002SS

<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Nuclide MDA (pCi/grams)</b>	<b>Line MDA (pCi/grams)</b>
Sb-125	671.44	1.79	3.02E-01	1.34E-01	2.71E+00
Ba-133	79.61	2.65	7.74E-01	9.78E-02	3.38E+00
	81.00	32.90	-3.41E-01		2.23E-01
	276.40	7.16	2.55E-01		5.65E-01
	302.85	18.34	-5.01E-02		2.00E-01
	356.01	62.05	-5.71E-02		9.78E-02
	383.85	8.94	-2.21E-01		4.07E-01
Cs-134	475.36	1.48	5.08E-01	6.13E-02	3.01E+00
	563.25	8.34	-8.05E-02		5.22E-01
	569.33	15.37	3.86E-02		2.80E-01
	604.72	97.62	-6.84E-03		6.65E-02
	795.86	85.46	2.53E-02		6.13E-02
	801.95	8.69	1.10E-01		5.48E-01
	1038.61	0.99	-1.89E+00		5.65E+00
	1167.97	1.79	-3.26E+00		3.52E+00
	1365.19	3.02	-2.31E-01		1.43E+00
Cs-137	661.66	85.10	3.32E-02	6.18E-02	6.18E-02
Eu-152	121.78	28.67	-1.63E-02	1.30E-01	1.30E-01
	244.70	7.61	4.07E-02		5.87E-01
	295.94	0.45	1.31E+01		1.17E+01
	344.28	26.60	-1.18E-01		1.46E-01
	367.79	0.86	-3.26E-01		4.29E+00
	411.12	2.24	-2.77E-01		1.66E+00
	443.96	2.83	-1.64E-01		1.29E+00
	488.68	0.42	3.56E+00		1.04E+01
	563.99	0.49	-2.78E+00		8.71E+00
	586.26	0.46	-2.34E+00		1.49E+01
	678.62	0.47	-2.17E+00		9.13E+00
	688.67	0.86	7.29E-02		5.12E+00
	719.35	0.28	3.24E-01		1.67E+01
	778.90	12.96	6.01E-02		3.56E-01
	810.45	0.32	-2.31E+00		1.35E+01
	867.37	4.26	-7.80E-01		9.90E-01
	919.33	0.43	-9.31E+00		1.09E+01
	964.08	14.65	1.50E-01		4.70E-01
	1085.87	10.24	-3.63E-01		5.61E-01
	1089.74	1.73	2.09E-01		3.72E+00
	1112.07	13.69	-5.95E-02		4.31E-01
	1212.95	1.43	6.19E-01		5.53E+00
	1249.94	0.19	-4.48E+00		3.44E+01
	1299.14	1.63	2.36E+00		3.74E+00
	1408.01	21.07	1.59E-01		2.63E-01
	1457.64	0.50	-3.82E+00		5.06E+01
	1528.10	0.28	1.21E+00		1.51E+01
Eu-154	123.07	40.40	-1.49E-02	9.16E-02	9.16E-02
	247.93	6.89	-7.21E-02		5.22E-01
	591.76	4.95	-6.17E-02		9.08E-01
	692.42	1.78	5.72E-01		2.51E+00
	723.30	20.06	2.09E-01		2.76E-01
	756.80	4.52	3.63E-02		1.05E+00
	873.18	12.08	8.19E-02		4.12E-01



Analysis Report for 26-Jun-19-10032

L1-10208D-RIGS-002SS

<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Nuclide MDA (pCi/grams)</b>	<b>Line MDA (pCi/grams)</b>
Eu-154	996.29	10.48	-1.50E-01	9.16E-02	4.88E-01
	1004.76	18.01	2.51E-01		3.24E-01
	1274.43	34.80	-2.43E-01		1.51E-01
	1596.48	1.80	-1.06E+00		2.54E+00
Eu-155	45.30	1.31	4.29E+00	2.15E-01	1.28E+01
	60.01	1.22	-5.68E+00		1.41E+01
	86.55	30.70	2.77E-02		2.15E-01
+ Ra-226	186.21	* 3.64	6.64E-01	9.62E-01	9.62E-01
	Pa-231	27.36	10.30		1.53E+00
+ U-235	283.69	1.70	-1.34E+00	6.12E-02	2.09E+00
	300.07	2.47	-1.39E+00		1.60E+00
	302.65	2.20	-4.17E-01		1.66E+00
	330.06	1.40	1.30E+00		2.81E+00
	143.76	10.96	-5.83E-02		3.34E-01
	163.33	5.08	1.63E-01		8.25E-01
Am-241	185.71	* 57.20	4.22E-02	4.86E-01	6.12E-02
	202.11	1.08	1.29E+00		3.71E+00
	205.31	5.01	-7.91E-01		7.34E-01
Am-241	59.54	35.90	-1.69E-01	4.86E-01	4.86E-01

+ = Nuclide identified during the nuclide identification

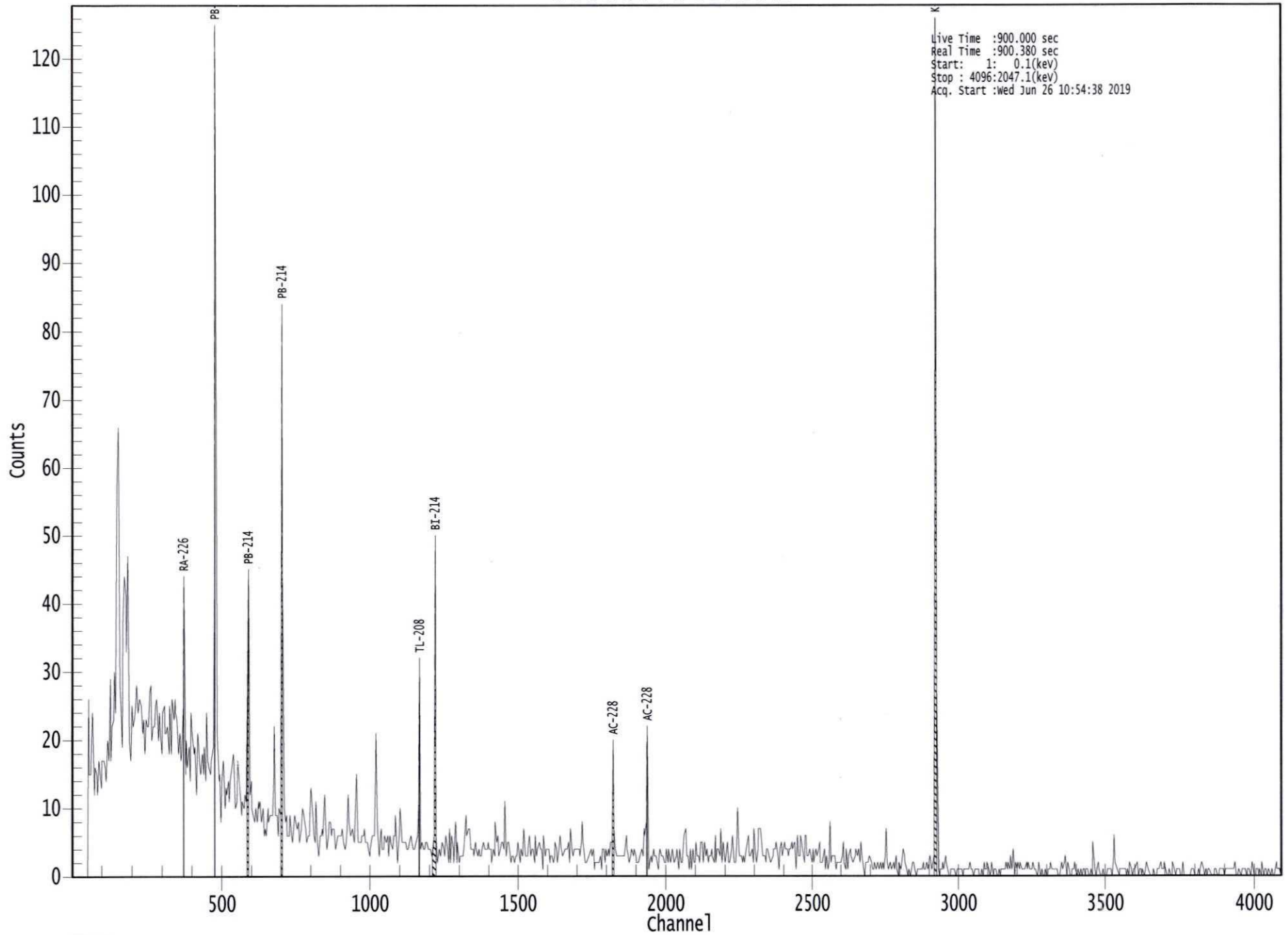
\* = Energy line found in the spectrum

&gt; = MDA value not calculated

@ = Half-life too short to be able to perform the decay correction

? = CAUTION: MDA value is inconsistent with Currie MDA at 95% confidence level

# 000077640.CNF



ROI Type: 1

Analysis Report for 26-Jun-19-10033  
L1-10208D-RIGS-003SS

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## GAMMA SPECTRUM ANALYSIS

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Sample Identification : 26-Jun-19-10033  
Sample Description : L1-10208D-RIGS-003SS  
Sample Type : Soil  
Unit :  
Sample Point :  
  
Sample Size : 1.330E+03 grams  
Facility : Default  
  
Sample Taken On : 6/25/2019 12:54:00PM  
Acquisition Started : 6/26/2019 10:55:11AM  
  
Procedure : 130G\_SOIL\_1  
Operator : Administrator  
Detector Name : P40818B  
Geometry : 130G\_SOIL\_1  
Live Time : 900.0 seconds  
Real Time : 901.6 seconds  
  
Dead Time : 0.18 %  
  
Peak Locate Threshold : 3.00  
Peak Locate Range (in channels) : 120 - 8192  
Peak Area Range (in channels) : 120 - 8192  
Identification Energy Tolerance : 1.000 keV  
  
Energy Calibration Used Done On : 1/29/2019  
Efficiency Calibration Used Done On : 6/26/2019  
Efficiency Calibration Description :  
  
Sample Number : 77641  
Fill Height : 1329.99 gram  
Certificate Name : Eu155-Na22  
Certificate Date : 1/30/2012 12:00:00PM

*[Handwritten signature]*  
6-30-19

*[Handwritten signature]*  
6-26-19

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## PEAK ANALYSIS REPORT

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Peak Analysis Performed on : 6/26/2019 11:10:15AM

Peak Analysis From Channel : 120  
Peak Analysis To Channel : 8192

Analysis Report for 26-Jun-19-10033

L1-10208D-RIGS-003SS

Peak No.	Energy (keV)	ROI start	ROI end	Peak Centroid	Net Peak Area	Net Area Uncertainty	Continuum Counts	FWHM (keV)
1	238.46	945 -	960	953.95	1.78E+02	20.27	7.80E+01	1.10
2	295.36	1174 -	1187	1181.34	5.94E+01	13.40	4.36E+01	1.47
3	351.78	1402 -	1413	1406.87	9.78E+01	13.46	3.33E+01	0.78
4	582.82	2325 -	2336	2330.47	5.90E+01	9.83	1.50E+01	0.58
5	608.77	2426 -	2443	2434.25	9.86E+01	12.86	2.04E+01	1.13
6	661.12	2638 -	2650	2643.59	3.86E+01	7.86	8.40E+00	0.37
7	910.61	3632 -	3648	3641.38	5.56E+01	8.70	6.38E+00	1.12
8	1119.39	4471 -	4482	4476.68	1.95E+01	5.57	4.54E+00	0.54
9	1459.95	5827 -	5851	5839.64	3.81E+02	19.52	0.00E+00	1.75

M = First peak in a multiplet region  
m = Other peak in a multiplet region  
F = Fitted singlet  
Errors quoted at 1.000sigma

No background subtract performed on this spectrum.

## NUCLIDE IDENTIFICATION REPORT

Nuclide Library Used : C:\Canberra\Apex\Root\Default\Library\ZION LIB-BNL.NLB

### IDENTIFIED NUCLIDES

Nuclide Name	Id Confidence	Energy (keV)	Yield(%)	Activity (pCi/grams)	Activity Uncertainty
K-40	0.88	1460.82 *	10.66	9.95E+00	6.68E-01
Cs-137	0.95	661.66 *	85.10	7.29E-02	1.55E-02
Tl-208	0.97	583.19 *	85.00	1.02E-01	1.81E-02
Pb-212	0.99	115.18	0.60		
		238.63 *	43.60	3.28E-01	4.59E-02
		300.09	3.30		
Bi-214	0.96	609.32 *	45.49	3.29E-01	4.73E-02
		768.36	4.89		

Analysis Report for 26-Jun-19-10033

L1-10208D-RIGS-003SS

<b>Nuclide Name</b>	<b>Id Confidence</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Activity Uncertainty</b>
Bi-214	0.96	806.18	1.26		
		934.06	3.11		
		1120.29 *	14.92	3.01E-01	8.70E-02
		1155.21	1.63		
		1238.12	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		
		1661.27	1.05		
		1729.59	2.88		
		1764.49	15.30		
		1847.43	2.03		
Pb-214	0.99	2118.51	1.16		
		241.99	7.25		
		295.22 *	18.42	2.93E-01	7.01E-02
Ac-228	0.98	351.93 *	35.60	2.83E-01	4.51E-02
		785.96	1.06		
Ac-228	0.98	129.07	2.42		
		209.25	3.89		
		270.24	3.46		
		328.00	2.95		
		338.32	11.27		
		409.46	1.92		
		463.00	4.40		
		794.95	4.25		
		911.20 *	25.80	4.32E-01	7.02E-02
		964.77	4.99		
		968.97	15.80		
1588.20	3.22				

\* = Energy line found in the spectrum.

- = Manually added nuclide.

? = Manually edited nuclide.

@ = Energy line not used for Weighted Mean Activity

Energy Tolerance : 1.000 keV

Nuclide confidence index threshold = 0.30

Errors quoted at 1.000sigma

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**INTERFERENCE CORRECTED REPORT**

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Analysis Report for 26-Jun-19-10033

L1-10208D-RIGS-003SS

	<b>Nuclide Name</b>	<b>Nuclide Id Confidence</b>	<b>Wt mean Activity (pCi/grams)</b>	<b>Wt mean Activity Uncertainty</b>	<b>Comments</b>
	K-40	0.886	9.95E+00	6.68E-01	
	Cs-137	0.955	7.29E-02	1.55E-02	
	Tl-208	0.978	1.02E-01	1.81E-02	
X	Bi-211	0.921			
	Pb-212	0.996	3.28E-01	4.59E-02	
	Bi-214	0.964	3.23E-01	4.15E-02	
	Pb-214	0.997	2.86E-01	3.79E-02	
	Ac-228	0.983	4.32E-01	7.02E-02	

? = 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 1.000sigma

Analysis Report for 26-Jun-19-10033

L1-10208D-RIGS-003SS

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**UNIDENTIFIED PEAKS**


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Peak Locate Performed on : 6/26/2019 11:10:15AM  
 Peak Locate From Channel : 120  
 Peak Locate To Channel : 8192

<b>Peak No.</b>	<b>Energy (keV)</b>	<b>Peak Size (CPS)</b>	<b>Peak CPS (%) Uncertainty</b>	<b>Peak Type</b>	<b>Tolerance Nuclide</b>
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All peaks were identified.

M = First peak in a multiplet region

m = Other peak in a multiplet region

F = Fitted singlet

Errors quoted at 1.000sigma

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**NUCLIDE MDA REPORT**


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Nuclide Library Used : C:\Canberra\Apex\Root\Default\Library\ZION LIB-BNL.NLB

<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Nuclide MDA (pCi/grams)</b>	<b>Line MDA (pCi/grams)</b>
An Pk	511.00	100.00	3.54E-02	6.79E-02	6.79E-02
BE-7	477.60	10.44	9.33E-02	4.98E-01	4.98E-01
+ K-40	1460.82	* 10.66	9.95E+00	7.51E-02	7.51E-02
Mn-54	834.85	99.98	3.04E-02	5.67E-02	5.67E-02
Co-60	1173.23	99.85	1.21E-02	6.45E-02	7.64E-02
	1332.49	99.98	6.55E-03		6.45E-02
Nb-94	702.65	99.81	2.35E-02	5.58E-02	5.58E-02
	871.09	99.89	-3.90E-02		6.23E-02
Ag-108m	79.13	6.60	1.67E+00	5.22E-02	2.35E+00
	433.94	90.50	5.94E-03		5.22E-02
	614.28	89.80	-3.05E-02		6.38E-02
	722.94	90.80	-2.05E-02		7.12E-02
Sb-125	176.31	6.84	1.29E-01	1.70E-01	6.64E-01
	380.45	1.52	-4.99E-01		2.97E+00
	427.87	29.60	2.71E-02		1.70E-01
	463.36	10.49	2.40E-01		5.08E-01
	600.60	17.65	-1.57E-01		2.77E-01
	606.71	4.98	2.60E+00		1.78E+00
	635.95	11.22	4.76E-01		5.04E-01

Analysis Report for 26-Jun-19-10033

L1-10208D-RIGS-003SS

<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Nuclide MDA (pCi/grams)</b>	<b>Line MDA (pCi/grams)</b>
Sb-125	671.44	1.79	7.57E-02	1.70E-01	2.88E+00
Ba-133	79.61	2.65	4.24E+00	8.37E-02	5.65E+00
	81.00	32.90	-3.68E-01		3.76E-01
	276.40	7.16	-4.25E-01		5.97E-01
	302.85	18.34	5.94E-02		2.43E-01
	356.01	62.05	-2.53E-02		8.37E-02
	383.85	8.94	4.15E-01		5.47E-01
Cs-134	475.36	1.48	1.47E+00	6.32E-02	3.55E+00
	563.25	8.34	2.81E-01		6.00E-01
	569.33	15.37	6.51E-02		3.21E-01
	604.72	97.62	-2.05E-02		8.80E-02
	795.86	85.46	4.86E-02		6.32E-02
	801.95	8.69	-7.29E-01		5.88E-01
	1038.61	0.99	-5.96E-01		6.66E+00
	1167.97	1.79	-4.12E-02		4.25E+00
	1365.19	3.02	-6.57E-01		2.04E+00
+ Cs-137	661.66	* 85.10	7.29E-02	3.63E-02	3.63E-02
Eu-152	121.78	28.67	-6.57E-03	1.82E-01	1.82E-01
	244.70	7.61	3.56E-01		6.88E-01
	295.94	0.45	7.24E-01		1.25E+01
	344.28	26.60	-1.86E-02		1.83E-01
	367.79	0.86	-8.45E-01		4.91E+00
	411.12	2.24	2.16E-01		2.24E+00
	443.96	2.83	-7.00E-01		1.51E+00
	488.68	0.42	6.13E+00		1.14E+01
	563.99	0.49	3.94E-01		1.01E+01
	586.26	0.46	-9.63E+00		1.67E+01
	678.62	0.47	-1.34E-01		9.49E+00
	688.67	0.86	2.41E+00		5.94E+00
	719.35	0.28	6.87E+00		1.96E+01
	778.90	12.96	4.82E-02		4.23E-01
	810.45	0.32	2.41E+00		1.78E+01
	867.37	4.26	-6.51E-01		1.44E+00
	919.33	0.43	1.03E+00		1.37E+01
	964.08	14.65	1.23E-01		5.19E-01
	1085.87	10.24	2.66E-01		6.99E-01
	1089.74	1.73	-2.77E+00		4.20E+00
	1112.07	13.69	-1.67E-01		5.76E-01
	1212.95	1.43	-1.20E+00		5.40E+00
	1249.94	0.19	-2.85E+01		3.47E+01
	1299.14	1.63	1.81E+00		3.98E+00
	1408.01	21.07	-6.65E-02		2.68E-01
	1457.64	0.50	2.09E+02		5.35E+01
	1528.10	0.28	-6.94E-01		1.59E+01
Eu-154	123.07	40.40	-1.72E-02	1.26E-01	1.26E-01
	247.93	6.89	-1.66E-01		6.32E-01
	591.76	4.95	3.08E-01		1.04E+00
	692.42	1.78	-6.82E-01		3.00E+00
	723.30	20.06	6.60E-02		3.28E-01
	756.80	4.52	-4.46E-01		1.05E+00
	873.18	12.08	2.85E-01		5.22E-01



Analysis Report for 26-Jun-19-10033

L1-10208D-RIGS-003SS

<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Nuclide MDA (pCi/grams)</b>	<b>Line MDA (pCi/grams)</b>
Eu-154	996.29	10.48	3.05E-02	1.26E-01	5.37E-01
	1004.76	18.01	4.92E-02		2.96E-01
	1274.43	34.80	-5.02E-02		1.91E-01
	1596.48	1.80	1.33E+00		2.73E+00
Eu-155	45.30	1.31	-2.12E+01	2.95E-01	3.39E+01
	60.01	1.22	-7.30E+00		3.19E+01
	86.55	30.70	-4.15E-02		3.14E-01
	105.31	21.10	-1.40E-01		2.95E-01
Ra-226	186.21	3.64	1.01E+00	1.38E+00	1.38E+00
Pa-231	27.36	10.30	3.91E+00	1.86E+00	3.95E+00
	283.69	1.70	-4.45E-01		2.32E+00
	300.07	2.47	1.14E+00		1.86E+00
	302.65	2.20	3.71E-01		2.03E+00
	330.06	1.40	3.14E+00		3.61E+00
	U-235	143.76	10.96		-2.31E-01
U-235	163.33	5.08	2.33E-01	8.72E-02	9.40E-01
	185.71	57.20	7.85E-02		8.72E-02
	202.11	1.08	-8.11E-01		4.28E+00
	205.31	5.01	-4.98E-01		9.17E-01
Am-241	59.54	35.90	-7.97E-01	1.15E+00	1.15E+00

+ = Nuclide identified during the nuclide identification

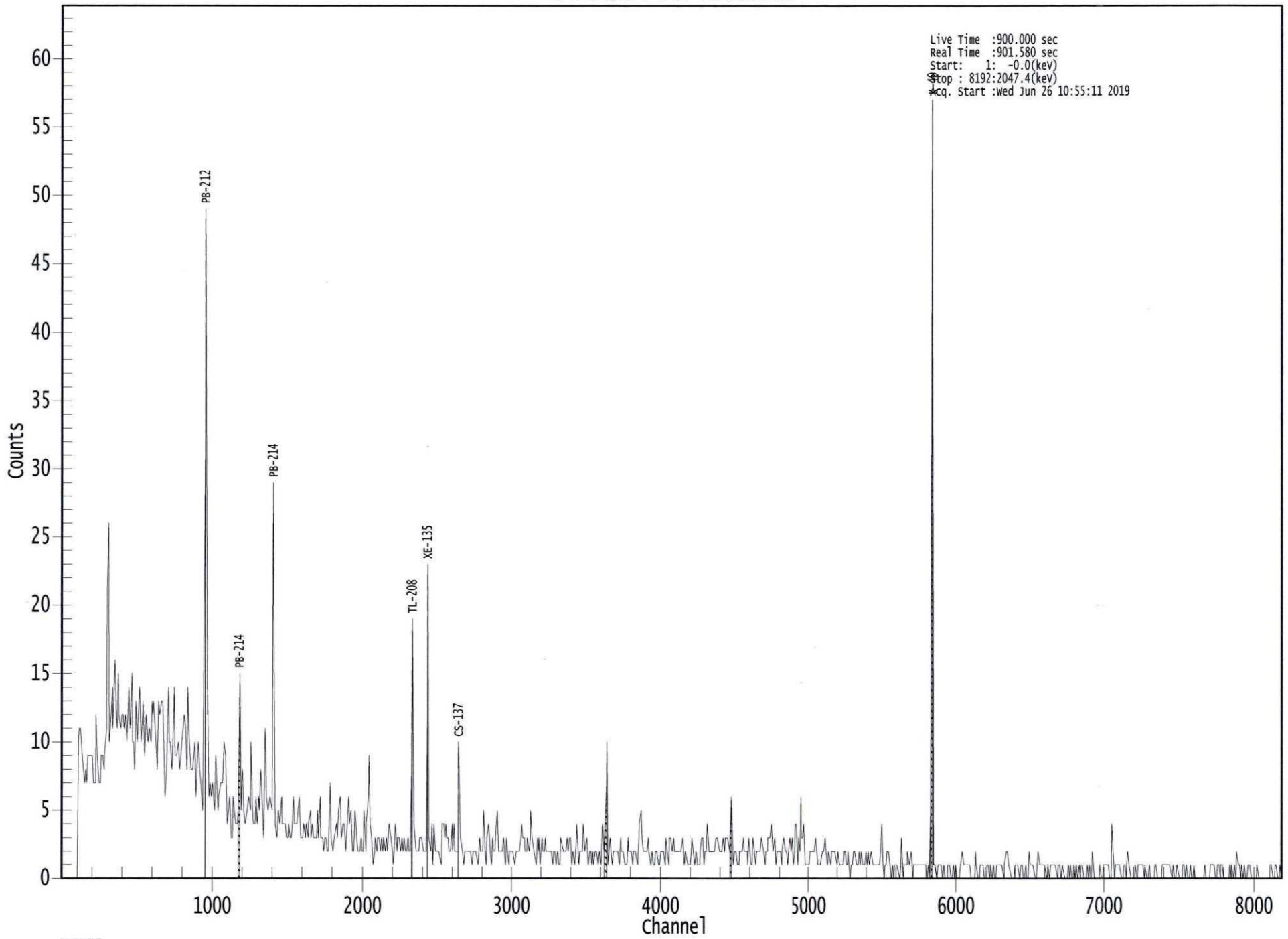
\* = Energy line found in the spectrum

&gt; = MDA value not calculated

@ = Half-life too short to be able to perform the decay correction

? = CAUTION: MDA value is inconsistent with Currie MDA at 95% confidence level

000077641.CNF



Live Time :900.000 sec  
Real Time :901.580 sec  
Start: 1: -0.0(keV)  
Stop : 8192:2047.4(keV)  
Acq. Start :Wed Jun 26 10:55:11 2019

ROI Type: 1

Analysis Report for 17-Oct-19-10006  
L1-10208D-AIGS-001SS

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## GAMMA SPECTRUM ANALYSIS

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Sample Identification : 17-Oct-19-10006  
Sample Description : L1-10208D-AIGS-001SS  
Sample Type : Soil  
Unit :  
Sample Point :  
  
Sample Size : 1.521E+03 grams  
Facility : Default  
  
Sample Taken On : 10/16/2019 8:00:00AM  
Acquisition Started : 10/17/2019 9:32:49AM  
  
Procedure : 130G\_SOIL\_1  
Operator : Administrator  
Detector Name : 324  
Geometry : 130G\_SOIL\_1  
Live Time : 900.0 seconds  
Real Time : 900.4 seconds  
  
Dead Time : 0.04 %  
  
Peak Locate Threshold : 3.00  
Peak Locate Range (in channels) : 120 - 4096  
Peak Area Range (in channels) : 120 - 4096  
Identification Energy Tolerance : 1.000 keV  
  
Energy Calibration Used Done On : 9/29/2018  
Efficiency Calibration Used Done On : 10/17/2019  
Efficiency Calibration Description :  
  
Sample Number : 80540  
Fill Height : 1520.76 gram  
Certificate Name : Eu155-Na22  
Certificate Date : 1/30/2013 12:00:00PM

*AP. [Signature]*  
10-17-19

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## PEAK ANALYSIS REPORT

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Peak Analysis Performed on : 10/17/2019 9:47:52AM  
Peak Analysis From Channel : 120  
Peak Analysis To Channel : 4096

*[Signature]*  
10-17-19

Analysis Report for 17-Oct-19-10006  
L1-10208D-AIGS-001SS

Peak No.	Energy (keV)	ROI start	ROI end	Peak Centroid	Net Peak Area	Net Area Uncertainty	Continuum Counts	FWHM (keV)
1	238.61	472 -	481	477.40	1.85E+02	23.45	1.54E+02	1.27
2	295.21	585 -	595	590.48	1.02E+02	16.22	6.58E+01	1.07
3	351.82	698 -	708	703.58	1.77E+02	17.21	4.97E+01	1.19
4	583.04	1161 -	1171	1165.68	6.28E+01	12.70	4.13E+01	1.72
5	609.26	1212 -	1223	1218.10	1.29E+02	14.08	2.70E+01	1.38
6	910.85	1816 -	1825	1821.15	5.90E+01	9.63	1.50E+01	1.68
7	1119.83	2236 -	2245	2239.21	2.80E+01	7.66	1.30E+01	1.24
8	1460.50	2915 -	2928	2921.05	4.70E+02	22.39	1.16E+01	2.20
9	1764.20	3524 -	3534	3529.25	3.08E+01	6.39	4.16E+00	1.36

M = First peak in a multiplet region  
m = Other peak in a multiplet region  
F = Fitted singlet  
Errors quoted at 1.000sigma

No background subtract performed on this spectrum.

## NUCLIDE IDENTIFICATION REPORT

Nuclide Library Used : C:\Canberra\Apex\Root\Default\Library\ZION LIB-BNL.NLB

### IDENTIFIED NUCLIDES

Nuclide Name	Id Confidence	Energy (keV)		Yield(%)	Activity (pCi/grams)	Activity Uncertainty
K-40	0.98	1460.82	*	10.66	8.86E+00	5.71E-01
Tl-208	0.99	583.19	*	85.00	8.10E-02	1.71E-02
Pb-212	1.00	115.18		0.60		
		238.63	*	43.60	2.60E-01	3.90E-02
		300.09		3.30		
Bi-214	0.99	609.32	*	45.49	3.20E-01	3.99E-02
		768.36		4.89		
		806.18		1.26		

Analysis Report for 17-Oct-19-10006

L1-10208D-AIGS-001SS

<b>Nuclide Name</b>	<b>Id Confidence</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Activity Uncertainty</b>
Bi-214	0.99	934.06	3.11		
		1120.29 *	14.92	3.15E-01	8.71E-02
		1155.21	1.63		
		1238.12	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		
		1661.27	1.05		
		1729.59	2.88		
		1764.49 *	15.30	4.66E-01	9.84E-02
		1847.43	2.03		
2118.51	1.16				
Pb-214	0.99	241.99	7.25		
		295.22 *	18.42	3.83E-01	6.81E-02
		351.93 *	35.60	3.89E-01	4.89E-02
Ac-228	0.99	785.96	1.06		
		129.07	2.42		
		209.25	3.89		
		270.24	3.46		
		328.00	2.95		
		338.32	11.27		
		409.46	1.92		
		463.00	4.40		
		794.95	4.25		
		911.20 *	25.80	3.36E-01	5.69E-02
964.77	4.99				
968.97	15.80				
1588.20	3.22				

\* = Energy line found in the spectrum.

- = Manually added nuclide.

? = Manually edited nuclide.

@ = Energy line not used for Weighted Mean Activity

Energy Tolerance : 1.000 keV

Nuclide confidence index threshold = 0.30

Errors quoted at 1.000sigma

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**INTERFERENCE CORRECTED REPORT**

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Analysis Report for 17-Oct-19-10006

L1-10208D-AIGS-001SS

<b>Nuclide Name</b>	<b>Nuclide Id Confidence</b>	<b>Wt mean Activity (pCi/grams)</b>	<b>Wt mean Activity Uncertainty</b>	<b>Comments</b>	
	K-40	0.983	8.86E+00	5.71E-01	
	Tl-208	0.997	8.10E-02	1.71E-02	
X	Bi-211	0.914			
	Pb-212	1.000	2.60E-01	3.90E-02	
	Bi-214	0.993	3.37E-01	3.40E-02	
	Pb-214	0.999	3.87E-01	3.97E-02	
	Ac-228	0.994	3.36E-01	5.69E-02	

? = 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 1.000sigma

Analysis Report for 17-Oct-19-10006  
L1-10208D-AIGS-001SS

**UNIDENTIFIED PEAKS**

Peak Locate Performed on : 10/17/2019 9:47:52AM  
Peak Locate From Channel : 120  
Peak Locate To Channel : 4096

Peak No.	Energy (keV)	Peak Size (CPS)	Peak CPS (%) Uncertainty	Peak Type	Tolerance Nuclide
All peaks were identified.					
M = First peak in a multiplet region					
m = Other peak in a multiplet region					
F = Fitted singlet					
Errors quoted at 1.000sigma					

**NUCLIDE MDA REPORT**

Nuclide Library Used : C:\Canberra\Apex\Root\Default\Library\ZION LIB-BNL.NLB

Nuclide Name	Energy (keV)	Yield(%)	Activity (pCi/grams)	Nuclide MDA (pCi/grams)	Line MDA (pCi/grams)
An Pk	511.00	100.00	6.71E-02	5.42E-02	5.42E-02
BE-7	477.60	10.44	6.35E-02	4.01E-01	4.01E-01
+ K-40	1460.82	* 10.66	8.86E+00	4.10E-01	4.10E-01
Mn-54	834.85	99.98	2.47E-02	4.62E-02	4.62E-02
Co-60	1173.23	99.85	-1.73E-03	5.22E-02	6.07E-02
	1332.49	99.98	5.23E-03		5.22E-02
Nb-94	702.65	99.81	3.42E-03	3.93E-02	3.93E-02
	871.09	99.89	2.84E-02		4.28E-02
Ag-108m	79.13	6.60	8.73E-01	3.76E-02	1.36E+00
	433.94	90.50	3.64E-03		3.76E-02
	614.28	89.80	-2.50E-02		6.15E-02
	722.94	90.80	-1.23E-04		5.17E-02
Sb-125	176.31	6.84	-8.22E-02	1.01E-01	5.63E-01
	380.45	1.52	5.71E-01		2.26E+00
	427.87	29.60	-9.05E-02		1.01E-01
	463.36	10.49	-2.98E-02		3.39E-01
	600.60	17.65	-5.40E-02		2.13E-01
	606.71	4.98	-4.81E-02		1.49E+00
	635.95	11.22	1.48E-02		3.78E-01

Analysis Report for 17-Oct-19-10006

L1-10208D-AIGS-001SS

<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Nuclide MDA (pCi/grams)</b>	<b>Line MDA (pCi/grams)</b>
Sb-125	671.44	1.79	-7.34E-01	1.01E-01	1.87E+00
Ba-133	79.61	2.65	1.41E+00	8.16E-02	3.17E+00
	81.00	32.90	-2.01E-01		2.15E-01
	276.40	7.16	1.19E-01		5.11E-01
	302.85	18.34	7.57E-02		1.94E-01
	356.01	62.05	-4.57E-02		8.16E-02
	383.85	8.94	-1.30E-01		3.69E-01
Cs-134	475.36	1.48	7.46E-02	4.86E-02	2.60E+00
	563.25	8.34	5.98E-02		4.47E-01
	569.33	15.37	1.22E-01		2.47E-01
	604.72	97.62	-3.61E-03		6.49E-02
	795.86	85.46	2.42E-02		4.86E-02
	801.95	8.69	2.61E-01		5.34E-01
	1038.61	0.99	-9.03E-01		4.79E+00
	1167.97	1.79	1.77E+00		3.34E+00
	1365.19	3.02	1.90E-01		1.32E+00
Cs-137	661.66	85.10	4.56E-02	5.34E-02	5.34E-02
Eu-152	121.78	28.67	-1.08E-02	1.17E-01	1.17E-01
	244.70	7.61	7.82E-02		5.23E-01
	295.94	0.45	-1.57E+00		1.04E+01
	344.28	26.60	-1.14E-01		1.38E-01
	367.79	0.86	-2.46E-01		3.59E+00
	411.12	2.24	4.79E-01		1.67E+00
	443.96	2.83	-1.59E-01		1.18E+00
	488.68	0.42	-2.00E-01		9.01E+00
	563.99	0.49	-2.05E+00		7.18E+00
	586.26	0.46	1.73E+00		1.41E+01
	678.62	0.47	2.93E+00		8.53E+00
	688.67	0.86	-2.80E+00		4.68E+00
	719.35	0.28	1.03E+01		1.53E+01
	778.90	12.96	-1.39E-01		3.11E-01
	810.45	0.32	-7.38E+00		1.22E+01
	867.37	4.26	3.27E-02		9.12E-01
	919.33	0.43	1.59E+00		9.93E+00
	964.08	14.65	-2.81E-01		4.20E-01
	1085.87	10.24	2.18E-01		5.40E-01
	1089.74	1.73	-1.00E+00		3.10E+00
	1112.07	13.69	9.26E-03		3.61E-01
	1212.95	1.43	-1.72E-01		4.38E+00
	1249.94	0.19	-6.35E-01		2.90E+01
	1299.14	1.63	-1.99E+00		2.76E+00
	1408.01	21.07	-7.88E-02		1.74E-01
	1457.64	0.50	-1.43E+01		4.35E+01
	1528.10	0.28	4.42E+00		1.08E+01
Eu-154	123.07	40.40	-1.56E-02	8.24E-02	8.24E-02
	247.93	6.89	-2.18E-01		4.74E-01
	591.76	4.95	-1.35E-01		8.75E-01
	692.42	1.78	7.03E-01		2.52E+00
	723.30	20.06	1.15E-01		2.46E-01
	756.80	4.52	1.94E-01		9.56E-01
	873.18	12.08	-1.35E-01		3.39E-01



Analysis Report for 17-Oct-19-10006

L1-10208D-AIGS-001SS

<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Nuclide MDA (pCi/grams)</b>	<b>Line MDA (pCi/grams)</b>
Eu-154	996.29	10.48	1.23E-02	8.24E-02	4.83E-01
	1004.76	18.01	-2.20E-02		2.82E-01
	1274.43	34.80	4.69E-03		1.66E-01
	1596.48	1.80	-2.51E-01		2.15E+00
Eu-155	45.30	1.31	5.28E-01	1.97E-01	1.18E+01
	60.01	1.22	-9.33E+00		1.26E+01
	86.55	30.70	1.02E-01		2.00E-01
	105.31	21.10	-5.24E-02		1.97E-01
Ra-226	186.21	3.64	6.05E-01	1.14E+00	1.14E+00
Pa-231	27.36	10.30	7.22E-01	1.26E+00	1.26E+00
	283.69	1.70	1.25E+00		2.13E+00
	300.07	2.47	2.04E-01		1.43E+00
	302.65	2.20	6.31E-01		1.62E+00
	330.06	1.40	8.12E-01		2.66E+00
U-235	143.76	10.96	3.95E-02	7.29E-02	3.05E-01
	163.33	5.08	1.74E-01		7.40E-01
	185.71	57.20	3.35E-02		7.29E-02
	202.11	1.08	3.96E-01		3.46E+00
	205.31	5.01	-6.77E-01		7.15E-01
Am-241	59.54	35.90	-3.12E-01	4.34E-01	4.34E-01

+ = Nuclide identified during the nuclide identification

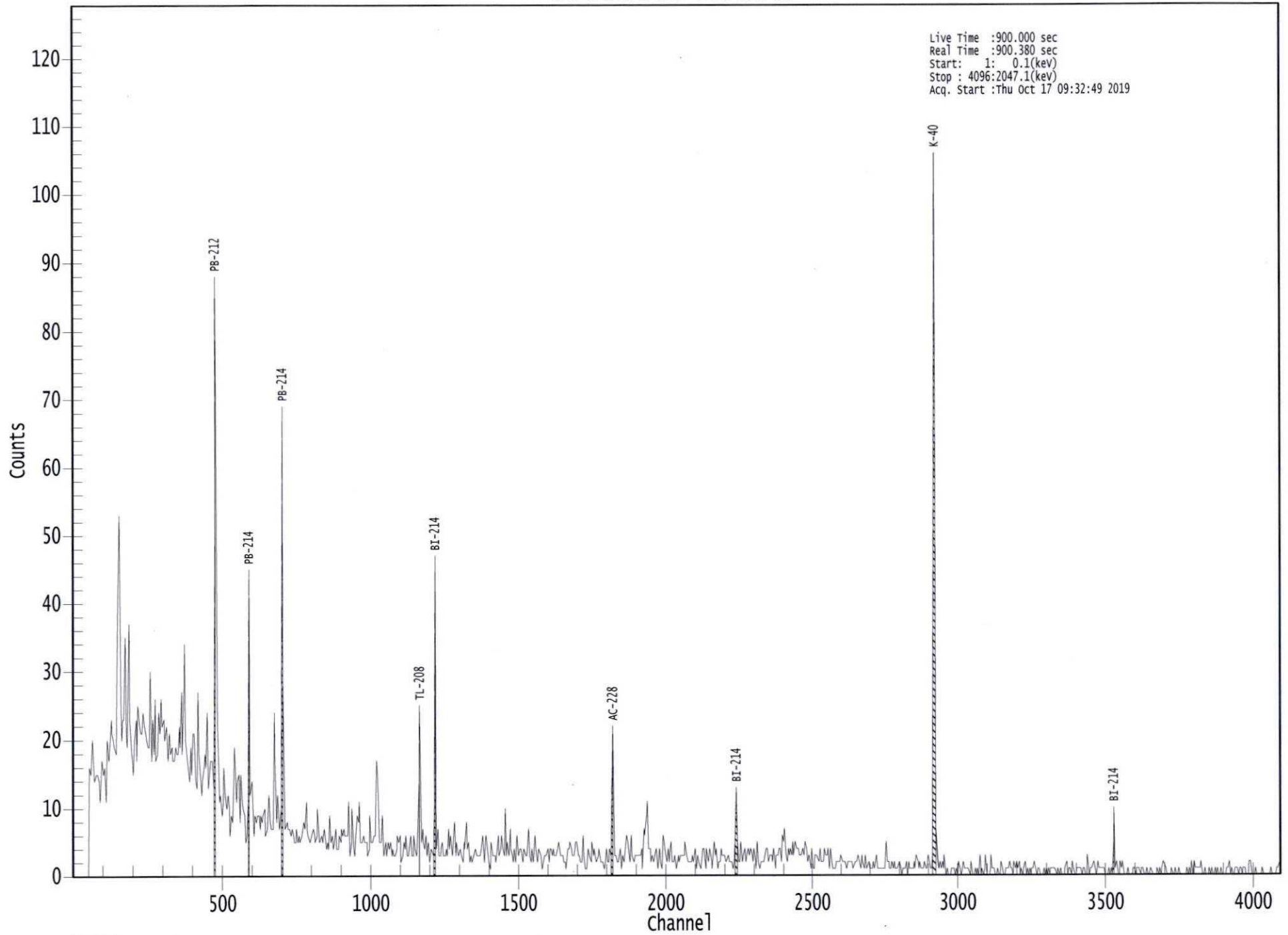
\* = Energy line found in the spectrum

&gt; = MDA value not calculated


@ = Half-life too short to be able to perform the decay correction

? = CAUTION: MDA value is inconsistent with Currie MDA at 95% confidence level

0000080540.CNF



Live Time :900.000 sec  
Real Time :900.380 sec  
Start: 1: 0.1(kev)  
Stop : 4096:2047.1(kev)  
Acq. Start :Thu Oct 17 09:32:49 2019

 ROI Type: 1

Analysis Report for 17-Oct-19-10007  
L1-10208D-AIGS-002SS

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## GAMMA SPECTRUM ANALYSIS

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Sample Identification : 17-Oct-19-10007  
Sample Description : L1-10208D-AIGS-002SS  
Sample Type : Soil  
Unit :  
Sample Point :  
  
Sample Size : 1.271E+03 grams  
Facility : Default  
  
Sample Taken On : 10/16/2019 8:02:00AM  
Acquisition Started : 10/17/2019 9:32:55AM  
  
Procedure : 130G\_SOIL\_1  
Operator : Administrator  
Detector Name : P40818B  
Geometry : 130G\_SOIL\_1  
Live Time : 900.0 seconds  
Real Time : 901.5 seconds  
  
Dead Time : 0.17 %  
  
Peak Locate Threshold : 3.00  
Peak Locate Range (in channels) : 120 - 8192  
Peak Area Range (in channels) : 120 - 8192  
Identification Energy Tolerance : 1.000 keV  
  
Energy Calibration Used Done On : 1/29/2019  
Efficiency Calibration Used Done On : 10/17/2019  
Efficiency Calibration Description :  
  
Sample Number : 80541  
Fill Height : 1270.60 gram  
Certificate Name : Eu155-Na22  
Certificate Date : 1/30/2012 12:00:00PM

*pp. m. l. d.*  
*10-17-19*

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## PEAK ANALYSIS REPORT

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Peak Analysis Performed on : 10/17/2019 9:48:00AM  
Peak Analysis From Channel : 120  
Peak Analysis To Channel : 8192

*J. m. d.*  
*10-17-19*

Analysis Report for 17-Oct-19-10007  
L1-10208D-AIGS-002SS

Peak No.	Energy (keV)	ROI start	ROI end	Peak Centroid	Net Peak Area	Net Area Uncertainty	Continuum Counts	FWHM (keV)
1	77.20	304 -	315	309.53	2.82E+01	16.25	9.28E+01	0.71
2	238.59	949 -	960	954.45	1.20E+02	17.05	6.77E+01	0.69
3	295.02	1176 -	1184	1179.99	6.38E+01	11.23	2.93E+01	0.98
4	351.95	1398 -	1414	1407.51	1.49E+02	15.26	2.70E+01	1.00
5	583.02	2327 -	2337	2331.31	4.23E+01	9.02	1.57E+01	0.94
6	609.14	2429 -	2442	2435.71	8.99E+01	11.65	1.61E+01	0.97
7	910.90	3636 -	3647	3642.56	3.10E+01	8.01	1.30E+01	0.47
8	968.74	3868 -	3879	3873.92	2.25E+01	6.99	1.05E+01	0.51
9	1120.08	4473 -	4485	4479.40	2.40E+01	7.65	1.30E+01	0.41
10	1460.39	5830 -	5854	5841.38	3.37E+02	18.67	2.91E+00	1.85

M = First peak in a multiplet region  
m = Other peak in a multiplet region  
F = Fitted singlet  
Errors quoted at 1.000sigma

No background subtract performed on this spectrum.

## NUCLIDE IDENTIFICATION REPORT

Nuclide Library Used : C:\Canberra\Apex\Root\Default\Library\ZION LIB-BNL.NLB

### IDENTIFIED NUCLIDES

Nuclide Name	Id Confidence	Energy (keV)	Yield(%)	Activity (pCi/grams)	Activity Uncertainty
K-40	0.97	1460.82 *	10.66	8.96E+00	6.30E-01
Tl-208	0.99	583.19 *	85.00	7.45E-02	1.65E-02
Pb-212	1.00	115.18	0.60		
		238.63 *	43.60	2.25E-01	3.67E-02
		300.09	3.30		
Pb212-XR	0.99	74.82	10.28		
		77.11 *	17.10	3.52E-01	2.06E-01

Analysis Report for 17-Oct-19-10007  
L1-10208D-AIGS-002SS

<b>Nuclide Name</b>	<b>Id Confidence</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Activity Uncertainty</b>
Pb212-XR	0.99	87.35	3.97		
		89.78	1.46		
Bi-214	0.99	609.32 *	45.49	3.05E-01	4.36E-02
		768.36	4.89		
		806.18	1.26		
		934.06	3.11		
		1120.29 *	14.92	3.77E-01	1.21E-01
		1155.21	1.63		
		1238.12	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		
		1661.27	1.05		
		1729.59	2.88		
		1764.49	15.30		
		1847.43	2.03		
		2118.51	1.16		
Pb-214	0.99	241.99	7.25		
		295.22 *	18.42	3.18E-01	6.16E-02
		351.93 *	35.60	4.38E-01	5.69E-02
		785.96	1.06		
Pb214-XR	0.99	74.82	5.80		
		77.11 *	9.70	6.21E-01	3.65E-01
		87.35	2.24		
		89.78	0.82		
Ac-228	0.99	129.07	2.42		
		209.25	3.89		
		270.24	3.46		
		328.00	2.95		
		338.32	11.27		
		409.46	1.92		
		463.00	4.40		
		794.95	4.25		
		911.20 *	25.80	2.45E-01	6.42E-02
		964.77	4.99		
		968.97 *	15.80	3.03E-01	9.51E-02
		1588.20	3.22		

\* = Energy line found in the spectrum.

- = Manually added nuclide.

? = Manually edited nuclide.

@ = Energy line not used for Weighted Mean Activity

Energy Tolerance : 1.000 keV

Nuclide confidence index threshold = 0.30

Errors quoted at 1.000sigma

Analysis Report for 17-Oct-19-10007

L1-10208D-AIGS-002SS

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## INTERFERENCE CORRECTED REPORT

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<b>Nuclide Name</b>	<b>Nuclide Id Confidence</b>	<b>Wt mean Activity (pCi/grams)</b>	<b>Wt mean Activity Uncertainty</b>	<b>Comments</b>
	0.970	8.96E+00	6.30E-01	
	0.996	7.45E-02	1.65E-02	
X	0.885			
	1.000	2.25E-01	3.67E-02	
?	0.999	3.52E-01	2.06E-01	
	0.997	3.13E-01	4.10E-02	
	0.998	3.83E-01	4.18E-02	
?	0.999	6.21E-01	3.65E-01	
	0.994	2.63E-01	5.32E-02	

? = 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 1.000sigma

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Analysis Report for 17-Oct-19-10007  
L1-10208D-AIGS-002SS

**UNIDENTIFIED PEAKS**

Peak Locate Performed on : 10/17/2019 9:48:00AM  
Peak Locate From Channel : 120  
Peak Locate To Channel : 8192

Peak No.	Energy (keV)	Peak Size (CPS)	Peak CPS (%) Uncertainty	Peak Type	Tolerance Nuclide
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All peaks were identified.

M = First peak in a multiplet region  
m = Other peak in a multiplet region  
F = Fitted singlet  
Errors quoted at 1.000sigma

**NUCLIDE MDA REPORT**

Nuclide Library Used : C:\Canberra\Apex\Root\Default\Library\ZION LIB-BNL.NLB

Nuclide Name	Energy (keV)	Yield(%)	Activity (pCi/grams)	Nuclide MDA (pCi/grams)	Line MDA (pCi/grams)
An Pk	511.00	100.00	1.00E-01	7.00E-02	7.00E-02
BE-7	477.60	10.44	4.47E-01	5.10E-01	5.10E-01
+ K-40	1460.82	* 10.66	8.96E+00	3.81E-01	3.81E-01
Mn-54	834.85	99.98	1.44E-02	5.68E-02	5.68E-02
Co-60	1173.23	99.85	4.71E-02	4.96E-02	7.38E-02
	1332.49	99.98	-4.13E-02		4.96E-02
Nb-94	702.65	99.81	-5.37E-03	5.21E-02	5.80E-02
	871.09	99.89	-9.46E-03		5.21E-02
Ag-108m	79.13	6.60	7.91E-02	4.52E-02	2.03E+00
	433.94	90.50	-3.90E-02		4.52E-02
	614.28	89.80	-5.58E-02		7.34E-02
	722.94	90.80	-3.86E-03		6.50E-02
Sb-125	176.31	6.84	-8.78E-02	1.37E-01	6.61E-01
	380.45	1.52	-1.02E+00		2.74E+00
	427.87	29.60	-5.96E-02		1.37E-01
	463.36	10.49	1.71E-01		4.71E-01
	600.60	17.65	-6.43E-02		2.29E-01
	606.71	4.98	2.78E+00		1.75E+00
	635.95	11.22	-4.52E-01		3.95E-01

Analysis Report for 17-Oct-19-10007

L1-10208D-AIGS-002SS

<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Nuclide MDA (pCi/grams)</b>	<b>Line MDA (pCi/grams)</b>
Sb-125	671.44	1.79	-5.18E-01	1.37E-01	2.77E+00
Ba-133	79.61	2.65	-3.94E-01	1.02E-01	4.76E+00
	81.00	32.90	6.97E-03		3.21E-01
	276.40	7.16	-2.49E-01		6.38E-01
	302.85	18.34	-3.60E-03		2.56E-01
	356.01	62.05	-1.92E-02		1.02E-01
	383.85	8.94	8.41E-02		4.68E-01
Cs-134	475.36	1.48	3.71E+00	6.70E-02	3.65E+00
	563.25	8.34	-2.24E-01		5.69E-01
	569.33	15.37	3.93E-02		3.04E-01
	604.72	97.62	-3.86E-02		8.05E-02
	795.86	85.46	-3.47E-03		6.70E-02
	801.95	8.69	4.07E-02		6.07E-01
	1038.61	0.99	-3.36E-01		6.37E+00
	1167.97	1.79	3.87E+00		4.16E+00
	1365.19	3.02	1.01E+00		2.07E+00
Cs-137	661.66	85.10	1.44E-02	6.46E-02	6.46E-02
Eu-152	121.78	28.67	3.33E-03	1.80E-01	1.83E-01
	244.70	7.61	2.72E-01		6.50E-01
	295.94	0.45	9.91E+00		1.30E+01
	344.28	26.60	1.20E-01		1.80E-01
	367.79	0.86	1.63E+00		4.66E+00
	411.12	2.24	-7.73E-01		1.80E+00
	443.96	2.83	-1.23E+00		1.56E+00
	488.68	0.42	-1.81E+00		1.02E+01
	563.99	0.49	1.52E+00		9.79E+00
	586.26	0.46	1.32E+01		1.52E+01
	678.62	0.47	1.12E+00		1.13E+01
	688.67	0.86	1.52E-02		5.62E+00
	719.35	0.28	1.10E+01		1.89E+01
	778.90	12.96	-1.06E-02		4.47E-01
	810.45	0.32	6.14E+00		1.73E+01
	867.37	4.26	-1.30E+00		1.10E+00
	919.33	0.43	3.60E+00		1.40E+01
	964.08	14.65	1.54E-01		5.88E-01
	1085.87	10.24	-1.76E-01		5.70E-01
	1089.74	1.73	-3.77E-01		3.64E+00
	1112.07	13.69	-3.97E-01		4.50E-01
	1212.95	1.43	1.21E+00		6.02E+00
	1249.94	0.19	-2.31E+01		3.32E+01
	1299.14	1.63	9.00E-01		4.29E+00
	1408.01	21.07	1.96E-01		2.80E-01
	1457.64	0.50	1.95E+02		5.18E+01
	1528.10	0.28	8.33E+00		1.71E+01
Eu-154	123.07	40.40	1.62E-02	1.28E-01	1.28E-01
	247.93	6.89	-1.48E-01		6.15E-01
	591.76	4.95	2.74E-01		9.31E-01
	692.42	1.78	-3.33E-01		3.04E+00
	723.30	20.06	1.60E-01		3.04E-01
	756.80	4.52	-5.61E-02		1.14E+00
	873.18	12.08	-3.46E-01		4.07E-01



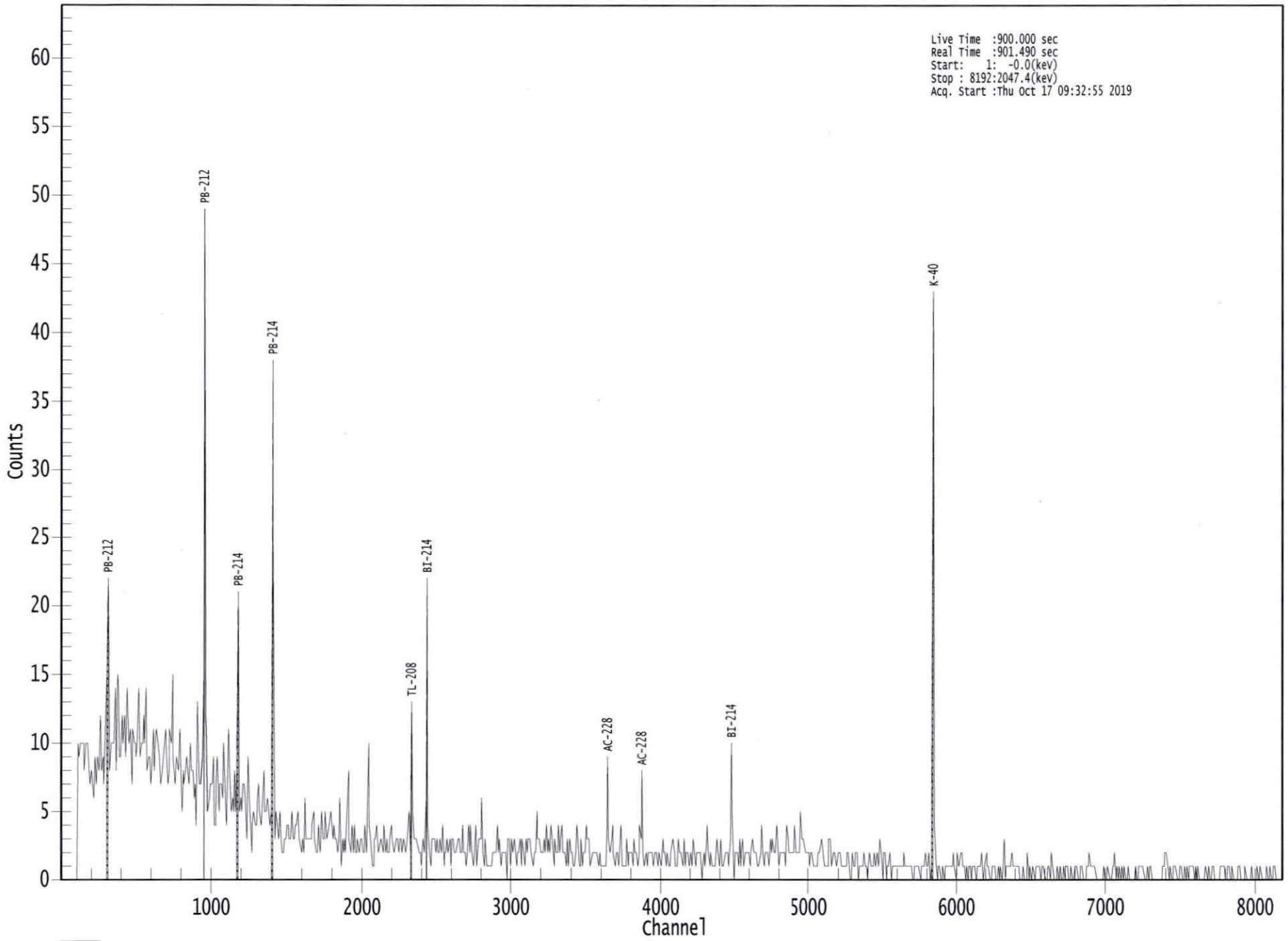
Analysis Report for 17-Oct-19-10007

L1-10208D-AIGS-002SS

<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Nuclide MDA (pCi/grams)</b>	<b>Line MDA (pCi/grams)</b>
Eu-154	996.29	10.48	-1.91E-01	1.28E-01	5.46E-01
	1004.76	18.01	-3.28E-01		2.88E-01
	1274.43	34.80	8.45E-02		2.05E-01
	1596.48	1.80	1.23E+00		3.52E+00
Eu-155	45.30	1.31	1.08E+00	2.74E-01	3.50E+01
	60.01	1.22	2.43E+01		3.41E+01
	86.55	30.70	-1.59E-01		2.74E-01
	105.31	21.10	-2.14E-01		2.90E-01
Ra-226	186.21	3.64	1.15E+00	1.33E+00	1.33E+00
Pa-231	27.36	10.30	2.96E+00	1.89E+00	3.90E+00
	283.69	1.70	-1.49E+00		2.63E+00
	300.07	2.47	-1.25E+00		1.89E+00
	302.65	2.20	-5.32E-01		2.11E+00
	330.06	1.40	-4.60E-01		3.28E+00
	U-235	143.76	10.96		-1.33E-01
U-235	163.33	5.08	2.02E-01	8.56E-02	8.59E-01
	185.71	57.20	7.31E-02		8.56E-02
	202.11	1.08	4.80E-01		3.70E+00
	205.31	5.01	6.25E-02		8.53E-01
Am-241	59.54	35.90	4.53E-01	1.17E+00	1.17E+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  
 ? = CAUTION: MDA value is inconsistent with Currie MDA at 95% confidence level

# 000080541.CNF



Live Time :900.000 sec  
Real Time :901.490 sec  
Start: 1: -0.0(kev)  
Stop : 8192:2047.4(kev)  
Acq. Start :Thu Oct 17 09:32:55 2019

ROI Type: 1

Analysis Report for 17-Oct-19-10008  
L1-10208D-AIGS-003SS

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## GAMMA SPECTRUM ANALYSIS

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Sample Identification : 17-Oct-19-10008  
Sample Description : L1-10208D-AIGS-003SS  
Sample Type : Soil  
Unit :  
Sample Point :  
  
Sample Size : 1.480E+03 grams  
Facility : Default  
  
Sample Taken On : 10/16/2019 8:04:00AM  
Acquisition Started : 10/17/2019 9:33:04AM  
  
Procedure : 130G\_SOIL\_1  
Operator : Administrator  
Detector Name : P11314  
Geometry : 130G\_SOIL\_1  
Live Time : 900.0 seconds  
Real Time : 900.4 seconds  
  
Dead Time : 0.04 %  
  
Peak Locate Threshold : 3.00  
Peak Locate Range (in channels) : 120 - 8192  
Peak Area Range (in channels) : 120 - 8192  
Identification Energy Tolerance : 1.000 keV  
  
Energy Calibration Used Done On : 1/24/2019  
Efficiency Calibration Used Done On : 10/17/2019  
Efficiency Calibration Description :  
  
Sample Number : 80542  
Fill Height : 1480.37 gram  
Certificate Name : Eu155-Na22  
Certificate Date : 12/22/2008 12:00:00PM

*J. M. S. L.*  
10-17-19

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## PEAK ANALYSIS REPORT

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Peak Analysis Performed on : 10/17/2019 9:48:14AM  
Peak Analysis From Channel : 120  
Peak Analysis To Channel : 8192

*J. M. S. L.*  
10-17-19

Analysis Report for 17-Oct-19-10008

L1-10208D-AIGS-003SS

	Peak No.	Energy (keV)	ROI start	ROI end	Peak Centroid	Net Peak Area	Net Area Uncertainty	Continuum Counts	FWHM (keV)
	1	77.44	306 -	316	310.30	4.76E+01	18.44	1.19E+02	1.12
M	2	238.90	948 -	971	955.17	1.92E+02	14.67	6.53E+01	1.10
m	3	241.82	948 -	971	966.83	3.47E+01	9.10	8.67E+01	1.10
	4	295.40	1176 -	1187	1180.88	6.96E+01	13.03	3.94E+01	0.62
	5	338.43	1348 -	1359	1352.80	4.14E+01	11.77	3.86E+01	1.20
	6	351.95	1400 -	1415	1406.81	1.43E+02	15.55	3.24E+01	1.12
	7	583.32	2324 -	2338	2331.41	7.53E+01	11.10	1.67E+01	1.13
	8	609.20	2426 -	2442	2434.83	1.01E+02	12.14	1.48E+01	1.81
	9	1237.73	4943 -	4954	4948.40	1.20E+01	5.88	9.00E+00	0.94
	10	1460.45	5827 -	5852	5839.75	4.85E+02	22.61	6.34E+00	1.86

M = First peak in a multiplet region  
m = Other peak in a multiplet region  
F = Fitted singlet  
Errors quoted at 1.000sigma

No background subtract performed on this spectrum.

## NUCLIDE IDENTIFICATION REPORT

Nuclide Library Used : C:\Canberra\Apex\Root\Default\Library\ZION LIB-BNL.NLB

### IDENTIFIED NUCLIDES

Nuclide Name	Id Confidence	Energy (keV)		Yield(%)	Activity (pCi/grams)	Activity Uncertainty
K-40	0.97	1460.82	*	10.66	1.10E+01	7.00E-01
Tl-208	0.99	583.19	*	85.00	1.14E-01	1.82E-02
Pb-212	0.99	115.18		0.60		
		238.63	*	43.60	3.07E-01	3.41E-02
		300.09		3.30		
Pb212-XR	0.99	74.82		10.28		
		77.11	*	17.10	3.33E-01	1.34E-01

Analysis Report for 17-Oct-19-10008

L1-10208D-AIGS-003SS

<b>Nuclide Name</b>	<b>Id Confidence</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Activity Uncertainty</b>
Pb212-XR	0.99	87.35	3.97		
		89.78	1.46		
Bi-214	0.99	609.32 *	45.49	2.95E-01	3.97E-02
		768.36	4.89		
		806.18	1.26		
		934.06	3.11		
		1120.29	14.92		
		1155.21	1.63		
		1238.12 *	5.83	4.41E-01	2.17E-01
		1280.98	1.43		
		1377.67	3.99		
		1385.31	0.79		
		1401.52	1.33		
		1407.99	2.39		
		1509.21	2.13		
		1661.27	1.05		
		1729.59	2.88		
		1764.49	15.30		
		1847.43	2.03		
		2118.51	1.16		
Pb-214	0.99	241.99 *	7.25	3.36E-01	9.21E-02
		295.22 *	18.42	2.99E-01	6.10E-02
		351.93 *	35.60	3.61E-01	4.89E-02
		785.96	1.06		
Pb214-XR	0.99	74.82	5.80		
		77.11 *	9.70	5.88E-01	2.37E-01
		87.35	2.24		
		89.78	0.82		
Ac-228	0.57	129.07	2.42		
		209.25	3.89		
		270.24	3.46		
		328.00	2.95		
		338.32 *	11.27	3.22E-01	9.52E-02
		409.46	1.92		
		463.00	4.40		
		794.95	4.25		
		911.20	25.80		
		964.77	4.99		
		968.97	15.80		
		1588.20	3.22		

\* = Energy line found in the spectrum.

- = Manually added nuclide.

? = Manually edited nuclide.

@ = Energy line not used for Weighted Mean Activity

Energy Tolerance : 1.000 keV

Nuclide confidence index threshold = 0.30

Errors quoted at 1.000sigma

Analysis Report for 17-Oct-19-10008

L1-10208D-AIGS-003SS

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## INTERFERENCE CORRECTED REPORT

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<b>Nuclide Name</b>	<b>Nuclide Id Confidence</b>	<b>Wt mean Activity (pCi/grams)</b>	<b>Wt mean Activity Uncertainty</b>	<b>Comments</b>	
	K-40	0.979	1.10E+01	7.00E-01	
	Tl-208	0.997	1.14E-01	1.82E-02	
X	Bi-211	0.884			
	Pb-212	0.990	3.07E-01	3.41E-02	
?	Pb212-XR	0.991	3.33E-01	1.34E-01	
	Bi-214	0.998	3.00E-01	3.90E-02	
	Pb-214	0.998	3.37E-01	3.52E-02	
?	Pb214-XR	0.991	5.88E-01	2.37E-01	
	Ac-228	0.575	3.22E-01	9.52E-02	

? = 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 1.000sigma

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Analysis Report for 17-Oct-19-10008  
L1-10208D-AIGS-003SS

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## UNIDENTIFIED PEAKS

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Peak Locate Performed on : 10/17/2019 9:48:14AM  
Peak Locate From Channel : 120  
Peak Locate To Channel : 8192

Peak No.	Energy (keV)	Peak Size (CPS)	Peak CPS (%) Uncertainty	Peak Type	Tolerance Nuclide
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All peaks were identified.

M = First peak in a multiplet region  
m = Other peak in a multiplet region  
F = Fitted singlet  
Errors quoted at 1.000sigma

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## NUCLIDE MDA REPORT

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Nuclide Library Used : C:\Canberra\Apex\Root\Default\Library\ZION LIB-BNL.NLB

Nuclide Name	Energy (keV)	Yield(%)	Activity (pCi/grams)	Nuclide MDA (pCi/grams)	Line MDA (pCi/grams)
An Pk	511.00	100.00	6.35E-02	5.98E-02	5.98E-02
BE-7	477.60	10.44	2.01E-01	4.29E-01	4.29E-01
+ K-40	1460.82	* 10.66	1.10E+01	4.61E-01	4.61E-01
Mn-54	834.85	99.98	-1.19E-02	5.72E-02	5.72E-02
Co-60	1173.23	99.85	1.15E-02	6.85E-02	7.27E-02
	1332.49	99.98	4.56E-02		6.85E-02
Nb-94	702.65	99.81	-9.93E-04	4.53E-02	4.53E-02
	871.09	99.89	-2.97E-03		4.87E-02
Ag-108m	79.13	6.60	-1.35E-01	4.57E-02	1.36E+00
	433.94	90.50	-1.38E-02		4.57E-02
	614.28	89.80	-2.24E-02		6.53E-02
	722.94	90.80	-6.79E-02		6.38E-02
Sb-125	176.31	6.84	-1.36E-01	1.23E-01	5.51E-01
	380.45	1.52	-5.81E-01		2.36E+00
	427.87	29.60	-8.78E-02		1.23E-01
	463.36	10.49	7.52E-02		3.89E-01
	600.60	17.65	1.03E-01		2.64E-01
	606.71	4.98	2.88E+00		1.61E+00
	635.95	11.22	-2.15E-02		3.77E-01

Analysis Report for 17-Oct-19-10008

L1-10208D-AIGS-003SS

<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Nuclide MDA (pCi/grams)</b>	<b>Line MDA (pCi/grams)</b>
Sb-125	671.44	1.79	-3.57E-01	1.23E-01	2.54E+00
Ba-133	79.61	2.65	-1.98E-01	8.72E-02	3.32E+00
	81.00	32.90	-1.21E-01		2.09E-01
	276.40	7.16	-2.16E-01		5.20E-01
	302.85	18.34	7.61E-02		2.22E-01
	356.01	62.05	7.78E-03		8.72E-02
	383.85	8.94	3.77E-02		4.07E-01
Cs-134	475.36	1.48	1.71E+00	6.20E-02	3.01E+00
	563.25	8.34	-1.75E-02		5.46E-01
	569.33	15.37	6.17E-02		2.74E-01
	604.72	97.62	1.53E-02		7.18E-02
	795.86	85.46	6.26E-03		6.20E-02
	801.95	8.69	-2.09E-01		5.46E-01
	1038.61	0.99	-3.98E+00		5.63E+00
	1167.97	1.79	-2.62E+00		3.65E+00
	1365.19	3.02	-9.36E-01		1.37E+00
Cs-137	661.66	85.10	8.30E-02	6.62E-02	6.62E-02
Eu-152	121.78	28.67	2.08E-02	1.39E-01	1.39E-01
	244.70	7.61	-2.67E-01		6.09E-01
	295.94	0.45	6.73E+00		1.15E+01
	344.28	26.60	-5.32E-02		1.43E-01
	367.79	0.86	4.48E-01		4.02E+00
	411.12	2.24	-1.05E+00		1.74E+00
	443.96	2.83	-8.41E-01		1.31E+00
	488.68	0.42	2.59E-01		9.80E+00
	563.99	0.49	-1.36E+01		8.23E+00
	586.26	0.46	-2.43E+00		1.50E+01
	678.62	0.47	-4.70E+00		1.04E+01
	688.67	0.86	-3.37E+00		5.78E+00
	719.35	0.28	1.36E+01		1.89E+01
	778.90	12.96	-4.82E-02		3.31E-01
	810.45	0.32	-8.40E-01		1.44E+01
	867.37	4.26	-1.64E-01		1.19E+00
	919.33	0.43	5.57E+00		1.40E+01
	964.08	14.65	2.12E-01		5.65E-01
	1085.87	10.24	-2.52E-01		6.00E-01
	1089.74	1.73	-6.66E-01		3.56E+00
	1112.07	13.69	-2.44E-01		4.96E-01
	1212.95	1.43	3.96E+00		5.56E+00
	1249.94	0.19	-1.63E+00		3.79E+01
	1299.14	1.63	1.67E+00		3.66E+00
	1408.01	21.07	-1.84E-01		2.39E-01
	1457.64	0.50	2.31E+02		5.26E+01
	1528.10	0.28	-1.81E+00		1.30E+01
Eu-154	123.07	40.40	-5.38E-02	9.71E-02	9.71E-02
	247.93	6.89	-6.24E-01		5.18E-01
	591.76	4.95	-5.25E-02		8.23E-01
	692.42	1.78	-1.46E+00		2.74E+00
	723.30	20.06	-2.95E-01		2.94E-01
	756.80	4.52	-4.76E-02		1.12E+00
	873.18	12.08	-2.57E-01		4.21E-01



Analysis Report for 17-Oct-19-10008

L1-10208D-AIGS-003SS

<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Nuclide MDA (pCi/grams)</b>	<b>Line MDA (pCi/grams)</b>
Eu-154	996.29	10.48	1.40E-01	9.71E-02	5.82E-01
	1004.76	18.01	1.40E-01		3.12E-01
	1274.43	34.80	6.60E-02		1.99E-01
	1596.48	1.80	1.73E+00		2.81E+00
Eu-155	45.30	1.31	-8.36E+00	2.13E-01	1.24E+01
	60.01	1.22	7.77E+00		1.51E+01
	86.55	30.70	1.35E-01		2.19E-01
	105.31	21.10	-1.33E-01		2.13E-01
Ra-226	186.21	3.64	2.04E-01	1.14E+00	1.14E+00
Pa-231	27.36	10.30	1.23E+00	1.52E+00	1.52E+00
	283.69	1.70	-4.99E-01		2.27E+00
	300.07	2.47	-1.50E-01		1.63E+00
	302.65	2.20	7.71E-03		1.81E+00
	330.06	1.40	9.97E-01		2.97E+00
	U-235	143.76	10.96		-1.03E-01
	163.33	5.08	-1.52E-01	6.99E-01	
	185.71	57.20	2.15E-02	7.32E-02	
	202.11	1.08	1.73E+00	3.58E+00	
	205.31	5.01	6.47E-02	7.15E-01	
Am-241	59.54	35.90	1.32E-01	5.23E-01	5.23E-01

+ = Nuclide identified during the nuclide identification

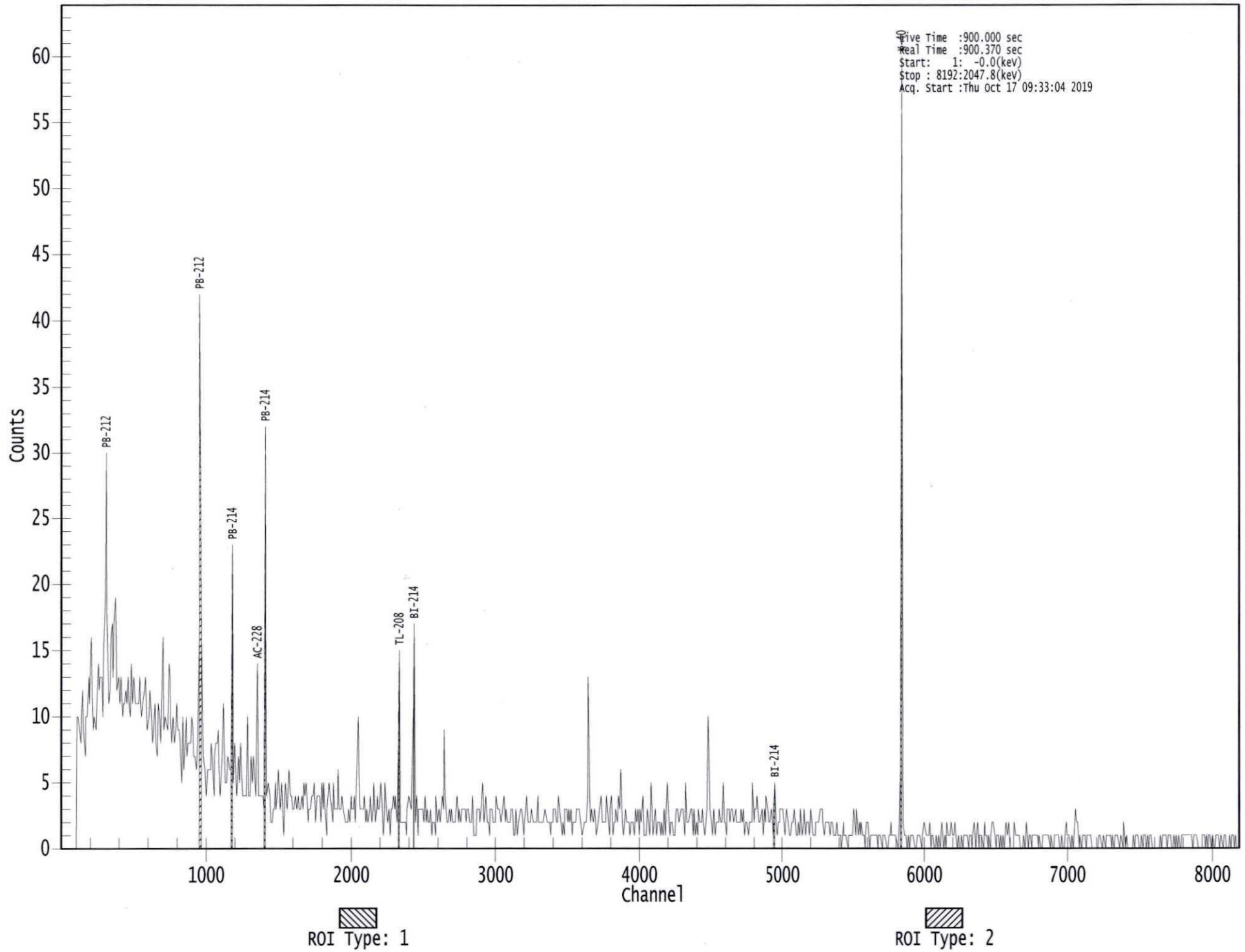
\* = Energy line found in the spectrum

&gt; = MDA value not calculated

@ = Half-life too short to be able to perform the decay correction

? = CAUTION: MDA value is inconsistent with Currie MDA at 95% confidence level

0000080542.CNF



Analysis Report for 17-Oct-19-10009  
L1-10208D-AIGS-004SS

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## GAMMA SPECTRUM ANALYSIS

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Sample Identification : 17-Oct-19-10009  
Sample Description : L1-10208D-AIGS-004SS  
Sample Type : Soil  
Unit :  
Sample Point :  
  
Sample Size : 1.253E+03 grams  
Facility : Default  
  
Sample Taken On : 10/16/2019 8:06:00AM  
Acquisition Started : 10/17/2019 9:33:12AM  
  
Procedure : 130G\_SOIL\_1  
Operator : Administrator  
Detector Name : 352  
Geometry : 130G\_SOIL\_1  
Live Time : 900.0 seconds  
Real Time : 900.3 seconds  
  
Dead Time : 0.04 %  
  
Peak Locate Threshold : 3.00  
Peak Locate Range (in channels) : 120 - 8192  
Peak Area Range (in channels) : 120 - 8192  
Identification Energy Tolerance : 1.000 keV  
  
Energy Calibration Used Done On : 9/29/2018  
Efficiency Calibration Used Done On : 10/17/2019  
Efficiency Calibration Description :  
  
Sample Number : 80543  
Fill Height : 1253.03 gram  
Certificate Name : Eu155-Na22  
Certificate Date : 1/7/2013 12:00:00PM

*J. M. White*  
10-17-19

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## PEAK ANALYSIS REPORT

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Peak Analysis Performed on : 10/17/2019 9:48:17AM  
Peak Analysis From Channel : 120  
Peak Analysis To Channel : 8192

*J. M. White*  
10-17-19

Analysis Report for 17-Oct-19-10009

L1-10208D-AIGS-004SS

Peak No.	Energy (keV)	ROI start	ROI end	Peak Centroid	Net Peak Area	Net Area Uncertainty	Continuum Counts	FWHM (keV)
1	238.59	949 -	961	954.84	1.85E+02	21.13	9.94E+01	0.90
2	295.16	1173 -	1188	1180.88	8.40E+01	14.74	4.40E+01	0.56
3	338.19	1347 -	1359	1352.81	5.64E+01	12.20	3.46E+01	1.21
4	351.96	1400 -	1415	1407.85	1.40E+02	15.92	3.78E+01	1.06
5	510.79	2036 -	2049	2042.63	5.52E+01	12.28	3.48E+01	0.55
6	583.24	2326 -	2339	2332.28	8.30E+01	11.88	2.10E+01	1.47
7	609.27	2428 -	2444	2436.35	1.19E+02	12.04	8.50E+00	1.43
8	767.54	3064 -	3075	3069.23	1.25E+01	6.24	1.05E+01	0.97
9	911.26	3636 -	3651	3644.07	6.31E+01	9.62	9.86E+00	0.38
10	968.62	3866 -	3880	3873.54	3.48E+01	8.53	1.32E+01	1.05
11	1120.31	4475 -	4487	4480.52	3.02E+01	6.73	5.83E+00	0.32
12	1460.59	5829 -	5855	5842.74	4.85E+02	23.02	1.02E+01	2.21

M = First peak in a multiplet region  
m = Other peak in a multiplet region  
F = Fitted singlet  
Errors quoted at 1.000sigma

No background subtract performed on this spectrum.

## NUCLIDE IDENTIFICATION REPORT

Nuclide Library Used : C:\Canberra\Apex\Root\Default\Library\ZION LIB-BNL.NLB

### IDENTIFIED NUCLIDES

Nuclide Name	Id Confidence	Energy (keV)	Yield(%)	Activity (pCi/grams)	Activity Uncertainty
An Pk	0.99	511.00 *	100.00	6.59E-02	1.53E-02
K-40	0.99	1460.82 *	10.66	1.08E+01	6.97E-01
Tl-208	1.00	583.19 *	85.00	1.25E-01	1.95E-02
Pb-212	1.00	115.18 *	0.60		
		238.63 *	43.60	3.02E-01	4.23E-02

Analysis Report for 17-Oct-19-10009

L1-10208D-AIGS-004SS

<b>Nuclide Name</b>	<b>Id Confidence</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Activity Uncertainty</b>
Pb-212	1.00	300.09	3.30		
Bi-214	0.99	609.32 *	45.49	3.44E-01	4.06E-02
		768.36 *	4.89	3.93E-01	1.98E-01
		806.18	1.26		
		934.06	3.11		
		1120.29 *	14.92	4.01E-01	9.09E-02
		1155.21	1.63		
		1238.12	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		
		1661.27	1.05		
		1729.59	2.88		
		1764.49	15.30		
		1847.43	2.03		
		2118.51	1.16		
Pb-214	1.00	241.99	7.25		
		295.22 *	18.42	3.66E-01	7.06E-02
		351.93 *	35.60	3.58E-01	4.98E-02
		785.96	1.06		
Ac-228	0.99	129.07	2.42		
		209.25	3.89		
		270.24	3.46		
		328.00	2.95		
		338.32 *	11.27	4.42E-01	1.02E-01
		409.46	1.92		
		463.00	4.40		
		794.95	4.25		
		911.20 *	25.80	4.23E-01	6.70E-02
		964.77	4.99		
		968.97 *	15.80	3.97E-01	9.89E-02
		1588.20	3.22		

\* = Energy line found in the spectrum.

- = Manually added nuclide.

? = Manually edited nuclide.

@ = Energy line not used for Weighted Mean Activity

Energy Tolerance : 1.000 keV

Nuclide confidence index threshold = 0.30

Errors quoted at 1.000sigma

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**INTERFERENCE CORRECTED REPORT**

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Analysis Report for 17-Oct-19-10009

L1-10208D-AIGS-004SS

	<b>Nuclide Name</b>	<b>Nuclide Id Confidence</b>	<b>Wt mean Activity (pCi/grams)</b>	<b>Wt mean Activity Uncertainty</b>	<b>Comments</b>
	An Pk	0.993	6.59E-02	1.53E-02	
	K-40	0.992	1.08E+01	6.97E-01	
	Tl-208	1.000	1.25E-01	1.95E-02	
X	Bi-211	0.880			
	Pb-212	1.000	3.02E-01	4.23E-02	
	Bi-214	0.995	3.55E-01	3.65E-02	
	Pb-214	1.000	3.61E-01	4.07E-02	
	Ac-228	0.996	4.21E-01	4.88E-02	

? = 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 1.000sigma

Analysis Report for 17-Oct-19-10009  
L1-10208D-AIGS-004SS

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## UNIDENTIFIED PEAKS

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Peak Locate Performed on : 10/17/2019 9:48:17AM  
Peak Locate From Channel : 120  
Peak Locate To Channel : 8192

Peak No.	Energy (keV)	Peak Size (CPS)	Peak CPS (%) Uncertainty	Peak Type	Tolerance Nuclide
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All peaks were identified.

M = First peak in a multiplet region

m = Other peak in a multiplet region

F = Fitted singlet

Errors quoted at 1.000sigma

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## NUCLIDE MDA REPORT

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Nuclide Library Used : C:\Canberra\Apex\Root\Default\Library\ZION LIB-BNL.NLB

Nuclide Name	Energy (keV)	Yield(%)	Activity (pCi/grams)	Nuclide MDA (pCi/grams)	Line MDA (pCi/grams)
+ An Pk	511.00	* 100.00	6.59E-02	4.30E-02	4.30E-02
BE-7	477.60	10.44	1.27E-01	4.73E-01	4.73E-01
+ K-40	1460.82	* 10.66	1.08E+01	5.72E-01	5.72E-01
Mn-54	834.85	99.98	4.22E-02	6.01E-02	6.01E-02
Co-60	1173.23	99.85	-2.86E-02	6.86E-02	7.17E-02
	1332.49	99.98	-5.71E-03		6.86E-02
Nb-94	702.65	99.81	-5.83E-03	4.89E-02	4.89E-02
	871.09	99.89	1.99E-02		5.76E-02
Ag-108m	79.13	6.60	-6.41E-01	4.51E-02	1.76E+00
	433.94	90.50	8.01E-03		4.51E-02
	614.28	89.80	-7.32E-02		8.79E-02
	722.94	90.80	7.57E-02		7.16E-02
Sb-125	176.31	6.84	-1.34E-01	1.28E-01	6.08E-01
	380.45	1.52	-2.58E-01		2.65E+00
	427.87	29.60	-7.11E-02		1.28E-01
	463.36	10.49	3.27E-01		4.66E-01
	600.60	17.65	2.72E-01		2.99E-01
	606.71	4.98	2.25E+00		1.63E+00
	635.95	11.22	-2.09E-02		3.98E-01

Analysis Report for 17-Oct-19-10009

L1-10208D-AIGS-004SS

<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Nuclide MDA (pCi/grams)</b>	<b>Line MDA (pCi/grams)</b>
Sb-125	671.44	1.79	-2.46E+00	1.28E-01	2.65E+00
Ba-133	79.61	2.65	1.91E+00	9.83E-02	4.32E+00
	81.00	32.90	-3.28E-01		3.00E-01
	276.40	7.16	1.84E-01		5.85E-01
	302.85	18.34	-8.58E-02		2.38E-01
	356.01	62.05	-5.68E-02		9.83E-02
	383.85	8.94	-1.05E-01		4.78E-01
Cs-134	475.36	1.48	1.06E+00	6.35E-02	3.20E+00
	563.25	8.34	1.36E-01		5.28E-01
	569.33	15.37	1.16E-02		2.79E-01
	604.72	97.62	-3.30E-02		7.68E-02
	795.86	85.46	-2.69E-02		6.35E-02
	801.95	8.69	-9.30E-01		6.28E-01
	1038.61	0.99	-2.21E+00		5.64E+00
	1167.97	1.79	1.65E+00		3.87E+00
	1365.19	3.02	1.02E-01		1.56E+00
Cs-137	661.66	85.10	3.67E-02	7.73E-02	7.73E-02
Eu-152	121.78	28.67	3.21E-02	1.51E-01	1.72E-01
	244.70	7.61	-2.12E-01		6.43E-01
	295.94	0.45	1.27E+01		1.24E+01
	344.28	26.60	-1.10E-01		1.51E-01
	367.79	0.86	4.33E+00		5.16E+00
	411.12	2.24	1.04E+00		2.32E+00
	443.96	2.83	7.96E-01		1.68E+00
	488.68	0.42	6.09E+00		1.04E+01
	563.99	0.49	5.36E+00		9.15E+00
	586.26	0.46	1.86E+01		1.66E+01
	678.62	0.47	-1.15E+00		9.65E+00
	688.67	0.86	3.87E+00		5.92E+00
	719.35	0.28	-1.00E+01		1.80E+01
	778.90	12.96	1.54E-01		4.30E-01
	810.45	0.32	-1.26E+01		1.71E+01
	867.37	4.26	-7.52E-01		1.40E+00
	919.33	0.43	-1.61E+01		1.37E+01
	964.08	14.65	9.38E-02		5.65E-01
	1085.87	10.24	-2.98E-01		5.53E-01
	1089.74	1.73	4.05E+00		3.57E+00
	1112.07	13.69	-8.53E-01		4.79E-01
	1212.95	1.43	1.63E+00		5.58E+00
	1249.94	0.19	-3.51E+01		3.24E+01
	1299.14	1.63	2.62E+00		4.15E+00
	1408.01	21.07	-1.74E-01		2.29E-01
	1457.64	0.50	2.27E+02		5.22E+01
	1528.10	0.28	-2.05E+00		1.44E+01
Eu-154	123.07	40.40	-3.91E-02	1.20E-01	1.20E-01
	247.93	6.89	1.13E-01		6.07E-01
	591.76	4.95	-1.11E+00		1.03E+00
	692.42	1.78	1.44E+00		2.84E+00
	723.30	20.06	3.58E-01		3.24E-01
	756.80	4.52	5.92E-01		1.14E+00
	873.18	12.08	2.43E-01		4.72E-01



Analysis Report for 17-Oct-19-10009

L1-10208D-AIGS-004SS

<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Nuclide MDA (pCi/grams)</b>	<b>Line MDA (pCi/grams)</b>
Eu-154	996.29	10.48	1.82E-01	1.20E-01	6.20E-01
	1004.76	18.01	-1.12E-01		3.59E-01
	1274.43	34.80	-1.44E-01		1.83E-01
	1596.48	1.80	-1.17E+00		2.86E+00
Eu-155	45.30	1.31	1.05E+01	2.56E-01	2.47E+01
	60.01	1.22	-1.19E+01		2.39E+01
	86.55	30.70	-6.29E-02		2.71E-01
	105.31	21.10	-3.04E-02		2.56E-01
Ra-226	186.21	3.64	3.39E-01	1.28E+00	1.28E+00
Pa-231	27.36	10.30	2.73E+00	1.95E+00	2.71E+00
	283.69	1.70	-9.49E-02		2.38E+00
	300.07	2.47	8.54E-01		1.95E+00
	302.65	2.20	5.34E-02		2.01E+00
	330.06	1.40	4.11E-01		3.16E+00
U-235	143.76	10.96	2.05E-01	8.13E-02	4.20E-01
	163.33	5.08	2.07E-01		8.39E-01
	185.71	57.20	1.80E-02		8.13E-02
	202.11	1.08	-1.16E+00		3.91E+00
	205.31	5.01	-1.18E+00		7.63E-01
Am-241	59.54	35.90	1.30E-01	8.62E-01	8.62E-01

+ = Nuclide identified during the nuclide identification

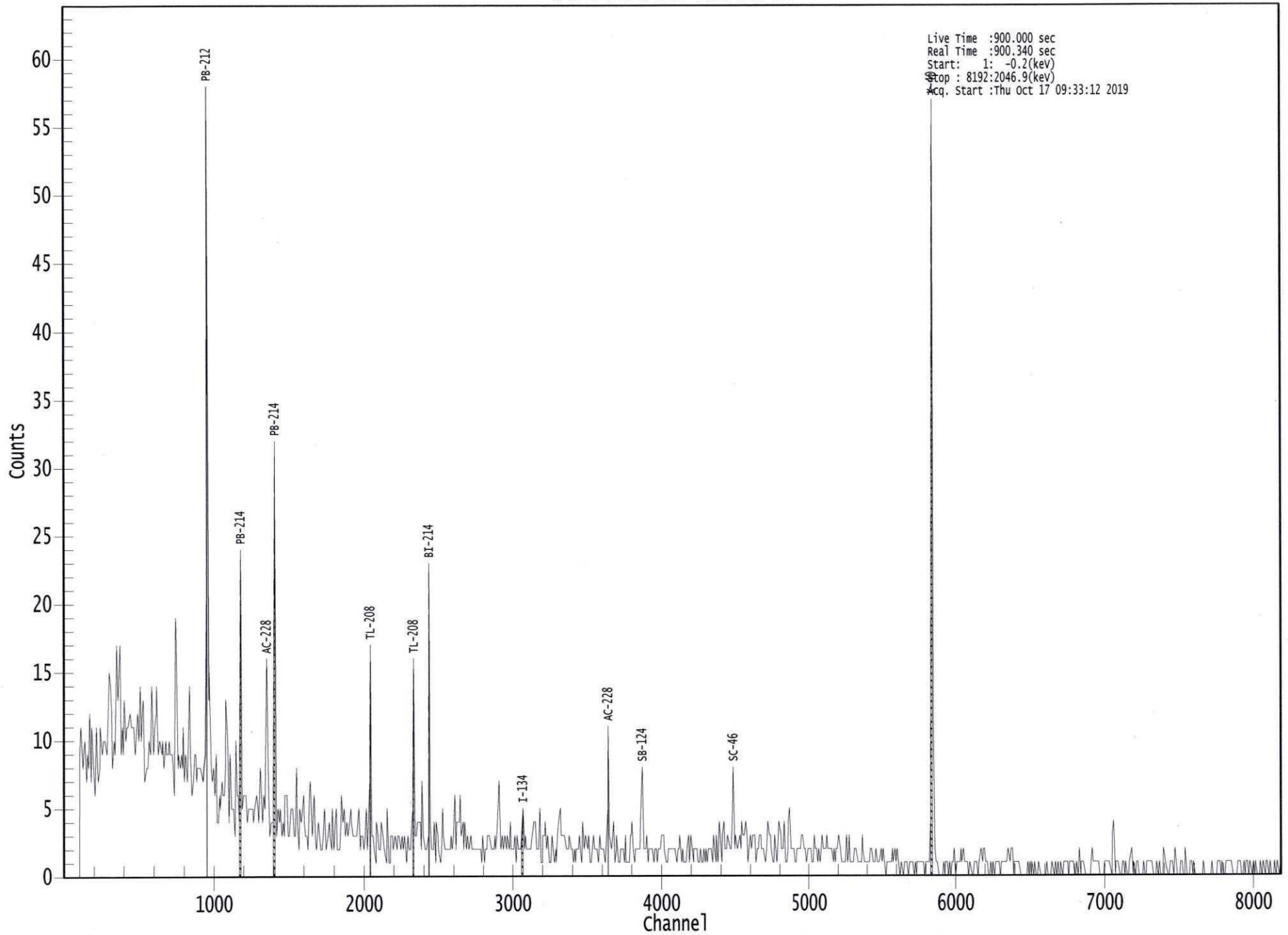
\* = Energy line found in the spectrum

&gt; = MDA value not calculated

@ = Half-life too short to be able to perform the decay correction

? = CAUTION: MDA value is inconsistent with Currie MDA at 95% confidence level

0000080543.CNF



ROI Type: 1

Analysis Report for 17-Oct-19-10010  
L1-10208D-AIGS-005SS

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## GAMMA SPECTRUM ANALYSIS

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Sample Identification : 17-Oct-19-10010  
Sample Description : L1-10208D-AIGS-005SS  
Sample Type : Soil  
Unit :  
Sample Point :  
  
Sample Size : 1.345E+03 grams  
Facility : Default  
  
Sample Taken On : 10/16/2019 8:10:00AM  
Acquisition Started : 10/17/2019 9:53:11AM  
  
Procedure : 130G\_SOIL\_1  
Operator : Administrator  
Detector Name : 324  
Geometry : 130G\_SOIL\_1  
Live Time : 900.0 seconds  
Real Time : 900.5 seconds  
  
Dead Time : 0.05 %  
  
Peak Locate Threshold : 3.00  
Peak Locate Range (in channels) : 120 - 4096  
Peak Area Range (in channels) : 120 - 4096  
Identification Energy Tolerance : 1.000 keV  
  
Energy Calibration Used Done On : 9/29/2018  
Efficiency Calibration Used Done On : 10/17/2019  
Efficiency Calibration Description :  
  
Sample Number : 80544  
Fill Height : 1345.19 gram  
Certificate Name : Eu155-Na22  
Certificate Date : 1/30/2013 12:00:00PM

*J. M. Seld*  
10-17-19

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## PEAK ANALYSIS REPORT

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Peak Analysis Performed on : 10/17/2019 10:08:14AM  
Peak Analysis From Channel : 120  
Peak Analysis To Channel : 4096

*J. M. Seld*  
10-17-19

Analysis Report for 17-Oct-19-10010  
L1-10208D-AIGS-005SS

Peak No.	Energy (keV)	ROI start	ROI end	Peak Centroid	Net Peak Area	Net Area Uncertainty	Continuum Counts	FWHM (keV)
1	238.62	472 -	481	477.42	3.57E+02	30.37	2.45E+02	1.10
2	295.20	585 -	594	590.45	1.21E+02	18.73	1.02E+02	1.22
3	351.88	698 -	708	703.70	2.48E+02	20.42	7.12E+01	1.14
4	510.66	1016 -	1026	1021.01	7.05E+01	13.29	4.45E+01	1.64
5	583.13	1161 -	1171	1165.86	1.14E+02	15.02	4.68E+01	1.42
6	609.23	1212 -	1223	1218.05	1.89E+02	16.57	3.45E+01	1.55
7	911.20	1816 -	1828	1821.85	1.30E+02	13.64	2.13E+01	2.44
8	968.82	1933 -	1943	1937.09	6.29E+01	11.14	2.41E+01	1.75
9	1120.09	2235 -	2245	2239.73	3.77E+01	10.13	2.73E+01	1.62
10	1460.60	2914 -	2928	2921.24	6.79E+02	26.38	5.74E+00	1.85

M = First peak in a multiplet region  
m = Other peak in a multiplet region  
F = Fitted singlet  
Errors quoted at 1.000sigma

No background subtract performed on this spectrum.

## NUCLIDE IDENTIFICATION REPORT

Nuclide Library Used : C:\Canberra\Apex\Root\Default\Library\ZION LIB-BNL.NLB

### IDENTIFIED NUCLIDES

Nuclide Name	Id Confidence	Energy (keV)	Yield(%)	Activity (pCi/grams)	Activity Uncertainty
An Pk	0.98	511.00 *	100.00	7.42E-02	1.49E-02
K-40	0.99	1460.82 *	10.66	1.33E+01	7.74E-01
Tl-208	0.99	583.19 *	85.00	1.52E-01	2.20E-02
Pb-212	1.00	115.18	0.60		
		238.63 *	43.60	5.14E-01	6.03E-02
		300.09	3.30		
Bi-214	0.99	609.32 *	45.49	4.83E-01	5.14E-02

Analysis Report for 17-Oct-19-10010

L1-10208D-AIGS-005SS

<b>Nuclide Name</b>	<b>Id Confidence</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Activity Uncertainty</b>
Bi-214	0.99	768.36	4.89		
		806.18	1.26		
		934.06	3.11		
		1120.29 *	14.92	4.40E-01	1.20E-01
		1155.21	1.63		
		1238.12	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		
		1661.27	1.05		
		1729.59	2.88		
		1764.49	15.30		
Pb-214	1.00	1847.43	2.03		
		2118.51	1.16		
		241.99	7.25		
Ac-228	0.73	295.22 *	18.42	4.65E-01	8.11E-02
		351.93 *	35.60	5.59E-01	6.42E-02
		785.96	1.06		
		129.07	2.42		
		209.25	3.89		
		270.24	3.46		
		328.00	2.95		
		338.32	11.27		
		409.46	1.92		
		463.00	4.40		
		794.95	4.25		
911.20 *	25.80	7.66E-01	8.69E-02		
964.77	4.99				
968.97 *	15.80	6.31E-01	1.15E-01		
1588.20	3.22				

\* = Energy line found in the spectrum.

- = Manually added nuclide.

? = Manually edited nuclide.

@ = Energy line not used for Weighted Mean Activity

Energy Tolerance : 1.000 keV

Nuclide confidence index threshold = 0.30

Errors quoted at 1.000sigma

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**INTERFERENCE CORRECTED REPORT**

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Analysis Report for 17-Oct-19-10010

L1-10208D-AIGS-005SS

<b>Nuclide Name</b>	<b>Nuclide Id Confidence</b>	<b>Wt mean Activity (pCi/grams)</b>	<b>Wt mean Activity Uncertainty</b>	<b>Comments</b>
An Pk	0.982	7.42E-02	1.49E-02	
K-40	0.992	1.33E+01	7.74E-01	
Tl-208	0.999	1.52E-01	2.20E-02	
X Bi-211	0.900			
Pb-212	1.000	5.14E-01	6.03E-02	
Bi-214	0.999	4.76E-01	4.73E-02	
Pb-214	1.000	5.23E-01	5.04E-02	
Ac-228	0.739	7.17E-01	6.94E-02	

? = 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 1.000sigma

Analysis Report for 17-Oct-19-10010  
L1-10208D-AIGS-005SS

### UNIDENTIFIED PEAKS

Peak Locate Performed on : 10/17/2019 10:08:14AM  
Peak Locate From Channel : 120  
Peak Locate To Channel : 4096

Peak No.	Energy (keV)	Peak Size (CPS)	Peak CPS (%) Uncertainty	Peak Type	Tolerance Nuclide
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All peaks were identified.

M = First peak in a multiplet region  
m = Other peak in a multiplet region  
F = Fitted singlet  
Errors quoted at 1.000sigma

### NUCLIDE MDA REPORT

Nuclide Library Used : C:\Canberra\Apex\Root\Default\Library\ZION LIB-BNL.NLB

	Nuclide Name	Energy (keV)	Yield(%)	Activity (pCi/grams)	Nuclide MDA (pCi/grams)	Line MDA (pCi/grams)
+	An Pk	511.00	* 100.00	7.42E-02	3.98E-02	3.98E-02
	BE-7	477.60	10.44	6.36E-02	4.09E-01	4.09E-01
+	K-40	1460.82	* 10.66	1.33E+01	3.28E-01	3.28E-01
	Mn-54	834.85	99.98	-9.06E-03	5.44E-02	5.44E-02
	Co-60	1173.23	99.85	2.96E-03	6.17E-02	7.13E-02
		1332.49	99.98	1.45E-02		6.17E-02
	Nb-94	702.65	99.81	1.44E-02	5.14E-02	5.14E-02
		871.09	99.89	-3.01E-04		5.63E-02
	Ag-108m	79.13	6.60	7.55E-01	4.70E-02	1.61E+00
		433.94	90.50	1.17E-02		4.70E-02
		614.28	89.80	-5.07E-02		7.32E-02
		722.94	90.80	1.87E-02		6.18E-02
	Sb-125	176.31	6.84	1.19E-01	1.37E-01	6.52E-01
		380.45	1.52	-1.80E+00		2.36E+00
		427.87	29.60	-1.52E-02		1.37E-01
		463.36	10.49	1.40E-01		4.46E-01
		600.60	17.65	-5.92E-02		2.56E-01
		606.71	4.98	-5.16E-02		1.83E+00
		635.95	11.22	5.05E-02		4.41E-01

Analysis Report for 17-Oct-19-10010

L1-10208D-AIGS-005SS

<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Nuclide MDA (pCi/grams)</b>	<b>Line MDA (pCi/grams)</b>
Sb-125	671.44	1.79	-6.13E-02	1.37E-01	2.53E+00
Ba-133	79.61	2.65	1.62E-01	9.81E-02	3.76E+00
	81.00	32.90	-4.15E-01		2.53E-01
	276.40	7.16	1.90E-02		5.93E-01
	302.85	18.34	-6.85E-02		2.15E-01
	356.01	62.05	-4.20E-02		9.81E-02
	383.85	8.94	2.50E-03		4.55E-01
Cs-134	475.36	1.48	-2.01E-02	7.14E-02	2.68E+00
	563.25	8.34	-8.13E-02		5.48E-01
	569.33	15.37	7.97E-02		3.30E-01
	604.72	97.62	-2.36E-02		7.91E-02
	795.86	85.46	2.29E-02		7.14E-02
	801.95	8.69	-1.23E-01		6.44E-01
	1038.61	0.99	1.61E-01		5.82E+00
	1167.97	1.79	-2.56E+00		3.74E+00
	1365.19	3.02	-4.09E-01		1.49E+00
Cs-137	661.66	85.10	6.51E-02	6.82E-02	6.82E-02
Eu-152	121.78	28.67	-4.39E-02	1.41E-01	1.41E-01
	244.70	7.61	-2.76E-01		6.34E-01
	295.94	0.45	-2.67E+00		1.26E+01
	344.28	26.60	-2.09E-01		1.46E-01
	367.79	0.86	2.15E+00		4.82E+00
	411.12	2.24	2.64E-02		1.92E+00
	443.96	2.83	2.88E-01		1.54E+00
	488.68	0.42	-5.39E+00		1.07E+01
	563.99	0.49	1.20E+00		9.51E+00
	586.26	0.46	-1.31E+00		1.73E+01
	678.62	0.47	8.67E-01		1.06E+01
	688.67	0.86	2.16E+00		5.66E+00
	719.35	0.28	-4.78E+00		1.75E+01
	778.90	12.96	-3.61E-01		3.67E-01
	810.45	0.32	-1.02E+01		1.46E+01
	867.37	4.26	2.10E-01		1.34E+00
	919.33	0.43	-9.83E+00		1.22E+01
	964.08	14.65	-3.96E-01		5.46E-01
	1085.87	10.24	-1.79E-01		5.60E-01
	1089.74	1.73	1.09E+00		3.57E+00
	1112.07	13.69	1.49E-01		5.15E-01
	1212.95	1.43	-3.14E-01		5.48E+00
	1249.94	0.19	-1.07E+01		3.77E+01
	1299.14	1.63	3.60E-01		3.82E+00
	1408.01	21.07	1.81E-01		2.59E-01
	1457.64	0.50	-1.66E+01		5.33E+01
	1528.10	0.28	-4.46E-01		1.32E+01
Eu-154	123.07	40.40	-3.60E-02	1.00E-01	1.00E-01
	247.93	6.89	-1.37E-01		5.92E-01
	591.76	4.95	-1.38E-02		9.80E-01
	692.42	1.78	-1.12E-01		2.55E+00
	723.30	20.06	2.34E-01		2.89E-01
	756.80	4.52	1.32E-01		1.02E+00
	873.18	12.08	-3.26E-02		4.50E-01

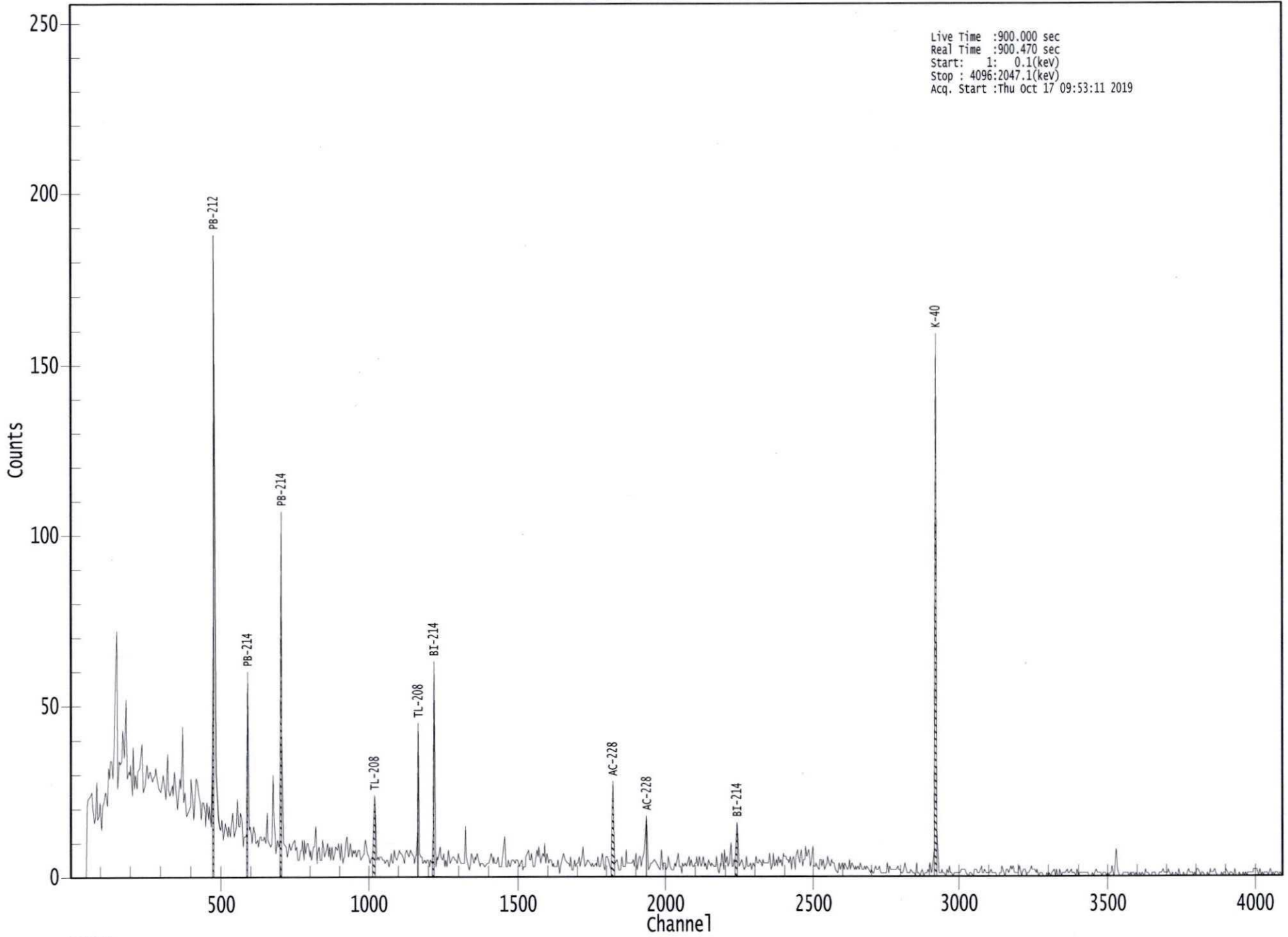


Analysis Report for 17-Oct-19-10010

L1-10208D-AIGS-005SS

<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Nuclide MDA (pCi/grams)</b>	<b>Line MDA (pCi/grams)</b>		
Eu-154	996.29	10.48	2.05E-01	1.00E-01	5.23E-01		
	1004.76	18.01	1.07E-01		3.19E-01		
	1274.43	34.80	-1.74E-01		1.87E-01		
	1596.48	1.80	-5.01E-01		2.58E+00		
Eu-155	45.30	1.31	-1.28E+00	2.37E-01	1.42E+01		
	60.01	1.22	-8.63E+00		1.53E+01		
	86.55	30.70	7.30E-02		2.37E-01		
Ra-226	105.31	21.10	7.53E-02	1.30E+00	2.40E-01		
Ra-226	186.21	3.64	5.80E-01	1.30E+00	1.30E+00		
	Pa-231	27.36	10.30		6.40E-01	1.45E+00	
Pa-231	283.69	1.70	1.39E+00	1.45E+00	2.48E+00		
	300.07	2.47	-1.85E+00		1.68E+00		
	302.65	2.20	-5.71E-01		1.79E+00		
	330.06	1.40	1.49E+00		3.18E+00		
	U-235	143.76	10.96		1.94E-01	8.34E-02	3.75E-01
		163.33	5.08		4.08E-01		9.07E-01
185.71		57.20	5.94E-02	8.34E-02			
202.11		1.08	2.12E+00	4.13E+00			
U-235	205.31	5.01	-9.73E-01	8.34E-02	8.69E-01		
	Am-241	59.54	35.90		-2.09E-01	5.46E-01	

- + = 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  
 ? = CAUTION: MDA value is inconsistent with Currie MDA at 95% confidence level



Live Time :900.000 sec  
Real Time :900.470 sec  
Start: 1: 0.1(kev)  
Stop : 4096:2047.1(kev)  
Acq. Start :Thu Oct 17 09:53:11 2019

 ROI Type: 1

Analysis Report for 17-Oct-19-10011  
L1-10208D-AIGS-006SS

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## GAMMA SPECTRUM ANALYSIS

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Sample Identification : 17-Oct-19-10011  
Sample Description : L1-10208D-AIGS-006SS  
Sample Type : Soil  
Unit :  
Sample Point :  
  
Sample Size : 1.212E+03 grams  
Facility : Default  
  
Sample Taken On : 10/16/2019 8:12:00AM  
Acquisition Started : 10/17/2019 9:53:18AM  
  
Procedure : 130G\_SOIL\_1  
Operator : Administrator  
Detector Name : P40818B  
Geometry : 130G\_SOIL\_1  
Live Time : 900.0 seconds  
Real Time : 901.8 seconds  
  
Dead Time : 0.20 %  
  
Peak Locate Threshold : 3.00  
Peak Locate Range (in channels) : 120 - 8192  
Peak Area Range (in channels) : 120 - 8192  
Identification Energy Tolerance : 1.000 keV  
  
Energy Calibration Used Done On : 1/29/2019  
Efficiency Calibration Used Done On : 10/17/2019  
Efficiency Calibration Description :  
  
Sample Number : 80545  
Fill Height : 1212.07 gram  
Certificate Name : Eu155-Na22  
Certificate Date : 1/30/2012 12:00:00PM

*J. M. ...*  
10-17-19

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## PEAK ANALYSIS REPORT

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Peak Analysis Performed on : 10/17/2019 10:08:22AM  
Peak Analysis From Channel : 120  
Peak Analysis To Channel : 8192

*J. M. ...*  
10-17-19

Analysis Report for 17-Oct-19-10011  
L1-10208D-AIGS-006SS

	Peak No.	Energy (keV)	ROI start	ROI end	Peak Centroid	Net Peak Area	Net Area Uncertainty	Continuum Counts	FWHM (keV)
M	1	74.88	296 -	314	300.24	3.87E+01	15.63	6.70E+01	0.63
m	2	77.09	296 -	314	309.08	6.49E+01	23.65	8.08E+01	0.64
	3	238.62	946 -	960	954.56	2.43E+02	22.43	9.03E+01	0.93
	4	295.21	1175 -	1189	1180.74	9.93E+01	15.30	4.67E+01	0.94
	5	351.88	1400 -	1414	1407.27	1.44E+02	15.82	3.67E+01	1.00
	6	583.12	2323 -	2338	2331.71	9.32E+01	11.85	1.58E+01	0.92
	7	609.20	2425 -	2443	2435.96	1.41E+02	14.22	1.85E+01	1.36
	8	727.45	2904 -	2913	2908.82	1.87E+01	6.87	1.23E+01	0.85
	9	910.88	3635 -	3650	3642.48	6.74E+01	10.09	1.16E+01	1.30
	10	968.74	3868 -	3882	3873.92	3.62E+01	7.45	6.84E+00	1.09
	11	1460.35	5830 -	5852	5841.23	3.81E+02	21.42	2.01E+01	1.90

M = First peak in a multiplet region  
m = Other peak in a multiplet region  
F = Fitted singlet  
Errors quoted at 1.000sigma

No background subtract performed on this spectrum.

## NUCLIDE IDENTIFICATION REPORT

Nuclide Library Used : C:\Canberra\Apex\Root\Default\Library\ZION LIB-BNL.NLB

### IDENTIFIED NUCLIDES

Nuclide Name	Id Confidence	Energy (keV)		Yield(%)	Activity (pCi/grams)	Activity Uncertainty
K-40	0.96	1460.82	*	10.66	1.03E+01	7.33E-01
Tl-208	0.99	583.19	*	85.00	1.67E-01	2.35E-02
Bi-212	0.99	39.86		1.06		
		727.33	*	6.67	4.97E-01	1.85E-01
		785.37		1.10		
		1620.50		1.47		

Analysis Report for 17-Oct-19-10011

L1-10208D-AIGS-006SS

<b>Nuclide Name</b>	<b>Id Confidence</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Activity Uncertainty</b>
Pb-212	1.00	115.18	0.60		
		238.63 *	43.60	4.60E-01	5.65E-02
		300.09	3.30		
Pb212-XR	1.00	74.82 *	10.28	9.23E-01	3.84E-01
		77.11 *	17.10	8.23E-01	3.12E-01
		87.35	3.97		
		89.78	1.46		
Bi-214	0.99	609.32 *	45.49	4.85E-01	5.71E-02
		768.36	4.89		
		806.18	1.26		
		934.06	3.11		
		1120.29	14.92		
		1155.21	1.63		
		1238.12	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		
		1661.27	1.05		
		1729.59	2.88		
		1764.49	15.30		
		1847.43	2.03		
2118.51	1.16				
Pb-214	1.00	241.99	7.25		
		295.22 *	18.42	5.04E-01	8.74E-02
		351.93 *	35.60	4.31E-01	5.85E-02
Ac-228	0.73	785.96	1.06		
		129.07	2.42		
		209.25	3.89		
		270.24	3.46		
		328.00	2.95		
		338.32	11.27		
		409.46	1.92		
		463.00	4.40		
		794.95	4.25		
		911.20 *	25.80	5.42E-01	8.46E-02
		964.77	4.99		
968.97 *	15.80	4.96E-01	1.05E-01		
1588.20	3.22				

\* = Energy line found in the spectrum.

- = Manually added nuclide.

? = Manually edited nuclide.

@ = Energy line not used for Weighted Mean Activity

Energy Tolerance : 1.000 keV

Nuclide confidence index threshold = 0.30

Errors quoted at 1.000sigma

Analysis Report for 17-Oct-19-10011

L1-10208D-AIGS-006SS

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## INTERFERENCE CORRECTED REPORT

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<i><b>Nuclide Name</b></i>	<i><b>Nuclide Id Confidence</b></i>	<i><b>Wt mean Activity (pCi/grams)</b></i>	<i><b>Wt mean Activity Uncertainty</b></i>	<i><b>Comments</b></i>	
	K-40	0.965	1.03E+01	7.33E-01	
	Tl-208	0.999	1.67E-01	2.35E-02	
X	Bi-211	0.899			
	Bi-212	0.999	4.97E-01	1.85E-01	
	Pb-212	1.000	4.60E-01	5.65E-02	
	Pb212-XR	1.000	8.63E-01	2.42E-01	
	Bi-214	0.999	4.85E-01	5.71E-02	
	Pb-214	1.000	4.53E-01	4.86E-02	
X	Pb214-XR	1.000			
	Ac-228	0.730	5.24E-01	6.58E-02	

? = 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 1.000sigma

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Analysis Report for 17-Oct-19-10011  
L1-10208D-AIGS-006SS

**UNIDENTIFIED PEAKS**

Peak Locate Performed on : 10/17/2019 10:08:22AM  
Peak Locate From Channel : 120  
Peak Locate To Channel : 8192

Peak No.	Energy (keV)	Peak Size (CPS)	Peak CPS (%) Uncertainty	Peak Type	Tolerance Nuclide
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All peaks were identified.

M = First peak in a multiplet region  
m = Other peak in a multiplet region  
F = Fitted singlet  
Errors quoted at 1.000sigma

**NUCLIDE MDA REPORT**

Nuclide Library Used : C:\Canberra\Apex\Root\Default\Library\ZION LIB-BNL.NLB

Nuclide Name	Energy (keV)	Yield(%)	Activity (pCi/grams)	Nuclide MDA (pCi/grams)	Line MDA (pCi/grams)
An Pk	511.00	100.00	7.24E-02	6.88E-02	6.88E-02
BE-7	477.60	10.44	2.19E-01	5.34E-01	5.34E-01
+ K-40	1460.82	* 10.66	1.03E+01	8.89E-01	8.89E-01
Mn-54	834.85	99.98	-1.24E-03	6.03E-02	6.03E-02
Co-60	1173.23	99.85	-6.24E-02	7.48E-02	8.84E-02
	1332.49	99.98	-4.08E-02		7.48E-02
Nb-94	702.65	99.81	9.84E-03	5.84E-02	5.84E-02
	871.09	99.89	-4.81E-03		6.12E-02
Ag-108m	79.13	6.60	-7.25E-01	5.12E-02	2.20E+00
	433.94	90.50	-1.99E-02		5.12E-02
	614.28	89.80	-5.74E-02		9.03E-02
	722.94	90.80	5.78E-03		8.32E-02
Sb-125	176.31	6.84	2.92E-01	1.71E-01	7.24E-01
	380.45	1.52	1.11E+00		3.11E+00
	427.87	29.60	1.01E-01		1.71E-01
	463.36	10.49	2.41E-01		5.52E-01
	600.60	17.65	3.13E-01		3.53E-01
	606.71	4.98	3.77E+00		2.13E+00
	635.95	11.22	3.09E-01		5.55E-01

Analysis Report for 17-Oct-19-10011  
L1-10208D-AIGS-006SS

<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Nuclide MDA (pCi/grams)</b>	<b>Line MDA (pCi/grams)</b>
Sb-125	671.44	1.79	-1.99E+00	1.71E-01	3.39E+00
Ba-133	79.61	2.65	-3.17E+00	1.03E-01	5.04E+00
	81.00	32.90	-2.07E-01		3.37E-01
	276.40	7.16	-1.63E-01		6.62E-01
	302.85	18.34	1.44E-01		2.68E-01
	356.01	62.05	1.21E-02		1.03E-01
	383.85	8.94	4.29E-01		5.77E-01
Cs-134	475.36	1.48	1.13E+00	7.67E-02	3.52E+00
	563.25	8.34	9.92E-04		5.65E-01
	569.33	15.37	2.47E-01		3.81E-01
	604.72	97.62	5.23E-03		1.00E-01
	795.86	85.46	6.08E-03		7.67E-02
	801.95	8.69	-5.66E-01		6.84E-01
	1038.61	0.99	1.89E+00		7.45E+00
	1167.97	1.79	8.75E-01		4.35E+00
	1365.19	3.02	3.13E-01		2.16E+00
Cs-137	661.66	85.10	1.53E-02	7.65E-02	7.65E-02
Eu-152	121.78	28.67	4.30E-02	1.82E-01	1.98E-01
	244.70	7.61	9.15E-01		8.07E-01
	295.94	0.45	7.57E+00		1.46E+01
	344.28	26.60	-1.34E-01		1.82E-01
	367.79	0.86	-4.09E+00		5.10E+00
	411.12	2.24	5.92E-01		2.39E+00
	443.96	2.83	-1.81E+00		1.65E+00
	488.68	0.42	-2.83E+00		1.11E+01
	563.99	0.49	-1.52E+01		9.35E+00
	586.26	0.46	-6.83E+00		1.89E+01
	678.62	0.47	-4.64E+00		1.33E+01
	688.67	0.86	-2.88E+00		6.54E+00
	719.35	0.28	-1.49E+01		2.19E+01
	778.90	12.96	-1.01E-01		4.43E-01
	810.45	0.32	2.24E+01		2.07E+01
	867.37	4.26	-6.11E-01		1.41E+00
	919.33	0.43	-8.05E+00		1.42E+01
	964.08	14.65	-4.12E-01		6.30E-01
	1085.87	10.24	2.96E-01		7.77E-01
	1089.74	1.73	3.02E+00		4.80E+00
	1112.07	13.69	2.52E-01		5.64E-01
	1212.95	1.43	1.35E+00		6.20E+00
	1249.94	0.19	-1.86E-01		4.15E+01
	1299.14	1.63	1.47E+00		4.60E+00
	1408.01	21.07	2.33E-01		3.52E-01
	1457.64	0.50	2.34E+02		5.78E+01
	1528.10	0.28	-1.59E+00		1.65E+01
Eu-154	123.07	40.40	3.13E-02	1.42E-01	1.42E-01
	247.93	6.89	1.13E-01		7.49E-01
	591.76	4.95	-3.37E-01		9.85E-01
	692.42	1.78	-7.01E-01		3.35E+00
	723.30	20.06	-1.21E-02		3.87E-01
	756.80	4.52	3.08E-02		1.29E+00
	873.18	12.08	2.94E-01		5.21E-01



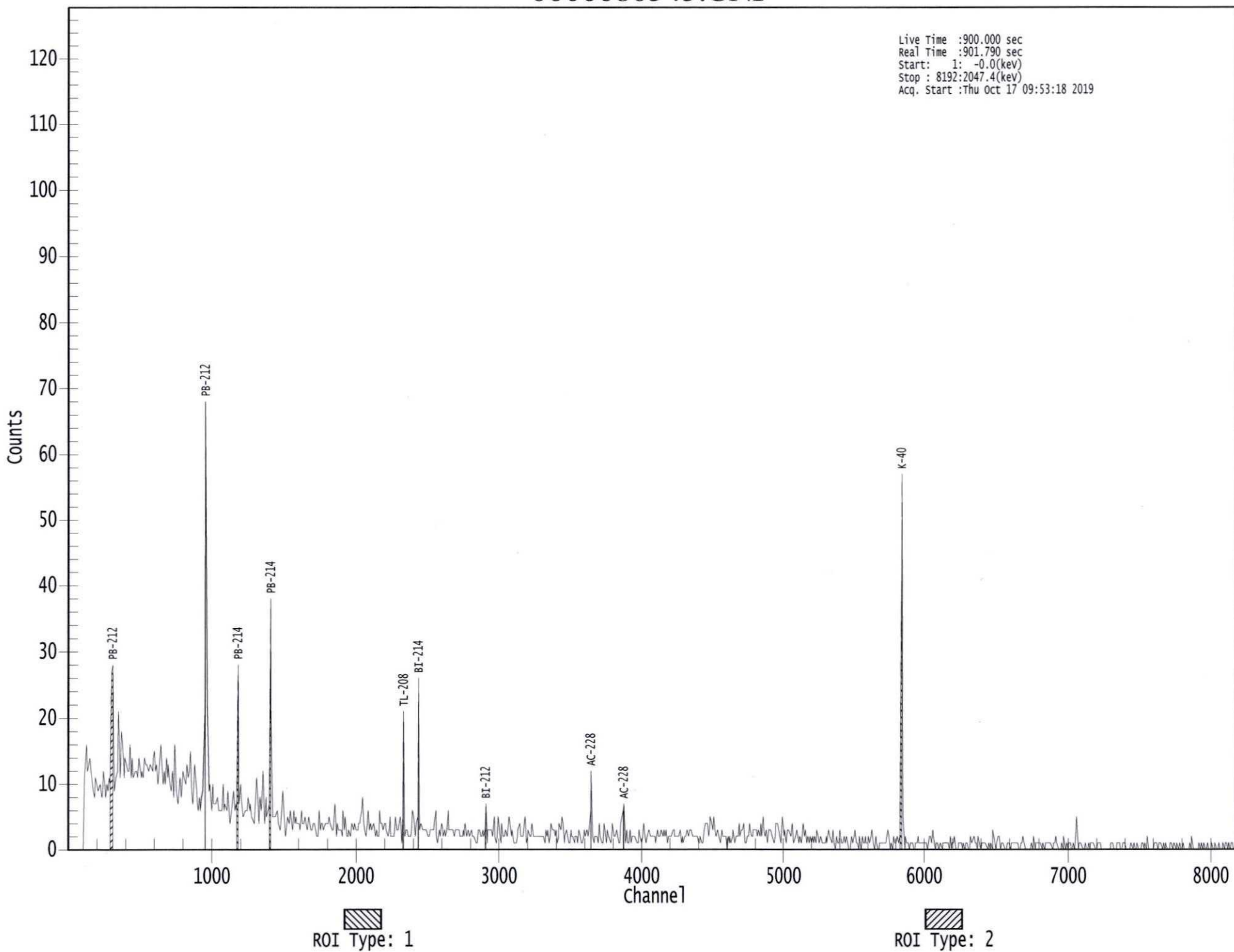
Analysis Report for 17-Oct-19-10011

L1-10208D-AIGS-006SS

<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Nuclide MDA (pCi/grams)</b>	<b>Line MDA (pCi/grams)</b>
Eu-154	996.29	10.48	3.16E-02	1.42E-01	5.56E-01
	1004.76	18.01	-8.45E-02		3.76E-01
	1274.43	34.80	1.95E-02		2.25E-01
	1596.48	1.80	1.55E+00		2.98E+00
Eu-155	45.30	1.31	-2.78E+00	3.30E-01	3.70E+01
	60.01	1.22	3.61E+00		3.94E+01
	86.55	30.70	1.62E-01		3.46E-01
	105.31	21.10	-1.22E-01		3.30E-01
Ra-226	186.21	3.64	2.08E+00	1.52E+00	1.52E+00
Pa-231	27.36	10.30	3.78E+00	2.08E+00	4.42E+00
	283.69	1.70	-8.91E-01		2.81E+00
	300.07	2.47	-3.55E-01		2.08E+00
	302.65	2.20	7.43E-01		2.21E+00
	330.06	1.40	3.24E+00		4.06E+00
U-235	143.76	10.96	-5.94E-03	9.53E-02	5.05E-01
	163.33	5.08	-1.63E-01		1.01E+00
	185.71	57.20	7.12E-02		9.53E-02
	202.11	1.08	1.69E+00		4.96E+00
	205.31	5.01	-4.49E-01		1.04E+00
Am-241	59.54	35.90	2.35E-01	1.40E+00	1.40E+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  
 ? = CAUTION: MDA value is inconsistent with Currie MDA at 95% confidence level

000080545.CNF



Analysis Report for 02-Jul-19-10011  
L1-10209B-RIGS-002SB

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## GAMMA SPECTRUM ANALYSIS

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Sample Identification : 02-Jul-19-10011  
Sample Description : L1-10209B-RIGS-002SB  
Sample Type : Soil  
Unit :  
Sample Point :  
  
Sample Size : 1.335E+03 grams  
Facility : Default  
  
Sample Taken On : 7/1/2019 1:45:00PM  
Acquisition Started : 7/2/2019 8:56:10AM  
  
Procedure : 130G\_SOIL\_1  
Operator : Administrator  
Detector Name : P40818B  
Geometry : 130G\_SOIL\_1  
Live Time : 900.0 seconds  
Real Time : 901.6 seconds  
  
Dead Time : 0.18 %  
  
Peak Locate Threshold : 3.00  
Peak Locate Range (in channels) : 120 - 8192  
Peak Area Range (in channels) : 120 - 8192  
Identification Energy Tolerance : 1.000 keV  
  
Energy Calibration Used Done On : 1/29/2019  
Efficiency Calibration Used Done On : 7/2/2019  
Efficiency Calibration Description :  
  
Sample Number : 77725  
Fill Height : 1334.95 gram  
Certificate Name : Eu155-Na22  
Certificate Date : 1/30/2012 12:00:00PM

*J.P. [unclear]*  
7-2-19

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## PEAK ANALYSIS REPORT

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Peak Analysis Performed on : 7/2/2019 9:11:14AM  
Peak Analysis From Channel : 120  
Peak Analysis To Channel : 8192

*J.P. [unclear]*  
7-819

Analysis Report for 02-Jul-19-10011  
L1-10209B-RIGS-002SB

Peak No.	Energy (keV)	ROI start	ROI end	Peak Centroid	Net Peak Area	Net Area Uncertainty	Continuum Counts	FWHM (keV)
1	238.78	947 -	962	955.20	1.49E+02	22.25	1.15E+02	0.88
2	295.46	1175 -	1187	1181.74	7.18E+01	13.51	4.22E+01	0.91
3	338.46	1349 -	1359	1353.61	3.93E+01	10.29	2.77E+01	0.73
4	352.15	1399 -	1415	1408.34	1.19E+02	14.59	2.99E+01	0.78
5	583.40	2326 -	2340	2332.82	6.81E+01	11.94	2.59E+01	1.22
6	609.52	2430 -	2445	2437.25	8.82E+01	12.40	2.18E+01	1.65
7	661.86	2640 -	2654	2646.55	6.97E+01	10.41	1.33E+01	0.84
8	911.78	3639 -	3653	3646.09	4.68E+01	8.55	9.17E+00	1.67
9	1461.25	5833 -	5856	5844.83	3.55E+02	19.76	8.86E+00	1.21
10	1765.10	7055 -	7068	7061.43	1.70E+01	4.12	0.00E+00	1.19

M = First peak in a multiplet region  
m = Other peak in a multiplet region  
F = Fitted singlet  
Errors quoted at 1.000sigma

No background subtract performed on this spectrum.

## NUCLIDE IDENTIFICATION REPORT

Nuclide Library Used : C:\Canberra\Apex\Root\Default\Library\ZION LIB-BNL.NLB

### IDENTIFIED NUCLIDES

Nuclide Name	Id Confidence	Energy (keV)	Yield(%)	Activity (pCi/grams)	Activity Uncertainty
K-40	0.97	1460.82 *	10.66	9.27E+00	6.54E-01
Cs-137	0.99	661.66 *	85.10	1.32E-01	2.12E-02
Tl-208	0.99	583.19 *	85.00	1.18E-01	2.19E-02
Pb-212	0.99	115.18	0.60		
		238.63 *	43.60	2.74E-01	4.66E-02
		300.09	3.30		
Bi-214	0.98	609.32 *	45.49	2.95E-01	4.50E-02

Analysis Report for 02-Jul-19-10011

L1-10209B-RIGS-002SB

<b>Nuclide Name</b>	<b>Id Confidence</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Activity Uncertainty</b>
Bi-214	0.98	768.36	4.89		
		806.18	1.26		
		934.06	3.11		
		1120.29	14.92		
		1155.21	1.63		
		1238.12	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		
		1661.27	1.05		
		1729.59	2.88		
		1764.49 *	15.30	3.58E-01	8.81E-02
1847.43	2.03				
2118.51	1.16				
Pb-214	0.99	241.99	7.25		
		295.22 *	18.42	3.54E-01	7.23E-02
		351.93 *	35.60	3.45E-01	5.05E-02
Ac-228	0.98	785.96	1.06		
		129.07	2.42		
		209.25	3.89		
		270.24	3.46		
		328.00	2.95		
		338.32 *	11.27	3.49E-01	9.59E-02
		409.46	1.92		
		463.00	4.40		
		794.95	4.25		
		911.20 *	25.80	3.64E-01	6.82E-02
964.77	4.99				
968.97	15.80				
1588.20	3.22				

\* = Energy line found in the spectrum.

- = Manually added nuclide.

? = Manually edited nuclide.

@ = Energy line not used for Weighted Mean Activity

Energy Tolerance : 1.000 keV

Nuclide confidence index threshold = 0.30

Errors quoted at 1.000sigma

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**INTERFERENCE CORRECTED REPORT**

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Analysis Report for 02-Jul-19-10011

L1-10209B-RIGS-002SB

<b>Nuclide Name</b>	<b>Nuclide Id Confidence</b>	<b>Wt mean Activity (pCi/grams)</b>	<b>Wt mean Activity Uncertainty</b>	<b>Comments</b>
K-40	0.971	9.27E+00	6.54E-01	
Cs-137	0.993	1.32E-01	2.12E-02	
Tl-208	0.993	1.18E-01	2.19E-02	
Pb-212	0.997	2.74E-01	4.66E-02	
Bi-214	0.989	3.08E-01	4.01E-02	
Pb-214	0.993	3.48E-01	4.14E-02	
Ac-228	0.983	3.59E-01	5.56E-02	

? = 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 1.000sigma

Analysis Report for 02-Jul-19-10011  
L1-10209B-RIGS-002SB

## UNIDENTIFIED PEAKS

Peak Locate Performed on : 7/2/2019 9:11:14AM  
Peak Locate From Channel : 120  
Peak Locate To Channel : 8192

Peak No.	Energy (keV)	Peak Size (CPS)	Peak CPS (%) Uncertainty	Peak Type	Tolerance Nuclide
All peaks were identified.					
M = First peak in a multiplet region					
m = Other peak in a multiplet region					
F = Fitted singlet					
Errors quoted at 1.000sigma					

## NUCLIDE MDA REPORT

Nuclide Library Used : C:\Canberra\Apex\Root\Default\Library\ZION LIB-BNL.NLB

Nuclide Name	Energy (keV)	Yield(%)	Activity (pCi/grams)	Nuclide MDA (pCi/grams)	Line MDA (pCi/grams)
An Pk	511.00	100.00	4.71E-02	6.18E-02	6.18E-02
BE-7	477.60	10.44	1.09E-01	4.85E-01	4.85E-01
+ K-40	1460.82	* 10.66	9.27E+00	6.01E-01	6.01E-01
Mn-54	834.85	99.98	5.11E-03	5.82E-02	5.82E-02
Co-60	1173.23	99.85	9.70E-02	7.88E-02	9.00E-02
	1332.49	99.98	1.94E-02		7.88E-02
Nb-94	702.65	99.81	7.13E-03	4.92E-02	5.24E-02
	871.09	99.89	-1.49E-02		4.92E-02
Ag-108m	79.13	6.60	-2.33E-03	5.30E-02	2.20E+00
	433.94	90.50	-2.56E-02		5.30E-02
	614.28	89.80	-2.87E-02		8.19E-02
	722.94	90.80	8.88E-03		6.59E-02
Sb-125	176.31	6.84	-3.93E-01	1.49E-01	6.59E-01
	380.45	1.52	-2.36E+00		3.08E+00
	427.87	29.60	-2.68E-02		1.49E-01
	463.36	10.49	2.54E-01		4.64E-01
	600.60	17.65	-1.54E-02		3.08E-01
	606.71	4.98	-3.16E-01		1.78E+00
	635.95	11.22	1.63E-01		4.94E-01

Analysis Report for 02-Jul-19-10011  
L1-10209B-RIGS-002SB

<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Nuclide MDA (pCi/grams)</b>	<b>Line MDA (pCi/grams)</b>
Sb-125	671.44	1.79	-1.29E-01	1.49E-01	3.05E+00
Ba-133	79.61	2.65	-4.44E-01	9.89E-02	5.21E+00
	81.00	32.90	-3.95E-01		3.57E-01
	276.40	7.16	-1.24E-01		6.20E-01
	302.85	18.34	2.34E-01		2.76E-01
	356.01	62.05	-6.60E-03		9.89E-02
	383.85	8.94	2.15E-01		5.25E-01
Cs-134	475.36	1.48	2.06E+00	7.01E-02	3.54E+00
	563.25	8.34	4.83E-01		5.86E-01
	569.33	15.37	-1.89E-02		2.95E-01
	604.72	97.62	-3.41E-02		7.76E-02
	795.86	85.46	-7.18E-03		7.01E-02
	801.95	8.69	-3.83E-01		6.85E-01
	1038.61	0.99	9.04E-01		6.46E+00
	1167.97	1.79	1.58E+00		4.69E+00
	1365.19	3.02	-7.20E-01		2.03E+00
+ Cs-137	661.66	* 85.10	1.32E-01	4.53E-02	4.53E-02
Eu-152	121.78	28.67	1.50E-01	1.81E-01	1.93E-01
	244.70	7.61	1.46E-01		6.75E-01
	295.94	0.45	7.78E+00		1.30E+01
	344.28	26.60	6.18E-02		1.81E-01
	367.79	0.86	-1.69E+00		5.24E+00
	411.12	2.24	2.96E-01		2.22E+00
	443.96	2.83	-5.42E-01		1.71E+00
	488.68	0.42	-4.40E+00		1.09E+01
	563.99	0.49	3.87E+00		9.74E+00
	586.26	0.46	-1.29E+00		1.75E+01
	678.62	0.47	3.01E+00		1.15E+01
	688.67	0.86	3.40E+00		6.53E+00
	719.35	0.28	-1.46E+01		1.93E+01
	778.90	12.96	-1.62E-01		3.98E-01
	810.45	0.32	1.42E+01		1.80E+01
	867.37	4.26	-5.26E-01		1.44E+00
	919.33	0.43	-1.57E+01		1.12E+01
	964.08	14.65	-1.70E-01		5.28E-01
	1085.87	10.24	1.81E-01		6.80E-01
	1089.74	1.73	1.01E-01		3.81E+00
	1112.07	13.69	2.00E-01		5.69E-01
	1212.95	1.43	-2.37E+00		5.46E+00
	1249.94	0.19	-2.56E+00		4.10E+01
	1299.14	1.63	2.86E+00		4.13E+00
	1408.01	21.07	-1.18E-02		3.05E-01
	1457.64	0.50	-4.78E-01		5.30E+01
	1528.10	0.28	7.15E+00		1.59E+01
Eu-154	123.07	40.40	5.97E-03	1.32E-01	1.32E-01
	247.93	6.89	2.72E-01		6.84E-01
	591.76	4.95	2.26E-02		8.77E-01
	692.42	1.78	1.42E+00		3.30E+00
	723.30	20.06	5.08E-02		3.07E-01
	756.80	4.52	-3.51E-01		1.25E+00
	873.18	12.08	-1.56E-01		3.91E-01

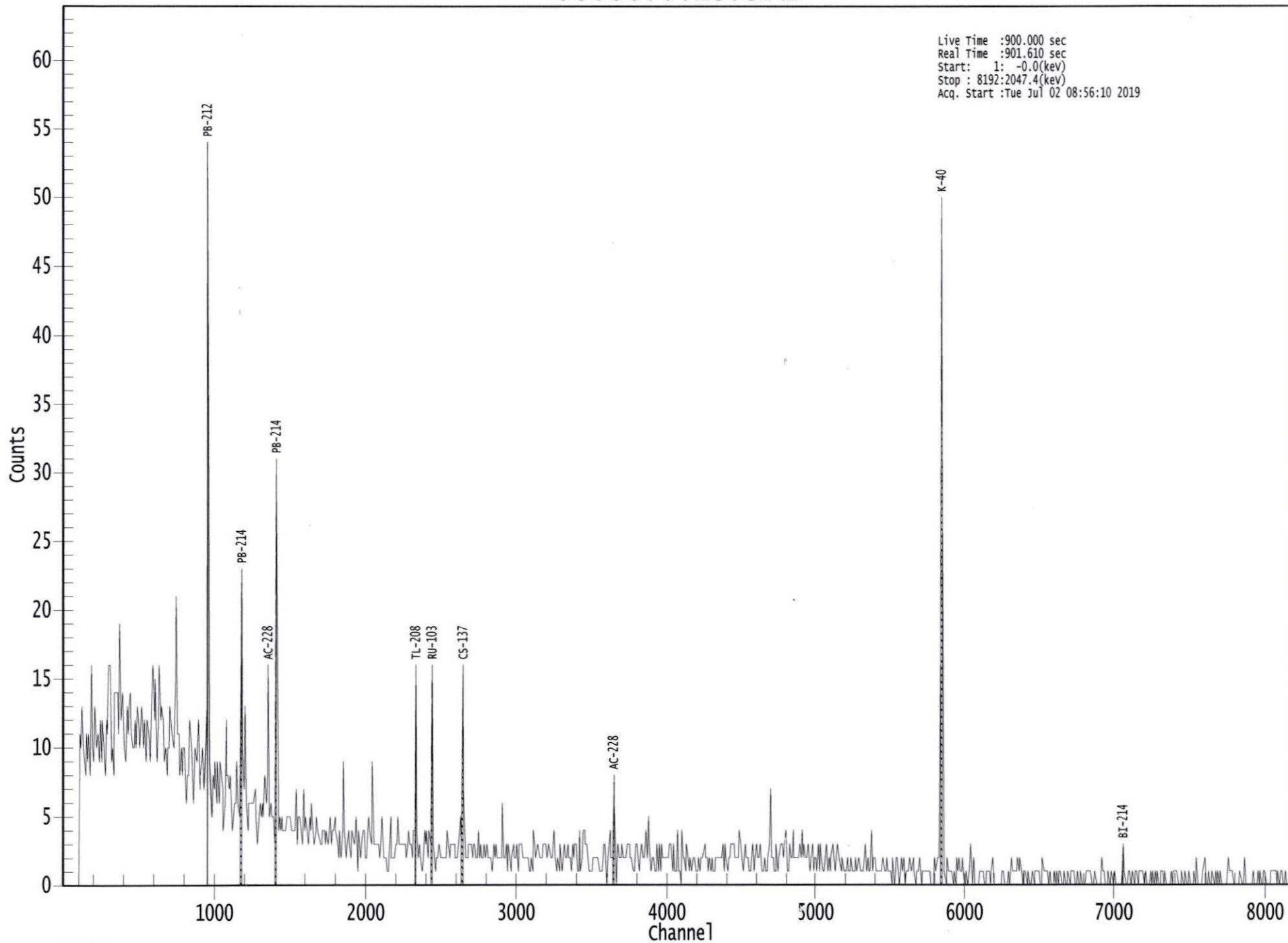


Analysis Report for 02-Jul-19-10011  
L1-10209B-RIGS-002SB

<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Nuclide MDA (pCi/grams)</b>	<b>Line MDA (pCi/grams)</b>
Eu-154	996.29	10.48	2.32E-01	1.32E-01	6.27E-01
	1004.76	18.01	-2.14E-01		3.62E-01
	1274.43	34.80	-5.02E-02		2.17E-01
	1596.48	1.80	-1.03E+00		3.23E+00
Eu-155	45.30	1.31	-7.33E+00	3.14E-01	3.78E+01
	60.01	1.22	-1.35E+01		3.60E+01
	86.55	30.70	1.30E-01		3.36E-01
	105.31	21.10	9.60E-02		3.14E-01
Ra-226	186.21	3.64	1.61E+00	1.48E+00	1.48E+00
Pa-231	27.36	10.30	4.39E+00	1.98E+00	4.04E+00
	283.69	1.70	7.01E-01		2.69E+00
	300.07	2.47	-6.14E-01		1.98E+00
	302.65	2.20	1.31E+00		2.26E+00
U-235	330.06	1.40	-2.78E-01	9.40E-02	3.36E+00
	143.76	10.96	-1.70E-01		4.47E-01
	163.33	5.08	-2.00E-01		9.40E-01
	185.71	57.20	9.63E-02		9.40E-02
	202.11	1.08	-3.70E+00		3.97E+00
Am-241	205.31	5.01	-5.81E-01	1.31E+00	8.61E-01
	59.54	35.90	2.16E-01		1.31E+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  
 ? = CAUTION: MDA value is inconsistent with Currie MDA at 95% confidence level

0000077725.CNF



Live Time :900.000 sec  
Real Time :901.610 sec  
Start: 1: -0.0(kev)  
Stop : 8192:2047.4(kev)  
Acq. Start :Tue Jul 02 08:56:10 2019

ROI Type: 1

Analysis Report for 02-Jul-19-10012  
L1-10209B-RIGS-003SB

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## GAMMA SPECTRUM ANALYSIS

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Sample Identification : 02-Jul-19-10012  
Sample Description : L1-10209B-RIGS-003SB  
Sample Type : Soil  
Unit :  
Sample Point :  
  
Sample Size : 1.489E+03 grams  
Facility : Default  
  
Sample Taken On : 7/1/2019 1:47:00PM  
Acquisition Started : 7/2/2019 8:56:19AM  
  
Procedure : 130G\_SOIL\_1  
Operator : Administrator  
Detector Name : P11314  
Geometry : 130G\_SOIL\_1  
Live Time : 1800.0 seconds  
Real Time : 1800.7 seconds  
  
Dead Time : 0.04 %  
  
Peak Locate Threshold : 3.00  
Peak Locate Range (in channels) : 120 - 8192  
Peak Area Range (in channels) : 120 - 8192  
Identification Energy Tolerance : 1.000 keV  
  
Energy Calibration Used Done On : 1/24/2019  
Efficiency Calibration Used Done On : 7/2/2019  
Efficiency Calibration Description :  
  
Sample Number : 77726  
Fill Height : 1489.35 gram  
Certificate Name : Eu155-Na22  
Certificate Date : 12/22/2008 12:00:00PM

*J. P. [Signature]*  
7-2-19

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## PEAK ANALYSIS REPORT

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Peak Analysis Performed on : 7/2/2019 9:30:11AM  
Peak Analysis From Channel : 120  
Peak Analysis To Channel : 8192

*J. P. [Signature]*  
7-8-19

Analysis Report for 02-Jul-19-10012

L1-10209B-RIGS-003SB

	<b>Peak No.</b>	<b>Energy (keV)</b>	<b>ROI start</b>	<b>ROI end</b>	<b>Peak Centroid</b>	<b>Net Peak Area</b>	<b>Net Area Uncertainty</b>	<b>Continuum Counts</b>	<b>FWHM (keV)</b>
M	1	75.02	296 -	315	300.61	1.19E+02	14.58	1.65E+02	0.92
m	2	77.22	296 -	315	309.40	1.49E+02	15.72	2.00E+02	0.93
	3	186.05	739 -	749	744.05	1.01E+02	19.81	1.22E+02	0.99
	4	238.68	948 -	960	954.28	3.17E+02	26.08	1.37E+02	1.11
	5	295.24	1175 -	1188	1180.26	1.35E+02	19.36	8.63E+01	1.28
	6	338.39	1345 -	1360	1352.65	8.58E+01	18.30	8.12E+01	1.43
	7	351.95	1398 -	1415	1406.81	3.03E+02	24.51	9.07E+01	1.56
	8	510.64	2033 -	2051	2040.92	7.57E+01	18.83	8.23E+01	0.40
	9	583.06	2322 -	2340	2330.34	1.35E+02	16.37	3.85E+01	1.10
	10	609.15	2426 -	2443	2434.65	2.16E+02	18.43	3.81E+01	1.50
	11	661.38	2634 -	2653	2643.40	3.33E+02	22.47	4.83E+01	1.67
	12	781.90	3120 -	3130	3125.21	1.44E+01	7.02	1.26E+01	0.77
	13	910.79	3631 -	3649	3640.63	1.02E+02	13.51	2.38E+01	1.46
	14	1119.49	4468 -	4481	4475.35	2.70E+01	9.94	2.60E+01	0.85
	15	1172.66	4681 -	4698	4688.08	7.29E+01	12.28	2.41E+01	1.24
	16	1331.71	5317 -	5331	5324.48	5.22E+01	10.62	2.08E+01	0.75
	17	1460.04	5824 -	5851	5838.09	6.81E+02	27.85	2.10E+01	1.33
	18	1763.52	7047 -	7061	7053.15	3.50E+01	7.23	6.02E+00	1.12

M = First peak in a multiplet region

m = Other peak in a multiplet region

F = Fitted singlet

Errors quoted at 1.000sigma

No background subtract performed on this spectrum.

## NUCLIDE IDENTIFICATION REPORT

Nuclide Library Used : C:\Canberra\Apex\Root\Default\Library\ZION LIB-BNL.NLB

### IDENTIFIED NUCLIDES

Analysis Report for 02-Jul-19-10012

L1-10209B-RIGS-003SB

<b>Nuclide Name</b>	<b>Id Confidence</b>	<b>Energy (keV)</b>		<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Activity Uncertainty</b>
An Pk	0.98	511.00	*	100.00	4.50E-02	1.16E-02
K-40	0.90	1460.82	*	10.66	7.70E+00	4.59E-01
Co-60	0.92	1173.23	*	99.85	7.56E-02	1.31E-02
		1332.49	*	99.98	5.86E-02	1.21E-02
Cs-137	0.98	661.66	*	85.10	2.74E-01	2.48E-02
Tl-208	0.99	583.19	*	85.00	1.03E-01	1.38E-02
Pb-212	1.00	115.18		0.60		
		238.63	*	43.60	2.53E-01	2.92E-02
		300.09		3.30		
Pb212-XR	0.99	74.82	*	10.28	7.60E-01	1.22E-01
		77.11	*	17.10	5.27E-01	7.75E-02
		87.35		3.97		
		89.78		1.46		
Bi-214	0.96	609.32	*	45.49	3.15E-01	3.29E-02
		768.36		4.89		
		806.18		1.26		
		934.06		3.11		
		1120.29	*	14.92	1.81E-01	6.72E-02
		1155.21		1.63		
		1238.12		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		
		1661.27		1.05		
		1729.59		2.88		
		1764.49	*	15.30	3.19E-01	6.71E-02
		1847.43		2.03		
		2118.51		1.16		
Pb-214	1.00	241.99		7.25		
		295.22	*	18.42	2.89E-01	4.76E-02
		351.93	*	35.60	3.84E-01	4.37E-02
		785.96		1.06		
Ra-226	0.99	186.21	*	3.64	8.41E-01	1.79E-01
Ac-228	0.73	129.07		2.42		
		209.25		3.89		
		270.24		3.46		
		328.00		2.95		
		338.32	*	11.27	3.33E-01	7.61E-02
		409.46		1.92		
		463.00		4.40		
		794.95		4.25		
		911.20	*	25.80	3.46E-01	4.82E-02
		964.77		4.99		
		968.97		15.80		
		1588.20		3.22		
U-235	0.98	143.76		10.96		
		163.33		5.08		
		185.71	*	57.20	5.35E-02	1.14E-02
		202.11		1.08		
		205.31		5.01		

Analysis Report for 02-Jul-19-10012

L1-10209B-RIGS-003SB

- \* = Energy line found in the spectrum.  
 - = Manually added nuclide.  
 ? = Manually edited nuclide.  
 @ = Energy line not used for Weighted Mean Activity

Energy Tolerance : 1.000 keV

Nuclide confidence index threshold = 0.30

Errors quoted at 1.000sigma

## INTERFERENCE CORRECTED REPORT

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (pCi/grams)	Wt mean Activity Uncertainty	Comments
An Pk	0.980	4.50E-02	1.16E-02	
K-40	0.906	7.70E+00	4.59E-01	
Co-60	0.928	6.65E-02	8.90E-03	
Cs-137	0.988	2.74E-01	2.48E-02	
Tl-208	0.997	1.03E-01	1.38E-02	
X Bi-211	0.884			
Pb-212	1.000	2.53E-01	2.92E-02	
Pb212-XR	0.997	5.94E-01	6.54E-02	
Bi-214	0.964	2.94E-01	2.70E-02	
Pb-214	1.000	3.41E-01	3.22E-02	
X Pb214-XR	0.997			
? Ra-226	0.996	8.41E-01	1.79E-01	
Ac-228	0.737	3.42E-01	4.07E-02	
? <del>U-235</del> <i>Ra-226</i>	<del>0.987</del>	<del>5.35E-02</del>	<del>1.14E-02</del>	

- ? = 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 1.000sigma

*JPW*  
7-2-19

*U-235 only 1 peak*

Analysis Report for 02-Jul-19-10012  
L1-10209B-RIGS-003SB

## UNIDENTIFIED PEAKS

Peak Locate Performed on : 7/2/2019 9:30:11AM  
Peak Locate From Channel : 120  
Peak Locate To Channel : 8192

Peak No.	Energy (keV)	Peak Size (CPS)	Peak CPS (%) Uncertainty	Peak Type	Tolerance Nuclide
12	781.90	7.99897E-03	48.78		Ac-228

M = First peak in a multiplet region  
m = Other peak in a multiplet region  
F = Fitted singlet  
Errors quoted at 1.000sigma

JPW  
7-2-19

## NUCLIDE MDA REPORT

Nuclide Library Used : C:\Canberra\Apex\Root\Default\Library\ZION LIB-BNL.NLB

	Nuclide Name	Energy (keV)	Yield(%)	Activity (pCi/grams)	Nuclide MDA (pCi/grams)	Line MDA (pCi/grams)
+	An Pk	511.00	* 100.00	4.50E-02	3.54E-02	3.54E-02
	BE-7	477.60	10.44	7.07E-02	2.88E-01	2.88E-01
+	K-40	1460.82	* 10.66	7.70E+00	4.05E-01	4.05E-01
	Mn-54	834.85	99.98	-1.35E-02	3.25E-02	3.25E-02
+	Co-60	1173.23	* 99.85	7.56E-02	3.28E-02	3.40E-02
	Nb-94	1332.49	* 99.98	5.86E-02		3.28E-02
		702.65	99.81	-4.44E-03	2.84E-02	3.32E-02
		871.09	99.89	-9.52E-03		2.84E-02
	Ag-108m	79.13	6.60	-4.44E-02	2.96E-02	9.53E-01
		433.94	90.50	-5.59E-02		2.96E-02
		614.28	89.80	-1.37E-03		4.58E-02
		722.94	90.80	7.53E-03		4.16E-02
	Sb-125	176.31	6.84	4.38E-02	1.02E-01	3.67E-01
		380.45	1.52	-1.45E+00		1.73E+00
		427.87	29.60	4.76E-02		1.02E-01
		463.36	10.49	9.26E-02		3.16E-01
		600.60	17.65	1.11E-01		1.88E-01
		606.71	4.98	-1.89E-01		1.15E+00

Analysis Report for 02-Jul-19-10012

L1-10209B-RIGS-003SB

Nuclide Name	Energy (keV)	Yield(%)	Activity (pCi/grams)	Nuclide MDA (pCi/grams)	Line MDA (pCi/grams)
Sb-125	635.95	11.22	1.16E-01	1.02E-01	-2.58E-01
	671.44	1.79	-3.64E+00		1.70E+00
Ba-133	79.61	2.65	2.49E-01	5.68E-02	2.33E+00
	81.00	32.90	-3.71E-02		1.51E-01
	276.40	7.16	2.41E-03		3.68E-01
	302.85	18.34	1.64E-02		1.43E-01
	356.01	62.05	2.01E-03		5.68E-02
	383.85	8.94	-2.24E-02		2.91E-01
Cs-134	475.36	1.48	7.08E-01	3.73E-02	2.09E+00
	563.25	8.34	-5.70E-01		3.50E-01
	569.33	15.37	5.26E-02		1.87E-01
	604.72	97.62	-7.50E-03		5.14E-02
	795.86	85.46	2.24E-02		3.73E-02
	801.95	8.69	-6.37E-03		3.91E-01
	1038.61	0.99	1.23E+00		4.01E+00
	1167.97	1.79	-1.24E+00		3.34E+00
	1365.19	3.02	-5.42E-01		1.04E+00
	+ Cs-137	661.66	* 85.10		2.74E-01
Eu-152	121.78	28.67	-3.56E-02	9.93E-02	9.93E-02
	244.70	7.61	4.11E-01		4.03E-01
	295.94	0.45	1.26E+01		7.86E+00
	344.28	26.60	6.87E-02		1.16E-01
	367.79	0.86	7.79E-01		2.85E+00
	411.12	2.24	-1.23E-01		1.32E+00
	443.96	2.83	-1.24E+00		1.00E+00
	488.68	0.42	2.94E+00		7.28E+00
	563.99	0.49	-5.87E+00		5.84E+00
	586.26	0.46	-1.90E+00		1.00E+01
	678.62	0.47	2.22E+00		6.60E+00
	688.67	0.86	2.33E+00		3.78E+00
	719.35	0.28	1.38E+00		1.19E+01
	778.90	12.96	-1.18E-01		2.82E-01
	810.45	0.32	4.25E+00		1.04E+01
	867.37	4.26	-5.00E-01		7.08E-01
	919.33	0.43	-1.92E+00		8.59E+00
	964.08	14.65	2.86E-01		3.57E-01
	1085.87	10.24	5.94E-02		4.18E-01
	1089.74	1.73	-1.91E+00		2.51E+00
1112.07	13.69	-9.64E-02	3.14E-01		
1212.95	1.43	2.07E+00	3.58E+00		
1249.94	0.19	7.02E-01	2.24E+01		
1299.14	1.63	-2.58E-01	2.28E+00		
1408.01	21.07	-2.88E-02	1.52E-01		
1457.64	0.50	1.69E+02	3.14E+01		
1528.10	0.28	-1.37E+00	9.22E+00		
Eu-154	123.07	40.40	3.19E-02	7.08E-02	7.08E-02
	247.93	6.89	1.55E-01		3.74E-01
	591.76	4.95	-2.63E-01		5.73E-01
	692.42	1.78	1.94E-01		1.88E+00
	723.30	20.06	1.13E-01		1.91E-01
	756.80	4.52	-2.68E-01		7.13E-01

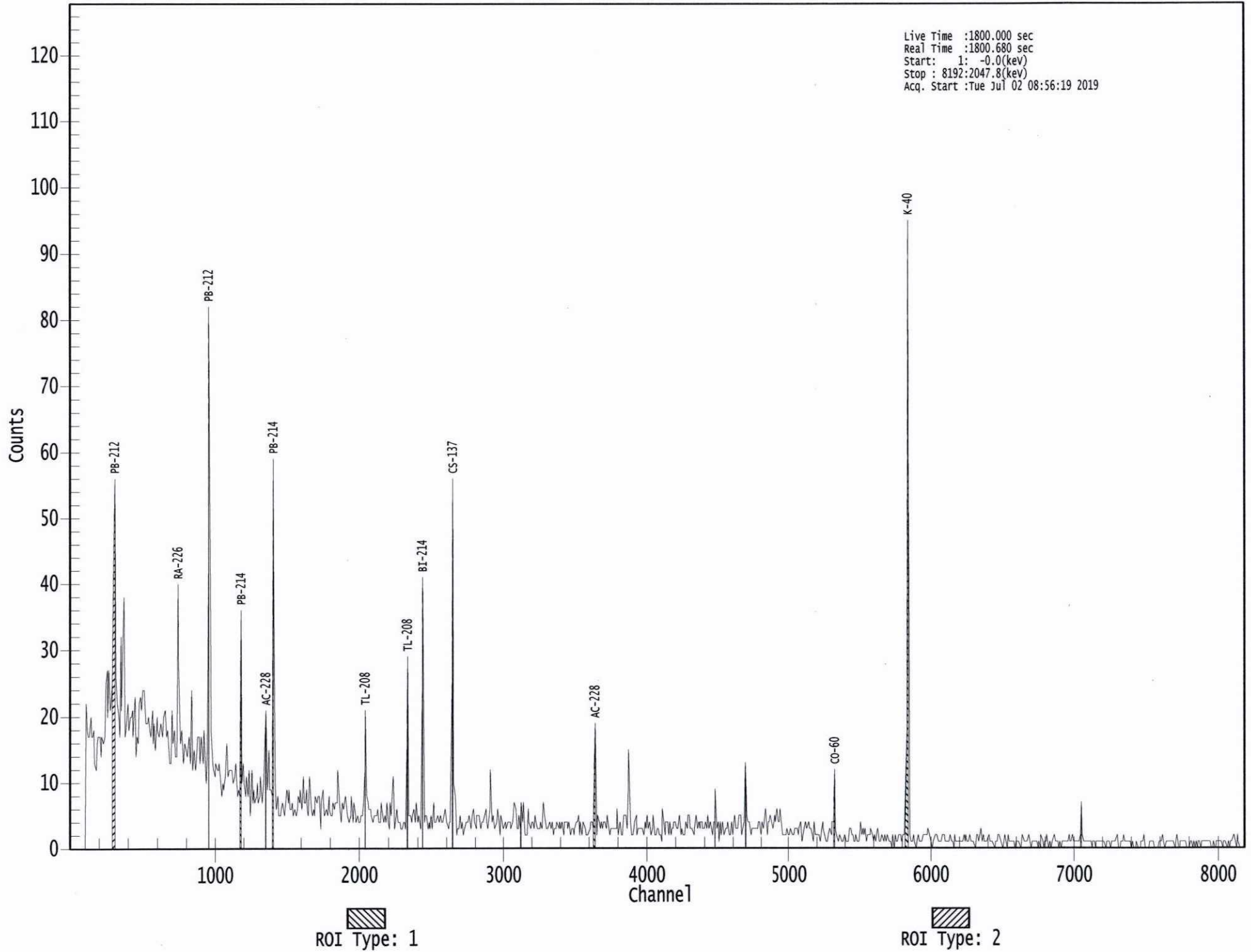


Analysis Report for 02-Jul-19-10012  
L1-10209B-RIGS-003SB

<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Nuclide MDA (pCi/grams)</b>	<b>Line MDA (pCi/grams)</b>
Eu-154	873.18	12.08	-4.76E-02	7.08E-02	2.65E-01
	996.29	10.48	3.69E-02		3.65E-01
	1004.76	18.01	-7.56E-02		2.17E-01
	1274.43	34.80	-1.45E-01		1.21E-01
	1596.48	1.80	2.56E-01		1.67E+00
Eu-155	45.30	1.31	-3.11E+00	1.46E-01	8.72E+00
	60.01	1.22	1.06E+00		9.70E+00
	86.55	30.70	1.76E-01		1.46E-01
	105.31	21.10	4.29E-02		1.58E-01
+ Ra-226	186.21	* 3.64	8.41E-01	5.09E-01	5.09E-01
Pa-231	27.36	10.30	1.55E+00	1.01E+00	1.01E+00
	283.69	1.70	9.02E-02		1.55E+00
	300.07	2.47	-1.22E-01		1.06E+00
	302.65	2.20	5.65E-01		1.22E+00
	330.06	1.40	7.21E-01		2.02E+00
+ U-235	143.76	10.96	1.59E-01	3.24E-02	2.50E-01
Am-241	163.33	5.08	-1.17E-01	3.33E-01	4.93E-01
	185.71	* 57.20	5.35E-02		3.24E-02
	202.11	1.08	1.54E+00		2.41E+00
	205.31	5.01	-5.09E-01		5.09E-01
Am-241	59.54	35.90	-7.89E-02	3.33E-01	3.33E-01

- + = 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  
 ? = CAUTION: MDA value is inconsistent with Currie MDA at 95% confidence level

Live Time :1800.000 sec  
Real Time :1800.680 sec  
Start: 1: -0.0(kev)  
Stop : 8192:2047.8(kev)  
Acq. Start :Tue Jul 02 08:56:19 2019



Analysis Report for 02-Jul-19-10013  
L1-10209B-RIGS-004SB

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## GAMMA SPECTRUM ANALYSIS

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Sample Identification : 02-Jul-19-10013  
Sample Description : L1-10209B-RIGS-004SB  
Sample Type : Soil  
Unit :  
Sample Point :  
  
Sample Size : 1.348E+03 grams  
Facility : Default  
  
Sample Taken On : 7/1/2019 1:49:00PM  
Acquisition Started : 7/2/2019 8:56:28AM  
  
Procedure : 130G\_SOIL\_1  
Operator : Administrator  
Detector Name : 352  
Geometry : 130G\_SOIL\_1  
Live Time : 900.0 seconds  
Real Time : 900.3 seconds  
  
Dead Time : 0.04 %  
  
Peak Locate Threshold : 3.00  
Peak Locate Range (in channels) : 120 - 8192  
Peak Area Range (in channels) : 120 - 8192  
Identification Energy Tolerance : 1.000 keV  
  
Energy Calibration Used Done On : 9/29/2018  
Efficiency Calibration Used Done On : 7/2/2019  
Efficiency Calibration Description :  
  
Sample Number : 77727  
Fill Height : 1347.55 gram  
Certificate Name : Eu155-Na22  
Certificate Date : 1/7/2013 12:00:00PM

*J.P. [Signature]*  
7-2-19

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## PEAK ANALYSIS REPORT

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Peak Analysis Performed on : 7/2/2019 9:11:37AM  
Peak Analysis From Channel : 120  
Peak Analysis To Channel : 8192

*[Signature]*  
7-8-19

Analysis Report for 02-Jul-19-10013

L1-10209B-RIGS-004SB

Peak No.	Energy (keV)	ROI start	ROI end	Peak Centroid	Net Peak Area	Net Area Uncertainty	Continuum Counts	FWHM (keV)
M 1	185.95	738 -	750	744.52	2.85E+01	16.89	9.55E+01	0.44
m 2	238.69	946 -	973	955.23	1.59E+02	34.47	7.63E+01	1.05
m 3	241.89	946 -	973	968.01	4.02E+01	10.47	5.99E+01	1.05
4	295.31	1175 -	1189	1181.47	6.51E+01	13.31	3.89E+01	1.05
5	351.91	1401 -	1415	1407.64	1.09E+02	14.47	3.48E+01	1.37
6	583.12	2325 -	2338	2331.78	7.00E+01	11.30	2.10E+01	0.98
7	609.30	2428 -	2442	2436.45	7.73E+01	12.98	3.17E+01	1.09
8	661.59	2635 -	2655	2645.52	4.03E+02	22.32	2.62E+01	1.15
9	910.95	3636 -	3650	3642.84	4.95E+01	9.13	1.15E+01	0.75
10	1173.23	4682 -	4700	4692.30	7.74E+01	10.80	1.16E+01	0.57
11	1332.51	5321 -	5338	5329.91	6.54E+01	10.23	1.16E+01	0.98
12	1460.77	5830 -	5855	5843.45	3.54E+02	19.17	3.26E+00	1.61

M = First peak in a multiplet region

m = Other peak in a multiplet region

F = Fitted singlet

Errors quoted at 1.000sigma

No background subtract performed on this spectrum.

## NUCLIDE IDENTIFICATION REPORT

Nuclide Library Used : C:\Canberra\Apex\Root\Default\Library\ZION LIB-BNL.NLB

### IDENTIFIED NUCLIDES

Nuclide Name	Id Confidence	Energy (keV)	Yield(%)	Activity (pCi/grams)	Activity Uncertainty
K-40	1.00	1460.82	* 10.66	7.70E+00	5.35E-01
Co-60	1.00	1173.23	* 99.85	1.54E-01	2.24E-02
		1332.49	* 99.98	1.42E-01	2.29E-02
Cs-137	0.99	661.66	* 85.10	6.46E-01	5.28E-02
Tl-208	0.99	583.19	* 85.00	1.03E-01	1.78E-02

Analysis Report for 02-Jul-19-10013

L1-10209B-RIGS-004SB

<b>Nuclide Name</b>	<b>Id Confidence</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Activity Uncertainty</b>
Pb-212	0.99	115.18	0.60		
		238.63 *	43.60	2.56E-01	5.91E-02
		300.09	3.30		
Bi-214	1.00	609.32 *	45.49	2.20E-01	3.92E-02
		768.36	4.89		
		806.18	1.26		
		934.06	3.11		
		1120.29	14.92		
		1155.21	1.63		
		1238.12	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		
		1661.27	1.05		
		1729.59	2.88		
1764.49	15.30				
1847.43	2.03				
2118.51	1.16				
Pb-214	0.99	241.99 *	7.25	3.91E-01	1.07E-01
		295.22 *	18.42	2.78E-01	6.11E-02
		351.93 *	35.60	2.73E-01	4.23E-02
		785.96	1.06		
Ra-226	0.98	186.21 *	3.64	4.88E-01	2.92E-01
Ac-228	0.99	129.07	2.42		
		209.25	3.89		
		270.24	3.46		
		328.00	2.95		
		338.32	11.27		
		409.46	1.92		
		463.00	4.40		
		794.95	4.25		
		911.20 *	25.80	3.24E-01	6.13E-02
		964.77	4.99		
		968.97	15.80		
		1588.20	3.22		
U-235	0.99	143.76	10.96		
		163.33	5.08		
		185.71 *	57.20	3.11E-02	1.86E-02
		202.11	1.08		
		205.31	5.01		

\* = Energy line found in the spectrum.

- = Manually added nuclide.

? = Manually edited nuclide.

@ = Energy line not used for Weighted Mean Activity

Energy Tolerance : 1.000 keV

Nuclide confidence index threshold = 0.30

Errors quoted at 1.000sigma

Analysis Report for 02-Jul-19-10013  
L1-10209B-RIGS-004SB

## INTERFERENCE CORRECTED REPORT

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (pCi/grams)	Wt mean Activity Uncertainty	Comments
K-40	1.000	7.70E+00	5.35E-01	
Co-60	1.000	1.48E-01	1.60E-02	
Cs-137	0.999	6.46E-01	5.28E-02	
Tl-208	0.999	1.03E-01	1.78E-02	
X Bi-211	0.893			
Pb-212	0.999	2.56E-01	5.91E-02	
Bi-214	1.000	2.20E-01	3.92E-02	
Pb-214	0.999	2.86E-01	3.31E-02	
? Ra-226	0.989	4.88E-01	2.92E-01	
? Ac-228	0.997	3.24E-01	6.13E-02	
? <del>U-235</del> <i>Ra-226</i>	<del>0.994</del>	<del>3.11E-02</del>	<del>1.86E-02</del>	

- ? = 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 1.000sigma

*JRW*  
*7-2-19*

*U-235 only 1 Peak*

Analysis Report for 02-Jul-19-10013  
L1-10209B-RIGS-004SB

## UNIDENTIFIED PEAKS

Peak Locate Performed on : 7/2/2019 9:11:37AM  
Peak Locate From Channel : 120  
Peak Locate To Channel : 8192

Peak No.	Energy (keV)	Peak Size (CPS)	Peak CPS (%) Uncertainty	Peak Type	Tolerance Nuclide
All peaks were identified.					
M = First peak in a multiplet region					
m = Other peak in a multiplet region					
F = Fitted singlet					
Errors quoted at 1.000sigma					

## NUCLIDE MDA REPORT

Nuclide Library Used : C:\Canberra\Apex\Root\Default\Library\ZION LIB-BNL.NLB

Nuclide Name	Energy (keV)	Yield(%)	Activity (pCi/grams)	Nuclide MDA (pCi/grams)	Line MDA (pCi/grams)
An Pk	511.00	100.00	4.04E-02	6.63E-02	6.63E-02
BE-7	477.60	10.44	4.76E-01	5.17E-01	5.17E-01
+ K-40	1460.82	* 10.66	7.70E+00	3.38E-01	3.38E-01
Mn-54	834.85	99.98	1.83E-02	5.30E-02	5.30E-02
+ Co-60	1173.23	* 99.85	1.54E-01	4.82E-02	4.82E-02
Nb-94	1332.49	* 99.98	1.42E-01		5.23E-02
	702.65	99.81	-3.69E-03	4.56E-02	4.56E-02
Ag-108m	871.09	99.89	1.56E-02		5.05E-02
	79.13	6.60	-7.13E-01	5.59E-02	1.73E+00
Sb-125	433.94	90.50	2.17E-02		5.59E-02
	614.28	89.80	-6.50E-02		8.11E-02
	722.94	90.80	4.90E-02		6.03E-02
	176.31	6.84	1.43E-01	1.60E-01	5.85E-01
	380.45	1.52	-6.09E-01		2.91E+00
	427.87	29.60	-7.07E-02		1.60E-01
	463.36	10.49	3.65E-01		5.19E-01
	600.60	17.65	-3.84E-02		2.52E-01
	606.71	4.98	1.90E+00		1.55E+00
	635.95	11.22	-1.01E-02		4.60E-01

Analysis Report for 02-Jul-19-10013  
L1-10209B-RIGS-004SB

Nuclide Name	Energy (keV)	Yield(%)	Activity (pCi/grams)	Nuclide MDA (pCi/grams)	Line MDA (pCi/grams)
Sb-125	671.44	1.79	1.69E+00	1.60E-01	3.01E+00
Ba-133	79.61	2.65	-3.74E-01	9.20E-02	4.23E+00
	81.00	32.90	-4.87E-01		3.01E-01
	276.40	7.16	2.56E-02		5.76E-01
	302.85	18.34	8.01E-02		2.34E-01
	356.01	62.05	-4.39E-03		9.20E-02
	383.85	8.94	1.10E-01		5.10E-01
Cs-134	475.36	1.48	-8.20E-01	6.06E-02	3.47E+00
	563.25	8.34	4.10E-01		6.07E-01
	569.33	15.37	6.87E-02		2.90E-01
	604.72	97.62	-4.06E-02		7.36E-02
	795.86	85.46	1.04E-02		6.06E-02
	801.95	8.69	-2.50E-01		6.00E-01
	1038.61	0.99	-1.81E+00		6.25E+00
	1167.97	1.79	-1.03E+00		5.85E+00
	1365.19	3.02	1.23E-01		1.89E+00
+ Cs-137	661.66	* 85.10	6.46E-01	5.77E-02	5.77E-02
Eu-152	121.78	28.67	9.23E-02	1.55E-01	1.73E-01
	244.70	7.61	-2.70E-01		5.98E-01
	295.94	0.45	2.33E+00		1.13E+01
	344.28	26.60	-3.90E-02		1.55E-01
	367.79	0.86	-1.48E+00		5.16E+00
	411.12	2.24	-3.88E-02		2.27E+00
	443.96	2.83	-9.94E-01		1.59E+00
	488.68	0.42	6.64E-01		1.13E+01
	563.99	0.49	7.77E+00		1.04E+01
	586.26	0.46	2.26E+01		1.53E+01
	678.62	0.47	-6.50E+00		1.02E+01
	688.67	0.86	-2.37E+00		6.17E+00
	719.35	0.28	3.96E+00		1.85E+01
	778.90	12.96	-5.60E-02		4.24E-01
	810.45	0.32	-5.23E+00		1.58E+01
	867.37	4.26	-1.73E-01		1.24E+00
	919.33	0.43	-1.15E+01		1.33E+01
	964.08	14.65	2.74E-01		5.01E-01
	1085.87	10.24	-6.90E-02		5.06E-01
	1089.74	1.73	-1.94E-01		3.29E+00
	1112.07	13.69	-3.83E-01		4.61E-01
	1212.95	1.43	4.41E-01		4.63E+00
	1249.94	0.19	-1.89E+01		3.20E+01
	1299.14	1.63	1.02E+00		3.33E+00
	1408.01	21.07	-8.00E-02		2.30E-01
	1457.64	0.50	1.67E+02		4.34E+01
	1528.10	0.28	-6.74E-01		1.25E+01
Eu-154	123.07	40.40	1.29E-01	1.25E-01	1.25E-01
	247.93	6.89	-9.50E-02		5.73E-01
	591.76	4.95	7.49E-01		1.03E+00
	692.42	1.78	1.01E+00		2.97E+00
	723.30	20.06	8.49E-02		2.70E-01
	756.80	4.52	-1.43E-01		1.12E+00
	873.18	12.08	-3.28E-01		4.07E-01



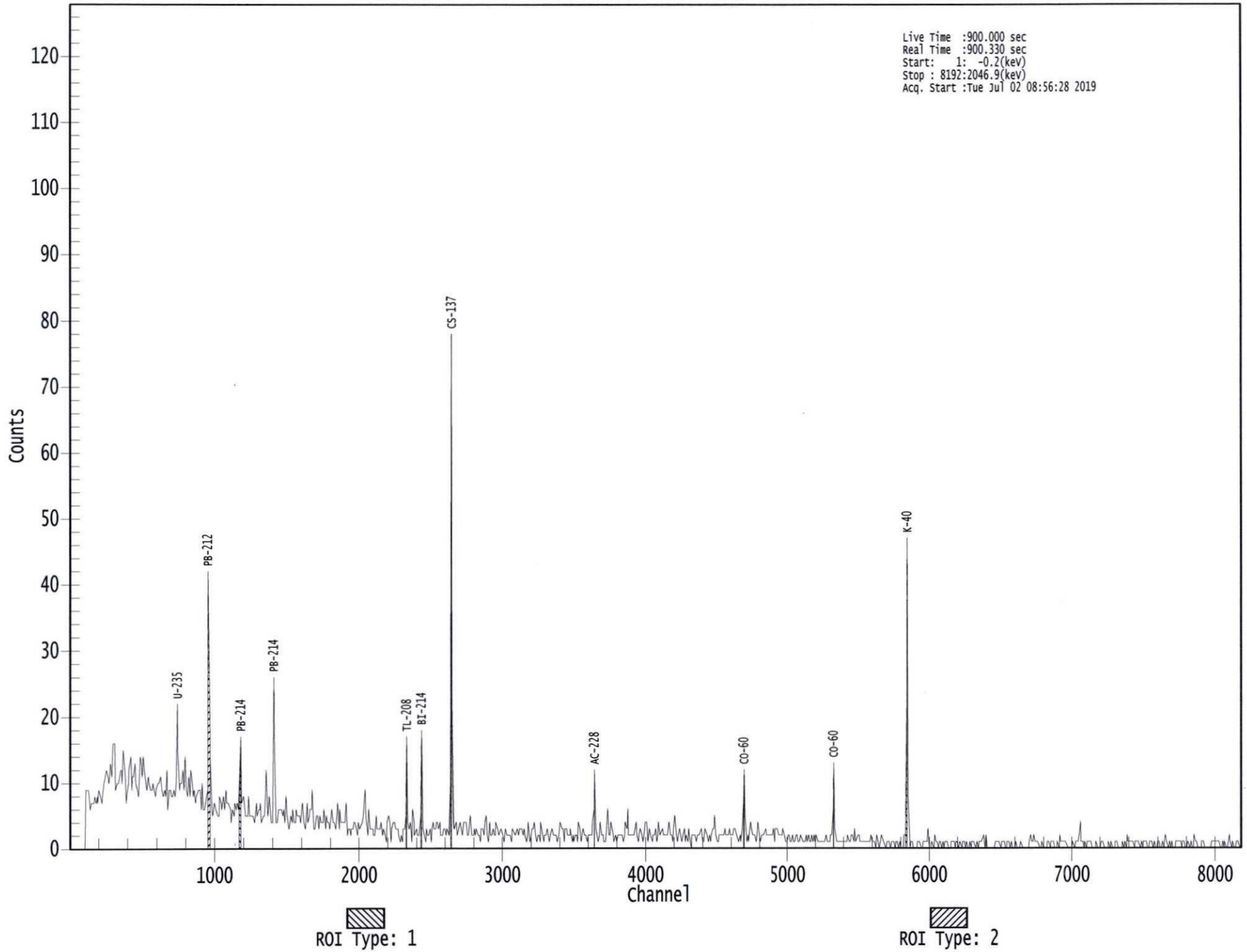
Analysis Report for 02-Jul-19-10013  
L1-10209B-RIGS-004SB

<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Nuclide MDA (pCi/grams)</b>	<b>Line MDA (pCi/grams)</b>
Eu-154	996.29	10.48	4.11E-01	1.25E-01	5.93E-01
	1004.76	18.01	2.35E-01		3.58E-01
	1274.43	34.80	1.02E-01		1.81E-01
	1596.48	1.80	-3.11E-01		2.49E+00
Eu-155	45.30	1.31	1.25E+01	2.53E-01	2.46E+01
	60.01	1.22	-9.28E+00		2.70E+01
	86.55	30.70	5.08E-02		2.54E-01
	105.31	21.10	2.15E-02		2.53E-01
+ Ra-226	186.21	* 3.64	4.88E-01	9.82E-01	9.82E-01
Pa-231	27.36	10.30	2.70E+00	1.85E+00	2.73E+00
	283.69	1.70	-5.14E-02		2.43E+00
	300.07	2.47	7.51E-01		1.85E+00
	302.65	2.20	3.37E-01		1.94E+00
+ U-235	330.06	1.40	7.87E-02	6.25E-02	3.24E+00
	143.76	10.96	1.71E-01		3.93E-01
	163.33	5.08	-5.33E-01		7.72E-01
	185.71	* 57.20	3.11E-02		6.25E-02
	202.11	1.08	-9.89E-01		3.96E+00
	205.31	5.01	-2.72E-01		8.49E-01
Am-241	59.54	35.90	-3.03E-01	9.46E-01	9.46E-01

- + = 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  
 ? = CAUTION: MDA value is inconsistent with Currie MDA at 95% confidence level

0000077727.CNF

Live Time :900.000 sec  
Real Time :900.330 sec  
Start: 1: -0.2(kev)  
Stop : 8192:2046.9(kev)  
Acq. Start :Tue Jul 02 08:56:28 2019



Analysis Report for 02-Jul-19-10014  
L1-10209B-RIGS-005SB

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## GAMMA SPECTRUM ANALYSIS

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Sample Identification : 02-Jul-19-10014  
Sample Description : L1-10209B-RIGS-005SB  
Sample Type : Soil  
Unit :  
Sample Point :  
  
Sample Size : 1.399E+03 grams  
Facility : Default  
  
Sample Taken On : 7/1/2019 1:51:00PM  
Acquisition Started : 7/2/2019 9:15:28AM  
  
Procedure : 130G\_SOIL\_1  
Operator : Administrator  
Detector Name : 324  
Geometry : 130G\_SOIL\_1  
Live Time : 900.0 seconds  
Real Time : 900.4 seconds  
  
Dead Time : 0.04 %  
  
Peak Locate Threshold : 3.00  
Peak Locate Range (in channels) : 120 - 4096  
Peak Area Range (in channels) : 120 - 4096  
Identification Energy Tolerance : 1.000 keV  
  
Energy Calibration Used Done On : 9/29/2018  
Efficiency Calibration Used Done On : 7/2/2019  
Efficiency Calibration Description :  
  
Sample Number : 77728  
Fill Height : 1398.55 gram  
Certificate Name : Eu155-Na22  
Certificate Date : 1/30/2013 12:00:00PM

*[Handwritten signature]*  
7-2-19

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## PEAK ANALYSIS REPORT

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Peak Analysis Performed on : 7/2/2019 9:30:31AM  
Peak Analysis From Channel : 120  
Peak Analysis To Channel : 4096

*[Handwritten signature]*  
7-8-19

Analysis Report for 02-Jul-19-10014

L1-10209B-RIGS-005SB

Peak No.	Energy (keV)	ROI start	ROI end	Peak Centroid	Net Peak Area	Net Area Uncertainty	Continuum Counts	FWHM (keV)
1	77.09	152 -	158	154.77	6.09E+01	21.50	1.96E+02	0.79
2	186.10	368 -	376	372.51	6.82E+01	20.23	1.59E+02	1.15
3	238.63	472 -	481	477.43	1.94E+02	25.73	2.00E+02	1.39
4	295.14	585 -	594	590.33	1.05E+02	16.95	8.11E+01	1.29
5	338.21	672 -	681	676.39	5.72E+01	14.18	6.38E+01	1.12
6	351.86	698 -	708	703.66	2.20E+02	18.47	5.09E+01	1.36
7	583.05	1160 -	1171	1165.71	7.60E+01	13.06	3.70E+01	1.59
8	609.13	1212 -	1223	1217.84	1.21E+02	15.04	4.20E+01	1.16
9	661.52	1319 -	1326	1322.58	1.75E+01	9.51	3.55E+01	1.01
10	910.73	1817 -	1827	1820.92	8.33E+01	10.98	1.57E+01	1.77
11	1119.93	2232 -	2243	2239.40	3.06E+01	10.08	2.84E+01	1.75
12	1460.39	2913 -	2928	2920.83	5.55E+02	23.80	3.86E+00	1.91
13	1763.80	3523 -	3533	3528.45	3.23E+01	6.23	2.75E+00	1.01

M = First peak in a multiplet region  
m = Other peak in a multiplet region  
F = Fitted singlet  
Errors quoted at 1.000sigma

No background subtract performed on this spectrum.

## NUCLIDE IDENTIFICATION REPORT

Nuclide Library Used : C:\Canberra\Apex\Root\Default\Library\ZION LIB-BNL.NLB

### IDENTIFIED NUCLIDES

Nuclide Name	Id Confidence	Energy (keV)	Yield(%)	Activity (pCi/grams)	Activity Uncertainty	
K-40	0.97	1460.82	*	10.66	1.07E+01	6.54E-01
Cs-137	0.99	661.66	*	85.10	2.51E-02	1.37E-02
Tl-208	0.99	583.19	*	85.00	1.00E-01	1.82E-02
Pb-212	1.00	115.18		0.60		

Analysis Report for 02-Jul-19-10014

L1-10209B-RIGS-005SB

<b>Nuclide Name</b>	<b>Id Confidence</b>	<b>Energy (keV)</b>		<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Activity Uncertainty</b>
Pb-212	1.00	238.63	*	43.60	2.76E-01	4.30E-02
		300.09		3.30		
Pb212-XR	1.00	74.82		10.28		
		77.11	*	17.10	4.03E-01	1.48E-01
		87.35		3.97		
		89.78		1.46		
Bi-214	0.98	609.32	*	45.49	3.07E-01	4.23E-02
		768.36		4.89		
		806.18		1.26		
		934.06		3.11		
		1120.29	*	14.92	3.52E-01	1.17E-01
		1155.21		1.63		
		1238.12		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		
		1661.27		1.05		
		1729.59		2.88		
		1764.49	*	15.30	5.00E-01	9.87E-02
		1847.43		2.03		
		2118.51		1.16		
Pb-214	0.99	241.99		7.25		
		295.22	*	18.42	4.00E-01	7.21E-02
		351.93	*	35.60	4.92E-01	5.70E-02
		785.96		1.06		
Pb214-XR	1.00	74.82		5.80		
		77.11	*	9.70	7.10E-01	2.63E-01
		87.35		2.24		
		89.78		0.82		
Ra-226	0.99	186.21	*	3.64	1.03E+00	3.17E-01
Ac-228	0.98	129.07		2.42		
		209.25		3.89		
		270.24		3.46		
		328.00		2.95		
		338.32	*	11.27	3.92E-01	1.02E-01
		409.46		1.92		
		463.00		4.40		
		794.95		4.25		
		911.20	*	25.80	4.86E-01	6.75E-02
		964.77		4.99		
		968.97		15.80		
		1588.20		3.22		
U-235	0.98	143.76		10.96		
		163.33		5.08		
		185.71	*	57.20	6.57E-02	2.02E-02
		202.11		1.08		
		205.31		5.01		

Analysis Report for 02-Jul-19-10014  
L1-10209B-RIGS-005SB

\* = Energy line found in the spectrum.  
 - = Manually added nuclide.  
 ? = Manually edited nuclide.  
 @ = Energy line not used for Weighted Mean Activity  
 Energy Tolerance : 1.000 keV  
 Nuclide confidence index threshold = 0.30  
 Errors quoted at 1.000sigma

## INTERFERENCE CORRECTED REPORT

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (pCi/grams)	Wt mean Activity Uncertainty	Comments
K-40	0.970	1.07E+01	6.54E-01	
Cs-137	0.997	2.51E-02	1.37E-02	
Tl-208	0.997	1.00E-01	1.82E-02	
X Bi-211	0.905			
Pb-212	1.000	2.76E-01	4.30E-02	
? Pb212-XR	1.000	4.03E-01	1.48E-01	
Bi-214	0.984	3.38E-01	3.69E-02	
Pb-214	0.999	4.56E-01	4.47E-02	
? Pb214-XR	1.000	7.10E-01	2.63E-01	
? Ra-226	0.998	1.03E+00	3.17E-01	
Ac-228	0.989	4.57E-01	5.64E-02	
? U-235 <i>Ra-226</i>	<u>0.983</u>	<u>6.57E-02</u>	<u>2.02E-02</u>	

? = 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 1.000sigma

*U-235 only 1 Peak*

*JPW  
7-2-19*

Analysis Report for 02-Jul-19-10014  
L1-10209B-RIGS-005SB

## UNIDENTIFIED PEAKS

Peak Locate Performed on : 7/2/2019 9:30:31AM  
Peak Locate From Channel : 120  
Peak Locate To Channel : 4096

Peak No.	Energy (keV)	Peak Size (CPS)	Peak CPS (%) Uncertainty	Peak Type	Tolerance Nuclide
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All peaks were identified.

M = First peak in a multiplet region  
m = Other peak in a multiplet region  
F = Fitted singlet  
Errors quoted at 1.000sigma

## NUCLIDE MDA REPORT

Nuclide Library Used : C:\Canberra\Apex\Root\Default\Library\ZION LIB-BNL.NLB

Nuclide Name	Energy (keV)	Yield(%)	Activity (pCi/grams)	Nuclide MDA (pCi/grams)	Line MDA (pCi/grams)
An Pk	511.00	100.00	7.78E-02	6.18E-02	6.18E-02
BE-7	477.60	10.44	1.10E-01	3.97E-01	3.97E-01
+ K-40	1460.82	* 10.66	1.07E+01	2.76E-01	2.76E-01
Mn-54	834.85	99.98	2.28E-02	5.08E-02	5.08E-02
Co-60	1173.23	99.85	4.69E-02	5.69E-02	7.04E-02
	1332.49	99.98	5.30E-03		5.69E-02
Nb-94	702.65	99.81	-5.45E-04	4.38E-02	4.50E-02
	871.09	99.89	-1.21E-02		4.38E-02
Ag-108m	79.13	6.60	-3.96E-01	3.90E-02	1.34E+00
	433.94	90.50	-3.17E-02		3.90E-02
	614.28	89.80	1.72E-03		6.05E-02
	722.94	90.80	2.75E-02		6.03E-02
Sb-125	176.31	6.84	2.31E-01	1.24E-01	6.04E-01
	380.45	1.52	-6.86E-01		2.38E+00
	427.87	29.60	3.77E-02		1.24E-01
	463.36	10.49	3.91E-01		4.19E-01
	600.60	17.65	4.24E-02		2.69E-01
	606.71	4.98	8.37E-02		1.59E+00
	635.95	11.22	8.78E-02		3.93E-01

Analysis Report for 02-Jul-19-10014  
L1-10209B-RIGS-005SB

<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Nuclide MDA (pCi/grams)</b>	<b>Line MDA (pCi/grams)</b>
Sb-125	671.44	1.79	-1.48E+00	1.24E-01	2.26E+00
Ba-133	79.61	2.65	-1.33E+00	8.94E-02	3.12E+00
	81.00	32.90	-2.25E-01		2.08E-01
	276.40	7.16	3.06E-01		5.44E-01
	302.85	18.34	1.24E-01		2.22E-01
	356.01	62.05	-6.79E-02		8.94E-02
	383.85	8.94	1.33E-01		4.43E-01
Cs-134	475.36	1.48	-1.43E+00	6.03E-02	2.63E+00
	563.25	8.34	-5.86E-02		4.51E-01
	569.33	15.37	-5.25E-02		2.64E-01
	604.72	97.62	-2.16E-03		7.34E-02
	795.86	85.46	4.85E-02		6.03E-02
	801.95	8.69	-5.49E-01		4.78E-01
	1038.61	0.99	2.41E+00		5.75E+00
	1167.97	1.79	-1.65E+00		3.66E+00
	1365.19	3.02	5.42E-01		1.58E+00
+ Cs-137	661.66	* 85.10	2.51E-02	4.56E-02	4.56E-02
Eu-152	121.78	28.67	-4.47E-02	1.32E-01	1.32E-01
	244.70	7.61	-4.62E-02		5.78E-01
	295.94	0.45	-2.93E+00		1.13E+01
	344.28	26.60	-3.34E-02		1.42E-01
	367.79	0.86	2.01E+00		4.56E+00
	411.12	2.24	-8.06E-01		1.74E+00
	443.96	2.83	-9.11E-01		1.28E+00
	488.68	0.42	1.40E-01		1.02E+01
	563.99	0.49	-1.46E+00		7.66E+00
	586.26	0.46	-5.42E+00		1.37E+01
	678.62	0.47	3.34E+00		9.92E+00
	688.67	0.86	1.28E+00		5.00E+00
	719.35	0.28	1.47E+00		1.79E+01
	778.90	12.96	5.93E-02		3.43E-01
	810.45	0.32	7.05E+00		1.47E+01
	867.37	4.26	-5.00E-01		1.05E+00
	919.33	0.43	-5.51E+00		1.06E+01
	964.08	14.65	-1.37E-01		4.58E-01
	1085.87	10.24	-6.22E-02		5.28E-01
	1089.74	1.73	-2.34E+00		3.01E+00
	1112.07	13.69	-7.10E-02		4.39E-01
	1212.95	1.43	1.75E+00		4.88E+00
	1249.94	0.19	-7.72E+00		3.09E+01
	1299.14	1.63	1.27E+00		3.54E+00
	1408.01	21.07	1.05E-01		2.51E-01
	1457.64	0.50	-5.52E+00		4.77E+01
	1528.10	0.28	-8.87E+00		1.18E+01
Eu-154	123.07	40.40	2.33E-02	9.58E-02	9.58E-02
	247.93	6.89	4.61E-02		5.41E-01
	591.76	4.95	-1.06E-01		9.08E-01
	692.42	1.78	-1.39E+00		2.35E+00
	723.30	20.06	1.76E-02		2.69E-01
	756.80	4.52	-3.12E-01		9.08E-01
	873.18	12.08	-1.49E-01		3.68E-01



Analysis Report for 02-Jul-19-10014

L1-10209B-RIGS-005SB

<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Nuclide MDA (pCi/grams)</b>	<b>Line MDA (pCi/grams)</b>
Eu-154	996.29	10.48	2.26E-01	9.58E-02	5.28E-01
	1004.76	18.01	-8.05E-02		3.02E-01
	1274.43	34.80	3.33E-02		1.74E-01
	1596.48	1.80	7.83E-01		2.12E+00
Eu-155	45.30	1.31	7.47E+00	2.19E-01	1.39E+01
	60.01	1.22	-1.23E+01		1.37E+01
	86.55	30.70	8.36E-02		2.19E-01
	105.31	21.10	3.18E-02		2.19E-01
+ Ra-226	186.21	* 3.64	1.03E+00	9.92E-01	9.92E-01
Pa-231	27.36	10.30	1.16E-01	1.18E+00	1.18E+00
	283.69	1.70	-7.05E-01		2.06E+00
	300.07	2.47	-1.60E+00		1.58E+00
	302.65	2.20	1.03E+00		1.85E+00
	330.06	1.40	4.19E-01		2.96E+00
+ U-235	143.76	10.96	1.29E-01	6.31E-02	3.48E-01
U-235	163.33	5.08	-1.01E-01	6.31E-02	7.92E-01
	185.71	* 57.20	6.57E-02		6.31E-02
	202.11	1.08	6.45E-01		3.54E+00
	205.31	5.01	-8.88E-01		7.18E-01
Am-241	59.54	35.90	-3.83E-01	4.87E-01	4.87E-01

+ = Nuclide identified during the nuclide identification

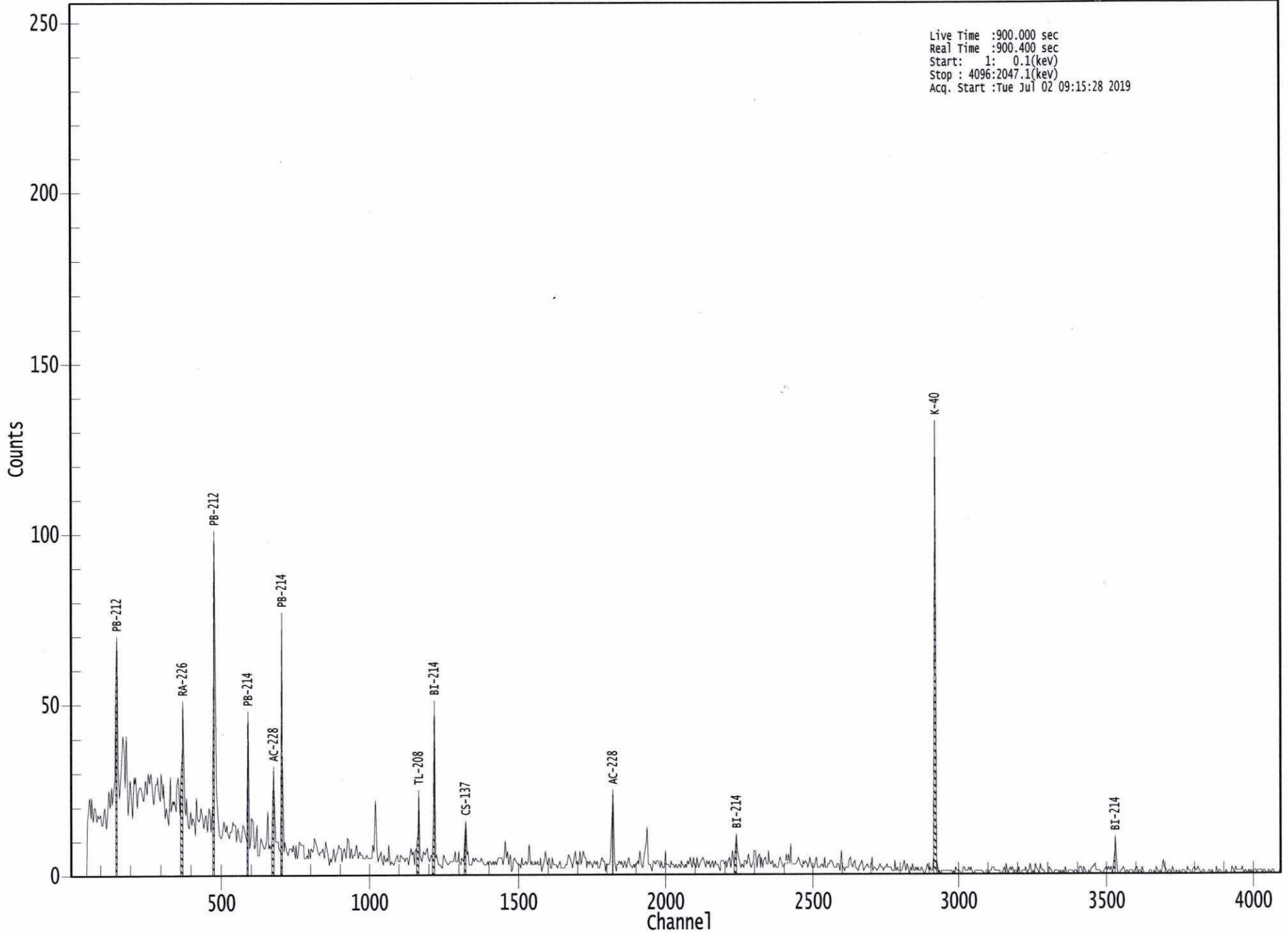
\* = Energy line found in the spectrum

&gt; = MDA value not calculated

@ = Half-life too short to be able to perform the decay correction

? = CAUTION: MDA value is inconsistent with Currie MDA at 95% confidence level

Live Time :900.000 sec  
Real Time :900.400 sec  
Start: 1: 0.1(kev)  
Stop : 4096:2047.1(kev)  
Acq. Start :Tue Jul 02 09:15:28 2019



ROI Type: 1

Analysis Report for 02-Jul-19-10015  
L1-10209B-RIGS-006SB

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## GAMMA SPECTRUM ANALYSIS

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Sample Identification : 02-Jul-19-10015  
Sample Description : L1-10209B-RIGS-006SB  
Sample Type : Soil  
Unit :  
Sample Point :  
  
Sample Size : 1.207E+03 grams  
Facility : Default  
  
Sample Taken On : 7/1/2019 1:53:00PM  
Acquisition Started : 7/2/2019 9:15:36AM  
  
Procedure : 130G\_SOIL\_1  
Operator : Administrator  
Detector Name : P40818B  
Geometry : 130G\_SOIL\_1  
Live Time : 900.0 seconds  
Real Time : 901.7 seconds  
  
Dead Time : 0.18 %  
  
Peak Locate Threshold : 3.00  
Peak Locate Range (in channels) : 120 - 8192  
Peak Area Range (in channels) : 120 - 8192  
Identification Energy Tolerance : 1.000 keV  
  
Energy Calibration Used Done On : 1/29/2019  
Efficiency Calibration Used Done On : 7/2/2019  
Efficiency Calibration Description :  
  
Sample Number : 77729  
Fill Height : 1206.93 gram  
Certificate Name : Eu155-Na22  
Certificate Date : 1/30/2012 12:00:00PM

*J.P. M...  
7-2-19*

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## PEAK ANALYSIS REPORT

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Peak Analysis Performed on : 7/2/2019 9:30:41AM  
Peak Analysis From Channel : 120  
Peak Analysis To Channel : 8192

*J.P. M...  
7-8-19*

Analysis Report for 02-Jul-19-10015

L1-10209B-RIGS-006SB

Peak No.	Energy (keV)	ROI start	ROI end	Peak Centroid	Net Peak Area	Net Area Uncertainty	Continuum Counts	FWHM (keV)
1	77.24	305 -	316	309.70	5.61E+01	17.92	1.03E+02	0.81
2	238.70	949 -	960	954.88	1.94E+02	20.10	8.40E+01	0.81
3	295.35	1177 -	1188	1181.32	7.26E+01	13.13	3.94E+01	0.64
4	338.59	1348 -	1360	1354.15	5.30E+01	11.93	3.40E+01	1.00
5	352.17	1399 -	1415	1408.42	1.65E+02	16.64	3.58E+01	1.23
6	583.39	2325 -	2343	2332.78	6.47E+01	12.20	2.43E+01	1.04
7	609.57	2430 -	2445	2437.46	1.17E+02	12.91	1.63E+01	0.84
8	727.78	2906 -	2915	2910.17	1.58E+01	5.90	8.25E+00	0.52
9	911.44	3637 -	3652	3644.71	6.10E+01	8.90	6.02E+00	1.54
10	969.34	3871 -	3882	3876.35	3.10E+01	7.32	9.00E+00	0.61
11	1461.26	5834 -	5855	5844.86	3.88E+02	20.20	5.50E+00	1.59

M = First peak in a multiplet region

m = Other peak in a multiplet region

F = Fitted singlet

Errors quoted at 1.000sigma

No background subtract performed on this spectrum.

## NUCLIDE IDENTIFICATION REPORT

Nuclide Library Used : C:\Canberra\Apex\Root\Default\Library\ZION LIB-BNL.NLB

### IDENTIFIED NUCLIDES

Nuclide Name	Id Confidence	Energy (keV)	Yield(%)	Activity (pCi/grams)	Activity Uncertainty
K-40	0.97	1460.82	* 10.66	1.05E+01	7.14E-01
Tl-208	0.99	583.19	* 85.00	1.16E-01	2.30E-02
Bi-212	0.97	39.86	1.06		
		727.33	* 6.67	4.20E-01	1.59E-01
		785.37	1.10		
		1620.50	1.47		

Analysis Report for 02-Jul-19-10015  
L1-10209B-RIGS-006SB

<b>Nuclide Name</b>	<b>Id Confidence</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Activity Uncertainty</b>
Pb-212	0.99	115.18	0.60		
		238.63 *	43.60	3.68E-01	4.84E-02
		300.09	3.30		
Pb212-XR	0.99	74.82	10.28		
		77.11 *	17.10	7.07E-01	2.37E-01
		87.35	3.97		
		89.78	1.46		
Bi-214	0.99	609.32 *	45.49	4.04E-01	5.08E-02
		768.36	4.89		
		806.18	1.26		
		934.06	3.11		
		1120.29	14.92		
		1155.21	1.63		
		1238.12	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		
		1661.27	1.05		
		1729.59	2.88		
		1764.49	15.30		
1847.43	2.03				
2118.51	1.16				
Pb-214	0.99	241.99	7.25		
		295.22 *	18.42	3.69E-01	7.29E-02
		351.93 *	35.60	4.94E-01	6.36E-02
Pb214-XR	0.99	785.96	1.06		
		74.82	5.80		
		77.11 *	9.70	1.25E+00	4.22E-01
		87.35	2.24		
Ac-228	0.99	89.78	0.82		
		129.07	2.42		
		209.25	3.89		
		270.24	3.46		
		328.00	2.95		
		338.32 *	11.27	4.87E-01	1.17E-01
		409.46	1.92		
		463.00	4.40		
		794.95	4.25		
		911.20 *	25.80	4.92E-01	7.48E-02
		964.77	4.99		
968.97 *	15.80	4.26E-01	1.02E-01		
1588.20	3.22				

Analysis Report for 02-Jul-19-10015  
L1-10209B-RIGS-006SB

\* = Energy line found in the spectrum.  
- = Manually added nuclide.  
? = Manually edited nuclide.  
@ = Energy line not used for Weighted Mean Activity  
Energy Tolerance : 1.000 keV  
Nuclide confidence index threshold = 0.30  
Errors quoted at 1.000sigma

## INTERFERENCE CORRECTED REPORT

<b>Nuclide Name</b>	<b>Nuclide Id Confidence</b>	<b>Wt mean Activity (pCi/grams)</b>	<b>Wt mean Activity Uncertainty</b>	<b>Comments</b>
K-40	0.970	1.05E+01	7.14E-01	
Tl-208	0.993	1.16E-01	2.30E-02	
Bi-212	0.979	4.20E-01	1.59E-01	
Pb-212	0.999	3.68E-01	4.84E-02	
? Pb212-XR	0.998	7.07E-01	2.37E-01	
Bi-214	0.996	4.04E-01	5.08E-02	
Pb-214	0.994	4.40E-01	4.79E-02	
? Pb214-XR	0.998	1.25E+00	4.22E-01	
Ac-228	0.992	4.73E-01	5.36E-02	

? = 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 1.000sigma

Analysis Report for 02-Jul-19-10015  
L1-10209B-RIGS-006SB

## UNIDENTIFIED PEAKS

Peak Locate Performed on : 7/2/2019 9:30:41AM  
Peak Locate From Channel : 120  
Peak Locate To Channel : 8192

Peak No.	Energy (keV)	Peak Size (CPS)	Peak CPS (%) Uncertainty	Peak Type	Tolerance Nuclide
All peaks were identified.					
M = First peak in a multiplet region					
m = Other peak in a multiplet region					
F = Fitted singlet					
Errors quoted at 1.000sigma					

## NUCLIDE MDA REPORT

Nuclide Library Used : C:\Canberra\Apex\Root\Default\Library\ZION LIB-BNL.NLB

Nuclide Name	Energy (keV)	Yield(%)	Activity (pCi/grams)	Nuclide MDA (pCi/grams)	Line MDA (pCi/grams)
An Pk	511.00	100.00	1.11E-01	7.31E-02	7.31E-02
BE-7	477.60	10.44	2.01E-01	5.10E-01	5.10E-01
+ K-40	1460.82	* 10.66	1.05E+01	4.97E-01	4.97E-01
Mn-54	834.85	99.98	-5.59E-03	5.96E-02	5.96E-02
Co-60	1173.23	99.85	-5.71E-03	6.26E-02	7.64E-02
	1332.49	99.98	-4.14E-02		6.26E-02
Nb-94	702.65	99.81	1.82E-02	5.69E-02	5.98E-02
	871.09	99.89	3.37E-02		5.69E-02
Ag-108m	79.13	6.60	-2.77E-01	5.89E-02	2.25E+00
	433.94	90.50	2.05E-02		5.89E-02
	614.28	89.80	-8.49E-03		9.92E-02
	722.94	90.80	-4.25E-02		6.63E-02
Sb-125	176.31	6.84	2.12E-01	1.78E-01	7.04E-01
	380.45	1.52	1.28E+00		3.18E+00
	427.87	29.60	-1.07E-01		1.78E-01
	463.36	10.49	1.21E-01		5.36E-01
	600.60	17.65	-1.33E-01		2.83E-01
	606.71	4.98	-5.98E-03		2.01E+00
	635.95	11.22	1.66E-01		4.91E-01

Analysis Report for 02-Jul-19-10015

L1-10209B-RIGS-006SB

<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Nuclide MDA (pCi/grams)</b>	<b>Line MDA (pCi/grams)</b>
Sb-125	671.44	1.79	-7.74E-01	1.78E-01	2.98E+00
Ba-133	79.61	2.65	-3.00E-01	1.16E-01	5.39E+00
	81.00	32.90	-1.54E-01		3.46E-01
	276.40	7.16	-2.24E-01		6.69E-01
	302.85	18.34	2.04E-02		2.50E-01
	356.01	62.05	-2.61E-02		1.16E-01
	383.85	8.94	-5.64E-01		4.72E-01
Cs-134	475.36	1.48	1.03E+00	6.74E-02	3.56E+00
	563.25	8.34	2.63E-01		6.14E-01
	569.33	15.37	2.38E-01		3.79E-01
	604.72	97.62	-3.99E-03		8.35E-02
	795.86	85.46	2.49E-02		6.74E-02
	801.95	8.69	-1.60E-01		6.19E-01
	1038.61	0.99	-4.28E+00		6.50E+00
	1167.97	1.79	-8.42E-02		4.36E+00
	1365.19	3.02	-9.88E-01		1.95E+00
Cs-137	661.66	85.10	1.63E-02	7.01E-02	7.01E-02
Eu-152	121.78	28.67	-3.24E-02	1.75E-01	1.91E-01
	244.70	7.61	1.38E-01		7.26E-01
	295.94	0.45	8.45E+00		1.38E+01
	344.28	26.60	-8.48E-02		1.75E-01
	367.79	0.86	-2.00E+00		5.49E+00
	411.12	2.24	6.30E-01		2.25E+00
	443.96	2.83	4.12E-01		1.68E+00
	488.68	0.42	-3.59E+00		1.12E+01
	563.99	0.49	-7.82E+00		9.97E+00
	586.26	0.46	-4.46E-01		1.74E+01
	678.62	0.47	1.40E+00		1.18E+01
	688.67	0.86	-4.49E+00		6.32E+00
	719.35	0.28	8.56E-01		1.76E+01
	778.90	12.96	-5.41E-01		4.44E-01
	810.45	0.32	1.73E+00		1.91E+01
	867.37	4.26	-1.64E+00		1.20E+00
	919.33	0.43	-2.02E+00		1.49E+01
	964.08	14.65	-2.66E-01		5.91E-01
	1085.87	10.24	-2.43E-01		6.68E-01
	1089.74	1.73	-4.00E-01		3.78E+00
	1112.07	13.69	1.67E-01		5.30E-01
	1212.95	1.43	-1.95E+00		6.15E+00
	1249.94	0.19	-2.99E+01		4.64E+01
	1299.14	1.63	2.49E+00		4.68E+00
	1408.01	21.07	2.54E-01		3.18E-01
	1457.64	0.50	2.22E+02		5.68E+01
	1528.10	0.28	7.45E+00		1.66E+01
Eu-154	123.07	40.40	-2.25E-02	1.33E-01	1.33E-01
	247.93	6.89	-3.03E-02		6.53E-01
	591.76	4.95	-3.45E-01		8.80E-01
	692.42	1.78	6.78E-01		3.50E+00
	723.30	20.06	-1.41E-01		3.10E-01
	756.80	4.52	5.07E-01		1.31E+00
	873.18	12.08	-4.81E-02		4.48E-01



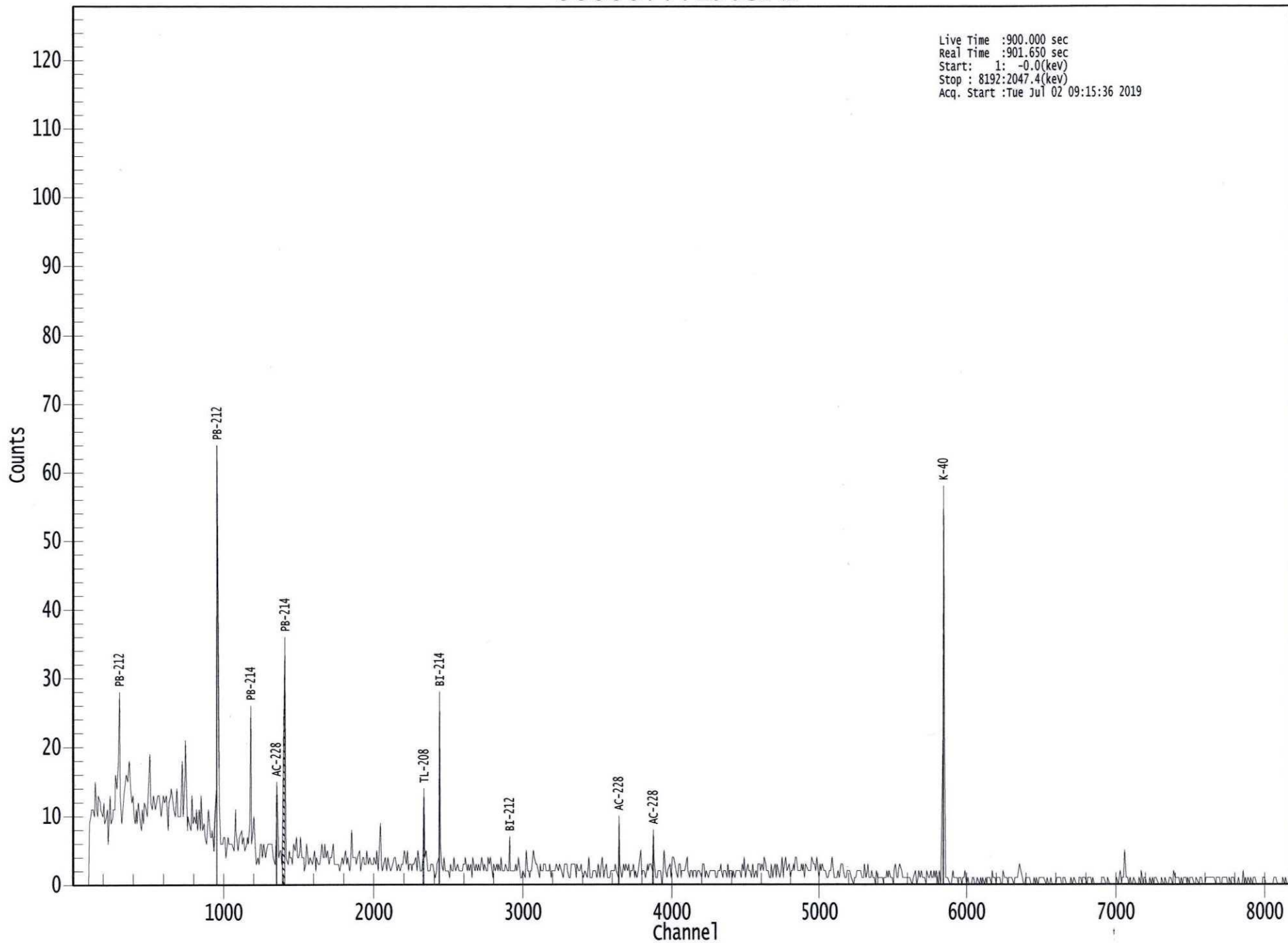
Analysis Report for 02-Jul-19-10015

L1-10209B-RIGS-006SB

<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Nuclide MDA (pCi/grams)</b>	<b>Line MDA (pCi/grams)</b>
Eu-154	996.29	10.48	-2.10E-01	1.33E-01	6.16E-01
	1004.76	18.01	2.43E-01		4.20E-01
	1274.43	34.80	-9.25E-02		2.22E-01
	1596.48	1.80	1.14E-01		3.60E+00
Eu-155	45.30	1.31	-9.43E+00	3.12E-01	3.95E+01
	60.01	1.22	-2.23E+01		3.43E+01
	86.55	30.70	1.42E-01		3.43E-01
	105.31	21.10	-1.25E-03		3.12E-01
Ra-226	186.21	3.64	8.15E-01	1.46E+00	1.46E+00
Pa-231	27.36	10.30	4.50E+00	1.95E+00	4.23E+00
	283.69	1.70	-8.64E-02		2.80E+00
	300.07	2.47	9.73E-01		1.95E+00
	302.65	2.20	1.01E-01		2.08E+00
	330.06	1.40	-4.08E-01		3.55E+00
	U-235	143.76	10.96		4.44E-02
U-235	163.33	5.08	-2.96E-01	9.35E-02	9.60E-01
	185.71	57.20	6.80E-02		9.35E-02
	202.11	1.08	-3.88E-01		4.38E+00
	205.31	5.01	-7.71E-01		9.40E-01
Am-241	59.54	35.90	-5.64E-01	1.26E+00	1.26E+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  
 ? = CAUTION: MDA value is inconsistent with Currie MDA at 95% confidence level

Live Time :900.000 sec  
Real Time :901.650 sec  
Start: 1: -0.0(keV)  
Stop : 8192:2047.4(keV)  
Acq. Start :Tue Jul 02 09:15:36 2019



ROI Type: 1

Analysis Report for 09-Aug-19-10020  
L1-10208C-RIGS-001SS

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## GAMMA SPECTRUM ANALYSIS

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Sample Identification : 09-Aug-19-10020  
Sample Description : L1-10208C-RIGS-001SS  
Sample Type : Soil  
Unit :  
Sample Point :  
  
Sample Size : 1.710E+03 grams  
Facility : Default  
  
Sample Taken On : 8/8/2019 1:40:00PM  
Acquisition Started : 8/9/2019 12:33:15PM  
  
Procedure : 130G\_SOIL\_1  
Operator : Administrator  
Detector Name : P40818B  
Geometry : 130G\_SOIL\_1  
Live Time : 900.0 seconds  
Real Time : 901.4 seconds  
  
Dead Time : 0.15 %  
  
Peak Locate Threshold : 3.00  
Peak Locate Range (in channels) : 120 - 8192  
Peak Area Range (in channels) : 120 - 8192  
Identification Energy Tolerance : 1.000 keV  
  
Energy Calibration Used Done On : 1/29/2019  
Efficiency Calibration Used Done On : 8/9/2019  
Efficiency Calibration Description :  
  
Sample Number : 78636  
Fill Height : 1710.39 gram  
Certificate Name : Eu155-Na22  
Certificate Date : 1/30/2012 12:00:00PM

*J.P. [Signature]*  
8-12-19

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## PEAK ANALYSIS REPORT

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Peak Analysis Performed on : 8/9/2019 12:48:19PM

Peak Analysis From Channel : 120  
Peak Analysis To Channel : 8192

*J.P. [Signature]*  
8-13-19

Analysis Report for 09-Aug-19-10020

L1-10208C-RIGS-001SS

Peak No.	Energy (keV)	ROI start	ROI end	Peak Centroid	Net Peak Area	Net Area Uncertainty	Continuum Counts	FWHM (keV)
1	77.08	305 -	314	309.05	2.88E+01	12.46	5.62E+01	0.35
2	238.65	946 -	960	954.69	1.65E+02	17.98	5.54E+01	0.68
3	295.19	1174 -	1188	1180.68	6.66E+01	13.66	4.14E+01	0.91
4	338.29	1347 -	1359	1352.94	2.59E+01	10.27	3.01E+01	0.94
5	351.85	1401 -	1413	1407.13	9.63E+01	12.49	2.28E+01	1.15
6	583.13	2325 -	2337	2331.74	4.83E+01	10.40	2.27E+01	0.70
7	609.19	2429 -	2443	2435.92	6.54E+01	9.98	1.16E+01	0.72
8	911.01	3637 -	3651	3643.02	4.11E+01	8.21	8.94E+00	1.13
9	1460.66	5832 -	5854	5842.47	2.82E+02	17.70	8.33E+00	1.61

M = First peak in a multiplet region

m = Other peak in a multiplet region

F = Fitted singlet

Errors quoted at 1.000sigma

No background subtract performed on this spectrum.

## NUCLIDE IDENTIFICATION REPORT

Nuclide Library Used : C:\Canberra\Apex\Root\Default\Library\ZION LIB-BNL.NLB

### IDENTIFIED NUCLIDES

Nuclide Name	Id Confidence	Energy (keV)	Yield(%)	Activity (pCi/grams)	Activity Uncertainty
K-40	0.99	1460.82 *	10.66	6.81E+00	5.21E-01
Tl-208	1.00	583.19 *	85.00	7.86E-02	1.76E-02
Pb-212	1.00	115.18	0.60		
		238.63 *	43.60	2.89E-01	3.93E-02
		300.09	3.30		
Pb212-XR	1.00	74.82	10.28		
		77.11 *	17.10	3.50E-01	1.56E-01
		87.35	3.97		

Analysis Report for 09-Aug-19-10020

L1-10208C-RIGS-001SS

<b>Nuclide Name</b>	<b>Id Confidence</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Activity Uncertainty</b>
Pb212-XR	1.00	89.78	1.46		
Bi-214	0.99	609.32 *	45.49	2.05E-01	3.36E-02
		768.36	4.89		
		806.18	1.26		
		934.06	3.11		
		1120.29	14.92		
		1155.21	1.63		
		1238.12	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		
		1661.27	1.05		
		1729.59	2.88		
		1764.49	15.30		
		1847.43	2.03		
		2118.51	1.16		
Pb-214	0.99	241.99	7.25		
		295.22 *	18.42	3.11E-01	6.85E-02
		351.93 *	35.60	2.64E-01	4.02E-02
		785.96	1.06		
Pb214-XR	1.00	74.82	5.80		
		77.11 *	9.70	6.17E-01	2.76E-01
		87.35	2.24		
		89.78	0.82		
Ac-228	0.99	129.07	2.42		
		209.25	3.89		
		270.24	3.46		
		328.00	2.95		
		338.32 *	11.27	2.18E-01	8.83E-02
		409.46	1.92		
		463.00	4.40		
		794.95	4.25		
		911.20 *	25.80	2.98E-01	6.09E-02
		964.77	4.99		
		968.97	15.80		
		1588.20	3.22		

\* = Energy line found in the spectrum.

- = Manually added nuclide.

? = Manually edited nuclide.

@ = Energy line not used for Weighted Mean Activity

Energy Tolerance : 1.000 keV

Nuclide confidence index threshold = 0.30

Errors quoted at 1.000sigma

Analysis Report for 09-Aug-19-10020

L1-10208C-RIGS-001SS

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## INTERFERENCE CORRECTED REPORT

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<b>Nuclide Name</b>	<b>Nuclide Id Confidence</b>	<b>Wt mean Activity (pCi/grams)</b>	<b>Wt mean Activity Uncertainty</b>	<b>Comments</b>
	K-40 0.996	6.81E+00	5.21E-01	
	Tl-208 1.000	7.86E-02	1.76E-02	
X	Bi-211 0.908			
	Pb-212 1.000	2.89E-01	3.93E-02	
?	Pb212-XR 1.000	3.50E-01	1.56E-01	
	Bi-214 0.999	2.05E-01	3.36E-02	
	Pb-214 0.999	2.76E-01	3.47E-02	
?	Pb214-XR 1.000	6.17E-01	2.76E-01	
	Ac-228 0.998	2.72E-01	5.01E-02	

? = 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 1.000sigma

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Analysis Report for 09-Aug-19-10020  
L1-10208C-RIGS-001SS

## UNIDENTIFIED PEAKS

Peak Locate Performed on : 8/9/2019 12:48:19PM  
Peak Locate From Channel : 120  
Peak Locate To Channel : 8192

Peak No.	Energy (keV)	Peak Size (CPS)	Peak CPS (%) Uncertainty	Peak Type	Tolerance Nuclide
All peaks were identified.					
M = First peak in a multiplet region					
m = Other peak in a multiplet region					
F = Fitted singlet					
Errors quoted at 1.000sigma					

## NUCLIDE MDA REPORT

Nuclide Library Used : C:\Canberra\Apex\Root\Default\Library\ZION LIB-BNL.NLB

	Nuclide Name	Energy (keV)	Yield(%)	Activity (pCi/grams)	Nuclide MDA (pCi/grams)	Line MDA (pCi/grams)
	An Pk	511.00	100.00	3.69E-02	5.58E-02	5.58E-02
	BE-7	477.60	10.44	1.99E-01	4.39E-01	4.39E-01
+	K-40	1460.82	* 10.66	6.81E+00	5.32E-01	5.32E-01
	Mn-54	834.85	99.98	1.89E-02	5.59E-02	5.59E-02
	Co-60	1173.23	99.85	5.54E-03	5.16E-02	6.16E-02
		1332.49	99.98	-1.16E-02		5.16E-02
	Nb-94	702.65	99.81	3.22E-02	5.23E-02	5.23E-02
		871.09	99.89	1.48E-02		5.52E-02
	Ag-108m	79.13	6.60	-2.51E-01	4.42E-02	1.73E+00
		433.94	90.50	-8.45E-03		4.42E-02
		614.28	89.80	-1.59E-02		6.35E-02
		722.94	90.80	5.77E-02		6.05E-02
	Sb-125	176.31	6.84	2.85E-01	1.37E-01	5.99E-01
		380.45	1.52	2.02E-01		2.66E+00
		427.87	29.60	3.31E-03		1.37E-01
		463.36	10.49	3.66E-01		4.89E-01
		600.60	17.65	-1.26E-01		2.44E-01
		606.71	4.98	2.23E+00		1.46E+00
		635.95	11.22	-2.20E-01		3.64E-01

Analysis Report for 09-Aug-19-10020

L1-10208C-RIGS-001SS

<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Nuclide MDA (pCi/grams)</b>	<b>Line MDA (pCi/grams)</b>
Sb-125	671.44	1.79	-2.01E+00	1.37E-01	2.12E+00
Ba-133	79.61	2.65	-1.90E+00	7.87E-02	4.15E+00
	81.00	32.90	-3.38E-01		2.86E-01
	276.40	7.16	4.13E-02		5.61E-01
	302.85	18.34	7.15E-02		2.33E-01
	356.01	62.05	-5.09E-02		7.87E-02
	383.85	8.94	-8.43E-02		4.76E-01
Cs-134	475.36	1.48	1.44E+00	5.37E-02	2.97E+00
	563.25	8.34	-7.59E-02		5.01E-01
	569.33	15.37	6.96E-02		2.63E-01
	604.72	97.62	-1.47E-02		6.85E-02
	795.86	85.46	2.60E-04		5.37E-02
	801.95	8.69	2.00E-02		4.91E-01
	1038.61	0.99	-1.91E-01		5.02E+00
	1167.97	1.79	-2.49E+00		3.13E+00
	1365.19	3.02	5.81E-02		1.69E+00
Cs-137	661.66	85.10	2.04E-02	5.69E-02	5.69E-02
Eu-152	121.78	28.67	-6.42E-02	1.42E-01	1.58E-01
	244.70	7.61	3.02E-01		5.94E-01
	295.94	0.45	1.61E+01		1.18E+01
	344.28	26.60	1.19E-02		1.42E-01
	367.79	0.86	2.17E+00		4.68E+00
	411.12	2.24	5.86E-01		1.90E+00
	443.96	2.83	9.99E-01		1.49E+00
	488.68	0.42	3.93E+00		9.37E+00
	563.99	0.49	4.05E+00		8.39E+00
	586.26	0.46	-8.38E+00		1.51E+01
	678.62	0.47	-4.03E+00		8.89E+00
	688.67	0.86	-4.31E+00		5.64E+00
	719.35	0.28	5.76E-01		1.83E+01
	778.90	12.96	-1.14E-01		3.29E-01
	810.45	0.32	-6.95E+00		1.28E+01
	867.37	4.26	-6.37E-01		1.12E+00
	919.33	0.43	5.19E+00		1.26E+01
	964.08	14.65	2.73E-01		4.79E-01
	1085.87	10.24	2.21E-01		5.71E-01
	1089.74	1.73	-6.53E-01		3.39E+00
	1112.07	13.69	4.53E-02		4.27E-01
	1212.95	1.43	1.19E+00		4.76E+00
	1249.94	0.19	3.64E+00		3.76E+01
	1299.14	1.63	-1.23E+00		3.84E+00
	1408.01	21.07	1.19E-01		2.15E-01
	1457.64	0.50	1.40E+02		4.35E+01
	1528.10	0.28	-1.02E+01		1.06E+01
Eu-154	123.07	40.40	-4.35E-02	1.12E-01	1.12E-01
	247.93	6.89	-1.88E-01		5.46E-01
	591.76	4.95	4.17E-01		9.28E-01
	692.42	1.78	1.19E-01		3.01E+00
	723.30	20.06	-7.43E-02		2.59E-01
	756.80	4.52	-9.81E-02		1.02E+00
	873.18	12.08	-2.30E-02		4.57E-01



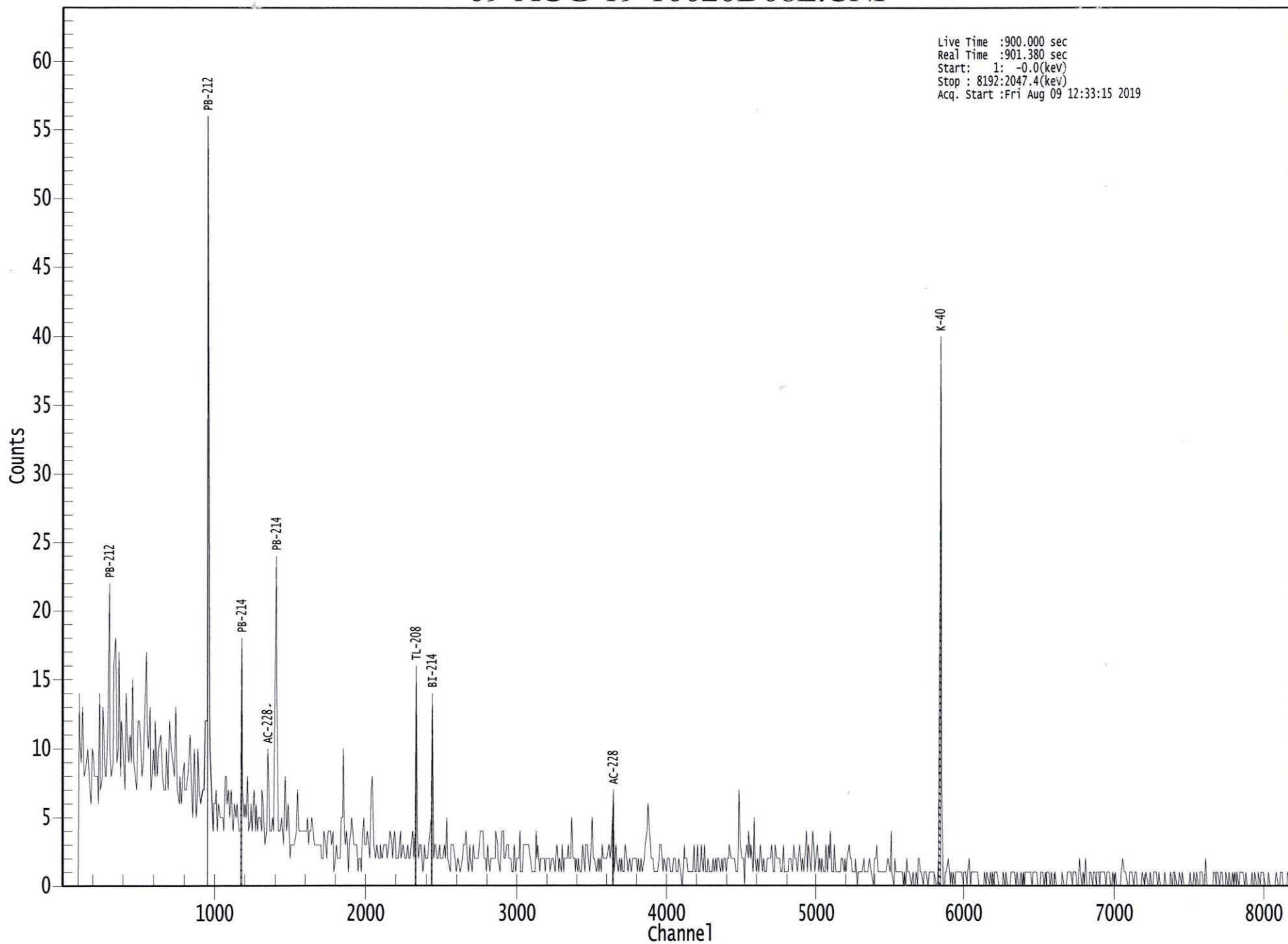
Analysis Report for 09-Aug-19-10020

L1-10208C-RIGS-001SS

<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Nuclide MDA (pCi/grams)</b>	<b>Line MDA (pCi/grams)</b>
Eu-154	996.29	10.48	-4.67E-02	1.12E-01	5.10E-01
	1004.76	18.01	-9.66E-02		2.70E-01
	1274.43	34.80	-2.70E-02		1.70E-01
	1596.48	1.80	-1.02E+00		1.72E+00
Eu-155	45.30	1.31	1.40E+01	3.03E-01	3.30E+01
	60.01	1.22	-9.11E+00		3.35E+01
	86.55	30.70	1.14E-01		3.03E-01
	105.31	21.10	2.29E-01		3.07E-01
Ra-226	186.21	3.64	1.14E+00	1.17E+00	1.17E+00
Pa-231	27.36	10.30	3.60E+00	1.68E+00	3.77E+00
	283.69	1.70	-1.42E+00		2.12E+00
	300.07	2.47	-9.37E-01		1.68E+00
	302.65	2.20	6.97E-01		1.93E+00
	330.06	1.40	1.17E+00		2.86E+00
U-235	143.76	10.96	-1.01E-04	7.53E-02	4.11E-01
	163.33	5.08	7.46E-02		8.13E-01
	185.71	57.20	7.54E-02		7.53E-02
	202.11	1.08	-6.35E-01		3.51E+00
	205.31	5.01	1.11E-01		8.13E-01
Am-241	59.54	35.90	2.43E-01	1.23E+00	1.23E+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  
 ? = CAUTION: MDA value is inconsistent with Currie MDA at 95% confidence level

09-AUG-19-10020D08E.CNF



ROI Type: 1

Analysis Report for 08-Aug-19-10010  
L1-10208B-RIGS-001SS

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## GAMMA SPECTRUM ANALYSIS

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Sample Identification : 08-Aug-19-10010  
Sample Description : L1-10208B-RIGS-001SS  
Sample Type : Soil  
Unit :  
Sample Point :  
  
Sample Size : 1.236E+03 grams  
Facility : Default  
  
Sample Taken On : 8/7/2019 9:30:00AM  
Acquisition Started : 8/8/2019 9:59:18AM  
  
Procedure : 130G\_SOIL\_1  
Operator : Administrator  
Detector Name : 352  
Geometry : 130G\_SOIL\_1  
Live Time : 900.0 seconds  
Real Time : 900.3 seconds  
  
Dead Time : 0.04 %  
  
Peak Locate Threshold : 3.00  
Peak Locate Range (in channels) : 120 - 8192  
Peak Area Range (in channels) : 120 - 8192  
Identification Energy Tolerance : 1.000 keV  
  
Energy Calibration Used Done On : 9/29/2018  
Efficiency Calibration Used Done On : 8/8/2019  
Efficiency Calibration Description :  
  
Sample Number : 78595  
Fill Height : 1236.17 gram  
Certificate Name : Eu155-Na22  
Certificate Date : 1/7/2013 12:00:00PM

*J. M. [Signature]*  
8-8-19

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## PEAK ANALYSIS REPORT

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Peak Analysis Performed on : 8/8/2019 10:14:27AM  
Peak Analysis From Channel : 120  
Peak Analysis To Channel : 8192

*J. M. [Signature]*  
1430 8-13-19

Analysis Report for 08-Aug-19-10010

L1-10208B-RIGS-001SS

Peak No.	Energy (keV)	ROI start	ROI end	Peak Centroid	Net Peak Area	Net Area Uncertainty	Continuum Counts	FWHM (keV)
1	77.13	306 -	315	309.82	4.25E+01	13.90	6.65E+01	0.88
2	238.60	949 -	963	954.86	2.12E+02	21.40	8.06E+01	1.22
3	295.22	1172 -	1185	1181.12	6.27E+01	12.84	3.73E+01	0.89
4	351.96	1399 -	1413	1407.82	1.12E+02	14.54	3.47E+01	1.46
5	583.16	2325 -	2338	2331.94	5.40E+01	9.94	1.60E+01	0.79
6	609.30	2428 -	2445	2436.48	1.09E+02	12.52	1.48E+01	1.03
7	661.65	2639 -	2652	2645.80	4.64E+01	9.46	1.56E+01	0.99
8	911.10	3636 -	3650	3643.42	4.24E+01	10.39	2.26E+01	0.85
9	969.17	3869 -	3882	3875.76	3.38E+01	8.21	1.22E+01	0.36
10	1460.67	5830 -	5854	5843.06	3.75E+02	20.64	1.25E+01	2.10

M = First peak in a multiplet region  
m = Other peak in a multiplet region  
F = Fitted singlet  
Errors quoted at 1.000sigma

No background subtract performed on this spectrum.

## NUCLIDE IDENTIFICATION REPORT

Nuclide Library Used : C:\Canberra\Apex\Root\Default\Library\ZION LIB-BNL.NLB

### IDENTIFIED NUCLIDES

Nuclide Name	Id Confidence	Energy (keV)	Yield(%)	Activity (pCi/grams)	Activity Uncertainty
K-40	0.99	1460.82 *	10.66	8.41E+00	5.90E-01
Cs-137	1.00	661.66 *	85.10	7.66E-02	1.63E-02
Tl-208	1.00	583.19 *	85.00	8.20E-02	1.59E-02
Pb-212	1.00	115.18	0.60		
		238.63 *	43.60	3.49E-01	4.51E-02
		300.09	3.30		
Pb212-XR	1.00	74.82	10.28		

Analysis Report for 08-Aug-19-10010

L1-10208B-RIGS-001SS

<b>Nuclide Name</b>	<b>Id Confidence</b>	<b>Energy (keV)</b>		<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Activity Uncertainty</b>
Pb212-XR	1.00	77.11	*	17.10	4.09E-01	1.40E-01
		87.35		3.97		
		89.78		1.46		
Bi-214	1.00	609.32	*	45.49	3.19E-01	4.12E-02
		768.36		4.89		
		806.18		1.26		
		934.06		3.11		
		1120.29		14.92		
		1155.21		1.63		
		1238.12		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		
		1661.27		1.05		
		1729.59		2.88		
		1764.49		15.30		
		1847.43		2.03		
		2118.51		1.16		
Pb-214	1.00	241.99		7.25		
		295.22	*	18.42	2.75E-01	6.03E-02
		351.93	*	35.60	2.88E-01	4.39E-02
		785.96		1.06		
Pb214-XR	1.00	74.82		5.80		
		77.11	*	9.70	7.21E-01	2.49E-01
		87.35		2.24		
		89.78		0.82		
Ac-228	0.99	129.07		2.42		
		209.25		3.89		
		270.24		3.46		
		328.00		2.95		
		338.32		11.27		
		409.46		1.92		
		463.00		4.40		
		794.95		4.25		
		911.20	*	25.80	2.85E-01	7.11E-02
		964.77		4.99		
		968.97	*	15.80	3.87E-01	9.56E-02
		1588.20		3.22		

\* = Energy line found in the spectrum.

- = Manually added nuclide.

? = Manually edited nuclide.

@ = Energy line not used for Weighted Mean Activity

Energy Tolerance : 1.000 keV

Nuclide confidence index threshold = 0.30

Errors quoted at 1.000sigma

Analysis Report for 08-Aug-19-10010  
L1-10208B-RIGS-001SS

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## INTERFERENCE CORRECTED REPORT

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<b>Nuclide Name</b>	<b>Nuclide Id Confidence</b>	<b>Wt mean Activity (pCi/grams)</b>	<b>Wt mean Activity Uncertainty</b>	<b>Comments</b>
K-40	0.996	8.41E+00	5.90E-01	
Cs-137	1.000	7.66E-02	1.63E-02	
Tl-208	1.000	8.20E-02	1.59E-02	
X Bi-211	0.882			
Pb-212	1.000	3.49E-01	4.51E-02	
? Pb212-XR	1.000	4.09E-01	1.40E-01	
Bi-214	1.000	3.19E-01	4.12E-02	
Pb-214	1.000	2.83E-01	3.55E-02	
? Pb214-XR	1.000	7.21E-01	2.49E-01	
Ac-228	0.998	3.22E-01	5.71E-02	

- ? = 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 1.000sigma

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Analysis Report for 08-Aug-19-10010

L1-10208B-RIGS-001SS

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**UNIDENTIFIED PEAKS**


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Peak Locate Performed on : 8/8/2019 10:14:27AM  
 Peak Locate From Channel : 120  
 Peak Locate To Channel : 8192

Peak No.	Energy (keV)	Peak Size (CPS)	Peak CPS (%) Uncertainty	Peak Type	Tolerance Nuclide
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All peaks were identified.

M = First peak in a multiplet region  
 m = Other peak in a multiplet region  
 F = Fitted singlet  
 Errors quoted at 1.000sigma

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**NUCLIDE MDA REPORT**


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Nuclide Library Used : C:\Canberra\Apex\Root\Default\Library\ZION LIB-BNL.NLB

Nuclide Name	Energy (keV)	Yield(%)	Activity (pCi/grams)	Nuclide MDA (pCi/grams)	Line MDA (pCi/grams)
An Pk	511.00	100.00	6.39E-02	6.08E-02	6.08E-02
BE-7	477.60	10.44	-6.41E-02	4.24E-01	4.24E-01
+ K-40	1460.82	* 10.66	8.41E+00	6.11E-01	6.11E-01
Mn-54	834.85	99.98	-6.28E-03	6.26E-02	6.26E-02
Co-60	1173.23	99.85	-1.97E-02	6.21E-02	7.21E-02
	1332.49	99.98	-4.89E-02		6.21E-02
Nb-94	702.65	99.81	-3.08E-02	5.06E-02	5.58E-02
	871.09	99.89	-8.01E-03		5.06E-02
Ag-108m	79.13	6.60	1.00E+00	4.92E-02	1.64E+00
	433.94	90.50	-4.61E-02		4.92E-02
	614.28	89.80	-2.47E-02		8.56E-02
	722.94	90.80	2.04E-02		6.66E-02
Sb-125	176.31	6.84	-5.67E-01	1.51E-01	5.17E-01
	380.45	1.52	4.61E-01		2.49E+00
	427.87	29.60	-6.63E-02		1.51E-01
	463.36	10.49	2.13E-01		4.47E-01
	600.60	17.65	-4.10E-02		2.89E-01
	606.71	4.98	2.71E+00		1.64E+00
	635.95	11.22	2.09E-01		3.95E-01

Analysis Report for 08-Aug-19-10010

L1-10208B-RIGS-001SS

<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Nuclide MDA (pCi/grams)</b>	<b>Line MDA (pCi/grams)</b>
Sb-125	671.44	1.79	-3.98E-01	1.51E-01	2.44E+00
Ba-133	79.61	2.65	-6.71E-01	8.91E-02	4.01E+00
	81.00	32.90	-1.22E-01		2.65E-01
	276.40	7.16	-5.07E-01		5.47E-01
	302.85	18.34	1.08E-01		2.28E-01
	356.01	62.05	-1.40E-01		8.91E-02
	383.85	8.94	1.55E-02		4.28E-01
Cs-134	475.36	1.48	-7.79E-01	6.31E-02	2.93E+00
	563.25	8.34	-1.89E-02		5.56E-01
	569.33	15.37	1.57E-01		2.77E-01
	604.72	97.62	-2.63E-02		7.88E-02
	795.86	85.46	-1.55E-02		6.31E-02
	801.95	8.69	-1.48E-01		6.63E-01
	1038.61	0.99	1.50E+00		5.91E+00
	1167.97	1.79	1.87E+00		3.93E+00
	1365.19	3.02	9.06E-01		1.80E+00
+ Cs-137	661.66	* 85.10	7.66E-02	4.15E-02	4.15E-02
Eu-152	121.78	28.67	-2.92E-02	1.42E-01	1.63E-01
	244.70	7.61	-3.19E-01		5.71E-01
	295.94	0.45	1.25E+01		1.15E+01
	344.28	26.60	-9.95E-03		1.42E-01
	367.79	0.86	-5.56E+00		4.41E+00
	411.12	2.24	1.02E+00		1.90E+00
	443.96	2.83	-1.08E+00		1.47E+00
	488.68	0.42	8.68E-01		1.00E+01
	563.99	0.49	-4.34E-01		9.36E+00
	586.26	0.46	6.46E+00		1.40E+01
	678.62	0.47	8.21E-01		9.69E+00
	688.67	0.86	-2.04E-01		5.44E+00
	719.35	0.28	-2.05E+01		1.75E+01
	778.90	12.96	-2.92E-01		3.52E-01
	810.45	0.32	6.15E+00		1.66E+01
	867.37	4.26	-3.73E-01		1.22E+00
	919.33	0.43	-1.16E+01		1.28E+01
	964.08	14.65	3.01E-01		5.71E-01
	1085.87	10.24	1.46E-01		6.61E-01
	1089.74	1.73	-9.93E-01		3.84E+00
	1112.07	13.69	-7.06E-01		5.02E-01
	1212.95	1.43	2.41E-01		5.11E+00
	1249.94	0.19	3.19E+01		3.89E+01
	1299.14	1.63	2.13E+00		3.94E+00
	1408.01	21.07	7.87E-02		2.75E-01
	1457.64	0.50	1.88E+02		4.67E+01
	1528.10	0.28	5.27E+00		1.28E+01
Eu-154	123.07	40.40	5.48E-02	1.17E-01	1.17E-01
	247.93	6.89	-1.39E-02		5.65E-01
	591.76	4.95	-2.64E-01		1.04E+00
	692.42	1.78	7.53E-01		2.79E+00
	723.30	20.06	6.52E-02		3.04E-01
	756.80	4.52	4.98E-01		1.17E+00
	873.18	12.08	2.17E-01		4.13E-01



Analysis Report for 08-Aug-19-10010

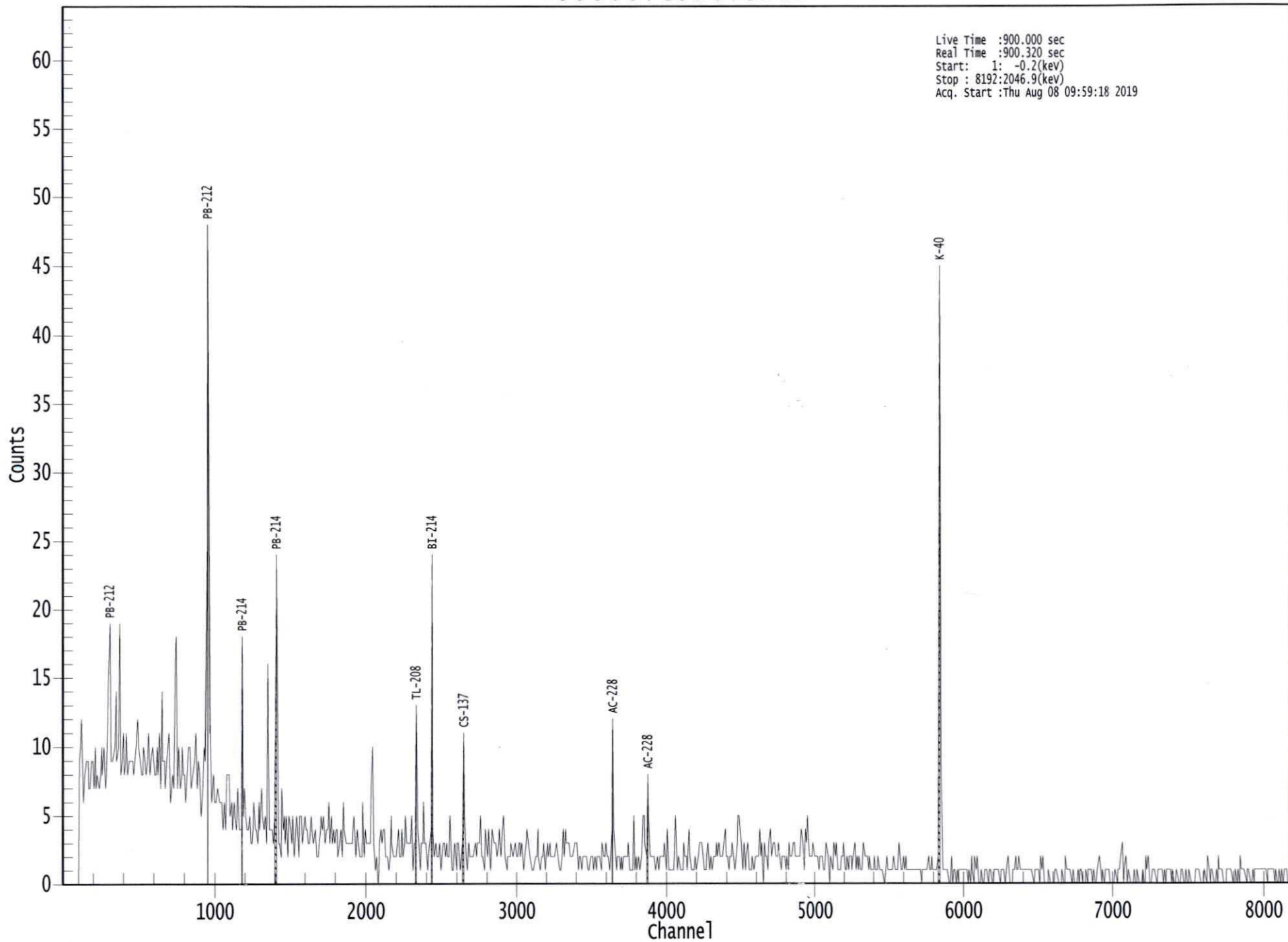
L1-10208B-RIGS-001SS

<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Nuclide MDA (pCi/grams)</b>	<b>Line MDA (pCi/grams)</b>
Eu-154	996.29	10.48	1.83E-01	1.17E-01	5.64E-01
	1004.76	18.01	-9.78E-02		2.72E-01
	1274.43	34.80	3.57E-02		1.70E-01
	1596.48	1.80	-3.30E+00		2.68E+00
Eu-155	45.30	1.31	-1.54E+01	2.49E-01	2.23E+01
	60.01	1.22	-2.27E+01		2.29E+01
	86.55	30.70	-2.12E-02		2.49E-01
	105.31	21.10	2.26E-02		2.60E-01
Ra-226	186.21	3.64	7.32E-01	1.24E+00	1.24E+00
Pa-231	27.36	10.30	1.06E+00	1.74E+00	2.50E+00
	283.69	1.70	-1.09E+00		2.24E+00
	300.07	2.47	-1.98E+00		1.74E+00
	302.65	2.20	5.06E-01		1.90E+00
	330.06	1.40	1.88E+00		2.95E+00
U-235	143.76	10.96	-1.06E-01	7.86E-02	4.04E-01
	163.33	5.08	-4.21E-01		7.33E-01
	185.71	57.20	8.61E-02		7.86E-02
	202.11	1.08	-8.22E-01		3.82E+00
	205.31	5.01	-5.30E-01		8.15E-01
Am-241	59.54	35.90	-4.51E-01	8.14E-01	8.14E-01

- + = 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  
 ? = CAUTION: MDA value is inconsistent with Currie MDA at 95% confidence level

000078595.CNF

Live Time :900.000 sec  
Real Time :900.320 sec  
Start: 1: -0.2(keV)  
Stop : 8192:2046.9(keV)  
Acq. Start :Thu Aug 08 09:59:18 2019



ROI Type: 1

Analysis Report for 08-Aug-19-10011  
L1-10208B-RIGS-002SS

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## GAMMA SPECTRUM ANALYSIS

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Sample Identification : 08-Aug-19-10011  
Sample Description : L1-10208B-RIGS-002SS  
Sample Type : Soil  
Unit :  
Sample Point :  
  
Sample Size : 1.043E+03 grams  
Facility : Default  
  
Sample Taken On : 8/7/2019 9:35:00AM  
Acquisition Started : 8/8/2019 10:16:41AM  
  
Procedure : 130G\_SOIL\_1  
Operator : Administrator  
Detector Name : 352  
Geometry : 130G\_SOIL\_1  
Live Time : 900.0 seconds  
Real Time : 900.3 seconds  
  
Dead Time : 0.03 %  
  
Peak Locate Threshold : 3.00  
Peak Locate Range (in channels) : 120 - 8192  
Peak Area Range (in channels) : 120 - 8192  
Identification Energy Tolerance : 1.000 keV  
  
Energy Calibration Used Done On : 9/29/2018  
Efficiency Calibration Used Done On : 8/8/2019  
Efficiency Calibration Description :  
  
Sample Number : 78596  
Fill Height : 1042.88 gram  
Certificate Name : Eu155-Na22  
Certificate Date : 1/7/2013 12:00:00PM

*AP. M. S. L.*  
8-8-19

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## PEAK ANALYSIS REPORT

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Peak Analysis Performed on : 8/8/2019 10:31:44AM  
Peak Analysis From Channel : 120  
Peak Analysis To Channel : 8192

*JMK*  
8-13-19

Analysis Report for 08-Aug-19-10011

L1-10208B-RIGS-002SS

Peak No.	Energy (keV)	ROI start	ROI end	Peak Centroid	Net Peak Area	Net Area Uncertainty	Continuum Counts	FWHM (keV)
1	238.60	949 -	961	954.86	1.50E+02	18.81	7.69E+01	0.59
2	295.21	1174 -	1188	1181.06	6.38E+01	13.52	4.13E+01	1.42
3	338.38	1347 -	1359	1353.55	4.47E+01	10.42	2.43E+01	0.43
4	351.85	1402 -	1414	1407.38	1.04E+02	12.71	2.21E+01	1.03
5	583.13	2327 -	2338	2331.85	5.55E+01	9.40	1.25E+01	0.54
6	609.21	2427 -	2446	2436.13	9.70E+01	10.70	5.00E+00	1.60
7	661.57	2638 -	2652	2645.45	5.73E+01	8.59	5.69E+00	1.10
8	911.32	3636 -	3651	3644.33	5.44E+01	9.13	9.65E+00	0.96
9	969.25	3871 -	3882	3876.06	1.83E+01	6.20	7.75E+00	0.34
10	1460.61	5831 -	5854	5842.79	3.42E+02	20.01	1.47E+01	1.59

M = First peak in a multiplet region  
m = Other peak in a multiplet region  
F = Fitted singlet  
Errors quoted at 1.000sigma

No background subtract performed on this spectrum.

## NUCLIDE IDENTIFICATION REPORT

Nuclide Library Used : C:\Camberra\Apex\Root\Default\Library\ZION LIB-BNL.NLB

### IDENTIFIED NUCLIDES

Nuclide Name	Id Confidence	Energy (keV)	Yield(%)	Activity (pCi/grams)	Activity Uncertainty
K-40	0.99	1460.82 *	10.66	8.28E+00	6.03E-01
Cs-137	0.99	661.66 *	85.10	1.01E-01	1.63E-02
Tl-208	1.00	583.19 *	85.00	8.99E-02	1.62E-02
Pb-212	1.00	115.18	0.60		
		238.63 *	43.60	2.61E-01	3.90E-02
		300.09	3.30		
Bi-214	0.99	609.32 *	45.49	3.02E-01	3.80E-02

Analysis Report for 08-Aug-19-10011

L1-10208B-RIGS-002SS

<b>Nuclide Name</b>	<b>Id Confidence</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Activity Uncertainty</b>
Bi-214	0.99	768.36	4.89		
		806.18	1.26		
		934.06	3.11		
		1120.29	14.92		
		1155.21	1.63		
		1238.12	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		
		1661.27	1.05		
		1729.59	2.88		
		1764.49	15.30		
		1847.43	2.03		
Pb-214	0.99	2118.51	1.16		
		241.99	7.25		
		295.22 *	18.42	2.96E-01	6.71E-02
Ac-228	0.99	351.93 *	35.60	2.83E-01	4.14E-02
		785.96	1.06		
		129.07	2.42		
		209.25	3.89		
		270.24	3.46		
		328.00	2.95		
		338.32 *	11.27	3.74E-01	9.24E-02
		409.46	1.92		
		463.00	4.40		
		794.95	4.25		
911.20 *	25.80	3.93E-01	6.81E-02		
964.77	4.99				
968.97 *	15.80	2.24E-01	7.69E-02		
1588.20	3.22				

\* = Energy line found in the spectrum.

- = Manually added nuclide.

? = Manually edited nuclide.

@ = Energy line not used for Weighted Mean Activity

Energy Tolerance : 1.000 keV

Nuclide confidence index threshold = 0.30

Errors quoted at 1.000sigma

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**INTERFERENCE CORRECTED REPORT**

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Analysis Report for 08-Aug-19-10011

L1-10208B-RIGS-002SS

<b>Nuclide Name</b>	<b>Nuclide Id Confidence</b>	<b>Wt mean Activity (pCi/grams)</b>	<b>Wt mean Activity Uncertainty</b>	<b>Comments</b>
K-40	0.993	8.28E+00	6.03E-01	
Cs-137	0.999	1.01E-01	1.63E-02	
Tl-208	1.000	8.99E-02	1.62E-02	
X Bi-211	0.908			
Pb-212	1.000	2.61E-01	3.90E-02	
Bi-214	0.999	3.02E-01	3.80E-02	
Pb-214	0.999	2.87E-01	3.52E-02	
Ac-228	0.997	3.32E-01	4.46E-02	

? = 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 1.000sigma

Analysis Report for 08-Aug-19-10011  
L1-10208B-RIGS-002SS

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## UNIDENTIFIED PEAKS

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Peak Locate Performed on : 8/8/2019 10:31:44AM  
Peak Locate From Channel : 120  
Peak Locate To Channel : 8192

Peak No.	Energy (keV)	Peak Size (CPS)	Peak CPS (%) Uncertainty	Peak Type	Tolerance Nuclide
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All peaks were identified.

M = First peak in a multiplet region  
m = Other peak in a multiplet region  
F = Fitted singlet  
Errors quoted at 1.000sigma

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## NUCLIDE MDA REPORT

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Nuclide Library Used : C:\Canberra\Apex\Root\Default\Library\ZION LIB-BNL.NLB

Nuclide Name	Energy (keV)	Yield(%)	Activity (pCi/grams)	Nuclide MDA (pCi/grams)	Line MDA (pCi/grams)
An Pk	511.00	100.00	2.83E-02	6.14E-02	6.14E-02
BE-7	477.60	10.44	3.26E-01	4.60E-01	4.60E-01
+ K-40	1460.82	* 10.66	8.28E+00	6.95E-01	6.95E-01
Mn-54	834.85	99.98	4.44E-02	5.63E-02	5.63E-02
Co-60	1173.23	99.85	4.35E-02	5.16E-02	7.90E-02
	1332.49	99.98	-1.78E-02		5.16E-02
Nb-94	702.65	99.81	1.83E-02	5.10E-02	5.14E-02
	871.09	99.89	-3.77E-02		5.10E-02
Ag-108m	79.13	6.60	-2.43E-01	5.09E-02	1.71E+00
	433.94	90.50	-2.52E-02		5.09E-02
	614.28	89.80	1.11E-02		8.23E-02
	722.94	90.80	3.62E-02		6.80E-02
Sb-125	176.31	6.84	4.92E-01	1.53E-01	5.48E-01
	380.45	1.52	-1.38E+00		2.58E+00
	427.87	29.60	5.17E-02		1.53E-01
	463.36	10.49	2.04E-01		4.56E-01
	600.60	17.65	2.29E-01		2.90E-01
	606.71	4.98	2.15E+00		1.61E+00
	635.95	11.22	2.37E-01		4.17E-01

Analysis Report for 08-Aug-19-10011

L1-10208B-RIGS-002SS

<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Nuclide MDA (pCi/grams)</b>	<b>Line MDA (pCi/grams)</b>
Sb-125	671.44	1.79	1.80E+00	1.53E-01	2.75E+00
Ba-133	79.61	2.65	1.49E+00	8.78E-02	4.18E+00
	81.00	32.90	-5.09E-01		2.84E-01
	276.40	7.16	-2.62E-01		5.60E-01
	302.85	18.34	-2.47E-02		2.08E-01
	356.01	62.05	-3.85E-03		8.78E-02
	383.85	8.94	-5.37E-01		4.01E-01
Cs-134	475.36	1.48	2.04E+00	6.05E-02	3.12E+00
	563.25	8.34	-2.02E-02		5.11E-01
	569.33	15.37	8.72E-02		2.90E-01
	604.72	97.62	7.08E-03		7.59E-02
	795.86	85.46	1.89E-02		6.05E-02
	801.95	8.69	-6.13E-01		6.07E-01
	1038.61	0.99	2.09E+00		5.91E+00
	1167.97	1.79	4.58E+00		4.57E+00
	1365.19	3.02	7.72E-02		1.47E+00
+ Cs-137	661.66	* 85.10	1.01E-01	2.94E-02	2.94E-02
Eu-152	121.78	28.67	-4.68E-02	1.52E-01	1.52E-01
	244.70	7.61	2.69E-01		6.05E-01
	295.94	0.45	1.32E+01		1.20E+01
	344.28	26.60	-1.42E-01		1.55E-01
	367.79	0.86	7.86E-01		4.97E+00
	411.12	2.24	-5.11E-01		2.21E+00
	443.96	2.83	-1.94E+00		1.49E+00
	488.68	0.42	4.95E+00		9.97E+00
	563.99	0.49	-3.31E+00		8.46E+00
	586.26	0.46	1.41E+01		1.44E+01
	678.62	0.47	-5.22E-02		9.57E+00
	688.67	0.86	4.58E-01		4.27E+00
	719.35	0.28	-4.96E+00		1.93E+01
	778.90	12.96	-3.66E-01		4.09E-01
	810.45	0.32	1.03E+01		1.58E+01
	867.37	4.26	-2.03E+00		1.13E+00
	919.33	0.43	-2.30E+01		1.20E+01
	964.08	14.65	-2.55E-01		5.21E-01
	1085.87	10.24	9.61E-02		6.48E-01
	1089.74	1.73	1.13E+00		3.69E+00
	1112.07	13.69	-8.15E-02		5.40E-01
	1212.95	1.43	-2.99E+00		5.49E+00
	1249.94	0.19	-3.31E+01		3.71E+01
	1299.14	1.63	-1.56E+00		3.12E+00
	1408.01	21.07	3.27E-02		2.70E-01
	1457.64	0.50	1.78E+02		4.84E+01
	1528.10	0.28	6.62E+00		1.47E+01
Eu-154	123.07	40.40	5.61E-02	1.12E-01	1.12E-01
	247.93	6.89	-1.65E-01		5.39E-01
	591.76	4.95	1.33E-01		8.67E-01
	692.42	1.78	2.41E-01		2.12E+00
	723.30	20.06	2.29E-01		3.08E-01
	756.80	4.52	5.98E-02		1.18E+00
	873.18	12.08	8.88E-03		4.49E-01



Analysis Report for 08-Aug-19-10011

L1-10208B-RIGS-002SS

<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Nuclide MDA (pCi/grams)</b>	<b>Line MDA (pCi/grams)</b>
Eu-154	996.29	10.48	3.76E-01	1.12E-01	6.20E-01
	1004.76	18.01	1.16E-01		3.50E-01
	1274.43	34.80	-1.29E-01		1.92E-01
	1596.48	1.80	-2.50E+00		2.77E+00
Eu-155	45.30	1.31	4.29E-01	2.29E-01	2.35E+01
	60.01	1.22	-1.50E+01		2.33E+01
	86.55	30.70	-7.13E-02		2.50E-01
	105.31	21.10	-1.14E-01		2.29E-01
Ra-226	186.21	3.64	2.00E+00	1.28E+00	1.28E+00
Pa-231	27.36	10.30	2.03E+00	1.74E+00	2.52E+00
	283.69	1.70	-6.69E-01		2.01E+00
	300.07	2.47	1.21E-01		1.74E+00
	302.65	2.20	-5.53E-01		1.74E+00
	330.06	1.40	1.63E+00		3.19E+00
U-235	143.76	10.96	-6.14E-02	8.06E-02	4.01E-01
	163.33	5.08	2.07E-01		7.60E-01
	185.71	57.20	1.18E-01		8.06E-02
	202.11	1.08	-3.84E-01		3.63E+00
	205.31	5.01	-8.79E-01		7.64E-01
Am-241	59.54	35.90	-2.61E-01	8.26E-01	8.26E-01

+ = Nuclide identified during the nuclide identification

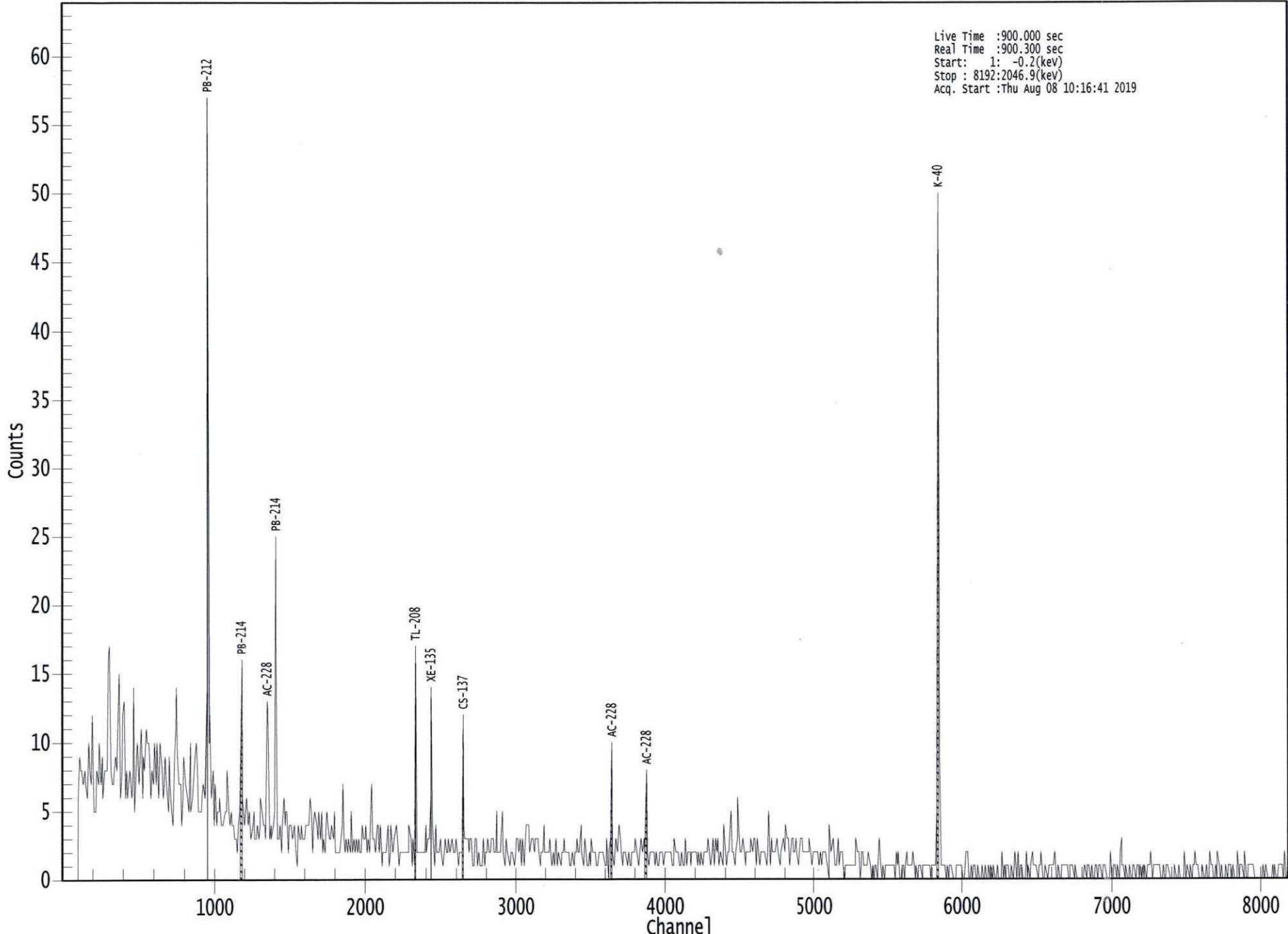
\* = Energy line found in the spectrum

&gt; = MDA value not calculated

@ = Half-life too short to be able to perform the decay correction

? = CAUTION: MDA value is inconsistent with Currie MDA at 95% confidence level

0000078596.CNF



Live Time :900.000 sec  
Real Time :900.300 sec  
Start: 1: -0.2(keV)  
Stop : 8192:2046.9(keV)  
Acq. Start :Thu Aug 08 10:16:41 2019

 ROI Type: 1

Analysis Report for 19-Aug-19-10001  
L1-10207B-RIGS-001SS

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## GAMMA SPECTRUM ANALYSIS

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Sample Identification : 19-Aug-19-10001  
Sample Description : L1-10207B-RIGS-001SS  
Sample Type : Soil  
Unit :  
Sample Point :  
  
Sample Size : 1.174E+03 grams  
Facility : Default  
  
Sample Taken On : 8/15/2019 2:30:00PM  
Acquisition Started : 8/19/2019 9:15:12AM  
  
Procedure : 130G\_SOIL\_1  
Operator : Administrator  
Detector Name : 324  
Geometry : 130G\_SOIL\_1  
Live Time : 900.0 seconds  
Real Time : 900.4 seconds  
  
Dead Time : 0.04 %  
  
Peak Locate Threshold : 3.00  
Peak Locate Range (in channels) : 120 - 4096  
Peak Area Range (in channels) : 120 - 4096  
Identification Energy Tolerance : 1.000 keV  
  
Energy Calibration Used Done On : 9/29/2018  
Efficiency Calibration Used Done On : 8/19/2019  
Efficiency Calibration Description :  
  
Sample Number : 78909  
Fill Height : 1174.25 gram  
Certificate Name : Eu155-Na22  
Certificate Date : 1/30/2013 12:00:00PM

*J.P. [Signature]*  
8-19-19

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## PEAK ANALYSIS REPORT

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Peak Analysis Performed on : 8/19/2019 9:30:15AM  
Peak Analysis From Channel : 120  
Peak Analysis To Channel : 4096

*J.M. [Signature]*  
8-20-19

Analysis Report for 19-Aug-19-10001

L1-10207B-RIGS-001SS

Peak No.	Energy (keV)	ROI start	ROI end	Peak Centroid	Net Peak Area	Net Area Uncertainty	Continuum Counts	FWHM (keV)
1	238.64	473 -	481	477.46	1.56E+02	22.02	1.46E+02	1.13
2	295.32	585 -	593	590.69	1.04E+02	15.37	6.20E+01	1.56
3	338.49	672 -	681	676.95	6.16E+01	13.49	5.34E+01	1.18
4	352.03	699 -	708	704.00	1.54E+02	16.83	5.75E+01	1.23
5	583.17	1162 -	1171	1165.94	7.78E+01	11.13	2.02E+01	1.36
6	609.18	1212 -	1223	1217.93	1.19E+02	13.77	2.84E+01	1.13
7	661.59	1318 -	1328	1322.72	6.21E+01	10.92	2.39E+01	1.69
8	910.88	1816 -	1826	1821.21	4.73E+01	10.68	2.67E+01	1.91
9	1460.62	2913 -	2928	2921.30	4.11E+02	20.85	7.89E+00	1.69

M = First peak in a multiplet region

m = Other peak in a multiplet region

F = Fitted singlet

Errors quoted at 1.000sigma

No background subtract performed on this spectrum.

## NUCLIDE IDENTIFICATION REPORT

Nuclide Library Used : C:\Canberra\Apex\Root\Default\Library\ZION LIB-BNL.NLB

### IDENTIFIED NUCLIDES

Nuclide Name	Id Confidence	Energy (keV)		Yield(%)	Activity (pCi/grams)	Activity Uncertainty
K-40	0.99	1460.82	*	10.66	8.47E+00	5.65E-01
Cs-137	0.99	661.66	*	85.10	9.40E-02	1.75E-02
Tl-208	1.00	583.19	*	85.00	1.08E-01	1.68E-02
Pb-212	1.00	115.18		0.60		
		238.63	*	43.60	2.34E-01	3.80E-02
		300.09		3.30		
Bi-214	0.99	609.32	*	45.49	3.18E-01	4.15E-02
		768.36		4.89		



Analysis Report for 19-Aug-19-10001  
L1-10207B-RIGS-001SS

<b>Nuclide Name</b>	<b>Id Confidence</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Activity Uncertainty</b>
Bi-214	0.99	806.18	1.26		
		934.06	3.11		
		1120.29	14.92		
		1155.21	1.63		
		1238.12	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		
		1661.27	1.05		
		1729.59	2.88		
		1764.49	15.30		
		1847.43	2.03		
2118.51	1.16				
Pb-214	0.99	241.99	7.25		
		295.22 *	18.42	4.17E-01	7.00E-02
		351.93 *	35.60	3.61E-01	4.90E-02
Ac-228	0.99	785.96	1.06		
		129.07	2.42		
		209.25	3.89		
		270.24	3.46		
		328.00	2.95		
		338.32 *	11.27	4.45E-01	1.04E-01
		409.46	1.92		
		463.00	4.40		
		794.95	4.25		
		911.20 *	25.80	2.93E-01	6.73E-02
		964.77	4.99		
968.97	15.80				
1588.20	3.22				

\* = Energy line found in the spectrum.

- = Manually added nuclide.

? = Manually edited nuclide.

@ = Energy line not used for Weighted Mean Activity

Energy Tolerance : 1.000 keV

Nuclide confidence index threshold = 0.30

Errors quoted at 1.000sigma

**INTERFERENCE CORRECTED REPORT**

Analysis Report for 19-Aug-19-10001  
L1-10207B-RIGS-001SS

<b>Nuclide Name</b>	<b>Nuclide Id Confidence</b>	<b>Wt mean Activity (pCi/grams)</b>	<b>Wt mean Activity Uncertainty</b>	<b>Comments</b>
K-40	0.994	8.47E+00	5.65E-01	
Cs-137	0.999	9.40E-02	1.75E-02	
Tl-208	1.000	1.08E-01	1.68E-02	
X Bi-211	0.863			
Pb-212	1.000	2.34E-01	3.80E-02	
Bi-214	0.999	3.18E-01	4.15E-02	
Pb-214	0.999	3.79E-01	4.01E-02	
Ac-228	0.994	3.38E-01	5.65E-02	

- ? = 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 1.000sigma

Analysis Report for 19-Aug-19-10001  
L1-10207B-RIGS-001SS

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## UNIDENTIFIED PEAKS

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Peak Locate Performed on : 8/19/2019 9:30:15AM  
Peak Locate From Channel : 120  
Peak Locate To Channel : 4096

Peak No.	Energy (keV)	Peak Size (CPS)	Peak CPS (%) Uncertainty	Peak Type	Tolerance Nuclide
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All peaks were identified.

M = First peak in a multiplet region  
m = Other peak in a multiplet region  
F = Fitted singlet  
Errors quoted at 1.000sigma

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## NUCLIDE MDA REPORT

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Nuclide Library Used : C:\Canberra\Apex\Root\Default\Library\ZION LIB-BNL.NLB

Nuclide Name	Energy (keV)	Yield(%)	Activity (pCi/grams)	Nuclide MDA (pCi/grams)	Line MDA (pCi/grams)
An Pk	511.00	100.00	6.09E-02	6.05E-02	6.05E-02
BE-7	477.60	10.44	-6.12E-02	3.83E-01	3.83E-01
+ K-40	1460.82	* 10.66	8.47E+00	3.98E-01	3.98E-01
Mn-54	834.85	99.98	1.95E-02	5.42E-02	5.42E-02
Co-60	1173.23	99.85	2.77E-02	5.70E-02	7.26E-02
	1332.49	99.98	1.04E-02		5.70E-02
Nb-94	702.65	99.81	1.37E-02	4.16E-02	4.36E-02
	871.09	99.89	-2.41E-02		4.16E-02
Ag-108m	79.13	6.60	5.28E-01	4.04E-02	1.33E+00
	433.94	90.50	-7.79E-03		4.04E-02
	614.28	89.80	-3.95E-02		6.14E-02
	722.94	90.80	-1.64E-02		4.83E-02
Sb-125	176.31	6.84	-4.08E-01	1.15E-01	5.18E-01
	380.45	1.52	-4.18E-01		2.43E+00
	427.87	29.60	-6.38E-02		1.15E-01
	463.36	10.49	1.25E-02		3.84E-01
	600.60	17.65	-5.40E-02		2.48E-01
	606.71	4.98	2.08E-01		1.61E+00
	635.95	11.22	-7.60E-02		3.55E-01



Analysis Report for 19-Aug-19-10001  
L1-10207B-RIGS-001SS

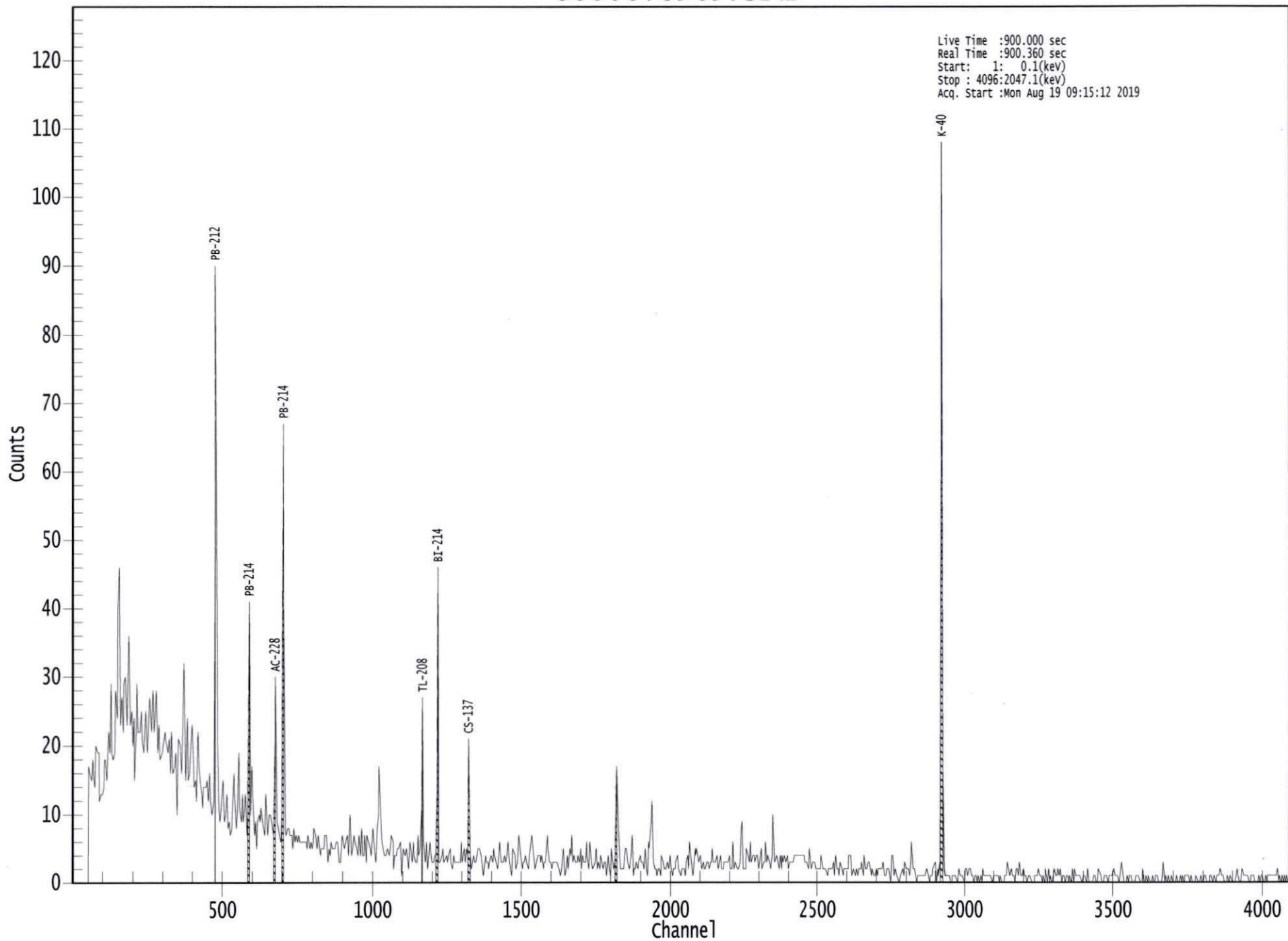
<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Nuclide MDA (pCi/grams)</b>	<b>Line MDA (pCi/grams)</b>
Sb-125	671.44	1.79	-1.41E-01	1.15E-01	2.39E+00
Ba-133	79.61	2.65	1.13E+00	9.17E-02	3.14E+00
	81.00	32.90	-3.00E-01		2.12E-01
	276.40	7.16	2.51E-01		5.45E-01
	302.85	18.34	1.22E-01		2.23E-01
	356.01	62.05	-4.79E-02		9.17E-02
	383.85	8.94	-1.60E-01		3.99E-01
Cs-134	475.36	1.48	-8.20E-01	6.12E-02	2.58E+00
	563.25	8.34	-6.78E-02		4.73E-01
	569.33	15.37	-4.18E-02		2.61E-01
	604.72	97.62	1.10E-02		7.20E-02
	795.86	85.46	3.20E-02		6.12E-02
	801.95	8.69	-2.42E-02		5.15E-01
	1038.61	0.99	4.41E-02		5.65E+00
	1167.97	1.79	-3.25E-01		3.94E+00
	1365.19	3.02	1.05E+00		1.83E+00
+ Cs-137	661.66	* 85.10	9.40E-02	4.32E-02	4.32E-02
Eu-152	121.78	28.67	4.85E-02	1.30E-01	1.30E-01
	244.70	7.61	1.72E-01		5.61E-01
	295.94	0.45	-6.18E+00		1.17E+01
	344.28	26.60	-1.41E-01		1.30E-01
	367.79	0.86	2.19E-01		4.31E+00
	411.12	2.24	6.95E-01		1.77E+00
	443.96	2.83	-6.03E-03		1.27E+00
	488.68	0.42	-1.05E+00		1.00E+01
	563.99	0.49	5.54E-01		8.27E+00
	586.26	0.46	-2.62E+00		1.40E+01
	678.62	0.47	6.39E+00		1.01E+01
	688.67	0.86	-1.41E+00		4.56E+00
	719.35	0.28	4.16E+00		1.60E+01
	778.90	12.96	2.36E-02		3.77E-01
	810.45	0.32	5.05E+00		1.34E+01
	867.37	4.26	3.65E-02		1.04E+00
	919.33	0.43	-9.60E+00		1.16E+01
	964.08	14.65	-2.94E-01		4.01E-01
	1085.87	10.24	9.69E-02		5.81E-01
	1089.74	1.73	5.71E-01		3.45E+00
	1112.07	13.69	-3.47E-01		4.15E-01
	1212.95	1.43	2.15E+00		5.10E+00
	1249.94	0.19	-1.12E+01		3.12E+01
	1299.14	1.63	-1.15E+00		3.67E+00
	1408.01	21.07	3.74E-02		2.77E-01
	1457.64	0.50	-2.13E+00		4.43E+01
	1528.10	0.28	3.02E+00		1.45E+01
Eu-154	123.07	40.40	5.02E-02	9.24E-02	9.24E-02
	247.93	6.89	-2.85E-01		5.04E-01
	591.76	4.95	3.56E-01		8.89E-01
	692.42	1.78	1.46E+00		2.43E+00
	723.30	20.06	3.76E-02		2.29E-01
	756.80	4.52	7.28E-02		9.88E-01
	873.18	12.08	9.24E-02		3.68E-01

Analysis Report for 19-Aug-19-10001  
L1-10207B-RIGS-001SS

<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Nuclide MDA (pCi/grams)</b>	<b>Line MDA (pCi/grams)</b>
Eu-154	996.29	10.48	1.05E-01	9.24E-02	4.34E-01
	1004.76	18.01	7.57E-02		2.72E-01
	1274.43	34.80	-4.84E-03		1.56E-01
	1596.48	1.80	2.66E-01		2.72E+00
Eu-155	45.30	1.31	3.57E-01	2.10E-01	1.21E+01
	60.01	1.22	-1.50E+00		1.43E+01
	86.55	30.70	9.78E-02		2.10E-01
	105.31	21.10	2.39E-02		2.17E-01
Ra-226	186.21	3.64	1.18E+00	1.23E+00	1.23E+00
Pa-231	27.36	10.30	1.16E+00	1.38E+00	1.38E+00
	283.69	1.70	-2.07E-01		2.15E+00
	300.07	2.47	-2.30E+00		1.71E+00
	302.65	2.20	1.01E+00		1.85E+00
	330.06	1.40	2.05E+00		2.97E+00
	143.76	10.96	1.62E-01		7.89E-02
163.33	5.08	7.32E-02	7.80E-01		
185.71	57.20	7.13E-02	7.89E-02		
202.11	1.08	1.14E+00	3.72E+00		
205.31	5.01	-4.70E-01	7.58E-01		
Am-241	59.54	35.90	-1.71E-01	4.91E-01	4.91E-01

- + = 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  
 ? = CAUTION: MDA value is inconsistent with Currie MDA at 95% confidence level

000078909.CNF



Live Time :900.000 sec  
Real Time :900.360 sec  
Start: 1: 0.1(kev)  
Stop : 4096:2047.1(kev)  
Acq. Start :Mon Aug 19 09:15:12 2019

ROI Type: 1

Analysis Report for 19-Aug-19-10002  
L1-10207B-RIGS-002SS

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## GAMMA SPECTRUM ANALYSIS

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Sample Identification : 19-Aug-19-10002  
Sample Description : L1-10207B-RIGS-002SS  
Sample Type : Soil  
Unit :  
Sample Point :  
  
Sample Size : 1.322E+03 grams  
Facility : Default  
  
Sample Taken On : 8/15/2019 2:32:00PM  
Acquisition Started : 8/19/2019 9:39:41AM  
  
Procedure : 130G\_SOIL\_1  
Operator : Administrator  
Detector Name : P40818B  
Geometry : 130G\_SOIL\_1  
Live Time : 900.0 seconds  
Real Time : 901.7 seconds  
  
Dead Time : 0.19 %  
  
Peak Locate Threshold : 3.00  
Peak Locate Range (in channels) : 120 - 8192  
Peak Area Range (in channels) : 120 - 8192  
Identification Energy Tolerance : 1.000 keV  
  
Energy Calibration Used Done On : 1/29/2019  
Efficiency Calibration Used Done On : 8/19/2019  
Efficiency Calibration Description :  
  
Sample Number : 78912  
Fill Height : 1322.31 gram  
Certificate Name : Eu155-Na22  
Certificate Date : 1/30/2012 12:00:00PM

*J.A. Mitchell*  
8-19-19

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## PEAK ANALYSIS REPORT

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Peak Analysis Performed on : 8/19/2019 9:54:45AM  
Peak Analysis From Channel : 120  
Peak Analysis To Channel : 8192

*J.M.H.*  
8-20-19

Analysis Report for 19-Aug-19-10002

L1-10207B-RIGS-002SS

	Peak No.	Energy (keV)	ROI start	ROI end	Peak Centroid	Net Peak Area	Net Area Uncertainty	Continuum Counts	FWHM (keV)
M	1	238.55	948 -	974	954.28	2.10E+02	15.69	5.99E+01	0.95
m	2	241.90	948 -	974	967.69	3.21E+01	8.08	5.98E+01	0.95
	3	295.15	1175 -	1189	1180.51	4.26E+01	15.88	7.24E+01	1.04
	4	338.21	1346 -	1358	1352.61	4.75E+01	10.90	2.65E+01	0.91
	5	351.83	1401 -	1414	1407.06	1.48E+02	16.11	3.95E+01	0.72
	6	582.94	2325 -	2337	2330.97	5.97E+01	11.39	2.63E+01	1.33
	7	609.11	2429 -	2442	2435.61	8.32E+01	12.18	2.38E+01	1.21
	8	661.38	2637 -	2651	2644.63	4.96E+01	10.96	2.44E+01	1.08
	9	910.81	3635 -	3650	3642.19	5.17E+01	9.80	1.43E+01	0.80
	10	1460.04	5829 -	5851	5839.99	3.80E+02	20.29	8.44E+00	1.68

M = First peak in a multiplet region

m = Other peak in a multiplet region

F = Fitted singlet

Errors quoted at 1.000sigma

No background subtract performed on this spectrum.

## NUCLIDE IDENTIFICATION REPORT

Nuclide Library Used : C:\Canberra\Apex\Root\Default\Library\ZION LIB-BNL.NLB

### IDENTIFIED NUCLIDES

Nuclide Name	Id Confidence	Energy (keV)	Yield(%)	Activity (pCi/grams)	Activity Uncertainty
K-40	0.90	1460.82 *	10.66	9.93E+00	6.84E-01
Cs-137	0.98	661.66 *	85.10	9.39E-02	2.15E-02
Tl-208	0.99	583.19 *	85.00	1.04E-01	2.08E-02
Bi-211	0.91	351.07 *	13.02	1.17E+00	1.59E-01
Pb-212	0.99	115.18	0.60		
		238.63 *	43.60	3.88E-01	4.27E-02
		300.09	3.30		

Analysis Report for 19-Aug-19-10002  
L1-10207B-RIGS-002SS

<b>Nuclide Name</b>	<b>Id Confidence</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Activity Uncertainty</b>
Bi-214	0.99	609.32 *	45.49	2.79E-01	4.41E-02
		768.36	4.89		
		806.18	1.26		
		934.06	3.11		
		1120.29	14.92		
		1155.21	1.63		
		1238.12	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		
		1661.27	1.05		
		1729.59	2.88		
		1764.49	15.30		
1847.43	2.03				
2118.51	1.16				
Pb-214	0.99	241.99 *	7.25	3.59E-01	9.48E-02
		295.22 *	18.42	2.10E-01	8.01E-02
		351.93 *	35.60	4.28E-01	5.80E-02
Ac-228	0.99	785.96	1.06	4.23E-01	1.03E-01
		129.07	2.42		
		209.25	3.89		
		270.24	3.46		
		328.00	2.95		
		338.32 *	11.27		
		409.46	1.92		
		463.00	4.40		
		794.95	4.25		
		911.20 *	25.80		
		964.77	4.99	4.03E-01	7.83E-02
		968.97	15.80		
		1588.20	3.22		

\* = Energy line found in the spectrum.

- = Manually added nuclide.

? = Manually edited nuclide.

@ = Energy line not used for Weighted Mean Activity

Energy Tolerance : 1.000 keV

Nuclide confidence index threshold = 0.30

Errors quoted at 1.000sigma

**INTERFERENCE CORRECTED REPORT**

Analysis Report for 19-Aug-19-10002  
 L1-10207B-RIGS-002SS

<b>Nuclide Name</b>	<b>Nuclide Id Confidence</b>	<b>Wt mean Activity (pCi/grams)</b>	<b>Wt mean Activity Uncertainty</b>	<b>Comments</b>
K-40	0.907	9.93E+00	6.84E-01	
Cs-137	0.988	9.39E-02	2.15E-02	
Tl-208	0.990	1.04E-01	2.08E-02	
Bi-211	0.912	4.26E-01	2.31E-01	
Pb-212	0.999	3.88E-01	4.27E-02	
Bi-214	0.997	2.79E-01	4.41E-02	
Pb-214	0.999	2.73E-01	6.12E-02	
Ac-228	0.992	4.10E-01	6.24E-02	

- ? = 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 1.000sigma

Analysis Report for 19-Aug-19-10002  
L1-10207B-RIGS-002SS

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## UNIDENTIFIED PEAKS

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Peak Locate Performed on : 8/19/2019 9:54:45AM  
Peak Locate From Channel : 120  
Peak Locate To Channel : 8192

Peak No.	Energy (keV)	Peak Size (CPS)	Peak CPS (%) Uncertainty	Peak Type	Tolerance Nuclide
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All peaks were identified.

M = First peak in a multiplet region  
m = Other peak in a multiplet region  
F = Fitted singlet  
Errors quoted at 1.000sigma

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## NUCLIDE MDA REPORT

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Nuclide Library Used : C:\Canberra\Apex\Root\Default\Library\ZION LIB-BNL.NLB

Nuclide Name	Energy (keV)	Yield(%)	Activity (pCi/grams)	Nuclide MDA (pCi/grams)	Line MDA (pCi/grams)
An Pk	511.00	100.00	3.99E-02	6.96E-02	6.96E-02
BE-7	477.60	10.44	-5.87E-02	4.76E-01	4.76E-01
+ K-40	1460.82	* 10.66	9.93E+00	5.79E-01	5.79E-01
Mn-54	834.85	99.98	7.47E-03	6.33E-02	6.33E-02
Co-60	1173.23	99.85	-1.49E-02	8.44E-02	8.72E-02
	1332.49	99.98	6.05E-02		8.44E-02
Nb-94	702.65	99.81	2.01E-03	5.32E-02	6.08E-02
	871.09	99.89	-3.67E-02		5.32E-02
Ag-108m	79.13	6.60	9.59E-01	5.40E-02	2.18E+00
	433.94	90.50	-2.22E-02		5.40E-02
	614.28	89.80	-2.39E-02		7.24E-02
	722.94	90.80	1.43E-02		6.27E-02
Sb-125	176.31	6.84	1.35E-01	1.72E-01	6.85E-01
	380.45	1.52	-1.46E+00		3.01E+00
	427.87	29.60	-2.17E-02		1.72E-01
	463.36	10.49	-2.17E-02		5.24E-01
	600.60	17.65	-8.17E-03		2.94E-01
	606.71	4.98	3.83E+00		1.84E+00
	635.95	11.22	-3.74E-01		4.21E-01



Analysis Report for 19-Aug-19-10002  
L1-10207B-RIGS-002SS

<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Nuclide MDA (pCi/grams)</b>	<b>Line MDA (pCi/grams)</b>
Sb-125	671.44	1.79	-1.97E+00	1.72E-01	3.03E+00
Ba-133	79.61	2.65	1.09E+00	9.21E-02	5.22E+00
	81.00	32.90	-5.67E-01		3.48E-01
	276.40	7.16	-5.85E-02		6.54E-01
	302.85	18.34	8.86E-02		2.68E-01
	356.01	62.05	-4.99E-02		9.21E-02
	383.85	8.94	2.83E-01		5.27E-01
Cs-134	475.36	1.48	-1.84E+00	6.71E-02	3.17E+00
	563.25	8.34	-3.01E-01		5.36E-01
	569.33	15.37	-1.32E-01		3.26E-01
	604.72	97.62	-5.61E-02		8.74E-02
	795.86	85.46	4.77E-02		6.71E-02
	801.95	8.69	-5.40E-01		4.56E-01
	1038.61	0.99	-1.63E+00		6.40E+00
	1167.97	1.79	3.78E+00		4.90E+00
	1365.19	3.02	1.76E+00		2.14E+00
+ Cs-137	661.66	* 85.10	9.39E-02	5.94E-02	5.94E-02
Eu-152	121.78	28.67	9.35E-02	1.75E-01	1.99E-01
	244.70	7.61	-1.93E-01		6.68E-01
	295.94	0.45	9.13E+00		1.37E+01
	344.28	26.60	3.92E-02		1.75E-01
	367.79	0.86	-8.88E-01		4.64E+00
	411.12	2.24	7.07E-03		2.13E+00
	443.96	2.83	-1.05E+00		1.60E+00
	488.68	0.42	6.17E+00		1.24E+01
	563.99	0.49	2.56E+00		9.43E+00
	586.26	0.46	-3.70E+00		1.80E+01
	678.62	0.47	6.87E+00		1.27E+01
	688.67	0.86	-9.66E-01		5.96E+00
	719.35	0.28	-7.96E+00		1.73E+01
	778.90	12.96	-1.63E-01		4.62E-01
	810.45	0.32	1.03E+01		1.73E+01
	867.37	4.26	-6.78E-01		1.31E+00
	919.33	0.43	1.15E+00		1.34E+01
	964.08	14.65	4.89E-01		6.06E-01
	1085.87	10.24	1.92E-01		8.07E-01
	1089.74	1.73	2.39E+00		4.69E+00
	1112.07	13.69	-3.65E-01		4.97E-01
	1212.95	1.43	3.51E+00		6.00E+00
	1249.94	0.19	9.80E+00		4.38E+01
	1299.14	1.63	-2.30E+00		4.22E+00
	1408.01	21.07	2.83E-01		3.27E-01
	1457.64	0.50	2.20E+02		5.46E+01
	1528.10	0.28	8.65E-01		1.69E+01
Eu-154	123.07	40.40	3.01E-02	1.39E-01	1.39E-01
	247.93	6.89	1.35E-01		6.73E-01
	591.76	4.95	5.22E-02		1.07E+00
	692.42	1.78	-1.61E+00		2.93E+00
	723.30	20.06	3.11E-01		2.90E-01
	756.80	4.52	6.85E-01		1.27E+00
	873.18	12.08	3.31E-02		4.70E-01

Analysis Report for 19-Aug-19-10002

L1-10207B-RIGS-002SS

<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Nuclide MDA (pCi/grams)</b>	<b>Line MDA (pCi/grams)</b>
Eu-154	996.29	10.48	-9.15E-02	1.39E-01	5.86E-01
	1004.76	18.01	2.34E-01		3.78E-01
	1274.43	34.80	5.86E-02		1.88E-01
	1596.48	1.80	1.67E+00		3.01E+00
Eu-155	45.30	1.31	3.50E+00	3.08E-01	3.48E+01
	60.01	1.22	2.37E+00		3.54E+01
	86.55	30.70	-9.41E-02		3.26E-01
Ra-226	105.31	21.10	3.67E-02	1.35E+00	3.08E-01
	186.21	3.64	7.39E-01		1.35E+00
Pa-231	27.36	10.30	4.80E+00	2.18E+00	4.21E+00
	283.69	1.70	-4.62E-01		2.57E+00
	300.07	2.47	1.23E+00		2.18E+00
	302.65	2.20	9.70E-01		2.28E+00
	330.06	1.40	2.07E+00		3.57E+00
	U-235	143.76	10.96		8.09E-02
163.33	5.08	-2.28E-01	9.36E-01		
185.71	57.20	3.34E-02	8.58E-02		
202.11	1.08	-1.18E+00	4.40E+00		
205.31	5.01	-2.25E-01	9.30E-01		
Am-241	59.54	35.90	5.00E-01	1.28E+00	1.28E+00

+ = Nuclide identified during the nuclide identification

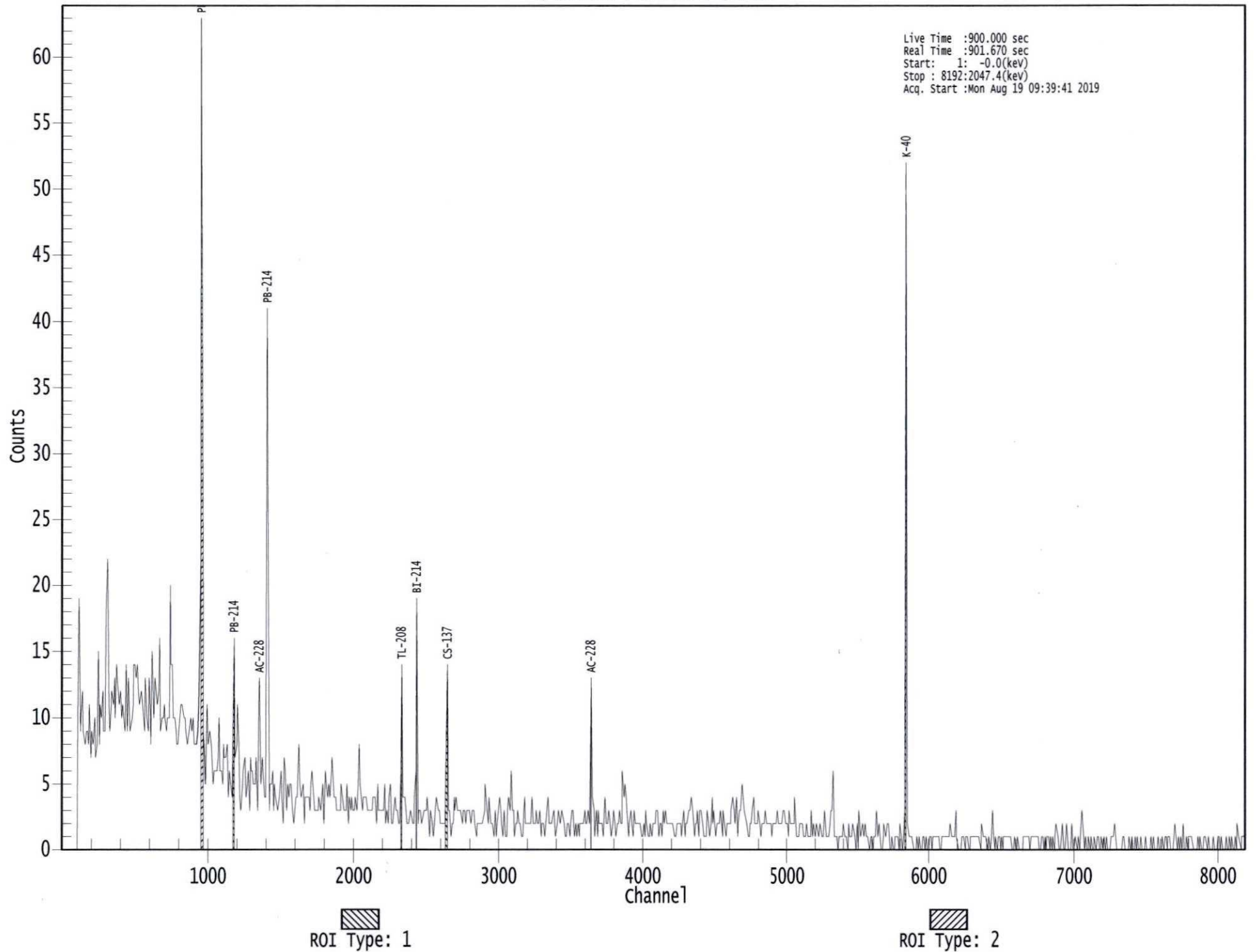
\* = Energy line found in the spectrum

&gt; = MDA value not calculated

@ = Half-life too short to be able to perform the decay correction

? = CAUTION: MDA value is inconsistent with Currie MDA at 95% confidence level

0000078912.CNF



Analysis Report for 19-Aug-19-10003  
L1-10207B-RIGS-003SS

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## GAMMA SPECTRUM ANALYSIS

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Sample Identification : 19-Aug-19-10003  
Sample Description : L1-10207B-RIGS-003SS  
Sample Type : Soil  
Unit :  
Sample Point :  
  
Sample Size : 1.644E+03 grams  
Facility : Default  
  
Sample Taken On : 8/15/2019 2:34:00PM  
Acquisition Started : 8/19/2019 9:15:28AM  
  
Procedure : 130G\_SOIL\_1  
Operator : Administrator  
Detector Name : 352  
Geometry : 130G\_SOIL\_1  
Live Time : 900.0 seconds  
Real Time : 900.4 seconds  
  
Dead Time : 0.04 %  
  
Peak Locate Threshold : 3.00  
Peak Locate Range (in channels) : 120 - 8192  
Peak Area Range (in channels) : 120 - 8192  
Identification Energy Tolerance : 1.000 keV  
  
Energy Calibration Used Done On : 9/29/2018  
Efficiency Calibration Used Done On : 8/19/2019  
Efficiency Calibration Description :  
  
Sample Number : 78911  
Fill Height : 1643.67 gram  
Certificate Name : Eu155-Na22  
Certificate Date : 1/7/2013 12:00:00PM

*J. M. M. M.*  
8-19-19

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## PEAK ANALYSIS REPORT

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Peak Analysis Performed on : 8/19/2019 9:30:41AM  
Peak Analysis From Channel : 120  
Peak Analysis To Channel : 8192

*J. M. M. M.*  
8-20-19

Analysis Report for 19-Aug-19-10003  
L1-10207B-RIGS-003SS

Peak No.	Energy (keV)	ROI start	ROI end	Peak Centroid	Net Peak Area	Net Area Uncertainty	Continuum Counts	FWHM (keV)
1	238.63	948 -	960	955.00	1.42E+02	18.49	7.37E+01	0.94
2	295.33	1176 -	1188	1181.54	7.09E+01	13.28	4.01E+01	0.88
3	338.20	1346 -	1360	1352.84	5.63E+01	13.39	4.27E+01	0.88
4	351.94	1399 -	1415	1407.74	1.53E+02	16.29	3.58E+01	0.49
5	583.31	2325 -	2340	2332.55	7.85E+01	9.73	5.52E+00	0.84
6	609.39	2427 -	2444	2436.82	1.17E+02	14.06	2.47E+01	1.20
7	661.70	2641 -	2650	2646.00	1.88E+01	7.63	1.73E+01	0.53
8	911.28	3636 -	3651	3644.17	5.10E+01	9.65	1.40E+01	0.87
9	1460.75	5830 -	5855	5843.37	4.45E+02	21.77	6.59E+00	2.16

M = First peak in a multiplet region  
m = Other peak in a multiplet region  
F = Fitted singlet  
Errors quoted at 1.000sigma

No background subtract performed on this spectrum.

## NUCLIDE IDENTIFICATION REPORT

Nuclide Library Used : C:\Canberra\Apex\Root\Default\Library\ZION LIB-BNL.NLB

### IDENTIFIED NUCLIDES

Nuclide Name	Id Confidence	Energy (keV)		Yield(%)	Activity (pCi/grams)	Activity Uncertainty
K-40	0.99	1460.82	*	10.66	9.15E+00	5.98E-01
Cs-137	1.00	661.66	*	85.10	2.87E-02	1.18E-02
Tl-208	0.99	583.19	*	85.00	1.11E-01	1.52E-02
Pb-212	1.00	115.18		0.60		
		238.63	*	43.60	2.20E-01	3.37E-02
		300.09		3.30		
Bi-214	1.00	609.32	*	45.49	3.18E-01	4.26E-02
		768.36		4.89		

Analysis Report for 19-Aug-19-10003  
L1-10207B-RIGS-003SS

<b>Nuclide Name</b>	<b>Id Confidence</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Activity Uncertainty</b>
Bi-214	1.00	806.18	1.26		
		934.06	3.11		
		1120.29	14.92		
		1155.21	1.63		
		1238.12	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		
		1661.27	1.05		
		1729.59	2.88		
		1764.49	15.30		
		1847.43	2.03		
Pb-214	0.99	2118.51	1.16		
		241.99	7.25		
		295.22 *	18.42	2.91E-01	5.94E-02
		351.93 *	35.60	3.68E-01	4.90E-02
Ac-228	0.99	785.96	1.06		
		129.07	2.42		
		209.25	3.89		
		270.24	3.46		
		328.00	2.95		
		338.32 *	11.27	4.15E-01	1.04E-01
		409.46	1.92		
		463.00	4.40		
		794.95	4.25		
		911.20 *	25.80	3.17E-01	6.15E-02
		964.77	4.99		
968.97	15.80				
1588.20	3.22				

\* = Energy line found in the spectrum.

- = Manually added nuclide.

? = Manually edited nuclide.

@ = Energy line not used for Weighted Mean Activity

Energy Tolerance : 1.000 keV

Nuclide confidence index threshold = 0.30

Errors quoted at 1.000sigma

**INTERFERENCE CORRECTED REPORT**

Analysis Report for 19-Aug-19-10003

L1-10207B-RIGS-003SS

<b>Nuclide Name</b>	<b>Nuclide Id Confidence</b>	<b>Wt mean Activity (pCi/grams)</b>	<b>Wt mean Activity Uncertainty</b>	<b>Comments</b>
K-40	0.999	9.15E+00	5.98E-01	
Cs-137	1.000	2.87E-02	1.18E-02	
Tl-208	0.998	1.11E-01	1.52E-02	
X Bi-211	0.887			
Pb-212	1.000	2.20E-01	3.37E-02	
Bi-214	1.000	3.18E-01	4.26E-02	
Pb-214	0.999	3.37E-01	3.78E-02	
Ac-228	0.999	3.42E-01	5.30E-02	

? = 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 1.000sigma

Analysis Report for 19-Aug-19-10003  
L1-10207B-RIGS-003SS

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## UNIDENTIFIED PEAKS

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Peak Locate Performed on : 8/19/2019 9:30:41AM  
Peak Locate From Channel : 120  
Peak Locate To Channel : 8192

Peak No.	Energy (keV)	Peak Size (CPS)	Peak CPS (%) Uncertainty	Peak Type	Tolerance Nuclide
All peaks were identified.					
M = First peak in a multiplet region					
m = Other peak in a multiplet region					
F = Fitted singlet					
Errors quoted at 1.000sigma					

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## NUCLIDE MDA REPORT

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Nuclide Library Used : C:\Canberra\Apex\Root\Default\Library\ZION LIB-BNL.NLB

	Nuclide Name	Energy (keV)	Yield(%)	Activity (pCi/grams)	Nuclide MDA (pCi/grams)	Line MDA (pCi/grams)
	An Pk	511.00	100.00	3.92E-02	6.05E-02	6.05E-02
	BE-7	477.60	10.44	6.72E-02	4.33E-01	4.33E-01
+	K-40	1460.82	* 10.66	9.15E+00	4.30E-01	4.30E-01
	Mn-54	834.85	99.98	8.90E-03	5.45E-02	5.45E-02
	Co-60	1173.23	99.85	1.51E-02	5.50E-02	7.74E-02
		1332.49	99.98	-3.42E-03		5.50E-02
	Nb-94	702.65	99.81	-3.53E-02	4.70E-02	4.70E-02
		871.09	99.89	-3.01E-02		4.92E-02
	Ag-108m	79.13	6.60	-4.05E-01	4.65E-02	1.82E+00
		433.94	90.50	3.27E-02		4.65E-02
		614.28	89.80	4.11E-04		8.82E-02
		722.94	90.80	2.37E-02		6.52E-02
	Sb-125	176.31	6.84	4.32E-01	1.48E-01	6.12E-01
		380.45	1.52	-1.13E+00		2.63E+00
		427.87	29.60	7.74E-03		1.48E-01
		463.36	10.49	-2.47E-01		4.03E-01
		600.60	17.65	-1.51E-01		2.73E-01
		606.71	4.98	3.52E+00		1.65E+00
		635.95	11.22	8.74E-02		3.97E-01



Analysis Report for 19-Aug-19-10003

L1-10207B-RIGS-003SS

<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Nuclide MDA (pCi/grams)</b>	<b>Line MDA (pCi/grams)</b>
Sb-125	671.44	1.79	-2.07E+00	1.48E-01	2.55E+00
Ba-133	79.61	2.65	1.57E+00	9.27E-02	4.42E+00
	81.00	32.90	-5.00E-01		3.06E-01
	276.40	7.16	-1.17E-01		5.75E-01
	302.85	18.34	1.63E-01		2.42E-01
	356.01	62.05	-2.74E-02		9.27E-02
	383.85	8.94	-3.83E-01		4.57E-01
Cs-134	475.36	1.48	-1.76E-01	6.62E-02	2.76E+00
	563.25	8.34	-2.29E-01		5.14E-01
	569.33	15.37	-1.14E-02		2.96E-01
	604.72	97.62	-1.64E-02		7.82E-02
	795.86	85.46	8.54E-02		6.62E-02
	801.95	8.69	7.88E-02		5.96E-01
	1038.61	0.99	9.73E-01		5.23E+00
	1167.97	1.79	2.24E+00		4.25E+00
	1365.19	3.02	5.36E-01		1.49E+00
+ Cs-137	661.66	* 85.10	2.87E-02	3.70E-02	3.70E-02
Eu-152	121.78	28.67	-6.23E-02	1.38E-01	1.61E-01
	244.70	7.61	2.23E-02		6.39E-01
	295.94	0.45	4.36E+00		1.17E+01
	344.28	26.60	-8.72E-02		1.38E-01
	367.79	0.86	-1.74E+00		4.46E+00
	411.12	2.24	-4.58E-02		1.97E+00
	443.96	2.83	1.09E-01		1.47E+00
	488.68	0.42	2.92E+00		1.11E+01
	563.99	0.49	2.20E-01		8.87E+00
	586.26	0.46	1.29E+01		1.37E+01
	678.62	0.47	3.63E+00		9.41E+00
	688.67	0.86	-4.15E+00		5.77E+00
	719.35	0.28	2.14E+01		1.89E+01
	778.90	12.96	-1.76E-01		3.83E-01
	810.45	0.32	2.41E+00		1.43E+01
	867.37	4.26	-9.59E-01		1.18E+00
	919.33	0.43	-9.12E+00		1.19E+01
	964.08	14.65	6.46E-01		5.61E-01
	1085.87	10.24	2.85E-01		6.33E-01
	1089.74	1.73	7.04E-01		3.49E+00
	1112.07	13.69	4.28E-02		4.27E-01
	1212.95	1.43	3.53E-01		4.92E+00
	1249.94	0.19	-1.75E+01		3.75E+01
	1299.14	1.63	6.43E-01		3.97E+00
	1408.01	21.07	-9.29E-02		2.17E-01
	1457.64	0.50	1.92E+02		4.60E+01
	1528.10	0.28	3.14E+00		1.67E+01
Eu-154	123.07	40.40	9.14E-02	1.16E-01	1.16E-01
	247.93	6.89	-1.01E-01		5.78E-01
	591.76	4.95	6.30E-01		1.00E+00
	692.42	1.78	3.51E-01		2.83E+00
	723.30	20.06	1.88E-01		2.96E-01
	756.80	4.52	-4.03E-01		1.11E+00
	873.18	12.08	4.50E-02		4.33E-01

Analysis Report for 19-Aug-19-10003

L1-10207B-RIGS-003SS

<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Nuclide MDA (pCi/grams)</b>	<b>Line MDA (pCi/grams)</b>
Eu-154	996.29	10.48	3.00E-02	1.16E-01	5.80E-01
	1004.76	18.01	-7.18E-03		3.26E-01
	1274.43	34.80	-8.45E-03		1.79E-01
	1596.48	1.80	-9.32E-01		2.80E+00
Eu-155	45.30	1.31	5.90E+00	2.67E-01	2.34E+01
	60.01	1.22	-4.48E+00		2.59E+01
	86.55	30.70	-3.70E-02		2.78E-01
	105.31	21.10	1.94E-01		2.67E-01
Ra-226	186.21	3.64	4.48E-01	1.22E+00	1.22E+00
Pa-231	27.36	10.30	3.00E+00	1.90E+00	2.60E+00
	283.69	1.70	-1.39E+00		2.47E+00
	300.07	2.47	1.11E-01		1.90E+00
	302.65	2.20	9.34E-01		2.00E+00
	330.06	1.40	-5.17E-01		2.98E+00
	U-235	143.76	10.96		-2.21E-01
U-235	163.33	5.08	1.29E-01	7.90E-02	8.17E-01
	185.71	57.20	7.82E-02		7.90E-02
	202.11	1.08	-3.09E+00		3.72E+00
	205.31	5.01	-5.40E-01		8.22E-01
	Am-241	59.54	35.90		6.84E-02

+ = Nuclide identified during the nuclide identification

\* = Energy line found in the spectrum

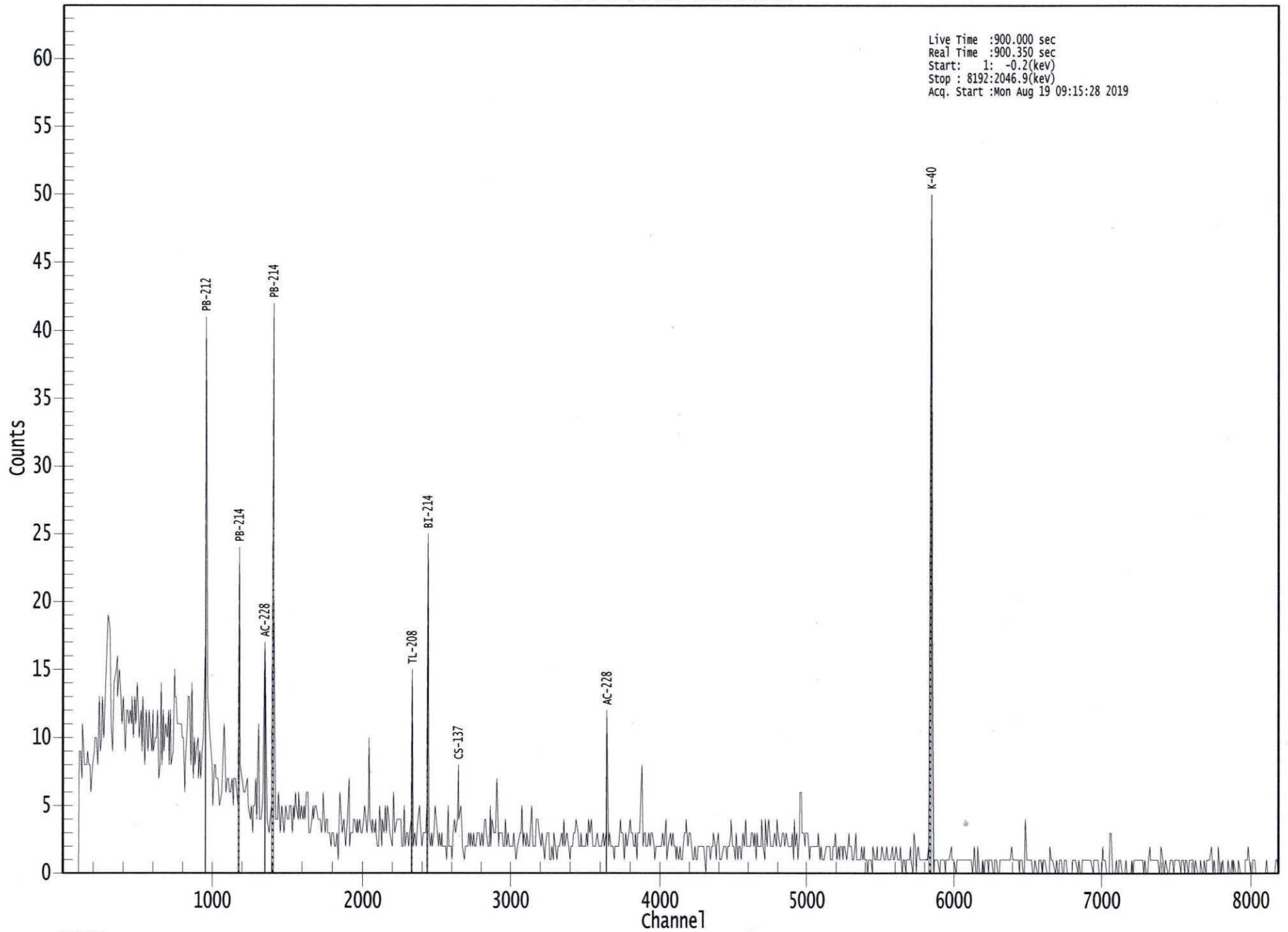
&gt; = MDA value not calculated


@ = Half-life too short to be able to perform the decay correction

? = CAUTION: MDA value is inconsistent with Currie MDA at 95% confidence level

# 000078911.CNF

Live Time :900.000 sec  
Real Time :900.350 sec  
Start: 1: -0.2(keV)  
Stop : 8192:2046.9(keV)  
Acq. Start :Mon Aug 19 09:15:28 2019



 ROI Type: 1

Analysis Report for 19-Aug-19-10004  
L1-10207B-RIGS-004SS

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## GAMMA SPECTRUM ANALYSIS

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Sample Identification : 19-Aug-19-10004  
Sample Description : L1-10207B-RIGS-004SS  
Sample Type : Soil  
Unit :  
Sample Point :  
  
Sample Size : 1.343E+03 grams  
Facility : Default  
  
Sample Taken On : 8/15/2019 2:36:00PM  
Acquisition Started : 8/19/2019 9:39:47AM  
  
Procedure : 130G\_SOIL\_1  
Operator : Administrator  
Detector Name : 324  
Geometry : 130G\_SOIL\_1  
Live Time : 900.0 seconds  
Real Time : 900.4 seconds  
  
Dead Time : 0.04 %  
  
Peak Locate Threshold : 3.00  
Peak Locate Range (in channels) : 120 - 4096  
Peak Area Range (in channels) : 120 - 4096  
Identification Energy Tolerance : 1.000 keV  
  
Energy Calibration Used Done On : 9/29/2018  
Efficiency Calibration Used Done On : 8/19/2019  
Efficiency Calibration Description :  
  
Sample Number : 78913  
Fill Height : 1342.82 gram  
Certificate Name : Eu155-Na22  
Certificate Date : 1/30/2013 12:00:00PM

*J. Mitchell*  
8-19-19

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## PEAK ANALYSIS REPORT

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Peak Analysis Performed on : 8/19/2019 9:54:50AM  
Peak Analysis From Channel : 120  
Peak Analysis To Channel : 4096

*J. Mitchell*  
8-20-19

Analysis Report for 19-Aug-19-10004

L1-10207B-RIGS-004SS

	Peak No.	Energy (keV)	ROI start	ROI end	Peak Centroid	Net Peak Area	Net Area Uncertainty	Continuum Counts	FWHM (keV)
M	1	238.62	473 -	488	477.43	2.34E+02	17.46	1.10E+02	1.07
m	2	241.88	473 -	488	483.94	4.94E+01	9.04	7.90E+01	1.07
	3	295.22	585 -	594	590.49	8.86E+01	15.32	6.44E+01	1.11
	4	338.25	673 -	680	676.48	4.41E+01	11.95	4.89E+01	1.30
	5	351.79	698 -	708	703.52	1.81E+02	17.37	5.07E+01	1.18
	6	583.26	1160 -	1171	1166.13	9.20E+01	12.33	2.40E+01	1.42
	7	609.26	1213 -	1223	1218.11	1.56E+02	13.94	1.64E+01	0.99
	8	661.40	1319 -	1328	1322.33	6.25E+01	10.23	1.85E+01	1.10
	9	911.32	1817 -	1827	1822.08	5.70E+01	10.11	1.90E+01	0.76
	10	1120.26	2236 -	2244	2240.08	2.93E+01	7.93	1.58E+01	0.84
	11	1460.63	2913 -	2928	2921.31	5.07E+02	23.44	1.41E+01	1.76

M = First peak in a multiplet region

m = Other peak in a multiplet region

F = Fitted singlet

Errors quoted at 1.000sigma

No background subtract performed on this spectrum.

## NUCLIDE IDENTIFICATION REPORT

Nuclide Library Used : C:\Canberra\Apex\Root\Default\Library\ZION LIB-BNL.NLB

### IDENTIFIED NUCLIDES

Nuclide Name	Id Confidence	Energy (keV)		Yield(%)	Activity (pCi/grams)	Activity Uncertainty
K-40	0.99	1460.82	*	10.66	9.92E+00	6.29E-01
Cs-137	0.98	661.66	*	85.10	9.05E-02	1.58E-02
Tl-208	0.99	583.19	*	85.00	1.23E-01	1.80E-02
Pb-212	1.00	115.18		0.60		
		238.63	*	43.60	3.37E-01	3.71E-02
		300.09		3.30		

Analysis Report for 19-Aug-19-10004

L1-10207B-RIGS-004SS

<b>Nuclide Name</b>	<b>Id Confidence</b>	<b>Energy (keV)</b>		<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Activity Uncertainty</b>
Bi-214	1.00	609.32	*	45.49	3.99E-01	4.31E-02
		768.36		4.89		
		806.18		1.26		
		934.06		3.11		
		1120.29	*	14.92	3.42E-01	9.37E-02
		1155.21		1.63		
		1238.12		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		
		1661.27		1.05		
		1729.59		2.88		
		1764.49		15.30		
		1847.43		2.03		
2118.51		1.16				
Pb-214	0.99	241.99	*	7.25	4.31E-01	8.61E-02
		295.22	*	18.42	3.41E-01	6.50E-02
		351.93	*	35.60	4.09E-01	5.11E-02
Ac-228	0.99	785.96		1.06		
		129.07		2.42		
		209.25		3.89		
		270.24		3.46		
		328.00		2.95		
		338.32	*	11.27	3.06E-01	8.65E-02
		409.46		1.92		
		463.00		4.40		
		794.95		4.25		
		911.20	*	25.80	3.36E-01	6.14E-02
		964.77		4.99		
968.97		15.80				
1588.20		3.22				

\* = Energy line found in the spectrum.

- = Manually added nuclide.

? = Manually edited nuclide.

@ = Energy line not used for Weighted Mean Activity

Energy Tolerance : 1.000 keV

Nuclide confidence index threshold = 0.30

Errors quoted at 1.000sigma

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**INTERFERENCE CORRECTED REPORT**

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Analysis Report for 19-Aug-19-10004  
L1-10207B-RIGS-004SS

<b>Nuclide Name</b>	<b>Nuclide Id Confidence</b>	<b>Wt mean Activity (pCi/grams)</b>	<b>Wt mean Activity Uncertainty</b>	<b>Comments</b>
K-40	0.994	9.92E+00	6.29E-01	
Cs-137	0.989	9.05E-02	1.58E-02	
Tl-208	0.999	1.23E-01	1.80E-02	
X Bi-211	0.920			
Pb-212	1.000	3.37E-01	3.71E-02	
Bi-214	1.000	3.89E-01	3.91E-02	
Pb-214	0.998	3.92E-01	3.64E-02	
Ac-228	0.999	3.26E-01	5.01E-02	

- ? = 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 1.000sigma

Analysis Report for 19-Aug-19-10004  
L1-10207B-RIGS-004SS

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## UNIDENTIFIED PEAKS

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Peak Locate Performed on : 8/19/2019 9:54:50AM  
Peak Locate From Channel : 120  
Peak Locate To Channel : 4096

Peak No.	Energy (keV)	Peak Size (CPS)	Peak CPS (%) Uncertainty	Peak Type	Tolerance Nuclide
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All peaks were identified.

M = First peak in a multiplet region  
m = Other peak in a multiplet region  
F = Fitted singlet  
Errors quoted at 1.000sigma

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## NUCLIDE MDA REPORT

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Nuclide Library Used : C:\Canberra\Apex\Root\Default\Library\ZION LIB-BNL.NLB

Nuclide Name	Energy (keV)	Yield(%)	Activity (pCi/grams)	Nuclide MDA (pCi/grams)	Line MDA (pCi/grams)
An Pk	511.00	100.00	9.41E-02	6.08E-02	6.08E-02
BE-7	477.60	10.44	-1.12E-01	3.42E-01	3.42E-01
+ K-40	1460.82	* 10.66	9.92E+00	4.90E-01	4.90E-01
Mn-54	834.85	99.98	-1.76E-02	4.28E-02	4.28E-02
Co-60	1173.23	99.85	1.61E-02	6.18E-02	6.30E-02
	1332.49	99.98	2.71E-02		6.18E-02
Nb-94	702.65	99.81	2.76E-02	4.37E-02	4.73E-02
	871.09	99.89	1.47E-02		4.37E-02
Ag-108m	79.13	6.60	1.04E+00	4.01E-02	1.35E+00
	433.94	90.50	2.11E-03		4.01E-02
	614.28	89.80	-6.07E-02		6.35E-02
	722.94	90.80	-2.85E-02		4.72E-02
Sb-125	176.31	6.84	-1.98E-01	1.16E-01	5.49E-01
	380.45	1.52	7.74E-02		2.28E+00
	427.87	29.60	2.35E-02		1.16E-01
	463.36	10.49	4.84E-01		4.49E-01
	600.60	17.65	8.96E-02		2.39E-01
	606.71	4.98	-3.63E-01		1.61E+00
	635.95	11.22	-1.09E-01		3.76E-01



Analysis Report for 19-Aug-19-10004

L1-10207B-RIGS-004SS

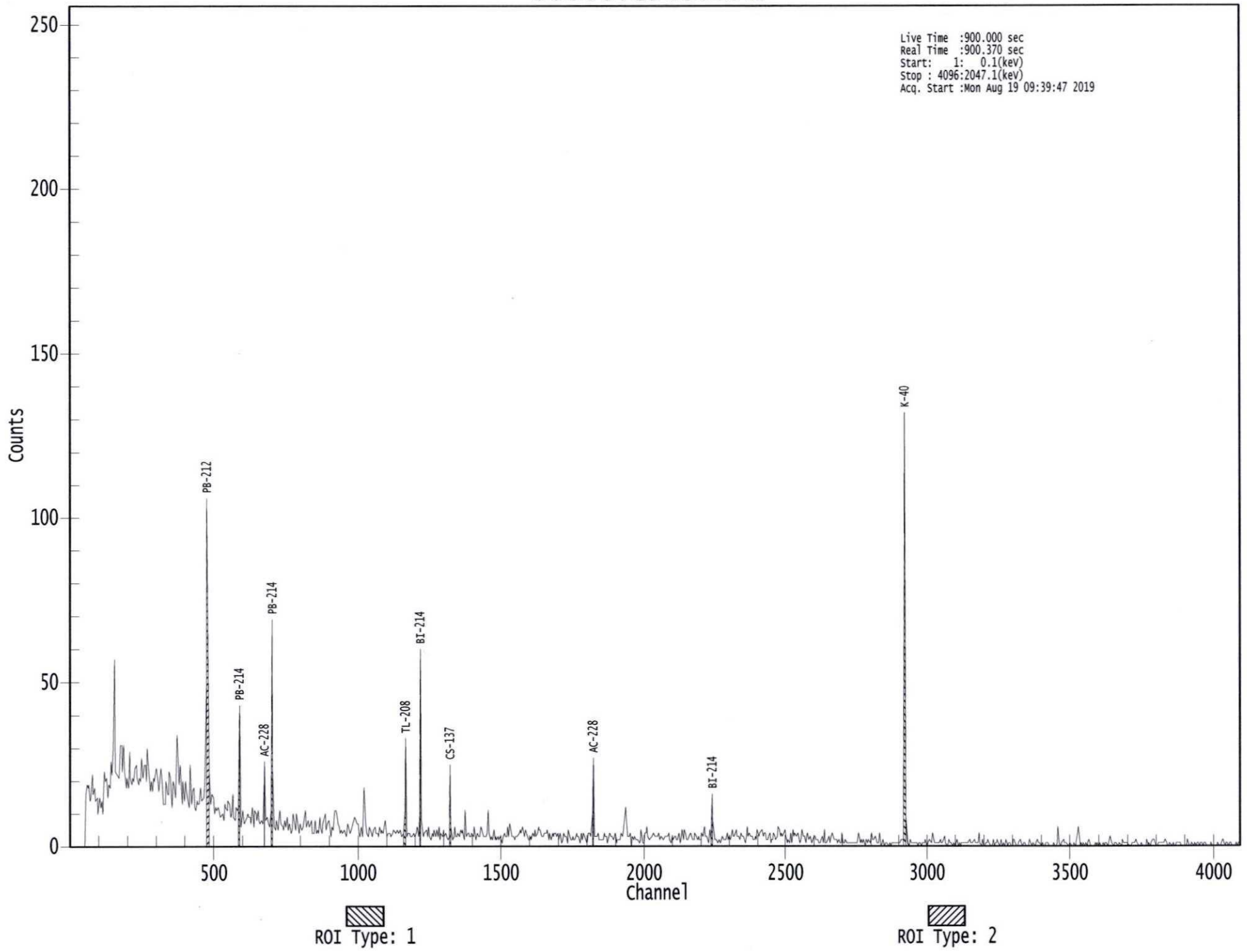
<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Nuclide MDA (pCi/grams)</b>	<b>Line MDA (pCi/grams)</b>
Sb-125	671.44	1.79	5.07E-01	1.16E-01	2.47E+00
Ba-133	79.61	2.65	1.42E+00	8.23E-02	3.14E+00
	81.00	32.90	-3.25E-01		2.02E-01
	276.40	7.16	-5.06E-02		5.10E-01
	302.85	18.34	7.88E-02		1.86E-01
	356.01	62.05	-2.32E-02		8.23E-02
	383.85	8.94	-3.84E-01		3.77E-01
Cs-134	475.36	1.48	3.62E-01	5.36E-02	2.30E+00
	563.25	8.34	-8.99E-02		4.62E-01
	569.33	15.37	7.80E-03		2.65E-01
	604.72	97.62	-2.90E-02		7.04E-02
	795.86	85.46	-1.81E-03		5.36E-02
	801.95	8.69	-1.13E-01		4.78E-01
	1038.61	0.99	-6.57E-01		5.19E+00
	1167.97	1.79	1.13E+00		3.75E+00
	1365.19	3.02	8.70E-02		1.24E+00
+ Cs-137	661.66	* 85.10	9.05E-02	3.61E-02	3.61E-02
Eu-152	121.78	28.67	-1.37E-02	1.23E-01	1.23E-01
	244.70	7.61	-1.74E-02		5.52E-01
	295.94	0.45	-3.03E+00		1.03E+01
	344.28	26.60	-1.10E-01		1.45E-01
	367.79	0.86	2.80E+00		4.38E+00
	411.12	2.24	5.07E-01		1.73E+00
	443.96	2.83	2.84E-01		1.34E+00
	488.68	0.42	-1.91E+00		9.74E+00
	563.99	0.49	5.17E-01		8.15E+00
	586.26	0.46	2.36E-01		1.43E+01
	678.62	0.47	2.32E+00		9.02E+00
	688.67	0.86	-3.86E+00		4.89E+00
	719.35	0.28	2.52E+00		1.44E+01
	778.90	12.96	-2.15E-01		3.31E-01
	810.45	0.32	-4.86E+00		1.41E+01
	867.37	4.26	-6.41E-02		9.92E-01
	919.33	0.43	-5.22E+00		1.01E+01
	964.08	14.65	6.40E-02		4.42E-01
	1085.87	10.24	9.10E-02		5.73E-01
	1089.74	1.73	-6.51E-01		3.21E+00
	1112.07	13.69	-6.01E-02		4.21E-01
	1212.95	1.43	-2.27E-01		4.77E+00
	1249.94	0.19	8.46E-01		3.21E+01
	1299.14	1.63	1.85E+00		3.49E+00
	1408.01	21.07	-2.38E-02		2.24E-01
	1457.64	0.50	1.08E+00		4.70E+01
	1528.10	0.28	6.82E+00		1.64E+01
Eu-154	123.07	40.40	-6.78E-04	8.89E-02	8.89E-02
	247.93	6.89	1.04E-01		5.31E-01
	591.76	4.95	-1.44E-01		7.77E-01
	692.42	1.78	-3.14E-02		2.51E+00
	723.30	20.06	8.47E-02		2.40E-01
	756.80	4.52	3.37E-01		9.79E-01
	873.18	12.08	-4.44E-02		3.35E-01

Analysis Report for 19-Aug-19-10004  
L1-10207B-RIGS-004SS

<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Nuclide MDA (pCi/grams)</b>	<b>Line MDA (pCi/grams)</b>
Eu-154	996.29	10.48	-1.43E-01	8.89E-02	4.14E-01
	1004.76	18.01	1.45E-01		3.00E-01
	1274.43	34.80	-3.67E-02		1.74E-01
	1596.48	1.80	3.26E-01		2.24E+00
Eu-155	45.30	1.31	6.09E-01	1.97E-01	1.22E+01
	60.01	1.22	2.69E+00		1.37E+01
	86.55	30.70	5.33E-02		1.97E-01
	105.31	21.10	6.98E-02		2.16E-01
Ra-226	186.21	3.64	4.87E-01	1.17E+00	1.17E+00
Pa-231	27.36	10.30	8.96E-01	1.29E+00	1.29E+00
	283.69	1.70	5.67E-01		2.14E+00
	300.07	2.47	-1.39E+00		1.35E+00
	302.65	2.20	6.56E-01		1.55E+00
	330.06	1.40	1.07E+00		2.80E+00
U-235	143.76	10.96	8.11E-02	7.49E-02	3.13E-01
	163.33	5.08	-4.98E-01		6.91E-01
	185.71	57.20	3.80E-02		7.49E-02
	202.11	1.08	9.10E-01		3.55E+00
	205.31	5.01	-9.68E-01		7.27E-01
Am-241	59.54	35.90	5.51E-02	4.73E-01	4.73E-01

- + = 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  
 ? = CAUTION: MDA value is inconsistent with Currie MDA at 95% confidence level

# 0000078913.CNF



Analysis Report for 19-Aug-19-10005  
L1-10207B-RIGS-005SS

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## GAMMA SPECTRUM ANALYSIS

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Sample Identification : 19-Aug-19-10005  
Sample Description : L1-10207B-RIGS-005SS  
Sample Type : Soil  
Unit :  
Sample Point :  
  
Sample Size : 1.300E+03 grams  
Facility : Default  
  
Sample Taken On : 8/15/2019 2:38:00PM  
Acquisition Started : 8/19/2019 10:18:06AM  
  
Procedure : 130G\_SOIL\_1  
Operator : Administrator  
Detector Name : 352  
Geometry : 130G\_SOIL\_1  
Live Time : 900.0 seconds  
Real Time : 900.4 seconds  
  
Dead Time : 0.04 %  
  
Peak Locate Threshold : 3.00  
Peak Locate Range (in channels) : 120 - 8192  
Peak Area Range (in channels) : 120 - 8192  
Identification Energy Tolerance : 1.000 keV  
  
Energy Calibration Used Done On : 9/29/2018  
Efficiency Calibration Used Done On : 8/19/2019  
Efficiency Calibration Description :  
  
Sample Number : 78915  
Fill Height : 1300.16 gram  
Certificate Name : Eu155-Na22  
Certificate Date : 1/7/2013 12:00:00PM

*J. M. ...*  
8-19-19

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## PEAK ANALYSIS REPORT

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Peak Analysis Performed on : 8/19/2019 10:33:09AM  
Peak Analysis From Channel : 120  
Peak Analysis To Channel : 8192

*J. M. ...*  
8-20-19

Analysis Report for 19-Aug-19-10005  
L1-10207B-RIGS-005SS

Peak No.	Energy (keV)	ROI start	ROI end	Peak Centroid	Net Peak Area	Net Area Uncertainty	Continuum Counts	FWHM (keV)
1	77.04	305 -	314	309.47	4.32E+01	16.14	9.58E+01	0.33
2	87.16	346 -	357	349.90	3.31E+01	16.53	9.49E+01	0.56
3	185.74	740 -	751	743.70	7.28E+01	15.88	6.92E+01	0.81
4	238.71	946 -	963	955.33	2.69E+02	27.38	1.46E+02	0.95
5	295.29	1174 -	1187	1181.39	9.80E+01	15.46	5.10E+01	0.99
6	338.24	1346 -	1359	1352.99	3.22E+01	12.70	4.68E+01	1.04
7	351.95	1399 -	1416	1407.81	1.69E+02	18.64	5.45E+01	0.64
8	583.30	2326 -	2340	2332.53	9.85E+01	13.52	2.95E+01	0.45
9	609.29	2427 -	2444	2436.42	1.38E+02	15.97	3.60E+01	1.13
10	661.52	2638 -	2653	2645.25	5.57E+01	9.48	1.13E+01	0.54
11	727.27	2902 -	2914	2908.16	1.46E+01	7.61	1.54E+01	0.33
12	911.47	3636 -	3652	3644.94	6.44E+01	9.89	1.06E+01	1.56
13	1460.62	5830 -	5855	5842.86	5.65E+02	25.17	1.62E+01	2.00
14	1763.93	7051 -	7064	7057.80	2.40E+01	6.62	7.02E+00	1.45

M = First peak in a multiplet region

m = Other peak in a multiplet region

F = Fitted singlet

Errors quoted at 1.000sigma

No background subtract performed on this spectrum.

## NUCLIDE IDENTIFICATION REPORT

Nuclide Library Used : C:\Canberra\Apex\Root\Default\Library\ZION LIB-BNL.NLB

### IDENTIFIED NUCLIDES

Nuclide Name	Id Confidence	Energy (keV)	Yield(%)	Activity (pCi/grams)	Activity Uncertainty
K-40	0.99	1460.82 *	10.66	1.24E+01	7.74E-01
Cs-137	0.99	661.66 *	85.10	9.03E-02	1.63E-02
Tl-208	0.99	583.19 *	85.00	1.47E-01	2.20E-02

Analysis Report for 19-Aug-19-10005

L1-10207B-RIGS-005SS

<b>Nuclide Name</b>	<b>Id Confidence</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Activity Uncertainty</b>		
Bi-212	1.00	39.86	1.06				
		727.33 *	6.67	3.22E-01	1.69E-01		
		785.37	1.10				
Pb-212	0.99	1620.50	1.47				
		115.18	0.60				
		238.63 *	43.60	4.36E-01	5.67E-02		
Pb212-XR	0.99	300.09	3.30				
		74.82	10.28				
		77.11 *	17.10	4.13E-01	1.60E-01		
Bi-214	0.99	87.35 *	3.97	9.58E-01	4.88E-01		
		89.78	1.46				
		609.32 *	45.49	3.96E-01	5.17E-02		
		768.36	4.89				
		806.18	1.26				
		934.06	3.11				
		1120.29	14.92				
		1155.21	1.63				
		1238.12	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				
1661.27	1.05						
1729.59	2.88						
1764.49 *	15.30	4.25E-01	1.18E-01				
1847.43	2.03						
2118.51	1.16						
Pb-214	1.00	241.99	7.25				
		295.22 *	18.42	4.23E-01	7.48E-02		
		351.93 *	35.60	4.26E-01	5.82E-02		
Ra-226	0.96	785.96	1.06				
Ac-228	0.99	186.21 *	3.64	1.26E+00	2.93E-01		
		129.07	2.42				
		209.25	3.89				
		270.24	3.46				
		328.00	2.95				
		338.32 *	11.27	2.50E-01	1.01E-01		
		409.46	1.92				
		463.00	4.40				
		794.95	4.25				
		911.20 *	25.80	4.26E-01	6.80E-02		
		964.77	4.99				
		968.97	15.80				
		1588.20	3.22				
		U-235	1.00	143.76	10.96		
				163.33	5.08		
185.71 *	57.20			8.03E-02	1.87E-02		
202.11	1.08						
205.31	5.01						

Analysis Report for 19-Aug-19-10005  
L1-10207B-RIGS-005SS

\* = Energy line found in the spectrum.  
 - = Manually added nuclide.  
 ? = Manually edited nuclide.  
 @ = Energy line not used for Weighted Mean Activity  
 Energy Tolerance : 1.000 keV  
 Nuclide confidence index threshold = 0.30  
 Errors quoted at 1.000sigma

## INTERFERENCE CORRECTED REPORT

	Nuclide Name	Nuclide Id Confidence	Wt mean Activity (pCi/grams)	Wt mean Activity Uncertainty	Comments
	K-40	0.994	1.24E+01	7.74E-01	
X	<del>Cd-109</del> Pb-212/Pb-214	<del>0.886</del>			
	Cs-137	0.997	9.03E-02	1.63E-02	
X	<del>Eu-155</del> Pb-212/Pb-214	<del>0.966</del>			
	Tl-208	0.998	1.47E-01	2.20E-02	
X	Bi-211	0.882			
	Bi-212	1.000	3.22E-01	1.69E-01	
	Pb-212	0.999	4.36E-01	5.67E-02	
	Pb212-XR	0.999	4.66E-01	1.52E-01	
	Bi-214	0.993	4.01E-01	4.74E-02	
	Pb-214	1.000	4.25E-01	4.59E-02	
X	Pb214-XR	0.999			
?	Ra-226	0.966	1.26E+00	2.93E-01	
	Ac-228	0.996	3.71E-01	5.63E-02	
?	<del>U-235</del> Ra-226	<del>1.000</del>	<del>8.03E-02</del>	<del>1.87E-02</del>	

? = 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 1.000sigma

cd-109 1/2 life 1.24 years  
 EU-155 only 1 peak  
 U-235 only 1 peak

*JPW*  
8-19-19

Analysis Report for 19-Aug-19-10005  
L1-10207B-RIGS-005SS

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## UNIDENTIFIED PEAKS

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Peak Locate Performed on : 8/19/2019 10:33:09AM  
Peak Locate From Channel : 120  
Peak Locate To Channel : 8192

Peak No.	Energy (keV)	Peak Size (CPS)	Peak CPS (%) Uncertainty	Peak Type	Tolerance Nuclide
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All peaks were identified.

M = First peak in a multiplet region

m = Other peak in a multiplet region

F = Fitted singlet

Errors quoted at 1.000sigma

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## NUCLIDE MDA REPORT

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Nuclide Library Used : C:\Canberra\Apex\Root\Default\Library\ZION LIB-BNL.NLB

Nuclide Name	Energy (keV)	Yield(%)	Activity (pCi/grams)	Nuclide MDA (pCi/grams)	Line MDA (pCi/grams)
An Pk	511.00	100.00	4.63E-02	6.63E-02	6.63E-02
BE-7	477.60	10.44	-1.47E-01	5.40E-01	5.40E-01
+ K-40	1460.82	* 10.66	1.24E+01	6.83E-01	6.83E-01
Mn-54	834.85	99.98	1.24E-02	5.92E-02	5.92E-02
Co-60	1173.23	99.85	5.33E-02	6.95E-02	8.63E-02
	1332.49	99.98	4.78E-02		6.95E-02
Nb-94	702.65	99.81	2.22E-02	4.76E-02	5.53E-02
	871.09	99.89	-5.19E-02		4.76E-02
Ag-108m	79.13	6.60	-4.11E-01	5.04E-02	1.80E+00
	433.94	90.50	1.67E-02		5.04E-02
	614.28	89.80	1.75E-02		1.03E-01
	722.94	90.80	-1.37E-02		7.34E-02
Sb-125	176.31	6.84	-1.39E-01	1.63E-01	6.22E-01
	380.45	1.52	2.12E+00		3.09E+00
	427.87	29.60	3.51E-03		1.63E-01
	463.36	10.49	2.36E-01		4.92E-01
	600.60	17.65	-5.43E-02		2.92E-01
	606.71	4.98	5.01E+00		1.95E+00
	635.95	11.22	-2.82E-01		4.17E-01



Analysis Report for 19-Aug-19-10005

L1-10207B-RIGS-005SS

<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Nuclide MDA (pCi/grams)</b>	<b>Line MDA (pCi/grams)</b>
Sb-125	671.44	1.79	-1.24E-01	1.63E-01	3.20E+00
Ba-133	79.61	2.65	-9.20E-01	1.12E-01	4.37E+00
	81.00	32.90	-4.21E-01		2.91E-01
	276.40	7.16	-2.78E-01		6.49E-01
	302.85	18.34	1.77E-01		2.51E-01
	356.01	62.05	2.57E-02		1.12E-01
	383.85	8.94	3.36E-01		5.34E-01
Cs-134	475.36	1.48	1.93E+00	7.22E-02	3.62E+00
	563.25	8.34	-3.73E-02		5.93E-01
	569.33	15.37	-1.10E-01		3.00E-01
	604.72	97.62	3.71E-03		9.33E-02
	795.86	85.46	3.10E-02		7.22E-02
	801.95	8.69	-2.77E-01		6.60E-01
	1038.61	0.99	-1.24E+00		6.68E+00
	1167.97	1.79	-4.22E-01		4.68E+00
	1365.19	3.02	1.10E+00		2.13E+00
+ Cs-137	661.66	* 85.10	9.03E-02	3.68E-02	3.68E-02
Eu-152	121.78	28.67	8.49E-02	1.62E-01	1.73E-01
	244.70	7.61	1.83E-01		6.74E-01
	295.94	0.45	1.90E+01		1.34E+01
	344.28	26.60	4.00E-02		1.62E-01
	367.79	0.86	2.05E+00		5.02E+00
	411.12	2.24	1.03E+00		2.28E+00
	443.96	2.83	2.44E-02		1.53E+00
	488.68	0.42	-1.12E+01		1.16E+01
	563.99	0.49	-1.95E+00		1.00E+01
	586.26	0.46	3.10E+01		1.82E+01
	678.62	0.47	7.06E-01		1.18E+01
	688.67	0.86	2.29E+00		5.90E+00
	719.35	0.28	1.10E+01		2.19E+01
	778.90	12.96	3.23E-03		4.20E-01
	810.45	0.32	1.16E+01		1.86E+01
	867.37	4.26	-5.93E-01		1.30E+00
	919.33	0.43	-2.38E+01		1.35E+01
	964.08	14.65	7.57E-01		6.16E-01
	1085.87	10.24	2.66E-01		6.50E-01
	1089.74	1.73	-1.57E+00		4.09E+00
	1112.07	13.69	-6.42E-01		5.14E-01
	1212.95	1.43	-4.94E+00		5.79E+00
	1249.94	0.19	1.65E+01		4.06E+01
	1299.14	1.63	-4.12E-01		4.36E+00
	1408.01	21.07	2.82E-01		2.97E-01
	1457.64	0.50	2.75E+02		5.59E+01
	1528.10	0.28	-2.46E+00		1.34E+01
Eu-154	123.07	40.40	3.21E-02	1.21E-01	1.21E-01
	247.93	6.89	-2.93E-01		6.52E-01
	591.76	4.95	5.02E-02		1.02E+00
	692.42	1.78	-1.36E+00		2.81E+00
	723.30	20.06	-3.28E-02		3.29E-01
	756.80	4.52	-2.34E-01		1.25E+00
	873.18	12.08	-5.31E-02		4.18E-01

Analysis Report for 19-Aug-19-10005  
L1-10207B-RIGS-005SS

<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Nuclide MDA (pCi/grams)</b>	<b>Line MDA (pCi/grams)</b>	
Eu-154	996.29	10.48	4.31E-01	1.21E-01	6.01E-01	
	1004.76	18.01	-2.27E-01		3.04E-01	
	1274.43	34.80	-1.68E-01		1.91E-01	
	1596.48	1.80	-1.36E+00		3.09E+00	
Eu-155	45.30	1.31	-9.09E+00	2.08E-01	2.38E+01	
	60.01	1.22	-9.83E+00		2.82E+01	
	86.55	*	30.70		1.24E-01	2.08E-01
	105.31		21.10		1.91E-01	2.82E-01
+ Ra-226	186.21	*	3.64	1.26E+00	8.37E-01	
Pa-231	27.36	10.30	3.62E+00	1.99E+00	2.93E+00	
	283.69	1.70	-4.27E+00		2.36E+00	
	300.07	2.47	-4.31E-01		1.99E+00	
	302.65	2.20	3.91E-01		2.07E+00	
	330.06	1.40	2.63E+00		3.46E+00	
	+ U-235	143.76	10.96		2.01E-01	5.32E-02
U-235	163.33	5.08	5.86E-02	5.32E-02	8.85E-01	
	185.71	*	57.20		8.03E-02	5.32E-02
	202.11	1.08	-3.39E+00		4.37E+00	
	205.31	5.01	-1.94E-01		9.58E-01	
Am-241	59.54	35.90	-7.00E-01	9.85E-01	9.85E-01	

+ = Nuclide identified during the nuclide identification

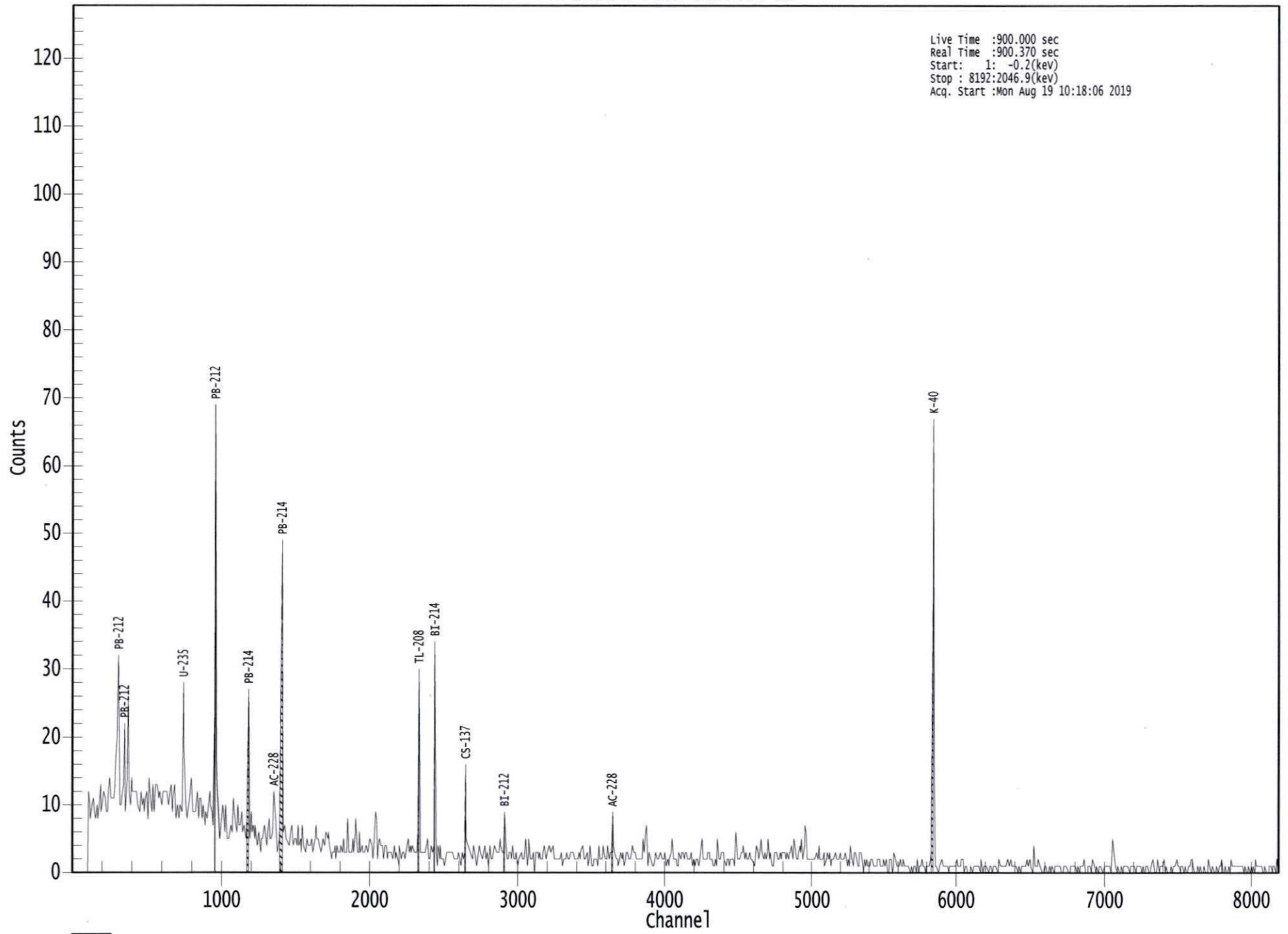
\* = Energy line found in the spectrum

> = MDA value not calculated

@ = Half-life too short to be able to perform the decay correction

? = CAUTION: MDA value is inconsistent with Currie MDA at 95% confidence level

# 000078915.CNF



 ROI Type: 1

Analysis Report for 19-Aug-19-10006  
L1-10207B-RIGS-006SS

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## GAMMA SPECTRUM ANALYSIS

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Sample Identification : 19-Aug-19-10006  
Sample Description : L1-10207B-RIGS-006SS  
Sample Type : Soil  
Unit :  
Sample Point :  
  
Sample Size : 1.428E+03 grams  
Facility : Default  
  
Sample Taken On : 8/15/2019 2:40:00PM  
Acquisition Started : 8/19/2019 10:18:12AM  
  
Procedure : 130G\_SOIL\_1  
Operator : Administrator  
Detector Name : 324  
Geometry : 130G\_SOIL\_1  
Live Time : 900.0 seconds  
Real Time : 900.4 seconds  
  
Dead Time : 0.05 %  
  
Peak Locate Threshold : 3.00  
Peak Locate Range (in channels) : 120 - 4096  
Peak Area Range (in channels) : 120 - 4096  
Identification Energy Tolerance : 1.000 keV  
  
Energy Calibration Used Done On : 9/29/2018  
Efficiency Calibration Used Done On : 8/19/2019  
Efficiency Calibration Description :  
  
Sample Number : 78916  
Fill Height : 1427.76 gram  
Certificate Name : Eu155-Na22  
Certificate Date : 1/30/2013 12:00:00PM

*W. W. W. W.*  
8-19-19

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## PEAK ANALYSIS REPORT

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Peak Analysis Performed on : 8/19/2019 10:33:14AM  
Peak Analysis From Channel : 120  
Peak Analysis To Channel : 4096

*J. M. M.*  
8-20-19

Analysis Report for 19-Aug-19-10006

L1-10207B-RIGS-006SS

	Peak No.	Energy (keV)	ROI start	ROI end	Peak Centroid	Net Peak Area	Net Area Uncertainty	Continuum Counts	FWHM (keV)
M	1	238.64	473 -	487	477.47	3.03E+02	55.40	9.89E+01	1.11
m	2	241.60	473 -	487	483.38	7.31E+01	15.35	1.13E+02	1.11
	3	295.29	585 -	595	590.63	1.12E+02	17.02	7.37E+01	1.49
	4	338.32	671 -	680	676.62	4.19E+01	13.42	6.11E+01	1.32
	5	351.79	699 -	708	703.53	1.80E+02	18.18	6.66E+01	1.13
	6	583.14	1160 -	1170	1165.88	1.04E+02	12.77	2.48E+01	1.01
	7	609.19	1213 -	1223	1217.97	1.69E+02	14.94	2.28E+01	1.39
	8	661.55	1316 -	1328	1322.64	4.93E+01	11.97	3.58E+01	1.45
	9	911.00	1816 -	1827	1821.44	7.34E+01	11.07	1.96E+01	1.41
	10	968.82	1934 -	1942	1937.10	2.64E+01	9.07	2.56E+01	1.55
	11	1120.37	2234 -	2245	2240.30	2.90E+01	9.84	2.70E+01	1.07
	12	1460.54	2914 -	2928	2921.14	5.29E+02	23.44	7.37E+00	1.84

M = First peak in a multiplet region

m = Other peak in a multiplet region

F = Fitted singlet

Errors quoted at 1.000sigma

No background subtract performed on this spectrum.

## NUCLIDE IDENTIFICATION REPORT

Nuclide Library Used : C:\Canberra\Apex\Root\Default\Library\ZION LIB-BNL.NLB

### IDENTIFIED NUCLIDES

Nuclide Name	Id Confidence	Energy (keV)		Yield(%)	Activity (pCi/grams)	Activity Uncertainty
K-40	0.98	1460.82	*	10.66	1.01E+01	6.29E-01
Cs-137	0.99	661.66	*	85.10	7.01E-02	1.75E-02
Tl-208	1.00	583.19	*	85.00	1.37E-01	1.86E-02
Pb-212	1.00	115.18		0.60		
		238.63	*	43.60	4.31E-01	8.61E-02

Analysis Report for 19-Aug-19-10006

L1-10207B-RIGS-006SS

<b>Nuclide Name</b>	<b>Id Confidence</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Activity Uncertainty</b>
Pb-212	1.00	300.09	3.30		
Bi-214	0.99	609.32 *	45.49	4.27E-01	4.56E-02
		768.36	4.89		
		806.18	1.26		
		934.06	3.11		
		1120.29 *	14.92	3.32E-01	1.14E-01
		1155.21	1.63		
		1238.12	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		
		1661.27	1.05		
		1729.59	2.88		
		1764.49	15.30		
		1847.43	2.03		
		2118.51	1.16		
Pb-214	0.99	241.99 *	7.25	6.28E-01	1.41E-01
		295.22 *	18.42	4.26E-01	7.31E-02
		351.93 *	35.60	4.01E-01	5.16E-02
		785.96	1.06		
Ac-228	0.99	129.07	2.42		
		209.25	3.89		
		270.24	3.46		
		328.00	2.95		
		338.32 *	11.27	2.86E-01	9.46E-02
		409.46	1.92		
		463.00	4.40		
		794.95	4.25		
		911.20 *	25.80	4.26E-01	6.67E-02
		964.77	4.99		
		968.97 *	15.80	2.60E-01	9.01E-02
		1588.20	3.22		

\* = Energy line found in the spectrum.

- = Manually added nuclide.

? = Manually edited nuclide.

@ = Energy line not used for Weighted Mean Activity

Energy Tolerance : 1.000 keV

Nuclide confidence index threshold = 0.30

Errors quoted at 1.000sigma

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**INTERFERENCE CORRECTED REPORT**

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Analysis Report for 19-Aug-19-10006  
L1-10207B-RIGS-006SS

<b>Nuclide Name</b>	<b>Nuclide Id Confidence</b>	<b>Wt mean Activity (pCi/grams)</b>	<b>Wt mean Activity Uncertainty</b>	<b>Comments</b>
K-40	0.987	1.01E+01	6.29E-01	
Cs-137	0.998	7.01E-02	1.75E-02	
Tl-208	1.000	1.37E-01	1.86E-02	
X Bi-211	0.920			
Pb-212	1.000	4.31E-01	8.61E-02	
Bi-214	0.999	4.14E-01	4.23E-02	
Pb-214	0.995	4.27E-01	4.04E-02	
Ac-228	0.997	3.47E-01	4.67E-02	

? = 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 1.000sigma

Analysis Report for 19-Aug-19-10006  
L1-10207B-RIGS-006SS

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## UNIDENTIFIED PEAKS

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Peak Locate Performed on : 8/19/2019 10:33:14AM  
Peak Locate From Channel : 120  
Peak Locate To Channel : 4096

Peak No.	Energy (keV)	Peak Size (CPS)	Peak CPS (%) Uncertainty	Peak Type	Tolerance Nuclide
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All peaks were identified.

M = First peak in a multiplet region  
m = Other peak in a multiplet region  
F = Fitted singlet  
Errors quoted at 1.000sigma

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## NUCLIDE MDA REPORT

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Nuclide Library Used : C:\Canberra\Apex\Root\Default\Library\ZION LIB-BNL.NLB

Nuclide Name	Energy (keV)	Yield(%)	Activity (pCi/grams)	Nuclide MDA (pCi/grams)	Line MDA (pCi/grams)
An Pk	511.00	100.00	9.34E-02	6.50E-02	6.50E-02
BE-7	477.60	10.44	2.93E-01	4.11E-01	4.11E-01
+ K-40	1460.82	* 10.66	1.01E+01	3.53E-01	3.53E-01
Mn-54	834.85	99.98	3.49E-03	4.88E-02	4.88E-02
Co-60	1173.23	99.85	-5.52E-03	6.28E-02	6.95E-02
	1332.49	99.98	2.21E-02		6.28E-02
Nb-94	702.65	99.81	-3.15E-03	4.33E-02	4.33E-02
	871.09	99.89	2.97E-02		5.09E-02
Ag-108m	79.13	6.60	8.83E-01	3.72E-02	1.51E+00
	433.94	90.50	-2.77E-02		3.72E-02
	614.28	89.80	-6.08E-02		6.68E-02
	722.94	90.80	9.27E-04		5.34E-02
Sb-125	176.31	6.84	8.81E-02	1.20E-01	5.91E-01
	380.45	1.52	-1.59E+00		2.35E+00
	427.87	29.60	-2.13E-02		1.20E-01
	463.36	10.49	2.10E-01		4.25E-01
	600.60	17.65	-6.31E-02		2.29E-01
	606.71	4.98	-2.44E-01		1.66E+00
	635.95	11.22	-1.67E-02		3.70E-01



Analysis Report for 19-Aug-19-10006  
L1-10207B-RIGS-006SS

<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Nuclide MDA (pCi/grams)</b>	<b>Line MDA (pCi/grams)</b>
Sb-125	671.44	1.79	-3.97E-01	1.20E-01	2.50E+00
Ba-133	79.61	2.65	1.08E+00	8.93E-02	3.51E+00
	81.00	32.90	-2.45E-01		2.30E-01
	276.40	7.16	9.36E-02		5.26E-01
	302.85	18.34	6.53E-02		2.01E-01
	356.01	62.05	-5.51E-02		8.93E-02
	383.85	8.94	1.05E-01		4.31E-01
Cs-134	475.36	1.48	-2.48E-01	5.45E-02	2.58E+00
	563.25	8.34	-1.38E-01		4.04E-01
	569.33	15.37	4.68E-03		2.35E-01
	604.72	97.62	-2.87E-02		7.23E-02
	795.86	85.46	9.20E-03		5.45E-02
	801.95	8.69	-1.44E-01		5.02E-01
	1038.61	0.99	-1.14E+00		5.09E+00
	1167.97	1.79	2.83E-01		4.00E+00
	1365.19	3.02	-1.94E-01		1.64E+00
+ Cs-137	661.66	* 85.10	7.01E-02	5.09E-02	5.09E-02
Eu-152	121.78	28.67	-2.81E-02	1.28E-01	1.28E-01
	244.70	7.61	-1.35E-01		5.68E-01
	295.94	0.45	-1.01E+00		1.11E+01
	344.28	26.60	-9.32E-02		1.54E-01
	367.79	0.86	3.30E-01		4.05E+00
	411.12	2.24	1.04E-02		1.77E+00
	443.96	2.83	-7.57E-01		1.31E+00
	488.68	0.42	2.18E+00		9.73E+00
	563.99	0.49	-2.10E+00		6.94E+00
	586.26	0.46	-7.27E+00		1.47E+01
	678.62	0.47	-3.26E-01		9.70E+00
	688.67	0.86	3.08E-01		5.43E+00
	719.35	0.28	-2.60E+00		1.42E+01
	778.90	12.96	1.16E-01		3.46E-01
	810.45	0.32	-3.72E+00		1.42E+01
	867.37	4.26	-4.83E-01		1.14E+00
	919.33	0.43	-1.40E+01		1.11E+01
	964.08	14.65	-4.90E-01		4.47E-01
	1085.87	10.24	-3.84E-01		4.63E-01
	1089.74	1.73	-1.30E-01		3.04E+00
	1112.07	13.69	-6.16E-02		4.18E-01
	1212.95	1.43	1.65E+00		5.16E+00
	1249.94	0.19	5.67E+00		3.63E+01
	1299.14	1.63	-3.13E+00		2.81E+00
	1408.01	21.07	4.14E-02		2.40E-01
	1457.64	0.50	-6.17E+00		4.65E+01
	1528.10	0.28	2.44E+00		1.23E+01
Eu-154	123.07	40.40	2.40E-02	9.40E-02	9.40E-02
	247.93	6.89	-2.83E-01		5.15E-01
	591.76	4.95	-2.75E-01		7.38E-01
	692.42	1.78	2.00E+00		2.61E+00
	723.30	20.06	1.29E-01		2.54E-01
	756.80	4.52	5.02E-02		1.02E+00
	873.18	12.08	-4.03E-02		3.86E-01

Analysis Report for 19-Aug-19-10006

L1-10207B-RIGS-006SS

<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Nuclide MDA (pCi/grams)</b>	<b>Line MDA (pCi/grams)</b>
Eu-154	996.29	10.48	9.35E-03	9.40E-02	4.67E-01
	1004.76	18.01	5.76E-02		2.87E-01
	1274.43	34.80	8.89E-03		1.87E-01
	1596.48	1.80	-1.03E+00		2.37E+00
Eu-155	45.30	1.31	1.45E+00	2.13E-01	1.29E+01
	60.01	1.22	-1.73E+00		1.49E+01
	86.55	30.70	1.30E-01		2.13E-01
Ra-226	105.31	21.10	3.57E-02	1.19E+00	2.21E-01
	186.21	3.64	7.28E-01		1.19E+00
Pa-231	27.36	10.30	9.29E-01	1.29E+00	1.29E+00
	283.69	1.70	9.22E-01		2.12E+00
	300.07	2.47	-2.18E-01		1.48E+00
	302.65	2.20	5.44E-01		1.68E+00
	330.06	1.40	1.97E+00		3.02E+00
	143.76	10.96	9.94E-03		7.41E-02
163.33	5.08	-1.16E-01	7.90E-01		
185.71	57.20	1.58E-02	7.41E-02		
202.11	1.08	1.01E+00	3.75E+00		
U-235	205.31	5.01	-8.01E-01	5.08E-01	7.32E-01
	59.54	35.90	-2.28E-01		5.08E-01

+ = Nuclide identified during the nuclide identification

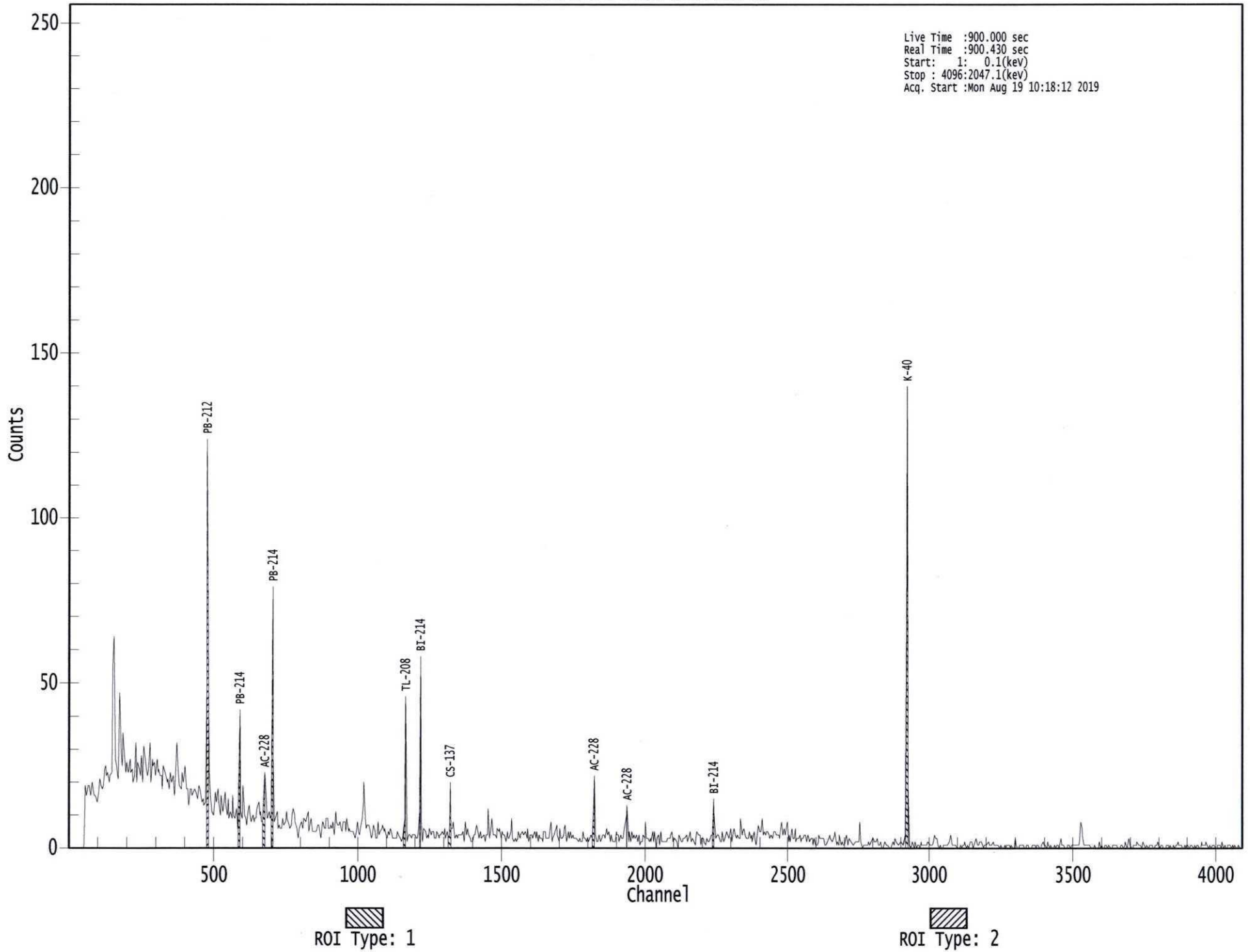
\* = Energy line found in the spectrum

&gt; = MDA value not calculated

@ = Half-life too short to be able to perform the decay correction

? = CAUTION: MDA value is inconsistent with Currie MDA at 95% confidence level

Live Time :900.000 sec  
Real Time :900.430 sec  
Start: 1: 0.1(keV)  
Stop : 4096:2047.1(keV)  
Acq. Start :Mon Aug 19 10:18:12 2019



Analysis Report for 19-Aug-19-10007  
L1-10207B-RIGS-007SS

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## GAMMA SPECTRUM ANALYSIS

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Sample Identification : 19-Aug-19-10007  
Sample Description : L1-10207B-RIGS-007SS  
Sample Type : Soil  
Unit :  
Sample Point :  
  
Sample Size : 1.315E+03 grams  
Facility : Default  
  
Sample Taken On : 8/15/2019 2:42:00PM  
Acquisition Started : 8/19/2019 10:18:18AM  
  
Procedure : 130G\_SOIL\_1  
Operator : Administrator  
Detector Name : P40818B  
Geometry : 130G\_SOIL\_1  
Live Time : 900.0 seconds  
Real Time : 901.6 seconds  
  
Dead Time : 0.18 %  
  
Peak Locate Threshold : 3.00  
Peak Locate Range (in channels) : 120 - 8192  
Peak Area Range (in channels) : 120 - 8192  
Identification Energy Tolerance : 1.000 keV  
  
Energy Calibration Used Done On : 1/29/2019  
Efficiency Calibration Used Done On : 8/19/2019  
Efficiency Calibration Description :  
  
Sample Number : 78917  
Fill Height : 1315.23 gram  
Certificate Name : Eu155-Na22  
Certificate Date : 1/30/2012 12:00:00PM

*J. Stahl*  
8-19-19

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## PEAK ANALYSIS REPORT

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Peak Analysis Performed on : 8/19/2019 10:33:39AM

Peak Analysis From Channel : 120  
Peak Analysis To Channel : 8192

*J. Stahl*  
8-20-19

Analysis Report for 19-Aug-19-10007

L1-10207B-RIGS-007SS

	<b>Peak No.</b>	<b>Energy (keV)</b>	<b>ROI start</b>	<b>ROI end</b>	<b>Peak Centroid</b>	<b>Net Peak Area</b>	<b>Net Area Uncertainty</b>	<b>Continuum Counts</b>	<b>FWHM (keV)</b>
M	1	75.04	294 -	313	300.90	4.19E+01	17.35	5.74E+01	0.42
m	2	77.19	294 -	313	309.49	3.08E+01	12.60	6.84E+01	0.43
	3	238.65	948 -	960	954.69	1.77E+02	19.21	7.31E+01	0.83
	4	295.09	1175 -	1186	1180.25	8.60E+01	12.99	3.30E+01	0.39
	5	338.13	1346 -	1359	1352.30	5.39E+01	11.53	2.81E+01	0.44
	6	351.74	1401 -	1415	1406.68	1.12E+02	15.10	4.04E+01	0.95
	7	582.84	2325 -	2340	2330.59	6.40E+01	11.26	2.10E+01	0.42
	8	609.00	2425 -	2444	2435.16	1.11E+02	13.16	1.76E+01	1.18
	9	661.19	2639 -	2651	2643.88	3.35E+01	8.46	1.45E+01	0.32
	10	910.68	3633 -	3648	3641.70	5.20E+01	8.72	8.00E+00	0.58
	11	1460.09	5830 -	5850	5840.18	3.55E+02	18.84	0.00E+00	1.91

M = First peak in a multiplet region

m = Other peak in a multiplet region

F = Fitted singlet

Errors quoted at 1.000sigma

No background subtract performed on this spectrum.

## NUCLIDE IDENTIFICATION REPORT

Nuclide Library Used : C:\Canberra\Apex\Root\Default\Library\ZION LIB-BNL.NLB

### IDENTIFIED NUCLIDES

<b>Nuclide Name</b>	<b>Id Confidence</b>	<b>Energy (keV)</b>		<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Activity Uncertainty</b>
K-40	0.91	1460.82	*	10.66	9.31E+00	6.38E-01
Cs-137	0.96	661.66	*	85.10	6.35E-02	1.65E-02
Tl-208	0.98	583.19	*	85.00	1.11E-01	2.07E-02
Pb-212	1.00	115.18		0.60		
		238.63	*	43.60	3.27E-01	4.43E-02
		300.09		3.30		

Analysis Report for 19-Aug-19-10007

L1-10207B-RIGS-007SS

<b>Nuclide Name</b>	<b>Id Confidence</b>	<b>Energy (keV)</b>		<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Activity Uncertainty</b>
Pb212-XR	0.99	74.82	*	10.28	9.76E-01	4.16E-01
		77.11	*	17.10	3.83E-01	1.61E-01
		87.35		3.97		
		89.78		1.46		
Bi-214	0.99	609.32	*	45.49	3.74E-01	4.95E-02
		768.36		4.89		
		806.18		1.26		
		934.06		3.11		
		1120.29		14.92		
		1155.21		1.63		
		1238.12		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		
		1661.27		1.05		
		1729.59		2.88		
1764.49		15.30				
1847.43		2.03				
2118.51		1.16				
Pb-214	0.99	241.99		7.25		
		295.22	*	18.42	4.25E-01	7.27E-02
		351.93	*	35.60	3.24E-01	5.10E-02
Ac-228	0.98	785.96		1.06		
		129.07		2.42		
		209.25		3.89		
		270.24		3.46		
		328.00		2.95		
		338.32	*	11.27	4.81E-01	1.10E-01
		409.46		1.92		
		463.00		4.40		
		794.95		4.25		
		911.20	*	25.80	4.06E-01	7.03E-02
		964.77		4.99		
968.97		15.80				
1588.20		3.22				

\* = Energy line found in the spectrum.

- = Manually added nuclide.

? = Manually edited nuclide.

@ = Energy line not used for Weighted Mean Activity

Energy Tolerance : 1.000 keV

Nuclide confidence index threshold = 0.30

Errors quoted at 1.000sigma

Analysis Report for 19-Aug-19-10007

L1-10207B-RIGS-007SS

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## INTERFERENCE CORRECTED REPORT

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<b>Nuclide Name</b>	<b>Nuclide Id Confidence</b>	<b>Wt mean Activity (pCi/grams)</b>	<b>Wt mean Activity Uncertainty</b>	<b>Comments</b>
K-40	0.917	9.31E+00	6.38E-01	
Cs-137	0.966	6.35E-02	1.65E-02	
Tl-208	0.981	1.11E-01	2.07E-02	
X Bi-211	0.931			
Pb-212	1.000	3.27E-01	4.43E-02	
Pb212-XR	0.997	4.61E-01	1.50E-01	
Bi-214	0.993	3.74E-01	4.95E-02	
Pb-214	0.996	3.58E-01	4.17E-02	
X Pb214-XR	0.997			
Ac-228	0.986	4.27E-01	5.93E-02	

? = 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 1.000sigma

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Analysis Report for 19-Aug-19-10007  
L1-10207B-RIGS-007SS

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## UNIDENTIFIED PEAKS

---

Peak Locate Performed on : 8/19/2019 10:33:39AM  
Peak Locate From Channel : 120  
Peak Locate To Channel : 8192

Peak No.	Energy (keV)	Peak Size (CPS)	Peak CPS (%) Uncertainty	Peak Type	Tolerance Nuclide
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All peaks were identified.

M = First peak in a multiplet region  
m = Other peak in a multiplet region  
F = Fitted singlet  
Errors quoted at 1.000sigma

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## NUCLIDE MDA REPORT

---

Nuclide Library Used : C:\Canberra\Apex\Root\Default\Library\ZION LIB-BNL.NLB

Nuclide Name	Energy (keV)	Yield(%)	Activity (pCi/grams)	Nuclide MDA (pCi/grams)	Line MDA (pCi/grams)
An Pk	511.00	100.00	1.07E-01	7.41E-02	7.41E-02
BE-7	477.60	10.44	-3.32E-01	4.98E-01	4.98E-01
+ K-40	1460.82	* 10.66	9.31E+00	7.54E-02	7.54E-02
Mn-54	834.85	99.98	-4.01E-03	5.57E-02	5.57E-02
Co-60	1173.23	99.85	5.72E-02	7.13E-02	9.14E-02
	1332.49	99.98	3.46E-02		7.13E-02
Nb-94	702.65	99.81	-1.14E-02	5.20E-02	5.20E-02
	871.09	99.89	-3.97E-02		5.69E-02
Ag-108m	79.13	6.60	1.58E-01	5.11E-02	1.91E+00
	433.94	90.50	2.11E-02		5.11E-02
	614.28	89.80	3.01E-02		7.35E-02
	722.94	90.80	4.87E-02		7.86E-02
Sb-125	176.31	6.84	2.18E-01	1.57E-01	6.46E-01
	380.45	1.52	-1.77E-01		2.92E+00
	427.87	29.60	-3.93E-02		1.57E-01
	463.36	10.49	1.82E-01		4.86E-01
	600.60	17.65	1.90E-02		2.72E-01
	606.71	4.98	3.71E+00		1.85E+00
	635.95	11.22	-7.02E-02		4.33E-01



Analysis Report for 19-Aug-19-10007

L1-10207B-RIGS-007SS

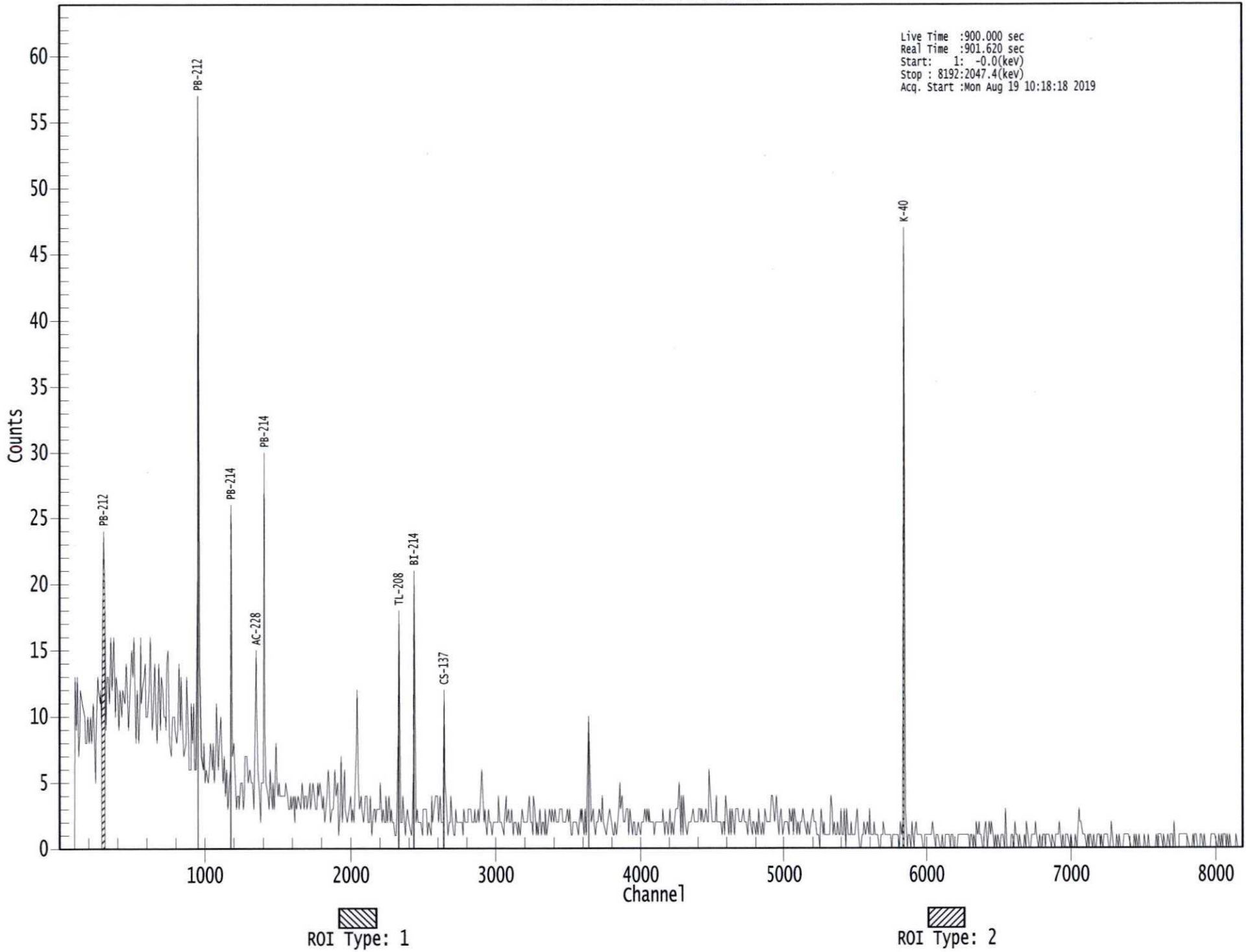
<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Nuclide MDA (pCi/grams)</b>	<b>Line MDA (pCi/grams)</b>
Sb-125	671.44	1.79	1.08E-01	1.57E-01	2.78E+00
Ba-133	79.61	2.65	-1.63E+00	8.57E-02	4.57E+00
	81.00	32.90	-2.74E-01		3.33E-01
	276.40	7.16	8.70E-03		6.41E-01
	302.85	18.34	-1.14E-01		2.33E-01
	356.01	62.05	-9.64E-04		8.57E-02
	383.85	8.94	-1.30E-01		4.79E-01
Cs-134	475.36	1.48	2.78E+00	6.73E-02	3.65E+00
	563.25	8.34	-5.80E-01		5.22E-01
	569.33	15.37	1.59E-01		3.01E-01
	604.72	97.62	-1.79E-02		9.02E-02
	795.86	85.46	-2.47E-02		6.73E-02
	801.95	8.69	-2.55E-01		6.99E-01
	1038.61	0.99	1.17E+00		6.89E+00
	1167.97	1.79	3.73E+00		4.91E+00
	1365.19	3.02	1.32E+00		1.89E+00
+ Cs-137	661.66	* 85.10	6.35E-02	4.51E-02	4.51E-02
Eu-152	121.78	28.67	4.83E-02	1.67E-01	1.87E-01
	244.70	7.61	-2.69E-03		6.67E-01
	295.94	0.45	1.06E+01		1.34E+01
	344.28	26.60	-6.56E-02		1.67E-01
	367.79	0.86	-4.78E+00		5.05E+00
	411.12	2.24	-7.62E-02		2.18E+00
	443.96	2.83	1.66E+00		1.73E+00
	488.68	0.42	-1.27E+01		1.04E+01
	563.99	0.49	-1.62E+00		9.33E+00
	586.26	0.46	-7.97E-01		1.70E+01
	678.62	0.47	-4.52E+00		9.36E+00
	688.67	0.86	6.58E-02		5.20E+00
	719.35	0.28	-2.30E+00		2.08E+01
	778.90	12.96	1.39E-02		4.12E-01
	810.45	0.32	8.05E-01		1.85E+01
	867.37	4.26	-1.16E+00		1.35E+00
	919.33	0.43	-5.80E+00		1.38E+01
	964.08	14.65	2.76E-01		5.81E-01
	1085.87	10.24	-4.23E-01		6.36E-01
	1089.74	1.73	-9.21E-01		4.06E+00
	1112.07	13.69	-2.58E-01		5.53E-01
	1212.95	1.43	-1.78E+00		6.01E+00
	1249.94	0.19	2.81E+01		4.58E+01
	1299.14	1.63	-3.94E-01		4.08E+00
	1408.01	21.07	6.07E-02		2.42E-01
	1457.64	0.50	2.01E+02		5.23E+01
	1528.10	0.28	-7.96E+00		1.50E+01
Eu-154	123.07	40.40	4.33E-02	1.35E-01	1.35E-01
	247.93	6.89	5.57E-01		6.61E-01
	591.76	4.95	-8.08E-01		9.45E-01
	692.42	1.78	-1.22E+00		2.65E+00
	723.30	20.06	3.49E-01		3.61E-01
	756.80	4.52	-1.05E-01		1.19E+00
	873.18	12.08	1.70E-01		4.99E-01

Analysis Report for 19-Aug-19-10007  
L1-10207B-RIGS-007SS

<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Nuclide MDA (pCi/grams)</b>	<b>Line MDA (pCi/grams)</b>
Eu-154	996.29	10.48	-3.76E-01	1.35E-01	5.08E-01
	1004.76	18.01	2.54E-01		3.79E-01
	1274.43	34.80	5.74E-02		2.12E-01
	1596.48	1.80	8.24E-01		3.25E+00
Eu-155	45.30	1.31	-4.59E+00	3.12E-01	3.51E+01
	60.01	1.22	-7.59E-01		3.42E+01
	86.55	30.70	2.45E-02		3.48E-01
	105.31	21.10	-8.07E-02		3.12E-01
Ra-226	186.21	3.64	1.21E+00	1.40E+00	1.40E+00
Pa-231	27.36	10.30	4.67E+00	1.81E+00	4.19E+00
	283.69	1.70	-7.51E-01		2.49E+00
	300.07	2.47	-1.29E+00		1.81E+00
	302.65	2.20	2.98E-01		1.99E+00
	330.06	1.40	-1.77E+00		3.21E+00
U-235	143.76	10.96	-5.12E-01	8.92E-02	4.81E-01
	163.33	5.08	-9.14E-02		9.25E-01
	185.71	57.20	6.57E-02		8.92E-02
	202.11	1.08	-3.77E+00		4.14E+00
	205.31	5.01	-6.35E-01		8.86E-01
Am-241	59.54	35.90	8.71E-02	1.23E+00	1.23E+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  
 ? = CAUTION: MDA value is inconsistent with Currie MDA at 95% confidence level

# 000078917.CNF



Analysis Report for 19-Aug-19-10008  
L1-10207B-RIGS-008SS

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## GAMMA SPECTRUM ANALYSIS

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Sample Identification : 19-Aug-19-10008  
Sample Description : L1-10207B-RIGS-008SS  
Sample Type : Soil  
Unit :  
Sample Point :  
  
Sample Size : 1.307E+03 grams  
Facility : Default  
  
Sample Taken On : 8/15/2019 2:44:00PM  
Acquisition Started : 8/19/2019 10:36:43AM  
  
Procedure : 130G\_SOIL\_1  
Operator : Administrator  
Detector Name : 324  
Geometry : 130G\_SOIL\_1  
Live Time : 900.0 seconds  
Real Time : 900.4 seconds  
  
Dead Time : 0.04 %  
  
Peak Locate Threshold : 3.00  
Peak Locate Range (in channels) : 120 - 4096  
Peak Area Range (in channels) : 120 - 4096  
Identification Energy Tolerance : 1.000 keV  
  
Energy Calibration Used Done On : 9/29/2018  
Efficiency Calibration Used Done On : 8/19/2019  
Efficiency Calibration Description :  
  
Sample Number : 78918  
Fill Height : 1306.51 gram  
Certificate Name : Eu155-Na22  
Certificate Date : 1/30/2013 12:00:00PM

*J.P. Nadeau*  
8-19-19

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## PEAK ANALYSIS REPORT

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Peak Analysis Performed on : 8/19/2019 10:51:46AM  
Peak Analysis From Channel : 120  
Peak Analysis To Channel : 4096

*J.M.H.*  
8-20-19

Analysis Report for 19-Aug-19-10008  
L1-10207B-RIGS-008SS

Peak No.	Energy (keV)	ROI start	ROI end	Peak Centroid	Net Peak Area	Net Area Uncertainty	Continuum Counts	FWHM (keV)
1	186.04	368 -	376	372.38	6.72E+01	20.36	1.63E+02	1.08
2	238.65	473 -	481	477.48	2.22E+02	24.58	1.72E+02	1.30
3	295.14	585 -	595	590.34	9.68E+01	16.72	7.62E+01	0.79
4	338.42	671 -	681	676.81	7.24E+01	14.13	5.36E+01	1.55
5	352.01	699 -	708	703.96	2.08E+02	17.24	3.94E+01	1.20
6	583.10	1161 -	1171	1165.81	9.51E+01	12.92	2.99E+01	1.43
7	609.24	1212 -	1223	1218.06	1.75E+02	15.44	2.55E+01	1.43
8	911.23	1818 -	1827	1821.92	8.05E+01	10.75	1.55E+01	1.49
9	1460.63	2913 -	2928	2921.31	5.48E+02	24.29	1.39E+01	1.83
10	1764.18	3523 -	3535	3529.22	2.78E+01	6.02	3.25E+00	1.54

M = First peak in a multiplet region  
m = Other peak in a multiplet region  
F = Fitted singlet  
Errors quoted at 1.000sigma

No background subtract performed on this spectrum.

## NUCLIDE IDENTIFICATION REPORT

Nuclide Library Used : C:\Canberra\Apex\Root\Default\Library\ZION LIB-BNL.NLB

### IDENTIFIED NUCLIDES

Nuclide Name	Id Confidence	Energy (keV)	Yield(%)	Activity (pCi/grams)	Activity Uncertainty
K-40	0.99	1460.82 *	10.66	1.08E+01	6.72E-01
Tl-208	0.99	583.19 *	85.00	1.28E-01	1.90E-02
Pb-212	1.00	115.18	0.60		
		238.63 *	43.60	3.22E-01	4.41E-02
		300.09	3.30		
Bi-214	0.99	609.32 *	45.49	4.51E-01	4.83E-02
		768.36	4.89		

Analysis Report for 19-Aug-19-10008  
L1-10207B-RIGS-008SS

<b>Nuclide Name</b>	<b>Id Confidence</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Activity Uncertainty</b>
Bi-214	0.99	806.18	1.26		
		934.06	3.11		
		1120.29	14.92		
		1155.21	1.63		
		1238.12	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		
		1661.27	1.05		
		1729.59	2.88		
		1764.49 *	15.30	4.41E-01	9.73E-02
		1847.43	2.03		
2118.51	1.16				
Pb-214	0.99	241.99	7.25		
		295.22 *	18.42	3.76E-01	7.14E-02
		351.93 *	35.60	4.72E-01	5.44E-02
		785.96	1.06		
Ra-226	0.99	186.21 *	3.64	1.03E+00	3.23E-01
Ac-228	0.74	129.07	2.42		
		209.25	3.89		
		270.24	3.46		
		328.00	2.95		
		338.32 *	11.27	5.06E-01	1.07E-01
		409.46	1.92		
		463.00	4.40		
		794.95	4.25		
		911.20 *	25.80	4.79E-01	6.72E-02
		964.77	4.99		
		968.97	15.80		
		1588.20	3.22		
U-235	0.98	143.76	10.96		
		163.33	5.08		
		185.71 *	57.20	6.56E-02	2.06E-02
		202.11	1.08		
		205.31	5.01		

\* = Energy line found in the spectrum.

- = Manually added nuclide.

? = Manually edited nuclide.

@ = Energy line not used for Weighted Mean Activity

Energy Tolerance : 1.000 keV

Nuclide confidence index threshold = 0.30

Errors quoted at 1.000sigma

Analysis Report for 19-Aug-19-10008

L1-10207B-RIGS-008SS

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## INTERFERENCE CORRECTED REPORT

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	<b>Nuclide Name</b>	<b>Nuclide Id Confidence</b>	<b>Wt mean Activity (pCi/grams)</b>	<b>Wt mean Activity Uncertainty</b>	<b>Comments</b>
	K-40	0.994	1.08E+01	6.72E-01	
	Tl-208	0.999	1.28E-01	1.90E-02	
X	Bi-211	0.869			
	Pb-212	1.000	3.22E-01	4.41E-02	
	Bi-214	0.997	4.49E-01	4.32E-02	
	Pb-214	0.999	4.37E-01	4.33E-02	
?	Ra-226	0.995	1.03E+00	3.23E-01	
	Ac-228	0.743	4.87E-01	5.69E-02	
?	U-235 <i>Ra-226</i>	0.988	6.56E-02	2.06E-02	

? = 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 1.000sigma

*U-235 only 1 peak 8/19/19 JPW*

Analysis Report for 19-Aug-19-10008  
L1-10207B-RIGS-008SS

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## UNIDENTIFIED PEAKS

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Peak Locate Performed on : 8/19/2019 10:51:46AM  
Peak Locate From Channel : 120  
Peak Locate To Channel : 4096

Peak No.	Energy (keV)	Peak Size (CPS)	Peak CPS (%) Uncertainty	Peak Type	Tolerance Nuclide
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All peaks were identified.

M = First peak in a multiplet region  
m = Other peak in a multiplet region  
F = Fitted singlet  
Errors quoted at 1.000sigma

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## NUCLIDE MDA REPORT

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Nuclide Library Used : C:\Canberra\Apex\Root\Default\Library\ZION LIB-BNL.NLB

Nuclide Name	Energy (keV)	Yield(%)	Activity (pCi/grams)	Nuclide MDA (pCi/grams)	Line MDA (pCi/grams)
An Pk	511.00	100.00	7.35E-02	6.09E-02	6.09E-02
BE-7	477.60	10.44	1.38E-01	3.83E-01	3.83E-01
+ K-40	1460.82	* 10.66	1.08E+01	4.90E-01	4.90E-01
Mn-54	834.85	99.98	4.42E-02	5.32E-02	5.32E-02
Co-60	1173.23	99.85	5.85E-02	6.54E-02	7.32E-02
	1332.49	99.98	2.95E-02		6.54E-02
Nb-94	702.65	99.81	2.39E-02	4.84E-02	4.94E-02
	871.09	99.89	1.14E-02		4.84E-02
Ag-108m	79.13	6.60	8.61E-01	4.48E-02	1.41E+00
	433.94	90.50	1.24E-02		4.48E-02
	614.28	89.80	-3.37E-02		7.18E-02
	722.94	90.80	-1.38E-02		5.29E-02
Sb-125	176.31	6.84	3.73E-01	1.23E-01	6.01E-01
	380.45	1.52	-8.86E-01		2.46E+00
	427.87	29.60	-7.63E-02		1.23E-01
	463.36	10.49	1.70E-01		3.83E-01
	600.60	17.65	4.08E-03		2.41E-01
	606.71	4.98	-1.04E-01		1.72E+00
	635.95	11.22	3.09E-03		3.94E-01



Analysis Report for 19-Aug-19-10008

L1-10207B-RIGS-008SS

<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Nuclide MDA (pCi/grams)</b>	<b>Line MDA (pCi/grams)</b>
Sb-125	671.44	1.79	1.70E-01	1.23E-01	2.49E+00
Ba-133	79.61	2.65	-4.27E-01	9.31E-02	3.17E+00
	81.00	32.90	-4.62E-01		2.06E-01
	276.40	7.16	-2.72E-02		5.20E-01
	302.85	18.34	7.01E-02		2.03E-01
	356.01	62.05	-1.08E-01		9.31E-02
	383.85	8.94	-9.63E-03		4.25E-01
Cs-134	475.36	1.48	-4.96E-01	5.78E-02	2.42E+00
	563.25	8.34	-9.23E-02		4.46E-01
	569.33	15.37	7.52E-02		2.44E-01
	604.72	97.62	-1.41E-02		7.48E-02
	795.86	85.46	2.66E-02		5.78E-02
	801.95	8.69	4.85E-02		5.65E-01
	1038.61	0.99	-3.13E+00		6.12E+00
	1167.97	1.79	7.32E-01		3.72E+00
	1365.19	3.02	6.44E-01		1.51E+00
Cs-137	661.66	85.10	7.33E-02	6.73E-02	6.73E-02
Eu-152	121.78	28.67	-1.47E-02	1.25E-01	1.25E-01
	244.70	7.61	-2.67E-01		5.49E-01
	295.94	0.45	-3.75E-01		1.10E+01
	344.28	26.60	-5.83E-02		1.49E-01
	367.79	0.86	1.43E+00		4.25E+00
	411.12	2.24	9.33E-01		1.90E+00
	443.96	2.83	-5.28E-01		1.33E+00
	488.68	0.42	3.34E+00		9.89E+00
	563.99	0.49	-2.52E+00		7.38E+00
	586.26	0.46	-6.63E+00		1.48E+01
	678.62	0.47	3.08E+00		9.58E+00
	688.67	0.86	-1.02E+00		5.16E+00
	719.35	0.28	-4.00E+00		1.62E+01
	778.90	12.96	-9.36E-02		3.74E-01
	810.45	0.32	-2.24E+00		1.57E+01
	867.37	4.26	8.66E-01		1.21E+00
	919.33	0.43	-7.48E+00		1.17E+01
	964.08	14.65	1.16E-01		4.81E-01
	1085.87	10.24	-2.38E-01		5.46E-01
	1089.74	1.73	2.69E-01		3.43E+00
	1112.07	13.69	-4.26E-01		4.09E-01
	1212.95	1.43	1.19E+00		5.50E+00
	1249.94	0.19	-1.19E+01		3.31E+01
	1299.14	1.63	8.63E-01		3.25E+00
	1408.01	21.07	4.82E-02		2.42E-01
	1457.64	0.50	-2.51E+00		4.91E+01
	1528.10	0.28	-9.09E+00		1.20E+01
Eu-154	123.07	40.40	-1.21E-02	8.89E-02	8.89E-02
	247.93	6.89	3.32E-01		5.44E-01
	591.76	4.95	-4.63E-02		8.50E-01
	692.42	1.78	8.83E-01		2.73E+00
	723.30	20.06	1.97E-02		2.42E-01
	756.80	4.52	3.87E-01		1.06E+00
	873.18	12.08	-2.38E-01		3.76E-01

Analysis Report for 19-Aug-19-10008

L1-10207B-RIGS-008SS

<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Nuclide MDA (pCi/grams)</b>	<b>Line MDA (pCi/grams)</b>
Eu-154	996.29	10.48	-1.60E-01	8.89E-02	5.28E-01
	1004.76	18.01	2.94E-01		3.32E-01
	1274.43	34.80	-1.39E-01		1.58E-01
	1596.48	1.80	1.76E+00		2.61E+00
Eu-155	45.30	1.31	-4.60E+00	2.12E-01	1.30E+01
	60.01	1.22	-2.83E+00		1.39E+01
	86.55	30.70	5.23E-02		2.20E-01
	105.31	21.10	7.58E-02		2.12E-01
+ Ra-226	186.21	* 3.64	1.03E+00	1.01E+00	1.01E+00
Pa-231	27.36	10.30	2.76E-01	1.18E+00	1.18E+00
	283.69	1.70	-1.11E-01		2.17E+00
	300.07	2.47	-1.04E-01		1.49E+00
	302.65	2.20	5.84E-01		1.69E+00
	330.06	1.40	1.65E+00		3.10E+00
+ U-235	143.76	10.96	3.38E-02	6.45E-02	3.60E-01
U-235	163.33	5.08	-5.68E-02	6.45E-02	7.96E-01
	185.71	* 57.20	6.56E-02		6.45E-02
	202.11	1.08	-1.80E+00		3.74E+00
	205.31	5.01	-1.13E-01		8.53E-01
Am-241	59.54	35.90	-1.66E-01	4.78E-01	4.78E-01

+ = Nuclide identified during the nuclide identification

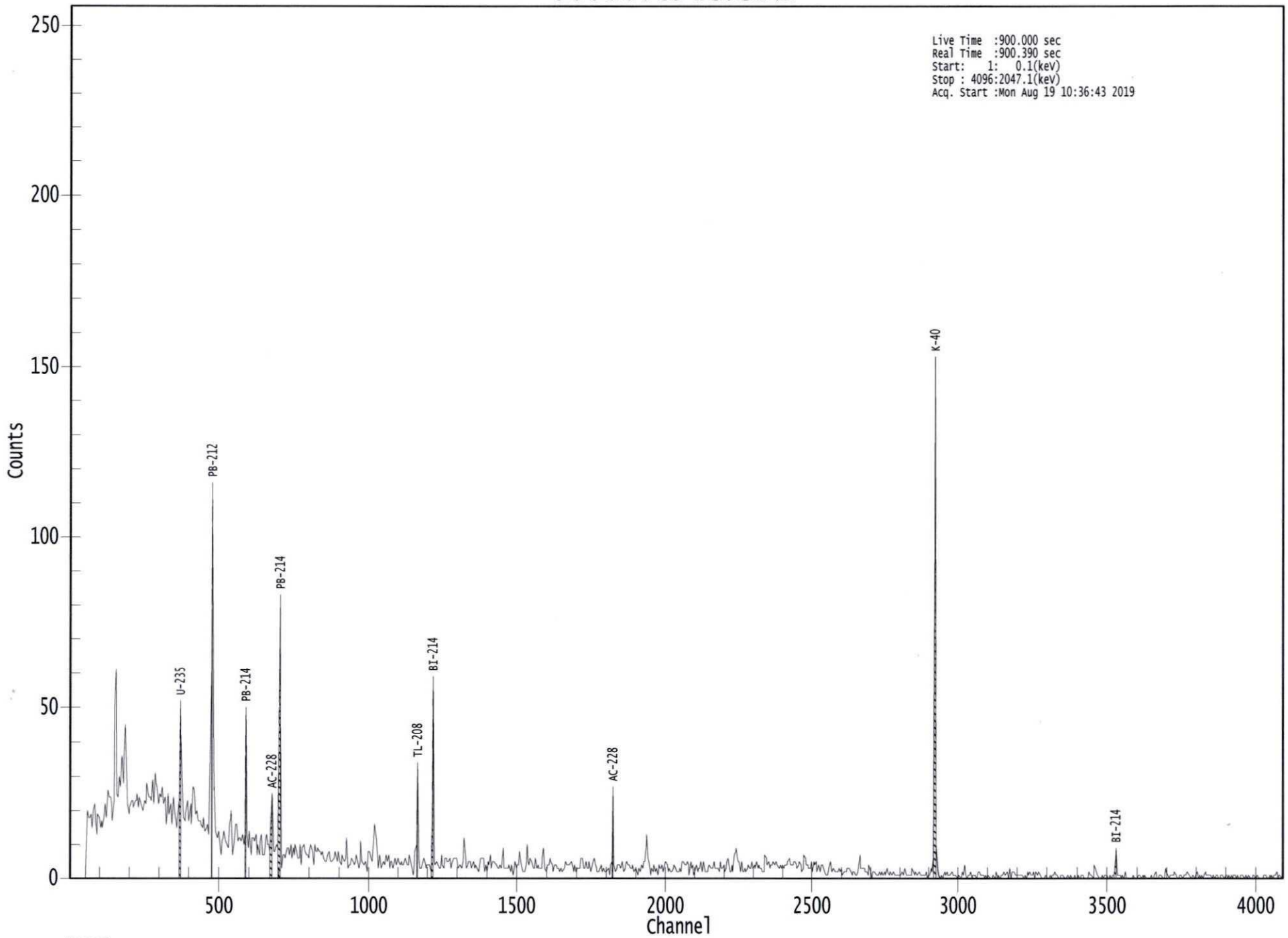
\* = Energy line found in the spectrum

&gt; = MDA value not calculated

@ = Half-life too short to be able to perform the decay correction

? = CAUTION: MDA value is inconsistent with Currie MDA at 95% confidence level

# 000078918.CNF



 ROI Type: 1

Analysis Report for 20-Aug-19-10021  
L1-10207B-RIGS-009SS

---

## GAMMA SPECTRUM ANALYSIS

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Sample Identification : 20-Aug-19-10021  
Sample Description : L1-10207B-RIGS-009SS  
Sample Type : Soil  
Unit :  
Sample Point :  
  
Sample Size : 1.452E+03 grams  
Facility : Default  
  
Sample Taken On : 8/19/2019 9:30:00AM  
Acquisition Started : 8/20/2019 11:25:47AM  
  
Procedure : 130G\_SOIL\_1  
Operator : Administrator  
Detector Name : 324  
Geometry : 130G\_SOIL\_1  
Live Time : 900.0 seconds  
Real Time : 904.5 seconds  
  
Dead Time : 0.50 %  
  
Peak Locate Threshold : 3.00  
Peak Locate Range (in channels) : 120 - 4096  
Peak Area Range (in channels) : 120 - 4096  
Identification Energy Tolerance : 1.000 keV  
  
Energy Calibration Used Done On : 9/29/2018  
Efficiency Calibration Used Done On : 8/20/2019  
Efficiency Calibration Description :  
  
Sample Number : 78981  
Fill Height : 1451.77 gram  
Certificate Name : Eu155-Na22  
Certificate Date : 1/30/2013 12:00:00PM

*J. M. ...*  
8-20-19

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## PEAK ANALYSIS REPORT

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Peak Analysis Performed on : 8/20/2019 11:40:54AM  
Peak Analysis From Channel : 120  
Peak Analysis To Channel : 4096

*J. M. ...*  
8-20-19

Analysis Report for 20-Aug-19-10021

L1-10207B-RIGS-009SS

Peak No.	Energy (keV)	ROI start	ROI end	Peak Centroid	Net Peak Area	Net Area Uncertainty	Continuum Counts	FWHM (keV)
1	238.75	474 -	482	477.68	1.36E+02	60.43	1.65E+03	0.90
2	1173.15	2338 -	2352	2345.91	2.48E+04	164.01	7.35E+02	1.81
3	1332.41	2657 -	2671	2664.64	2.26E+04	152.01	1.75E+02	1.97
4	1460.66	2915 -	2928	2921.38	3.97E+02	24.35	7.13E+01	1.82

M = First peak in a multiplet region

m = Other peak in a multiplet region

F = Fitted singlet

Errors quoted at 1.000sigma

No background subtract performed on this spectrum.

## NUCLIDE IDENTIFICATION REPORT

Nuclide Library Used : C:\Canberra\Apex\Root\Default\Library\ZION LIB-BNL.NLB

### IDENTIFIED NUCLIDES

Nuclide Name	Id Confidence	Energy (keV)	Yield(%)	Activity (pCi/grams)	Activity Uncertainty
K-40	0.99	1460.82 *	10.66	7.57E+00	5.69E-01
Co-60	0.99	1173.23 *	99.85	4.34E+01	1.76E+00
		1332.49 *	99.98	4.30E+01	1.74E+00
Pb-212	0.99	115.18	0.60		
		238.63 *	43.60	1.93E-01	8.70E-02
		300.09	3.30		

Analysis Report for 20-Aug-19-10021

L1-10207B-RIGS-009SS

\* = Energy line found in the spectrum.  
 - = Manually added nuclide.  
 ? = Manually edited nuclide.  
 @ = Energy line not used for Weighted Mean Activity  
 Energy Tolerance : 1.000 keV  
 Nuclide confidence index threshold = 0.30  
 Errors quoted at 1.000sigma

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## INTERFERENCE CORRECTED REPORT

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<b>Nuclide Name</b>	<b>Nuclide Id Confidence</b>	<b>Wt mean Activity (pCi/grams)</b>	<b>Wt mean Activity Uncertainty</b>	<b>Comments</b>
K-40	0.996	7.57E+00	5.69E-01	
Co-60	0.999	4.32E+01	1.24E+00	
Pb-212	0.998	1.93E-01	8.70E-02	

? = 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 1.000sigma

---

Analysis Report for 20-Aug-19-10021  
L1-10207B-RIGS-009SS

## UNIDENTIFIED PEAKS

Peak Locate Performed on : 8/20/2019 11:40:54AM  
Peak Locate From Channel : 120  
Peak Locate To Channel : 4096

Peak No.	Energy (keV)	Peak Size (CPS)	Peak CPS (%) Uncertainty	Peak Type	Tolerance Nuclide
All peaks were identified.					
M = First peak in a multiplet region					
m = Other peak in a multiplet region					
F = Fitted singlet					
Errors quoted at 1.000sigma					

## NUCLIDE MDA REPORT

Nuclide Library Used : C:\Canberra\Apex\Root\Default\Library\ZION LIB-BNL.NLB

	Nuclide Name	Energy (keV)	Yield(%)	Activity (pCi/grams)	Nuclide MDA (pCi/grams)	Line MDA (pCi/grams)
	An Pk	511.00	100.00	2.14E-02	1.91E-01	1.91E-01
	BE-7	477.60	10.44	-4.05E-01	1.63E+00	1.63E+00
+	K-40	1460.82	* 10.66	7.57E+00	9.62E-01	9.62E-01
	Mn-54	834.85	99.98	-1.63E-01	2.86E-01	2.86E-01
+	Co-60	1173.23	* 99.85	4.34E+01	1.50E-01	2.79E-01
		1332.49	* 99.98	4.30E+01		1.50E-01
	Nb-94	702.65	99.81	-1.21E-02	2.41E-01	2.41E-01
		871.09	99.89	1.49E-01		3.15E-01
	Ag-108m	79.13	6.60	1.37E+00	1.81E-01	3.20E+00
		433.94	90.50	-6.71E-02		1.81E-01
		614.28	89.80	-1.42E-01		2.42E-01
		722.94	90.80	-7.63E-02		2.73E-01
	Sb-125	176.31	6.84	2.21E-01	5.42E-01	1.81E+00
		380.45	1.52	-1.71E+00		1.03E+01
		427.87	29.60	1.97E-01		5.42E-01
		463.36	10.49	1.71E-01		1.58E+00
		600.60	17.65	-4.96E-01		1.22E+00
		606.71	4.98	2.62E+00		4.57E+00
		635.95	11.22	1.10E+00		2.01E+00

Analysis Report for 20-Aug-19-10021  
L1-10207B-RIGS-009SS

<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Nuclide MDA (pCi/grams)</b>	<b>Line MDA (pCi/grams)</b>
Sb-125	671.44	1.79	7.39E+00	5.42E-01	1.32E+01
Ba-133	79.61	2.65	-5.41E-01	2.52E-01	7.68E+00
	81.00	32.90	-5.50E-01		5.77E-01
	276.40	7.16	3.24E-01		2.00E+00
	302.85	18.34	2.11E-01		7.78E-01
	356.01	62.05	-6.41E-02		2.52E-01
	383.85	8.94	1.20E-01		1.75E+00
Cs-134	475.36	1.48	2.73E+00	2.30E-01	1.15E+01
	563.25	8.34	3.42E-01		2.32E+00
	569.33	15.37	2.98E-01		1.27E+00
	604.72	97.62	4.79E-02		2.30E-01
	795.86	85.46	-5.12E-02		3.17E-01
	801.95	8.69	-8.28E-01		3.13E+00
	1038.61	0.99	5.44E+00		3.60E+01
	1167.97	1.79	-1.26E+01		6.18E+01
	1365.19	3.02	6.10E-01		4.19E+00
Cs-137	661.66	85.10	9.34E-02	2.68E-01	2.68E-01
Eu-152	121.78	28.67	1.94E-01	3.86E-01	3.86E-01
	244.70	7.61	1.37E-02		1.88E+00
	295.94	0.45	4.99E+00		3.21E+01
	344.28	26.60	-1.52E-02		5.76E-01
	367.79	0.86	3.39E+00		1.78E+01
	411.12	2.24	1.29E+00		7.12E+00
	443.96	2.83	-5.01E-01		5.60E+00
	488.68	0.42	-4.44E-01		4.27E+01
	563.99	0.49	-1.15E+01		3.91E+01
	586.26	0.46	3.26E+01		4.72E+01
	678.62	0.47	3.11E+01		5.07E+01
	688.67	0.86	-1.20E+01		2.70E+01
	719.35	0.28	-1.91E+01		8.81E+01
	778.90	12.96	-1.87E+00		2.02E+00
	810.45	0.32	2.15E+01		8.77E+01
	867.37	4.26	2.77E+00		7.31E+00
	919.33	0.43	-1.11E-01		8.54E+01
	964.08	14.65	8.94E-01		2.60E+00
	1085.87	10.24	-1.63E+00		3.54E+00
	1089.74	1.73	3.56E-01		2.11E+01
	1112.07	13.69	-1.41E+00		2.73E+00
	1212.95	1.43	-1.04E+01		1.49E+01
	1249.94	0.19	7.97E+00		9.46E+01
	1299.14	1.63	-4.77E+00		9.76E+00
	1408.01	21.07	3.13E-01		6.53E-01
	1457.64	0.50	-1.34E+01		4.59E+01
	1528.10	0.28	-1.04E+01		3.78E+01
Eu-154	123.07	40.40	-2.26E-03	2.70E-01	2.70E-01
	247.93	6.89	-3.66E-01		2.04E+00
	591.76	4.95	-1.15E+00		4.23E+00
	692.42	1.78	-1.69E+00		1.33E+01
	723.30	20.06	-3.07E-01		1.23E+00
	756.80	4.52	1.37E+00		5.69E+00
	873.18	12.08	7.72E-01		2.61E+00

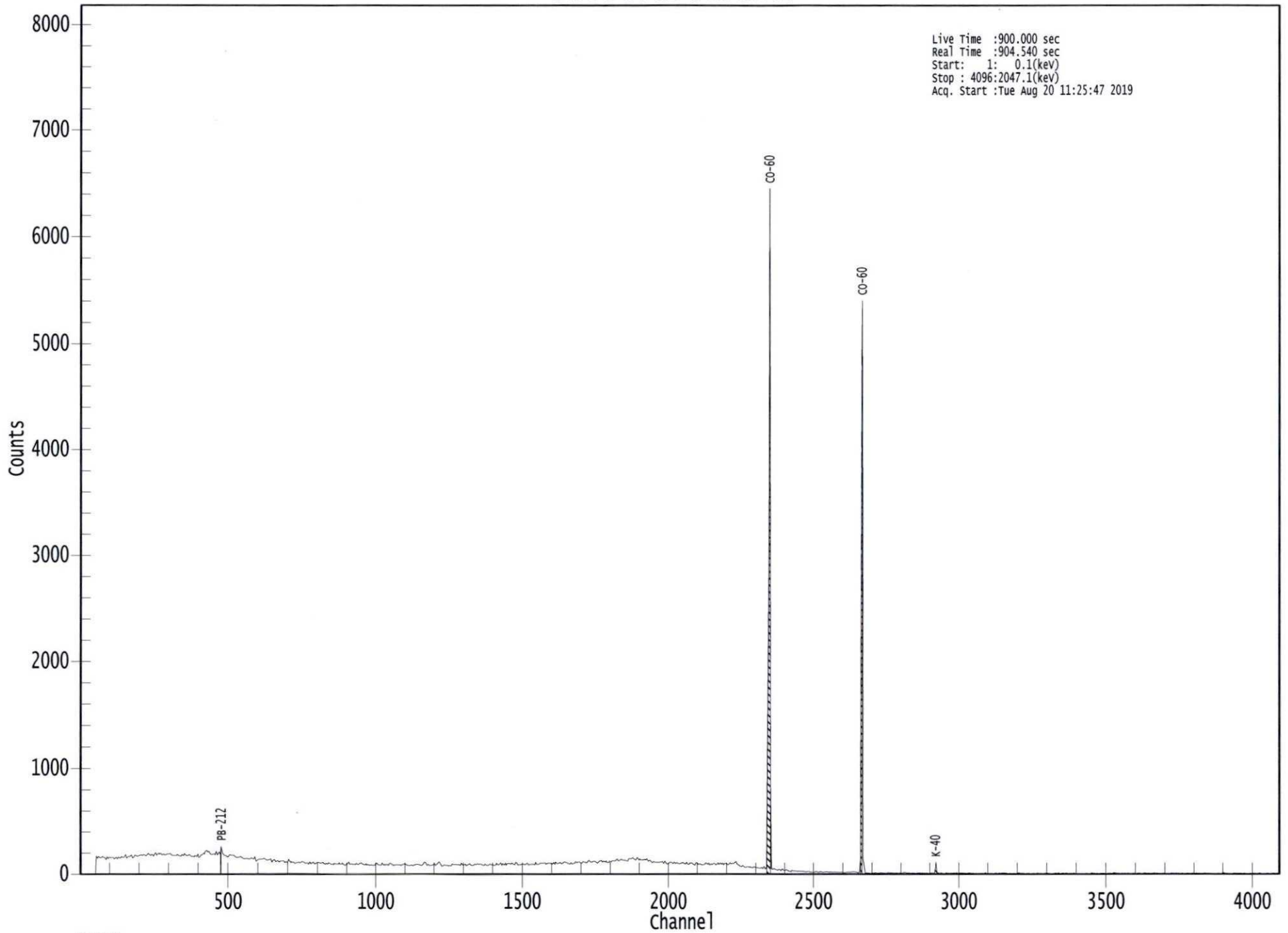


Analysis Report for 20-Aug-19-10021  
L1-10207B-RIGS-009SS

<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Nuclide MDA (pCi/grams)</b>	<b>Line MDA (pCi/grams)</b>
Eu-154	996.29	10.48	-3.57E-01	2.70E-01	3.33E+00
	1004.76	18.01	2.34E-01		1.92E+00
	1274.43	34.80	1.30E-01		5.11E-01
	1596.48	1.80	-4.94E+00		6.36E+00
Eu-155	45.30	1.31	3.64E+00	5.28E-01	4.11E+01
	60.01	1.22	2.44E+01		4.27E+01
	86.55	30.70	2.54E-01		5.28E-01
	105.31	21.10	3.46E-01		6.10E-01
Ra-226	186.21	3.64	1.98E+00	3.42E+00	3.42E+00
Pa-231	27.36	10.30	9.60E+00	4.12E+00	4.12E+00
	283.69	1.70	2.37E+00		8.38E+00
	300.07	2.47	-4.48E+00		5.67E+00
	302.65	2.20	1.76E+00		6.48E+00
	330.06	1.40	1.34E+00		1.10E+01
U-235	143.76	10.96	2.59E-01	2.18E-01	9.68E-01
	163.33	5.08	-1.50E-01		2.42E+00
	185.71	57.20	8.20E-02		2.18E-01
	202.11	1.08	-3.53E+00		1.16E+01
	205.31	5.01	-1.54E+00		2.54E+00
Am-241	59.54	35.90	6.43E-01	1.50E+00	1.50E+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  
 ? = CAUTION: MDA value is inconsistent with Currie MDA at 95% confidence level

0000078981.CNF



 ROI Type: 1

Analysis Report for 26-Aug-19-10001  
L1-10207B-RIGS-010SS

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## GAMMA SPECTRUM ANALYSIS

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Sample Identification : 26-Aug-19-10001  
Sample Description : L1-10207B-RIGS-010SS  
Sample Type : Soil  
Unit :  
Sample Point :  
  
Sample Size : 1.230E+03 grams  
Facility : Default  
  
Sample Taken On : 8/22/2019 1:00:00PM  
Acquisition Started : 8/26/2019 9:42:44AM  
  
Procedure : 130G\_SOIL\_1  
Operator : Administrator  
Detector Name : 324  
Geometry : 130G\_SOIL\_1  
Live Time : 900.0 seconds  
Real Time : 900.4 seconds  
  
Dead Time : 0.04 %  
  
Peak Locate Threshold : 3.00  
Peak Locate Range (in channels) : 120 - 4096  
Peak Area Range (in channels) : 120 - 4096  
Identification Energy Tolerance : 1.000 keV  
  
Energy Calibration Used Done On : 9/29/2018  
Efficiency Calibration Used Done On : 8/26/2019  
Efficiency Calibration Description :  
  
Sample Number : 79092  
Fill Height : 1230.22 gram  
Certificate Name : Eu155-Na22  
Certificate Date : 1/30/2013 12:00:00PM

*J.M. [Signature]*  
8-26-19

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## PEAK ANALYSIS REPORT

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Peak Analysis Performed on : 8/26/2019 9:57:47AM  
Peak Analysis From Channel : 120  
Peak Analysis To Channel : 4096

*J.M. [Signature]*  
8-26-19

Analysis Report for 26-Aug-19-10001

L1-10207B-RIGS-010SS

Peak No.	Energy (keV)	ROI start	ROI end	Peak Centroid	Net Peak Area	Net Area Uncertainty	Continuum Counts	FWHM (keV)
1	238.54	472 -	481	477.25	1.86E+02	23.95	1.63E+02	1.28
2	295.22	587 -	595	590.50	9.96E+01	14.47	5.14E+01	1.25
3	338.24	673 -	680	676.45	4.73E+01	11.47	4.17E+01	1.30
4	351.62	698 -	708	703.19	1.54E+02	16.73	5.29E+01	1.23
5	583.14	1161 -	1171	1165.89	7.71E+01	11.87	2.69E+01	1.45
6	609.08	1213 -	1223	1217.74	1.07E+02	13.64	3.24E+01	1.40
7	661.35	1318 -	1328	1322.23	3.54E+01	9.47	2.26E+01	1.33
8	910.76	1817 -	1827	1820.96	6.04E+01	9.50	1.26E+01	1.33
9	1460.24	2913 -	2928	2920.53	4.30E+02	21.28	7.72E+00	1.86
10	1763.58	3522 -	3533	3528.02	2.70E+01	5.89	2.97E+00	1.88

M = First peak in a multiplet region

m = Other peak in a multiplet region

F = Fitted singlet

Errors quoted at 1.000sigma

No background subtract performed on this spectrum.

## NUCLIDE IDENTIFICATION REPORT

Nuclide Library Used : C:\Canberra\Apex\Root\Default\Library\ZION LIB-BNL.NLB

### IDENTIFIED NUCLIDES

Nuclide Name	Id Confidence	Energy (keV)		Yield(%)	Activity (pCi/grams)	Activity Uncertainty
K-40	0.94	1460.82	*	10.66	8.69E+00	5.72E-01
Cs-137	0.98	661.66	*	85.10	5.27E-02	1.44E-02
Tl-208	1.00	583.19	*	85.00	1.06E-01	1.75E-02
Pb-212	0.99	115.18		0.60		
		238.63	*	43.60	2.74E-01	4.17E-02
		300.09		3.30		
Bi-214	0.97	609.32	*	45.49	2.81E-01	3.97E-02

Analysis Report for 26-Aug-19-10001

L1-10207B-RIGS-010SS

<b>Nuclide Name</b>	<b>Id Confidence</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Activity Uncertainty</b>
Bi-214	0.97	768.36	4.89		
		806.18	1.26		
		934.06	3.11		
		1120.29	14.92		
		1155.21	1.63		
		1238.12	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		
		1661.27	1.05		
		1729.59	2.88		
		1764.49 *	15.30	4.39E-01	9.74E-02
1847.43	2.03				
2118.51	1.16				
Pb-214	0.99	241.99	7.25		
		295.22 *	18.42	3.93E-01	6.52E-02
		351.93 *	35.60	3.57E-01	4.81E-02
Ac-228	0.99	785.96	1.06		
		129.07	2.42		
		209.25	3.89		
		270.24	3.46		
		328.00	2.95		
		338.32 *	11.27	3.36E-01	8.60E-02
		409.46	1.92		
		463.00	4.40		
		794.95	4.25		
		911.20 *	25.80	3.67E-01	6.00E-02
		964.77	4.99		
968.97	15.80				
1588.20	3.22				

\* = Energy line found in the spectrum.

- = Manually added nuclide.

? = Manually edited nuclide.

@ = Energy line not used for Weighted Mean Activity

Energy Tolerance : 1.000 keV

Nuclide confidence index threshold = 0.30

Errors quoted at 1.000sigma

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**INTERFERENCE CORRECTED REPORT**

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Analysis Report for 26-Aug-19-10001

L1-10207B-RIGS-010SS

<b>Nuclide Name</b>	<b>Nuclide Id Confidence</b>	<b>Wt mean Activity (pCi/grams)</b>	<b>Wt mean Activity Uncertainty</b>	<b>Comments</b>
K-40	0.947	8.69E+00	5.72E-01	
Cs-137	0.985	5.27E-02	1.44E-02	
Tl-208	1.000	1.06E-01	1.75E-02	
X Bi-211	0.952			
Pb-212	0.999	2.74E-01	4.17E-02	
Bi-214	0.978	3.04E-01	3.68E-02	
Pb-214	0.991	3.69E-01	3.87E-02	
Ac-228	0.990	3.57E-01	4.92E-02	

? = 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 1.000sigma

Analysis Report for 26-Aug-19-10001  
L1-10207B-RIGS-010SS

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## UNIDENTIFIED PEAKS

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Peak Locate Performed on : 8/26/2019 9:57:47AM  
Peak Locate From Channel : 120  
Peak Locate To Channel : 4096

Peak No.	Energy (keV)	Peak Size (CPS)	Peak CPS (%) Uncertainty	Peak Type	Tolerance Nuclide
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All peaks were identified.

M = First peak in a multiplet region  
m = Other peak in a multiplet region  
F = Fitted singlet  
Errors quoted at 1.000sigma

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## NUCLIDE MDA REPORT

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Nuclide Library Used : C:\Canberra\Apex\Root\Default\Library\ZION LIB-BNL.NLB

	Nuclide Name	Energy (keV)	Yield(%)	Activity (pCi/grams)	Nuclide MDA (pCi/grams)	Line MDA (pCi/grams)
	An Pk	511.00	100.00	8.16E-02	6.21E-02	6.21E-02
	BE-7	477.60	10.44	-1.46E-01	3.70E-01	3.70E-01
+	K-40	1460.82	* 10.66	8.69E+00	3.85E-01	3.85E-01
	Mn-54	834.85	99.98	-2.65E-02	4.78E-02	4.78E-02
	Co-60	1173.23	99.85	-2.87E-02	5.87E-02	6.09E-02
		1332.49	99.98	1.09E-02		5.87E-02
	Nb-94	702.65	99.81	-4.99E-03	4.44E-02	4.44E-02
		871.09	99.89	1.50E-02		4.69E-02
	Ag-108m	79.13	6.60	1.24E+00	3.80E-02	1.37E+00
		433.94	90.50	7.14E-03		3.80E-02
		614.28	89.80	6.43E-03		5.78E-02
		722.94	90.80	1.95E-02		6.19E-02
	Sb-125	176.31	6.84	1.19E-01	1.25E-01	5.80E-01
		380.45	1.52	1.94E+00		2.65E+00
		427.87	29.60	7.17E-02		1.25E-01
		463.36	10.49	-1.77E-01		3.34E-01
		600.60	17.65	-8.03E-02		2.14E-01
		606.71	4.98	-6.35E-01		1.51E+00
		635.95	11.22	-5.03E-02		3.49E-01

Analysis Report for 26-Aug-19-10001

L1-10207B-RIGS-010SS

<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Nuclide MDA (pCi/grams)</b>	<b>Line MDA (pCi/grams)</b>
Sb-125	671.44	1.79	-1.15E-01	1.25E-01	2.38E+00
Ba-133	79.61	2.65	1.46E+00	7.63E-02	3.16E+00
	81.00	32.90	-4.32E-01		1.94E-01
	276.40	7.16	-3.07E-01		5.04E-01
	302.85	18.34	2.09E-01		2.17E-01
	356.01	62.05	-3.34E-02		7.63E-02
	383.85	8.94	6.38E-02		4.33E-01
Cs-134	475.36	1.48	1.26E+00	6.01E-02	2.58E+00
	563.25	8.34	1.61E-01		5.22E-01
	569.33	15.37	2.11E-02		2.88E-01
	604.72	97.62	-4.44E-02		7.16E-02
	795.86	85.46	1.92E-02		6.01E-02
	801.95	8.69	5.91E-02		5.26E-01
	1038.61	0.99	-3.93E+00		5.20E+00
	1167.97	1.79	8.95E-01		3.80E+00
	1365.19	3.02	-3.34E-01		1.58E+00
+ Cs-137	661.66	* 85.10	5.27E-02	4.15E-02	4.15E-02
Eu-152	121.78	28.67	2.01E-02	1.32E-01	1.32E-01
	244.70	7.61	1.38E-01		5.85E-01
	295.94	0.45	8.92E+00		1.07E+01
	344.28	26.60	-1.59E-01		1.36E-01
	367.79	0.86	6.74E-01		4.47E+00
	411.12	2.24	4.62E-01		1.83E+00
	443.96	2.83	-2.15E-01		1.17E+00
	488.68	0.42	-1.10E+01		8.80E+00
	563.99	0.49	3.66E+00		8.92E+00
	586.26	0.46	3.84E-01		1.43E+01
	678.62	0.47	-3.10E+00		9.38E+00
	688.67	0.86	1.99E+00		5.37E+00
	719.35	0.28	1.15E+01		1.86E+01
	778.90	12.96	-2.52E-01		3.58E-01
	810.45	0.32	3.55E+00		1.30E+01
	867.37	4.26	-5.50E-01		1.02E+00
	919.33	0.43	-6.54E+00		9.91E+00
	964.08	14.65	4.66E-02		4.28E-01
	1085.87	10.24	7.15E-02		5.23E-01
	1089.74	1.73	-1.27E-01		3.35E+00
	1112.07	13.69	-3.70E-01		4.08E-01
	1212.95	1.43	8.15E-01		4.40E+00
	1249.94	0.19	7.40E+00		3.23E+01
	1299.14	1.63	2.45E-01		3.65E+00
	1408.01	21.07	7.49E-02		2.58E-01
	1457.64	0.50	-1.18E+00		4.44E+01
	1528.10	0.28	-7.91E-01		1.30E+01
Eu-154	123.07	40.40	3.88E-02	9.56E-02	9.56E-02
	247.93	6.89	-3.49E-02		5.27E-01
	591.76	4.95	-1.15E-01		8.08E-01
	692.42	1.78	-4.10E-01		2.36E+00
	723.30	20.06	9.11E-02		2.79E-01
	756.80	4.52	4.83E-01		1.10E+00
	873.18	12.08	6.19E-02		3.73E-01



Analysis Report for 26-Aug-19-10001

L1-10207B-RIGS-010SS

<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Nuclide MDA (pCi/grams)</b>	<b>Line MDA (pCi/grams)</b>
Eu-154	996.29	10.48	6.22E-02	9.56E-02	4.63E-01
	1004.76	18.01	-1.38E-01		2.83E-01
	1274.43	34.80	7.82E-03		1.91E-01
	1596.48	1.80	5.56E-01		2.22E+00
Eu-155	45.30	1.31	-1.28E+00	2.03E-01	1.11E+01
	60.01	1.22	-1.31E+00		1.43E+01
	86.55	30.70	6.07E-03		2.03E-01
Ra-226	105.31	21.10	1.33E-01	1.15E+00	2.16E-01
	186.21	3.64	5.64E-01		1.15E+00
Pa-231	27.36	10.30	5.59E-01	1.16E+00	1.16E+00
	283.69	1.70	3.60E-01		2.27E+00
	300.07	2.47	-1.03E+00		1.45E+00
	302.65	2.20	1.74E+00		1.80E+00
	330.06	1.40	7.46E-01		2.82E+00
U-235	143.76	10.96	-1.09E-01	7.23E-02	2.99E-01
	163.33	5.08	-1.11E-01		7.62E-01
	185.71	57.20	4.19E-02		7.23E-02
	202.11	1.08	1.47E-01		3.68E+00
	205.31	5.01	-2.30E-01		7.92E-01
Am-241	59.54	35.90	4.53E-02	5.03E-01	5.03E-01

+ = Nuclide identified during the nuclide identification

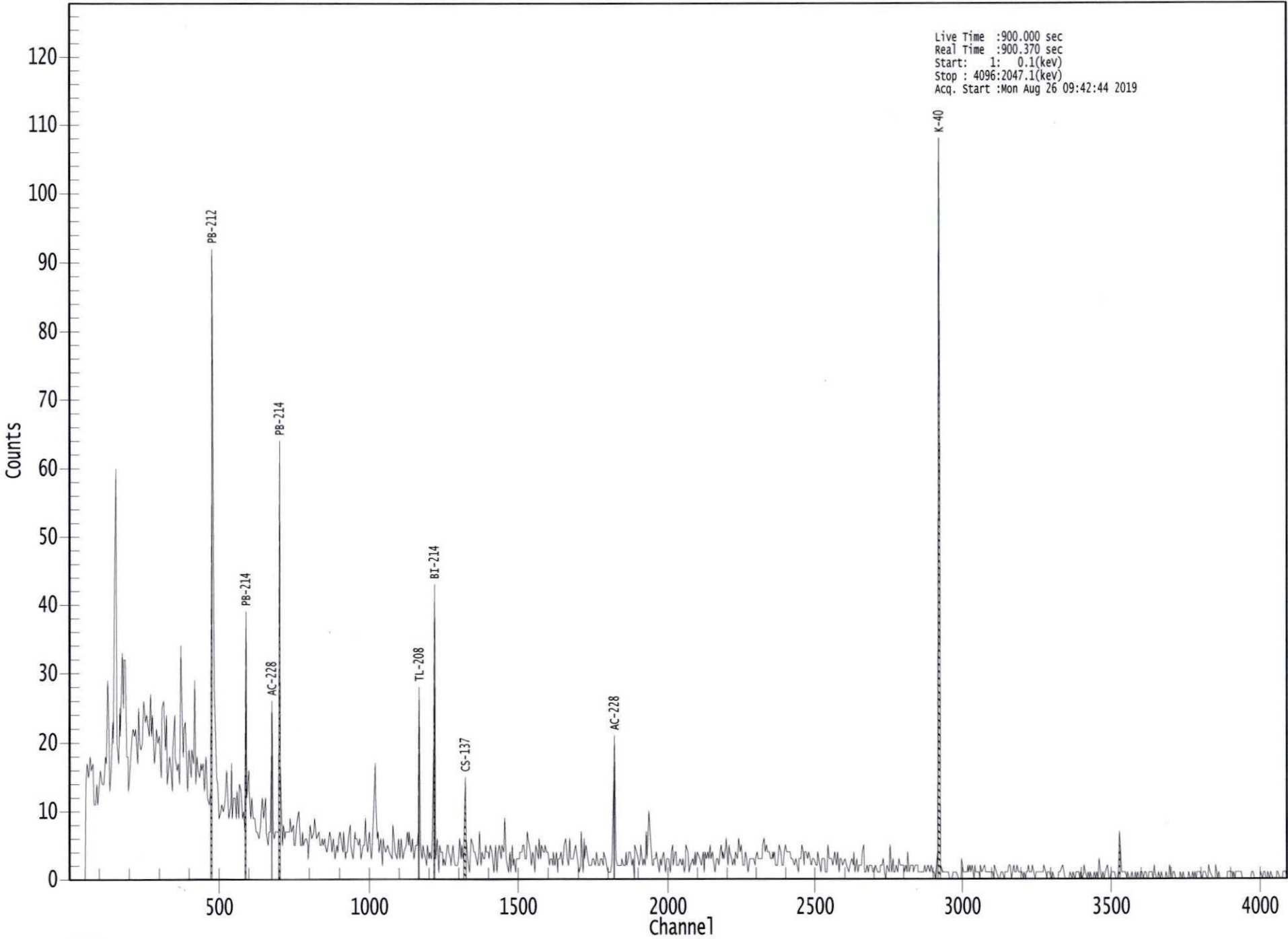
\* = Energy line found in the spectrum

&gt; = MDA value not calculated

@ = Half-life too short to be able to perform the decay correction

? = CAUTION: MDA value is inconsistent with Currie MDA at 95% confidence level

0000079092.CNF



Live Time : 900.000 sec  
Real Time : 900.370 sec  
Start: 1: 0.1(kev)  
Stop : 4096:2047.1(kev)  
Acq. Start : Mon Aug 26 09:42:44 2019

ROI Type: 1

Analysis Report for 26-Aug-19-10002  
L1-10207B-RIGS-011SS

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## GAMMA SPECTRUM ANALYSIS

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Sample Identification : 26-Aug-19-10002  
Sample Description : L1-10207B-RIGS-011SS  
Sample Type : Soil  
Unit :  
Sample Point :  
  
Sample Size : 1.306E+03 grams  
Facility : Default  
  
Sample Taken On : 8/22/2019 1:02:00PM  
Acquisition Started : 8/26/2019 9:42:51AM  
  
Procedure : 130G\_SOIL\_1  
Operator : Administrator  
Detector Name : P40818B  
Geometry : 130G\_SOIL\_1  
Live Time : 900.0 seconds  
Real Time : 901.6 seconds  
  
Dead Time : 0.18 %  
  
Peak Locate Threshold : 3.00  
Peak Locate Range (in channels) : 120 - 8192  
Peak Area Range (in channels) : 120 - 8192  
Identification Energy Tolerance : 1.000 keV  
  
Energy Calibration Used Done On : 1/29/2019  
Efficiency Calibration Used Done On : 8/26/2019  
Efficiency Calibration Description :  
  
Sample Number : 79093  
Fill Height : 1305.53 gram  
Certificate Name : Eu155-Na22  
Certificate Date : 1/30/2012 12:00:00PM

*M. N. N. N.*  
8-26-19

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## PEAK ANALYSIS REPORT

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Peak Analysis Performed on : 8/26/2019 9:57:55AM  
Peak Analysis From Channel : 120  
Peak Analysis To Channel : 8192

*zml*  
8-26-19

Analysis Report for 26-Aug-19-10002  
L1-10207B-RIGS-011SS

Peak No.	Energy (keV)	ROI start	ROI end	Peak Centroid	Net Peak Area	Net Area Uncertainty	Continuum Counts	FWHM (keV)
1	238.70	949 -	961	954.89	1.47E+02	20.53	9.82E+01	0.93
2	295.21	1175 -	1187	1180.76	7.70E+01	12.60	3.10E+01	0.94
3	338.44	1345 -	1359	1353.55	5.63E+01	12.38	3.37E+01	0.63
4	351.99	1401 -	1414	1407.68	1.27E+02	14.75	3.22E+01	0.57
5	583.15	2325 -	2340	2331.79	7.24E+01	9.74	7.58E+00	0.96
6	609.34	2430 -	2442	2436.55	8.67E+01	11.39	1.63E+01	0.82
7	661.47	2639 -	2652	2644.96	3.92E+01	9.78	1.98E+01	1.23
8	910.96	3636 -	3649	3642.80	4.75E+01	8.74	1.05E+01	1.10
9	1460.91	5832 -	5855	5843.47	3.48E+02	19.53	8.50E+00	1.84
10	1764.30	7052 -	7065	7058.20	1.90E+01	5.00	1.95E+00	1.04

M = First peak in a multiplet region  
m = Other peak in a multiplet region  
F = Fitted singlet  
Errors quoted at 1.000sigma

No background subtract performed on this spectrum.

## NUCLIDE IDENTIFICATION REPORT

Nuclide Library Used : C:\Canberra\Apex\Root\Default\Library\ZION LIB-BNL.NLB

### IDENTIFIED NUCLIDES

Nuclide Name	Id Confidence	Energy (keV)	Yield(%)	Activity (pCi/grams)	Activity Uncertainty
K-40	0.99	1460.82 *	10.66	9.17E+00	6.50E-01
Cs-137	0.99	661.66 *	85.10	7.46E-02	1.92E-02
Tl-208	1.00	583.19 *	85.00	1.26E-01	1.86E-02
Pb-212	0.99	115.18	0.60		
		238.63 *	43.60	2.72E-01	4.40E-02
		300.09	3.30		
Bi-214	0.99	609.32 *	45.49	2.92E-01	4.21E-02

Analysis Report for 26-Aug-19-10002  
L1-10207B-RIGS-011SS

<b>Nuclide Name</b>	<b>Id Confidence</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Activity Uncertainty</b>
Bi-214	0.99	768.36	4.89		
		806.18	1.26		
		934.06	3.11		
		1120.29	14.92		
		1155.21	1.63		
		1238.12	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		
		1661.27	1.05		
		1729.59	2.88		
		1764.49 *	15.30	4.05E-01	1.08E-01
1847.43	2.03				
2118.51	1.16				
Pb-214	1.00	241.99	7.25		
		295.22 *	18.42	3.82E-01	6.95E-02
		351.93 *	35.60	3.70E-01	5.22E-02
Ac-228	0.99	785.96	1.06		
		129.07	2.42		
		209.25	3.89		
		270.24	3.46		
		328.00	2.95		
		338.32 *	11.27	5.04E-01	1.18E-01
		409.46	1.92		
		463.00	4.40		
		794.95	4.25		
		911.20 *	25.80	3.72E-01	7.02E-02
		964.77	4.99		
968.97	15.80				
1588.20	3.22				

\* = Energy line found in the spectrum.

- = Manually added nuclide.

? = Manually edited nuclide.

@ = Energy line not used for Weighted Mean Activity

Energy Tolerance : 1.000 keV

Nuclide confidence index threshold = 0.30

Errors quoted at 1.000sigma

**INTERFERENCE CORRECTED REPORT**

Analysis Report for 26-Aug-19-10002  
L1-10207B-RIGS-011SS

<b>Nuclide Name</b>	<b>Nuclide Id Confidence</b>	<b>Wt mean Activity (pCi/grams)</b>	<b>Wt mean Activity Uncertainty</b>	<b>Comments</b>
K-40	0.999	9.17E+00	6.50E-01	
Cs-137	0.994	7.46E-02	1.92E-02	
Tl-208	1.000	1.26E-01	1.86E-02	
X Bi-211	0.874			
Pb-212	0.999	2.72E-01	4.40E-02	
Bi-214	0.999	3.07E-01	3.92E-02	
Pb-214	1.000	3.74E-01	4.17E-02	
Ac-228	0.997	4.06E-01	6.04E-02	

- ? = 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 1.000sigma

Analysis Report for 26-Aug-19-10002  
L1-10207B-RIGS-011SS

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## UNIDENTIFIED PEAKS

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Peak Locate Performed on : 8/26/2019 9:57:55AM  
Peak Locate From Channel : 120  
Peak Locate To Channel : 8192

Peak No.	Energy (keV)	Peak Size (CPS)	Peak CPS (%) Uncertainty	Peak Type	Tolerance Nuclide
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All peaks were identified.

M = First peak in a multiplet region  
m = Other peak in a multiplet region  
F = Fitted singlet  
Errors quoted at 1.000sigma

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## NUCLIDE MDA REPORT

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Nuclide Library Used : C:\Canberra\Apex\Root\Default\Library\ZION LIB-BNL.NLB

Nuclide Name	Energy (keV)	Yield(%)	Activity (pCi/grams)	Nuclide MDA (pCi/grams)	Line MDA (pCi/grams)
An Pk	511.00	100.00	8.67E-02	7.37E-02	7.37E-02
BE-7	477.60	10.44	-1.40E-01	5.51E-01	5.51E-01
+ K-40	1460.82	* 10.66	9.17E+00	5.87E-01	5.87E-01
Mn-54	834.85	99.98	-8.77E-02	5.23E-02	5.23E-02
Co-60	1173.23	99.85	9.03E-02	7.15E-02	8.76E-02
	1332.49	99.98	2.00E-02		7.15E-02
Nb-94	702.65	99.81	-2.24E-02	5.49E-02	5.49E-02
	871.09	99.89	2.76E-02		5.70E-02
Ag-108m	79.13	6.60	2.50E+00	5.42E-02	2.40E+00
	433.94	90.50	-4.66E-02		5.42E-02
	614.28	89.80	-7.27E-02		8.33E-02
	722.94	90.80	-1.15E-02		6.65E-02
Sb-125	176.31	6.84	3.46E-01	1.54E-01	6.66E-01
	380.45	1.52	-1.47E+00		2.72E+00
	427.87	29.60	-1.54E-01		1.54E-01
	463.36	10.49	-1.83E-01		4.80E-01
	600.60	17.65	5.93E-02		3.05E-01
	606.71	4.98	2.93E+00		1.80E+00
	635.95	11.22	1.73E-01		4.40E-01

Analysis Report for 26-Aug-19-10002

L1-10207B-RIGS-011SS

<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Nuclide MDA (pCi/grams)</b>	<b>Line MDA (pCi/grams)</b>
Sb-125	671.44	1.79	1.63E-01	1.54E-01	3.21E+00
Ba-133	79.61	2.65	-1.83E+00	9.86E-02	5.50E+00
	81.00	32.90	-4.28E-01		3.74E-01
	276.40	7.16	-1.23E-01		5.75E-01
	302.85	18.34	4.06E-01		2.71E-01
	356.01	62.05	-1.89E-02		9.86E-02
	383.85	8.94	1.15E-01		5.00E-01
Cs-134	475.36	1.48	4.27E-02	6.74E-02	3.68E+00
	563.25	8.34	1.16E-01		6.59E-01
	569.33	15.37	1.06E-01		3.47E-01
	604.72	97.62	-1.84E-02		8.21E-02
	795.86	85.46	2.13E-02		6.74E-02
	801.95	8.69	4.78E-03		6.12E-01
	1038.61	0.99	-1.54E+00		6.62E+00
	1167.97	1.79	-4.16E+00		4.19E+00
	1365.19	3.02	-1.13E+00		1.84E+00
+ Cs-137	661.66	* 85.10	7.46E-02	5.40E-02	5.40E-02
Eu-152	121.78	28.67	-8.04E-02	1.72E-01	1.86E-01
	244.70	7.61	3.51E-01		6.94E-01
	295.94	0.45	-1.92E+00		1.24E+01
	344.28	26.60	1.31E-01		1.72E-01
	367.79	0.86	-2.77E-01		5.24E+00
	411.12	2.24	7.48E-01		2.28E+00
	443.96	2.83	-1.46E+00		1.75E+00
	488.68	0.42	3.91E+00		1.14E+01
	563.99	0.49	6.42E+00		1.13E+01
	586.26	0.46	-6.20E+00		1.62E+01
	678.62	0.47	-1.66E+00		1.21E+01
	688.67	0.86	4.91E+00		6.87E+00
	719.35	0.28	-5.52E+00		1.68E+01
	778.90	12.96	-1.26E-01		4.20E-01
	810.45	0.32	1.23E+01		1.81E+01
	867.37	4.26	-1.49E+00		1.37E+00
	919.33	0.43	-1.36E+00		1.60E+01
	964.08	14.65	2.46E-01		5.56E-01
	1085.87	10.24	2.47E-01		6.86E-01
	1089.74	1.73	-3.29E-01		4.33E+00
	1112.07	13.69	-3.86E-01		6.10E-01
	1212.95	1.43	7.39E+00		5.90E+00
	1249.94	0.19	3.33E+00		3.74E+01
	1299.14	1.63	1.78E+00		4.17E+00
	1408.01	21.07	-3.56E-02		2.34E-01
	1457.64	0.50	1.98E+02		5.27E+01
	1528.10	0.28	-2.80E+00		1.60E+01
Eu-154	123.07	40.40	7.21E-02	1.35E-01	1.35E-01
	247.93	6.89	3.02E-01		6.36E-01
	591.76	4.95	-1.84E-01		1.05E+00
	692.42	1.78	2.91E+00		3.33E+00
	723.30	20.06	9.74E-02		3.13E-01
	756.80	4.52	7.21E-01		1.21E+00
	873.18	12.08	-2.30E-01		4.43E-01

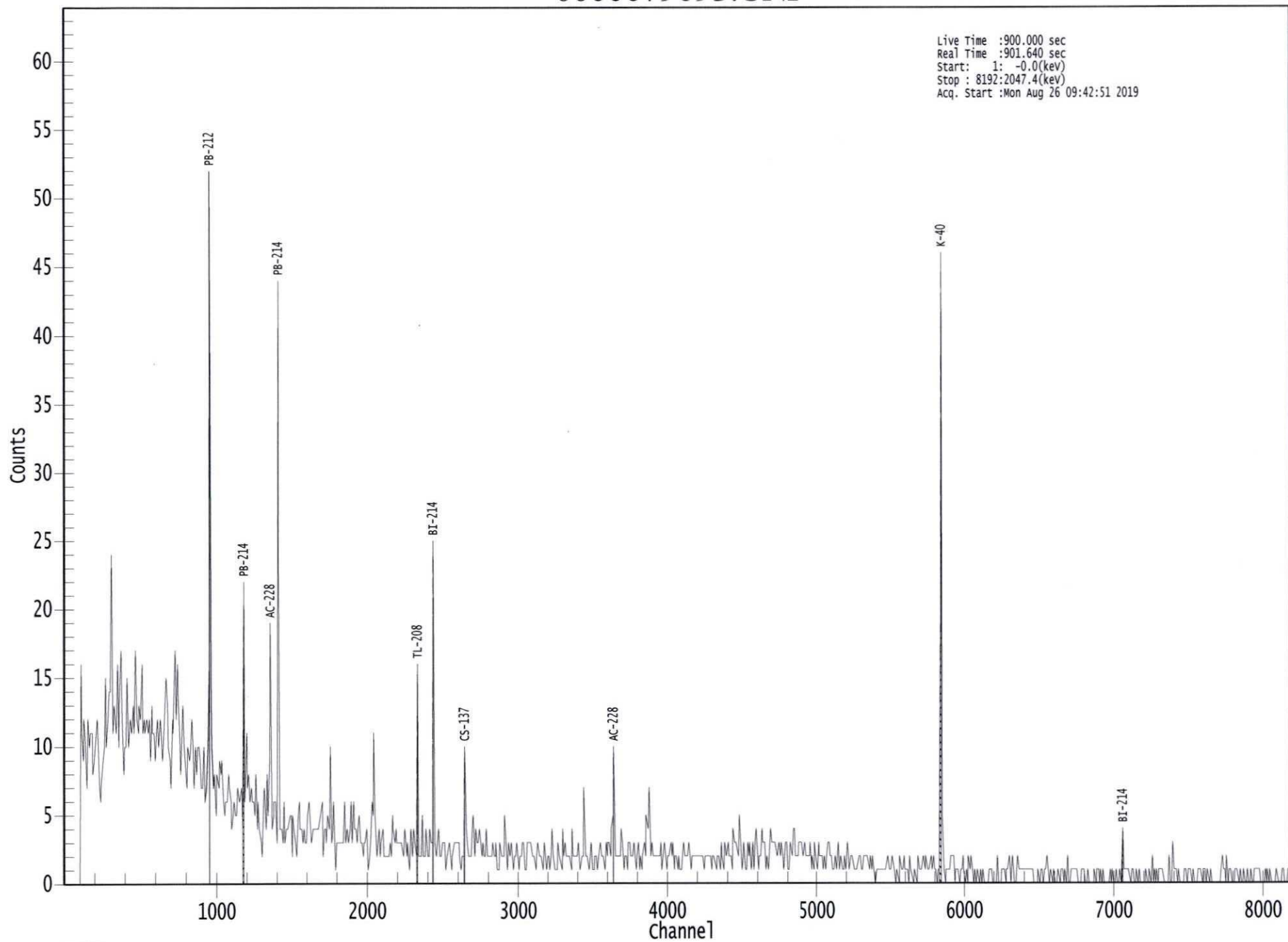


Analysis Report for 26-Aug-19-10002  
L1-10207B-RIGS-011SS

<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Nuclide MDA (pCi/grams)</b>	<b>Line MDA (pCi/grams)</b>
Eu-154	996.29	10.48	-1.38E-01	1.35E-01	5.70E-01
	1004.76	18.01	3.50E-01		3.99E-01
	1274.43	34.80	1.13E-01		2.22E-01
	1596.48	1.80	-4.83E+00		2.89E+00
Eu-155	45.30	1.31	8.14E+00	3.20E-01	3.72E+01
	60.01	1.22	-1.27E+01		3.31E+01
	86.55	30.70	1.35E-02		3.26E-01
	105.31	21.10	1.41E-01		3.20E-01
Ra-226	186.21	3.64	1.23E+00	1.45E+00	1.45E+00
Pa-231	27.36	10.30	4.13E+00	1.91E+00	4.16E+00
	283.69	1.70	2.91E-01		2.53E+00
	300.07	2.47	6.54E-02		1.91E+00
	302.65	2.20	2.60E+00		2.25E+00
	330.06	1.40	2.32E+00		3.51E+00
U-235	143.76	10.96	7.70E-02	9.27E-02	4.69E-01
	163.33	5.08	-3.46E-01		9.32E-01
	185.71	57.20	6.19E-02		9.27E-02
	202.11	1.08	-4.53E+00		4.03E+00
	205.31	5.01	-3.74E-02		8.91E-01
Am-241	59.54	35.90	-1.51E-01	1.17E+00	1.17E+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  
 ? = CAUTION: MDA value is inconsistent with Currie MDA at 95% confidence level

Live Time :900.000 sec  
Real Time :901.640 sec  
Start: 1: -0.0(kev)  
Stop : 8192:2047.4(kev)  
Acq. Start :Mon Aug 26 09:42:51 2019



ROI Type: 1

Analysis Report for 26-Aug-19-10003  
L1-10207B-RIGS-012SS

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## GAMMA SPECTRUM ANALYSIS

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Sample Identification : 26-Aug-19-10003  
Sample Description : L1-10207B-RIGS-012SS  
Sample Type : Soil  
Unit :  
Sample Point :  
  
Sample Size : 1.267E+03 grams  
Facility : Default  
  
Sample Taken On : 8/22/2019 1:04:00PM  
Acquisition Started : 8/26/2019 9:42:57AM  
  
Procedure : 130G\_SOIL\_1  
Operator : Administrator  
Detector Name : P11314  
Geometry : 130G\_SOIL\_1  
Live Time : 900.0 seconds  
Real Time : 900.4 seconds  
  
Dead Time : 0.04 %  
  
Peak Locate Threshold : 3.00  
Peak Locate Range (in channels) : 120 - 8192  
Peak Area Range (in channels) : 120 - 8192  
Identification Energy Tolerance : 1.000 keV  
  
Energy Calibration Used Done On : 1/24/2019  
Efficiency Calibration Used Done On : 8/26/2019  
Efficiency Calibration Description :  
  
Sample Number : 79094  
Fill Height : 1267.17 gram  
Certificate Name : Eu155-Na22  
Certificate Date : 12/22/2008 12:00:00PM

*P. N. Wild*  
8-26-19

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## PEAK ANALYSIS REPORT

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Peak Analysis Performed on : 8/26/2019 9:58:06AM  
Peak Analysis From Channel : 120  
Peak Analysis To Channel : 8192

*zmk*  
8-26-19

Analysis Report for 26-Aug-19-10003

L1-10207B-RIGS-012SS

Peak No.	Energy (keV)	ROI start	ROI end	Peak Centroid	Net Peak Area	Net Area Uncertainty	Continuum Counts	FWHM (keV)
1	77.42	306 -	316	310.23	4.28E+01	18.14	1.17E+02	0.60
2	238.76	946 -	962	954.62	1.81E+02	24.07	1.27E+02	0.83
3	295.41	1173 -	1188	1180.92	9.12E+01	15.72	5.08E+01	0.93
4	351.95	1398 -	1415	1406.81	1.67E+02	17.62	4.42E+01	0.91
5	510.74	2034 -	2046	2041.31	2.00E+01	11.51	4.10E+01	0.78
6	558.24	2226 -	2236	2231.16	2.22E+01	7.11	1.18E+01	0.74
7	583.10	2323 -	2339	2330.52	9.08E+01	12.78	2.32E+01	0.76
8	609.01	2427 -	2444	2434.07	1.18E+02	13.12	1.61E+01	0.65
9	968.95	3867 -	3878	3873.19	1.70E+01	7.40	1.50E+01	0.30
10	1460.04	5826 -	5851	5838.08	4.44E+02	22.26	1.25E+01	1.95
11	1763.09	7045 -	7058	7051.41	2.57E+01	6.36	5.27E+00	0.58

M = First peak in a multiplet region

m = Other peak in a multiplet region

F = Fitted singlet

Errors quoted at 1.000sigma

No background subtract performed on this spectrum.

## NUCLIDE IDENTIFICATION REPORT

Nuclide Library Used : C:\Canberra\Apex\Root\Default\Library\ZION LIB-BNL.NLB

### IDENTIFIED NUCLIDES

Nuclide Name	Id Confidence	Energy (keV)	Yield(%)	Activity (pCi/grams)	Activity Uncertainty
An Pk	0.98	511.00 *	100.00	2.59E-02	1.50E-02
K-40	0.90	1460.82 *	10.66	1.06E+01	7.04E-01
Tl-208	0.99	583.19 *	85.00	1.44E-01	2.21E-02
Pb-212	0.99	115.18	0.60		
		238.63 *	43.60	3.01E-01	4.68E-02
		300.09	3.30		

Analysis Report for 26-Aug-19-10003

L1-10207B-RIGS-012SS

<b>Nuclide Name</b>	<b>Id Confidence</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Activity Uncertainty</b>
Pb212-XR	0.99	74.82	10.28	3.06E-01	1.34E-01
		77.11 *	17.10		
		87.35	3.97		
		89.78	1.46		
Bi-214	0.99	609.32 *	45.49	3.61E-01	4.56E-02
		768.36	4.89		
		806.18	1.26		
		934.06	3.11		
		1120.29	14.92		
		1155.21	1.63		
		1238.12	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		
		1661.27	1.05		
		1729.59	2.88		
		1764.49	15.30		
1847.43	2.03				
2118.51	1.16				
Pb-214	0.99	241.99	7.25	4.09E-01	7.76E-02
		295.22 *	18.42		
		351.93 *	35.60		
Pb214-XR	0.99	785.96	1.06	4.41E-01	5.85E-02
		74.82	5.80		
Pb214-XR	0.99	77.11 *	9.70	5.40E-01	2.37E-01
		87.35	2.24		
		89.78	0.82		
Ac-228	1.00	129.07	2.42	2.07E-01	9.03E-02
		209.25	3.89		
		270.24	3.46		
		328.00	2.95		
		338.32	11.27		
		409.46	1.92		
		463.00	4.40		
		794.95	4.25		
		911.20	25.80		
		964.77	4.99		
		968.97 *	15.80		
1588.20	3.22				

\* = Energy line found in the spectrum.

- = Manually added nuclide.

? = Manually edited nuclide.

@ = Energy line not used for Weighted Mean Activity

Energy Tolerance : 1.000 keV

Nuclide confidence index threshold = 0.30

Errors quoted at 1.000sigma

Analysis Report for 26-Aug-19-10003  
L1-10207B-RIGS-012SS

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## INTERFERENCE CORRECTED REPORT

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<b>Nuclide Name</b>	<b>Nuclide Id Confidence</b>	<b>Wt mean Activity (pCi/grams)</b>	<b>Wt mean Activity Uncertainty</b>	<b>Comments</b>
An Pk	0.989	2.59E-02	1.50E-02	
K-40	0.906	1.06E+01	7.04E-01	
Tl-208	0.999	1.44E-01	2.21E-02	
X Bi-211	0.884			
Pb-212	0.998	3.01E-01	4.68E-02	
? Pb212-XR	0.992	3.06E-01	1.34E-01	
Bi-214	0.994	3.61E-01	4.56E-02	
Pb-214	0.998	4.29E-01	4.67E-02	
? Pb214-XR	0.992	5.40E-01	2.37E-01	
Ac-228	1.000	2.07E-01	9.03E-02	

- ? = 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 1.000sigma

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Analysis Report for 26-Aug-19-10003  
L1-10207B-RIGS-012SS

## UNIDENTIFIED PEAKS

Peak Locate Performed on : 8/26/2019 9:58:06AM  
Peak Locate From Channel : 120  
Peak Locate To Channel : 8192

Peak No.	Energy (keV)	Peak Size (CPS)	Peak CPS (%) Uncertainty	Peak Type	Tolerance Nuclide
6	558.24	2.46895E-02	31.98		NQPF
11	1763.09	2.85842E-02	24.70		Bi-214

JDW  
8-26-19

M = First peak in a multiplet region  
m = Other peak in a multiplet region  
F = Fitted singlet  
Errors quoted at 1.000sigma

## NUCLIDE MDA REPORT

Nuclide Library Used : C:\Canberra\Apex\Root\Default\Library\ZION LIB-BNL.NLB

	Nuclide Name	Energy (keV)	Yield(%)	Activity (pCi/grams)	Nuclide MDA (pCi/grams)	Line MDA (pCi/grams)
+	An Pk	511.00	* 100.00	2.59E-02	5.04E-02	5.04E-02
	BE-7	477.60	10.44	2.28E-01	4.63E-01	4.63E-01
+	K-40	1460.82	* 10.66	1.06E+01	6.53E-01	6.53E-01
	Mn-54	834.85	99.98	2.03E-02	6.48E-02	6.48E-02
	Co-60	1173.23	99.85	8.70E-02	6.83E-02	7.74E-02
		1332.49	99.98	8.92E-03		6.83E-02
	Nb-94	702.65	99.81	3.17E-04	4.75E-02	4.75E-02
		871.09	99.89	9.35E-03		5.64E-02
	Ag-108m	79.13	6.60	-2.59E-01	4.46E-02	1.38E+00
		433.94	90.50	1.16E-03		4.46E-02
		614.28	89.80	-1.14E-02		7.01E-02
		722.94	90.80	1.04E-02		6.75E-02
	Sb-125	176.31	6.84	1.12E-01	1.33E-01	5.61E-01
		380.45	1.52	-4.61E-01		2.62E+00
		427.87	29.60	-5.15E-02		1.33E-01
		463.36	10.49	5.26E-01		4.73E-01
		600.60	17.65	-1.51E-01		2.85E-01

Analysis Report for 26-Aug-19-10003  
L1-10207B-RIGS-012SS

<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Nuclide MDA (pCi/grams)</b>	<b>Line MDA (pCi/grams)</b>
Sb-125	606.71	4.98	3.73E-02	1.33E-01	1.81E+00
	635.95	11.22	-5.62E-02		4.45E-01
	671.44	1.79	-3.50E+00		2.47E+00
Ba-133	79.61	2.65	6.60E-02	8.42E-02	3.41E+00
	81.00	32.90	-2.22E-01		2.18E-01
	276.40	7.16	1.33E-02		5.71E-01
	302.85	18.34	-3.35E-02		2.28E-01
	356.01	62.05	4.71E-03		8.42E-02
	383.85	8.94	-2.19E-01		4.60E-01
Cs-134	475.36	1.48	6.08E-01	7.10E-02	3.14E+00
	563.25	8.34	-3.97E-03		5.62E-01
	569.33	15.37	1.42E-01		3.42E-01
	604.72	97.62	-2.25E-02		8.20E-02
	795.86	85.46	4.21E-03		7.10E-02
	801.95	8.69	3.86E-02		5.99E-01
	1038.61	0.99	-2.65E+00		6.12E+00
	1167.97	1.79	9.45E-01		4.18E+00
	1365.19	3.02	-1.21E-01		2.12E+00
	Cs-137	661.66	85.10		1.08E-01
Eu-152	121.78	28.67	8.16E-02	1.47E-01	1.47E-01
	244.70	7.61	2.73E-02		6.25E-01
	295.94	0.45	1.34E+01		1.26E+01
	344.28	26.60	-6.84E-02		1.64E-01
	367.79	0.86	3.44E+00		5.14E+00
	411.12	2.24	8.14E-01		2.10E+00
	443.96	2.83	-5.88E-01		1.58E+00
	488.68	0.42	1.53E+00		9.12E+00
	563.99	0.49	8.39E-01		9.34E+00
	586.26	0.46	-5.25E+00		1.70E+01
	678.62	0.47	4.13E+00		1.08E+01
	688.67	0.86	-1.24E+00		6.25E+00
	719.35	0.28	6.28E-01		1.70E+01
	778.90	12.96	-2.69E-01		3.65E-01
	810.45	0.32	2.48E+00		1.54E+01
	867.37	4.26	-5.50E-01		1.27E+00
	919.33	0.43	-3.47E+00		1.40E+01
	964.08	14.65	-2.68E-02		5.39E-01
	1085.87	10.24	-3.67E-01		5.44E-01
	1089.74	1.73	-2.50E-01		3.39E+00
	1112.07	13.69	-1.50E-01		4.74E-01
	1212.95	1.43	-9.42E-02		5.70E+00
	1249.94	0.19	1.54E+01		4.14E+01
1299.14	1.63	5.03E-01	4.13E+00		
1408.01	21.07	-8.41E-02	2.80E-01		
1457.64	0.50	2.31E+02	5.36E+01		
1528.10	0.28	-4.92E+00	1.54E+01		
Eu-154	123.07	40.40	7.51E-03	9.93E-02	9.93E-02
	247.93	6.89	-4.04E-01		5.39E-01
	591.76	4.95	-1.40E+00		8.51E-01
	692.42	1.78	-3.46E+00		2.91E+00
	723.30	20.06	1.25E-01		3.06E-01



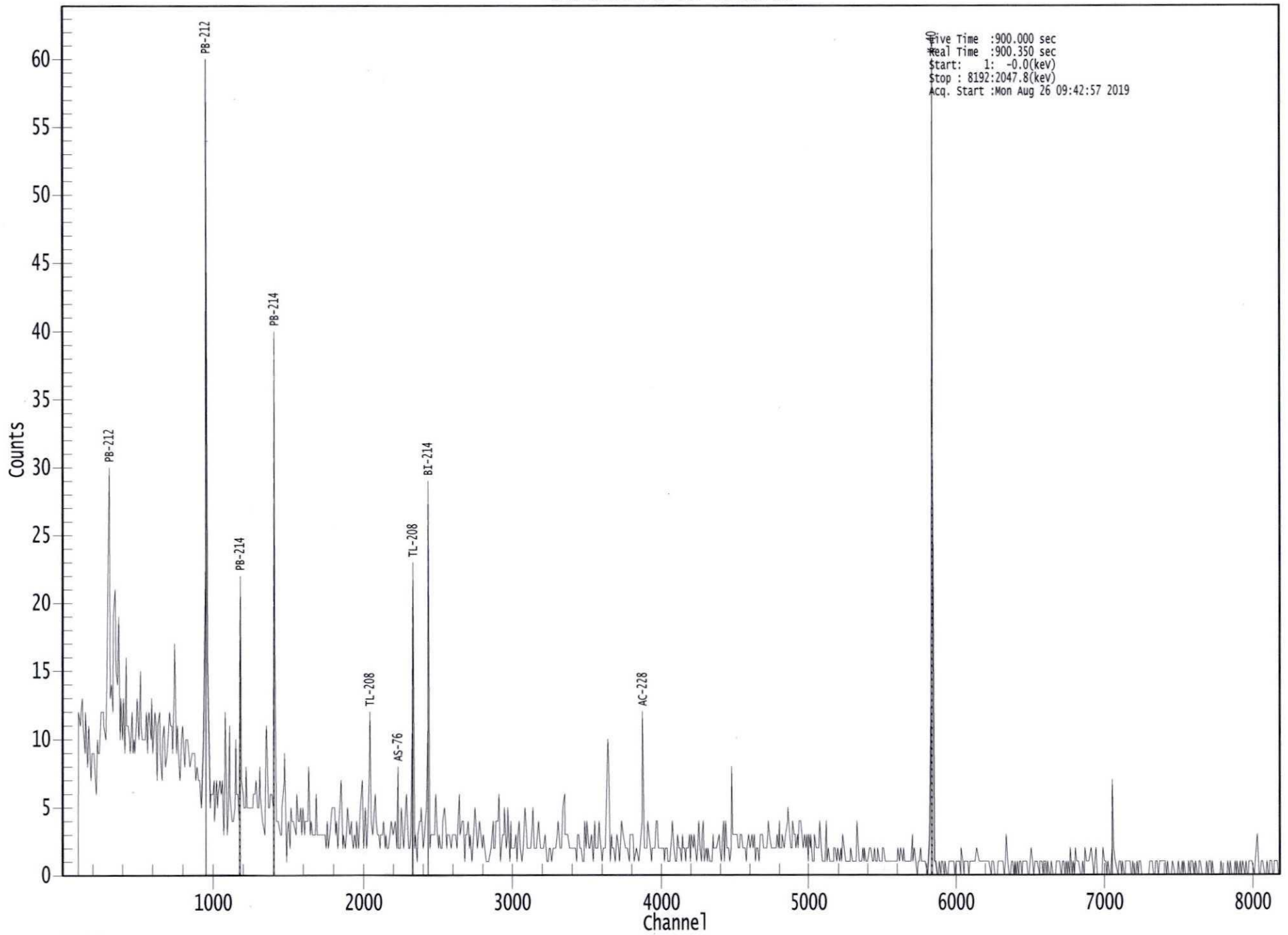
Analysis Report for 26-Aug-19-10003

L1-10207B-RIGS-012SS

<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Nuclide MDA (pCi/grams)</b>	<b>Line MDA (pCi/grams)</b>
Eu-154	756.80	4.52	-4.12E-01	9.93E-02	1.15E+00
	873.18	12.08	2.58E-01		4.91E-01
	996.29	10.48	1.47E-01		6.34E-01
	1004.76	18.01	1.75E-02		3.42E-01
	1274.43	34.80	1.61E-01		2.13E-01
	1596.48	1.80	7.61E-01		2.07E+00
Eu-155	45.30	1.31	-8.82E-01	2.29E-01	1.28E+01
	60.01	1.22	-2.87E+00		1.45E+01
	86.55	30.70	1.48E-01		2.31E-01
	105.31	21.10	-5.11E-02		2.29E-01
Ra-226	186.21	3.64	5.01E-01	1.24E+00	1.24E+00
Pa-231	27.36	10.30	1.12E+00	1.59E+00	1.59E+00
	283.69	1.70	-2.02E+00		2.04E+00
	300.07	2.47	3.04E-01		1.69E+00
	302.65	2.20	1.05E-01		1.91E+00
	330.06	1.40	9.08E-01		3.10E+00
U-235	143.76	10.96	-9.14E-02	7.95E-02	3.69E-01
	163.33	5.08	4.88E-01		7.83E-01
	185.71	57.20	4.53E-02		7.95E-02
	202.11	1.08	1.16E+00		3.81E+00
	205.31	5.01	-3.58E-01		8.00E-01
Am-241	59.54	35.90	2.30E-02	5.05E-01	5.05E-01

- + = 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  
 ? = CAUTION: MDA value is inconsistent with Currie MDA at 95% confidence level

000079094.CNF



Live Time : 900.000 sec  
Real Time : 900.350 sec  
Start: 1: -0.0(kev)  
Stop : 8192.2047.8(kev)  
Acq. Start : Mon Aug 26 09:42:57 2019

ROI Type: 1

Analysis Report for 26-Aug-19-10004  
L1-10207B-RIGS-013SS

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## GAMMA SPECTRUM ANALYSIS

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Sample Identification : 26-Aug-19-10004  
Sample Description : L1-10207B-RIGS-013SS  
Sample Type : Soil  
Unit :  
Sample Point :  
  
Sample Size : 1.309E+03 grams  
Facility : Default  
  
Sample Taken On : 8/22/2019 1:06:00PM  
Acquisition Started : 8/26/2019 9:43:05AM  
  
Procedure : 130G\_SOIL\_1  
Operator : Administrator  
Detector Name : 352  
Geometry : 130G\_SOIL\_1  
Live Time : 900.0 seconds  
Real Time : 900.3 seconds  
  
Dead Time : 0.04 %  
  
Peak Locate Threshold : 3.00  
Peak Locate Range (in channels) : 120 - 8192  
Peak Area Range (in channels) : 120 - 8192  
Identification Energy Tolerance : 1.000 keV  
  
Energy Calibration Used Done On : 9/29/2018  
Efficiency Calibration Used Done On : 8/26/2019  
Efficiency Calibration Description :  
  
Sample Number : 79095  
Fill Height : 1309.06 gram  
Certificate Name : Eu155-Na22  
Certificate Date : 1/7/2013 12:00:00PM

*J. M. ...*  
8-26-19

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## PEAK ANALYSIS REPORT

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Peak Analysis Performed on : 8/26/2019 9:58:10AM  
Peak Analysis From Channel : 120  
Peak Analysis To Channel : 8192

*J. M. ...*  
8-26-19

Analysis Report for 26-Aug-19-10004  
L1-10207B-RIGS-013SS

Peak No.	Energy (keV)	ROI start	ROI end	Peak Centroid	Net Peak Area	Net Area Uncertainty	Continuum Counts	FWHM (keV)
1	185.96	740 -	751	744.57	6.45E+01	15.22	6.65E+01	0.87
2	238.67	949 -	961	955.16	1.88E+02	21.17	9.90E+01	0.75
3	295.20	1175 -	1187	1181.02	5.75E+01	14.81	6.15E+01	0.79
4	338.52	1345 -	1360	1354.14	5.38E+01	12.55	3.42E+01	0.70
5	351.89	1401 -	1416	1407.57	1.63E+02	16.04	3.14E+01	1.24
6	583.11	2325 -	2339	2331.77	7.02E+01	11.43	2.08E+01	1.38
7	609.29	2428 -	2445	2436.41	1.35E+02	13.92	1.80E+01	1.18
8	661.72	2640 -	2652	2646.06	3.53E+01	7.81	9.75E+00	1.45
9	911.22	3637 -	3651	3643.92	4.47E+01	9.16	1.33E+01	0.75
10	1460.68	5829 -	5855	5843.09	4.70E+02	23.06	1.38E+01	1.88

M = First peak in a multiplet region  
m = Other peak in a multiplet region  
F = Fitted singlet  
Errors quoted at 1.000sigma

No background subtract performed on this spectrum.

## NUCLIDE IDENTIFICATION REPORT

Nuclide Library Used : C:\Canberra\Apex\Root\Default\Library\ZION LIB-BNL.NLB

### IDENTIFIED NUCLIDES

Nuclide Name	Id Confidence	Energy (keV)	Yield(%)	Activity (pCi/grams)	Activity Uncertainty
K-40	0.99	1460.82 *	10.66	1.03E+01	6.77E-01
Cs-137	0.99	661.66 *	85.10	5.70E-02	1.31E-02
Tl-208	0.99	583.19 *	85.00	1.05E-01	1.81E-02
Bi-211	0.89	351.07 *	13.02	1.12E+00	1.43E-01
Pb-212	1.00	115.18	0.60		
		238.63 *	43.60	3.04E-01	4.22E-02
		300.09	3.30		

Analysis Report for 26-Aug-19-10004

L1-10207B-RIGS-013SS

<b>Nuclide Name</b>	<b>Id Confidence</b>	<b>Energy (keV)</b>		<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Activity Uncertainty</b>				
Bi-214	1.00	609.32	*	45.49	3.87E-01	4.62E-02				
		768.36		4.89						
		806.18		1.26						
		934.06		3.11						
		1120.29		14.92						
		1155.21		1.63						
		1238.12		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						
		1661.27		1.05						
		1729.59		2.88						
Pb-214	1.00	1764.49		15.30	2.48E-01	6.68E-02				
		1847.43		2.03						
		2118.51		1.16						
		241.99		7.25						
		295.22	*	18.42						
		351.93	*	35.60						
		785.96		1.06						
		Ra-226	0.99	186.21			*	3.64	1.11E+00	2.78E-01
		Ac-228	0.99	129.07				2.42	4.17E-01	1.03E-01
				209.25				3.89		
				270.24				3.46		
				328.00				2.95		
				338.32			*	11.27		
				409.46				1.92		
				463.00				4.40		
794.95				4.25						
911.20	*			25.80						
964.77				4.99						
968.97				15.80						
U-235	0.99			1588.20		3.22	2.95E-01	6.18E-02		
				143.76		10.96				
				163.33		5.08				
				185.71	*	57.20				
		202.11		1.08						
		205.31		5.01	7.08E-02	1.77E-02				

\* = Energy line found in the spectrum.

- = Manually added nuclide.

? = Manually edited nuclide.

@ = Energy line not used for Weighted Mean Activity

Energy Tolerance : 1.000 keV

Nuclide confidence index threshold = 0.30

Errors quoted at 1.000sigma

Analysis Report for 26-Aug-19-10004

L1-10207B-RIGS-013SS

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## INTERFERENCE CORRECTED REPORT

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Nuclide Name	Nuclide Id Confidence	Wt mean Activity (pCi/grams)	Wt mean Activity Uncertainty	Comments
K-40	0.997	1.03E+01	6.77E-01	
Cs-137	0.999	5.70E-02	1.31E-02	
Tl-208	0.999	1.05E-01	1.81E-02	
Bi-211	0.897	4.44E-01	2.32E-01	
Pb-212	1.000	3.04E-01	4.22E-02	
Bi-214	1.000	3.87E-01	4.62E-02	
Pb-214	1.000	2.48E-01	6.68E-02	
? Ra-226	0.990	1.11E+00	2.78E-01	
Ac-228	0.999	3.27E-01	5.30E-02	
? <del>U-235</del> Ra-226	<del>0.993</del>	<del>7.08E-02</del>	<del>1.77E-02</del>	

? = 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 1.000sigma

U-235 only 1 peak

JPW  
8-26-19

Analysis Report for 26-Aug-19-10004  
L1-10207B-RIGS-013SS

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## UNIDENTIFIED PEAKS

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Peak Locate Performed on : 8/26/2019 9:58:10AM  
Peak Locate From Channel : 120  
Peak Locate To Channel : 8192

Peak No.	Energy (keV)	Peak Size (CPS)	Peak CPS (%) Uncertainty	Peak Type	Tolerance Nuclide
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All peaks were identified.

M = First peak in a multiplet region  
m = Other peak in a multiplet region  
F = Fitted singlet  
Errors quoted at 1.000sigma

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## NUCLIDE MDA REPORT

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Nuclide Library Used : C:\Canberra\Apex\Root\Default\Library\ZION LIB-BNL.NLB

Nuclide Name	Energy (keV)	Yield(%)	Activity (pCi/grams)	Nuclide MDA (pCi/grams)	Line MDA (pCi/grams)
An Pk	511.00	100.00	6.08E-02	6.36E-02	6.36E-02
BE-7	477.60	10.44	5.00E-01	4.95E-01	4.95E-01
+ K-40	1460.82	* 10.66	1.03E+01	6.48E-01	6.48E-01
Mn-54	834.85	99.98	2.66E-02	5.74E-02	5.74E-02
Co-60	1173.23	99.85	2.02E-02	6.29E-02	8.38E-02
	1332.49	99.98	3.26E-02		6.29E-02
Nb-94	702.65	99.81	1.44E-02	5.52E-02	5.52E-02
	871.09	99.89	3.31E-02		5.67E-02
Ag-108m	79.13	6.60	-1.49E+00	4.59E-02	1.79E+00
	433.94	90.50	7.40E-03		4.59E-02
	614.28	89.80	1.76E-02		9.71E-02
	722.94	90.80	2.09E-02		6.58E-02
Sb-125	176.31	6.84	-1.24E-01	1.43E-01	5.92E-01
	380.45	1.52	3.05E+00		3.05E+00
	427.87	29.60	8.36E-02		1.43E-01
	463.36	10.49	3.80E-01		4.77E-01
	600.60	17.65	-7.49E-02		2.46E-01
	606.71	4.98	3.89E+00		1.77E+00
	635.95	11.22	-1.59E-01		4.12E-01

Analysis Report for 26-Aug-19-10004

L1-10207B-RIGS-013SS

<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Nuclide MDA (pCi/grams)</b>	<b>Line MDA (pCi/grams)</b>
Sb-125	671.44	1.79	4.09E-01	1.43E-01	2.56E+00
Ba-133	79.61	2.65	-1.17E+00	1.01E-01	4.37E+00
	81.00	32.90	-3.46E-01		3.09E-01
	276.40	7.16	2.70E-01		6.22E-01
	302.85	18.34	7.34E-02		2.29E-01
	356.01	62.05	-9.92E-03		1.01E-01
	383.85	8.94	2.49E-02		4.89E-01
Cs-134	475.36	1.48	4.08E-01	6.14E-02	3.07E+00
	563.25	8.34	-9.14E-02		5.27E-01
	569.33	15.37	1.85E-02		2.96E-01
	604.72	97.62	-6.02E-03		8.37E-02
	795.86	85.46	2.11E-02		6.14E-02
	801.95	8.69	-3.11E-01		6.20E-01
	1038.61	0.99	-4.79E-01		5.41E+00
	1167.97	1.79	1.66E+00		4.36E+00
	1365.19	3.02	2.04E-01		1.68E+00
+ Cs-137	661.66	* 85.10	5.70E-02	3.25E-02	3.25E-02
Eu-152	121.78	28.67	1.54E-02	1.55E-01	1.66E-01
	244.70	7.61	-2.22E-01		5.70E-01
	295.94	0.45	1.45E+01		1.27E+01
	344.28	26.60	-7.67E-02		1.55E-01
	367.79	0.86	-2.96E-01		4.66E+00
	411.12	2.24	-1.26E+00		2.04E+00
	443.96	2.83	-9.31E-03		1.58E+00
	488.68	0.42	-1.47E+00		9.48E+00
	563.99	0.49	2.22E+00		9.28E+00
	586.26	0.46	2.16E+01		1.57E+01
	678.62	0.47	-1.10E+01		1.06E+01
	688.67	0.86	4.38E+00		6.33E+00
	719.35	0.28	2.49E+01		1.99E+01
	778.90	12.96	-2.95E-01		4.15E-01
	810.45	0.32	1.42E+01		1.74E+01
	867.37	4.26	-2.42E-01		1.41E+00
	919.33	0.43	-1.76E-01		1.15E+01
	964.08	14.65	2.49E-01		5.23E-01
	1085.87	10.24	1.15E-01		6.06E-01
	1089.74	1.73	1.72E+00		3.76E+00
	1112.07	13.69	-1.01E+00		4.77E-01
	1212.95	1.43	5.64E+00		5.73E+00
	1249.94	0.19	2.39E+01		4.05E+01
	1299.14	1.63	-2.50E+00		3.15E+00
	1408.01	21.07	4.06E-02		2.51E-01
	1457.64	0.50	2.29E+02		5.09E+01
	1528.10	0.28	1.12E+01		1.74E+01
Eu-154	123.07	40.40	8.78E-03	1.21E-01	1.21E-01
	247.93	6.89	5.76E-02		5.82E-01
	591.76	4.95	7.62E-01		1.00E+00
	692.42	1.78	2.74E+00		2.83E+00
	723.30	20.06	2.18E-01		3.03E-01
	756.80	4.52	-4.82E-01		1.18E+00
	873.18	12.08	-2.05E-01		4.50E-01



Analysis Report for 26-Aug-19-10004

L1-10207B-RIGS-013SS

<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Nuclide MDA (pCi/grams)</b>	<b>Line MDA (pCi/grams)</b>
Eu-154	996.29	10.48	4.88E-01	1.21E-01	5.80E-01
	1004.76	18.01	-7.56E-02		3.20E-01
	1274.43	34.80	-1.46E-01		1.98E-01
	1596.48	1.80	6.61E-01		3.16E+00
Eu-155	45.30	1.31	-4.24E+00	2.54E-01	2.39E+01
	60.01	1.22	1.46E+00		2.50E+01
	86.55	30.70	-1.34E-01		2.74E-01
	105.31	21.10	-2.41E-02		2.54E-01
+ Ra-226	186.21	* 3.64	1.11E+00	8.07E-01	8.07E-01
Pa-231	27.36	10.30	1.92E+00	1.88E+00	2.62E+00
	283.69	1.70	5.58E-02		2.44E+00
	300.07	2.47	-1.42E-01		1.88E+00
	302.65	2.20	-5.14E-01		1.91E+00
	330.06	1.40	-5.23E-01		3.00E+00
+ U-235	143.76	10.96	-1.11E-01	5.13E-02	4.29E-01
	163.33	5.08	-5.25E-01		8.32E-01
	185.71	* 57.20	7.08E-02		5.13E-02
	202.11	1.08	-1.11E+00		3.99E+00
	205.31	5.01	-5.22E-01		8.54E-01
Am-241	59.54	35.90	1.32E-01	8.87E-01	8.87E-01

+ = Nuclide identified during the nuclide identification

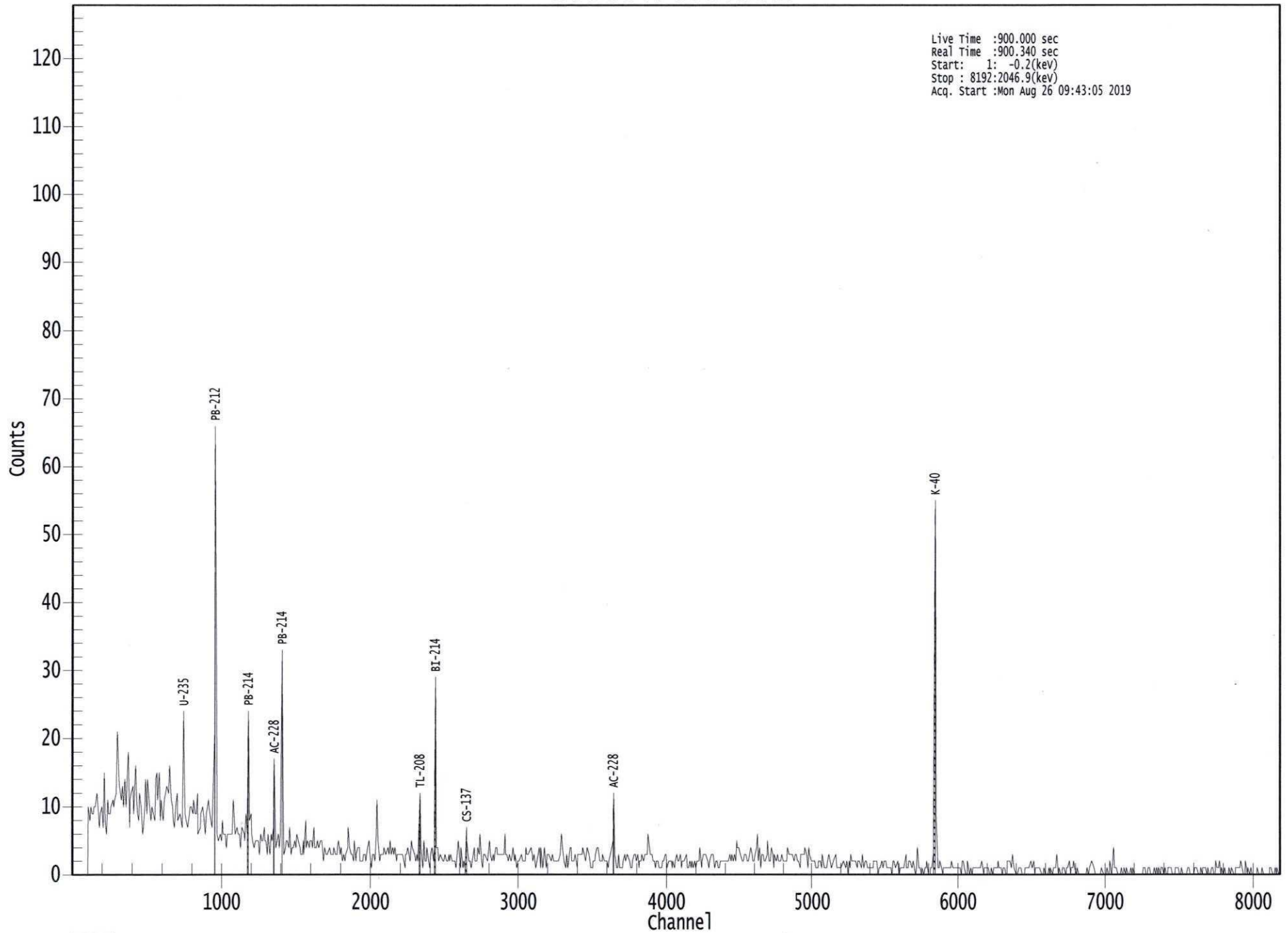
\* = Energy line found in the spectrum

&gt; = MDA value not calculated

@ = Half-life too short to be able to perform the decay correction

? = CAUTION: MDA value is inconsistent with Currie MDA at 95% confidence level

# 000079095.CNF



Live Time :900.000 sec  
Real Time :900.340 sec  
Start: 1: -0.2(kev)  
Stop : 8192:2046.9(kev)  
Acq. Start :Mon Aug 26 09:43:05 2019

 ROI Type: 1

Analysis Report for 26-Aug-19-10005  
L1-10207B-RIGS-014SS

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## GAMMA SPECTRUM ANALYSIS

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Sample Identification : 26-Aug-19-10005  
Sample Description : L1-10207B-RIGS-014SS  
Sample Type : Soil  
Unit :  
Sample Point :  
  
Sample Size : 1.420E+03 grams  
Facility : Default  
  
Sample Taken On : 8/22/2019 1:08:00PM  
Acquisition Started : 8/26/2019 10:07:54AM  
  
Procedure : 130G\_SOIL\_1  
Operator : Administrator  
Detector Name : 324  
Geometry : 130G\_SOIL\_1  
Live Time : 900.0 seconds  
Real Time : 900.4 seconds  
  
Dead Time : 0.04 %  
  
Peak Locate Threshold : 3.00  
Peak Locate Range (in channels) : 120 - 4096  
Peak Area Range (in channels) : 120 - 4096  
Identification Energy Tolerance : 1.000 keV  
  
Energy Calibration Used Done On : 9/29/2018  
Efficiency Calibration Used Done On : 8/26/2019  
Efficiency Calibration Description :  
  
Sample Number : 79096  
Fill Height : 1419.52 gram  
Certificate Name : Eu155-Na22  
Certificate Date : 1/30/2013 12:00:00PM

*J.P. M...  
8-26-19*

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## PEAK ANALYSIS REPORT

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Peak Analysis Performed on : 8/26/2019 10:22:57AM

Peak Analysis From Channel : 120  
Peak Analysis To Channel : 4096

*J.P. M...  
8-26-19*

Analysis Report for 26-Aug-19-10005  
L1-10207B-RIGS-014SS

Peak No.	Energy (keV)	ROI start	ROI end	Peak Centroid	Net Peak Area	Net Area Uncertainty	Continuum Counts	FWHM (keV)
1	238.59	472 -	481	477.37	2.41E+02	25.21	1.68E+02	1.20
2	295.08	585 -	594	590.22	7.21E+01	15.09	6.89E+01	1.34
3	338.01	671 -	680	676.00	3.08E+01	14.25	7.62E+01	0.97
4	351.89	698 -	708	703.72	1.86E+02	17.24	4.68E+01	1.47
5	510.50	1017 -	1026	1020.69	5.32E+01	13.05	5.18E+01	1.18
6	582.92	1161 -	1171	1165.45	8.75E+01	12.66	3.05E+01	1.61
7	608.87	1213 -	1223	1217.32	1.11E+02	13.94	3.45E+01	1.00
8	661.31	1319 -	1325	1322.16	2.04E+01	8.32	2.56E+01	0.97
9	910.77	1815 -	1827	1821.00	7.10E+01	10.26	1.30E+01	1.72
10	968.61	1933 -	1940	1936.69	2.42E+01	7.74	1.78E+01	0.72
11	1460.23	2912 -	2927	2920.52	4.80E+02	22.72	1.20E+01	1.99

M = First peak in a multiplet region  
m = Other peak in a multiplet region  
F = Fitted singlet  
Errors quoted at 1.000sigma

No background subtract performed on this spectrum.

## NUCLIDE IDENTIFICATION REPORT

Nuclide Library Used : C:\Canberra\Apex\Root\Default\Library\ZION LIB-BNL.NLB

### IDENTIFIED NUCLIDES

Nuclide Name	Id Confidence	Energy (keV)	Yield(%)	Activity (pCi/grams)	Activity Uncertainty
An Pk	0.96	511.00 *	100.00	5.73E-02	1.46E-02
K-40	0.94	1460.82 *	10.66	9.22E+00	5.92E-01
Cs-137	0.98	661.66 *	85.10	2.91E-02	1.20E-02
Tl-208	0.98	583.19 *	85.00	1.15E-01	1.80E-02
Bi-211	0.89	351.07 *	13.02	1.13E+00	1.39E-01
Pb-212	1.00	115.18	0.60		

Analysis Report for 26-Aug-19-10005

L1-10207B-RIGS-014SS

<b>Nuclide Name</b>	<b>Id Confidence</b>	<b>Energy (keV)</b>		<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Activity Uncertainty</b>
Pb-212	1.00	238.63	*	43.60	3.43E-01	4.53E-02
		300.09		3.30		
Bi-214	0.98	609.32	*	45.49	2.81E-01	3.90E-02
		768.36		4.89		
		806.18		1.26		
		934.06		3.11		
		1120.29		14.92		
		1155.21		1.63		
		1238.12		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		
		1661.27		1.05		
		1729.59		2.88		
		1764.49		15.30		
		1847.43		2.03		
		2118.51		1.16		
Pb-214	0.99	241.99		7.25		
		295.22	*	18.42	2.74E-01	6.14E-02
		351.93	*	35.60	4.15E-01	5.07E-02
		785.96		1.06		
Ac-228	0.98	129.07		2.42		
		209.25		3.89		
		270.24		3.46		
		328.00		2.95		
		338.32	*	11.27	2.11E-01	9.89E-02
		409.46		1.92		
		463.00		4.40		
		794.95		4.25		
		911.20	*	25.80	4.12E-01	6.22E-02
		964.77		4.99		
		968.97	*	15.80	2.38E-01	7.71E-02
		1588.20		3.22		

\* = Energy line found in the spectrum.

- = Manually added nuclide.

? = Manually edited nuclide.

@ = Energy line not used for Weighted Mean Activity

Energy Tolerance : 1.000 keV

Nuclide confidence index threshold = 0.30

Errors quoted at 1.000sigma

Analysis Report for 26-Aug-19-10005  
L1-10207B-RIGS-014SS

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## INTERFERENCE CORRECTED REPORT

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<b>Nuclide Name</b>	<b>Nuclide Id Confidence</b>	<b>Wt mean Activity (pCi/grams)</b>	<b>Wt mean Activity Uncertainty</b>	<b>Comments</b>
An Pk	0.961	5.73E-02	1.46E-02	
K-40	0.946	9.22E+00	5.92E-01	
Cs-137	0.981	2.91E-02	1.20E-02	
Tl-208	0.989	1.15E-01	1.80E-02	
Bi-211	0.899	3.85E-01	2.18E-01	
Pb-212	1.000	3.43E-01	4.53E-02	
Bi-214	0.987	2.81E-01	3.90E-02	
Pb-214	0.999	2.74E-01	6.14E-02	
Ac-228	0.985	3.18E-01	4.35E-02	

- 
- ? = 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 1.000sigma

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Analysis Report for 26-Aug-19-10005  
L1-10207B-RIGS-014SS

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## UNIDENTIFIED PEAKS

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Peak Locate Performed on : 8/26/2019 10:22:57AM  
Peak Locate From Channel : 120  
Peak Locate To Channel : 4096

Peak No.	Energy (keV)	Peak Size (CPS)	Peak CPS (%) Uncertainty	Peak Type	Tolerance Nuclide
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All peaks were identified.

M = First peak in a multiplet region  
m = Other peak in a multiplet region  
F = Fitted singlet  
Errors quoted at 1.000sigma

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## NUCLIDE MDA REPORT

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Nuclide Library Used : C:\Canberra\Apex\Root\Default\Library\ZION LIB-BNL.NLB

	Nuclide Name	Energy (keV)		Yield(%)	Activity (pCi/grams)	Nuclide MDA (pCi/grams)	Line MDA (pCi/grams)
+	An Pk	511.00	*	100.00	5.73E-02	4.26E-02	4.26E-02
	BE-7	477.60		10.44	-8.21E-02	3.49E-01	3.49E-01
+	K-40	1460.82	*	10.66	9.22E+00	4.47E-01	4.47E-01
	Mn-54	834.85		99.98	7.48E-03	5.15E-02	5.15E-02
	Co-60	1173.23		99.85	-2.00E-02	5.05E-02	6.90E-02
		1332.49		99.98	-6.39E-04		5.05E-02
	Nb-94	702.65		99.81	2.29E-02	4.04E-02	4.61E-02
		871.09		99.89	-3.45E-02		4.04E-02
	Ag-108m	79.13		6.60	1.95E-01	3.99E-02	1.32E+00
		433.94		90.50	-9.48E-03		3.99E-02
		614.28		89.80	-2.78E-02		5.57E-02
		722.94		90.80	2.63E-02		5.71E-02
	Sb-125	176.31		6.84	-7.65E-02	1.10E-01	5.75E-01
		380.45		1.52	-2.98E-01		2.38E+00
		427.87		29.60	-4.56E-02		1.10E-01
		463.36		10.49	1.19E-01		3.72E-01
		600.60		17.65	-1.34E-01		2.17E-01
		606.71		4.98	-2.11E-02		1.50E+00
		635.95		11.22	-8.71E-02		3.66E-01

Analysis Report for 26-Aug-19-10005

L1-10207B-RIGS-014SS

<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Nuclide MDA (pCi/grams)</b>	<b>Line MDA (pCi/grams)</b>
Sb-125	671.44	1.79	-7.32E-01	1.10E-01	2.35E+00
Ba-133	79.61	2.65	5.94E-01	8.26E-02	3.14E+00
	81.00	32.90	-2.31E-01		2.09E-01
	276.40	7.16	-1.72E-02		5.18E-01
	302.85	18.34	1.00E-01		1.99E-01
	356.01	62.05	-6.28E-02		8.26E-02
	383.85	8.94	1.29E-03		4.24E-01
Cs-134	475.36	1.48	-5.09E-01	5.34E-02	2.39E+00
	563.25	8.34	9.59E-02		5.01E-01
	569.33	15.37	-7.33E-02		2.36E-01
	604.72	97.62	-1.85E-02		6.91E-02
	795.86	85.46	1.05E-02		5.34E-02
	801.95	8.69	-2.79E-01		4.77E-01
	1038.61	0.99	-4.04E-01		5.03E+00
	1167.97	1.79	1.98E+00		4.00E+00
	1365.19	3.02	-4.29E-01		1.43E+00
+ Cs-137	661.66	* 85.10	2.91E-02	3.78E-02	3.78E-02
Eu-152	121.78	28.67	1.00E-02	1.27E-01	1.27E-01
	244.70	7.61	-1.89E-01		5.36E-01
	295.94	0.45	-2.58E+00		9.92E+00
	344.28	26.60	-4.04E-02		1.46E-01
	367.79	0.86	-1.31E-01		4.19E+00
	411.12	2.24	-2.18E-01		1.80E+00
	443.96	2.83	7.77E-02		1.32E+00
	488.68	0.42	2.00E+00		9.69E+00
	563.99	0.49	1.39E+00		8.26E+00
	586.26	0.46	-1.17E+00		1.43E+01
	678.62	0.47	6.54E-02		9.07E+00
	688.67	0.86	-2.64E+00		4.87E+00
	719.35	0.28	-4.42E+00		1.49E+01
	778.90	12.96	-3.81E-01		2.80E-01
	810.45	0.32	3.13E+00		1.28E+01
	867.37	4.26	3.95E-02		1.05E+00
	919.33	0.43	-6.49E+00		8.94E+00
	964.08	14.65	-2.78E-01		4.66E-01
	1085.87	10.24	-1.93E-01		4.48E-01
	1089.74	1.73	-1.10E-01		3.12E+00
	1112.07	13.69	-3.44E-01		4.13E-01
	1212.95	1.43	9.75E-01		4.69E+00
	1249.94	0.19	1.83E+00		2.96E+01
	1299.14	1.63	1.18E+00		3.48E+00
	1408.01	21.07	-4.50E-02		1.97E-01
	1457.64	0.50	-2.01E+00		4.48E+01
	1528.10	0.28	7.52E+00		1.36E+01
Eu-154	123.07	40.40	3.81E-02	9.10E-02	9.10E-02
	247.93	6.89	-4.60E-02		5.16E-01
	591.76	4.95	2.49E-01		8.23E-01
	692.42	1.78	5.55E-01		2.47E+00
	723.30	20.06	1.32E-01		2.65E-01
	756.80	4.52	1.85E-01		9.63E-01
	873.18	12.08	5.15E-03		3.56E-01

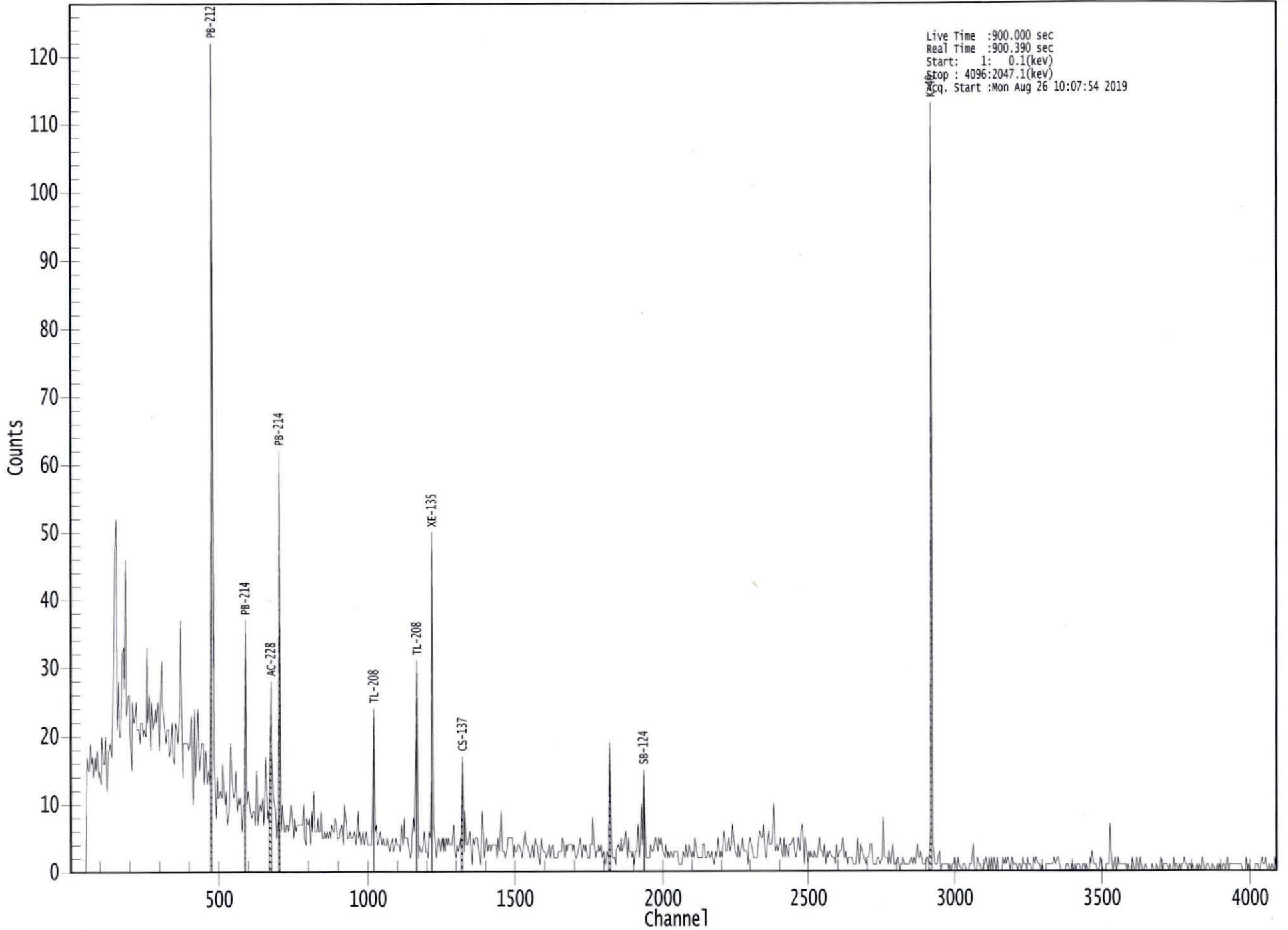


Analysis Report for 26-Aug-19-10005

L1-10207B-RIGS-014SS

<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Nuclide MDA (pCi/grams)</b>	<b>Line MDA (pCi/grams)</b>	
Eu-154	996.29	10.48	4.48E-02	9.10E-02	5.53E-01	
	1004.76	18.01	4.69E-02		2.88E-01	
	1274.43	34.80	2.91E-02		1.82E-01	
	1596.48	1.80	8.24E-01		2.46E+00	
Eu-155	45.30	1.31	-1.94E+00	2.08E-01	1.26E+01	
	60.01	1.22	-2.93E+00		1.27E+01	
	86.55	30.70	6.83E-02		2.08E-01	
Ra-226	105.31	21.10	3.57E-02		2.12E-01	
Ra-226	186.21	3.64	8.48E-01	1.20E+00	1.20E+00	
	Pa-231	27.36	10.30	9.41E-01	1.30E+00	1.30E+00
Pa-231	283.69	1.70	5.45E-02		2.09E+00	
	300.07	2.47	-6.60E-01		1.50E+00	
	302.65	2.20	8.35E-01		1.65E+00	
	330.06	1.40	1.92E+00		2.99E+00	
	U-235	143.76	10.96	2.99E-02	7.70E-02	3.25E-01
		163.33	5.08	2.41E-01		7.88E-01
	U-235	185.71	57.20	7.11E-02		7.70E-02
202.11		1.08	1.38E+00		3.70E+00	
U-235	205.31	5.01	-3.56E-01		7.55E-01	
	Am-241	59.54	35.90	5.76E-02	4.62E-01	4.62E-01

- + = 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  
 ? = CAUTION: MDA value is inconsistent with Currie MDA at 95% confidence level



ROI Type: 1

Analysis Report for 18-Oct-19-10009  
L1-10213C-AIGS-001SS

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## GAMMA SPECTRUM ANALYSIS

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Sample Identification : 18-Oct-19-10009  
Sample Description : L1-10213C-AIGS-001SS  
Sample Type : Soil  
Unit :  
Sample Point :  
  
Sample Size : 1.292E+03 grams  
Facility : Default  
  
Sample Taken On : 10/17/2019 7:50:00AM  
Acquisition Started : 10/18/2019 9:18:37AM  
  
Procedure : 130G\_SOIL\_1  
Operator : Administrator  
Detector Name : 324  
Geometry : 130G\_SOIL\_1  
Live Time : 900.0 seconds  
Real Time : 900.4 seconds  
  
Dead Time : 0.04 %  
  
Peak Locate Threshold : 3.00  
Peak Locate Range (in channels) : 120 - 4096  
Peak Area Range (in channels) : 120 - 4096  
Identification Energy Tolerance : 1.000 keV  
  
Energy Calibration Used Done On : 9/29/2018  
Efficiency Calibration Used Done On : 10/18/2019  
Efficiency Calibration Description :  
  
Sample Number : 80562  
Fill Height : 1292.11 gram  
Certificate Name : Eu155-Na22  
Certificate Date : 1/30/2013 12:00:00PM

*J.P. [Signature]*  
10-18-19

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## PEAK ANALYSIS REPORT

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Peak Analysis Performed on : 10/18/2019 9:33:41AM  
Peak Analysis From Channel : 120  
Peak Analysis To Channel : 4096

*J.P. [Signature]*  
10-20-19

Analysis Report for 18-Oct-19-10009

L1-10213C-AIGS-001SS

Peak No.	Energy (keV)	ROI start	ROI end	Peak Centroid	Net Peak Area	Net Area Uncertainty	Continuum Counts	FWHM (keV)
1	238.62	473 -	481	477.43	1.24E+02	19.62	1.21E+02	1.01
2	295.20	585 -	595	590.46	8.03E+01	16.78	8.17E+01	1.16
3	351.87	698 -	708	703.69	1.34E+02	14.63	3.33E+01	1.20
4	583.17	1160 -	1171	1165.94	6.99E+01	10.75	1.81E+01	1.59
5	609.24	1213 -	1222	1218.05	7.58E+01	10.61	1.62E+01	1.75
6	661.53	1316 -	1328	1322.59	1.98E+02	15.65	1.78E+01	1.99
7	911.29	1815 -	1828	1822.02	6.81E+01	9.64	8.88E+00	1.10
8	1460.45	2915 -	2928	2920.95	3.63E+02	19.41	5.04E+00	1.74

M = First peak in a multiplet region  
m = Other peak in a multiplet region  
F = Fitted singlet  
Errors quoted at 1.000sigma

No background subtract performed on this spectrum.

## NUCLIDE IDENTIFICATION REPORT

Nuclide Library Used : C:\Canberra\Apex\Root\Default\Library\ZION LIB-BNL.NLB

### IDENTIFIED NUCLIDES

Nuclide Name	Id Confidence	Energy (keV)	Yield(%)	Activity (pCi/grams)	Activity Uncertainty
K-40	0.97	1460.82 *	10.66	7.20E+00	4.96E-01
Cs-137	0.99	661.66 *	85.10	2.90E-01	2.88E-02
Tl-208	1.00	583.19 *	85.00	9.43E-02	1.56E-02
Pb-212	1.00	115.18	0.60		
		238.63 *	43.60	1.80E-01	3.20E-02
		300.09	3.30		
Bi-214	1.00	609.32 *	45.49	1.97E-01	3.00E-02
		768.36	4.89		
		806.18	1.26		

Analysis Report for 18-Oct-19-10009

L1-10213C-AIGS-001SS

<b>Nuclide Name</b>	<b>Id Confidence</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Activity Uncertainty</b>
Bi-214	1.00	934.06	3.11		
		1120.29	14.92		
		1155.21	1.63		
		1238.12	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		
		1661.27	1.05		
		1729.59	2.88		
		1764.49	15.30		
		1847.43	2.03		
		2118.51	1.16		
Pb-214	1.00	241.99	7.25		
		295.22 *	18.42	3.12E-01	6.99E-02
		351.93 *	35.60	3.05E-01	4.13E-02
Ac-228	0.73	785.96	1.06		
		129.07	2.42		
		209.25	3.89		
		270.24	3.46		
		328.00	2.95		
		338.32	11.27		
		409.46	1.92		
		463.00	4.40		
		794.95	4.25		
		911.20 *	25.80	4.07E-01	6.02E-02
		964.77	4.99		
		968.97	15.80		
1588.20	3.22				

\* = Energy line found in the spectrum.

- = Manually added nuclide.

? = Manually edited nuclide.

@ = Energy line not used for Weighted Mean Activity

Energy Tolerance : 1.000 keV

Nuclide confidence index threshold = 0.30

Errors quoted at 1.000sigma

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**INTERFERENCE CORRECTED REPORT**

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Analysis Report for 18-Oct-19-10009

L1-10213C-AIGS-001SS

<b>Nuclide Name</b>	<b>Nuclide Id Confidence</b>	<b>Wt mean Activity (pCi/grams)</b>	<b>Wt mean Activity Uncertainty</b>	<b>Comments</b>
K-40	0.978	7.20E+00	4.96E-01	
Cs-137	0.997	2.90E-01	2.88E-02	
Tl-208	1.000	9.43E-02	1.56E-02	
X Bi-211	0.902			
Pb-212	1.000	1.80E-01	3.20E-02	
Bi-214	1.000	1.97E-01	3.00E-02	
Pb-214	1.000	3.07E-01	3.56E-02	
Ac-228	0.739	4.07E-01	6.02E-02	

? = 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 1.000sigma

Analysis Report for 18-Oct-19-10009  
L1-10213C-AIGS-001SS

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## UNIDENTIFIED PEAKS

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Peak Locate Performed on : 10/18/2019 9:33:41AM  
Peak Locate From Channel : 120  
Peak Locate To Channel : 4096

Peak No.	Energy (keV)	Peak Size (CPS)	Peak CPS (%) Uncertainty	Peak Type	Tolerance Nuclide
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All peaks were identified.

M = First peak in a multiplet region  
m = Other peak in a multiplet region  
F = Fitted singlet  
Errors quoted at 1.000sigma

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## NUCLIDE MDA REPORT

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Nuclide Library Used : C:\Canberra\Apex\Root\Default\Library\ZION LIB-BNL.NLB

Nuclide Name	Energy (keV)	Yield(%)	Activity (pCi/grams)	Nuclide MDA (pCi/grams)	Line MDA (pCi/grams)
An Pk	511.00	100.00	3.75E-02	5.17E-02	5.17E-02
BE-7	477.60	10.44	3.69E-01	4.43E-01	4.43E-01
+ K-40	1460.82	* 10.66	7.20E+00	3.05E-01	3.05E-01
Mn-54	834.85	99.98	-4.35E-03	3.30E-02	3.30E-02
Co-60	1173.23	99.85	1.99E-02	5.11E-02	6.57E-02
	1332.49	99.98	1.96E-02		5.11E-02
Nb-94	702.65	99.81	-1.30E-02	3.72E-02	3.90E-02
	871.09	99.89	-9.62E-04		3.72E-02
Ag-108m	79.13	6.60	3.52E-01	3.69E-02	1.25E+00
	433.94	90.50	-2.84E-03		3.96E-02
	614.28	89.80	-6.47E-02		5.41E-02
	722.94	90.80	4.63E-04		3.69E-02
Sb-125	176.31	6.84	-2.59E-01	1.15E-01	4.95E-01
	380.45	1.52	1.48E-02		2.42E+00
	427.87	29.60	-5.26E-02		1.15E-01
	463.36	10.49	-1.29E-02		3.60E-01
	600.60	17.65	1.08E-02		2.39E-01
	606.71	4.98	1.03E-02		1.29E+00
	635.95	11.22	1.19E-01		3.47E-01

Analysis Report for 18-Oct-19-10009  
L1-10213C-AIGS-001SS

<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Nuclide MDA (pCi/grams)</b>	<b>Line MDA (pCi/grams)</b>
Sb-125	671.44	1.79	9.11E-01	1.15E-01	2.31E+00
Ba-133	79.61	2.65	2.11E-01	7.34E-02	2.94E+00
	81.00	32.90	-3.23E-01		1.93E-01
	276.40	7.16	1.88E-01		5.06E-01
	302.85	18.34	3.62E-02		2.08E-01
	356.01	62.05	-7.01E-02		7.34E-02
	383.85	8.94	-1.37E-01		3.84E-01
Cs-134	475.36	1.48	8.34E-01	4.81E-02	2.99E+00
	563.25	8.34	1.46E-01		4.15E-01
	569.33	15.37	4.36E-02		2.41E-01
	604.72	97.62	-3.98E-03		5.83E-02
	795.86	85.46	2.47E-03		4.81E-02
	801.95	8.69	2.97E-02		4.61E-01
	1038.61	0.99	-4.43E+00		4.31E+00
	1167.97	1.79	9.40E-01		3.40E+00
	1365.19	3.02	8.34E-02		1.35E+00
+ Cs-137	661.66	* 85.10	2.90E-01	3.82E-02	3.82E-02
Eu-152	121.78	28.67	1.40E-02	1.20E-01	1.20E-01
	244.70	7.61	4.18E-03		5.04E-01
	295.94	0.45	-1.00E+00		1.07E+01
	344.28	26.60	-9.37E-02		1.33E-01
	367.79	0.86	-1.35E+00		4.04E+00
	411.12	2.24	-3.49E-02		1.67E+00
	443.96	2.83	-2.44E-01		1.23E+00
	488.68	0.42	4.90E-01		9.16E+00
	563.99	0.49	4.29E-01		6.75E+00
	586.26	0.46	-4.00E+00		1.24E+01
	678.62	0.47	-9.22E-01		7.71E+00
	688.67	0.86	6.60E-01		4.41E+00
	719.35	0.28	-5.26E+00		1.17E+01
	778.90	12.96	6.10E-02		2.72E-01
	810.45	0.32	-3.24E+00		1.03E+01
	867.37	4.26	-2.06E-01		9.05E-01
	919.33	0.43	4.21E+00		1.16E+01
	964.08	14.65	5.91E-02		4.06E-01
	1085.87	10.24	7.95E-02		4.99E-01
	1089.74	1.73	1.68E+00		3.09E+00
	1112.07	13.69	-9.48E-02		3.62E-01
	1212.95	1.43	6.49E-01		4.17E+00
	1249.94	0.19	-3.85E+00		2.74E+01
	1299.14	1.63	3.00E-01		2.78E+00
	1408.01	21.07	7.32E-02		2.38E-01
	1457.64	0.50	-9.03E+00		4.01E+01
	1528.10	0.28	7.21E-01		1.21E+01
Eu-154	123.07	40.40	2.01E-02	8.56E-02	8.56E-02
	247.93	6.89	3.17E-03		5.05E-01
	591.76	4.95	-6.21E-02		7.94E-01
	692.42	1.78	-8.59E-01		2.08E+00
	723.30	20.06	4.90E-02		1.74E-01
	756.80	4.52	1.39E-01		9.54E-01
	873.18	12.08	1.21E-01		3.14E-01



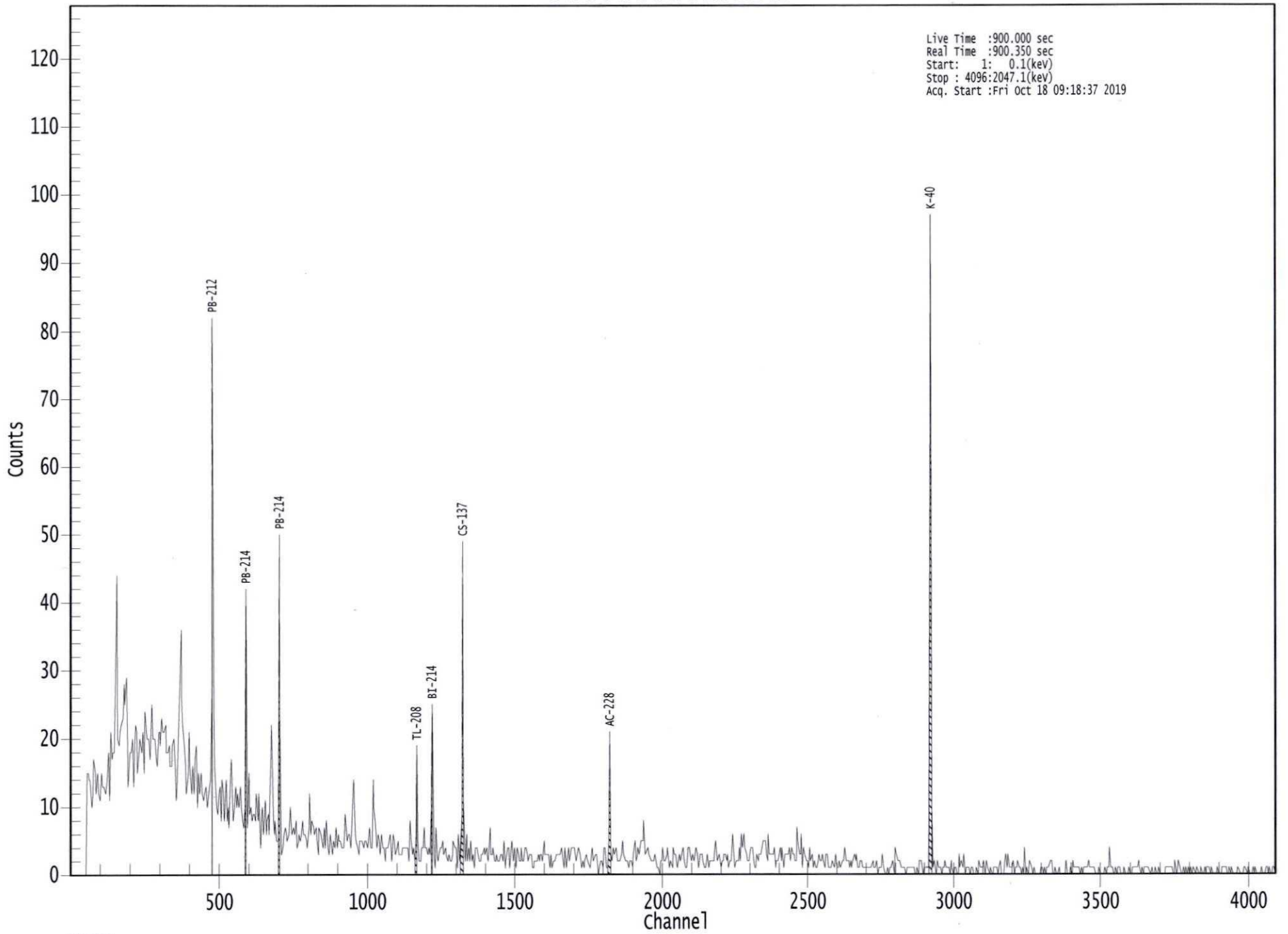
Analysis Report for 18-Oct-19-10009

L1-10213C-AIGS-001SS

<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Nuclide MDA (pCi/grams)</b>	<b>Line MDA (pCi/grams)</b>
Eu-154	996.29	10.48	-9.41E-02	8.56E-02	3.54E-01
	1004.76	18.01	1.29E-01		2.66E-01
	1274.43	34.80	-3.44E-02		1.48E-01
	1596.48	1.80	2.63E-01		2.85E+00
Eu-155	45.30	1.31	-8.15E-01	1.85E-01	1.12E+01
	60.01	1.22	-6.44E+00		1.22E+01
	86.55	30.70	-3.15E-02		1.87E-01
	105.31	21.10	-6.88E-02		1.85E-01
Ra-226	186.21	3.64	4.98E-01	1.17E+00	1.17E+00
Pa-231	27.36	10.30	8.20E-01	1.26E+00	1.26E+00
	283.69	1.70	1.16E-01		2.07E+00
	300.07	2.47	3.95E-01		1.53E+00
	302.65	2.20	3.02E-01		1.73E+00
	330.06	1.40	1.37E+00		2.76E+00
U-235	143.76	10.96	1.14E-01	7.62E-02	2.94E-01
	163.33	5.08	2.66E-02		7.73E-01
	185.71	57.20	6.76E-02		7.62E-02
	202.11	1.08	-4.70E-01		3.46E+00
	205.31	5.01	-3.47E-01		7.10E-01
Am-241	59.54	35.90	-1.96E-01	4.30E-01	4.30E-01

- + = 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  
 ? = CAUTION: MDA value is inconsistent with Currie MDA at 95% confidence level

000080562.CNF



Live Time :900.000 sec  
Real Time :900.350 sec  
Start: 1: 0.1(kev)  
Stop : 4096:2047.1(kev)  
Acq. Start :Fri Oct 18 09:18:37 2019

ROI Type: 1

Analysis Report for 18-Oct-19-10010  
L1-10213C-AIGS-002SS

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## GAMMA SPECTRUM ANALYSIS

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Sample Identification : 18-Oct-19-10010  
Sample Description : L1-10213C-AIGS-002SS  
Sample Type : Soil  
Unit :  
Sample Point :  
  
Sample Size : 1.023E+03 grams  
Facility : Default  
  
Sample Taken On : 10/17/2019 7:52:00AM  
Acquisition Started : 10/18/2019 10:08:21AM  
  
Procedure : 130G\_SOIL\_1  
Operator : Administrator  
Detector Name : 324  
Geometry : 130G\_SOIL\_1  
Live Time : 900.0 seconds  
Real Time : 900.4 seconds  
  
Dead Time : 0.05 %  
  
Peak Locate Threshold : 3.00  
Peak Locate Range (in channels) : 120 - 4096  
Peak Area Range (in channels) : 120 - 4096  
Identification Energy Tolerance : 1.000 keV  
  
Energy Calibration Used Done On : 9/29/2018  
Efficiency Calibration Used Done On : 10/18/2019  
Efficiency Calibration Description :  
  
Sample Number : 80569  
Fill Height : 1022.67 gram  
Certificate Name : Eu155-Na22  
Certificate Date : 1/30/2013 12:00:00PM

*J. W. ...*  
10-18-19

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## PEAK ANALYSIS REPORT

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Peak Analysis Performed on : 10/18/2019 10:23:24AM  
Peak Analysis From Channel : 120  
Peak Analysis To Channel : 4096

*J. W. ...*  
10-20-19

Analysis Report for 18-Oct-19-10010

L1-10213C-AIGS-002SS

Peak No.	Energy (keV)	ROI start	ROI end	Peak Centroid	Net Peak Area	Net Area Uncertainty	Continuum Counts	FWHM (keV)
1	75.20	147 -	154	151.00	7.30E+01	22.11	1.97E+02	0.98
2	238.66	473 -	481	477.50	1.81E+02	23.92	1.77E+02	1.21
3	338.42	672 -	680	676.81	5.79E+01	13.23	5.41E+01	0.92
4	351.78	698 -	708	703.50	1.95E+02	17.70	4.95E+01	1.17
5	583.07	1161 -	1171	1165.75	9.54E+01	13.51	3.66E+01	2.10
6	609.31	1213 -	1223	1218.20	1.14E+02	13.86	3.28E+01	1.54
7	661.49	1318 -	1327	1322.52	6.00E+01	11.23	2.90E+01	1.08
8	911.18	1816 -	1826	1821.81	5.89E+01	10.68	2.31E+01	1.81
9	1119.88	2234 -	2243	2239.30	2.10E+01	8.13	2.00E+01	1.38
10	1460.60	2914 -	2928	2921.26	5.15E+02	22.93	3.64E+00	2.05

M = First peak in a multiplet region  
m = Other peak in a multiplet region  
F = Fitted singlet  
Errors quoted at 1.000sigma

No background subtract performed on this spectrum.

## NUCLIDE IDENTIFICATION REPORT

Nuclide Library Used : C:\Canberra\Apex\Root\Default\Library\ZION LIB-BNL.NLB

### IDENTIFIED NUCLIDES

Nuclide Name	Id Confidence	Energy (keV)	Yield(%)	Activity (pCi/grams)	Activity Uncertainty
K-40	0.99	1460.82 *	10.66	1.13E+01	7.03E-01
Cs-137	0.99	661.66 *	85.10	9.63E-02	1.89E-02
Tl-208	0.99	583.19 *	85.00	1.41E-01	2.17E-02
Bi-211	0.92	351.07 *	13.02	1.33E+00	1.61E-01
Pb-212	1.00	115.18	0.60		
		238.63 *	43.60	2.85E-01	4.41E-02
		300.09	3.30		

Analysis Report for 18-Oct-19-10010  
L1-10213C-AIGS-002SS

<b>Nuclide Name</b>	<b>Id Confidence</b>	<b>Energy (keV)</b>		<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Activity Uncertainty</b>		
Bi-214	0.99	609.32	*	45.49	3.24E-01	4.39E-02		
		768.36		4.89				
		806.18		1.26				
				934.06		3.11		
				1120.29	*	14.92	2.74E-01	1.07E-01
				1155.21		1.63		
				1238.12		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		
				1661.27		1.05		
				1729.59		2.88		
				1764.49		15.30		
				1847.43		2.03		
		2118.51		1.16				
Pb-214	0.51	241.99		7.25	4.85E-01	5.86E-02		
		295.22		18.42				
		351.93	*	35.60				
Ac-228	1.00	785.96		1.06				
		129.07		2.42				
		209.25		3.89				
		270.24		3.46				
		328.00		2.95				
		338.32	*	11.27	4.41E-01	1.07E-01		
		409.46		1.92				
		463.00		4.40	3.87E-01	7.22E-02		
		794.95		4.25				
		911.20	*	25.80				
		964.77		4.99				
		968.97		15.80				
		1588.20		3.22				

\* = Energy line found in the spectrum.

- = Manually added nuclide.

? = Manually edited nuclide.

@ = Energy line not used for Weighted Mean Activity

Energy Tolerance : 1.000 keV

Nuclide confidence index threshold = 0.30

Errors quoted at 1.000sigma

**INTERFERENCE CORRECTED REPORT**

Analysis Report for 18-Oct-19-10010  
L1-10213C-AIGS-002SS

<b>Nuclide Name</b>	<b>Nuclide Id Confidence</b>	<b>Wt mean Activity (pCi/grams)</b>	<b>Wt mean Activity Uncertainty</b>	<b>Comments</b>
K-40	0.992	1.13E+01	7.03E-01	
Cs-137	0.996	9.63E-02	1.89E-02	
Tl-208	0.998	1.41E-01	2.17E-02	
? Bi-211	0.923	1.33E+00	1.61E-01	
Pb-212	1.000	2.85E-01	4.41E-02	
Bi-214	0.996	3.17E-01	4.06E-02	
? Pb-214	0.511	4.85E-01	5.86E-02	
Ac-228	1.000	4.04E-01	5.98E-02	

- ? = 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 1.000sigma

Analysis Report for 18-Oct-19-10010  
L1-10213C-AIGS-002SS

## UNIDENTIFIED PEAKS

Peak Locate Performed on : 10/18/2019 10:23:24AM  
Peak Locate From Channel : 120  
Peak Locate To Channel : 4096

Peak No.	Energy (keV)	Peak Size (CPS)	Peak CPS (%) Uncertainty	Peak Type	Tolerance Nuclide
1	75.20	8.11111E-02	30.29	Tol.	Pb212-XR Pb214-XR

M = First peak in a multiplet region  
m = Other peak in a multiplet region  
F = Fitted singlet  
Errors quoted at 1.000sigma

## NUCLIDE MDA REPORT

Nuclide Library Used : C:\Canberra\Apex\Root\Default\Library\ZION LIB-BNL.NLB

Nuclide Name	Energy (keV)	Yield(%)	Activity (pCi/grams)	Nuclide MDA (pCi/grams)	Line MDA (pCi/grams)
An Pk	511.00	100.00	8.78E-02	6.36E-02	6.36E-02
BE-7	477.60	10.44	1.65E-01	4.69E-01	4.69E-01
+ K-40	1460.82	* 10.66	1.13E+01	3.02E-01	3.02E-01
Mn-54	834.85	99.98	3.20E-03	4.94E-02	4.94E-02
Co-60	1173.23	99.85	4.12E-02	6.46E-02	7.11E-02
	1332.49	99.98	-9.40E-03		6.46E-02
Nb-94	702.65	99.81	-7.92E-03	5.07E-02	5.10E-02
	871.09	99.89	3.24E-02		5.07E-02
Ag-108m	79.13	6.60	2.15E-01	4.38E-02	1.41E+00
	433.94	90.50	-2.93E-02		4.38E-02
	614.28	89.80	-3.28E-02		7.00E-02
	722.94	90.80	2.48E-02		6.29E-02
Sb-125	176.31	6.84	2.93E-02	1.39E-01	6.06E-01
	380.45	1.52	1.39E-01		2.84E+00
	427.87	29.60	5.44E-02		1.39E-01
	463.36	10.49	1.34E-01		4.62E-01
	600.60	17.65	-8.88E-02		2.52E-01

Analysis Report for 18-Oct-19-10010  
L1-10213C-AIGS-002SS

<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Nuclide MDA (pCi/grams)</b>	<b>Line MDA (pCi/grams)</b>		
Sb-125	606.71	4.98	-2.08E-01	1.39E-01	1.69E+00		
	635.95	11.22	2.37E-01		4.93E-01		
	671.44	1.79	-1.23E+00		2.70E+00		
Ba-133	79.61	2.65	3.62E-01	9.55E-02	3.22E+00		
	81.00	32.90	-3.23E-01		2.12E-01		
	276.40	7.16	-3.69E-02		5.40E-01		
	302.85	18.34	7.70E-02		2.32E-01		
	356.01	62.05	-4.73E-02		9.55E-02		
	383.85	8.94	9.90E-02		4.67E-01		
	475.36	1.48	-5.33E-02		6.90E-02	3.18E+00	
Cs-134	563.25	8.34	7.00E-02	6.90E-02	5.75E-01		
	569.33	15.37	-8.64E-02		2.96E-01		
	604.72	97.62	-3.59E-02		7.19E-02		
	795.86	85.46	3.29E-02		6.90E-02		
	801.95	8.69	-3.36E-01		5.52E-01		
	1038.61	0.99	2.50E-01		5.85E+00		
	1167.97	1.79	-4.66E-01		3.96E+00		
	1365.19	3.02	4.02E-01		1.67E+00		
	+ Cs-137	661.66	* 85.10		9.63E-02	4.89E-02	4.89E-02
	Eu-152	121.78	28.67		1.18E-02	1.41E-01	1.41E-01
		244.70	7.61		-3.28E-01		5.84E-01
295.94		0.45	1.05E+01	1.23E+01			
344.28		26.60	-1.69E-01	1.53E-01			
367.79		0.86	2.79E+00	5.01E+00			
411.12		2.24	-3.01E-01	2.03E+00			
443.96		2.83	-7.42E-01	1.44E+00			
488.68		0.42	1.06E+00	1.02E+01			
563.99		0.49	9.98E-01	9.60E+00			
586.26		0.46	-3.50E+00	1.68E+01			
678.62		0.47	2.04E+00	9.78E+00			
688.67		0.86	1.43E+00	5.90E+00			
719.35		0.28	-1.24E+01	1.70E+01			
778.90		12.96	-1.19E-01	3.63E-01			
810.45		0.32	3.58E+00	1.52E+01			
867.37		4.26	-1.83E-01	1.15E+00			
919.33		0.43	-9.28E+00	1.16E+01			
964.08		14.65	-3.91E-02	5.34E-01			
1085.87		10.24	-2.11E-01	5.59E-01			
1089.74		1.73	-1.98E-01	3.50E+00			
1112.07		13.69	7.21E-02	4.37E-01			
1212.95		1.43	-4.47E-01	5.75E+00			
1249.94		0.19	-8.27E+00	3.59E+01			
1299.14	1.63	-3.22E-01	3.79E+00				
1408.01	21.07	8.57E-02	2.57E-01				
1457.64	0.50	-3.55E+00	5.23E+01				
1528.10	0.28	3.22E+00	1.55E+01				
Eu-154	123.07	40.40	1.26E-02	1.01E-01	1.01E-01		
	247.93	6.89	-2.08E-01		5.66E-01		
	591.76	4.95	-5.40E-01		8.60E-01		
	692.42	1.78	2.71E-01		3.00E+00		
	723.30	20.06	2.54E-01		2.98E-01		

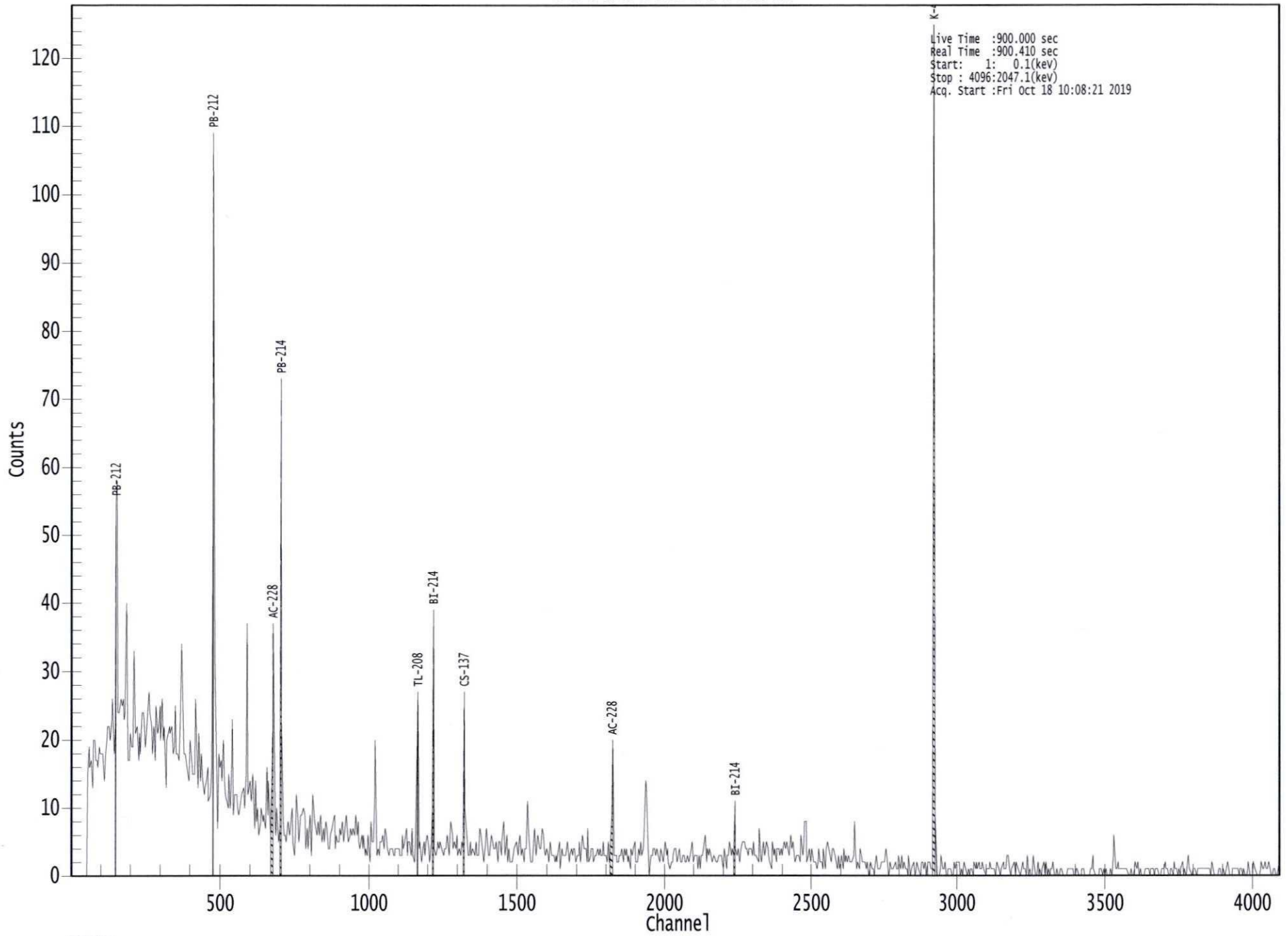


Analysis Report for 18-Oct-19-10010  
L1-10213C-AIGS-002SS

<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Nuclide MDA (pCi/grams)</b>	<b>Line MDA (pCi/grams)</b>
Eu-154	756.80	4.52	5.47E-01	1.01E-01	1.18E+00
	873.18	12.08	-1.98E-02		4.09E-01
	996.29	10.48	-2.24E-01		5.01E-01
	1004.76	18.01	1.78E-01		3.14E-01
	1274.43	34.80	-1.49E-02		2.04E-01
	1596.48	1.80	-9.65E-01		2.41E+00
Eu-155	45.30	1.31	3.30E+00	2.11E-01	1.39E+01
	60.01	1.22	6.22E+00		1.60E+01
	86.55	30.70	2.06E-03		2.11E-01
	105.31	21.10	8.50E-02		2.33E-01
Ra-226	186.21	3.64	9.58E-01	1.35E+00	1.35E+00
Pa-231	27.36	10.30	6.99E-01	1.32E+00	1.32E+00
	283.69	1.70	-6.26E-01		2.26E+00
	300.07	2.47	-2.94E+00		1.75E+00
	302.65	2.20	6.42E-01		1.93E+00
	330.06	1.40	2.54E+00		3.25E+00
	143.76	10.96	-2.34E-02		8.64E-02
163.33	5.08	7.04E-01	8.71E-01		
185.71	57.20	7.88E-02	8.64E-02		
202.11	1.08	5.99E-01	3.75E+00		
U-235	205.31	5.01	-6.50E-01	5.56E-01	8.26E-01
	59.54	35.90	1.16E-01		5.56E-01

- + = 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  
 ? = CAUTION: MDA value is inconsistent with Currie MDA at 95% confidence level

000080569.CNF



Live Time :900.000 sec  
Real Time :900.410 sec  
Start: 1: 0.1(kev)  
Stop : 4096:2047.1(kev)  
Acq. Start :Fri Oct 18 10:08:21 2019

ROI Type: 1

Analysis Report for 18-Oct-19-10011  
L1-10213C-AIGS-003SS

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## GAMMA SPECTRUM ANALYSIS

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Sample Identification : 18-Oct-19-10011  
Sample Description : L1-10213C-AIGS-003SS  
Sample Type : Soil  
Unit :  
Sample Point :  
  
Sample Size : 1.144E+03 grams  
Facility : Default  
  
Sample Taken On : 10/17/2019 7:54:00AM  
Acquisition Started : 10/18/2019 9:18:55AM  
  
Procedure : 130G\_SOIL\_1  
Operator : Administrator  
Detector Name : 352  
Geometry : 130G\_SOIL\_1  
Live Time : 900.0 seconds  
Real Time : 900.3 seconds  
  
Dead Time : 0.03 %  
  
Peak Locate Threshold : 3.00  
Peak Locate Range (in channels) : 120 - 8192  
Peak Area Range (in channels) : 120 - 8192  
Identification Energy Tolerance : 1.000 keV  
  
Energy Calibration Used Done On : 9/29/2018  
Efficiency Calibration Used Done On : 10/18/2019  
Efficiency Calibration Description :  
  
Sample Number : 80564  
Fill Height : 1144.23 gram  
Certificate Name : Eu155-Na22  
Certificate Date : 1/7/2013 12:00:00PM

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10-18-19

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## PEAK ANALYSIS REPORT

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Peak Analysis Performed on : 10/18/2019 9:34:01AM  
Peak Analysis From Channel : 120  
Peak Analysis To Channel : 8192

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10-20-19

Analysis Report for 18-Oct-19-10011

L1-10213C-AIGS-003SS

Peak No.	Energy (keV)	ROI start	ROI end	Peak Centroid	Net Peak Area	Net Area Uncertainty	Continuum Counts	FWHM (keV)
1	238.65	948 -	960	955.06	1.40E+02	18.66	7.94E+01	1.05
2	295.15	1174 -	1187	1180.84	7.00E+01	12.13	2.80E+01	1.23
3	351.89	1401 -	1415	1407.57	1.11E+02	12.83	1.76E+01	1.26
4	583.01	2324 -	2338	2331.36	5.46E+01	8.39	5.39E+00	0.71
5	609.09	2429 -	2442	2435.61	4.57E+01	10.86	2.63E+01	1.01
6	661.77	2639 -	2654	2646.27	6.63E+01	8.43	1.72E+00	0.90
7	768.47	3067 -	3078	3072.95	1.50E+01	5.51	5.95E+00	0.47
8	911.27	3638 -	3651	3644.13	2.62E+01	8.74	1.78E+01	0.56
9	968.85	3867 -	3880	3874.47	2.97E+01	6.72	5.29E+00	0.37
10	1460.76	5830 -	5856	5843.43	3.24E+02	18.81	6.75E+00	2.01

M = First peak in a multiplet region  
m = Other peak in a multiplet region  
F = Fitted singlet  
Errors quoted at 1.000sigma

No background subtract performed on this spectrum.

## NUCLIDE IDENTIFICATION REPORT

Nuclide Library Used : C:\Canberra\Apex\Root\Default\Library\ZION LIB-BNL.NLB

### IDENTIFIED NUCLIDES

Nuclide Name	Id Confidence	Energy (keV)	Yield(%)	Activity (pCi/grams)	Activity Uncertainty
K-40	0.99	1460.82	* 10.66	7.51E+00	5.44E-01
Cs-137	0.99	661.66	* 85.10	1.12E-01	1.58E-02
Tl-208	0.99	583.19	* 85.00	8.51E-02	1.40E-02
Pb-212	1.00	115.18	0.60		
		238.63	* 43.60	2.35E-01	3.67E-02
		300.09	3.30		
Bi-214	0.99	609.32	* 45.49	1.37E-01	3.36E-02

Analysis Report for 18-Oct-19-10011  
L1-10213C-AIGS-003SS

<b>Nuclide Name</b>	<b>Id Confidence</b>	<b>Energy (keV)</b>		<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Activity Uncertainty</b>
Bi-214	0.99	768.36	*	4.89	4.91E-01	1.82E-01
		806.18		1.26		
		934.06		3.11		
		1120.29		14.92		
		1155.21		1.63		
		1238.12		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		
		1661.27		1.05		
		1729.59		2.88		
		1764.49		15.30		
Pb-214	1.00	241.99		7.25	3.14E-01	5.99E-02
		295.22	*	18.42		
		351.93	*	35.60		
Ac-228	0.99	785.96		1.06	2.93E-01	4.11E-02
		129.07		2.42		
		209.25		3.89		
		270.24		3.46		
		328.00		2.95		
		338.32		11.27		
		409.46		1.92		
		463.00		4.40		
		794.95		4.25		
		911.20	*	25.80		
		964.77		4.99		
		968.97	*	15.80		
1588.20		3.22				

\* = Energy line found in the spectrum.  
 - = Manually added nuclide.  
 ? = Manually edited nuclide.  
 @ = Energy line not used for Weighted Mean Activity  
 Energy Tolerance : 1.000 keV  
 Nuclide confidence index threshold = 0.30  
 Errors quoted at 1.000sigma

**INTERFERENCE CORRECTED REPORT**

Analysis Report for 18-Oct-19-10011

L1-10213C-AIGS-003SS

<b>Nuclide Name</b>	<b>Nuclide Id Confidence</b>	<b>Wt mean Activity (pCi/grams)</b>	<b>Wt mean Activity Uncertainty</b>	<b>Comments</b>
K-40	0.999	7.51E+00	5.44E-01	
Cs-137	0.998	1.12E-01	1.58E-02	
Tl-208	0.995	8.51E-02	1.40E-02	
X Bi-211	0.897			
Pb-212	1.000	2.35E-01	3.67E-02	
Bi-214	0.996	1.49E-01	3.30E-02	
Pb-214	1.000	3.00E-01	3.39E-02	
Ac-228	0.999	2.43E-01	4.88E-02	

? = 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 1.000sigma

Analysis Report for 18-Oct-19-10011  
L1-10213C-AIGS-003SS

**UNIDENTIFIED PEAKS**

Peak Locate Performed on : 10/18/2019 9:34:01AM  
Peak Locate From Channel : 120  
Peak Locate To Channel : 8192

Peak No.	Energy (keV)	Peak Size (CPS)	Peak CPS (%) Uncertainty	Peak Type	Tolerance Nuclide
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All peaks were identified.

M = First peak in a multiplet region  
m = Other peak in a multiplet region  
F = Fitted singlet  
Errors quoted at 1.000sigma

**NUCLIDE MDA REPORT**

Nuclide Library Used : C:\Canberra\Apex\Root\Default\Library\ZION LIB-BNL.NLB

Nuclide Name	Energy (keV)	Yield(%)	Activity (pCi/grams)	Nuclide MDA (pCi/grams)	Line MDA (pCi/grams)
An Pk	511.00	100.00	4.36E-02	5.49E-02	5.49E-02
BE-7	477.60	10.44	3.64E-01	4.93E-01	4.93E-01
+ K-40	1460.82	* 10.66	7.51E+00	4.94E-01	4.94E-01
Mn-54	834.85	99.98	-8.56E-03	4.46E-02	4.46E-02
Co-60	1173.23	99.85	1.69E-02	5.36E-02	7.73E-02
	1332.49	99.98	-2.42E-02		5.36E-02
Nb-94	702.65	99.81	2.37E-03	4.52E-02	4.52E-02
	871.09	99.89	1.71E-02		4.90E-02
Ag-108m	79.13	6.60	1.25E-01	4.02E-02	1.62E+00
	433.94	90.50	-1.54E-02		4.02E-02
	614.28	89.80	-4.05E-02		7.77E-02
	722.94	90.80	-6.39E-03		5.06E-02
Sb-125	176.31	6.84	-1.13E-01	1.32E-01	5.33E-01
	380.45	1.52	-1.70E+00		2.38E+00
	427.87	29.60	-2.93E-03		1.32E-01
	463.36	10.49	-2.51E-01		3.79E-01
	600.60	17.65	2.89E-02		2.71E-01
	606.71	4.98	1.58E+00		1.45E+00
	635.95	11.22	3.01E-01		4.65E-01

Analysis Report for 18-Oct-19-10011

L1-10213C-AIGS-003SS

<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Nuclide MDA (pCi/grams)</b>	<b>Line MDA (pCi/grams)</b>
Sb-125	671.44	1.79	1.06E-01	1.32E-01	2.58E+00
Ba-133	79.61	2.65	6.83E-01	8.73E-02	3.86E+00
	81.00	32.90	-1.98E-01		2.74E-01
	276.40	7.16	9.84E-02		5.44E-01
	302.85	18.34	5.93E-02		2.15E-01
	356.01	62.05	-2.42E-02		8.73E-02
	383.85	8.94	2.67E-01		4.18E-01
Cs-134	475.36	1.48	6.17E-01	4.85E-02	3.15E+00
	563.25	8.34	1.44E-01		5.16E-01
	569.33	15.37	1.15E-01		2.79E-01
	604.72	97.62	-1.76E-02		6.84E-02
	795.86	85.46	-6.57E-02		4.85E-02
	801.95	8.69	4.53E-01		5.43E-01
	1038.61	0.99	2.07E+00		5.76E+00
	1167.97	1.79	9.41E-03		4.22E+00
	1365.19	3.02	-1.75E-01		1.52E+00
+ Cs-137	661.66	* 85.10	1.12E-01	1.74E-02	1.74E-02
Eu-152	121.78	28.67	1.24E-01	1.36E-01	1.45E-01
	244.70	7.61	5.56E-01		5.55E-01
	295.94	0.45	1.10E+01		1.19E+01
	344.28	26.60	-1.65E-01		1.36E-01
	367.79	0.86	-1.42E+00		4.42E+00
	411.12	2.24	-4.43E-01		1.62E+00
	443.96	2.83	4.20E-01		1.42E+00
	488.68	0.42	-6.02E+00		9.40E+00
	563.99	0.49	-4.08E+00		8.66E+00
	586.26	0.46	-8.85E+00		1.29E+01
	678.62	0.47	-9.81E-01		9.97E+00
	688.67	0.86	1.09E+00		5.32E+00
	719.35	0.28	3.28E+00		1.52E+01
	778.90	12.96	-1.43E-01		3.57E-01
	810.45	0.32	-3.70E+00		1.46E+01
	867.37	4.26	-8.70E-01		1.13E+00
	919.33	0.43	-1.37E+00		1.23E+01
	964.08	14.65	2.02E-01		5.42E-01
	1085.87	10.24	1.01E-02		4.67E-01
	1089.74	1.73	2.68E+00		3.02E+00
	1112.07	13.69	-5.06E-01		4.15E-01
	1212.95	1.43	5.39E+00		5.58E+00
	1249.94	0.19	-7.99E+00		3.51E+01
	1299.14	1.63	1.41E+00		4.12E+00
	1408.01	21.07	2.00E-02		2.52E-01
	1457.64	0.50	1.64E+02		4.47E+01
	1528.10	0.28	-4.53E+00		1.33E+01
Eu-154	123.07	40.40	2.95E-02	1.02E-01	1.02E-01
	247.93	6.89	-1.75E-01		4.86E-01
	591.76	4.95	5.00E-01		8.88E-01
	692.42	1.78	-3.35E+00		2.29E+00
	723.30	20.06	8.14E-02		2.36E-01
	756.80	4.52	4.71E-01		1.06E+00
	873.18	12.08	-3.77E-02		4.06E-01



Analysis Report for 18-Oct-19-10011

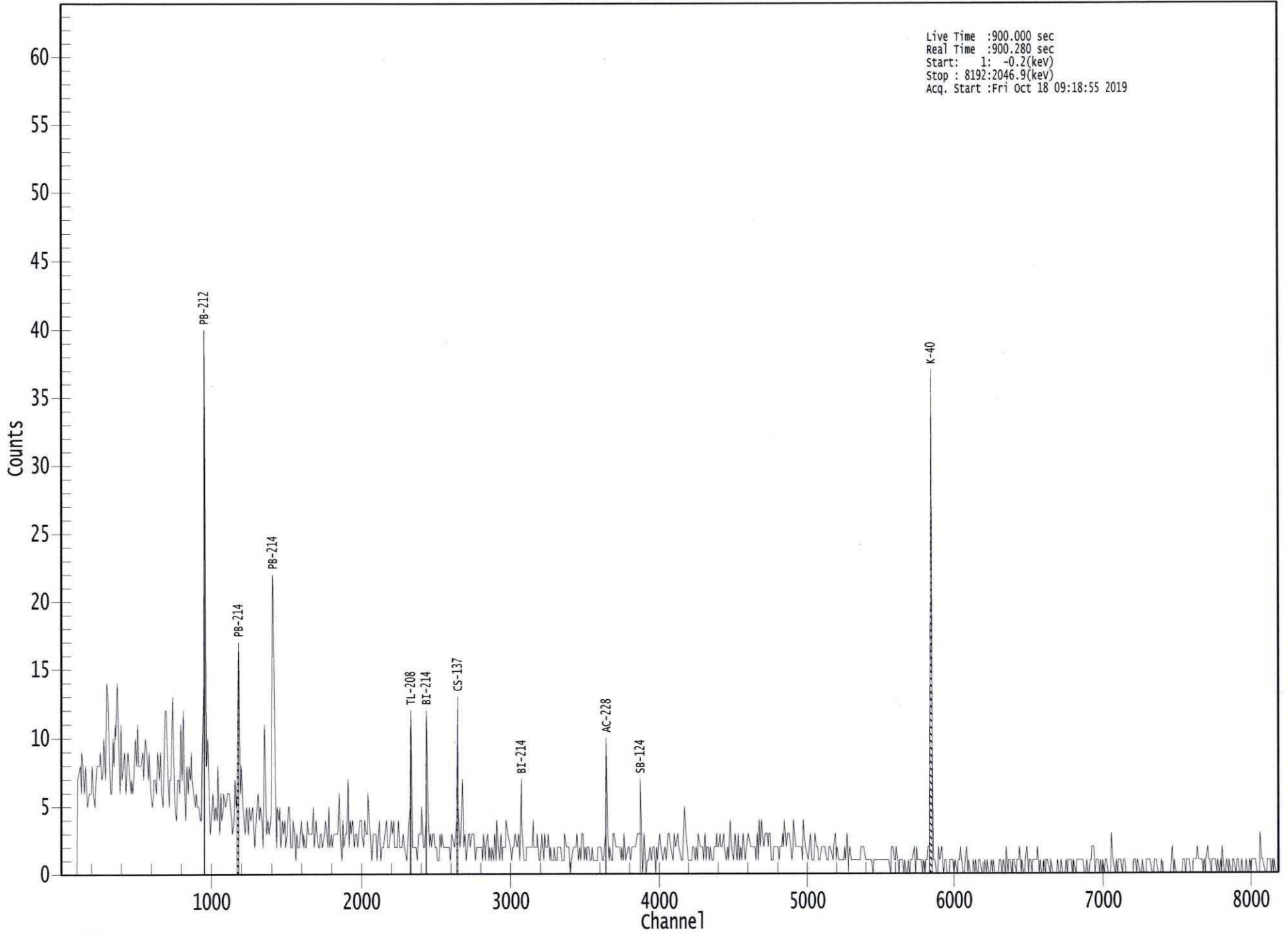
L1-10213C-AIGS-003SS

<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Nuclide MDA (pCi/grams)</b>	<b>Line MDA (pCi/grams)</b>	
Eu-154	996.29	10.48	-3.21E-01	1.02E-01	5.37E-01	
	1004.76	18.01	2.82E-01		3.19E-01	
	1274.43	34.80	-4.39E-02		1.87E-01	
	1596.48	1.80	-2.57E+00		2.54E+00	
Eu-155	45.30	1.31	-8.22E+00	2.22E-01	1.78E+01	
	60.01	1.22	3.38E+00		2.28E+01	
	86.55	30.70	-5.06E-02		2.38E-01	
Ra-226	105.31	21.10	-4.59E-02		2.22E-01	
Ra-226	186.21	3.64	1.48E+00	1.14E+00	1.14E+00	
	Pa-231	27.36	10.30		1.64E+00	1.75E+00
Pa-231	283.69	1.70	-1.17E+00		2.06E+00	
	300.07	2.47	1.07E+00		1.75E+00	
	302.65	2.20	7.10E-01		1.80E+00	
	330.06	1.40	7.89E-01		2.75E+00	
	U-235	143.76	10.96	-1.04E-02	7.21E-02	3.55E-01
		163.33	5.08	4.73E-01		7.20E-01
		185.71	57.20	5.21E-02		7.21E-02
U-235	202.11	1.08	3.64E+00		3.70E+00	
	205.31	5.01	-4.30E-01		7.48E-01	
Am-241	59.54	35.90	2.22E-01	8.02E-01	8.02E-01	

- + = 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  
 ? = CAUTION: MDA value is inconsistent with Currie MDA at 95% confidence level

000080564.CNF

Live Time :900.000 sec  
Real Time :900.280 sec  
Start: 1: -0.2(keV)  
Stop : 8192:2046.9(keV)  
Acq. Start :Fri Oct 18 09:18:55 2019



ROI Type: 1

Analysis Report for 18-Oct-19-10012  
L1-10213C-AIGS-004SS

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## GAMMA SPECTRUM ANALYSIS

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Sample Identification : 18-Oct-19-10012  
Sample Description : L1-10213C-AIGS-004SS  
Sample Type : Soil  
Unit :  
Sample Point :  
  
Sample Size : 9.691E+02 grams  
Facility : Default  
  
Sample Taken On : 10/17/2019 7:56:00AM  
Acquisition Started : 10/18/2019 10:08:27AM  
  
Procedure : 130G\_SOIL\_1  
Operator : Administrator  
Detector Name : P40818B  
Geometry : 130G\_SOIL\_1  
Live Time : 900.0 seconds  
Real Time : 901.7 seconds  
  
Dead Time : 0.19 %  
  
Peak Locate Threshold : 3.00  
Peak Locate Range (in channels) : 120 - 8192  
Peak Area Range (in channels) : 120 - 8192  
Identification Energy Tolerance : 1.000 keV  
  
Energy Calibration Used Done On : 1/29/2019  
Efficiency Calibration Used Done On : 10/18/2019  
Efficiency Calibration Description :  
  
Sample Number : 80570  
Fill Height : 969.07 gram  
Certificate Name : Eu155-Na22  
Certificate Date : 1/30/2012 12:00:00PM

*J. M. ...*  
10-18-19

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## PEAK ANALYSIS REPORT

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Peak Analysis Performed on : 10/18/2019 10:23:31AM  
Peak Analysis From Channel : 120  
Peak Analysis To Channel : 8192

*J. M. ...*  
10-20-19

Analysis Report for 18-Oct-19-10012  
L1-10213C-AIGS-004SS

Peak No.	Energy (keV)	ROI start	ROI end	Peak Centroid	Net Peak Area	Net Area Uncertainty	Continuum Counts	FWHM (keV)
1	185.98	739 -	749	744.22	4.64E+01	14.37	6.66E+01	0.62
2	238.62	948 -	960	954.57	2.17E+02	22.00	1.01E+02	0.84
3	295.30	1175 -	1187	1181.08	8.30E+01	12.85	3.10E+01	1.58
4	338.41	1345 -	1359	1353.43	7.33E+01	11.53	2.07E+01	0.87
5	351.83	1400 -	1416	1407.04	1.52E+02	16.92	4.32E+01	1.11
6	583.01	2324 -	2338	2331.27	7.71E+01	11.79	2.09E+01	1.10
7	609.19	2429 -	2444	2435.92	8.98E+01	12.55	2.22E+01	1.09
8	661.47	2639 -	2651	2645.00	5.30E+01	8.94	9.97E+00	1.03
9	726.98	2902 -	2911	2906.93	2.42E+01	5.73	3.79E+00	0.52
10	911.08	3636 -	3652	3643.27	6.16E+01	10.28	1.34E+01	1.21
11	1460.54	5831 -	5853	5842.00	3.93E+02	21.12	1.39E+01	1.32

M = First peak in a multiplet region  
m = Other peak in a multiplet region  
F = Fitted singlet  
Errors quoted at 1.000sigma

No background subtract performed on this spectrum.

## NUCLIDE IDENTIFICATION REPORT

Nuclide Library Used : C:\Canberra\Apex\Root\Default\Library\ZION LIB-BNL.NLB

### IDENTIFIED NUCLIDES

Nuclide Name	Id Confidence	Energy (keV)	Yield(%)	Activity (pCi/grams)	Activity Uncertainty
K-40	0.98	1460.82 *	10.66	1.19E+01	8.24E-01
Cs-137	0.99	661.66 *	85.10	1.15E-01	2.06E-02
Tl-208	0.99	583.19 *	85.00	1.53E-01	2.52E-02
Bi-212	0.98	39.86	1.06		
		727.33 *	6.67	7.16E-01	1.75E-01
		785.37	1.10		

Analysis Report for 18-Oct-19-10012  
L1-10213C-AIGS-004SS

<b>Nuclide Name</b>	<b>Id Confidence</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Activity Uncertainty</b>
Bi-212	0.98	1620.50	1.47		
Pb-212	1.00	115.18	0.60		
		238.63 *	43.60	4.51E-01	5.85E-02
		300.09	3.30		
Bi-214	0.99	609.32 *	45.49	3.44E-01	5.23E-02
		768.36	4.89		
		806.18	1.26		
		934.06	3.11		
		1120.29	14.92		
		1155.21	1.63		
		1238.12	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		
		1661.27	1.05		
		1729.59	2.88		
		1764.49	15.30		
		1847.43	2.03		
		2118.51	1.16		
Pb-214	0.99	241.99	7.25		
		295.22 *	18.42	4.62E-01	8.06E-02
		351.93 *	35.60	4.99E-01	6.85E-02
		785.96	1.06		
Ra-226	0.99	186.21 *	3.64	1.02E+00	3.27E-01
Ac-228	0.74	129.07	2.42		
		209.25	3.89		
		270.24	3.46		
		328.00	2.95		
		338.32 *	11.27	7.40E-01	1.31E-01
		409.46	1.92		
		463.00	4.40		
		794.95	4.25		
		911.20 *	25.80	5.52E-01	9.51E-02
		964.77	4.99		
		968.97	15.80		
		1588.20	3.22		
U-235	0.99	143.76	10.96		
		163.33	5.08		
		185.71 *	57.20	6.50E-02	2.08E-02
		202.11	1.08		
		205.31	5.01		

\* = Energy line found in the spectrum.

- = Manually added nuclide.

? = Manually edited nuclide.

@ = Energy line not used for Weighted Mean Activity

Energy Tolerance : 1.000 keV

Nuclide confidence index threshold = 0.30

Errors quoted at 1.000sigma

Analysis Report for 18-Oct-19-10012  
L1-10213C-AIGS-004SS

## INTERFERENCE CORRECTED REPORT

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (pCi/grams)	Wt mean Activity Uncertainty	Comments
K-40	0.987	1.19E+01	8.24E-01	
Cs-137	0.995	1.15E-01	2.06E-02	
Tl-208	0.995	1.53E-01	2.52E-02	
X Bi-211	0.913			
Bi-212	0.987	7.16E-01	1.75E-01	
Pb-212	1.000	4.51E-01	5.85E-02	
Bi-214	0.999	3.44E-01	5.23E-02	
Pb-214	0.999	4.84E-01	5.22E-02	
? Ra-226	0.992	1.02E+00	3.27E-01	
Ac-228	0.745	6.17E-01	7.70E-02	
? <del>U-235</del> Ra-226	<del>0.992</del>	<del>6.50E-02</del>	<del>2.08E-02</del>	

- ? = 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 1.000sigma

*u-235 only 1 Peak JMW 10-18-19*

Analysis Report for 18-Oct-19-10012  
L1-10213C-AIGS-004SS

### UNIDENTIFIED PEAKS

Peak Locate Performed on : 10/18/2019 10:23:31AM  
Peak Locate From Channel : 120  
Peak Locate To Channel : 8192

Peak No.	Energy (keV)	Peak Size (CPS)	Peak CPS (%) Uncertainty	Peak Type	Tolerance Nuclide
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All peaks were identified.

M = First peak in a multiplet region  
m = Other peak in a multiplet region  
F = Fitted singlet  
Errors quoted at 1.000sigma

### NUCLIDE MDA REPORT

Nuclide Library Used : C:\Canberra\Apex\Root\Default\Library\ZION LIB-BNL.NLB

Nuclide Name	Energy (keV)	Yield(%)	Activity (pCi/grams)	Nuclide MDA (pCi/grams)	Line MDA (pCi/grams)
An Pk	511.00	100.00	8.58E-02	7.89E-02	7.89E-02
BE-7	477.60	10.44	-4.19E-01	5.60E-01	5.60E-01
+ K-40	1460.82	* 10.66	1.19E+01	8.37E-01	8.37E-01
Mn-54	834.85	99.98	-1.78E-02	7.39E-02	7.39E-02
Co-60	1173.23	99.85	-6.67E-03	7.33E-02	1.04E-01
	1332.49	99.98	6.02E-02		7.33E-02
Nb-94	702.65	99.81	-1.42E-02	6.12E-02	6.33E-02
	871.09	99.89	-5.37E-02		6.12E-02
Ag-108m	79.13	6.60	3.06E+00	5.95E-02	2.73E+00
	433.94	90.50	2.42E-03		5.95E-02
	614.28	89.80	-6.24E-02		8.88E-02
	722.94	90.80	9.50E-03		8.73E-02
Sb-125	176.31	6.84	1.95E-01	1.84E-01	7.18E-01
	380.45	1.52	-2.21E+00		3.20E+00
	427.87	29.60	1.16E-01		1.84E-01
	463.36	10.49	3.37E-01		5.64E-01
	600.60	17.65	-1.40E-02		3.60E-01
	606.71	4.98	3.86E+00		2.08E+00
	635.95	11.22	-1.28E-01		4.74E-01

Analysis Report for 18-Oct-19-10012

L1-10213C-AIGS-004SS

<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Nuclide MDA (pCi/grams)</b>	<b>Line MDA (pCi/grams)</b>
Sb-125	671.44	1.79	2.32E+00	1.84E-01	3.13E+00
Ba-133	79.61	2.65	5.71E-01	1.07E-01	6.34E+00
	81.00	32.90	-5.46E-01		4.25E-01
	276.40	7.16	6.52E-01		7.85E-01
	302.85	18.34	2.84E-02		2.93E-01
	356.01	62.05	-3.79E-02		1.07E-01
	383.85	8.94	-2.00E-01		5.56E-01
Cs-134	475.36	1.48	1.58E+00	8.97E-02	3.93E+00
	563.25	8.34	2.12E-01		7.07E-01
	569.33	15.37	-2.87E-02		3.75E-01
	604.72	97.62	-2.09E-02		9.88E-02
	795.86	85.46	2.17E-02		8.97E-02
	801.95	8.69	-3.66E-01		6.98E-01
	1038.61	0.99	-8.22E+00		7.00E+00
	1167.97	1.79	-9.64E-01		5.76E+00
	1365.19	3.02	6.89E-01		1.98E+00
+ Cs-137	661.66	* 85.10	1.15E-01	4.44E-02	4.44E-02
Eu-152	121.78	28.67	-1.47E-02	1.84E-01	2.11E-01
	244.70	7.61	7.77E-01		8.25E-01
	295.94	0.45	-1.25E+00		1.43E+01
	344.28	26.60	7.68E-02		1.84E-01
	367.79	0.86	-4.41E+00		5.58E+00
	411.12	2.24	3.26E-01		2.49E+00
	443.96	2.83	1.29E+00		2.11E+00
	488.68	0.42	-4.89E+00		1.20E+01
	563.99	0.49	1.44E+00		1.18E+01
	586.26	0.46	-7.32E+00		2.07E+01
	678.62	0.47	-1.29E+00		1.38E+01
	688.67	0.86	-8.13E+00		7.00E+00
	719.35	0.28	1.62E+01		2.43E+01
	778.90	12.96	1.29E-02		4.92E-01
	810.45	0.32	6.96E+00		1.96E+01
	867.37	4.26	6.54E-02		1.64E+00
	919.33	0.43	1.06E+01		1.85E+01
	964.08	14.65	-4.28E-02		6.63E-01
	1085.87	10.24	2.34E-01		8.48E-01
	1089.74	1.73	5.34E-01		4.97E+00
	1112.07	13.69	3.51E-01		6.06E-01
	1212.95	1.43	-5.86E+00		6.42E+00
	1249.94	0.19	-2.68E+01		5.45E+01
	1299.14	1.63	2.48E+00		4.98E+00
	1408.01	21.07	-1.96E-01		3.55E-01
	1457.64	0.50	2.61E+02		6.45E+01
	1528.10	0.28	-3.27E+00		2.23E+01
Eu-154	123.07	40.40	-5.82E-02	1.43E-01	1.43E-01
	247.93	6.89	-6.73E-03		7.19E-01
	591.76	4.95	5.33E-01		1.26E+00
	692.42	1.78	-1.11E+00		3.35E+00
	723.30	20.06	1.70E-01		3.92E-01
	756.80	4.52	3.48E-01		1.37E+00
	873.18	12.08	1.84E-01		5.56E-01



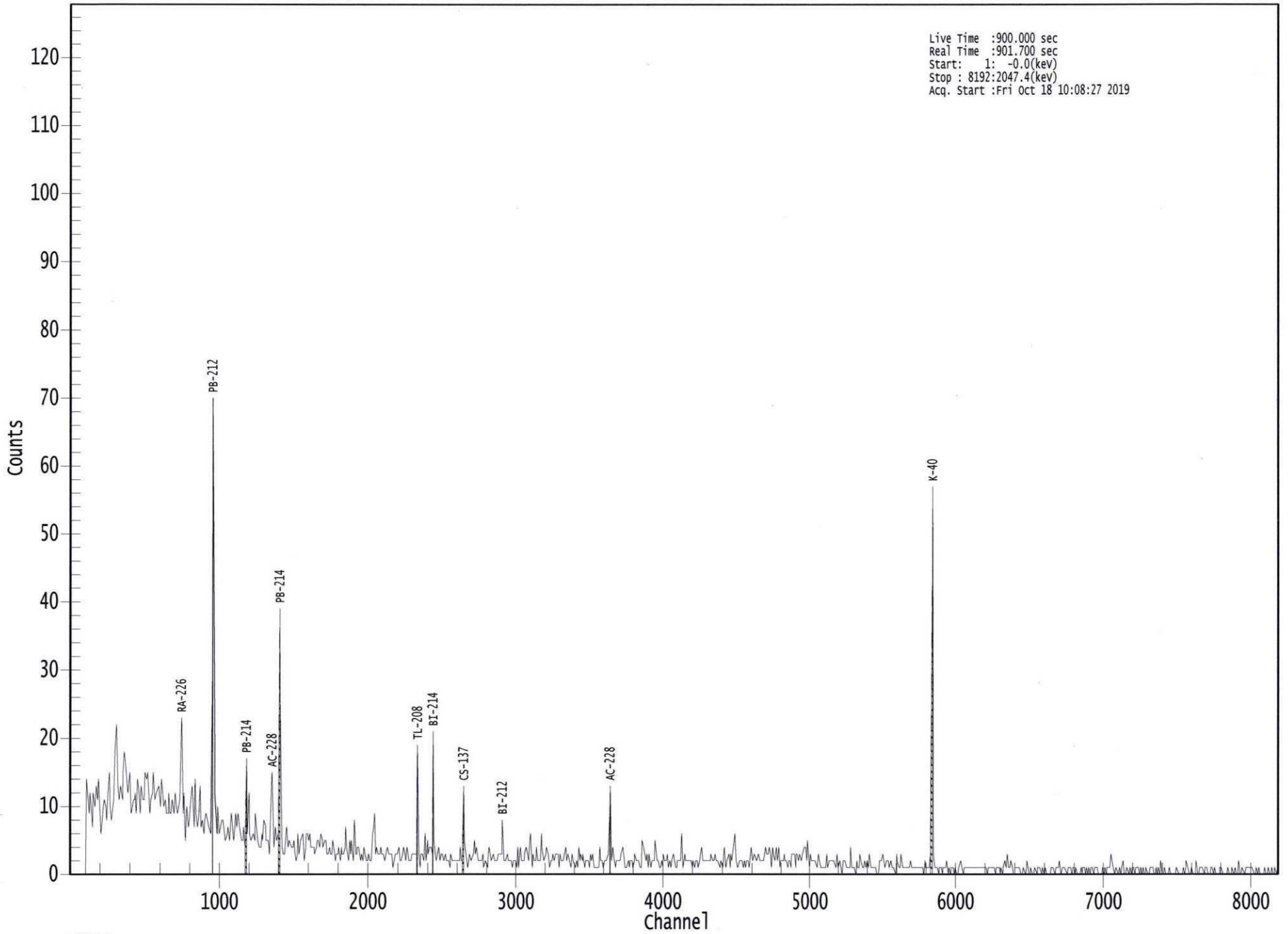
Analysis Report for 18-Oct-19-10012  
L1-10213C-AIGS-004SS

<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Nuclide MDA (pCi/grams)</b>	<b>Line MDA (pCi/grams)</b>
Eu-154	996.29	10.48	1.90E-02	1.43E-01	7.25E-01
	1004.76	18.01	5.56E-02		4.13E-01
	1274.43	34.80	-1.45E-02		2.25E-01
	1596.48	1.80	-9.94E-01		3.01E+00
Eu-155	45.30	1.31	3.61E+01	3.40E-01	4.22E+01
	60.01	1.22	-1.91E+01		3.99E+01
	86.55	30.70	-1.11E-01		3.54E-01
	105.31	21.10	-7.50E-02		3.40E-01
+ Ra-226	186.21	* 3.64	1.02E+00	1.01E+00	1.01E+00
Pa-231	27.36	10.30	5.82E+00	2.12E+00	4.83E+00
	283.69	1.70	-1.31E+00		2.88E+00
	300.07	2.47	-5.42E-01		2.12E+00
	302.65	2.20	4.35E-01		2.41E+00
	330.06	1.40	1.89E+00		4.05E+00
+ U-235	143.76	10.96	-5.10E-02	6.42E-02	5.42E-01
U-235	163.33	5.08	3.79E-01	6.42E-02	1.03E+00
	185.71	* 57.20	6.50E-02		6.42E-02
	202.11	1.08	5.22E-01		4.58E+00
	205.31	5.01	-4.56E-01		9.91E-01
Am-241	59.54	35.90	-3.70E-01	1.42E+00	1.42E+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  
 ? = CAUTION: MDA value is inconsistent with Currie MDA at 95% confidence level

0000080570.CNF

Live Time :900.000 sec  
Real Time :901.700 sec  
Start: 1: -0.0(kev)  
Stop : 8192:2047.4(kev)  
Acq. Start :Fri Oct 18 10:08:27 2019



ROI Type: 1

Analysis Report for 18-Apr-19-10038  
L1-10213C- AJGS-006SS

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## GAMMA SPECTRUM ANALYSIS

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Sample Identification : 18-Apr-19-10038  
Sample Description : L1-10213C- AJGS-006SS  
Sample Type : Soil  
Unit :  
Sample Point :  
  
Sample Size : 1.061E+03 grams  
Facility : Default  
  
Sample Taken On : 4/17/2019 8:00:00AM  
Acquisition Started : 4/18/2019 12:03:24PM  
  
Procedure : 130G\_SOIL\_1  
Operator : Administrator  
Detector Name : 352  
Geometry : 130G\_SOIL\_1  
Live Time : 900.0 seconds  
Real Time : 900.3 seconds  
  
Dead Time : 0.04 %  
  
Peak Locate Threshold : 3.00  
Peak Locate Range (in channels) : 120 - 8192  
Peak Area Range (in channels) : 120 - 8192  
Identification Energy Tolerance : 1.000 keV  
  
Energy Calibration Used Done On : 9/29/2018  
Efficiency Calibration Used Done On : 4/18/2019  
Efficiency Calibration Description :  
  
Sample Number : 65949  
Fill Height : 1060.64 gram  
Certificate Name : Eu155-Na22  
Certificate Date : 1/7/2013 12:00:00PM

*atd*  
4-18-19

*JP. [unclear]*  
4-18-19

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## PEAK ANALYSIS REPORT

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Peak Analysis Performed on : 4/18/2019 12:18:27PM  
Peak Analysis From Channel : 120  
Peak Analysis To Channel : 8192

*JMA*  
4-18-19

Analysis Report for 18-Apr-19-10038

L1-10213C- AJGS-006SS

	Peak No.	Energy (keV)	ROI start	ROI end	Peak Centroid	Net Peak Area	Net Area Uncertainty	Continuum Counts	FWHM (keV)
M	1	238.71	948 -	973	955.31	1.41E+02	33.19	3.79E+01	0.88
m	2	241.66	948 -	973	967.09	2.50E+01	8.60	3.95E+01	0.88
	3	295.26	1174 -	1188	1181.25	5.60E+01	10.56	1.90E+01	0.41
	4	338.26	1348 -	1358	1353.10	2.21E+01	8.61	2.19E+01	0.38
	5	351.89	1401 -	1416	1407.57	1.05E+02	13.15	2.28E+01	1.14
	6	583.03	2327 -	2338	2331.44	3.75E+01	8.30	1.25E+01	1.18
	7	609.29	2430 -	2446	2436.43	5.74E+01	11.04	2.06E+01	0.73
	8	661.72	2637 -	2653	2646.07	6.49E+01	11.17	1.91E+01	1.52
	9	911.05	3636 -	3650	3643.23	3.04E+01	6.82	5.57E+00	0.62
	10	1460.47	5832 -	5854	5842.26	2.12E+02	16.14	1.31E+01	1.68

M = First peak in a multiplet region  
m = Other peak in a multiplet region  
F = Fitted singlet  
Errors quoted at 1.000sigma

No background subtract performed on this spectrum.

## NUCLIDE IDENTIFICATION REPORT

Nuclide Library Used : C:\Canberra\Apex\Root\Default\Library\ZION LIB-BNL.NLB

### IDENTIFIED NUCLIDES

Nuclide Name	Id Confidence	Energy (keV)	Yield(%)	Activity (pCi/grams)	Activity Uncertainty
K-40	0.98	1460.82	* 10.66	5.08E+00	4.46E-01
Cs-137	0.99	661.66	* 85.10	1.13E-01	2.07E-02
Tl-208	0.99	583.19	* 85.00	6.02E-02	1.38E-02
Pb-212	0.99	115.18	0.60		
		238.63	* 43.60	2.44E-01	6.07E-02
		300.09	3.30		
Bi-214	1.00	609.32	* 45.49	1.78E-01	3.58E-02

Analysis Report for 18-Apr-19-10038

L1-10213C- AJGS-006SS

<b>Nuclide Name</b>	<b>Id Confidence</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Activity Uncertainty</b>
Bi-214	1.00	768.36	4.89		
		806.18	1.26		
		934.06	3.11		
		1120.29	14.92		
		1155.21	1.63		
		1238.12	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		
		1661.27	1.05		
		1729.59	2.88		
		1764.49	15.30		
Pb-214	0.99	241.99 *	7.25	2.62E-01	9.24E-02
		295.22 *	18.42	2.58E-01	5.29E-02
		351.93 *	35.60	2.85E-01	4.23E-02
Ac-228	0.99	785.96	1.06		
		129.07	2.42		
		209.25	3.89		
		270.24	3.46		
		328.00	2.95		
		338.32 *	11.27	1.84E-01	7.31E-02
		409.46	1.92		
		463.00	4.40		
		794.95	4.25		
		911.20 *	25.80	2.18E-01	4.97E-02
		964.77	4.99		
968.97	15.80				
1588.20	3.22				

\* = Energy line found in the spectrum.

- = Manually added nuclide.

? = Manually edited nuclide.

@ = Energy line not used for Weighted Mean Activity

Energy Tolerance : 1.000 keV

Nuclide confidence index threshold = 0.30

Errors quoted at 1.000sigma

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**INTERFERENCE CORRECTED REPORT**

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Analysis Report for 18-Apr-19-10038

L1-10213C- AJGS-006SS

<b>Nuclide Name</b>	<b>Nuclide Id Confidence</b>	<b>Wt mean Activity (pCi/grams)</b>	<b>Wt mean Activity Uncertainty</b>	<b>Comments</b>
K-40	0.981	5.08E+00	4.46E-01	
Cs-137	0.999	1.13E-01	2.07E-02	
Tl-208	0.996	6.02E-02	1.38E-02	
X Bi-211	0.897			
Pb-212	0.999	2.44E-01	6.07E-02	
Bi-214	1.000	1.78E-01	3.58E-02	
Pb-214	0.998	2.73E-01	3.11E-02	
Ac-228	0.999	2.07E-01	4.11E-02	

? = 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 1.000sigma

Analysis Report for 18-Apr-19-10038

L1-10213C- AJGS-006SS

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**UNIDENTIFIED PEAKS**


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Peak Locate Performed on : 4/18/2019 12:18:27PM  
 Peak Locate From Channel : 120  
 Peak Locate To Channel : 8192

Peak No.	Energy (keV)	Peak Size (CPS)	Peak CPS (%) Uncertainty	Peak Type	Tolerance Nuclide
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All peaks were identified.

M = First peak in a multiplet region  
 m = Other peak in a multiplet region  
 F = Fitted singlet  
 Errors quoted at 1.000sigma

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**NUCLIDE MDA REPORT**


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Nuclide Library Used : C:\Canberra\Apex\Root\Default\Library\ZION LIB-BNL.NLB

Nuclide Name	Energy (keV)	Yield(%)	Activity (pCi/grams)	Nuclide MDA (pCi/grams)	Line MDA (pCi/grams)
An Pk	511.00	100.00	8.40E-02	6.35E-02	6.35E-02
BE-7	477.60	10.44	3.48E-02	4.61E-01	4.61E-01
+ K-40	1460.82	* 10.66	5.08E+00	6.36E-01	6.36E-01
Mn-54	834.85	99.98	8.72E-04	4.60E-02	4.60E-02
Co-60	1173.23	99.85	-3.74E-02	6.52E-02	6.58E-02
	1332.49	99.98	-2.25E-02		6.52E-02
Nb-94	702.65	99.81	-1.62E-02	4.26E-02	4.53E-02
	871.09	99.89	-5.99E-02		4.26E-02
Ag-108m	79.13	6.60	-5.82E-01	4.41E-02	1.55E+00
	433.94	90.50	-1.04E-02		4.41E-02
	614.28	89.80	-2.41E-02		8.05E-02
	722.94	90.80	1.40E-02		5.64E-02
Sb-125	176.31	6.84	8.37E-02	1.54E-01	5.12E-01
	380.45	1.52	8.07E-01		2.45E+00
	427.87	29.60	5.70E-02		1.54E-01
	463.36	10.49	-1.42E-02		3.95E-01
	600.60	17.65	8.48E-02		2.53E-01
	606.71	4.98	1.94E+00		1.43E+00
	635.95	11.22	-4.70E-03		3.93E-01

Analysis Report for 18-Apr-19-10038

L1-10213C- AJGS-006SS

<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Nuclide MDA (pCi/grams)</b>	<b>Line MDA (pCi/grams)</b>
Sb-125	671.44	1.79	-2.23E+00	1.54E-01	2.37E+00
Ba-133	79.61	2.65	1.06E+00	8.85E-02	3.82E+00
	81.00	32.90	-1.86E-01		2.65E-01
	276.40	7.16	4.03E-01		5.84E-01
	302.85	18.34	2.83E-02		2.11E-01
	356.01	62.05	1.67E-03		8.85E-02
	383.85	8.94	-9.97E-02		4.02E-01
Cs-134	475.36	1.48	1.06E+00	6.01E-02	3.15E+00
	563.25	8.34	-2.34E-01		5.44E-01
	569.33	15.37	-8.76E-03		2.91E-01
	604.72	97.62	-1.11E-02		6.61E-02
	795.86	85.46	5.33E-02		6.01E-02
	801.95	8.69	-1.80E-01		5.33E-01
	1038.61	0.99	-1.89E+00		5.86E+00
	1167.97	1.79	-2.61E+00		3.86E+00
	1365.19	3.02	1.30E+00		2.05E+00
+ Cs-137	661.66	* 85.10	1.13E-01	5.09E-02	5.09E-02
Eu-152	121.78	28.67	-7.81E-03	1.35E-01	1.35E-01
	244.70	7.61	-1.98E-01		5.70E-01
	295.94	0.45	6.48E+00		1.07E+01
	344.28	26.60	2.51E-03		1.41E-01
	367.79	0.86	2.09E+00		4.36E+00
	411.12	2.24	4.93E-03		1.94E+00
	443.96	2.83	-1.02E-01		1.36E+00
	488.68	0.42	-2.70E+00		9.24E+00
	563.99	0.49	3.46E+00		9.44E+00
	586.26	0.46	9.42E+00		1.33E+01
	678.62	0.47	1.79E+00		9.06E+00
	688.67	0.86	4.39E+00		5.98E+00
	719.35	0.28	-1.07E+01		1.40E+01
	778.90	12.96	-3.63E-01		3.44E-01
	810.45	0.32	4.28E+00		1.43E+01
	867.37	4.26	-9.11E-01		1.08E+00
	919.33	0.43	-1.31E+01		1.03E+01
	964.08	14.65	2.37E-01		4.60E-01
	1085.87	10.24	1.32E-01		5.45E-01
	1089.74	1.73	6.62E-01		3.62E+00
	1112.07	13.69	-9.75E-01		3.91E-01
	1212.95	1.43	-3.45E+00		5.21E+00
	1249.94	0.19	-1.15E+01		2.81E+01
	1299.14	1.63	-9.76E-01		3.00E+00
	1408.01	21.07	-1.19E-01		2.30E-01
	1457.64	0.50	1.14E+02		3.90E+01
	1528.10	0.28	7.51E+00		1.54E+01
Eu-154	123.07	40.40	1.86E-02	1.02E-01	1.02E-01
	247.93	6.89	-2.72E-01		5.55E-01
	591.76	4.95	7.80E-01		1.01E+00
	692.42	1.78	2.90E+00		3.00E+00
	723.30	20.06	1.18E-01		2.62E-01
	756.80	4.52	-4.40E-01		1.05E+00
	873.18	12.08	1.17E-01		3.77E-01



Analysis Report for 18-Apr-19-10038

L1-10213C- AJGS-006SS

<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Nuclide MDA (pCi/grams)</b>	<b>Line MDA (pCi/grams)</b>
Eu-154	996.29	10.48	1.27E-01	1.02E-01	5.46E-01
	1004.76	18.01	-4.00E-02		3.05E-01
	1274.43	34.80	1.50E-02		1.47E-01
	1596.48	1.80	1.37E+00		2.63E+00
Eu-155	45.30	1.31	9.81E+00	2.19E-01	2.24E+01
	60.01	1.22	-3.01E+00		2.29E+01
	86.55	30.70	-4.96E-02		2.30E-01
	105.31	21.10	1.68E-01		2.19E-01
Ra-226	186.21	3.64	1.09E+00	1.17E+00	1.17E+00
Pa-231	27.36	10.30	1.16E-02	1.67E+00	2.17E+00
	283.69	1.70	-4.66E-01		2.38E+00
	300.07	2.47	2.66E-01		1.67E+00
	302.65	2.20	5.21E-01		1.76E+00
	330.06	1.40	2.29E-01		2.71E+00
	U-235	143.76	10.96		-1.12E-01
U-235	163.33	5.08	-1.31E-01	7.38E-02	7.36E-01
	185.71	57.20	2.50E-02		7.38E-02
	202.11	1.08	-4.52E-01		3.48E+00
	205.31	5.01	-1.86E-01		7.65E-01
Am-241	59.54	35.90	-1.49E-01	8.06E-01	8.06E-01

+ = Nuclide identified during the nuclide identification

\* = Energy line found in the spectrum

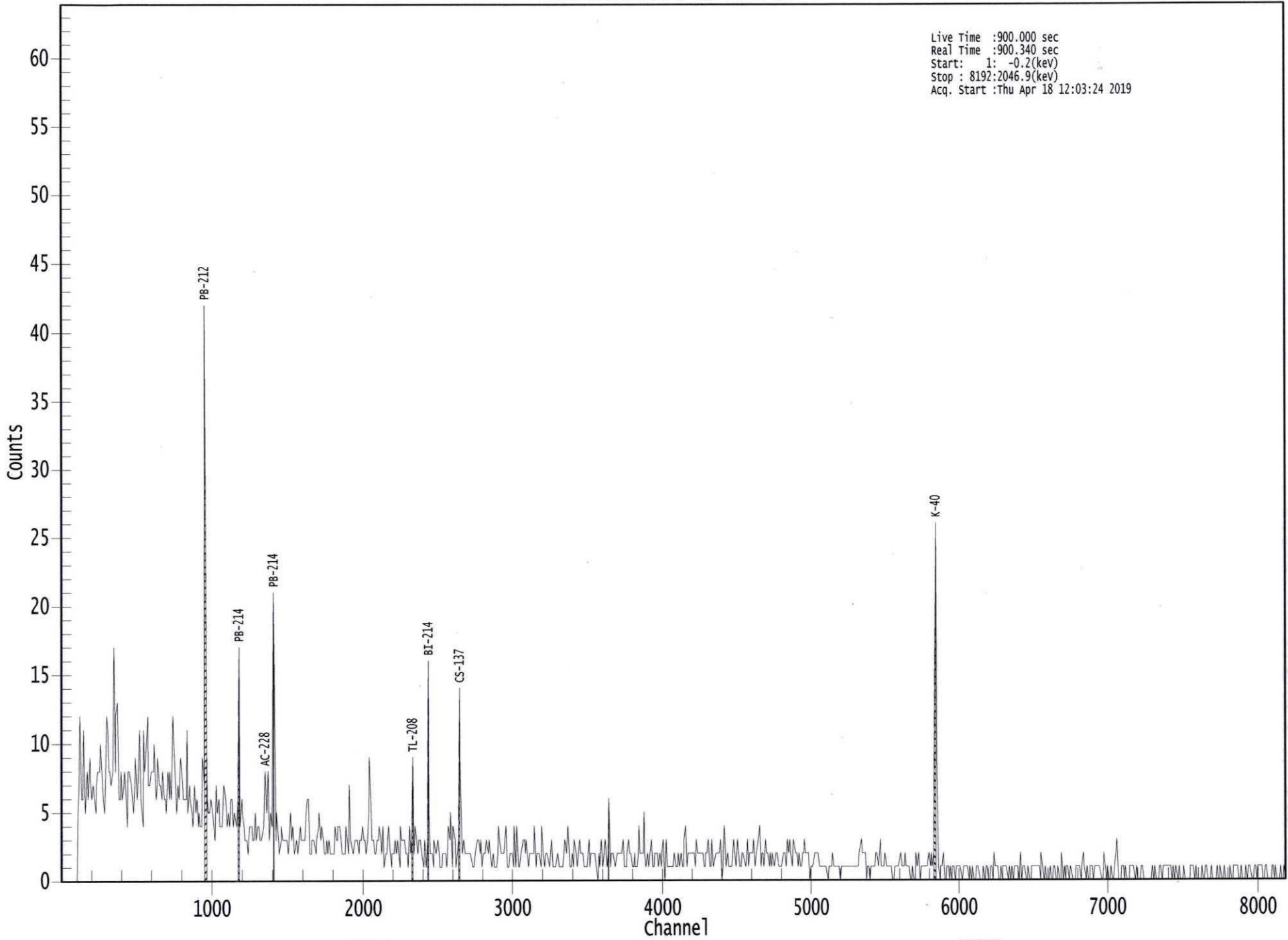
&gt; = MDA value not calculated

@ = Half-life too short to be able to perform the decay correction

? = CAUTION: MDA value is inconsistent with Currie MDA at 95% confidence level

0000065949.CNF

Live Time :900.000 sec  
Real Time :900.340 sec  
Start: 1: -0.2(kev)  
Stop : 8192:2046.9(kev)  
Acq. Start :Thu Apr 18 12:03:24 2019



ROI Type: 1

ROI Type: 2

Analysis Report for 18-Apr-19-10039  
L1-10213C- AJGS-007SS

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## GAMMA SPECTRUM ANALYSIS

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Sample Identification : 18-Apr-19-10039  
Sample Description : L1-10213C- AJGS-007SS  
Sample Type : Soil  
Unit :  
Sample Point :  
  
Sample Size : 9.733E+02 grams  
Facility : Default  
  
Sample Taken On : 4/17/2019 8:05:00AM  
Acquisition Started : 4/18/2019 12:23:05PM  
  
Procedure : 130G\_SOIL\_1  
Operator : Administrator  
Detector Name : 324  
Geometry : 130G\_SOIL\_1  
Live Time : 900.0 seconds  
Real Time : 901.1 seconds  
  
Dead Time : 0.12 %  
  
Peak Locate Threshold : 3.00  
Peak Locate Range (in channels) : 120 - 4096  
Peak Area Range (in channels) : 120 - 4096  
Identification Energy Tolerance : 1.000 keV  
  
Energy Calibration Used Done On : 9/29/2018  
Efficiency Calibration Used Done On : 4/18/2019  
Efficiency Calibration Description :  
  
Sample Number : 65950  
Fill Height : 973.27 gram  
Certificate Name : Eu155-Na22  
Certificate Date : 1/30/2013 12:00:00PM

*atg*  
4-18-19  
*g.p.m.*  
4-18-19

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## PEAK ANALYSIS REPORT

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Peak Analysis Performed on : 4/18/2019 12:38:09PM  
Peak Analysis From Channel : 120  
Peak Analysis To Channel : 4096

*g.p.m.*  
4-18-19

Analysis Report for 18-Apr-19-10039

L1-10213C- AJGS-007SS

	Peak No.	Energy (keV)	ROI start	ROI end	Peak Centroid	Net Peak Area	Net Area Uncertainty	Continuum Counts	FWHM (keV)
	1	77.20	151 -	158	155.00	8.61E+01	21.45	1.84E+02	0.72
	2	186.14	368 -	376	372.58	6.32E+01	18.45	1.30E+02	1.13
M	3	238.75	473 -	488	477.67	2.86E+02	18.50	1.14E+02	1.21
m	4	241.75	473 -	488	483.68	7.00E+01	10.21	9.29E+01	1.21
	5	295.27	585 -	595	590.60	9.31E+01	16.82	7.89E+01	1.19
	6	338.29	672 -	681	676.54	6.07E+01	13.21	5.03E+01	0.97
	7	352.04	699 -	708	704.03	1.77E+02	17.49	5.72E+01	1.27
	8	583.44	1160 -	1171	1166.48	1.03E+02	14.16	3.90E+01	1.72
	9	609.67	1213 -	1224	1218.91	1.31E+02	14.07	2.67E+01	1.64
	10	662.02	1318 -	1327	1323.58	5.57E+01	10.72	2.63E+01	1.38
	11	911.37	1815 -	1828	1822.19	7.33E+01	10.79	1.57E+01	1.99
	12	969.32	1932 -	1944	1938.10	5.27E+01	11.46	2.93E+01	1.34
	13	1120.68	2238 -	2247	2240.92	2.33E+01	8.04	1.67E+01	1.25
	14	1461.28	2916 -	2929	2922.62	4.72E+02	22.36	1.04E+01	2.14
	15	1764.98	3525 -	3535	3530.82	3.10E+01	6.36	4.02E+00	2.05

M = First peak in a multiplet region  
m = Other peak in a multiplet region  
F = Fitted singlet  
Errors quoted at 1.000sigma

No background subtract performed on this spectrum.

## NUCLIDE IDENTIFICATION REPORT

Nuclide Library Used : C:\Canberra\Apex\Root\Default\Library\ZION LIB-BNL.NLB

### IDENTIFIED NUCLIDES

Nuclide Name	Id Confidence	Energy (keV)	Yield(%)	Activity (pCi/grams)	Activity Uncertainty
K-40	0.96	1460.82	* 10.66	1.06E+01	6.83E-01
Cs-137	0.97	661.66	* 85.10	9.14E-02	1.84E-02

Analysis Report for 18-Apr-19-10039

L1-10213C- AJGS-007SS

<b>Nuclide Name</b>	<b>Id Confidence</b>	<b>Energy (keV)</b>		<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Activity Uncertainty</b>
Tl-208	0.99	583.19	*	85.00	1.56E-01	2.34E-02
Pb-212	0.99	115.18		0.60		
		238.63	*	43.60	4.61E-01	4.77E-02
		300.09		3.30		
Pb212-XR	0.99	74.82		10.28		
		77.11	*	17.10	6.17E-01	1.66E-01
		87.35		3.97		
		89.78		1.46		
Bi-214	0.98	609.32	*	45.49	3.82E-01	4.69E-02
		768.36		4.89		
		806.18		1.26		
		934.06		3.11		
		1120.29	*	14.92	3.12E-01	1.08E-01
		1155.21		1.63		
		1238.12		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		
		1661.27		1.05		
		1729.59		2.88		
		1764.49	*	15.30	5.63E-01	1.18E-01
		1847.43		2.03		
		2118.51		1.16		
Pb-214	0.99	241.99	*	7.25	6.82E-01	1.13E-01
		295.22	*	18.42	4.02E-01	7.94E-02
		351.93	*	35.60	4.49E-01	5.71E-02
		785.96		1.06		
Pb214-XR	0.99	74.82		5.80		
		77.11	*	9.70	1.09E+00	2.97E-01
		87.35		2.24		
		89.78		0.82		
Ra-226	0.99	186.21	*	3.64	1.07E+00	3.25E-01
Ac-228	0.99	129.07		2.42		
		209.25		3.89		
		270.24		3.46		
		328.00		2.95		
		338.32	*	11.27	4.73E-01	1.10E-01
		409.46		1.92		
		463.00		4.40		
		794.95		4.25		
		911.20	*	25.80	4.94E-01	7.57E-02
		964.77		4.99		
		968.97	*	15.80	6.04E-01	1.34E-01
		1588.20		3.22		
U-235	0.98	143.76		10.96		
		163.33		5.08		
		185.71	*	57.20	6.84E-02	2.07E-02
		202.11		1.08		
		205.31		5.01		

Analysis Report for 18-Apr-19-10039  
L1-10213C- AJGS-007SS

\* = Energy line found in the spectrum.  
 - = Manually added nuclide.  
 ? = Manually edited nuclide.  
 @ = Energy line not used for Weighted Mean Activity  
 Energy Tolerance : 1.000 keV  
 Nuclide confidence index threshold = 0.30  
 Errors quoted at 1.000sigma

## INTERFERENCE CORRECTED REPORT

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (pCi/grams)	Wt mean Activity Uncertainty	Comments
K-40	0.966	1.06E+01	6.83E-01	
Cs-137	0.979	9.14E-02	1.84E-02	
Tl-208	0.990	1.56E-01	2.34E-02	
X Bi-211	0.860			
Pb-212	0.998	4.61E-01	4.77E-02	
? Pb212-XR	0.999	6.17E-01	1.66E-01	
Bi-214	0.984	3.94E-01	4.05E-02	
Pb-214	0.998	4.68E-01	4.29E-02	
? Pb214-XR	0.999	1.09E+00	2.97E-01	
? Ra-226	0.999	1.07E+00	3.25E-01	
Ac-228	0.995	5.08E-01	5.65E-02	
? <del>U-235</del> Ra-226	<del>0.980</del>	<del>6.84E-02</del>	<del>2.07E-02</del>	

? = 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 1.000sigma

*AS*  
4-18-19

*U-235 only one peak*

*JPW*  
4-18-19

Analysis Report for 18-Apr-19-10039  
L1-10213C- AJGS-007SS

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## UNIDENTIFIED PEAKS

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Peak Locate Performed on : 4/18/2019 12:38:09PM  
Peak Locate From Channel : 120  
Peak Locate To Channel : 4096

Peak No.	Energy (keV)	Peak Size (CPS)	Peak CPS (%) Uncertainty	Peak Type	Tolerance Nuclide
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All peaks were identified.

M = First peak in a multiplet region  
m = Other peak in a multiplet region  
F = Fitted singlet  
Errors quoted at 1.000sigma

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## NUCLIDE MDA REPORT

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Nuclide Library Used : C:\Canberra\Apex\Root\Default\Library\ZION LIB-BNL.NLB

Nuclide Name	Energy (keV)	Yield(%)	Activity (pCi/grams)	Nuclide MDA (pCi/grams)	Line MDA (pCi/grams)
An Pk	511.00	100.00	9.71E-02	6.70E-02	6.70E-02
BE-7	477.60	10.44	-6.12E-02	4.32E-01	4.32E-01
+ K-40	1460.82	* 10.66	1.06E+01	4.72E-01	4.72E-01
Mn-54	834.85	99.98	-7.71E-03	5.06E-02	5.06E-02
Co-60	1173.23	99.85	1.64E-02	6.82E-02	8.05E-02
	1332.49	99.98	5.99E-02		6.82E-02
Nb-94	702.65	99.81	2.15E-02	4.91E-02	5.36E-02
	871.09	99.89	1.81E-02		4.91E-02
Ag-108m	79.13	6.60	-7.64E-02	4.67E-02	1.41E+00
	433.94	90.50	-1.64E-02		4.67E-02
	614.28	89.80	-2.38E-02		8.11E-02
	722.94	90.80	-2.02E-02		6.06E-02
Sb-125	176.31	6.84	9.04E-02	1.51E-01	6.42E-01
	380.45	1.52	6.15E-01		2.90E+00
	427.87	29.60	3.04E-02		1.51E-01
	463.36	10.49	2.34E-02		4.93E-01
	600.60	17.65	7.80E-02		2.93E-01
	606.71	4.98	-3.10E-01		1.78E+00
	635.95	11.22	1.80E-01		4.17E-01

Analysis Report for 18-Apr-19-10039

L1-10213C- AJGS-007SS

<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Nuclide MDA (pCi/grams)</b>	<b>Line MDA (pCi/grams)</b>
Sb-125	671.44	1.79	-5.02E-01	1.51E-01	2.59E+00
Ba-133	79.61	2.65	-3.56E-01	1.05E-01	3.33E+00
	81.00	32.90	-2.27E-01		2.10E-01
	276.40	7.16	2.72E-02		5.71E-01
	302.85	18.34	2.28E-01		2.37E-01
	356.01	62.05	-9.21E-02		1.05E-01
	383.85	8.94	-4.53E-01		4.37E-01
Cs-134	475.36	1.48	5.19E-02	6.43E-02	2.91E+00
	563.25	8.34	6.00E-01		6.65E-01
	569.33	15.37	9.04E-02		3.03E-01
	604.72	97.62	-1.93E-02		7.21E-02
	795.86	85.46	9.98E-03		6.43E-02
	801.95	8.69	-4.74E-01		5.58E-01
	1038.61	0.99	-1.82E+00		6.93E+00
	1167.97	1.79	1.73E+00		4.37E+00
	1365.19	3.02	-3.49E-01		1.42E+00
+ Cs-137	661.66	* 85.10	9.14E-02	4.75E-02	4.75E-02
Eu-152	121.78	28.67	6.94E-04	1.41E-01	1.41E-01
	244.70	7.61	-1.39E-01		6.52E-01
	295.94	0.45	-1.65E+00		1.20E+01
	344.28	26.60	-6.85E-02		1.46E-01
	367.79	0.86	-2.45E+00		4.93E+00
	411.12	2.24	5.29E-01		2.07E+00
	443.96	2.83	6.47E-01		1.69E+00
	488.68	0.42	4.25E+00		1.15E+01
	563.99	0.49	7.32E+00		1.09E+01
	586.26	0.46	-5.47E+00		1.77E+01
	678.62	0.47	-1.85E+00		1.02E+01
	688.67	0.86	1.53E+00		6.14E+00
	719.35	0.28	-1.69E+00		1.76E+01
	778.90	12.96	-9.02E-03		4.09E-01
	810.45	0.32	8.47E+00		1.64E+01
	867.37	4.26	-5.18E-01		1.13E+00
	919.33	0.43	-3.12E+00		1.31E+01
	964.08	14.65	1.36E-01		5.30E-01
	1085.87	10.24	-1.41E-01		6.05E-01
	1089.74	1.73	-1.56E+00		3.45E+00
	1112.07	13.69	-1.06E-01		4.60E-01
	1212.95	1.43	1.24E+00		5.43E+00
	1249.94	0.19	-4.08E+00		3.94E+01
	1299.14	1.63	1.21E-01		3.89E+00
	1408.01	21.07	7.94E-02		2.57E-01
	1457.64	0.50	-6.67E+00		5.20E+01
	1528.10	0.28	-6.27E+00		1.52E+01
Eu-154	123.07	40.40	2.71E-02	9.99E-02	9.99E-02
	247.93	6.89	-9.37E-02		6.08E-01
	591.76	4.95	-1.65E-01		9.82E-01
	692.42	1.78	-3.57E-01		2.72E+00
	723.30	20.06	1.41E-01		2.94E-01
	756.80	4.52	-3.59E-01		1.04E+00
	873.18	12.08	2.20E-01		4.07E-01



Analysis Report for 18-Apr-19-10039

L1-10213C- AJGS-007SS

<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Nuclide MDA (pCi/grams)</b>	<b>Line MDA (pCi/grams)</b>
Eu-154	996.29	10.48	2.75E-01	9.99E-02	5.58E-01
	1004.76	18.01	-2.28E-02		2.96E-01
	1274.43	34.80	-6.71E-02		1.90E-01
	1596.48	1.80	-9.09E-02		2.89E+00
Eu-155	45.30	1.31	-1.88E-01	2.24E-01	1.41E+01
	60.01	1.22	3.63E+00		1.44E+01
	86.55	30.70	8.12E-02		2.24E-01
	105.31	21.10	1.50E-01		2.28E-01
+ Ra-226	186.21	* 3.64	1.07E+00	1.01E+00	1.01E+00
Pa-231	27.36	10.30	9.45E-01	1.40E+00	1.40E+00
	283.69	1.70	1.11E-01		2.26E+00
	300.07	2.47	-3.34E-01		1.66E+00
	302.65	2.20	1.90E+00		1.97E+00
	330.06	1.40	-5.27E-01		2.98E+00
	+ U-235	143.76	10.96		6.63E-02
U-235	163.33	5.08	3.60E-01	6.42E-02	8.78E-01
	185.71	* 57.20	6.84E-02		6.42E-02
	202.11	1.08	1.54E+00		4.14E+00
	205.31	5.01	-7.98E-01		8.53E-01
Am-241	59.54	35.90	1.67E-01	5.01E-01	5.01E-01

+ = Nuclide identified during the nuclide identification

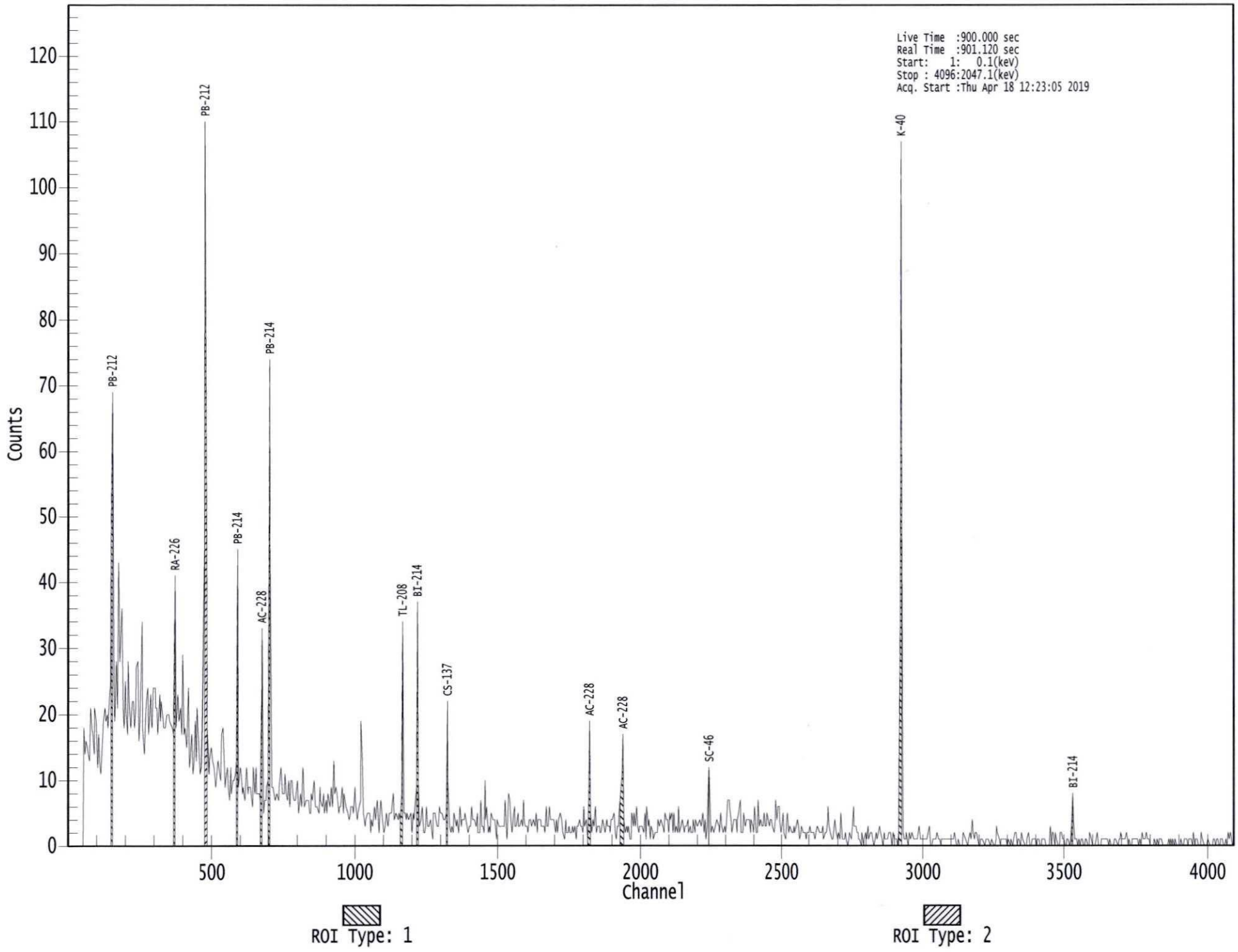
\* = Energy line found in the spectrum

&gt; = MDA value not calculated

@ = Half-life too short to be able to perform the decay correction

? = CAUTION: MDA value is inconsistent with Currie MDA at 95% confidence level

# 0000065950.CNF



Analysis Report for 18-Apr-19-10040  
L1-10213C- AJGS-008SS

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## GAMMA SPECTRUM ANALYSIS

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Sample Identification : 18-Apr-19-10040  
Sample Description : L1-10213C- AJGS-008SS  
Sample Type : Soil  
Unit :  
Sample Point :  
  
Sample Size : 1.013E+03 grams  
Facility : Default  
  
Sample Taken On : 4/17/2019 8:10:00AM  
Acquisition Started : 4/18/2019 12:23:11PM  
  
Procedure : 130G\_SOIL\_1  
Operator : Administrator  
Detector Name : P40818B  
Geometry : 130G\_SOIL\_1  
Live Time : 900.0 seconds  
Real Time : 901.7 seconds  
  
Dead Time : 0.19 %  
  
Peak Locate Threshold : 3.00  
Peak Locate Range (in channels) : 120 - 8192  
Peak Area Range (in channels) : 120 - 8192  
Identification Energy Tolerance : 1.000 keV  
  
Energy Calibration Used Done On : 1/29/2019  
Efficiency Calibration Used Done On : 4/18/2019  
Efficiency Calibration Description :  
  
Sample Number : 65951  
Fill Height : 1012.93 gram  
Certificate Name : Eu155-Na22  
Certificate Date : 1/30/2012 12:00:00PM

*ct*  
4-18-19  
*pp. added*  
4-18-19

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## PEAK ANALYSIS REPORT

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Peak Analysis Performed on : 4/18/2019 12:38:16PM  
Peak Analysis From Channel : 120  
Peak Analysis To Channel : 8192

*dm*  
4-18-19

Analysis Report for 18-Apr-19-10040

L1-10213C- AJGS-008SS

Peak No.	Energy (keV)	ROI start	ROI end	Peak Centroid	Net Peak Area	Net Area Uncertainty	Continuum Counts	FWHM (keV)
1	186.04	736 -	750	744.46	7.26E+01	18.93	9.94E+01	0.76
2	238.60	949 -	960	954.47	2.20E+02	20.72	8.23E+01	1.04
3	295.17	1176 -	1187	1180.58	5.92E+01	11.81	3.18E+01	1.32
4	351.96	1400 -	1414	1407.58	1.37E+02	15.35	3.40E+01	0.83
5	510.36	2036 -	2046	2040.78	2.46E+01	10.81	3.74E+01	1.28
6	583.02	2326 -	2339	2331.31	7.25E+01	12.08	2.55E+01	1.12
7	609.28	2428 -	2443	2436.29	1.18E+02	12.65	1.40E+01	1.17
8	661.30	2639 -	2651	2644.30	2.97E+01	8.54	1.63E+01	1.07
9	794.94	3174 -	3183	3178.72	1.50E+01	5.13	5.00E+00	0.78
10	911.14	3636 -	3651	3643.52	6.19E+01	8.96	6.06E+00	1.35
11	968.82	3868 -	3881	3874.24	3.37E+01	6.96	5.29E+00	1.21
12	1119.90	4473 -	4484	4478.71	2.00E+01	5.92	6.00E+00	0.51
13	1460.53	5830 -	5853	5841.95	3.53E+02	20.03	1.20E+01	1.77

M = First peak in a multiplet region

m = Other peak in a multiplet region

F = Fitted singlet

Errors quoted at 1.000sigma

No background subtract performed on this spectrum.

## NUCLIDE IDENTIFICATION REPORT

Nuclide Library Used : C:\Canberra\Apex\Root\Default\Library\ZION LIB-BNL.NLB

### IDENTIFIED NUCLIDES

Nuclide Name	Id Confidence	Energy (keV)	Yield(%)	Activity (pCi/grams)	Activity Uncertainty
An Pk	0.93	511.00 *	100.00	3.75E-02	1.67E-02
K-40	0.98	1460.82 *	10.66	1.04E+01	7.46E-01
Cs-137	0.98	661.66 *	85.10	6.28E-02	1.85E-02
Tl-208	0.99	583.19 *	85.00	1.41E-01	2.49E-02

Analysis Report for 18-Apr-19-10040

L1-10213C- AJGS-008SS

<b>Nuclide Name</b>	<b>Id Confidence</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Activity Uncertainty</b>
Pb-212	1.00	115.18	0.60		
		238.63 *	43.60	4.47E-01	5.55E-02
		300.09	3.30		
Bi-214	0.99	609.32 *	45.49	4.41E-01	5.42E-02
		768.36	4.89		
		806.18	1.26		
		934.06	3.11		
		1120.29 *	14.92	3.49E-01	1.04E-01
		1155.21	1.63		
		1238.12	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		
		1661.27	1.05		
		1729.59	2.88		
Pb-214	1.00	1764.49	15.30		
		1847.43	2.03		
Pb-214	1.00	2118.51	1.16		
		241.99	7.25		
		295.22 *	18.42	3.23E-01	6.94E-02
Ra-226	0.99	351.93 *	35.60	4.41E-01	6.07E-02
		785.96	1.06		
		186.21 *	3.64	1.57E+00	4.27E-01
Ac-228	0.73	129.07	2.42		
		209.25	3.89		
		270.24	3.46		
		328.00	2.95		
		338.32	11.27		
		409.46	1.92		
		463.00	4.40		
		794.95 *	4.25	7.24E-01	2.51E-01
		911.20 *	25.80	5.42E-01	8.17E-02
		964.77	4.99		
		968.97 *	15.80	5.03E-01	1.06E-01
		1588.20	3.22		
		U-235	0.98	143.76	10.96
163.33	5.08				
185.71 *	57.20			9.96E-02	2.72E-02
202.11	1.08				
205.31	5.01				

\* = Energy line found in the spectrum.

- = Manually added nuclide.

? = Manually edited nuclide.

@ = Energy line not used for Weighted Mean Activity

Energy Tolerance : 1.000 keV

Nuclide confidence index threshold = 0.30

Errors quoted at 1.000sigma

Analysis Report for 18-Apr-19-10040

L1-10213C- AJGS-008SS

## INTERFERENCE CORRECTED REPORT

	Nuclide Name	Nuclide Id Confidence	Wt mean Activity (pCi/grams)	Wt mean Activity Uncertainty	Comments
	An Pk	0.937	3.75E-02	1.67E-02	
	K-40	0.986	1.04E+01	7.46E-01	
X	<del>Cs-134</del> AC-228	<del>0.948</del>			
	Cs-137	0.980	6.28E-02	1.85E-02	
	Tl-208	0.996	1.41E-01	2.49E-02	
X	Bi-211	0.881			
	Pb-212	1.000	4.47E-01	5.55E-02	
	Bi-214	0.997	4.22E-01	4.81E-02	
	Pb-214	1.000	3.90E-01	4.57E-02	
?	Ra-226	0.996	1.57E+00	4.27E-01	
	Ac-228	0.735	5.39E-01	6.27E-02	
?	<del>U-235</del> Ra-226	<del>0.988</del>	<del>9.96E-02</del>	<del>2.72E-02</del>	

- ? = nuclide is part of an undetermined solution
- X = nuclide rejected by the interference analysis
- @ = nuclide contains energy lines not used in Weighted Mean Activity

AS  
4-18-19

Errors quoted at 1.000sigma

CS-134 half Life 2.06 years and only 1 peak

U-235 only one Peak

JOW  
4-18-19

Analysis Report for 18-Apr-19-10040

L1-10213C- AJGS-008SS

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**UNIDENTIFIED PEAKS**


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Peak Locate Performed on : 4/18/2019 12:38:16PM  
 Peak Locate From Channel : 120  
 Peak Locate To Channel : 8192

Peak No.	Energy (keV)	Peak Size (CPS)	Peak CPS (%) Uncertainty	Peak Type	Tolerance Nuclide
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All peaks were identified.

M = First peak in a multiplet region

m = Other peak in a multiplet region

F = Fitted singlet

Errors quoted at 1.000sigma

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**NUCLIDE MDA REPORT**


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Nuclide Library Used : C:\Canberra\Apex\Root\Default\Library\ZION LIB-BNL.NLB

	Nuclide Name	Energy (keV)	Yield(%)	Activity (pCi/grams)	Nuclide MDA (pCi/grams)	Line MDA (pCi/grams)
+	An Pk	511.00	* 100.00	3.75E-02	5.41E-02	5.41E-02
	BE-7	477.60	10.44	-1.01E-01	5.31E-01	5.31E-01
+	K-40	1460.82	* 10.66	1.04E+01	7.81E-01	7.81E-01
	Mn-54	834.85	99.98	3.66E-02	6.73E-02	6.73E-02
	Co-60	1173.23	99.85	1.95E-02	7.45E-02	9.34E-02
		1332.49	99.98	-3.31E-02		7.45E-02
	Nb-94	702.65	99.81	9.17E-04	6.04E-02	6.04E-02
		871.09	99.89	4.53E-02		6.56E-02
	Ag-108m	79.13	6.60	2.47E+00	5.87E-02	2.50E+00
		433.94	90.50	-1.05E-02		5.87E-02
		614.28	89.80	-2.63E-03		9.40E-02
		722.94	90.80	6.49E-02		7.99E-02
	Sb-125	176.31	6.84	-1.48E-01	1.71E-01	6.76E-01
		380.45	1.52	1.30E+00		3.62E+00
		427.87	29.60	8.18E-02		1.71E-01
		463.36	10.49	2.57E-03		6.05E-01
		600.60	17.65	-7.49E-02		3.17E-01
		606.71	4.98	4.32E+00		2.14E+00
		635.95	11.22	-1.22E-01		4.88E-01

Analysis Report for 18-Apr-19-10040

L1-10213C- AJGS-008SS

<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Nuclide MDA (pCi/grams)</b>	<b>Line MDA (pCi/grams)</b>
Sb-125	671.44	1.79	-1.57E+00	1.71E-01	3.10E+00
Ba-133	79.61	2.65	4.02E+00	1.11E-01	5.94E+00
	81.00	32.90	-3.70E-01		3.98E-01
	276.40	7.16	3.40E-01		6.66E-01
	302.85	18.34	2.33E-03		2.78E-01
	356.01	62.05	-3.16E-02		1.11E-01
	383.85	8.94	3.54E-01		6.33E-01
Cs-134	475.36	1.48	2.20E+00	3.43E-02	3.69E+00
	563.25	8.34	-3.87E-02		6.04E-01
	569.33	15.37	-3.96E-03		3.34E-01
	604.72	97.62	-4.22E-03		9.84E-02
	795.86	* 85.46	3.60E-02		3.43E-02
	801.95	8.69	2.39E-01		7.52E-01
	1038.61	0.99	1.13E+00		7.07E+00
	1167.97	1.79	-8.74E-01		4.74E+00
	1365.19	3.02	4.22E-01		1.93E+00
+ Cs-137	661.66	* 85.10	6.28E-02	5.33E-02	5.33E-02
Eu-152	121.78	28.67	8.79E-03	1.81E-01	2.04E-01
	244.70	7.61	6.74E-01		7.76E-01
	295.94	0.45	9.20E+00		1.37E+01
	344.28	26.60	-1.97E-01		1.81E-01
	367.79	0.86	6.68E-02		6.06E+00
	411.12	2.24	1.35E-01		2.49E+00
	443.96	2.83	-1.25E+00		1.59E+00
	488.68	0.42	1.32E+00		1.30E+01
	563.99	0.49	-7.71E+00		9.85E+00
	586.26	0.46	-9.10E+00		2.08E+01
	678.62	0.47	1.43E+00		1.28E+01
	688.67	0.86	-4.37E+00		6.92E+00
	719.35	0.28	-1.13E+01		2.00E+01
	778.90	12.96	-2.38E-01		4.19E-01
	810.45	0.32	7.44E+00		1.94E+01
	867.37	4.26	-1.71E+00		1.42E+00
	919.33	0.43	-4.77E+00		1.40E+01
	964.08	14.65	2.82E-01		6.89E-01
	1085.87	10.24	-1.44E-01		8.46E-01
	1089.74	1.73	6.57E-01		5.08E+00
	1112.07	13.69	1.31E-01		6.00E-01
	1212.95	1.43	-3.73E+00		6.97E+00
	1249.94	0.19	-1.86E+01		4.40E+01
	1299.14	1.63	-3.17E+00		5.25E+00
	1408.01	21.07	-6.01E-02		3.12E-01
	1457.64	0.50	2.33E+02		5.97E+01
	1528.10	0.28	-8.98E+00		1.91E+01
Eu-154	123.07	40.40	-5.94E-02	1.42E-01	1.42E-01
	247.93	6.89	-3.91E-01		6.60E-01
	591.76	4.95	-2.98E-02		1.29E+00
	692.42	1.78	1.70E+00		3.75E+00
	723.30	20.06	1.33E-01		3.55E-01
	756.80	4.52	-1.58E+00		1.30E+00
	873.18	12.08	-1.90E-01		5.28E-01



Analysis Report for 18-Apr-19-10040

L1-10213C- AJGS-008SS

<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Nuclide MDA (pCi/grams)</b>	<b>Line MDA (pCi/grams)</b>
Eu-154	996.29	10.48	8.60E-03	1.42E-01	6.88E-01
	1004.76	18.01	-3.69E-02		3.97E-01
	1274.43	34.80	-1.88E-01		2.31E-01
	1596.48	1.80	-3.48E+00		3.25E+00
Eu-155	45.30	1.31	-7.81E+00	3.55E-01	3.80E+01
	60.01	1.22	-2.62E+00		3.86E+01
	86.55	30.70	1.40E-01		3.61E-01
	105.31	21.10	3.68E-02		3.55E-01
+ Ra-226	186.21	* 3.64	1.57E+00	1.30E+00	1.30E+00
Pa-231	27.36	10.30	3.63E+00	2.06E+00	4.28E+00
	283.69	1.70	-1.98E+00		2.53E+00
	300.07	2.47	8.84E-01		2.06E+00
	302.65	2.20	3.38E-01		2.34E+00
	330.06	1.40	-6.36E-01		3.96E+00
	+ U-235	143.76	10.96		3.78E-01
U-235	163.33	5.08	4.90E-01	8.26E-02	1.03E+00
	185.71	* 57.20	9.96E-02		8.26E-02
	202.11	1.08	-1.24E+00		4.65E+00
	205.31	5.01	-1.30E+00		9.74E-01
Am-241	59.54	35.90	-5.14E-01	1.33E+00	1.33E+00

+ = Nuclide identified during the nuclide identification

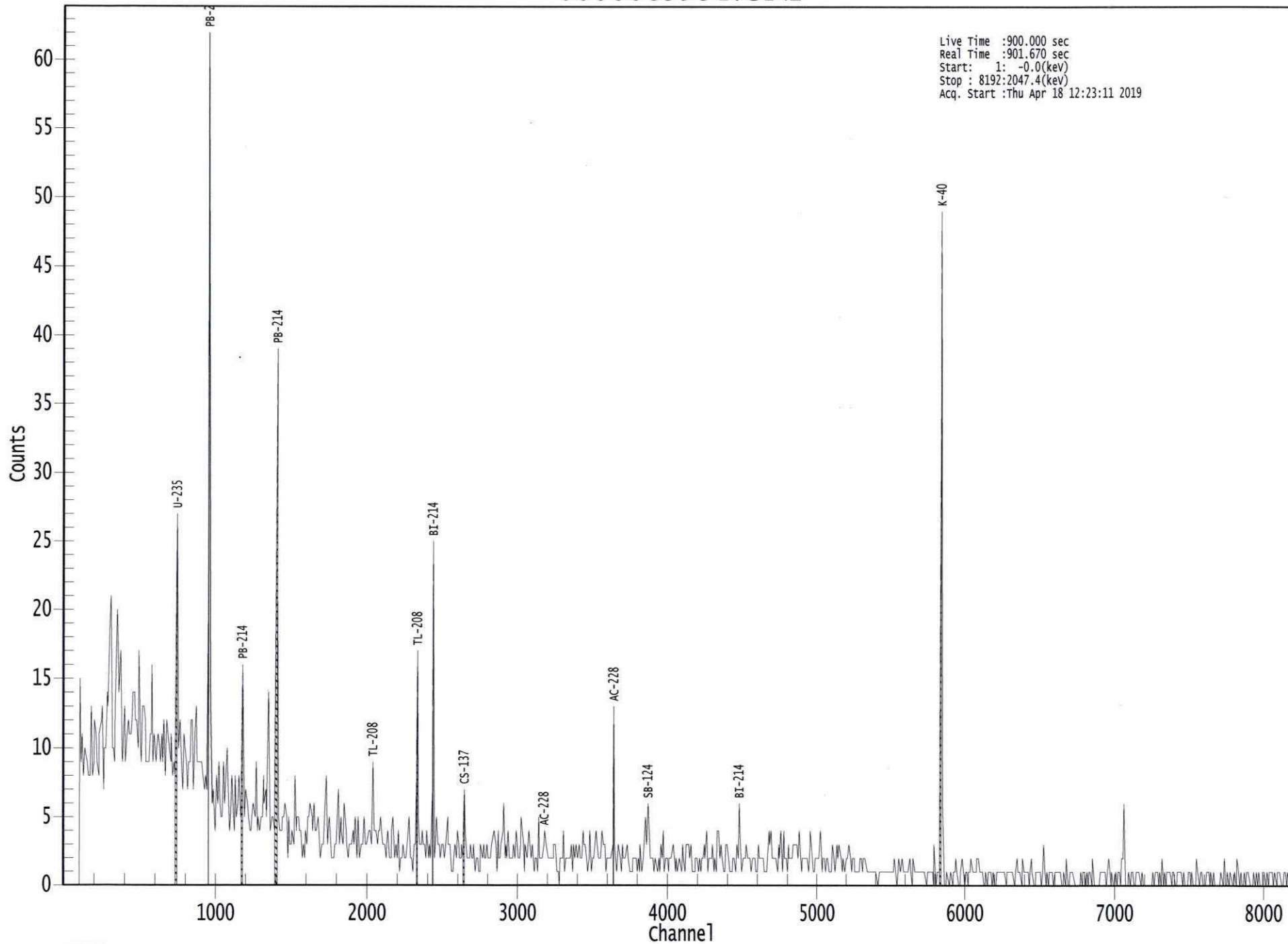
\* = Energy line found in the spectrum

&gt; = MDA value not calculated


@ = Half-life too short to be able to perform the decay correction

? = CAUTION: MDA value is inconsistent with Currie MDA at 95% confidence level

0000065951.CNF



Live Time :900.000 sec  
Real Time :901.670 sec  
Start: 1: -0.0(kev)  
Stop : 8192:2047.4(kev)  
Acq. Start :Thu Apr 18 12:23:11 2019

 ROI Type: 1

Analysis Report for 18-Apr-19-10041  
L1-10213C- AJGS-009SS

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## GAMMA SPECTRUM ANALYSIS

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Sample Identification : 18-Apr-19-10041  
Sample Description : L1-10213C- AJGS-009SS  
Sample Type : Soil  
Unit :  
Sample Point :  
  
Sample Size : 9.907E+02 grams  
Facility : Default  
  
Sample Taken On : 4/17/2019 8:15:00AM  
Acquisition Started : 4/18/2019 12:23:17PM  
  
Procedure : 130G\_SOIL\_1  
Operator : Administrator  
Detector Name : P11314  
Geometry : 130G\_SOIL\_1  
Live Time : 900.0 seconds  
Real Time : 900.3 seconds  
  
Dead Time : 0.03 %  
  
Peak Locate Threshold : 3.00  
Peak Locate Range (in channels) : 120 - 8192  
Peak Area Range (in channels) : 120 - 8192  
Identification Energy Tolerance : 1.000 keV  
  
Energy Calibration Used Done On : 1/24/2019  
Efficiency Calibration Used Done On : 4/18/2019  
Efficiency Calibration Description :  
  
Sample Number : 65952  
Fill Height : 990.71 gram  
Certificate Name : Eu155-Na22  
Certificate Date : 12/22/2008 12:00:00PM

*at*  
4-18-19  
*pp. milled*  
4-18-19

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## PEAK ANALYSIS REPORT

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Peak Analysis Performed on : 4/18/2019 12:38:40PM  
Peak Analysis From Channel : 120  
Peak Analysis To Channel : 8192

*mmh*  
4-18-19

Analysis Report for 18-Apr-19-10041

L1-10213C- AJGS-009SS

	Peak No.	Energy (keV)	ROI start	ROI end	Peak Centroid	Net Peak Area	Net Area Uncertainty	Continuum Counts	FWHM (keV)
M	1	75.11	294 -	315	301.00	1.02E+02	12.12	1.03E+02	0.91
m	2	77.27	294 -	315	309.59	1.36E+02	13.37	1.03E+02	0.91
	3	186.34	737 -	750	745.23	8.70E+01	16.76	7.00E+01	0.99
M	4	238.82	949 -	975	954.87	2.90E+02	17.72	7.70E+01	1.07
m	5	241.94	949 -	975	967.33	5.82E+01	9.59	7.56E+01	1.07
	6	295.42	1174 -	1189	1180.97	9.77E+01	17.32	6.63E+01	0.84
	7	352.08	1398 -	1413	1407.32	2.02E+02	17.28	3.20E+01	0.98
	8	583.14	2324 -	2338	2330.68	1.20E+02	13.45	2.08E+01	0.95
	9	609.24	2428 -	2445	2435.01	1.41E+02	15.18	2.84E+01	1.33
	10	661.48	2638 -	2650	2643.80	3.88E+01	9.02	1.63E+01	0.31
	11	911.29	3635 -	3649	3642.60	6.74E+01	8.81	3.56E+00	1.27
	12	968.90	3868 -	3878	3873.00	2.68E+01	8.95	2.22E+01	0.40
	13	1460.45	5828 -	5852	5839.74	4.92E+02	23.51	1.50E+01	1.61

M = First peak in a multiplet region

m = Other peak in a multiplet region

F = Fitted singlet

Errors quoted at 1.000sigma

No background subtract performed on this spectrum.

## NUCLIDE IDENTIFICATION REPORT

Nuclide Library Used : C:\Canberra\Apex\Root\Default\Library\ZION LIB-BNL.NLB

### IDENTIFIED NUCLIDES

Nuclide Name	Id Confidence	Energy (keV)		Yield(%)	Activity (pCi/grams)	Activity Uncertainty
K-40	0.97	1460.82	*	10.66	1.32E+01	8.54E-01
Cs-137	0.99	661.66	*	85.10	7.47E-02	1.80E-02
Tl-208	1.00	583.19	*	85.00	2.12E-01	2.70E-02
Pb-212	0.99	115.18		0.60		

Analysis Report for 18-Apr-19-10041

L1-10213C- AJGS-009SS

<b>Nuclide Name</b>	<b>Id Confidence</b>	<b>Energy (keV)</b>		<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Activity Uncertainty</b>
Pb-212	0.99	238.63 *		43.60	5.28E-01	5.35E-02
		300.09		3.30		
Pb212-XR	0.99	74.82 *		10.28	1.41E+00	2.22E-01
		77.11 *		17.10	1.05E+00	1.49E-01
		87.35		3.97		
		89.78		1.46		
Bi-214	1.00	609.32 *		45.49	4.78E-01	5.91E-02
		768.36		4.89		
		806.18		1.26		
		934.06		3.11		
		1120.29		14.92		
		1155.21		1.63		
		1238.12		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		
		1661.27		1.05		
		1729.59		2.88		
		1764.49		15.30		
		1847.43		2.03		
		2118.51		1.16		
Pb-214	0.99	241.99 *		7.25	6.42E-01	1.18E-01
		295.22 *		18.42	4.82E-01	9.37E-02
		351.93 *		35.60	5.90E-01	6.91E-02
		785.96		1.06		
Ra-226	0.99	186.21 *		3.64	1.66E+00	3.46E-01
Ac-228	0.73	129.07		2.42		
		209.25		3.89		
		270.24		3.46		
		328.00		2.95		
		338.32		11.27		
		409.46		1.92		
		463.00		4.40		
		794.95		4.25		
		911.20 *		25.80	5.37E-01	7.39E-02
		964.77		4.99		
		968.97 *		15.80	3.64E-01	1.23E-01
		1588.20		3.22		
U-235	0.95	143.76		10.96		
		163.33		5.08		
		185.71 *		57.20	1.05E-01	2.20E-02
		202.11		1.08		
		205.31		5.01		

Analysis Report for 18-Apr-19-10041

L1-10213C- AJGS-009SS

\* = Energy line found in the spectrum.  
 - = Manually added nuclide.  
 ? = Manually edited nuclide.  
 @ = Energy line not used for Weighted Mean Activity  
 Energy Tolerance : 1.000 keV  
 Nuclide confidence index threshold = 0.30  
 Errors quoted at 1.000sigma

## INTERFERENCE CORRECTED REPORT

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (pCi/grams)	Wt mean Activity Uncertainty	Comments
K-40	0.978	1.32E+01	8.54E-01	
Cs-137	0.995	7.47E-02	1.80E-02	
Tl-208	1.000	2.12E-01	2.70E-02	
Pb-212	0.995	5.28E-01	5.35E-02	
Pb212-XR	0.993	1.16E+00	1.24E-01	
Bi-214	1.000	4.78E-01	5.91E-02	
Pb-214	0.996	5.68E-01	5.03E-02	
X Pb214-XR	0.993			
? Ra-226	0.997	1.66E+00	3.46E-01	
Ac-228	0.736	4.91E-01	6.33E-02	
? <del>U-235</del> Ra-226	<del>0.956</del>	<del>1.05E-01</del>	<del>2.20E-02</del>	

? = 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 1.000sigma

AS  
4-18-19

U-235 only one peak

JAW  
4-18-19

Analysis Report for 18-Apr-19-10041  
L1-10213C- AJGS-009SS

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## UNIDENTIFIED PEAKS

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Peak Locate Performed on : 4/18/2019 12:38:40PM  
Peak Locate From Channel : 120  
Peak Locate To Channel : 8192

Peak No.	Energy (keV)	Peak Size (CPS)	Peak CPS (%) Uncertainty	Peak Type	Tolerance Nuclide
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All peaks were identified.

M = First peak in a multiplet region  
m = Other peak in a multiplet region  
F = Fitted singlet  
Errors quoted at 1.000sigma

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## NUCLIDE MDA REPORT

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Nuclide Library Used : C:\Canberra\Apex\Root\Default\Library\ZION LIB-BNL.NLB

Nuclide Name	Energy (keV)	Yield(%)	Activity (pCi/grams)	Nuclide MDA (pCi/grams)	Line MDA (pCi/grams)
An Pk	511.00	100.00	5.88E-02	7.86E-02	7.86E-02
BE-7	477.60	10.44	-4.10E-02	5.14E-01	5.14E-01
+ K-40	1460.82	* 10.66	1.32E+01	7.86E-01	7.86E-01
Mn-54	834.85	99.98	-3.86E-02	5.89E-02	5.89E-02
Co-60	1173.23	99.85	-5.12E-02	7.66E-02	8.84E-02
	1332.49	99.98	-1.67E-02		7.66E-02
Nb-94	702.65	99.81	-2.69E-02	6.07E-02	6.07E-02
	871.09	99.89	1.36E-02		6.83E-02
Ag-108m	79.13	6.60	-4.06E-01	6.06E-02	1.61E+00
	433.94	90.50	-6.72E-03		6.06E-02
	614.28	89.80	-8.67E-03		8.65E-02
	722.94	90.80	4.72E-02		8.27E-02
Sb-125	176.31	6.84	-4.66E-02	1.59E-01	6.28E-01
	380.45	1.52	2.53E+00		3.15E+00
	427.87	29.60	-4.16E-02		1.59E-01
	463.36	10.49	3.75E-01		5.52E-01
	600.60	17.65	1.74E-01		3.40E-01
	606.71	4.98	-4.74E-01		2.24E+00
	635.95	11.22	-4.73E-02		4.83E-01

Analysis Report for 18-Apr-19-10041

L1-10213C- AJGS-009SS

<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Nuclide MDA (pCi/grams)</b>	<b>Line MDA (pCi/grams)</b>
Sb-125	671.44	1.79	-2.74E+00	1.59E-01	2.78E+00
Ba-133	79.61	2.65	-9.36E-01	1.06E-01	3.89E+00
	81.00	32.90	-3.00E-01		2.24E-01
	276.40	7.16	-6.31E-02		6.42E-01
	302.85	18.34	2.50E-01		2.75E-01
	356.01	62.05	-7.15E-02		1.06E-01
	383.85	8.94	-1.70E-01		4.52E-01
Cs-134	475.36	1.48	1.60E+00	7.58E-02	3.78E+00
	563.25	8.34	-2.34E-01		7.40E-01
	569.33	15.37	-6.84E-02		3.47E-01
	604.72	97.62	-3.08E-02		9.76E-02
	795.86	85.46	3.93E-02		7.58E-02
	801.95	8.69	-2.80E-01		7.42E-01
	1038.61	0.99	5.22E-01		7.11E+00
	1167.97	1.79	2.13E+00		5.01E+00
	1365.19	3.02	2.07E+00		2.59E+00
+ Cs-137	661.66	* 85.10	7.47E-02	4.83E-02	4.83E-02
Eu-152	121.78	28.67	7.36E-02	1.56E-01	1.61E-01
	244.70	7.61	1.62E-01		7.18E-01
	295.94	0.45	1.43E+01		1.49E+01
	344.28	26.60	1.59E-02		1.56E-01
	367.79	0.86	1.86E+00		5.60E+00
	411.12	2.24	-1.44E+00		2.21E+00
	443.96	2.83	-1.01E+00		1.78E+00
	488.68	0.42	7.02E+00		1.23E+01
	563.99	0.49	-1.59E+01		1.16E+01
	586.26	0.46	-6.09E+00		2.14E+01
	678.62	0.47	-3.15E+00		1.19E+01
	688.67	0.86	-3.72E+00		6.89E+00
	719.35	0.28	1.89E+00		2.19E+01
	778.90	12.96	-1.14E-01		4.60E-01
	810.45	0.32	-8.85E+00		1.84E+01
	867.37	4.26	1.25E-01		1.53E+00
	919.33	0.43	5.55E+00		1.39E+01
	964.08	14.65	-1.49E-01		7.28E-01
	1085.87	10.24	4.91E-01		7.44E-01
	1089.74	1.73	2.85E+00		4.66E+00
	1112.07	13.69	2.71E-01		6.39E-01
	1212.95	1.43	2.88E+00		7.64E+00
	1249.94	0.19	-1.62E+01		4.33E+01
	1299.14	1.63	-2.91E+00		4.17E+00
	1408.01	21.07	-2.87E-01		2.84E-01
	1457.64	0.50	2.94E+02		6.37E+01
	1528.10	0.28	2.61E+00		1.90E+01
Eu-154	123.07	40.40	3.69E-02	1.13E-01	1.13E-01
	247.93	6.89	-5.00E-01		6.36E-01
	591.76	4.95	-1.03E+00		1.07E+00
	692.42	1.78	1.10E+00		3.64E+00
	723.30	20.06	3.77E-02		3.72E-01
	756.80	4.52	7.62E-01		1.29E+00
	873.18	12.08	1.69E-01		5.72E-01



Analysis Report for 18-Apr-19-10041

L1-10213C- AJGS-009SS

<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Nuclide MDA (pCi/grams)</b>	<b>Line MDA (pCi/grams)</b>
Eu-154	996.29	10.48	1.99E-01	1.13E-01	6.69E-01
	1004.76	18.01	3.97E-02		3.82E-01
	1274.43	34.80	2.79E-02		2.53E-01
	1596.48	1.80	7.27E-01		2.81E+00
Eu-155	45.30	1.31	3.40E+00	2.53E-01	1.47E+01
	60.01	1.22	4.02E+00		1.67E+01
	86.55	30.70	1.84E-01		2.66E-01
	105.31	21.10	-2.95E-02		2.53E-01
+ Ra-226	186.21	* 3.64	1.66E+00	9.54E-01	9.54E-01
Pa-231	27.36	10.30	2.42E+00	1.82E+00	1.82E+00
	283.69	1.70	-3.15E+00		2.34E+00
	300.07	2.47	1.21E+00		2.17E+00
	302.65	2.20	2.27E+00		2.34E+00
	330.06	1.40	8.20E-01		3.82E+00
	+ U-235	143.76	10.96		-1.20E-02
U-235	163.33	5.08	2.38E-01	6.07E-02	8.45E-01
	185.71	* 57.20	1.05E-01		6.07E-02
	202.11	1.08	3.65E-01		3.84E+00
	205.31	5.01	-7.75E-01		7.73E-01
Am-241	59.54	35.90	1.20E-02	5.76E-01	5.76E-01

+ = Nuclide identified during the nuclide identification

\* = Energy line found in the spectrum

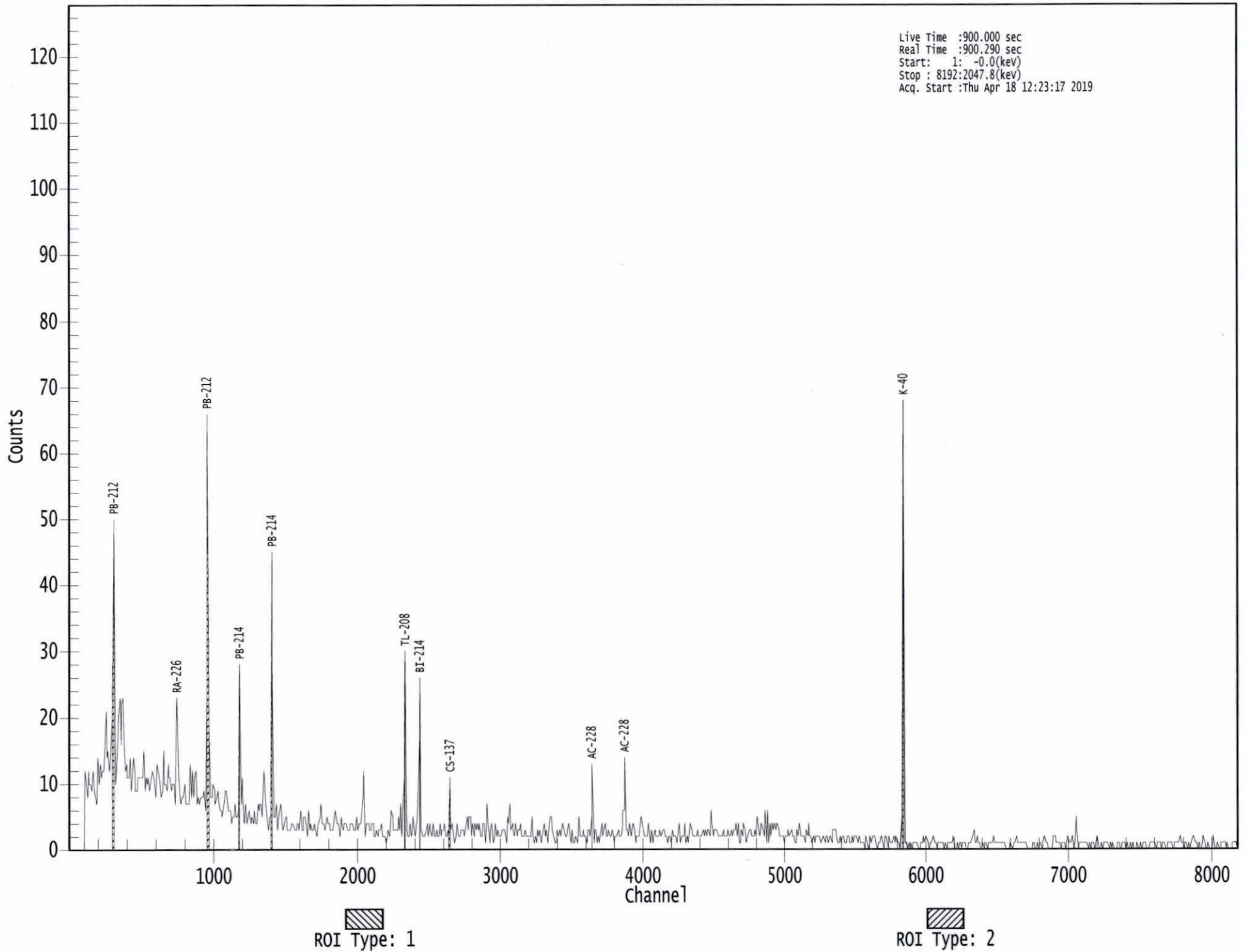
&gt; = MDA value not calculated

@ = Half-life too short to be able to perform the decay correction

? = CAUTION: MDA value is inconsistent with Currie MDA at 95% confidence level

0000065952.CNF

Live Time :900.000 sec  
Real Time :900.290 sec  
Start: 1: -0.0(keV)  
Stop : 8192.2047.8(keV)  
Acq. Start :Thu Apr 18 12:23:17 2019



Analysis Report for 18-Apr-19-10042  
L1-10213C- AJGS-010SS

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## GAMMA SPECTRUM ANALYSIS

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Sample Identification : 18-Apr-19-10042  
Sample Description : L1-10213C- AJGS-010SS  
Sample Type : Soil  
Unit :  
Sample Point :  
  
Sample Size : 1.079E+03 grams  
Facility : Default  
  
Sample Taken On : 4/17/2019 8:20:00AM  
Acquisition Started : 4/18/2019 12:23:25PM  
  
Procedure : 130G\_SOIL\_1  
Operator : Administrator  
Detector Name : 352  
Geometry : 130G\_SOIL\_1  
Live Time : 900.0 seconds  
Real Time : 900.4 seconds  
  
Dead Time : 0.05 %  
  
Peak Locate Threshold : 3.00  
Peak Locate Range (in channels) : 120 - 8192  
Peak Area Range (in channels) : 120 - 8192  
Identification Energy Tolerance : 1.000 keV  
  
Energy Calibration Used Done On : 9/29/2018  
Efficiency Calibration Used Done On : 4/18/2019  
Efficiency Calibration Description :  
  
Sample Number : 65953  
Fill Height : 1079.37 gram  
Certificate Name : Eu155-Na22  
Certificate Date : 1/7/2013 12:00:00PM

*at*  
4-18-19  
*P. Walsh*  
4-18-19

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## PEAK ANALYSIS REPORT

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Peak Analysis Performed on : 4/18/2019 12:38:32PM  
Peak Analysis From Channel : 120  
Peak Analysis To Channel : 8192

*gmb*  
4-18-19

Analysis Report for 18-Apr-19-10042  
L1-10213C- AJGS-010SS

Peak No.	Energy (keV)	ROI start	ROI end	Peak Centroid	Net Peak Area	Net Area Uncertainty	Continuum Counts	FWHM (keV)
1	238.66	949 -	960	955.10	2.89E+02	22.42	8.54E+01	1.05
2	295.21	1175 -	1188	1181.04	1.20E+02	15.79	4.62E+01	1.19
3	338.38	1348 -	1359	1353.58	4.86E+01	12.49	4.24E+01	0.81
4	351.95	1398 -	1417	1407.80	2.07E+02	18.44	3.77E+01	1.13
5	583.21	2325 -	2340	2332.16	9.66E+01	13.08	2.44E+01	1.14
6	609.26	2428 -	2445	2436.31	1.26E+02	14.73	2.74E+01	1.29
7	661.73	2638 -	2653	2646.11	4.70E+01	9.75	1.60E+01	0.63
8	727.04	2900 -	2913	2907.25	2.03E+01	9.10	2.27E+01	0.39
9	911.12	3635 -	3652	3643.52	8.10E+01	11.98	1.90E+01	1.35
10	1120.11	4473 -	4488	4479.73	3.81E+01	8.22	9.86E+00	0.31
11	1460.72	5831 -	5856	5843.24	5.66E+02	25.37	1.87E+01	1.96
12	1764.55	7054 -	7067	7060.26	1.50E+01	6.15	8.03E+00	0.45

M = First peak in a multiplet region  
m = Other peak in a multiplet region  
F = Fitted singlet  
Errors quoted at 1.000sigma

No background subtract performed on this spectrum.

## NUCLIDE IDENTIFICATION REPORT

Nuclide Library Used : C:\Canberra\Apex\Root\Default\Library\ZION LIB-BNL.NLB

### IDENTIFIED NUCLIDES

Nuclide Name	Id Confidence	Energy (keV)	Yield(%)	Activity (pCi/grams)	Activity Uncertainty
K-40	0.99	1460.82	* 10.66	1.35E+01	8.40E-01
Cs-137	0.99	661.66	* 85.10	8.16E-02	1.76E-02
Tl-208	1.00	583.19	* 85.00	1.54E-01	2.28E-02
Bi-212	0.99	39.86	1.06		
		727.33	* 6.67	4.79E-01	2.17E-01

Analysis Report for 18-Apr-19-10042

L1-10213C- AJGS-010SS

<b>Nuclide Name</b>	<b>Id Confidence</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Activity Uncertainty</b>
Bi-212	0.99	785.37	1.10		
		1620.50	1.47		
Pb-212	1.00	115.18	0.60		
		238.63 *	43.60	4.96E-01	5.56E-02
		300.09	3.30		
Bi-214	0.99	609.32 *	45.49	3.86E-01	5.08E-02
		768.36	4.89		
		806.18	1.26		
		934.06	3.11		
		1120.29 *	14.92	5.39E-01	1.18E-01
		1155.21	1.63		
		1238.12	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		
		1661.27	1.05		
		1729.59	2.88		
		1764.49 *	15.30	2.87E-01	1.18E-01
		1847.43	2.03		
		2118.51	1.16		
Pb-214	1.00	241.99	7.25		
		295.22 *	18.42	5.49E-01	8.46E-02
		351.93 *	35.60	5.57E-01	6.67E-02
		785.96	1.06		
Ac-228	1.00	129.07	2.42		
		209.25	3.89		
		270.24	3.46		
		328.00	2.95		
		338.32 *	11.27	4.01E-01	1.08E-01
		409.46	1.92		
		463.00	4.40		
		794.95	4.25		
		911.20 *	25.80	5.76E-01	8.87E-02
		964.77	4.99		
		968.97	15.80		
		1588.20	3.22		

\* = Energy line found in the spectrum.

- = Manually added nuclide.

? = Manually edited nuclide.

@ = Energy line not used for Weighted Mean Activity

Energy Tolerance : 1.000 keV

Nuclide confidence index threshold = 0.30

Errors quoted at 1.000sigma

Analysis Report for 18-Apr-19-10042

L1-10213C- AJGS-010SS

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## INTERFERENCE CORRECTED REPORT

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Nuclide Name	Nuclide Id Confidence	Wt mean Activity (pCi/grams)	Wt mean Activity Uncertainty	Comments
K-40	0.998	1.35E+01	8.40E-01	
Cs-137	0.999	8.16E-02	1.76E-02	
Tl-208	1.000	1.54E-01	2.28E-02	
X Bi-211	0.883			
Bi-212	0.991	4.79E-01	2.17E-01	
Pb-212	1.000	4.96E-01	5.56E-02	
Bi-214	0.999	3.93E-01	4.34E-02	
Pb-214	1.000	5.54E-01	5.24E-02	
Ac-228	1.000	5.06E-01	6.86E-02	

? = 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 1.000sigma

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Analysis Report for 18-Apr-19-10042  
L1-10213C- AJGS-010SS

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## UNIDENTIFIED PEAKS

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Peak Locate Performed on : 4/18/2019 12:38:32PM  
Peak Locate From Channel : 120  
Peak Locate To Channel : 8192

Peak No.	Energy (keV)	Peak Size (CPS)	Peak CPS (%) Uncertainty	Peak Type	Tolerance Nuclide
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All peaks were identified.

M = First peak in a multiplet region  
m = Other peak in a multiplet region  
F = Fitted singlet  
Errors quoted at 1.000sigma

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## NUCLIDE MDA REPORT

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Nuclide Library Used : C:\Canberra\Apex\Root\Default\Library\ZION LIB-BNL.NLB

Nuclide Name	Energy (keV)	Yield(%)	Activity (pCi/grams)	Nuclide MDA (pCi/grams)	Line MDA (pCi/grams)
An Pk	511.00	100.00	9.85E-02	7.27E-02	7.27E-02
BE-7	477.60	10.44	4.16E-01	5.66E-01	5.66E-01
+ K-40	1460.82	* 10.66	1.35E+01	7.79E-01	7.79E-01
Mn-54	834.85	99.98	1.52E-02	6.37E-02	6.37E-02
Co-60	1173.23	99.85	-5.13E-02	6.00E-02	8.57E-02
	1332.49	99.98	-9.03E-03		6.00E-02
Nb-94	702.65	99.81	-2.65E-02	5.93E-02	5.93E-02
	871.09	99.89	-7.34E-03		6.23E-02
Ag-108m	79.13	6.60	-1.12E+00	5.86E-02	2.12E+00
	433.94	90.50	6.60E-03		5.86E-02
	614.28	89.80	-2.25E-02		1.01E-01
	722.94	90.80	1.97E-02		7.82E-02
Sb-125	176.31	6.84	1.82E-03	1.66E-01	6.33E-01
	380.45	1.52	-6.22E-01		2.95E+00
	427.87	29.60	6.58E-02		1.66E-01
	463.36	10.49	4.22E-01		5.52E-01
	600.60	17.65	8.13E-02		3.19E-01
	606.71	4.98	3.55E+00		1.90E+00
	635.95	11.22	7.09E-02		5.44E-01

Analysis Report for 18-Apr-19-10042  
L1-10213C- AJGS-010SS

<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Nuclide MDA (pCi/grams)</b>	<b>Line MDA (pCi/grams)</b>
Sb-125	671.44	1.79	-1.39E+00	1.66E-01	3.21E+00
Ba-133	79.61	2.65	2.32E+00	1.17E-01	5.17E+00
	81.00	32.90	-8.37E-01		3.44E-01
	276.40	7.16	-6.25E-01		6.68E-01
	302.85	18.34	-7.68E-02		2.65E-01
	356.01	62.05	1.21E-03		1.17E-01
	383.85	8.94	1.66E-01		4.90E-01
Cs-134	475.36	1.48	-1.72E-01	8.64E-02	3.81E+00
	563.25	8.34	-4.84E-01		6.47E-01
	569.33	15.37	3.89E-03		3.66E-01
	604.72	97.62	-3.81E-02		8.64E-02
	795.86	85.46	7.63E-02		8.97E-02
	801.95	8.69	-1.39E+00		7.51E-01
	1038.61	0.99	2.93E+00		7.17E+00
	1167.97	1.79	-9.16E-01		4.84E+00
	1365.19	3.02	-1.63E+00		1.76E+00
+ Cs-137	661.66	* 85.10	8.16E-02	4.58E-02	4.58E-02
Eu-152	121.78	28.67	1.20E-03	1.73E-01	1.82E-01
	244.70	7.61	-2.36E-01		7.07E-01
	295.94	0.45	7.03E+00		1.47E+01
	344.28	26.60	9.78E-03		1.73E-01
	367.79	0.86	-3.90E+00		5.15E+00
	411.12	2.24	1.64E+00		2.26E+00
	443.96	2.83	-3.87E-01		1.92E+00
	488.68	0.42	1.78E+00		1.12E+01
	563.99	0.49	4.16E+00		1.15E+01
	586.26	0.46	2.81E+01		1.82E+01
	678.62	0.47	-1.07E+01		1.19E+01
	688.67	0.86	7.37E+00		7.60E+00
	719.35	0.28	4.93E-01		1.98E+01
	778.90	12.96	-1.35E-01		4.46E-01
	810.45	0.32	4.68E+00		1.94E+01
	867.37	4.26	-2.29E+00		1.44E+00
	919.33	0.43	-4.69E+00		1.31E+01
	964.08	14.65	6.16E-01		6.30E-01
	1085.87	10.24	1.44E-01		6.99E-01
	1089.74	1.73	-5.47E-01		4.06E+00
	1112.07	13.69	3.21E-02		4.79E-01
	1212.95	1.43	5.90E+00		6.78E+00
	1249.94	0.19	-2.01E+01		4.49E+01
	1299.14	1.63	-1.93E+00		4.64E+00
	1408.01	21.07	3.61E-02		3.09E-01
	1457.64	0.50	2.94E+02		6.08E+01
	1528.10	0.28	3.45E+00		1.75E+01
Eu-154	123.07	40.40	-1.35E-02	1.30E-01	1.30E-01
	247.93	6.89	4.31E-03		6.53E-01
	591.76	4.95	-1.11E-03		1.02E+00
	692.42	1.78	-1.70E+00		3.41E+00
	723.30	20.06	2.27E-01		3.56E-01
	756.80	4.52	-2.99E-01		1.32E+00
	873.18	12.08	1.99E-01		5.11E-01



Analysis Report for 18-Apr-19-10042

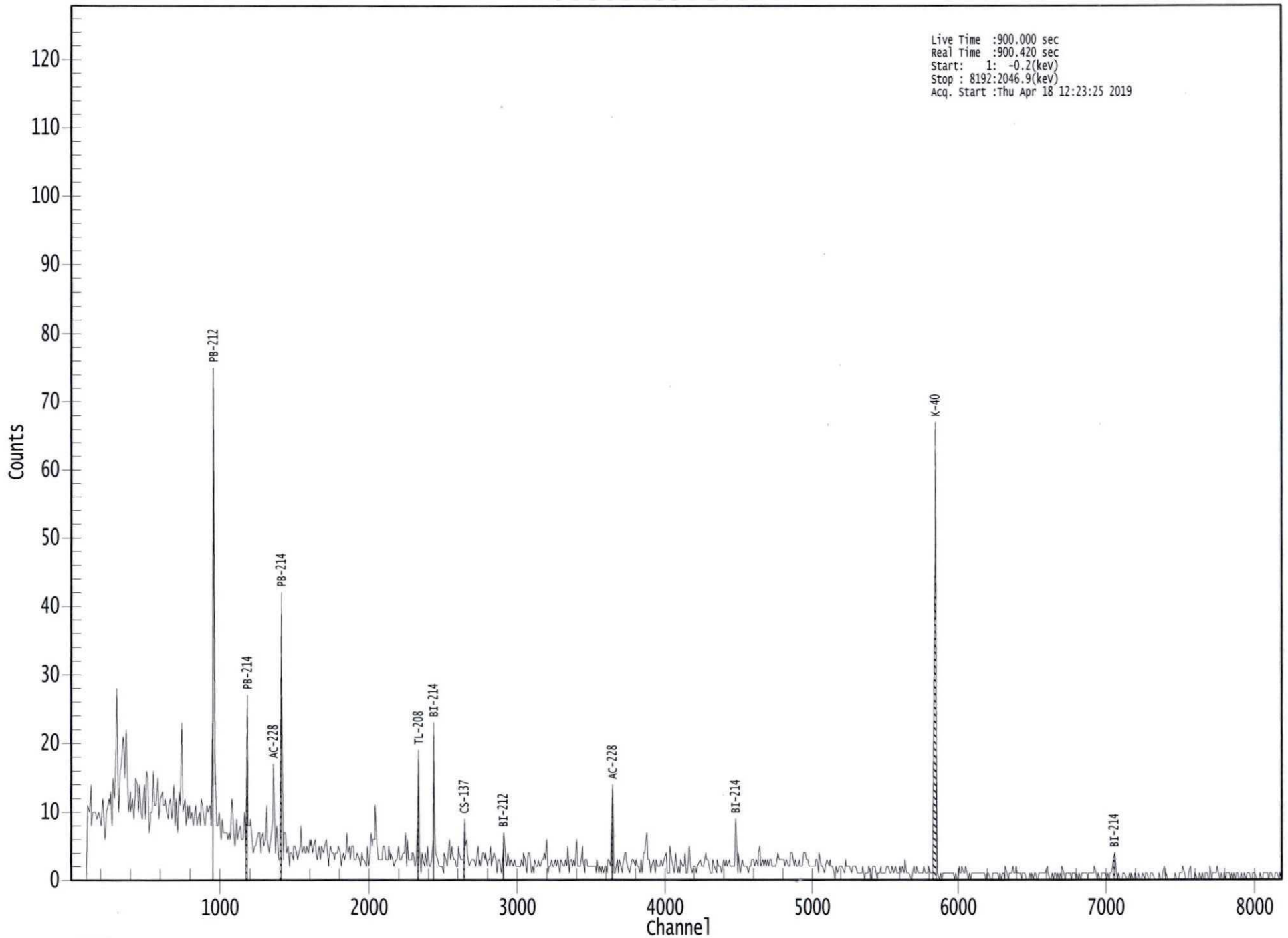
L1-10213C- AJGS-010SS

<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Nuclide MDA (pCi/grams)</b>	<b>Line MDA (pCi/grams)</b>
Eu-154	996.29	10.48	1.88E-01	1.30E-01	7.03E-01
	1004.76	18.01	-1.12E-01		3.70E-01
	1274.43	34.80	9.89E-04		2.31E-01
	1596.48	1.80	2.54E+00		3.91E+00
Eu-155	45.30	1.31	-6.66E-01	3.09E-01	2.62E+01
	60.01	1.22	-8.50E+00		2.73E+01
	86.55	30.70	-2.82E-01		3.15E-01
	105.31	21.10	3.47E-01		3.09E-01
Ra-226	186.21	3.64	6.81E-01	1.48E+00	1.48E+00
Pa-231	27.36	10.30	1.58E+00	2.23E+00	2.83E+00
	283.69	1.70	-2.07E-01		2.81E+00
	300.07	2.47	2.41E-01		2.24E+00
	302.65	2.20	7.19E-02		2.23E+00
	330.06	1.40	-2.52E-01		3.40E+00
U-235	143.76	10.96	-1.66E-01	9.60E-02	4.52E-01
	163.33	5.08	-1.96E-01		9.39E-01
	185.71	57.20	1.19E-01		9.60E-02
	202.11	1.08	-2.25E+00		4.34E+00
	205.31	5.01	-7.09E-01		9.29E-01
Am-241	59.54	35.90	2.56E-01	9.86E-01	9.86E-01

- + = 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  
 ? = CAUTION: MDA value is inconsistent with Currie MDA at 95% confidence level

# 0000065953.CNF

Live Time : 900.000 sec  
Real Time : 900.420 sec  
Start: 1: -0.2(keV)  
Stop : 8192:2046.9(keV)  
Acq. Start : Thu Apr 18 12:23:25 2019



 ROI Type: 1

Analysis Report for 18-Apr-19-10043  
L1-10213C- AJGS-011SS

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## GAMMA SPECTRUM ANALYSIS

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Sample Identification : 18-Apr-19-10043  
Sample Description : L1-10213C- AJGS-011SS  
Sample Type : Soil  
Unit :  
Sample Point :  
  
Sample Size : 9.483E+02 grams  
Facility : Default  
  
Sample Taken On : 4/17/2019 8:25:00AM  
Acquisition Started : 4/18/2019 12:42:14PM  
  
Procedure : 130G\_SOIL\_1  
Operator : Administrator  
Detector Name : 324  
Geometry : 130G\_SOIL\_1  
Live Time : 900.0 seconds  
Real Time : 901.0 seconds  
  
Dead Time : 0.11 %  
  
Peak Locate Threshold : 3.00  
Peak Locate Range (in channels) : 120 - 4096  
Peak Area Range (in channels) : 120 - 4096  
Identification Energy Tolerance : 1.000 keV  
  
Energy Calibration Used Done On : 9/29/2018  
Efficiency Calibration Used Done On : 4/18/2019  
Efficiency Calibration Description :  
  
Sample Number : 65954  
Fill Height : 948.30 gram  
Certificate Name : Eu155-Na22  
Certificate Date : 1/30/2013 12:00:00PM

*at*  
4-18-19

*ps. well*  
4-18-19

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## PEAK ANALYSIS REPORT

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Peak Analysis Performed on : 4/18/2019 12:57:17PM  
Peak Analysis From Channel : 120  
Peak Analysis To Channel : 4096

*mm*  
4-18-19

Analysis Report for 18-Apr-19-10043

L1-10213C- AJGS-011SS

Peak No.	Energy (keV)	ROI start	ROI end	Peak Centroid	Net Peak Area	Net Area Uncertainty	Continuum Counts	FWHM (keV)
1	238.68	473 -	481	477.54	8.86E+01	17.27	9.54E+01	1.16
2	352.09	699 -	708	704.13	6.73E+01	11.49	2.87E+01	1.52
3	583.52	1162 -	1172	1166.64	4.77E+01	9.55	1.73E+01	0.85
4	609.64	1213 -	1223	1218.86	3.13E+01	9.49	2.48E+01	1.12
5	661.96	1318 -	1329	1323.46	8.27E+01	10.77	1.33E+01	1.43
6	969.31	1935 -	1944	1938.08	2.30E+01	5.87	5.00E+00	1.63
7	1461.35	2916 -	2930	2922.77	2.08E+02	14.59	1.68E+00	1.81

M = First peak in a multiplet region

m = Other peak in a multiplet region

F = Fitted singlet

Errors quoted at 1.000sigma

No background subtract performed on this spectrum.

## NUCLIDE IDENTIFICATION REPORT

Nuclide Library Used : C:\Canberra\Apex\Root\Default\Library\ZION LIB-BNL.NLB

### IDENTIFIED NUCLIDES

Nuclide Name	Id Confidence	Energy (keV)	Yield(%)	Activity (pCi/grams)	Activity Uncertainty
K-40	0.95	1460.82	* 10.66	4.76E+00	3.92E-01
Cs-137	0.98	661.66	* 85.10	1.37E-01	1.97E-02
Tl-208	0.98	583.19	* 85.00	7.31E-02	1.53E-02
Pb-212	1.00	115.18	0.60		
		238.63	* 43.60	1.44E-01	3.04E-02
		300.09	3.30		
Bi-214	0.99	609.32	* 45.49	9.22E-02	2.85E-02
		768.36	4.89		
		806.18	1.26		
		934.06	3.11		

Analysis Report for 18-Apr-19-10043

L1-10213C- AJGS-011SS

<b>Nuclide Name</b>	<b>Id Confidence</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Activity Uncertainty</b>
Bi-214	0.99	1120.29	14.92		
		1155.21	1.63		
		1238.12	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		
		1661.27	1.05		
		1729.59	2.88		
		1764.49	15.30		
		1847.43	2.03		
		2118.51	1.16		
Pb-214	0.99	241.99	7.25		
		295.22	18.42		
		351.93 *	35.60	1.73E-01	3.26E-02
		785.96	1.06		
Ac-228	0.57	129.07	2.42		
		209.25	3.89		
		270.24	3.46		
		328.00	2.95		
		338.32	11.27		
		409.46	1.92		
		463.00	4.40		
		794.95	4.25		
		911.20	25.80		
		964.77	4.99		
		968.97 *	15.80	2.68E-01	6.93E-02
1588.20	3.22				

\* = Energy line found in the spectrum.

- = Manually added nuclide.

? = Manually edited nuclide.

@ = Energy line not used for Weighted Mean Activity

Energy Tolerance : 1.000 keV

Nuclide confidence index threshold = 0.30

Errors quoted at 1.000sigma

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**INTERFERENCE CORRECTED REPORT**

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Analysis Report for 18-Apr-19-10043

L1-10213C- AJGS-011SS

<b>Nuclide Name</b>	<b>Nuclide Id Confidence</b>	<b>Wt mean Activity (pCi/grams)</b>	<b>Wt mean Activity Uncertainty</b>	<b>Comments</b>
K-40	0.956	4.76E+00	3.92E-01	
Cs-137	0.985	1.37E-01	1.97E-02	
Tl-208	0.983	7.31E-02	1.53E-02	
Pb-212	1.000	1.44E-01	3.04E-02	
Bi-214	0.993	9.22E-02	2.85E-02	
Pb-214	0.998	1.73E-01	3.26E-02	
Ac-228	0.571	2.68E-01	6.93E-02	

- ? = 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 1.000sigma

Analysis Report for 18-Apr-19-10043

L1-10213C- AJGS-011SS

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**UNIDENTIFIED PEAKS**


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Peak Locate Performed on : 4/18/2019 12:57:17PM  
 Peak Locate From Channel : 120  
 Peak Locate To Channel : 4096

Peak No.	Energy (keV)	Peak Size (CPS)	Peak CPS (%) Uncertainty	Peak Type	Tolerance Nuclide
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All peaks were identified.

M = First peak in a multiplet region  
 m = Other peak in a multiplet region  
 F = Fitted singlet  
 Errors quoted at 1.000sigma

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**NUCLIDE MDA REPORT**


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Nuclide Library Used : C:\Canberra\Apex\Root\Default\Library\ZION LIB-BNL.NLB

Nuclide Name	Energy (keV)	Yield(%)	Activity (pCi/grams)	Nuclide MDA (pCi/grams)	Line MDA (pCi/grams)
An Pk	511.00	100.00	7.25E-02	5.72E-02	5.72E-02
BE-7	477.60	10.44	3.08E-03	4.10E-01	4.10E-01
+ K-40	1460.82	* 10.66	4.76E+00	2.31E-01	2.31E-01
Mn-54	834.85	99.98	1.66E-02	4.77E-02	4.77E-02
Co-60	1173.23	99.85	4.30E-02	5.53E-02	6.53E-02
	1332.49	99.98	2.37E-02		5.53E-02
Nb-94	702.65	99.81	-4.40E-03	3.87E-02	4.17E-02
	871.09	99.89	-8.71E-03		3.87E-02
Ag-108m	79.13	6.60	-3.51E-02	4.07E-02	1.08E+00
	433.94	90.50	-1.17E-03		4.07E-02
	614.28	89.80	-1.48E-02		5.82E-02
	722.94	90.80	-1.92E-02		4.75E-02
Sb-125	176.31	6.84	-1.19E-01	1.27E-01	4.77E-01
	380.45	1.52	7.02E-01		2.50E+00
	427.87	29.60	8.49E-03		1.27E-01
	463.36	10.49	2.21E-01		4.01E-01
	600.60	17.65	2.69E-03		2.13E-01
	606.71	4.98	8.40E-03		1.16E+00
	635.95	11.22	-6.12E-02		3.37E-01

Analysis Report for 18-Apr-19-10043

L1-10213C- AJGS-011SS

<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Nuclide MDA (pCi/grams)</b>	<b>Line MDA (pCi/grams)</b>
Sb-125	671.44	1.79	4.80E-01	1.27E-01	2.14E+00
Ba-133	79.61	2.65	-7.21E-01	7.16E-02	2.52E+00
	81.00	32.90	-7.63E-02		1.85E-01
	276.40	7.16	8.19E-02		4.63E-01
	302.85	18.34	4.52E-03		1.89E-01
	356.01	62.05	-2.13E-02		7.16E-02
	383.85	8.94	-1.17E-01		3.94E-01
Cs-134	475.36	1.48	2.12E+00	4.77E-02	3.04E+00
	563.25	8.34	-2.34E-01		4.31E-01
	569.33	15.37	5.29E-03		2.28E-01
	604.72	97.62	1.48E-03		4.89E-02
	795.86	85.46	2.84E-02		4.77E-02
	801.95	8.69	-5.96E-02		4.32E-01
	1038.61	0.99	-5.45E-01		4.63E+00
	1167.97	1.79	-1.37E+00		3.12E+00
	1365.19	3.02	3.65E-01		1.60E+00
+ Cs-137	661.66	* 85.10	1.37E-01	3.74E-02	3.74E-02
Eu-152	121.78	28.67	-1.37E-02	1.13E-01	1.13E-01
	244.70	7.61	-1.82E-01		4.96E-01
	295.94	0.45	4.19E+00		8.69E+00
	344.28	26.60	-7.44E-02		1.33E-01
	367.79	0.86	1.40E-01		4.18E+00
	411.12	2.24	1.14E-02		1.67E+00
	443.96	2.83	6.80E-01		1.35E+00
	488.68	0.42	1.24E+00		8.69E+00
	563.99	0.49	-2.33E+00		7.55E+00
	586.26	0.46	-7.10E-02		1.26E+01
	678.62	0.47	2.21E+00		9.02E+00
	688.67	0.86	-2.85E+00		4.03E+00
	719.35	0.28	-4.06E+00		1.33E+01
	778.90	12.96	3.64E-02		2.97E-01
	810.45	0.32	7.40E+00		1.31E+01
	867.37	4.26	-6.12E-01		8.32E-01
	919.33	0.43	-9.49E+00		1.03E+01
	964.08	14.65	-1.53E-01		3.48E-01
	1085.87	10.24	-7.62E-02		5.11E-01
	1089.74	1.73	-3.65E-02		2.91E+00
	1112.07	13.69	-2.31E-02		3.73E-01
	1212.95	1.43	-1.81E-01		3.47E+00
	1249.94	0.19	-5.47E+00		3.04E+01
	1299.14	1.63	-1.00E+00		2.68E+00
	1408.01	21.07	1.74E-02		2.11E-01
	1457.64	0.50	-3.39E+00		3.52E+01
	1528.10	0.28	-2.01E+00		1.12E+01
Eu-154	123.07	40.40	1.74E-02	8.28E-02	8.28E-02
	247.93	6.89	-8.98E-02		4.72E-01
	591.76	4.95	-2.35E-01		6.74E-01
	692.42	1.78	-4.32E-01		2.08E+00
	723.30	20.06	3.57E-02		2.31E-01
	756.80	4.52	4.08E-01		1.03E+00
	873.18	12.08	5.83E-03		3.20E-01



Analysis Report for 18-Apr-19-10043  
L1-10213C- AJGS-011SS

<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Nuclide MDA (pCi/grams)</b>	<b>Line MDA (pCi/grams)</b>
Eu-154	996.29	10.48	-3.94E-01	8.28E-02	3.94E-01
	1004.76	18.01	9.94E-02		2.54E-01
	1274.43	34.80	-1.11E-02		1.44E-01
	1596.48	1.80	3.01E-01		2.26E+00
Eu-155	45.30	1.31	5.67E+00	1.67E-01	1.11E+01
	60.01	1.22	-3.63E+00		1.07E+01
	86.55	30.70	-1.06E-02		1.67E-01
	105.31	21.10	5.18E-03		1.80E-01
Ra-226	186.21	3.64	7.11E-01	1.04E+00	1.04E+00
Pa-231	27.36	10.30	5.91E-01	1.11E+00	1.11E+00
	283.69	1.70	2.45E-01		1.97E+00
	300.07	2.47	-7.34E-01		1.44E+00
	302.65	2.20	3.77E-02		1.58E+00
	330.06	1.40	1.24E+00		2.60E+00
U-235	143.76	10.96	2.90E-02	6.45E-02	2.89E-01
	163.33	5.08	1.93E-02		6.64E-01
	185.71	57.20	2.61E-02		6.45E-02
	202.11	1.08	-1.09E+00		3.13E+00
	205.31	5.01	6.27E-02		7.16E-01
Am-241	59.54	35.90	-7.69E-02	3.82E-01	3.82E-01

+ = Nuclide identified during the nuclide identification

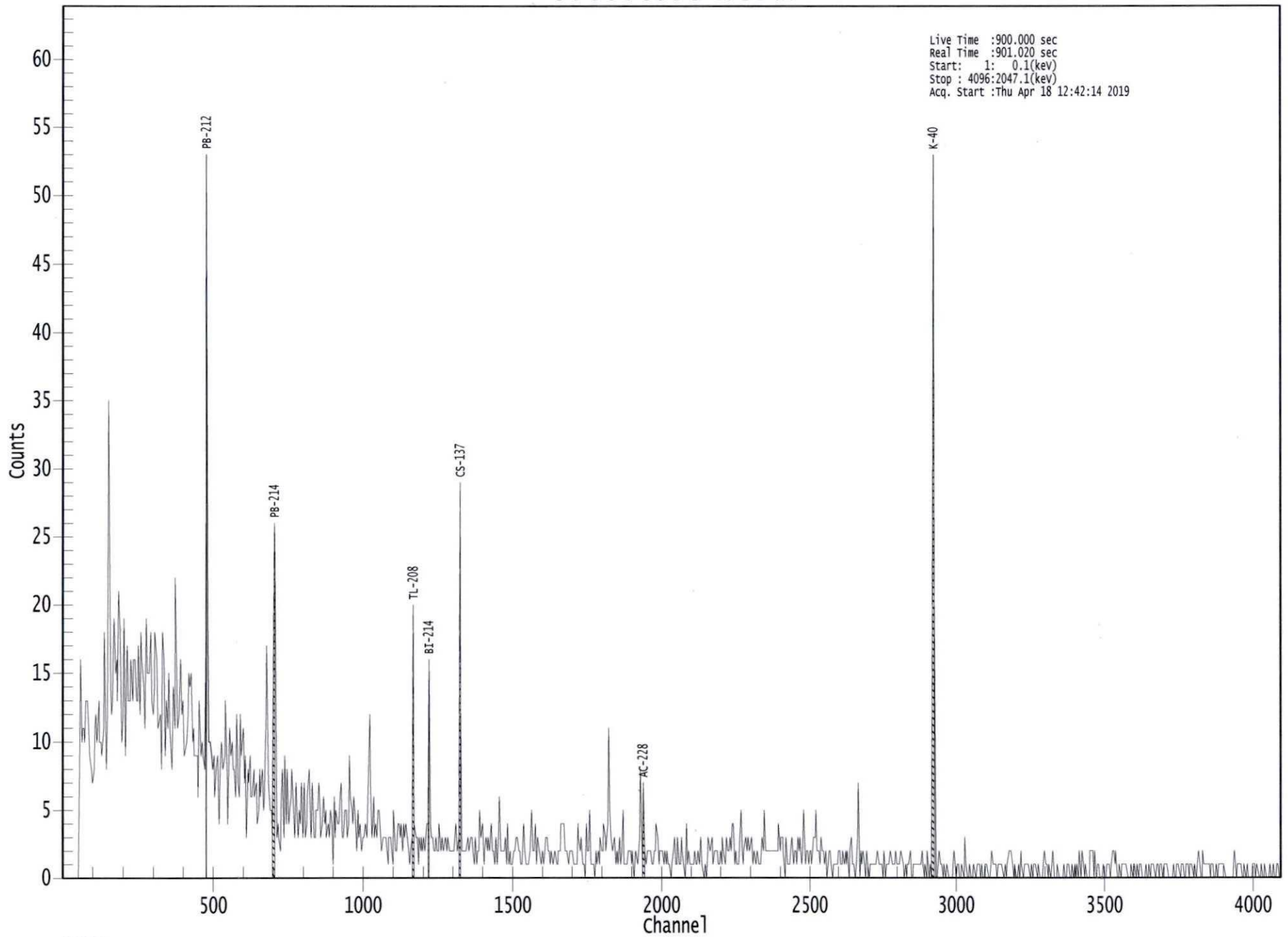
\* = Energy line found in the spectrum

> = MDA value not calculated


@ = Half-life too short to be able to perform the decay correction

? = CAUTION: MDA value is inconsistent with Currie MDA at 95% confidence level

0000065954.CNF



Live Time :900.000 sec  
Real Time :901.020 sec  
Start: 1: 0.1(keV)  
Stop : 4096:2047.1(keV)  
Acq. Start :Thu Apr 18 12:42:14 2019

 ROI Type: 1

Analysis Report for 18-Apr-19-10044  
L1-10213C- AJGS-012SS

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## GAMMA SPECTRUM ANALYSIS

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Sample Identification : 18-Apr-19-10044  
Sample Description : L1-10213C- AJGS-012SS  
Sample Type : Soil  
Unit :  
Sample Point :  
  
Sample Size : 1.104E+03 grams  
Facility : Default  
  
Sample Taken On : 4/17/2019 8:30:00AM  
Acquisition Started : 4/18/2019 12:42:22PM  
  
Procedure : 130G\_SOIL\_1  
Operator : Administrator  
Detector Name : P40818B  
Geometry : 130G\_SOIL\_1  
Live Time : 1800.0 seconds  
Real Time : 1802.9 seconds  
  
Dead Time : 0.16 %  
  
Peak Locate Threshold : 3.00  
Peak Locate Range (in channels) : 120 - 8192  
Peak Area Range (in channels) : 120 - 8192  
Identification Energy Tolerance : 1.000 keV  
  
Energy Calibration Used Done On : 1/29/2019  
Efficiency Calibration Used Done On : 4/18/2019  
Efficiency Calibration Description :  
  
Sample Number : 65955  
Fill Height : 1103.77 gram  
Certificate Name : Eu155-Na22  
Certificate Date : 1/30/2012 12:00:00PM

*atd*  
4-18-19  
  
*J.P. M.../*  
4-18-19

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## PEAK ANALYSIS REPORT

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Peak Analysis Performed on : 4/18/2019 2:39:27PM  
Peak Analysis From Channel : 120  
Peak Analysis To Channel : 8192

*J.M.H.*  
4-18-19

Analysis Report for 18-Apr-19-10044

L1-10213C- AJGS-012SS

Peak No.	Energy (keV)	ROI start	ROI end	Peak Centroid	Net Peak Area	Net Area Uncertainty	Continuum Counts	FWHM (keV)
1	77.26	306 -	315	309.75	3.71E+01	17.95	1.24E+02	0.70
2	238.61	947 -	959	954.55	2.46E+02	24.75	1.40E+02	1.00
3	295.29	1172 -	1186	1181.05	1.02E+02	18.78	8.72E+01	1.16
4	338.23	1348 -	1359	1352.69	4.50E+01	13.73	5.70E+01	0.31
5	351.92	1401 -	1415	1407.42	1.67E+02	18.90	6.61E+01	1.01
6	582.99	2325 -	2336	2331.19	8.00E+01	12.75	3.30E+01	1.26
7	609.17	2429 -	2445	2435.86	1.34E+02	14.88	2.82E+01	1.22
8	661.60	2637 -	2655	2645.50	3.99E+02	22.85	3.59E+01	1.36
9	910.90	3635 -	3650	3642.55	5.11E+01	10.24	1.79E+01	1.17
10	1172.67	4683 -	4697	4689.86	4.04E+01	10.00	2.06E+01	1.49
11	1332.45	5323 -	5335	5329.29	2.59E+01	8.27	1.61E+01	0.31
12	1460.54	5829 -	5854	5841.99	4.63E+02	22.45	9.66E+00	1.99
13	1764.50	7052 -	7065	7058.99	1.60E+01	5.94	7.00E+00	0.29

M = First peak in a multiplet region  
m = Other peak in a multiplet region  
F = Fitted singlet  
Errors quoted at 1.000sigma

No background subtract performed on this spectrum.

## NUCLIDE IDENTIFICATION REPORT

Nuclide Library Used : C:\Canberra\Apex\Root\Default\Library\ZION LIB-BNL.NLB

### IDENTIFIED NUCLIDES

Nuclide Name	Id Confidence	Energy (keV)		Yield(%)	Activity (pCi/grams)	Activity Uncertainty
K-40	0.98	1460.82	*	10.66	6.55E+00	4.26E-01
Co-60	0.97	1173.23	*	99.85	5.22E-02	1.31E-02
		1332.49	*	99.98	3.63E-02	1.17E-02
Cs-137	0.99	661.66	*	85.10	4.06E-01	3.36E-02

Analysis Report for 18-Apr-19-10044

L1-10213C- AJGS-012SS

<b>Nuclide Name</b>	<b>Id Confidence</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Activity Uncertainty</b>
Tl-208	0.99	583.19 *	85.00	7.45E-02	1.27E-02
Pb-212	1.00	115.18	0.60		
		238.63 *	43.60	2.42E-01	3.11E-02
		300.09	3.30		
Pb212-XR	0.99	74.82	10.28		
		77.11 *	17.10	2.38E-01	1.18E-01
		87.35	3.97		
		89.78	1.46		
Bi-214	0.99	609.32 *	45.49	2.40E-01	3.03E-02
		768.36	4.89		
		806.18	1.26		
		934.06	3.11		
		1120.29	14.92		
		1155.21	1.63		
		1238.12	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		
		1661.27	1.05		
		1729.59	2.88		
		1764.49 *	15.30	1.83E-01	6.83E-02
		1847.43	2.03		
		2118.51	1.16		
Pb-214	1.00	241.99	7.25		
		295.22 *	18.42	2.67E-01	5.37E-02
		351.93 *	35.60	2.58E-01	3.58E-02
		785.96	1.06		
Pb214-XR	0.99	74.82	5.80		
		77.11 *	9.70	4.20E-01	2.09E-01
		87.35	2.24		
		89.78	0.82		
Ac-228	0.99	129.07	2.42		
		209.25	3.89		
		270.24	3.46		
		328.00	2.95		
		338.32 *	11.27	2.14E-01	6.74E-02
		409.46	1.92		
		463.00	4.40		
		794.95	4.25		
		911.20 *	25.80	2.14E-01	4.39E-02
		964.77	4.99		
		968.97	15.80		
		1588.20	3.22		

Analysis Report for 18-Apr-19-10044

L1-10213C- AJGS-012SS

\* = Energy line found in the spectrum.  
 - = Manually added nuclide.  
 ? = Manually edited nuclide.  
 @ = Energy line not used for Weighted Mean Activity  
 Energy Tolerance : 1.000 keV  
 Nuclide confidence index threshold = 0.30  
 Errors quoted at 1.000sigma

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## INTERFERENCE CORRECTED REPORT

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<b>Nuclide Name</b>	<b>Nuclide Id Confidence</b>	<b>Wt mean Activity (pCi/grams)</b>	<b>Wt mean Activity Uncertainty</b>	<b>Comments</b>
K-40	0.987	6.55E+00	4.26E-01	
Co-60	0.975	4.33E-02	8.72E-03	
Cs-137	0.999	4.06E-01	3.36E-02	
Tl-208	0.994	7.45E-02	1.27E-02	
X Bi-211	0.890			
Pb-212	1.000	2.42E-01	3.11E-02	
? Pb212-XR	0.998	2.38E-01	1.18E-01	
Bi-214	0.999	2.31E-01	2.77E-02	
Pb-214	1.000	2.61E-01	2.98E-02	
? Pb214-XR	0.998	4.20E-01	2.09E-01	
Ac-228	0.995	2.14E-01	3.68E-02	

? = 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 1.000sigma

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Analysis Report for 18-Apr-19-10044

L1-10213C- AJGS-012SS

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**UNIDENTIFIED PEAKS**


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Peak Locate Performed on : 4/18/2019 2:39:27PM  
 Peak Locate From Channel : 120  
 Peak Locate To Channel : 8192

<b>Peak No.</b>	<b>Energy (keV)</b>	<b>Peak Size (CPS)</b>	<b>Peak CPS (%) Uncertainty</b>	<b>Peak Type</b>	<b>Tolerance Nuclide</b>
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All peaks were identified.

M = First peak in a multiplet region  
 m = Other peak in a multiplet region  
 F = Fitted singlet  
 Errors quoted at 1.000sigma

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**NUCLIDE MDA REPORT**


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Nuclide Library Used : C:\Canberra\Apex\Root\Default\Library\ZION LIB-BNL.NLB

<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Nuclide MDA (pCi/grams)</b>	<b>Line MDA (pCi/grams)</b>
An Pk	511.00	100.00	9.22E-02	5.16E-02	5.16E-02
BE-7	477.60	10.44	-5.02E-02	4.01E-01	4.01E-01
+ K-40	1460.82	* 10.66	6.55E+00	3.47E-01	3.47E-01
Mn-54	834.85	99.98	-1.68E-02	4.11E-02	4.11E-02
+ Co-60	1173.23	* 99.85	5.22E-02	3.51E-02	3.75E-02
	1332.49	* 99.98	3.63E-02		3.51E-02
Nb-94	702.65	99.81	-2.07E-02	3.59E-02	3.59E-02
	871.09	99.89	-3.09E-02		3.59E-02
Ag-108m	79.13	6.60	1.56E-01	3.69E-02	1.28E+00
	433.94	90.50	8.86E-04		3.69E-02
	614.28	89.80	-1.58E-02		4.73E-02
	722.94	90.80	4.69E-02		4.77E-02
Sb-125	176.31	6.84	-6.42E-02	1.10E-01	4.40E-01
	380.45	1.52	2.31E-01		2.22E+00
	427.87	29.60	-2.44E-02		1.10E-01
	463.36	10.49	-3.43E-02		3.45E-01
	600.60	17.65	-2.18E-02		2.13E-01
	606.71	4.98	-3.42E-01		1.19E+00
	635.95	11.22	4.84E-02		3.27E-01

Analysis Report for 18-Apr-19-10044

L1-10213C- AJGS-012SS

<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Nuclide MDA (pCi/grams)</b>	<b>Line MDA (pCi/grams)</b>
Sb-125	671.44	1.79	1.61E+00	1.10E-01	1.97E+00
Ba-133	79.61	2.65	8.54E-01	6.59E-02	3.07E+00
	81.00	32.90	-7.23E-02		2.13E-01
	276.40	7.16	1.95E-02		4.42E-01
	302.85	18.34	-4.14E-02		1.69E-01
	356.01	62.05	1.13E-02		6.59E-02
	383.85	8.94	-5.21E-02		3.71E-01
Cs-134	475.36	1.48	2.14E+00	3.95E-02	2.83E+00
	563.25	8.34	-4.74E-04		4.56E-01
	569.33	15.37	5.26E-02		2.31E-01
	604.72	97.62	-1.36E-02		5.70E-02
	795.86	85.46	4.90E-03		3.95E-02
	801.95	8.69	1.53E-01		3.91E-01
	1038.61	0.99	1.30E-01		4.07E+00
	1167.97	1.79	-4.56E-01		3.51E+00
	1365.19	3.02	5.22E-01		1.08E+00
+ Cs-137	661.66	* 85.10	4.06E-01	4.11E-02	4.11E-02
Eu-152	121.78	28.67	-4.42E-02	1.12E-01	1.19E-01
	244.70	7.61	-2.15E-02		4.47E-01
	295.94	0.45	7.47E+00		8.72E+00
	344.28	26.60	6.09E-03		1.12E-01
	367.79	0.86	-2.06E+00		3.62E+00
	411.12	2.24	1.23E+00		1.59E+00
	443.96	2.83	3.08E-01		1.24E+00
	488.68	0.42	-1.43E+00		7.92E+00
	563.99	0.49	-1.80E+00		7.66E+00
	586.26	0.46	-1.33E+01		1.13E+01
	678.62	0.47	-1.45E+00		6.27E+00
	688.67	0.86	1.93E+00		4.08E+00
	719.35	0.28	4.93E-01		1.35E+01
	778.90	12.96	3.86E-02		2.85E-01
	810.45	0.32	5.34E+00		1.13E+01
	867.37	4.26	-1.92E-01		8.75E-01
	919.33	0.43	2.46E+00		9.27E+00
	964.08	14.65	1.61E-01		3.92E-01
	1085.87	10.24	1.10E-02		4.09E-01
	1089.74	1.73	-9.73E-01		2.48E+00
	1112.07	13.69	1.77E-01		3.74E-01
	1212.95	1.43	2.02E+00		3.83E+00
	1249.94	0.19	1.21E+01		2.57E+01
	1299.14	1.63	8.91E-01		2.69E+00
	1408.01	21.07	-3.10E-02		1.73E-01
	1457.64	0.50	1.41E+02		3.25E+01
	1528.10	0.28	7.38E+00		1.38E+01
Eu-154	123.07	40.40	-2.60E-04	8.35E-02	8.35E-02
	247.93	6.89	-7.12E-02		4.23E-01
	591.76	4.95	2.57E-01		7.82E-01
	692.42	1.78	5.44E-01		2.26E+00
	723.30	20.06	2.10E-01		2.17E-01
	756.80	4.52	-4.20E-01		8.21E-01
	873.18	12.08	-9.43E-02		2.85E-01



Analysis Report for 18-Apr-19-10044

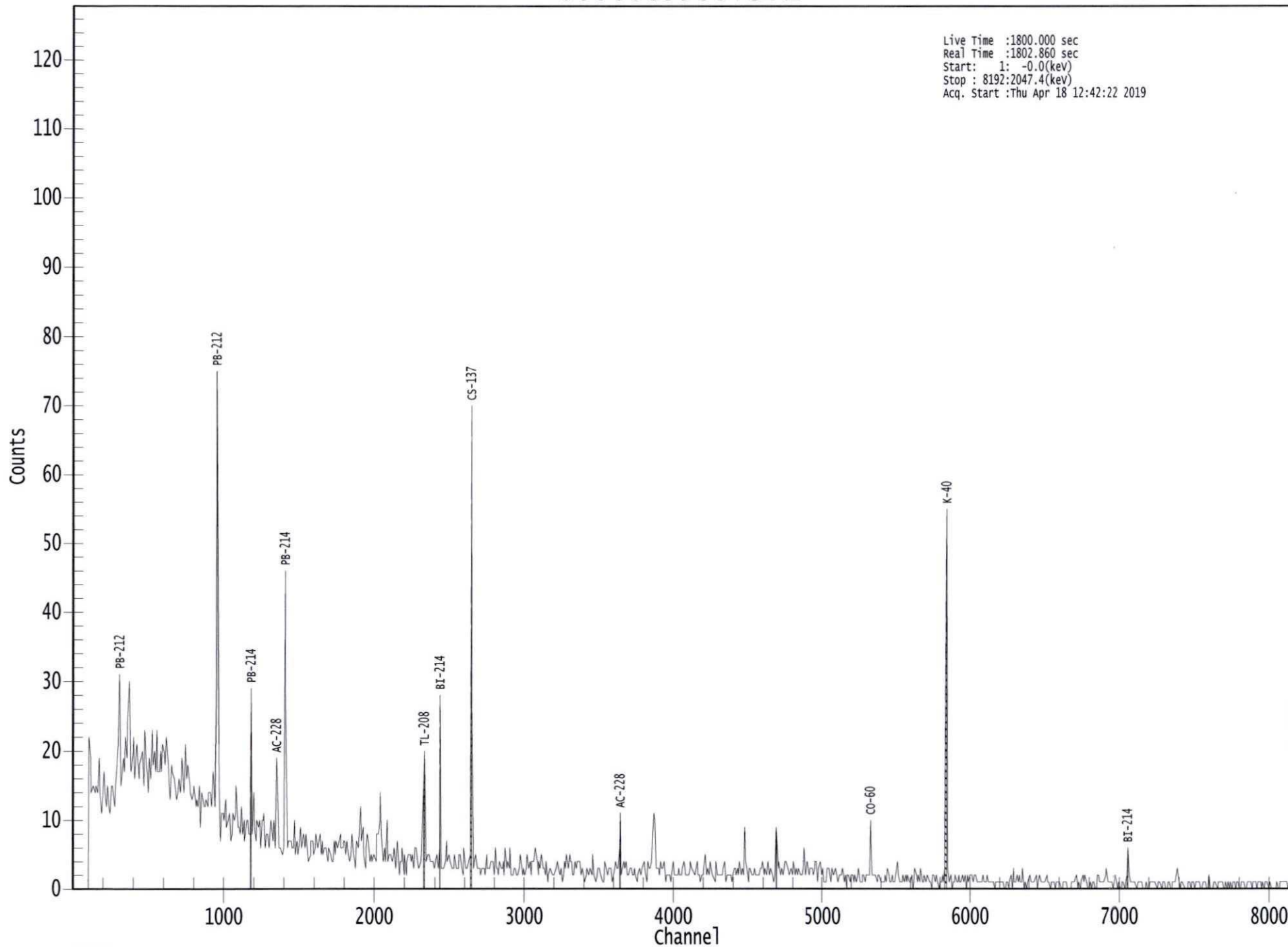
L1-10213C- AJGS-012SS

<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Nuclide MDA (pCi/grams)</b>	<b>Line MDA (pCi/grams)</b>
Eu-154	996.29	10.48	1.10E-02	8.35E-02	3.89E-01
	1004.76	18.01	1.29E-02		2.30E-01
	1274.43	34.80	1.49E-02		1.38E-01
	1596.48	1.80	-9.86E-01		1.62E+00
Eu-155	45.30	1.31	6.22E+00	2.13E-01	2.37E+01
	60.01	1.22	-4.25E+00		2.34E+01
	86.55	30.70	1.71E-02		2.13E-01
	105.31	21.10	4.68E-02		2.14E-01
Ra-226	186.21	3.64	6.63E-01	9.25E-01	9.25E-01
Pa-231	27.36	10.30	2.59E+00	1.26E+00	2.80E+00
	283.69	1.70	7.52E-02		1.81E+00
	300.07	2.47	-7.77E-01		1.26E+00
	302.65	2.20	-3.70E-01		1.40E+00
	330.06	1.40	2.23E+00		2.49E+00
U-235	143.76	10.96	-1.45E-01	5.87E-02	2.99E-01
	163.33	5.08	3.81E-01		6.28E-01
	185.71	57.20	4.79E-02		5.87E-02
	202.11	1.08	6.38E-01		2.86E+00
	205.31	5.01	-5.64E-01		5.81E-01
Am-241	59.54	35.90	3.21E-01	8.55E-01	8.55E-01

- + = 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  
 ? = CAUTION: MDA value is inconsistent with Currie MDA at 95% confidence level

000065955.CNF

Live Time :1800.000 sec  
Real Time :1802.860 sec  
Start: 1: -0.0(keV)  
Stop : 8192:2047.4(keV)  
Acq. Start :Thu Apr 18 12:42:22 2019



ROI Type: 1

Analysis Report for 18-Apr-19-10045  
L1-10213C- AJGS-013SS

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## GAMMA SPECTRUM ANALYSIS

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Sample Identification : 18-Apr-19-10045  
Sample Description : L1-10213C- AJGS-013SS  
Sample Type : Soil  
Unit :  
Sample Point :  
  
Sample Size : 1.006E+03 grams  
Facility : Default  
  
Sample Taken On : 4/17/2019 8:35:00AM  
Acquisition Started : 4/18/2019 12:42:33PM  
  
Procedure : 130G\_SOIL\_1  
Operator : Administrator  
Detector Name : P11314  
Geometry : 130G\_SOIL\_1  
Live Time : 900.0 seconds  
Real Time : 900.3 seconds  
  
Dead Time : 0.03 %  
  
Peak Locate Threshold : 3.00  
Peak Locate Range (in channels) : 120 - 8192  
Peak Area Range (in channels) : 120 - 8192  
Identification Energy Tolerance : 1.000 keV  
  
Energy Calibration Used Done On : 1/24/2019  
Efficiency Calibration Used Done On : 4/18/2019  
Efficiency Calibration Description :  
  
Sample Number : 65956  
Fill Height : 1005.93 gram  
Certificate Name : Eu155-Na22  
Certificate Date : 12/22/2008 12:00:00PM

*at*  
4-18-19  
*J.P. M...*  
4-18-19

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## PEAK ANALYSIS REPORT

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Peak Analysis Performed on : 4/18/2019 12:57:35PM  
Peak Analysis From Channel : 120  
Peak Analysis To Channel : 8192

*J.M.*  
4-18-19

Analysis Report for 18-Apr-19-10045

L1-10213C- AJGS-013SS

Peak No.	Energy (keV)	ROI start	ROI end	Peak Centroid	Net Peak Area	Net Area Uncertainty	Continuum Counts	FWHM (keV)
1	77.28	306 -	316	309.67	9.74E+01	19.34	1.15E+02	1.01
2	238.74	946 -	962	954.54	3.15E+02	27.10	1.33E+02	0.98
3	295.27	1173 -	1187	1180.37	1.02E+02	15.88	5.23E+01	0.96
4	338.40	1345 -	1361	1352.67	9.17E+01	14.15	3.43E+01	1.20
5	351.88	1397 -	1414	1406.53	1.65E+02	17.83	4.71E+01	1.13
6	583.10	2323 -	2339	2330.53	9.65E+01	13.07	2.35E+01	1.33
7	609.31	2426 -	2442	2435.28	1.40E+02	13.86	1.67E+01	1.16
8	911.13	3634 -	3650	3641.97	6.98E+01	11.40	1.92E+01	1.40
9	968.63	3866 -	3880	3871.94	5.38E+01	8.28	5.17E+00	0.48
10	1460.57	5827 -	5852	5840.24	4.88E+02	22.69	6.44E+00	1.84
11	1763.97	7048 -	7061	7054.94	1.47E+01	5.44	5.31E+00	0.70

M = First peak in a multiplet region

m = Other peak in a multiplet region

F = Fitted singlet

Errors quoted at 1.000sigma

No background subtract performed on this spectrum.

## NUCLIDE IDENTIFICATION REPORT

Nuclide Library Used : C:\Canberra\Apex\Root\Default\Library\ZION LIB-BNL.NLB

### IDENTIFIED NUCLIDES

Nuclide Name	Id Confidence	Energy (keV)	Yield(%)	Activity (pCi/grams)	Activity Uncertainty
K-40	0.99	1460.82	* 10.66	1.30E+01	8.27E-01
Tl-208	0.99	583.19	* 85.00	1.69E-01	2.50E-02
Pb-212	0.99	115.18	0.60		
		238.63	* 43.60	5.70E-01	6.73E-02
		300.09	3.30		
Pb212-XR	0.99	74.82	10.28		

Analysis Report for 18-Apr-19-10045

L1-10213C- AJGS-013SS

<b>Nuclide Name</b>	<b>Id Confidence</b>	<b>Energy (keV)</b>		<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Activity Uncertainty</b>
Pb212-XR	0.99	77.11	*	17.10	7.45E-01	1.66E-01
		87.35		3.97		
		89.78		1.46		
Bi-214	0.99	609.32	*	45.49	4.74E-01	5.48E-02
		768.36		4.89		
		806.18		1.26		
		934.06		3.11		
		1120.29		14.92		
		1155.21		1.63		
		1238.12		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		
		1661.27		1.05		
		1729.59		2.88		
		1764.49	*	15.30	3.17E-01	1.18E-01
		1847.43		2.03		
		2118.51		1.16		
Pb-214	1.00	241.99		7.25		
		295.22	*	18.42	4.98E-01	8.73E-02
		351.93	*	35.60	4.78E-01	6.42E-02
		785.96		1.06		
Pb214-XR	0.99	74.82		5.80		
		77.11	*	9.70	1.31E+00	3.00E-01
		87.35		2.24		
		89.78		0.82		
Ac-228	0.99	129.07		2.42		
		209.25		3.89		
		270.24		3.46		
		328.00		2.95		
		338.32	*	11.27	8.14E-01	1.42E-01
		409.46		1.92		
		463.00		4.40		
		794.95		4.25		
		911.20	*	25.80	5.52E-01	9.31E-02
		964.77		4.99		
		968.97	*	15.80	7.25E-01	1.16E-01
		1588.20		3.22		

\* = Energy line found in the spectrum.

- = Manually added nuclide.

? = Manually edited nuclide.

@ = Energy line not used for Weighted Mean Activity

Energy Tolerance : 1.000 keV

Nuclide confidence index threshold = 0.30

Errors quoted at 1.000sigma

Analysis Report for 18-Apr-19-10045

L1-10213C- AJGS-013SS

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## INTERFERENCE CORRECTED REPORT

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<b>Nuclide Name</b>	<b>Nuclide Id Confidence</b>	<b>Wt mean Activity (pCi/grams)</b>	<b>Wt mean Activity Uncertainty</b>	<b>Comments</b>
	0.990	1.30E+01	8.27E-01	
	0.999	1.69E-01	2.50E-02	
X Bi-211	0.900			
	0.998	5.70E-01	6.73E-02	
? Pb-212	0.997	7.45E-01	1.66E-01	
	0.994	4.46E-01	4.97E-02	
	1.000	4.85E-01	5.17E-02	
? Pb-214	0.997	1.31E+00	3.00E-01	
	0.996	6.60E-01	6.47E-02	

? = 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 1.000sigma

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Analysis Report for 18-Apr-19-10045  
L1-10213C- AJGS-013SS

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## UNIDENTIFIED PEAKS

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Peak Locate Performed on : 4/18/2019 12:57:35PM  
Peak Locate From Channel : 120  
Peak Locate To Channel : 8192

Peak No.	Energy (keV)	Peak Size (CPS)	Peak CPS (%) Uncertainty	Peak Type	Tolerance Nuclide
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All peaks were identified.

M = First peak in a multiplet region  
m = Other peak in a multiplet region  
F = Fitted singlet  
Errors quoted at 1.000sigma

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## NUCLIDE MDA REPORT

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Nuclide Library Used : C:\Canberra\Apex\Root\Default\Library\ZION LIB-BNL.NLB

Nuclide Name	Energy (keV)	Yield(%)	Activity (pCi/grams)	Nuclide MDA (pCi/grams)	Line MDA (pCi/grams)
An Pk	511.00	100.00	9.56E-02	7.80E-02	7.80E-02
BE-7	477.60	10.44	2.08E-01	5.67E-01	5.67E-01
+ K-40	1460.82	* 10.66	1.30E+01	5.49E-01	5.49E-01
Mn-54	834.85	99.98	-4.17E-02	6.45E-02	6.45E-02
Co-60	1173.23	99.85	-3.34E-02	7.48E-02	8.51E-02
	1332.49	99.98	2.48E-02		7.48E-02
Nb-94	702.65	99.81	-4.81E-02	5.96E-02	5.96E-02
	871.09	99.89	1.51E-02		6.09E-02
Ag-108m	79.13	6.60	-2.92E-01	5.32E-02	1.57E+00
	433.94	90.50	-3.66E-02		5.32E-02
	614.28	89.80	-7.30E-02		8.83E-02
	722.94	90.80	-7.14E-03		8.20E-02
Sb-125	176.31	6.84	5.30E-01	1.65E-01	6.20E-01
	380.45	1.52	-1.60E+00		2.80E+00
	427.87	29.60	-4.59E-02		1.65E-01
	463.36	10.49	2.68E-01		4.71E-01
	600.60	17.65	1.54E-01		3.05E-01
	606.71	4.98	4.25E+00		2.07E+00
	635.95	11.22	1.20E-01		4.85E-01

Analysis Report for 18-Apr-19-10045

L1-10213C- AJGS-013SS

<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Nuclide MDA (pCi/grams)</b>	<b>Line MDA (pCi/grams)</b>
Sb-125	671.44	1.79	-5.29E-01	1.65E-01	3.16E+00
Ba-133	79.61	2.65	-7.11E-01	9.03E-02	3.82E+00
	81.00	32.90	-3.14E-01		2.33E-01
	276.40	7.16	1.86E-01		6.11E-01
	302.85	18.34	7.64E-02		2.49E-01
	356.01	62.05	-1.42E-02		9.03E-02
	383.85	8.94	1.94E-01		4.82E-01
Cs-134	475.36	1.48	-1.06E+00	7.20E-02	3.87E+00
	563.25	8.34	-1.32E+00		6.41E-01
	569.33	15.37	-1.31E-01		3.37E-01
	604.72	97.62	-2.46E-02		8.58E-02
	795.86	85.46	2.13E-02		7.20E-02
	801.95	8.69	6.29E-01		7.52E-01
	1038.61	0.99	-2.95E+00		7.75E+00
	1167.97	1.79	1.43E+00		5.06E+00
	1365.19	3.02	-1.17E+00		2.18E+00
Cs-137	661.66	85.10	6.36E-02	8.86E-02	8.86E-02
Eu-152	121.78	28.67	-1.23E-02	1.51E-01	1.53E-01
	244.70	7.61	2.11E-01		6.83E-01
	295.94	0.45	1.29E+01		1.42E+01
	344.28	26.60	-9.42E-02		1.51E-01
	367.79	0.86	8.66E-01		5.28E+00
	411.12	2.24	1.69E+00		2.23E+00
	443.96	2.83	-4.56E-01		1.87E+00
	488.68	0.42	-2.37E+00		1.17E+01
	563.99	0.49	-1.08E+01		1.10E+01
	586.26	0.46	-5.61E+00		1.98E+01
	678.62	0.47	-8.30E+00		1.27E+01
	688.67	0.86	-3.87E+00		6.55E+00
	719.35	0.28	4.21E-01		2.42E+01
	778.90	12.96	1.30E-01		4.67E-01
	810.45	0.32	2.35E+00		1.80E+01
	867.37	4.26	-4.29E-01		1.42E+00
	919.33	0.43	-1.91E+01		1.44E+01
	964.08	14.65	-1.01E-01		6.89E-01
	1085.87	10.24	-5.85E-02		7.38E-01
	1089.74	1.73	8.50E-01		4.22E+00
	1112.07	13.69	1.45E-01		5.80E-01
	1212.95	1.43	2.48E+00		6.46E+00
	1249.94	0.19	-2.31E+01		4.24E+01
	1299.14	1.63	-1.00E+00		4.80E+00
	1408.01	21.07	8.24E-02		2.73E-01
	1457.64	0.50	2.73E+02		6.23E+01
	1528.10	0.28	1.04E+01		1.88E+01
Eu-154	123.07	40.40	6.02E-02	1.10E-01	1.10E-01
	247.93	6.89	-2.08E-01		5.73E-01
	591.76	4.95	-2.80E-01		1.02E+00
	692.42	1.78	4.33E+00		3.48E+00
	723.30	20.06	5.55E-02		3.71E-01
	756.80	4.52	1.05E+00		1.48E+00
	873.18	12.08	-2.73E-01		5.11E-01



Analysis Report for 18-Apr-19-10045

L1-10213C- AJGS-013SS

<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Nuclide MDA (pCi/grams)</b>	<b>Line MDA (pCi/grams)</b>
Eu-154	996.29	10.48	-1.17E-01	1.10E-01	7.26E-01
	1004.76	18.01	-5.14E-02		3.93E-01
	1274.43	34.80	-1.16E-01		2.15E-01
	1596.48	1.80	-2.21E+00		3.06E+00
Eu-155	45.30	1.31	6.83E-01	2.50E-01	1.56E+01
	60.01	1.22	-9.47E+00		1.58E+01
	86.55	30.70	1.01E-01		2.58E-01
	105.31	21.10	-7.03E-03		2.50E-01
Ra-226	186.21	3.64	1.27E+00	1.39E+00	1.39E+00
Pa-231	27.36	10.30	1.92E+00	1.72E+00	1.72E+00
	283.69	1.70	-9.69E-01		2.27E+00
	300.07	2.47	2.91E-01		1.82E+00
	302.65	2.20	2.16E-01		2.01E+00
	330.06	1.40	-1.52E+00		3.55E+00
	U-235	143.76	10.96		-2.69E-02
U-235	163.33	5.08	9.46E-02	8.74E-02	8.27E-01
	185.71	57.20	7.23E-02		8.74E-02
	202.11	1.08	1.13E+00		3.88E+00
	205.31	5.01	-1.17E-01		8.25E-01
Am-241	59.54	35.90	-9.55E-02	5.62E-01	5.62E-01

+ = Nuclide identified during the nuclide identification

\* = Energy line found in the spectrum

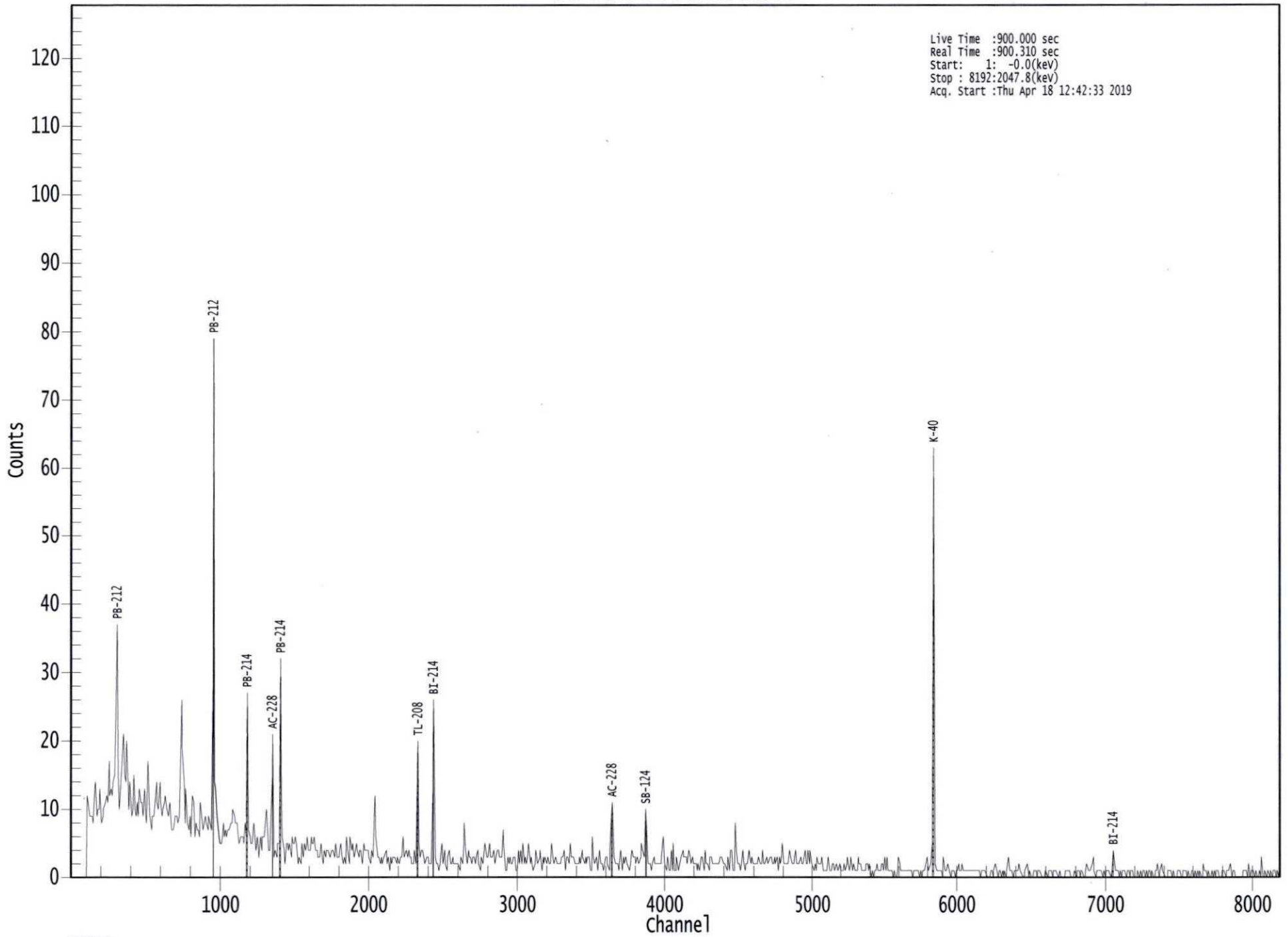
&gt; = MDA value not calculated

@ = Half-life too short to be able to perform the decay correction

? = CAUTION: MDA value is inconsistent with Currie MDA at 95% confidence level

000065956.CNF

Live Time :900.000 sec  
Real Time :900.310 sec  
Start: 1: -0.0(keV)  
Stop : 8192:2047.8(keV)  
Acq. Start :Thu Apr 18 12:42:33 2019



 ROI Type: 1

Analysis Report for 18-Apr-19-10046  
L1-10213C- AJGS-014SS

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## GAMMA SPECTRUM ANALYSIS

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Sample Identification : 18-Apr-19-10046  
Sample Description : L1-10213C- AJGS-014SS  
Sample Type : Soil  
Unit :  
Sample Point :  
  
Sample Size : 1.106E+03 grams  
Facility : Default  
  
Sample Taken On : 4/17/2019 8:40:00AM  
Acquisition Started : 4/18/2019 12:42:45PM  
  
Procedure : 130G\_SOIL\_1  
Operator : Administrator  
Detector Name : 352  
Geometry : 130G\_SOIL\_1  
Live Time : 900.0 seconds  
Real Time : 900.4 seconds  
  
Dead Time : 0.05 %  
  
Peak Locate Threshold : 3.00  
Peak Locate Range (in channels) : 120 - 8192  
Peak Area Range (in channels) : 120 - 8192  
Identification Energy Tolerance : 1.000 keV  
  
Energy Calibration Used Done On : 9/29/2018  
Efficiency Calibration Used Done On : 4/18/2019  
Efficiency Calibration Description :  
  
Sample Number : 65957  
Fill Height : 1106.16 gram  
Certificate Name : Eu155-Na22  
Certificate Date : 1/7/2013 12:00:00PM

*at*  
4-18-19  
*H. W. White*  
4-18-19

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## PEAK ANALYSIS REPORT

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Peak Analysis Performed on : 4/18/2019 12:57:47PM  
Peak Analysis From Channel : 120  
Peak Analysis To Channel : 8192

*JML*  
4-18-19

Analysis Report for 18-Apr-19-10046

L1-10213C- AJGS-014SS

	Peak No.	Energy (keV)	ROI start	ROI end	Peak Centroid	Net Peak Area	Net Area Uncertainty	Continuum Counts	FWHM (keV)
M	1	74.95	294 -	317	301.11	5.53E+01	19.22	9.54E+01	0.88
m	2	77.14	294 -	317	309.85	7.74E+01	25.22	8.12E+01	0.88
	3	238.64	950 -	961	955.04	2.39E+02	21.85	9.32E+01	1.02
	4	295.13	1173 -	1188	1180.75	1.18E+02	15.82	4.40E+01	0.84
	5	338.31	1349 -	1361	1353.27	5.14E+01	12.44	3.86E+01	0.97
	6	351.89	1401 -	1415	1407.55	1.51E+02	15.85	3.53E+01	1.05
	7	583.26	2326 -	2339	2332.34	8.30E+01	12.22	2.40E+01	1.03
	8	609.29	2427 -	2445	2436.45	1.60E+02	14.92	1.85E+01	0.91
	9	662.04	2643 -	2655	2647.34	3.44E+01	9.56	2.06E+01	0.35
	10	911.11	3636 -	3651	3643.47	6.30E+01	11.64	2.40E+01	0.87
	11	968.84	3866 -	3884	3874.43	5.15E+01	9.15	9.50E+00	0.53
	12	1120.78	4477 -	4489	4482.41	2.80E+01	8.54	1.70E+01	1.18
	13	1460.74	5830 -	5857	5843.31	4.97E+02	23.22	9.79E+00	1.40

M = First peak in a multiplet region

m = Other peak in a multiplet region

F = Fitted singlet

Errors quoted at 1.000sigma

No background subtract performed on this spectrum.

## NUCLIDE IDENTIFICATION REPORT

Nuclide Library Used : C:\Canberra\Apex\Root\Default\Library\ZION LIB-BNL.NLB

### IDENTIFIED NUCLIDES

Nuclide Name	Id Confidence	Energy (keV)	Yield(%)	Activity (pCi/grams)	Activity Uncertainty
K-40	0.99	1460.82	* 10.66	1.17E+01	7.46E-01
Cs-137	0.97	661.66	* 85.10	5.90E-02	1.68E-02
Tl-208	0.99	583.19	* 85.00	1.31E-01	2.09E-02
Pb-212	1.00	115.18	0.60		

Analysis Report for 18-Apr-19-10046

L1-10213C- AJGS-014SS

<b>Nuclide Name</b>	<b>Id Confidence</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Activity Uncertainty</b>
Pb-212	1.00	238.63 *	43.60	4.06E-01	4.96E-02
		300.09	3.30		
Pb212-XR	0.99	74.82 *	10.28	1.01E+00	3.66E-01
		77.11 *	17.10	7.65E-01	2.61E-01
		87.35	3.97		
		89.78	1.46		
Bi-214	0.82	609.32 *	45.49	4.88E-01	5.40E-02
		768.36	4.89		
		806.18	1.26		
		934.06	3.11		
		1120.29 *	14.92	3.92E-01	1.20E-01
		1155.21	1.63		
		1238.12	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		
		1661.27	1.05		
		1729.59	2.88		
		1764.49	15.30		
		1847.43	2.03		
		2118.51	1.16		
Pb-214	0.99	241.99	7.25		
		295.22 *	18.42	5.36E-01	8.36E-02
		351.93 *	35.60	4.01E-01	5.31E-02
		785.96	1.06		
Ac-228	0.99	129.07	2.42		
		209.25	3.89		
		270.24	3.46		
		328.00	2.95		
		338.32 *	11.27	4.20E-01	1.07E-01
		409.46	1.92		
		463.00	4.40		
		794.95	4.25		
		911.20 *	25.80	4.43E-01	8.40E-02
		964.77	4.99		
		968.97 *	15.80	6.17E-01	1.13E-01
		1588.20	3.22		

\* = Energy line found in the spectrum.

- = Manually added nuclide.

? = Manually edited nuclide.

@ = Energy line not used for Weighted Mean Activity

Energy Tolerance : 1.000 keV

Nuclide confidence index threshold = 0.30

Errors quoted at 1.000sigma

Analysis Report for 18-Apr-19-10046

L1-10213C- AJGS-014SS

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## INTERFERENCE CORRECTED REPORT

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<b>Nuclide Name</b>	<b>Nuclide Id Confidence</b>	<b>Wt mean Activity (pCi/grams)</b>	<b>Wt mean Activity Uncertainty</b>	<b>Comments</b>
K-40	0.999	1.17E+01	7.46E-01	
Cs-137	0.977	5.90E-02	1.68E-02	
Tl-208	0.999	1.31E-01	2.09E-02	
X Bi-211	0.898			
Pb-212	1.000	4.06E-01	4.96E-02	
Pb212-XR	0.999	8.48E-01	2.13E-01	
Bi-214	0.820	4.72E-01	4.93E-02	
Pb-214	0.999	4.40E-01	4.48E-02	
X Pb214-XR	0.999			
Ac-228	0.999	4.81E-01	5.71E-02	

? = 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 1.000sigma

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Analysis Report for 18-Apr-19-10046  
L1-10213C- AJGS-014SS

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## UNIDENTIFIED PEAKS

---

Peak Locate Performed on : 4/18/2019 12:57:47PM  
Peak Locate From Channel : 120  
Peak Locate To Channel : 8192

Peak No.	Energy (keV)	Peak Size (CPS)	Peak CPS (%) Uncertainty	Peak Type	Tolerance Nuclide
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All peaks were identified.

M = First peak in a multiplet region  
m = Other peak in a multiplet region  
F = Fitted singlet  
Errors quoted at 1.000sigma

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## NUCLIDE MDA REPORT

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Nuclide Library Used : C:\Canberra\Apex\Root\Default\Library\ZION LIB-BNL.NLB

Nuclide Name	Energy (keV)	Yield(%)	Activity (pCi/grams)	Nuclide MDA (pCi/grams)	Line MDA (pCi/grams)
An Pk	511.00	100.00	1.96E-02	6.09E-02	6.09E-02
BE-7	477.60	10.44	-1.51E-01	5.03E-01	5.03E-01
+ K-40	1460.82	* 10.66	1.17E+01	5.85E-01	5.85E-01
Mn-54	834.85	99.98	3.23E-02	6.80E-02	6.80E-02
Co-60	1173.23	99.85	-5.96E-02	6.29E-02	8.34E-02
	1332.49	99.98	1.72E-02		6.29E-02
Nb-94	702.65	99.81	-2.24E-02	5.76E-02	5.76E-02
	871.09	99.89	4.51E-02		6.04E-02
Ag-108m	79.13	6.60	3.93E-01	5.25E-02	1.83E+00
	433.94	90.50	-1.51E-02		5.25E-02
	614.28	89.80	-9.68E-03		1.05E-01
	722.94	90.80	1.25E-02		7.49E-02
Sb-125	176.31	6.84	4.07E-01	1.73E-01	6.45E-01
	380.45	1.52	1.58E+00		3.18E+00
	427.87	29.60	1.17E-01		1.73E-01
	463.36	10.49	3.97E-01		5.16E-01
	600.60	17.65	2.00E-01		2.88E-01
	606.71	4.98	5.25E+00		2.02E+00
	635.95	11.22	-1.40E-01		4.59E-01

Analysis Report for 18-Apr-19-10046

L1-10213C- AJGS-014SS

<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Nuclide MDA (pCi/grams)</b>	<b>Line MDA (pCi/grams)</b>
Sb-125	671.44	1.79	-2.11E+00	1.73E-01	2.83E+00
Ba-133	79.61	2.65	-1.69E-02	1.03E-01	4.42E+00
	81.00	32.90	6.43E-02		2.93E-01
	276.40	7.16	-6.11E-01		6.69E-01
	302.85	18.34	-2.92E-02		2.56E-01
	356.01	62.05	8.59E-03		1.03E-01
	383.85	8.94	-4.78E-01		5.26E-01
Cs-134	475.36	1.48	2.54E+00	7.45E-02	3.54E+00
	563.25	8.34	-1.70E-01		6.21E-01
	569.33	15.37	8.95E-02		3.63E-01
	604.72	97.62	-3.96E-02		9.51E-02
	795.86	85.46	6.10E-02		7.45E-02
	801.95	8.69	-3.36E-01		6.43E-01
	1038.61	0.99	-3.62E+00		6.34E+00
	1167.97	1.79	-3.32E+00		4.32E+00
	1365.19	3.02	6.53E-01		1.65E+00
+ Cs-137	661.66	* 85.10	5.90E-02	4.89E-02	4.89E-02
Eu-152	121.78	28.67	-1.48E-01	1.60E-01	1.66E-01
	244.70	7.61	8.95E-02		7.04E-01
	295.94	0.45	2.10E+01		1.44E+01
	344.28	26.60	-7.37E-02		1.60E-01
	367.79	0.86	1.89E+00		5.41E+00
	411.12	2.24	-1.71E+00		2.03E+00
	443.96	2.83	-8.12E-01		1.72E+00
	488.68	0.42	-1.02E+00		1.19E+01
	563.99	0.49	2.44E+00		1.07E+01
	586.26	0.46	2.66E+01		1.77E+01
	678.62	0.47	5.22E+00		1.17E+01
	688.67	0.86	5.45E-01		6.24E+00
	719.35	0.28	1.42E+00		2.11E+01
	778.90	12.96	-2.97E-01		4.27E-01
	810.45	0.32	-4.77E-01		1.50E+01
	867.37	4.26	-7.47E-01		1.43E+00
	919.33	0.43	-7.43E+00		1.35E+01
	964.08	14.65	3.41E-01		6.42E-01
	1085.87	10.24	-1.54E-01		6.39E-01
	1089.74	1.73	-3.30E-01		3.79E+00
	1112.07	13.69	-4.76E-01		5.20E-01
	1212.95	1.43	-1.01E+00		5.51E+00
	1249.94	0.19	-1.50E+01		4.32E+01
	1299.14	1.63	-1.20E+00		4.12E+00
	1408.01	21.07	2.43E-01		2.88E-01
	1457.64	0.50	2.51E+02		5.56E+01
	1528.10	0.28	2.62E+00		1.66E+01
Eu-154	123.07	40.40	-2.58E-02	1.18E-01	1.18E-01
	247.93	6.89	3.80E-01		6.78E-01
	591.76	4.95	1.31E-02		9.61E-01
	692.42	1.78	3.70E+00		3.47E+00
	723.30	20.06	4.40E-01		3.50E-01
	756.80	4.52	-3.85E-01		1.35E+00
	873.18	12.08	7.95E-02		4.84E-01



Analysis Report for 18-Apr-19-10046

L1-10213C- AJGS-014SS

<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Nuclide MDA (pCi/grams)</b>	<b>Line MDA (pCi/grams)</b>
Eu-154	996.29	10.48	2.83E-01	1.18E-01	6.58E-01
	1004.76	18.01	-8.22E-02		3.49E-01
	1274.43	34.80	-1.04E-01		2.06E-01
	1596.48	1.80	-9.21E-01		2.18E+00
Eu-155	45.30	1.31	1.71E+01	2.92E-01	2.50E+01
	60.01	1.22	8.82E+00		2.80E+01
	86.55	30.70	2.41E-02		3.10E-01
	105.31	21.10	5.37E-02		2.92E-01
Ra-226	186.21	3.64	1.99E+00	1.50E+00	1.50E+00
Pa-231	27.36	10.30	1.77E+00	2.05E+00	2.75E+00
	283.69	1.70	-2.03E+00		2.64E+00
	300.07	2.47	-5.53E-01		2.05E+00
	302.65	2.20	-4.17E-01		2.13E+00
	330.06	1.40	4.09E-01		3.84E+00
	U-235	143.76	10.96		-5.06E-02
U-235	163.33	5.08	-5.24E-01	9.55E-02	8.68E-01
	185.71	57.20	1.41E-01		9.55E-02
	202.11	1.08	-5.25E-01		4.11E+00
	205.31	5.01	-1.22E+00		9.06E-01
Am-241	59.54	35.90	5.18E-03	9.70E-01	9.70E-01

+ = Nuclide identified during the nuclide identification

\* = Energy line found in the spectrum

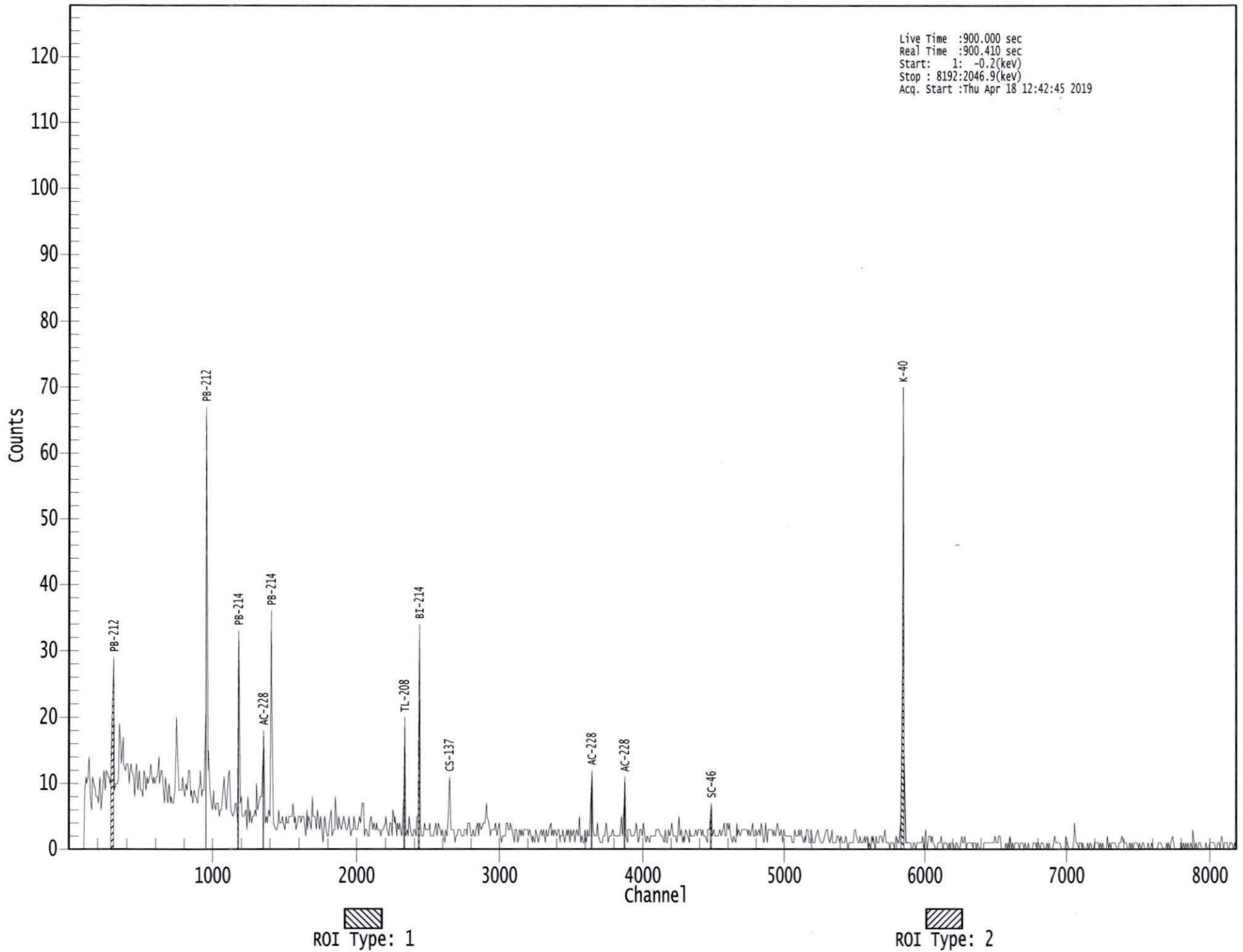
&gt; = MDA value not calculated

@ = Half-life too short to be able to perform the decay correction

? = CAUTION: MDA value is inconsistent with Currie MDA at 95% confidence level

0000065957.CNF

Live Time :900.000 sec  
Real Time :900.410 sec  
Start: 1: -0.2(kev)  
Stop : 8192:2046.9(kev)  
Acq. Start :Thu Apr 18 12:42:45 2019



Analysis Report for 18-Apr-19-10047  
L1-10213C- AJGS-015SS

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## GAMMA SPECTRUM ANALYSIS

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Sample Identification : 18-Apr-19-10047  
Sample Description : L1-10213C- AJGS-015SS  
Sample Type : Soil  
Unit :  
Sample Point :  
  
Sample Size : 1.108E+03 grams  
Facility : Default  
  
Sample Taken On : 4/17/2019 8:45:00AM  
Acquisition Started : 4/18/2019 1:08:04PM  
  
Procedure : 130G\_SOIL\_1  
Operator : Administrator  
Detector Name : 324  
Geometry : 130G\_SOIL\_1  
Live Time : 900.0 seconds  
Real Time : 901.1 seconds  
  
Dead Time : 0.13 %  
  
Peak Locate Threshold : 3.00  
Peak Locate Range (in channels) : 120 - 4096  
Peak Area Range (in channels) : 120 - 4096  
Identification Energy Tolerance : 1.000 keV  
  
Energy Calibration Used Done On : 9/29/2018  
Efficiency Calibration Used Done On : 4/18/2019  
Efficiency Calibration Description :  
  
Sample Number : 65958  
Fill Height : 1107.58 gram  
Certificate Name : Eu155-Na22  
Certificate Date : 1/30/2013 12:00:00PM

*at*  
4-18-19  
*J.P. [unclear]*  
4-18-19

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## PEAK ANALYSIS REPORT

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Peak Analysis Performed on : 4/18/2019 1:23:07PM  
Peak Analysis From Channel : 120  
Peak Analysis To Channel : 4096

*J.P. [unclear]*  
4-18-19

Analysis Report for 18-Apr-19-10047  
L1-10213C- AJGS-015SS

Peak No.	Energy (keV)	ROI start	ROI end	Peak Centroid	Net Peak Area	Net Area Uncertainty	Continuum Counts	FWHM (keV)
1	238.71	473 -	482	477.60	1.21E+02	20.57	1.33E+02	0.96
2	352.06	699 -	708	704.06	8.30E+01	13.58	4.50E+01	1.20
3	583.47	1160 -	1171	1166.54	3.85E+01	11.50	3.75E+01	0.89
4	609.63	1216 -	1223	1218.83	6.03E+01	10.34	2.27E+01	1.61
5	661.88	1317 -	1329	1323.28	5.50E+02	24.43	1.77E+01	1.65
6	1461.20	2915 -	2929	2922.45	3.43E+02	18.96	5.56E+00	2.10

M = First peak in a multiplet region  
m = Other peak in a multiplet region  
F = Fitted singlet  
Errors quoted at 1.000sigma

No background subtract performed on this spectrum.

## NUCLIDE IDENTIFICATION REPORT

Nuclide Library Used : C:\Canberra\Apex\Root\Default\Library\ZION LIB-BNL.NLB

### IDENTIFIED NUCLIDES

Nuclide Name	Id Confidence	Energy (keV)	Yield(%)	Activity (pCi/grams)	Activity Uncertainty
K-40	0.97	1460.82 *	10.66	7.26E+00	5.10E-01
Cs-137	0.99	661.66 *	85.10	8.52E-01	6.36E-02
Tl-208	0.98	583.19 *	85.00	5.49E-02	1.67E-02
Bi-211	0.85	351.07 *	13.02	5.45E-01	9.94E-02
Pb-212	0.99	115.18	0.60		
		238.63 *	43.60	1.85E-01	3.47E-02
		300.09	3.30		
Bi-214	0.99	609.32 *	45.49	1.65E-01	3.01E-02
		768.36	4.89		
		806.18	1.26		
		934.06	3.11		

Analysis Report for 18-Apr-19-10047

L1-10213C- AJGS-015SS

<b>Nuclide Name</b>	<b>Id Confidence</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Activity Uncertainty</b>
Bi-214	0.99	1120.29	14.92		
		1155.21	1.63		
		1238.12	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		
		1661.27	1.05		
		1729.59	2.88		
		1764.49	15.30		
		1847.43	2.03		
		2118.51	1.16		
Pb-214	0.99	241.99	7.25		
		295.22	18.42		
		351.93 *	35.60	1.99E-01	3.63E-02
		785.96	1.06		

\* = Energy line found in the spectrum.

- = Manually added nuclide.

? = Manually edited nuclide.

@ = Energy line not used for Weighted Mean Activity

Energy Tolerance : 1.000 keV

Nuclide confidence index threshold = 0.30

Errors quoted at 1.000sigma

## INTERFERENCE CORRECTED REPORT

<b>Nuclide Name</b>	<b>Nuclide Id Confidence</b>	<b>Wt mean Activity (pCi/grams)</b>	<b>Wt mean Activity Uncertainty</b>	<b>Comments</b>
K-40	0.978	7.26E+00	5.10E-01	
Cs-137	0.992	8.52E-01	6.36E-02	
Tl-208	0.988	5.49E-02	1.67E-02	
? Bi-211	0.856	5.45E-01	9.94E-02	
Pb-212	0.999	1.85E-01	3.47E-02	
Bi-214	0.994	1.65E-01	3.01E-02	
? Pb-214	0.999	1.99E-01	3.63E-02	

Analysis Report for 18-Apr-19-10047

L1-10213C- AJGS-015SS

- ? = 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 1.000sigma

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Analysis Report for 18-Apr-19-10047  
L1-10213C- AJGS-015SS

## UNIDENTIFIED PEAKS

Peak Locate Performed on : 4/18/2019 1:23:07PM  
Peak Locate From Channel : 120  
Peak Locate To Channel : 4096

Peak No.	Energy (keV)	Peak Size (CPS)	Peak CPS (%) Uncertainty	Peak Type	Tolerance Nuclide
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All peaks were identified.

M = First peak in a multiplet region  
m = Other peak in a multiplet region  
F = Fitted singlet  
Errors quoted at 1.000sigma

## NUCLIDE MDA REPORT

Nuclide Library Used : C:\Canberra\Apex\Root\Default\Library\ZION LIB-BNL.NLB

Nuclide Name	Energy (keV)	Yield(%)	Activity (pCi/grams)	Nuclide MDA (pCi/grams)	Line MDA (pCi/grams)
An Pk	511.00	100.00	4.69E-02	5.58E-02	5.58E-02
BE-7	477.60	10.44	-5.43E-02	4.02E-01	4.02E-01
+ K-40	1460.82	* 10.66	7.26E+00	3.47E-01	3.47E-01
Mn-54	834.85	99.98	-2.08E-03	3.99E-02	3.99E-02
Co-60	1173.23	99.85	4.09E-02	7.37E-02	7.37E-02
	1332.49	99.98	7.45E-02		7.37E-02
Nb-94	702.65	99.81	2.29E-03	4.00E-02	4.00E-02
	871.09	99.89	-1.45E-02		4.62E-02
Ag-108m	79.13	6.60	2.75E-01	4.41E-02	1.21E+00
	433.94	90.50	-9.80E-03		4.41E-02
	614.28	89.80	-4.96E-02		6.32E-02
	722.94	90.80	2.24E-03		4.49E-02
Sb-125	176.31	6.84	-2.57E-01	1.40E-01	5.20E-01
	380.45	1.52	-6.15E-02		2.58E+00
	427.87	29.60	4.44E-03		1.40E-01
	463.36	10.49	-2.00E-02		4.39E-01
	600.60	17.65	1.01E-02		2.53E-01
	606.71	4.98	-1.89E+00		1.36E+00
	635.95	11.22	-3.34E-01		3.39E-01

Analysis Report for 18-Apr-19-10047

L1-10213C- AJGS-015SS

<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Nuclide MDA (pCi/grams)</b>	<b>Line MDA (pCi/grams)</b>
Sb-125	671.44	1.79	-5.83E-01	1.40E-01	2.10E+00
Ba-133	79.61	2.65	1.12E+00	7.94E-02	2.91E+00
	81.00	32.90	-2.87E-01		1.87E-01
	276.40	7.16	-8.09E-02		5.57E-01
	302.85	18.34	1.38E-01		2.15E-01
	356.01	62.05	-5.01E-02		7.94E-02
	383.85	8.94	-1.89E-01		4.52E-01
Cs-134	475.36	1.48	1.06E+00	5.09E-02	2.81E+00
	563.25	8.34	-2.66E-01		4.55E-01
	569.33	15.37	1.54E-01		2.91E-01
	604.72	97.62	-1.09E-01		5.72E-02
	795.86	85.46	-1.24E-02		5.09E-02
	801.95	8.69	-4.77E-01		5.03E-01
	1038.61	0.99	-2.30E+00		3.98E+00
	1167.97	1.79	-2.88E+00		3.53E+00
	1365.19	3.02	-1.65E+00		1.17E+00
+ Cs-137	661.66	* 85.10	8.52E-01	4.02E-02	4.02E-02
Eu-152	121.78	28.67	-2.33E-03	1.27E-01	1.27E-01
	244.70	7.61	-4.08E-01		5.06E-01
	295.94	0.45	7.51E+00		1.04E+01
	344.28	26.60	-6.95E-02		1.49E-01
	367.79	0.86	8.48E-01		4.52E+00
	411.12	2.24	3.34E-01		1.96E+00
	443.96	2.83	3.58E-01		1.62E+00
	488.68	0.42	-6.12E+00		9.32E+00
	563.99	0.49	-5.45E+00		7.73E+00
	586.26	0.46	-2.84E+00		1.24E+01
	678.62	0.47	-2.55E+00		8.15E+00
	688.67	0.86	1.51E+00		4.59E+00
	719.35	0.28	-1.66E+01		1.19E+01
	778.90	12.96	-5.10E-02		2.99E-01
	810.45	0.32	-2.40E+00		1.37E+01
	867.37	4.26	-2.27E-01		1.13E+00
	919.33	0.43	-1.22E+01		9.35E+00
	964.08	14.65	-2.37E-01		4.02E-01
	1085.87	10.24	1.22E-01		5.07E-01
	1089.74	1.73	-2.62E+00		2.70E+00
	1112.07	13.69	1.17E-01		3.97E-01
	1212.95	1.43	9.34E-01		4.95E+00
	1249.94	0.19	1.69E+00		3.24E+01
	1299.14	1.63	1.59E-01		3.09E+00
	1408.01	21.07	1.40E-03		2.10E-01
	1457.64	0.50	-3.86E+00		4.13E+01
	1528.10	0.28	9.64E-01		9.25E+00
Eu-154	123.07	40.40	3.01E-02	9.19E-02	9.19E-02
	247.93	6.89	1.05E-01		5.33E-01
	591.76	4.95	-3.46E-01		8.49E-01
	692.42	1.78	-9.60E-01		2.02E+00
	723.30	20.06	8.39E-02		2.15E-01
	756.80	4.52	8.72E-02		1.01E+00
	873.18	12.08	1.41E-01		4.00E-01



Analysis Report for 18-Apr-19-10047

L1-10213C- AJGS-015SS

<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Nuclide MDA (pCi/grams)</b>	<b>Line MDA (pCi/grams)</b>
Eu-154	996.29	10.48	1.33E-01	9.19E-02	4.97E-01
	1004.76	18.01	-2.90E-01		2.14E-01
	1274.43	34.80	1.13E-02		1.71E-01
	1596.48	1.80	-3.69E-01		1.67E+00
Eu-155	45.30	1.31	-1.47E+00	1.91E-01	1.14E+01
	60.01	1.22	-2.34E-01		1.36E+01
	86.55	30.70	3.28E-02		1.91E-01
	105.31	21.10	2.65E-02		2.09E-01
Ra-226	186.21	3.64	5.08E-01	1.12E+00	1.12E+00
Pa-231	27.36	10.30	1.39E+00	1.36E+00	1.36E+00
	283.69	1.70	-6.56E-01		2.14E+00
	300.07	2.47	-2.93E+00		1.51E+00
	302.65	2.20	1.15E+00		1.79E+00
	330.06	1.40	-3.37E-01		3.17E+00
	U-235	143.76	10.96		-5.47E-02
U-235	163.33	5.08	-3.44E-01	7.09E-02	7.38E-01
	185.71	57.20	1.77E-02		7.09E-02
	202.11	1.08	-1.16E+00		3.52E+00
	205.31	5.01	-4.84E-01		7.21E-01
Am-241	59.54	35.90	-1.87E-01	4.62E-01	4.62E-01

+ = Nuclide identified during the nuclide identification

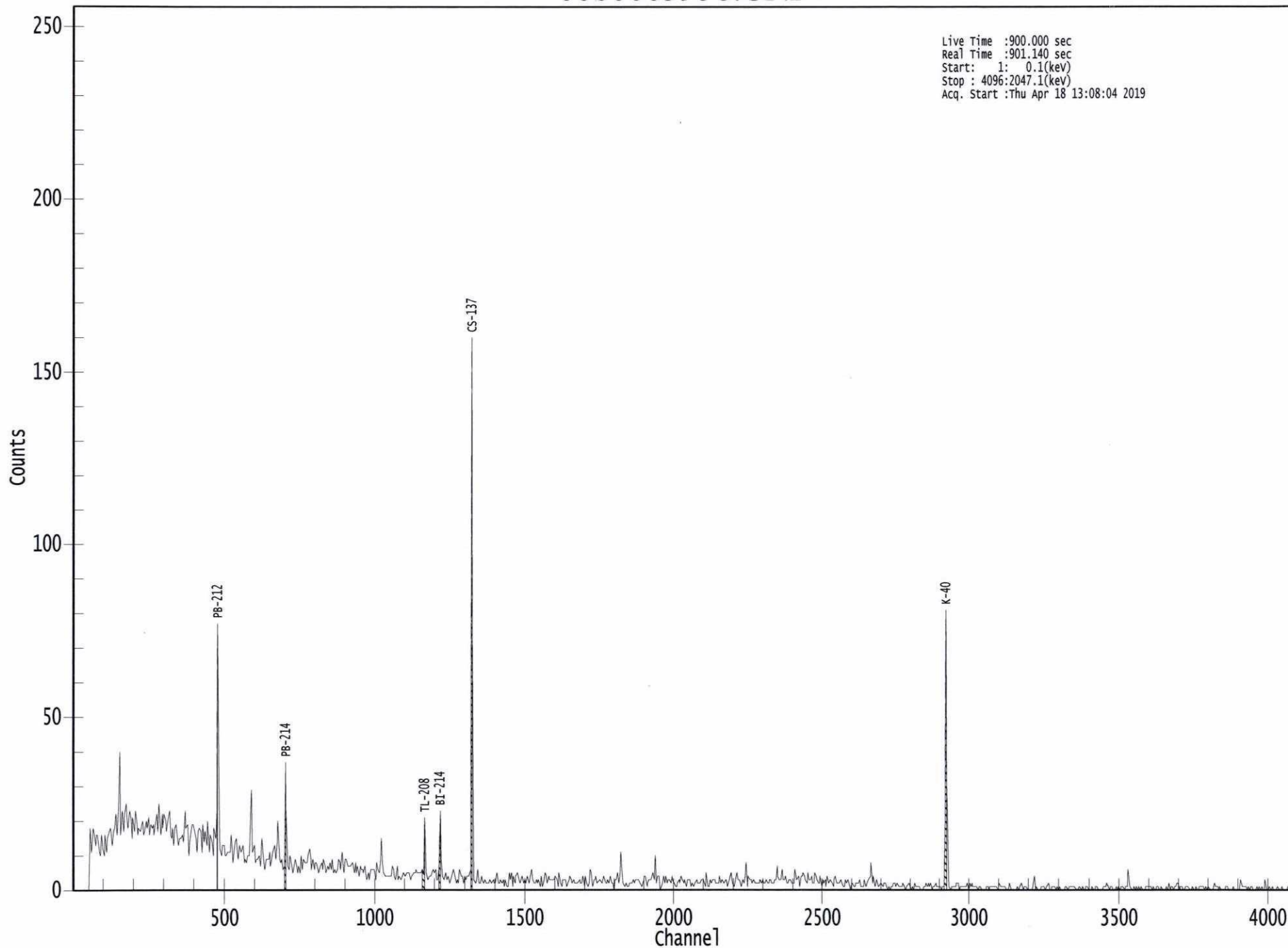
\* = Energy line found in the spectrum

&gt; = MDA value not calculated

@ = Half-life too short to be able to perform the decay correction

? = CAUTION: MDA value is inconsistent with Currie MDA at 95% confidence level

0000065958.CNF



ROI Type: 1

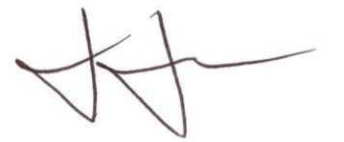
Analysis Report for 18-Jun-19-10040  
L1-10207A-AJGS-101SS

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## GAMMA SPECTRUM ANALYSIS

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Sample Identification : 18-Jun-19-10040  
Sample Description : L1-10207A-AJGS-101SS  
Sample Type : Soil  
Unit :  
Sample Point :  
  
Sample Size : 1.560E+03 grams  
Facility : Default  
  
Sample Taken On : 6/17/2019 12:30:00PM  
Acquisition Started : 6/18/2019 12:30:20PM  
  
Procedure : 130G\_SOIL\_1  
Operator : Administrator  
Detector Name : 352  
Geometry : 130G\_SOIL\_1  
Live Time : 900.0 seconds  
Real Time : 900.3 seconds  
  
Dead Time : 0.03 %  
  
Peak Locate Threshold : 3.00  
Peak Locate Range (in channels) : 120 - 8192  
Peak Area Range (in channels) : 120 - 8192  
Identification Energy Tolerance : 1.000 keV  
  
Energy Calibration Used Done On : 9/29/2018  
Efficiency Calibration Used Done On : 6/18/2019  
Efficiency Calibration Description :  
  
Sample Number : 77472  
Fill Height : 1559.82 gram  
Certificate Name : Eu155-Na22  
Certificate Date : 1/7/2013 12:00:00PM


  
6-18-19

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## PEAK ANALYSIS REPORT

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Peak Analysis Performed on : 6/18/2019 12:45:43PM  
Peak Analysis From Channel : 120  
Peak Analysis To Channel : 8192

  
6-19-19

Analysis Report for 18-Jun-19-10040

L1-10207A-AJGS-101SS

Peak No.	Energy (keV)	ROI start	ROI end	Peak Centroid	Net Peak Area	Net Area Uncertainty	Continuum Counts	FWHM (keV)
1	238.58	949 -	962	954.80	1.04E+02	17.84	7.70E+01	1.15
2	294.98	1174 -	1187	1180.13	3.15E+01	11.17	3.35E+01	0.60
3	352.02	1399 -	1414	1408.08	5.08E+01	11.66	2.82E+01	0.35
4	582.97	2326 -	2338	2331.18	3.08E+01	8.13	1.32E+01	0.62
5	609.10	2429 -	2444	2435.69	5.70E+01	9.02	7.03E+00	1.30
6	661.52	2635 -	2655	2645.26	3.10E+02	19.37	1.81E+01	1.44
7	1460.38	5831 -	5852	5841.88	1.92E+02	14.86	7.82E+00	2.01

M = First peak in a multiplet region

m = Other peak in a multiplet region

F = Fitted singlet

Errors quoted at 1.000sigma

No background subtract performed on this spectrum.

## NUCLIDE IDENTIFICATION REPORT

Nuclide Library Used : C:\Canberra\Apex\Root\Default\Library\ZION LIB-BNL.NLB

### IDENTIFIED NUCLIDES

Nuclide Name	Id Confidence	Energy (keV)	Yield(%)	Activity (pCi/grams)	Activity Uncertainty
K-40	0.96	1460.82	* 10.66	4.00E+00	3.55E-01
Cs-137	0.99	661.66	* 85.10	4.79E-01	4.15E-02
Tl-208	0.99	583.19	* 85.00	4.39E-02	1.19E-02
Pb-212	1.00	115.18	0.60		
		238.63	* 43.60	1.62E-01	3.08E-02
		300.09	3.30		
Bi-214	0.99	609.32	* 45.49	1.56E-01	2.64E-02
		768.36	4.89		
		806.18	1.26		
		934.06	3.11		

Analysis Report for 18-Jun-19-10040

L1-10207A-AJGS-101SS

<b>Nuclide Name</b>	<b>Id Confidence</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Activity Uncertainty</b>
Bi-214	0.99	1120.29	14.92		
		1155.21	1.63		
		1238.12	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		
		1661.27	1.05		
		1729.59	2.88		
		1764.49	15.30		
		1847.43	2.03		
		2118.51	1.16		
Pb-214	0.99	241.99	7.25		
		295.22 *	18.42	1.30E-01	4.74E-02
		351.93 *	35.60	1.23E-01	2.99E-02
		785.96	1.06		

\* = Energy line found in the spectrum.

- = Manually added nuclide.

? = Manually edited nuclide.

@ = Energy line not used for Weighted Mean Activity

Energy Tolerance : 1.000 keV

Nuclide confidence index threshold = 0.30

Errors quoted at 1.000sigma

## INTERFERENCE CORRECTED REPORT

<b>Nuclide Name</b>	<b>Nuclide Id Confidence</b>	<b>Wt mean Activity (pCi/grams)</b>	<b>Wt mean Activity Uncertainty</b>	<b>Comments</b>
K-40	0.969	4.00E+00	3.55E-01	
Cs-137	0.997	4.79E-01	4.15E-02	
Tl-208	0.992	4.39E-02	1.19E-02	
X Bi-211	0.865			
Pb-212	1.000	1.62E-01	3.08E-02	
Bi-214	0.997	1.56E-01	2.64E-02	
Pb-214	0.996	1.25E-01	2.53E-02	

Analysis Report for 18-Jun-19-10040

L1-10207A-AJGS-101SS

- ? = 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 1.000sigma

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Analysis Report for 18-Jun-19-10040  
L1-10207A-AJGS-101SS

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## UNIDENTIFIED PEAKS

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Peak Locate Performed on : 6/18/2019 12:45:43PM  
Peak Locate From Channel : 120  
Peak Locate To Channel : 8192

Peak No.	Energy (keV)	Peak Size (CPS)	Peak CPS (%) Uncertainty	Peak Type	Tolerance Nuclide
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All peaks were identified.

M = First peak in a multiplet region  
m = Other peak in a multiplet region  
F = Fitted singlet  
Errors quoted at 1.000sigma

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## NUCLIDE MDA REPORT

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Nuclide Library Used : C:\Canberra\Apex\Root\Default\Library\ZION LIB-BNL.NLB

Nuclide Name	Energy (keV)	Yield(%)	Activity (pCi/grams)	Nuclide MDA (pCi/grams)	Line MDA (pCi/grams)
An Pk	511.00	100.00	5.23E-02	5.29E-02	5.29E-02
BE-7	477.60	10.44	2.50E-01	4.95E-01	4.95E-01
+ K-40	1460.82	* 10.66	4.00E+00	4.38E-01	4.38E-01
Mn-54	834.85	99.98	-3.45E-03	4.67E-02	4.67E-02
Co-60	1173.23	99.85	5.51E-02	6.05E-02	6.05E-02
	1332.49	99.98	2.54E-02		6.31E-02
Nb-94	702.65	99.81	-2.58E-02	3.33E-02	3.33E-02
	871.09	99.89	-3.43E-03		3.91E-02
Ag-108m	79.13	6.60	9.82E-01	4.44E-02	1.46E+00
	433.94	90.50	1.35E-02		4.44E-02
	614.28	89.80	5.68E-03		6.00E-02
	722.94	90.80	2.49E-02		4.92E-02
Sb-125	176.31	6.84	2.09E-01	1.28E-01	5.08E-01
	380.45	1.52	-1.69E+00		2.33E+00
	427.87	29.60	-4.53E-02		1.28E-01
	463.36	10.49	1.04E-01		4.09E-01
	600.60	17.65	-1.94E-02		2.27E-01
	606.71	4.98	1.50E+00		1.19E+00
	635.95	11.22	3.71E-02		3.66E-01

Analysis Report for 18-Jun-19-10040

L1-10207A-AJGS-101SS

<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Nuclide MDA (pCi/grams)</b>	<b>Line MDA (pCi/grams)</b>
Sb-125	671.44	1.79	-1.87E+00	1.28E-01	1.99E+00
Ba-133	79.61	2.65	1.18E+00	7.13E-02	3.47E+00
	81.00	32.90	-2.23E-01		2.39E-01
	276.40	7.16	-1.76E-01		5.13E-01
	302.85	18.34	1.68E-02		2.09E-01
	356.01	62.05	-8.54E-03		7.13E-02
	383.85	8.94	-3.35E-01		3.88E-01
Cs-134	475.36	1.48	3.31E+00	5.06E-02	3.37E+00
	563.25	8.34	-1.71E-01		4.08E-01
	569.33	15.37	1.24E-02		2.52E-01
	604.72	97.62	-4.19E-02		5.89E-02
	795.86	85.46	2.09E-02		5.06E-02
	801.95	8.69	-2.68E-01		4.61E-01
	1038.61	0.99	-3.16E+00		4.44E+00
	1167.97	1.79	-5.57E-02		3.19E+00
	1365.19	3.02	9.80E-01		1.46E+00
+ Cs-137	661.66	* 85.10	4.79E-01	4.68E-02	4.68E-02
Eu-152	121.78	28.67	-5.43E-02	1.33E-01	1.33E-01
	244.70	7.61	-1.94E-01		4.90E-01
	295.94	0.45	1.42E+01		9.86E+00
	344.28	26.60	1.54E-02		1.38E-01
	367.79	0.86	-8.73E-01		4.29E+00
	411.12	2.24	3.81E-01		1.92E+00
	443.96	2.83	-6.92E-01		1.36E+00
	488.68	0.42	3.50E+00		9.86E+00
	563.99	0.49	-6.65E+00		6.82E+00
	586.26	0.46	5.54E+00		1.13E+01
	678.62	0.47	6.93E-01		7.88E+00
	688.67	0.86	8.64E-01		4.44E+00
	719.35	0.28	9.57E-01		1.36E+01
	778.90	12.96	3.85E-03		2.86E-01
	810.45	0.32	7.52E+00		1.16E+01
	867.37	4.26	-8.82E-01		8.96E-01
	919.33	0.43	-9.53E+00		1.11E+01
	964.08	14.65	4.62E-01		4.23E-01
	1085.87	10.24	2.31E-01		4.77E-01
	1089.74	1.73	-1.37E+00		2.93E+00
	1112.07	13.69	-2.19E-01		3.55E-01
	1212.95	1.43	1.33E+00		4.33E+00
	1249.94	0.19	-2.07E+01		2.67E+01
	1299.14	1.63	2.67E-01		3.25E+00
	1408.01	21.07	-6.60E-02		1.69E-01
	1457.64	0.50	9.07E+01		3.16E+01
	1528.10	0.28	2.44E+00		9.11E+00
Eu-154	123.07	40.40	3.08E-02	9.54E-02	9.54E-02
	247.93	6.89	-3.48E-01		5.08E-01
	591.76	4.95	5.48E-02		8.20E-01
	692.42	1.78	1.54E-01		2.22E+00
	723.30	20.06	2.12E-01		2.23E-01
	756.80	4.52	-9.31E-01		8.83E-01
	873.18	12.08	-1.34E-01		2.80E-01



Analysis Report for 18-Jun-19-10040

L1-10207A-AJGS-101SS

<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Nuclide MDA (pCi/grams)</b>	<b>Line MDA (pCi/grams)</b>
Eu-154	996.29	10.48	1.80E-01	9.54E-02	4.25E-01
	1004.76	18.01	-6.87E-02		2.34E-01
	1274.43	34.80	-4.33E-02		1.28E-01
	1596.48	1.80	-6.93E-01		2.38E+00
Eu-155	45.30	1.31	2.54E+00	2.10E-01	1.92E+01
	60.01	1.22	-2.07E+01		1.83E+01
	86.55	30.70	-2.12E-02		2.10E-01
	105.31	21.10	6.67E-02		2.19E-01
Ra-226	186.21	3.64	7.01E-01	1.07E+00	1.07E+00
Pa-231	27.36	10.30	8.54E-01	1.57E+00	1.97E+00
	283.69	1.70	2.70E-02		2.10E+00
	300.07	2.47	6.92E-01		1.57E+00
	302.65	2.20	1.84E-01		1.74E+00
	330.06	1.40	1.03E+00		2.87E+00
U-235	143.76	10.96	-5.68E-02	6.72E-02	3.42E-01
	163.33	5.08	-1.72E-01		6.56E-01
	185.71	57.20	1.97E-02		6.72E-02
	202.11	1.08	-3.13E+00		3.22E+00
	205.31	5.01	-5.01E-01		7.15E-01
Am-241	59.54	35.90	-5.95E-01	6.64E-01	6.64E-01

+ = Nuclide identified during the nuclide identification

\* = Energy line found in the spectrum

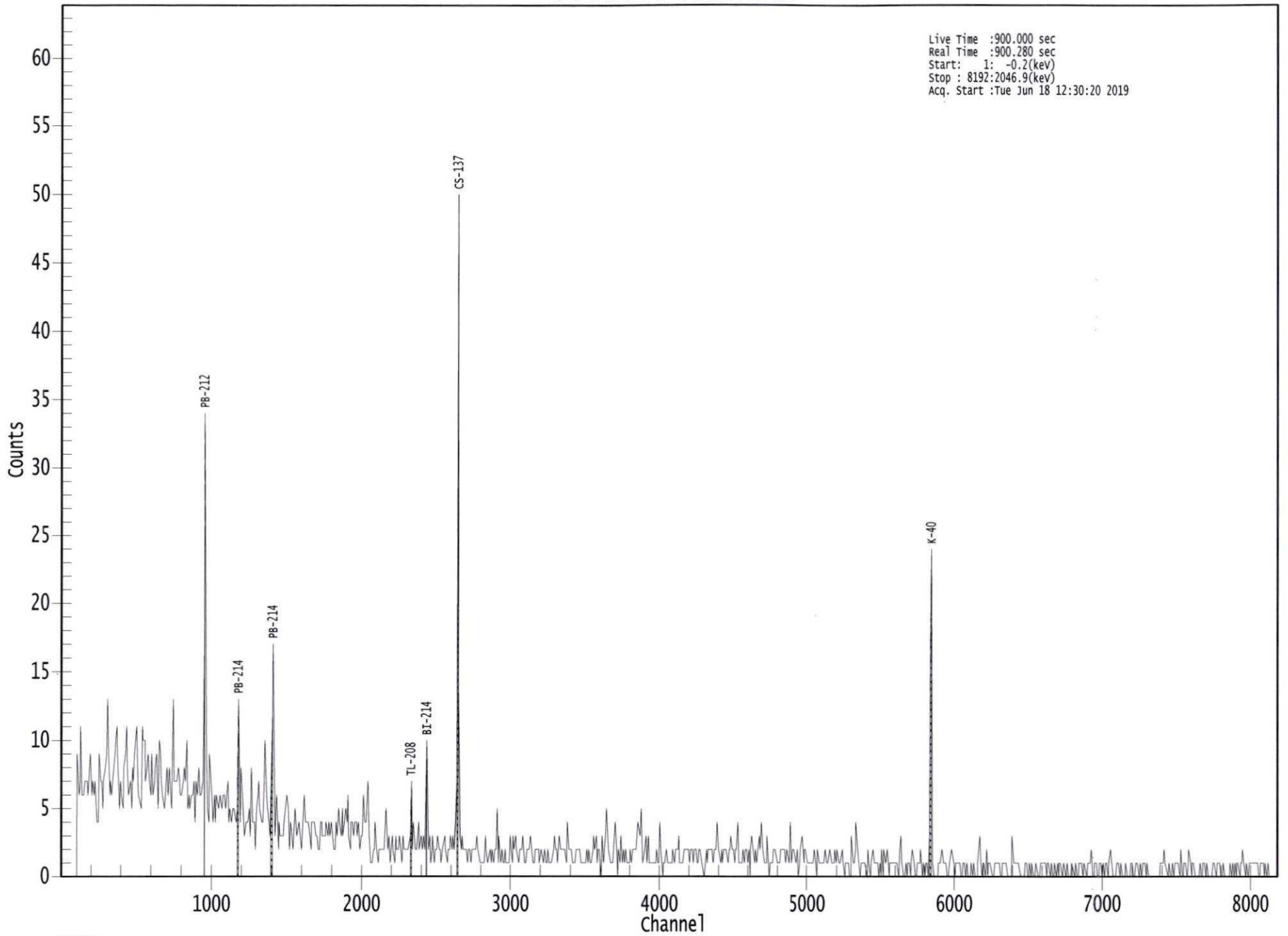
&gt; = MDA value not calculated

@ = Half-life too short to be able to perform the decay correction

? = CAUTION: MDA value is inconsistent with Currie MDA at 95% confidence level

# 0000077472.CNF

Live Time :900.000 sec  
Real Time :900.280 sec  
Start: 1: -0.2(keV)  
Stop : 8192:2046.9(keV)  
Acq. Start :Tue Jun 18 12:30:20 2019



 ROI Type: 1


Analysis Report for 18-Jun-19-10041  
L1-10207A-QJGS-101SS

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## GAMMA SPECTRUM ANALYSIS

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Sample Identification : 18-Jun-19-10041  
Sample Description : L1-10207A-QJGS-101SS  
Sample Type : Soil  
Unit :  
Sample Point :  
  
Sample Size : 1.599E+03 grams  
Facility : Default  
  
Sample Taken On : 6/17/2019 12:30:00PM  
Acquisition Started : 6/18/2019 12:50:16PM  
  
Procedure : 130G\_SOIL\_1  
Operator : Administrator  
Detector Name : 352  
Geometry : 130G\_SOIL\_1  
Live Time : 1800.0 seconds  
Real Time : 1800.5 seconds  
  
Dead Time : 0.03 %  
  
Peak Locate Threshold : 3.00  
Peak Locate Range (in channels) : 120 - 8192  
Peak Area Range (in channels) : 120 - 8192  
Identification Energy Tolerance : 1.000 keV  
  
Energy Calibration Used Done On : 9/29/2018  
Efficiency Calibration Used Done On : 6/18/2019  
Efficiency Calibration Description :  
  
Sample Number : 77474  
Fill Height : 1599.19 gram  
Certificate Name : Eu155-Na22  
Certificate Date : 1/7/2013 12:00:00PM


  
6-18-19

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## PEAK ANALYSIS REPORT

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Peak Analysis Performed on : 6/18/2019 1:23:44PM  
Peak Analysis From Channel : 120  
Peak Analysis To Channel : 8192

  
6-19-19

Analysis Report for 18-Jun-19-10041

L1-10207A-QJGS-101SS

Peak No.	Energy (keV)	ROI start	ROI end	Peak Centroid	Net Peak Area	Net Area Uncertainty	Continuum Counts	FWHM (keV)
1	77.07	307 -	316	309.58	3.41E+01	17.77	1.22E+02	0.49
2	185.93	740 -	749	744.46	3.60E+01	15.25	8.70E+01	0.76
3	238.60	948 -	960	954.86	2.30E+02	22.98	1.13E+02	0.84
4	295.43	1174 -	1188	1181.94	6.31E+01	16.52	7.29E+01	0.91
5	351.99	1401 -	1416	1407.94	1.16E+02	16.62	5.31E+01	0.72
6	477.21	1903 -	1914	1908.42	3.70E+01	10.89	3.20E+01	0.71
7	510.76	2034 -	2048	2042.53	4.35E+01	13.53	4.85E+01	0.93
8	583.09	2322 -	2339	2331.69	7.97E+01	14.66	4.03E+01	0.77
9	609.35	2427 -	2445	2436.68	8.41E+01	15.57	4.69E+01	1.00
10	661.49	2634 -	2656	2645.15	5.64E+02	25.58	2.32E+01	1.52
11	910.48	3635 -	3648	3640.96	5.37E+01	9.78	1.43E+01	0.62
12	968.70	3867 -	3881	3873.88	3.31E+01	9.51	1.99E+01	0.34
13	1172.99	4684 -	4698	4691.36	4.57E+01	8.17	7.32E+00	1.28
14	1332.19	5320 -	5335	5328.61	3.99E+01	7.65	6.09E+00	0.59
15	1460.45	5830 -	5856	5842.18	4.58E+02	23.17	1.88E+01	2.21

M = First peak in a multiplet region  
m = Other peak in a multiplet region  
F = Fitted singlet  
Errors quoted at 1.000sigma

No background subtract performed on this spectrum.

## NUCLIDE IDENTIFICATION REPORT

Nuclide Library Used : C:\Canberra\Apex\Root\Default\Library\ZION LIB-BNL.NLB

### IDENTIFIED NUCLIDES

Nuclide Name	Id Confidence	Energy (keV)	Yield(%)	Activity (pCi/grams)	Activity Uncertainty
An Pk	0.99	511.00 *	100.00	2.44E-02	7.76E-03
BE-7	0.97	477.60 *	10.44	1.90E-01	5.75E-02

Analysis Report for 18-Jun-19-10041

L1-10207A-QJGS-101SS

<b>Nuclide Name</b>	<b>Id Confidence</b>	<b>Energy (keV)</b>		<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Activity Uncertainty</b>
K-40	0.97	1460.82	*	10.66	4.74E+00	3.16E-01
Co-60	0.98	1173.23	*	99.85	4.34E-02	7.95E-03
		1332.49	*	99.98	4.11E-02	8.04E-03
Cs-137	0.99	661.66	*	85.10	4.33E-01	3.26E-02
Tl-208	0.99	583.19	*	85.00	5.65E-02	1.09E-02
Pb-212	1.00	115.18		0.60		
		238.63	*	43.60	1.79E-01	2.30E-02
		300.09		3.30		
Pb212-XR	1.00	74.82		10.28		
		77.11	*	17.10	1.58E-01	8.43E-02
		87.35		3.97		
		89.78		1.46		
Bi-214	1.00	609.32	*	45.49	1.15E-01	2.23E-02
		768.36		4.89		
		806.18		1.26		
		934.06		3.11		
		1120.29		14.92		
		1155.21		1.63		
		1238.12		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		
		1661.27		1.05		
		1729.59		2.88		
		1764.49		15.30		
		1847.43		2.03		
		2118.51		1.16		
Pb-214	0.99	241.99		7.25		
		295.22	*	18.42	1.30E-01	3.57E-02
		351.93	*	35.60	1.40E-01	2.30E-02
		785.96		1.06		
Pb214-XR	1.00	74.82		5.80		
		77.11	*	9.70	2.79E-01	1.49E-01
		87.35		2.24		
		89.78		0.82		
Ra-226	0.98	186.21	*	3.64	3.00E-01	1.29E-01
Ac-228	0.97	129.07		2.42		
		209.25		3.89		
		270.24		3.46		
		328.00		2.95		
		338.32		11.27		
		409.46		1.92		
		463.00		4.40		
		794.95		4.25		
		911.20	*	25.80	1.68E-01	3.14E-02
		964.77		4.99		
		968.97	*	15.80	1.76E-01	5.11E-02
		1588.20		3.22		
U-235	0.99	143.76		10.96		
		163.33		5.08		

Analysis Report for 18-Jun-19-10041

L1-10207A-QJGS-101SS

Nuclide Name	Id Confidence	Energy (keV)	Yield(%)	Activity (pCi/grams)	Activity Uncertainty
U-235	0.99	185.71 *	57.20	1.91E-02	8.23E-03
		202.11	1.08		
		205.31	5.01		

\* = Energy line found in the spectrum.

- = Manually added nuclide.

? = Manually edited nuclide.

@ = Energy line not used for Weighted Mean Activity

Energy Tolerance : 1.000 keV

Nuclide confidence index threshold = 0.30

Errors quoted at 1.000sigma

## INTERFERENCE CORRECTED REPORT

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (pCi/grams)	Wt mean Activity Uncertainty	Comments
An Pk	0.991	2.44E-02	7.76E-03	
BE-7	0.975	1.90E-01	5.75E-02	
K-40	0.978	4.74E+00	3.16E-01	
Co-60	0.988	4.22E-02	5.65E-03	
Cs-137	0.996	4.33E-01	3.26E-02	
Tl-208	0.999	5.65E-02	1.09E-02	
X Bi-211	0.874			
Pb-212	1.000	1.79E-01	2.30E-02	
? Pb212-XR	1.000	1.58E-01	8.43E-02	
Bi-214	1.000	1.15E-01	2.23E-02	
Pb-214	0.998	1.37E-01	1.93E-02	
? Pb214-XR	1.000	2.79E-01	1.49E-01	
? Ra-226	0.988	3.00E-01	1.29E-01	
Ac-228	0.973	1.70E-01	2.68E-02	
? U-235 Ra-226	0.994	1.91E-02	8.23E-03	

? = 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 1.000sigma

JJ 6-18-19

Analysis Report for 18-Jun-19-10041  
L1-10207A-QJGS-101SS

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## UNIDENTIFIED PEAKS

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Peak Locate Performed on : 6/18/2019 1:23:44PM  
Peak Locate From Channel : 120  
Peak Locate To Channel : 8192

Peak No.	Energy (keV)	Peak Size (CPS)	Peak CPS (%) Uncertainty	Peak Type	Tolerance Nuclide
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All peaks were identified.

M = First peak in a multiplet region  
m = Other peak in a multiplet region  
F = Fitted singlet  
Errors quoted at 1.000sigma

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## NUCLIDE MDA REPORT

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Nuclide Library Used : C:\Canberra\Apex\Root\Default\Library\ZION LIB-BNL.NLB

Nuclide Name	Energy (keV)	Yield(%)	Activity (pCi/grams)	Nuclide MDA (pCi/grams)	Line MDA (pCi/grams)
+	An Pk	511.00 *	100.00	2.44E-02	2.41E-02
+	BE-7	477.60 *	10.44	1.90E-01	1.72E-01
+	K-40	1460.82 *	10.66	4.74E+00	3.41E-01
	Mn-54	834.85	99.98	1.82E-02	3.14E-02
+	Co-60	1173.23 *	99.85	4.34E-02	1.75E-02
		1332.49 *	99.98	4.11E-02	1.80E-02
	Nb-94	702.65	99.81	-1.29E-02	2.69E-02
		871.09	99.89	-4.04E-03	2.85E-02
	Ag-108m	79.13	6.60	1.74E-01	2.93E-02
		433.94	90.50	-4.58E-03	2.93E-02
		614.28	89.80	7.94E-03	4.33E-02
		722.94	90.80	2.12E-03	3.19E-02
	Sb-125	176.31	6.84	2.60E-01	9.45E-02
		380.45	1.52	-1.32E+00	1.73E+00
		427.87	29.60	2.02E-02	9.45E-02
		463.36	10.49	-6.93E-02	2.86E-01
		600.60	17.65	6.65E-02	1.68E-01
		606.71	4.98	1.13E+00	8.46E-01
		635.95	11.22	-2.13E-01	2.36E-01

Analysis Report for 18-Jun-19-10041

L1-10207A-QJGS-101SS

<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Nuclide MDA (pCi/grams)</b>	<b>Line MDA (pCi/grams)</b>
Sb-125	671.44	1.79	-1.71E-01	9.45E-02	1.25E+00
Ba-133	79.61	2.65	3.00E-01	4.85E-02	2.37E+00
	81.00	32.90	5.85E-03		1.64E-01
	276.40	7.16	2.96E-02		3.58E-01
	302.85	18.34	7.79E-03		1.31E-01
	356.01	62.05	-9.76E-03		4.85E-02
	383.85	8.94	-1.28E-02		3.05E-01
Cs-134	475.36	1.48	6.39E-01	3.12E-02	2.23E+00
	563.25	8.34	8.95E-02		3.14E-01
	569.33	15.37	6.20E-02		1.69E-01
	604.72	97.62	3.79E-03		4.15E-02
	795.86	85.46	1.10E-02		3.12E-02
	801.95	8.69	2.17E-02		2.80E-01
	1038.61	0.99	-5.32E-01		3.11E+00
	1167.97	1.79	-1.96E+00		2.50E+00
	1365.19	3.02	-3.90E-01		8.65E-01
+ Cs-137	661.66	* 85.10	4.33E-01	2.70E-02	2.70E-02
Eu-152	121.78	28.67	-3.05E-02	9.32E-02	9.32E-02
	244.70	7.61	-7.15E-02		3.43E-01
	295.94	0.45	3.27E+00		6.44E+00
	344.28	26.60	-8.55E-02		9.48E-02
	367.79	0.86	-5.57E-01		3.08E+00
	411.12	2.24	6.77E-01		1.20E+00
	443.96	2.83	-3.02E-01		8.92E-01
	488.68	0.42	1.44E+00		5.39E+00
	563.99	0.49	2.14E+00		5.30E+00
	586.26	0.46	-1.39E+00		8.07E+00
	678.62	0.47	-2.15E+00		4.73E+00
	688.67	0.86	8.16E-01		2.98E+00
	719.35	0.28	-1.99E+00		8.22E+00
	778.90	12.96	-1.69E-01		1.75E-01
	810.45	0.32	-3.92E+00		8.15E+00
	867.37	4.26	-7.03E-02		6.98E-01
	919.33	0.43	-5.14E+00		7.29E+00
	964.08	14.65	-5.19E-03		3.04E-01
	1085.87	10.24	-3.30E-01		2.96E-01
	1089.74	1.73	1.87E+00		1.91E+00
	1112.07	13.69	-2.25E-01		2.55E-01
	1212.95	1.43	1.07E+00		2.74E+00
	1249.94	0.19	-6.55E+00		1.91E+01
	1299.14	1.63	1.47E+00		1.84E+00
	1408.01	21.07	-1.30E-01		1.18E-01
	1457.64	0.50	1.02E+02		2.39E+01
	1528.10	0.28	4.45E+00		7.60E+00
Eu-154	123.07	40.40	-1.10E-02	6.53E-02	6.53E-02
	247.93	6.89	1.90E-01		3.39E-01
	591.76	4.95	1.71E-01		5.14E-01
	692.42	1.78	-3.64E-01		1.42E+00
	723.30	20.06	4.84E-02		1.47E-01
	756.80	4.52	1.05E-02		6.32E-01
	873.18	12.08	-2.86E-01		2.23E-01



Analysis Report for 18-Jun-19-10041

L1-10207A-QJGS-101SS

<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Nuclide MDA (pCi/grams)</b>	<b>Line MDA (pCi/grams)</b>
Eu-154	996.29	10.48	-7.20E-02	6.53E-02	2.58E-01
	1004.76	18.01	5.61E-02		1.66E-01
	1274.43	34.80	3.95E-02		1.11E-01
	1596.48	1.80	2.34E-01		1.56E+00
Eu-155	45.30	1.31	-3.89E+00	1.42E-01	1.26E+01
	60.01	1.22	1.99E+00		1.48E+01
	86.55	30.70	-9.09E-02		1.42E-01
+ Ra-226	105.31	21.10	1.11E-02	4.20E-01	1.46E-01
	186.21	* 3.64	3.00E-01		4.20E-01
Pa-231	27.36	10.30	1.47E+00	1.03E+00	1.58E+00
	283.69	1.70	-5.33E-01		1.40E+00
	300.07	2.47	-2.55E-01		1.03E+00
	302.65	2.20	-6.36E-01		1.07E+00
	330.06	1.40	-1.22E+00		1.75E+00
+ U-235	143.76	10.96	1.35E-01	2.67E-02	2.42E-01
	163.33	5.08	-4.50E-01		4.38E-01
	185.71	* 57.20	1.91E-02		2.67E-02
	202.11	1.08	-4.29E-01		2.26E+00
	205.31	5.01	-3.01E-01		4.76E-01
Am-241	59.54	35.90	-2.53E-01	5.04E-01	5.04E-01

+ = Nuclide identified during the nuclide identification

\* = Energy line found in the spectrum

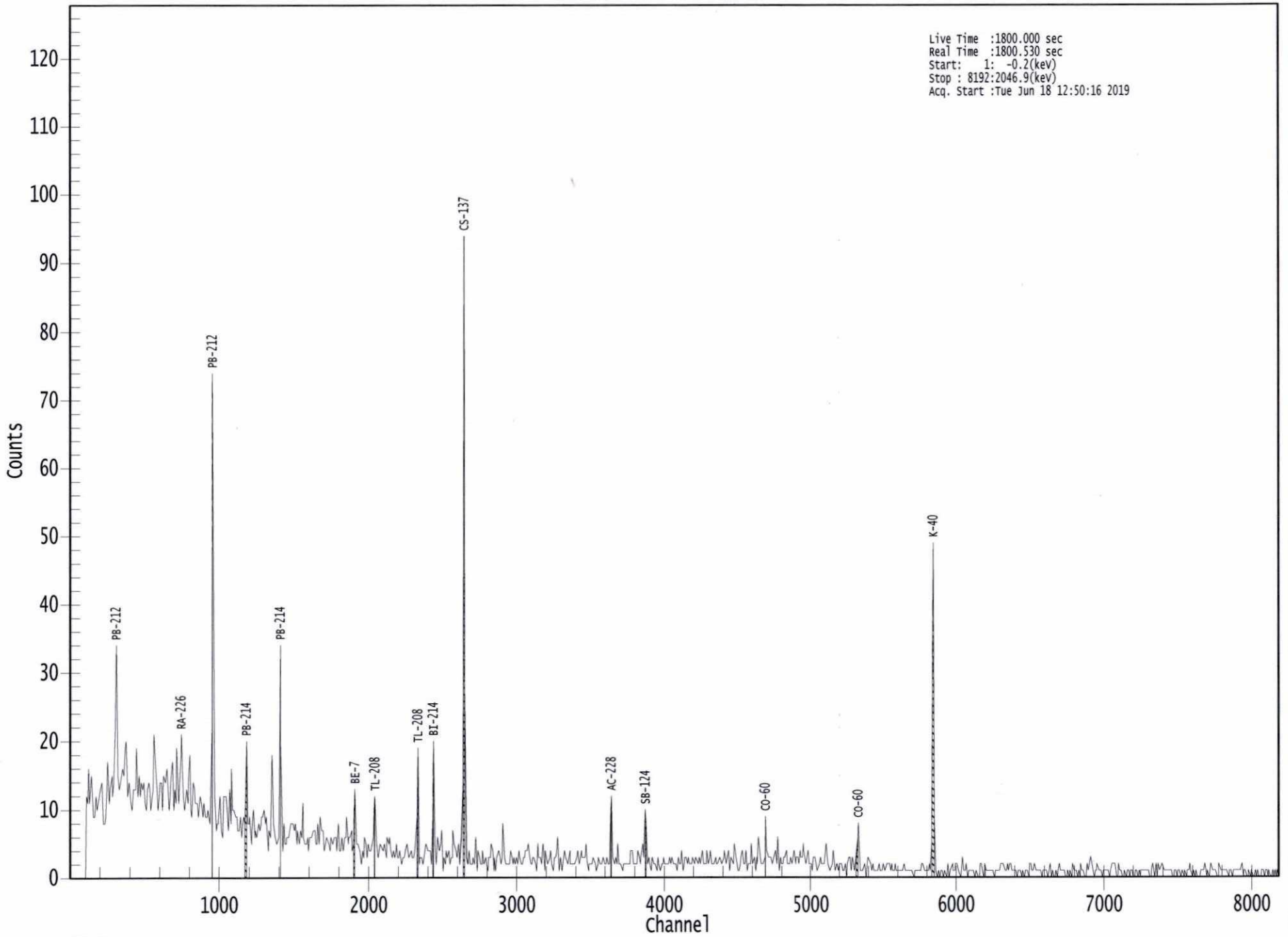
&gt; = MDA value not calculated

@ = Half-life too short to be able to perform the decay correction

? = CAUTION: MDA value is inconsistent with Currie MDA at 95% confidence level

0000077474.CNF

Live Time :1800.000 sec  
Real Time :1800.530 sec  
Start: 1: -0.2(keV)  
Stop : 8192:2046.9(keV)  
Acq. Start :Tue Jun 18 12:50:16 2019



ROI Type: 1

Analysis Report for 18-Jun-19-10042  
L1-10207A-AJGS-102SS

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## GAMMA SPECTRUM ANALYSIS

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Sample Identification : 18-Jun-19-10042  
Sample Description : L1-10207A-AJGS-102SS  
Sample Type : Soil  
Unit :  
Sample Point :  
  
Sample Size : 1.603E+03 grams  
Facility : Default  
  
Sample Taken On : 6/17/2019 12:32:00PM  
Acquisition Started : 6/18/2019 12:50:39PM  
  
Procedure : 130G\_SOIL\_1  
Operator : Administrator  
Detector Name : P11314  
Geometry : 130G\_SOIL\_1  
Live Time : 900.0 seconds  
Real Time : 900.3 seconds  
  
Dead Time : 0.03 %  
  
Peak Locate Threshold : 3.00  
Peak Locate Range (in channels) : 120 - 8192  
Peak Area Range (in channels) : 120 - 8192  
Identification Energy Tolerance : 1.000 keV  
  
Energy Calibration Used Done On : 1/24/2019  
Efficiency Calibration Used Done On : 6/18/2019  
Efficiency Calibration Description :  
  
Sample Number : 77475  
Fill Height : 1603.37 gram  
Certificate Name : Eu155-Na22  
Certificate Date : 12/22/2008 12:00:00PM


  
6-18-19

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## PEAK ANALYSIS REPORT

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Peak Analysis Performed on : 6/18/2019 1:05:41PM  
Peak Analysis From Channel : 120  
Peak Analysis To Channel : 8192

  
6-18-19

Analysis Report for 18-Jun-19-10042

L1-10207A-AJGS-102SS

Peak No.	Energy (keV)	ROI start	ROI end	Peak Centroid	Net Peak Area	Net Area Uncertainty	Continuum Counts	FWHM (keV)
1	238.82	949 -	961	954.85	1.00E+02	15.81	5.50E+01	1.12
2	351.98	1399 -	1412	1406.94	5.70E+01	10.71	2.10E+01	0.50
3	477.63	1905 -	1913	1909.02	1.33E+01	5.07	5.72E+00	0.64
4	583.15	2323 -	2338	2330.72	6.71E+01	9.21	5.92E+00	0.89
5	661.61	2639 -	2654	2644.35	1.06E+02	13.21	2.11E+01	1.07
6	910.99	3634 -	3648	3641.42	3.84E+01	7.80	7.60E+00	0.58
7	1460.59	5827 -	5850	5840.30	2.53E+02	17.02	9.13E+00	1.80

M = First peak in a multiplet region  
m = Other peak in a multiplet region  
F = Fitted singlet  
Errors quoted at 1.000sigma

No background subtract performed on this spectrum.

## NUCLIDE IDENTIFICATION REPORT

Nuclide Library Used : C:\Canberra\Apex\Root\Default\Library\ZION LIB-BNL.NLB

### IDENTIFIED NUCLIDES

Nuclide Name	Id Confidence	Energy (keV)	Yield(%)	Activity (pCi/grams)	Activity Uncertainty
BE-7	1.00	477.60 *	10.44	1.42E-01	5.53E-02
K-40	0.99	1460.82 *	10.66	5.60E+00	4.49E-01
Cs-137	1.00	661.66 *	85.10	1.72E-01	2.38E-02
Tl-208	1.00	583.19 *	85.00	9.99E-02	1.50E-02
Bi-211	0.87	351.07 *	13.02	3.89E-01	7.95E-02
Pb-212	0.99	115.18	0.60		
		238.63 *	43.60	1.57E-01	2.80E-02
		300.09	3.30		
Pb-214	1.00	241.99	7.25		
		295.22	18.42		

Analysis Report for 18-Jun-19-10042

L1-10207A-AJGS-102SS

<b>Nuclide Name</b>	<b>Id Confidence</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Activity Uncertainty</b>
Pb-214	1.00	351.93 *	35.60	1.42E-01	2.90E-02
		785.96	1.06		
Ac-228	0.99	129.07	2.42		
		209.25	3.89		
		270.24	3.46		
		328.00	2.95		
		338.32	11.27		
		409.46	1.92		
		463.00	4.40		
		794.95	4.25		
		911.20 *	25.80	2.55E-01	5.29E-02
		964.77	4.99		
		968.97	15.80		
		1588.20	3.22		

\* = Energy line found in the spectrum.

- = Manually added nuclide.

? = Manually edited nuclide.

@ = Energy line not used for Weighted Mean Activity

Energy Tolerance : 1.000 keV

Nuclide confidence index threshold = 0.30

Errors quoted at 1.000sigma

## INTERFERENCE CORRECTED REPORT

<b>Nuclide Name</b>	<b>Nuclide Id Confidence</b>	<b>Wt mean Activity (pCi/grams)</b>	<b>Wt mean Activity Uncertainty</b>	<b>Comments</b>
BE-7	1.000	1.42E-01	5.53E-02	
K-40	0.991	5.60E+00	4.49E-01	
Cs-137	1.000	1.72E-01	2.38E-02	
Tl-208	1.000	9.99E-02	1.50E-02	
? Bi-211	0.876	3.89E-01	7.95E-02	
Pb-212	0.995	1.57E-01	2.80E-02	
? Pb-214	1.000	1.42E-01	2.90E-02	
Ac-228	0.998	2.55E-01	5.29E-02	

Analysis Report for 18-Jun-19-10042

L1-10207A-AJGS-102SS

- ? = 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 1.000sigma

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Analysis Report for 18-Jun-19-10042

L1-10207A-AJGS-102SS

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**UNIDENTIFIED PEAKS**


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Peak Locate Performed on : 6/18/2019 1:05:41PM  
 Peak Locate From Channel : 120  
 Peak Locate To Channel : 8192

Peak No.	Energy (keV)	Peak Size (CPS)	Peak CPS (%) Uncertainty	Peak Type	Tolerance Nuclide
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All peaks were identified.

M = First peak in a multiplet region

m = Other peak in a multiplet region

F = Fitted singlet

Errors quoted at 1.000sigma

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**NUCLIDE MDA REPORT**


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Nuclide Library Used : C:\Canberra\Apex\Root\Default\Library\ZION LIB-BNL.NLB

Nuclide Name	Energy (keV)	Yield(%)	Activity (pCi/grams)	Nuclide MDA (pCi/grams)	Line MDA (pCi/grams)
An Pk	511.00	100.00	6.17E-02	5.46E-02	5.46E-02
+ BE-7	477.60	* 10.44	1.42E-01	1.59E-01	1.59E-01
+ K-40	1460.82	* 10.66	5.60E+00	5.20E-01	5.20E-01
Mn-54	834.85	99.98	-8.08E-04	3.93E-02	3.93E-02
Co-60	1173.23	99.85	3.83E-02	5.11E-02	6.58E-02
	1332.49	99.98	1.37E-02		5.11E-02
Nb-94	702.65	99.81	8.72E-03	3.93E-02	3.93E-02
	871.09	99.89	2.12E-02		4.30E-02
Ag-108m	79.13	6.60	8.13E-01	3.47E-02	1.13E+00
	433.94	90.50	-2.11E-02		3.47E-02
	614.28	89.80	-4.81E-02		4.79E-02
	722.94	90.80	-1.20E-02		5.04E-02
Sb-125	176.31	6.84	1.70E-01	1.21E-01	4.05E-01
	380.45	1.52	7.13E-02		2.17E+00
	427.87	29.60	6.48E-02		1.21E-01
	463.36	10.49	1.97E-01		3.62E-01
	600.60	17.65	-3.67E-02		2.35E-01
	606.71	4.98	1.14E+00		1.16E+00
	635.95	11.22	1.95E-01		3.54E-01

Analysis Report for 18-Jun-19-10042

L1-10207A-AJGS-102SS

Nuclide Name	Energy (keV)	Yield(%)	Activity (pCi/grams)	Nuclide MDA (pCi/grams)	Line MDA (pCi/grams)
Sb-125	671.44	1.79	-7.84E-01	1.21E-01	2.01E+00
Ba-133	79.61	2.65	1.59E+00	5.55E-02	2.72E+00
	81.00	32.90	-2.64E-01		1.70E-01
	276.40	7.16	-7.91E-02		4.72E-01
	302.85	18.34	1.08E-01		1.77E-01
	356.01	62.05	-2.35E-02		5.55E-02
	383.85	8.94	1.99E-01		3.71E-01
Cs-134	475.36	1.48	1.68E+00	4.55E-02	2.45E+00
	563.25	8.34	-8.05E-01		4.87E-01
	569.33	15.37	-2.84E-02		2.60E-01
	604.72	97.62	-5.13E-02		5.37E-02
	795.86	85.46	1.97E-02		4.55E-02
	801.95	8.69	-9.94E-02		3.88E-01
	1038.61	0.99	-1.95E+00		4.39E+00
	1167.97	1.79	-2.16E-01		3.57E+00
	1365.19	3.02	2.32E-01		1.69E+00
+ Cs-137	661.66	* 85.10	1.72E-01	5.02E-02	5.02E-02
Eu-152	121.78	28.67	1.70E-02	1.05E-01	1.07E-01
	244.70	7.61	7.74E-02		4.41E-01
	295.94	0.45	-4.19E+00		7.50E+00
	344.28	26.60	-3.13E-02		1.05E-01
	367.79	0.86	-6.58E-01		3.65E+00
	411.12	2.24	-3.87E-01		1.37E+00
	443.96	2.83	-3.24E-01		1.16E+00
	488.68	0.42	1.94E+00		8.67E+00
	563.99	0.49	-9.19E+00		7.77E+00
	586.26	0.46	9.61E-01		1.29E+01
	678.62	0.47	5.80E+00		7.99E+00
	688.67	0.86	-8.27E-01		3.92E+00
	719.35	0.28	6.02E+00		1.57E+01
	778.90	12.96	-2.62E-01		3.07E-01
	810.45	0.32	3.48E+00		1.27E+01
	867.37	4.26	1.02E-01		9.02E-01
	919.33	0.43	-3.20E+00		1.06E+01
	964.08	14.65	3.66E-01		4.30E-01
	1085.87	10.24	-5.87E-02		4.15E-01
	1089.74	1.73	1.24E+00		2.53E+00
	1112.07	13.69	5.70E-02		3.62E-01
	1212.95	1.43	2.01E+00		4.42E+00
	1249.94	0.19	1.14E+01		3.16E+01
	1299.14	1.63	6.11E-01		2.60E+00
	1408.01	21.07	6.77E-02		2.20E-01
	1457.64	0.50	1.19E+02		3.84E+01
	1528.10	0.28	-5.06E+00		9.70E+00
Eu-154	123.07	40.40	-9.48E-03	7.36E-02	7.36E-02
	247.93	6.89	-3.07E-01		4.42E-01
	591.76	4.95	2.77E-02		6.81E-01
	692.42	1.78	8.50E-01		2.03E+00
	723.30	20.06	-7.03E-02		2.28E-01
	756.80	4.52	5.60E-01		9.29E-01
	873.18	12.08	1.05E-03		3.56E-01



Analysis Report for 18-Jun-19-10042

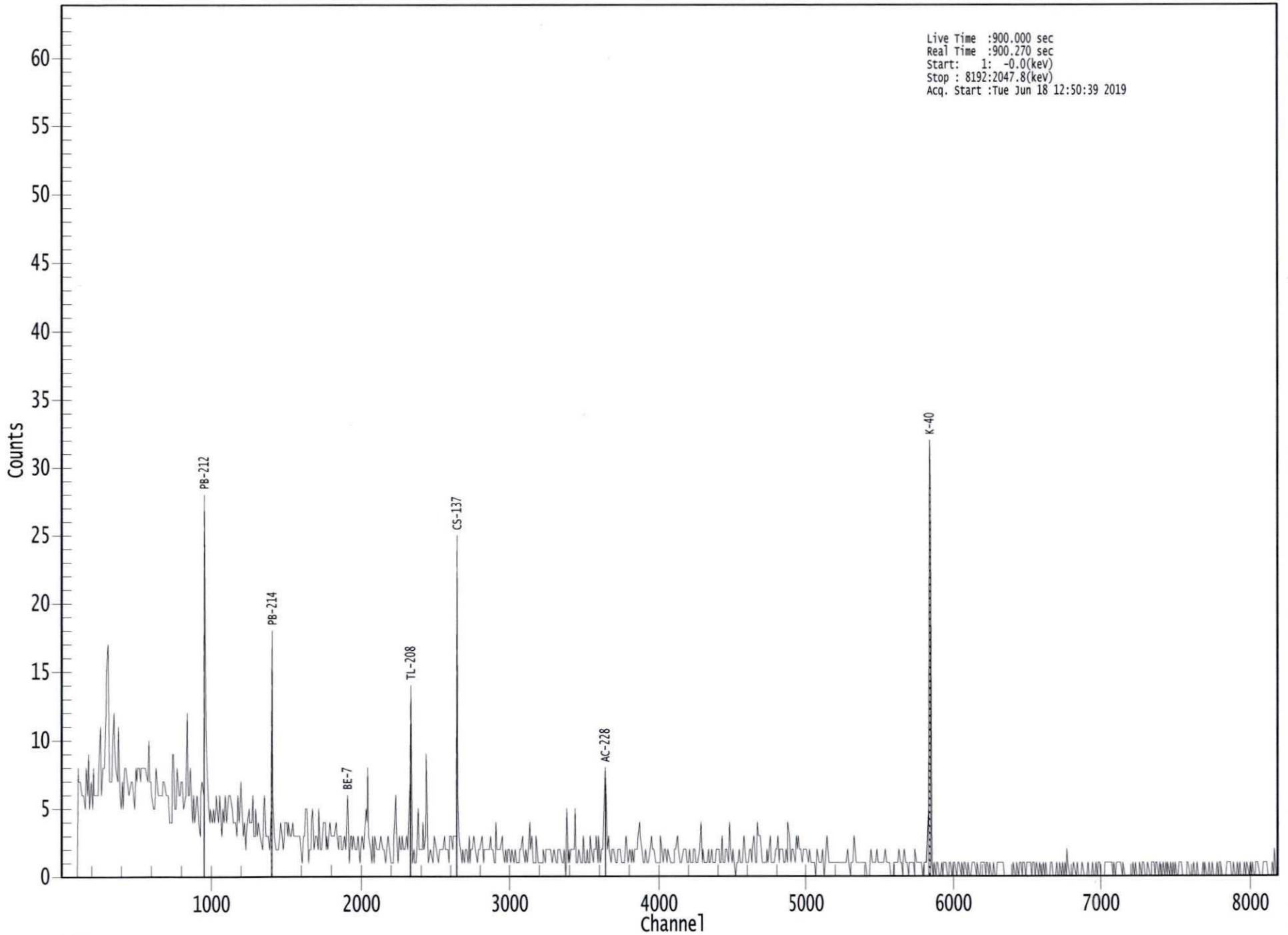
L1-10207A-AJGS-102SS

<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Nuclide MDA (pCi/grams)</b>	<b>Line MDA (pCi/grams)</b>
Eu-154	996.29	10.48	-2.28E-01	7.36E-02	3.93E-01
	1004.76	18.01	-2.62E-02		2.47E-01
	1274.43	34.80	1.47E-01		1.62E-01
	1596.48	1.80	1.41E-01		1.08E+00
Eu-155	45.30	1.31	2.92E+00	1.71E-01	1.02E+01
	60.01	1.22	-4.49E-01		1.03E+01
	86.55	30.70	8.82E-02		1.81E-01
Ra-226	105.31	21.10	-8.33E-02	8.42E-01	1.71E-01
Ra-226	186.21	3.64	5.76E-01	8.42E-01	8.42E-01
	Pa-231	27.36	10.30		7.90E-01
Pa-231	283.69	1.70	2.94E-01	1.16E+00	2.00E+00
	300.07	2.47	-6.75E-01		1.30E+00
	302.65	2.20	1.35E+00		1.50E+00
	330.06	1.40	-1.11E+00		2.17E+00
	U-235	143.76	10.96		1.99E-02
U-235	163.33	5.08	-2.07E-01	5.33E-02	5.64E-01
	185.71	57.20	2.42E-02		5.33E-02
	202.11	1.08	2.99E-01		2.68E+00
	205.31	5.01	-8.18E-01		5.52E-01
Am-241	59.54	35.90	-1.36E-01	3.59E-01	3.59E-01

- + = 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  
 ? = CAUTION: MDA value is inconsistent with Currie MDA at 95% confidence level

0000077475.CNF

Live Time :900.000 sec  
Real Time :900.270 sec  
Start: 1: -0.0(keV)  
Stop : 8192:2047.8(keV)  
Acq. Start :Tue Jun 18 12:50:39 2019



ROI Type: 1

Analysis Report for 18-Jun-19-10043  
L1-10207A-AJGS-103SS

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## GAMMA SPECTRUM ANALYSIS

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Sample Identification : 18-Jun-19-10043  
Sample Description : L1-10207A-AJGS-103SS  
Sample Type : Soil  
Unit :  
Sample Point :  
  
Sample Size : 1.807E+03 grams  
Facility : Default  
  
Sample Taken On : 6/17/2019 12:34:00PM  
Acquisition Started : 6/18/2019 12:59:26PM  
  
Procedure : 130G\_SOIL\_1  
Operator : Administrator  
Detector Name : 324  
Geometry : 130G\_SOIL\_1  
Live Time : 900.0 seconds  
Real Time : 900.3 seconds  
  
Dead Time : 0.03 %  
  
Peak Locate Threshold : 3.00  
Peak Locate Range (in channels) : 120 - 4096  
Peak Area Range (in channels) : 120 - 4096  
Identification Energy Tolerance : 1.000 keV  
  
Energy Calibration Used Done On : 9/29/2018  
Efficiency Calibration Used Done On : 6/18/2019  
Efficiency Calibration Description :  
  
Sample Number : 77476  
Fill Height : 1807.45 gram  
Certificate Name : Eu155-Na22  
Certificate Date : 1/30/2013 12:00:00PM




6-18-19

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## PEAK ANALYSIS REPORT

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Peak Analysis Performed on : 6/18/2019 1:14:28PM  
Peak Analysis From Channel : 120  
Peak Analysis To Channel : 4096

  
6-19-19

Analysis Report for 18-Jun-19-10043

L1-10207A-AJGS-103SS

Peak No.	Energy (keV)	ROI start	ROI end	Peak Centroid	Net Peak Area	Net Area Uncertainty	Continuum Counts	FWHM (keV)
1	238.69	473 -	481	477.55	6.69E+01	17.79	1.08E+02	1.05
2	338.56	672 -	681	677.09	3.11E+01	11.00	3.99E+01	1.28
3	352.11	700 -	709	704.17	6.68E+01	12.84	4.32E+01	1.10
4	583.26	1163 -	1171	1166.13	4.81E+01	9.09	1.59E+01	1.43
5	609.34	1213 -	1223	1218.26	6.20E+01	9.39	1.10E+01	1.44
6	1460.83	2915 -	2929	2921.71	1.99E+02	15.00	9.21E+00	1.95

M = First peak in a multiplet region  
m = Other peak in a multiplet region  
F = Fitted singlet  
Errors quoted at 1.000sigma

No background subtract performed on this spectrum.

## NUCLIDE IDENTIFICATION REPORT

Nuclide Library Used : C:\Canberra\Apex\Root\Default\Library\ZION LIB-BNL.NLB

### IDENTIFIED NUCLIDES

Nuclide Name	Id Confidence	Energy (keV)	Yield(%)	Activity (pCi/grams)	Activity Uncertainty
K-40	1.00	1460.82 *	10.66	3.59E+00	3.12E-01
Tl-208	0.99	583.19 *	85.00	6.00E-02	1.19E-02
Pb-212	1.00	115.18	0.60		
		238.63 *	43.60	9.16E-02	2.54E-02
		300.09	3.30		
Bi-214	1.00	609.32 *	45.49	1.49E-01	2.42E-02
		768.36	4.89		
		806.18	1.26		
		934.06	3.11		
		1120.29	14.92		
		1155.21	1.63		

Analysis Report for 18-Jun-19-10043

L1-10207A-AJGS-103SS

<b>Nuclide Name</b>	<b>Id Confidence</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Activity Uncertainty</b>		
Bi-214	1.00	1238.12	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				
		1661.27	1.05				
		1729.59	2.88				
		1764.49	15.30				
		1847.43	2.03				
		2118.51	1.16				
		Pb-214	0.99	241.99	7.25		
				295.22	18.42		
351.93 *	35.60			1.43E-01	2.96E-02		
Ac-228	0.99	785.96	1.06				
		129.07	2.42				
		209.25	3.89				
		270.24	3.46				
		328.00	2.95				
		338.32 *	11.27	2.04E-01	7.40E-02		
		409.46	1.92				
		463.00	4.40				
		794.95	4.25				
		911.20	25.80				
		964.77	4.99				
968.97	15.80						
1588.20	3.22						

\* = Energy line found in the spectrum.

- = Manually added nuclide.

? = Manually edited nuclide.

@ = Energy line not used for Weighted Mean Activity

Energy Tolerance : 1.000 keV

Nuclide confidence index threshold = 0.30

Errors quoted at 1.000sigma

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**INTERFERENCE CORRECTED REPORT**

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Analysis Report for 18-Jun-19-10043

L1-10207A-AJGS-103SS

<b>Nuclide Name</b>	<b>Nuclide Id Confidence</b>	<b>Wt mean Activity (pCi/grams)</b>	<b>Wt mean Activity Uncertainty</b>	<b>Comments</b>
K-40	1.000	3.59E+00	3.12E-01	
Tl-208	0.999	6.00E-02	1.19E-02	
Pb-212	1.000	9.16E-02	2.54E-02	
Bi-214	1.000	1.49E-01	2.42E-02	
Pb-214	0.997	1.43E-01	2.96E-02	
Ac-228	0.999	2.04E-01	7.40E-02	

- ? = 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 1.000sigma

Analysis Report for 18-Jun-19-10043  
L1-10207A-AJGS-103SS

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## UNIDENTIFIED PEAKS

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Peak Locate Performed on : 6/18/2019 1:14:28PM  
Peak Locate From Channel : 120  
Peak Locate To Channel : 4096

Peak No.	Energy (keV)	Peak Size (CPS)	Peak CPS (%) Uncertainty	Peak Type	Tolerance Nuclide
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All peaks were identified.

M = First peak in a multiplet region  
m = Other peak in a multiplet region  
F = Fitted singlet  
Errors quoted at 1.000sigma

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## NUCLIDE MDA REPORT

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Nuclide Library Used : C:\Canberra\Apex\Root\Default\Library\ZION LIB-BNL.NLB

Nuclide Name	Energy (keV)	Yield(%)	Activity (pCi/grams)	Nuclide MDA (pCi/grams)	Line MDA (pCi/grams)
An Pk	511.00	100.00	8.04E-02	5.22E-02	5.22E-02
BE-7	477.60	10.44	2.26E-01	3.47E-01	3.47E-01
+ K-40	1460.82	* 10.66	3.59E+00	3.66E-01	3.66E-01
Mn-54	834.85	99.98	1.16E-02	3.96E-02	3.96E-02
Co-60	1173.23	99.85	1.77E-02	4.08E-02	4.69E-02
	1332.49	99.98	-1.35E-02		4.08E-02
Nb-94	702.65	99.81	-4.56E-03	3.04E-02	3.04E-02
	871.09	99.89	5.97E-03		3.82E-02
Ag-108m	79.13	6.60	-2.29E-01	2.98E-02	9.94E-01
	433.94	90.50	-2.08E-02		2.98E-02
	614.28	89.80	-2.31E-02		4.37E-02
	722.94	90.80	6.43E-03		3.97E-02
Sb-125	176.31	6.84	-1.10E-01	9.83E-02	4.55E-01
	380.45	1.52	5.17E-02		1.87E+00
	427.87	29.60	-2.04E-02		9.83E-02
	463.36	10.49	7.47E-02		2.57E-01
	600.60	17.65	9.20E-02		1.89E-01
	606.71	4.98	-2.33E-01		1.00E+00
	635.95	11.22	-1.66E-01		2.54E-01

Analysis Report for 18-Jun-19-10043

L1-10207A-AJGS-103SS

<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Nuclide MDA (pCi/grams)</b>	<b>Line MDA (pCi/grams)</b>
Sb-125	671.44	1.79	5.32E-01	9.83E-02	1.92E+00
Ba-133	79.61	2.65	-9.13E-01	6.70E-02	2.33E+00
	81.00	32.90	-1.50E-01		1.64E-01
	276.40	7.16	-1.44E-01		3.84E-01
	302.85	18.34	7.92E-02		1.60E-01
	356.01	62.05	1.39E-02		6.70E-02
	383.85	8.94	6.05E-03		3.35E-01
Cs-134	475.36	1.48	1.21E+00	4.39E-02	2.40E+00
	563.25	8.34	6.64E-02		3.79E-01
	569.33	15.37	2.38E-02		1.95E-01
	604.72	97.62	-1.19E-02		4.39E-02
	795.86	85.46	1.46E-02		4.49E-02
	801.95	8.69	-2.00E-01		3.73E-01
	1038.61	0.99	1.23E+00		3.43E+00
	1167.97	1.79	-2.22E+00		2.30E+00
	1365.19	3.02	-5.01E-01		1.05E+00
Cs-137	661.66	85.10	1.67E-02	4.55E-02	4.55E-02
Eu-152	121.78	28.67	7.71E-03	1.06E-01	1.06E-01
	244.70	7.61	-1.29E-01		4.12E-01
	295.94	0.45	2.67E+00		7.39E+00
	344.28	26.60	-7.26E-02		1.10E-01
	367.79	0.86	1.07E-01		3.21E+00
	411.12	2.24	-3.99E-02		1.29E+00
	443.96	2.83	-6.42E-01		9.41E-01
	488.68	0.42	3.54E+00		7.47E+00
	563.99	0.49	9.45E-01		6.34E+00
	586.26	0.46	-2.06E+00		1.07E+01
	678.62	0.47	-4.96E+00		5.76E+00
	688.67	0.86	-3.27E-01		3.20E+00
	719.35	0.28	2.45E-01		1.23E+01
	778.90	12.96	-2.00E-02		2.74E-01
	810.45	0.32	4.40E-01		8.24E+00
	867.37	4.26	-1.50E-01		8.79E-01
	919.33	0.43	-5.61E+00		7.54E+00
	964.08	14.65	-1.31E-01		3.13E-01
	1085.87	10.24	-3.43E-01		3.67E-01
	1089.74	1.73	6.94E-01		2.32E+00
	1112.07	13.69	-1.26E-01		2.72E-01
	1212.95	1.43	4.03E-01		3.07E+00
	1249.94	0.19	1.21E+00		2.27E+01
	1299.14	1.63	8.39E-01		2.82E+00
	1408.01	21.07	1.78E-02		1.67E-01
	1457.64	0.50	-2.21E+00		2.78E+01
	1528.10	0.28	-1.18E+00		1.03E+01
Eu-154	123.07	40.40	1.25E-02	7.62E-02	7.62E-02
	247.93	6.89	1.21E-01		4.10E-01
	591.76	4.95	2.09E-01		7.11E-01
	692.42	1.78	-6.50E-01		1.59E+00
	723.30	20.06	4.71E-02		1.77E-01
	756.80	4.52	-4.43E-02		6.90E-01
	873.18	12.08	1.08E-01		3.00E-01



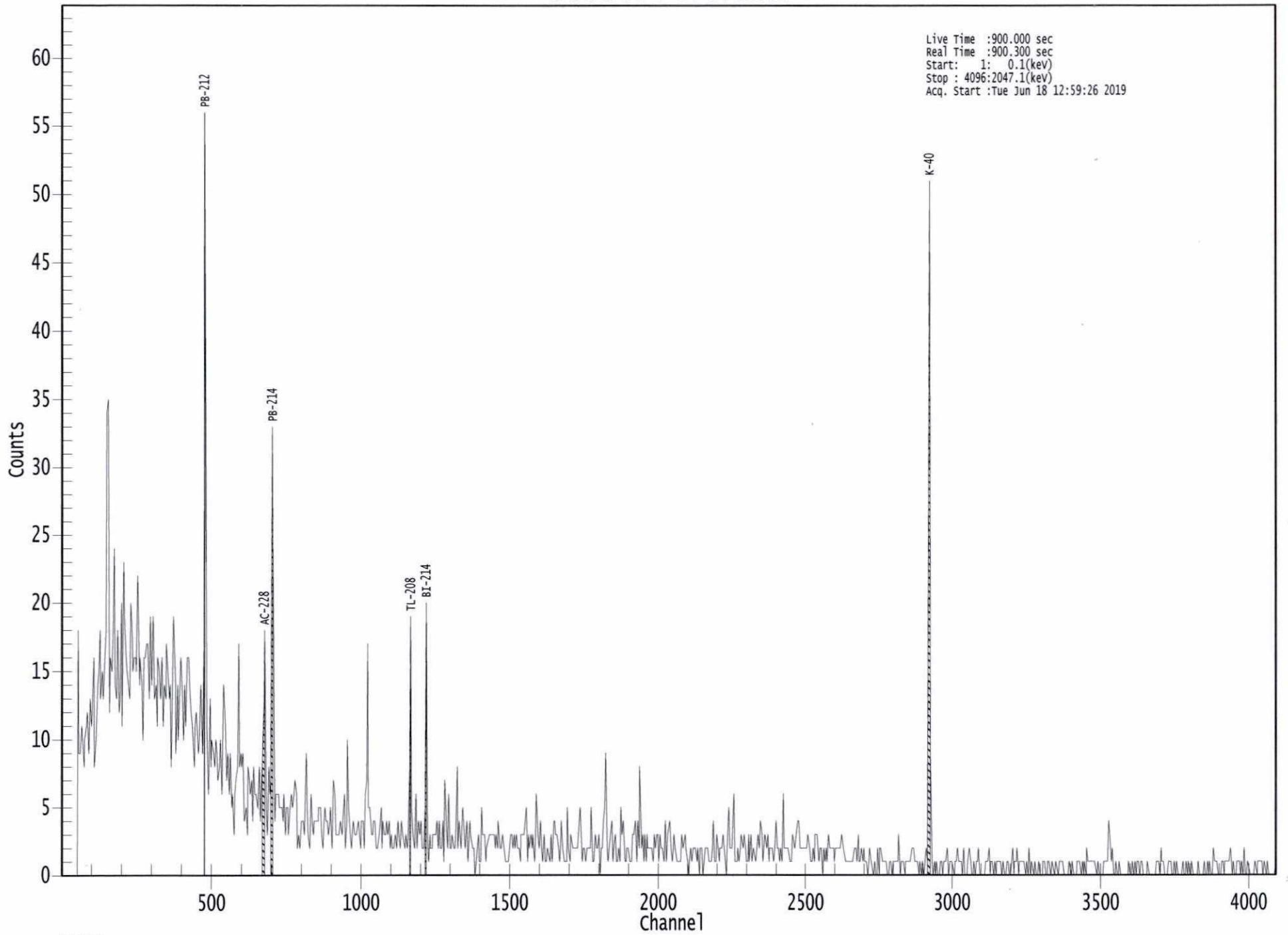
Analysis Report for 18-Jun-19-10043

L1-10207A-AJGS-103SS

<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Nuclide MDA (pCi/grams)</b>	<b>Line MDA (pCi/grams)</b>
Eu-154	996.29	10.48	3.85E-02	7.62E-02	3.56E-01
	1004.76	18.01	0.00E+00		2.08E-01
	1274.43	34.80	-6.15E-02		1.20E-01
	1596.48	1.80	-1.06E-01		1.78E+00
Eu-155	45.30	1.31	-1.70E+00	1.70E-01	9.24E+00
	60.01	1.22	-2.40E-01		1.10E+01
	86.55	30.70	1.03E-01		1.70E-01
	105.31	21.10	4.92E-02		1.70E-01
Ra-226	186.21	3.64	6.52E-01	9.18E-01	9.18E-01
Pa-231	27.36	10.30	1.09E+00	1.17E+00	1.17E+00
	283.69	1.70	2.81E-01		1.60E+00
	300.07	2.47	-4.22E-01		1.26E+00
	302.65	2.20	6.60E-01		1.33E+00
	330.06	1.40	-6.99E-01		1.82E+00
U-235	143.76	10.96	4.10E-02	5.76E-02	2.59E-01
	163.33	5.08	7.73E-02		6.19E-01
	185.71	57.20	3.05E-02		5.76E-02
	202.11	1.08	8.71E-01		2.87E+00
	205.31	5.01	-2.95E-01		5.69E-01
Am-241	59.54	35.90	1.17E-02	3.76E-01	3.76E-01

- + = 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  
 ? = CAUTION: MDA value is inconsistent with Currie MDA at 95% confidence level

000077476.CNF



 ROI Type: 1

Analysis Report for 18-Jun-19-10044  
L1-10207A-AJGS-104SS

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## GAMMA SPECTRUM ANALYSIS

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Sample Identification : 18-Jun-19-10044  
Sample Description : L1-10207A-AJGS-104SS  
Sample Type : Soil  
Unit :  
Sample Point :  
  
Sample Size : 1.579E+03 grams  
Facility : Default  
  
Sample Taken On : 6/17/2019 12:36:00PM  
Acquisition Started : 6/18/2019 1:06:43PM  
  
Procedure : 130G\_SOIL\_1  
Operator : Administrator  
Detector Name : P40818B  
Geometry : 130G\_SOIL\_1  
Live Time : 900.0 seconds  
Real Time : 901.2 seconds  
  
Dead Time : 0.13 %  
  
Peak Locate Threshold : 3.00  
Peak Locate Range (in channels) : 120 - 8192  
Peak Area Range (in channels) : 120 - 8192  
Identification Energy Tolerance : 1.000 keV  
  
Energy Calibration Used Done On : 1/29/2019  
Efficiency Calibration Used Done On : 6/18/2019  
Efficiency Calibration Description :  
  
Sample Number : 77477  
Fill Height : 1579.39 gram  
Certificate Name : Eu155-Na22  
Certificate Date : 1/30/2012 12:00:00PM



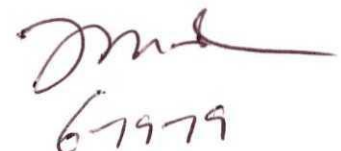
6-18-19

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## PEAK ANALYSIS REPORT

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Peak Analysis Performed on : 6/18/2019 1:21:46PM  
Peak Analysis From Channel : 120  
Peak Analysis To Channel : 8192

  
67979

Analysis Report for 18-Jun-19-10044

L1-10207A-AJGS-104SS

Peak No.	Energy (keV)	ROI start	ROI end	Peak Centroid	Net Peak Area	Net Area Uncertainty	Continuum Counts	FWHM (keV)
1	238.54	949 -	959	954.26	1.06E+02	15.01	4.97E+01	1.12
2	351.88	1401 -	1414	1407.24	6.25E+01	10.91	2.05E+01	0.37
3	582.75	2325 -	2336	2330.23	3.80E+01	7.79	9.00E+00	1.07
4	608.79	2429 -	2441	2434.35	5.01E+01	8.41	7.91E+00	0.62
5	860.16	3435 -	3444	3439.60	9.66E+00	3.60	1.34E+00	0.36
6	1459.81	5829 -	5849	5839.05	2.58E+02	16.06	0.00E+00	1.62

M = First peak in a multiplet region  
m = Other peak in a multiplet region  
F = Fitted singlet  
Errors quoted at 1.000sigma

No background subtract performed on this spectrum.

## NUCLIDE IDENTIFICATION REPORT

Nuclide Library Used : C:\Canberra\Apex\Root\Default\Library\ZION LIB-BNL.NLB

### IDENTIFIED NUCLIDES

Nuclide Name	Id Confidence	Energy (keV)	Yield(%)	Activity (pCi/grams)	Activity Uncertainty
Tl-208	0.97	583.19 *	85.00	6.29E-02	1.34E-02
Bi-211	0.90	351.07 *	13.02	4.75E-01	9.13E-02
Pb-212	0.99	115.18	0.60		
		238.63 *	43.60	1.89E-01	3.07E-02
		300.09	3.30		
Bi-214	0.98	609.32 *	45.49	1.60E-01	2.85E-02
		768.36	4.89		
		806.18	1.26		
		934.06	3.11		
		1120.29	14.92		
		1155.21	1.63		

Analysis Report for 18-Jun-19-10044

L1-10207A-AJGS-104SS

<b>Nuclide Name</b>	<b>Id Confidence</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Activity Uncertainty</b>
Bi-214	0.98	1238.12	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		
		1661.27	1.05		
		1729.59	2.88		
		1764.49	15.30		
		1847.43	2.03		
		2118.51	1.16		
		Pb-214	1.00	241.99	7.25
295.22	18.42				
351.93 *	35.60			1.74E-01	3.34E-02
785.96	1.06				

\* = Energy line found in the spectrum.

- = Manually added nuclide.

? = Manually edited nuclide.

@ = Energy line not used for Weighted Mean Activity

Energy Tolerance : 1.000 keV

Nuclide confidence index threshold = 0.30

Errors quoted at 1.000sigma

## INTERFERENCE CORRECTED REPORT

<b>Nuclide Name</b>	<b>Nuclide Id Confidence</b>	<b>Wt mean Activity (pCi/grams)</b>	<b>Wt mean Activity Uncertainty</b>	<b>Comments</b>
Tl-208	0.971	6.29E-02	1.34E-02	
? Bi-211	0.901	4.75E-01	9.13E-02	
Pb-212	0.999	1.89E-01	3.07E-02	
Bi-214	0.982	1.60E-01	2.85E-02	
? Pb-214	1.000	1.74E-01	3.34E-02	

Analysis Report for 18-Jun-19-10044

L1-10207A-AJGS-104SS

- ? = 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 1.000sigma

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Analysis Report for 18-Jun-19-10044

L1-10207A-AJGS-104SS

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**UNIDENTIFIED PEAKS**


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Peak Locate Performed on : 6/18/2019 1:21:46PM  
 Peak Locate From Channel : 120  
 Peak Locate To Channel : 8192

Peak No.	Energy (keV)	Peak Size (CPS)	Peak CPS (%) Uncertainty	Peak Type	Tolerance Nuclide
5	860.16	1.07323E-02	37.32		TL-208
6	1459.81	2.86667E-01	6.23		K-40

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M = First peak in a multiplet region  
 m = Other peak in a multiplet region  
 F = Fitted singlet  
 Errors quoted at 1.000sigma

JJ 6-18-19

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**NUCLIDE MDA REPORT**


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Nuclide Library Used : C:\Canberra\Apex\Root\Default\Library\ZION LIB-BNL.NLB

Nuclide Name	Energy (keV)	Yield(%)	Activity (pCi/grams)	Nuclide MDA (pCi/grams)	Line MDA (pCi/grams)
An Pk	511.00	100.00	8.90E-02	6.34E-02	6.34E-02
BE-7	477.60	10.44	1.76E-01	4.17E-01	4.17E-01
K-40	1460.82	10.66	6.12E+00	1.99E+00	1.99E+00
Mn-54	834.85	99.98	2.52E-02	4.29E-02	4.29E-02
Co-60	1173.23	99.85	1.97E-02	4.95E-02	6.07E-02
	1332.49	99.98	-2.64E-03		4.95E-02
Nb-94	702.65	99.81	1.01E-02	4.45E-02	4.45E-02
	871.09	99.89	3.60E-02		4.88E-02
Ag-108m	79.13	6.60	1.73E-01	3.91E-02	1.85E+00
	433.94	90.50	-2.56E-02		3.91E-02
	614.28	89.80	-2.11E-02		5.21E-02
	722.94	90.80	5.49E-04		4.99E-02
Sb-125	176.31	6.84	5.25E-01	1.26E-01	5.76E-01
	380.45	1.52	5.38E-01		2.29E+00
	427.87	29.60	6.27E-02		1.26E-01
	463.36	10.49	2.49E-01		4.14E-01
	600.60	17.65	-7.29E-02		2.26E-01

Analysis Report for 18-Jun-19-10044

L1-10207A-AJGS-104SS

<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Nuclide MDA (pCi/grams)</b>	<b>Line MDA (pCi/grams)</b>
Sb-125	606.71	4.98	2.07E+00	1.26E-01	1.34E+00
	635.95	11.22	1.41E-01		3.58E-01
	671.44	1.79	5.36E-01		2.15E+00
Ba-133	79.61	2.65	3.58E-01	6.29E-02	4.41E+00
	81.00	32.90	-1.48E-01		2.98E-01
	276.40	7.16	2.84E-02		5.47E-01
	302.85	18.34	3.04E-03		2.07E-01
	356.01	62.05	-1.82E-02		6.29E-02
	383.85	8.94	-3.27E-01		3.44E-01
Cs-134	475.36	1.48	-2.12E+00	6.03E-02	2.93E+00
	563.25	8.34	1.83E-01		4.81E-01
	569.33	15.37	3.83E-02		2.71E-01
	604.72	97.62	-5.22E-02		6.49E-02
	795.86	85.46	3.27E-02		6.03E-02
	801.95	8.69	-2.61E-01		4.79E-01
	1038.61	0.99	-3.10E+00		4.25E+00
	1167.97	1.79	8.00E-01		3.32E+00
	1365.19	3.02	5.89E-01		1.67E+00
	Cs-137	661.66	85.10		4.83E-03
Eu-152	121.78	28.67	6.09E-02	1.25E-01	1.53E-01
	244.70	7.61	-7.61E-02		5.53E-01
	295.94	0.45	4.74E+00		9.98E+00
	344.28	26.60	1.19E-02		1.25E-01
	367.79	0.86	1.33E-01		4.11E+00
	411.12	2.24	-1.24E-02		1.66E+00
	443.96	2.83	-7.18E-02		1.30E+00
	488.68	0.42	-4.71E-01		9.15E+00
	563.99	0.49	-9.04E-01		8.05E+00
	586.26	0.46	-1.65E+00		1.30E+01
	678.62	0.47	8.82E-01		8.73E+00
	688.67	0.86	-1.29E+00		4.75E+00
	719.35	0.28	-1.12E+01		1.32E+01
	778.90	12.96	-1.18E-01		3.36E-01
	810.45	0.32	-1.95E+00		1.27E+01
	867.37	4.26	5.56E-01		1.16E+00
	919.33	0.43	5.16E-01		1.20E+01
	964.08	14.65	3.38E-03		4.17E-01
	1085.87	10.24	-1.58E-01		4.86E-01
	1089.74	1.73	9.01E-01		2.95E+00
	1112.07	13.69	-2.06E-01		3.51E-01
	1212.95	1.43	-3.64E+00		4.02E+00
	1249.94	0.19	2.38E+01		3.34E+01
1299.14	1.63	1.82E+00	3.45E+00		
1408.01	21.07	1.09E-01	2.10E-01		
1457.64	0.50	1.36E+02	4.19E+01		
1528.10	0.28	3.87E+00	1.21E+01		
Eu-154	123.07	40.40	2.21E-02	1.07E-01	1.07E-01
	247.93	6.89	5.21E-01		5.75E-01
	591.76	4.95	2.31E-01		8.63E-01
	692.42	1.78	-5.24E-01		2.44E+00
	723.30	20.06	7.67E-02		2.22E-01



Analysis Report for 18-Jun-19-10044

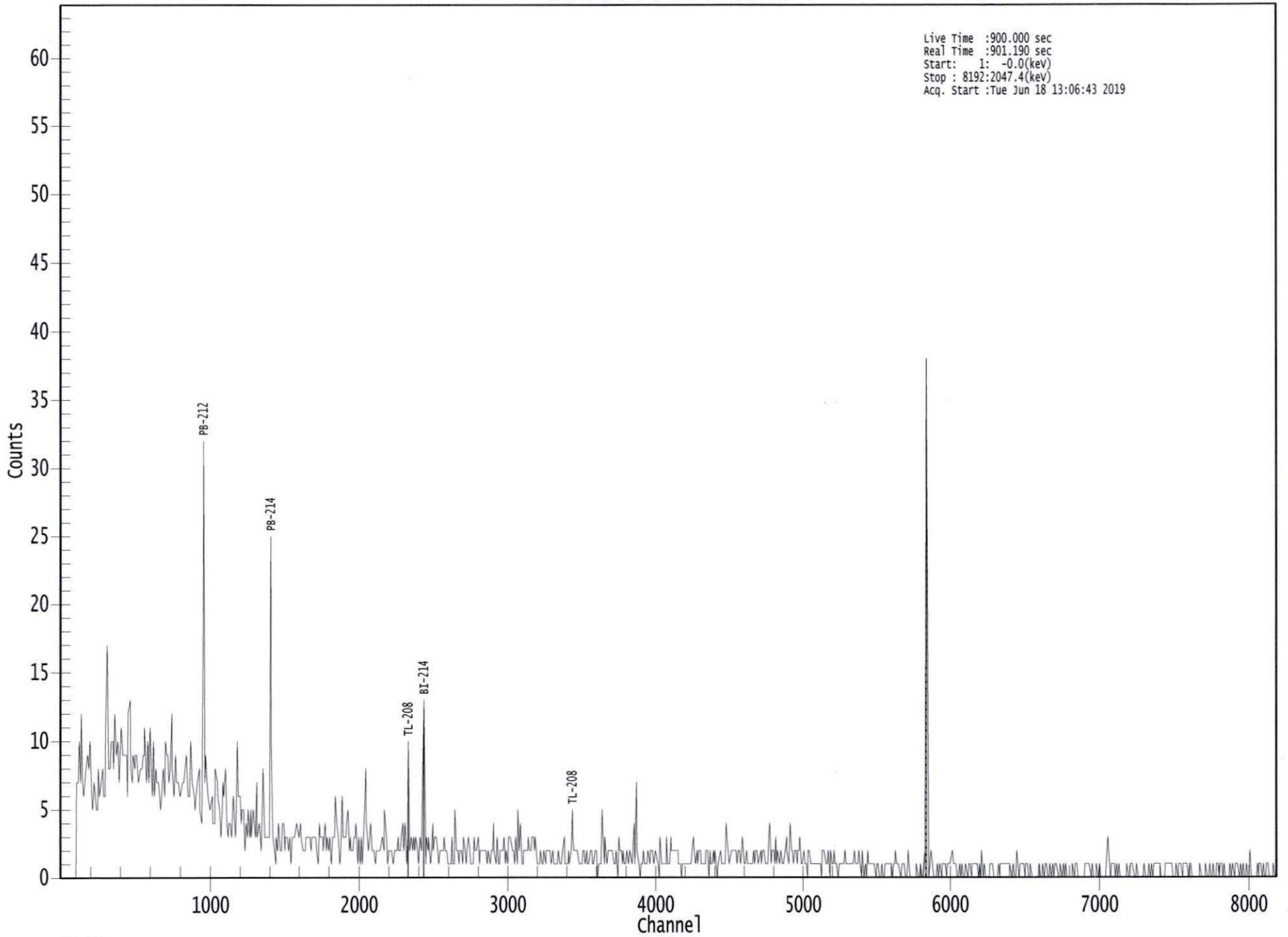
L1-10207A-AJGS-104SS


<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Nuclide MDA (pCi/grams)</b>	<b>Line MDA (pCi/grams)</b>
Eu-154	756.80	4.52	-8.33E-02	1.07E-01	1.00E+00
	873.18	12.08	0.00E+00		3.73E-01
	996.29	10.48	1.88E-01		5.37E-01
	1004.76	18.01	2.07E-02		2.63E-01
	1274.43	34.80	9.02E-02		1.63E-01
	1596.48	1.80	0.00E+00		2.44E+00
Eu-155	45.30	1.31	-2.10E+01	2.64E-01	3.04E+01
	60.01	1.22	-1.40E+01		2.92E+01
	86.55	30.70	1.97E-01		2.65E-01
	105.31	21.10	-1.68E-02		2.64E-01
Ra-226	186.21	3.64	1.38E+00	1.19E+00	1.19E+00
Pa-231	27.36	10.30	2.40E+00	1.65E+00	3.15E+00
	283.69	1.70	1.67E-02		2.00E+00
	300.07	2.47	5.70E-01		1.65E+00
	302.65	2.20	7.13E-01		1.76E+00
	330.06	1.40	2.14E+00		2.76E+00
	U-235	143.76	10.96		-1.71E-01
U-235	163.33	5.08	2.98E-02	7.52E-02	7.12E-01
	185.71	57.20	6.83E-02		7.52E-02
	202.11	1.08	-8.48E-03		3.48E+00
	205.31	5.01	1.13E-01		7.68E-01
Am-241	59.54	35.90	-2.43E-01	1.06E+00	1.06E+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  
 ? = CAUTION: MDA value is inconsistent with Currie MDA at 95% confidence level

0000077477.CNF

Live Time :900.000 sec  
Real Time :901.190 sec  
Start: 1: -0.0(keV)  
Stop : 8192:2047.4(keV)  
Acq. Start :Tue Jun 18 13:06:43 2019



 ROI Type: 1


Analysis Report for 19-Jun-19-10010  
L1-10208B-AJGS-101SS

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## GAMMA SPECTRUM ANALYSIS

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Sample Identification : 19-Jun-19-10010  
Sample Description : L1-10208B-AJGS-101SS  
Sample Type : Soil  
Unit :  
Sample Point :  
  
Sample Size : 1.709E+03 grams  
Facility : Default  
  
Sample Taken On : 6/17/2019 12:36:00PM  
Acquisition Started : 6/19/2019 8:09:15AM  
  
Procedure : 130G\_SOIL\_1  
Operator : Administrator  
Detector Name : P11314  
Geometry : 130G\_SOIL\_1  
Live Time : 900.0 seconds  
Real Time : 900.3 seconds  
  
Dead Time : 0.03 %  
  
Peak Locate Threshold : 3.00  
Peak Locate Range (in channels) : 120 - 8192  
Peak Area Range (in channels) : 120 - 8192  
Identification Energy Tolerance : 1.000 keV  
  
Energy Calibration Used Done On : 1/24/2019  
Efficiency Calibration Used Done On : 6/19/2019  
Efficiency Calibration Description :  
  
Sample Number : 77501  
Fill Height : 1709.03 gram  
Certificate Name : Eu155-Na22  
Certificate Date : 12/22/2008 12:00:00PM


  
6-19-19

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## PEAK ANALYSIS REPORT

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Peak Analysis Performed on : 6/19/2019 8:24:18AM  
Peak Analysis From Channel : 120  
Peak Analysis To Channel : 8192

  
6-19-19

Analysis Report for 19-Jun-19-10010

L1-10208B-AJGS-101SS

Peak No.	Energy (keV)	ROI start	ROI end	Peak Centroid	Net Peak Area	Net Area Uncertainty	Continuum Counts	FWHM (keV)
1	209.53	834 -	841	837.86	2.82E+01	9.28	2.88E+01	0.62
2	238.82	948 -	962	954.84	1.50E+02	20.45	8.87E+01	0.89
3	295.28	1175 -	1186	1180.42	3.85E+01	11.48	3.65E+01	0.61
4	338.22	1347 -	1359	1351.95	3.53E+01	9.80	2.28E+01	0.62
5	351.97	1400 -	1412	1406.90	1.15E+02	12.73	1.78E+01	1.14
6	583.28	2324 -	2338	2331.24	6.73E+01	10.74	1.67E+01	1.53
7	609.12	2426 -	2440	2434.52	7.47E+01	10.07	9.30E+00	0.65
8	968.69	3866 -	3879	3872.19	3.51E+01	7.00	4.93E+00	1.02
9	1460.38	5826 -	5851	5839.48	3.46E+02	18.96	3.22E+00	1.91

M = First peak in a multiplet region

m = Other peak in a multiplet region

F = Fitted singlet

Errors quoted at 1.000sigma

No background subtract performed on this spectrum.

## NUCLIDE IDENTIFICATION REPORT

Nuclide Library Used : C:\Canberra\Apex\Root\Default\Library\ZION LIB-BNL.NLB

### IDENTIFIED NUCLIDES

Nuclide Name	Id Confidence	Energy (keV)	Yield(%)	Activity (pCi/grams)	Activity Uncertainty
K-40	0.97	1460.82 *	10.66	7.53E+00	5.27E-01
Tl-208	0.99	583.19 *	85.00	9.89E-02	1.69E-02
Bi-211	0.87	351.07 *	13.02	7.77E-01	1.06E-01
Pb-212	0.99	115.18	0.60		
		238.63 *	43.60	2.34E-01	3.71E-02
		300.09	3.30		
Bi-214	0.99	609.32 *	45.49	2.11E-01	3.12E-02
		768.36	4.89		

Analysis Report for 19-Jun-19-10010

L1-10208B-AJGS-101SS

<b>Nuclide Name</b>	<b>Id Confidence</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Activity Uncertainty</b>
Bi-214	0.99	806.18	1.26		
		934.06	3.11		
		1120.29	14.92		
		1155.21	1.63		
		1238.12	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		
		1661.27	1.05		
		1729.59	2.88		
		1764.49	15.30		
		1847.43	2.03		
Pb-214	1.00	2118.51	1.16		
		241.99	7.25		
		295.22 *	18.42	1.62E-01	4.98E-02
		351.93 *	35.60	2.84E-01	3.88E-02
		785.96	1.06		
Ac-228	0.57	129.07	2.42		
		209.25 *	3.89	4.60E-01	1.56E-01
		270.24	3.46		
		328.00	2.95		
		338.32 *	11.27	2.67E-01	7.73E-02
		409.46	1.92		
		463.00	4.40		
		794.95	4.25		
		911.20	25.80		
		964.77	4.99		
		968.97 *	15.80	3.90E-01	7.98E-02
		1588.20	3.22		

\* = Energy line found in the spectrum.

- = Manually added nuclide.

? = Manually edited nuclide.

@ = Energy line not used for Weighted Mean Activity

Energy Tolerance : 1.000 keV

Nuclide confidence index threshold = 0.30

Errors quoted at 1.000sigma

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**INTERFERENCE CORRECTED REPORT**

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Analysis Report for 19-Jun-19-10010

L1-10208B-AJGS-101SS

<b>Nuclide Name</b>	<b>Nuclide Id Confidence</b>	<b>Wt mean Activity (pCi/grams)</b>	<b>Wt mean Activity Uncertainty</b>	<b>Comments</b>
K-40	0.970	7.53E+00	5.27E-01	
Tl-208	0.999	9.89E-02	1.69E-02	
Bi-211	0.878	3.35E-01	1.73E-01	
Pb-212	0.995	2.34E-01	3.71E-02	
Bi-214	0.997	2.11E-01	3.12E-02	
Pb-214	1.000	1.62E-01	4.98E-02	
Ac-228	0.572	3.42E-01	5.23E-02	

? = 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 1.000sigma

Analysis Report for 19-Jun-19-10010

L1-10208B-AJGS-101SS

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**UNIDENTIFIED PEAKS**


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Peak Locate Performed on : 6/19/2019 8:24:18AM  
 Peak Locate From Channel : 120  
 Peak Locate To Channel : 8192

Peak No.	Energy (keV)	Peak Size (CPS)	Peak CPS (%) Uncertainty	Peak Type	Tolerance Nuclide
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All peaks were identified.

M = First peak in a multiplet region

m = Other peak in a multiplet region

F = Fitted singlet

Errors quoted at 1.000sigma

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**NUCLIDE MDA REPORT**


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Nuclide Library Used : C:\Canberra\Apex\Root\Default\Library\ZION LIB-BNL.NLB

Nuclide Name	Energy (keV)	Yield(%)	Activity (pCi/grams)	Nuclide MDA (pCi/grams)	Line MDA (pCi/grams)
An Pk	511.00	100.00	4.90E-02	5.65E-02	5.65E-02
BE-7	477.60	10.44	1.72E-01	4.24E-01	4.24E-01
+ K-40	1460.82	* 10.66	7.53E+00	3.35E-01	3.35E-01
Mn-54	834.85	99.98	-3.56E-02	4.92E-02	4.92E-02
Co-60	1173.23	99.85	-2.52E-02	6.03E-02	6.63E-02
	1332.49	99.98	3.59E-03		6.03E-02
Nb-94	702.65	99.81	1.60E-02	4.20E-02	4.20E-02
	871.09	99.89	3.21E-02		4.55E-02
Ag-108m	79.13	6.60	7.08E-01	4.14E-02	1.28E+00
	433.94	90.50	-3.37E-02		4.14E-02
	614.28	89.80	-1.26E-02		5.25E-02
	722.94	90.80	1.09E-02		5.03E-02
Sb-125	176.31	6.84	-2.09E-01	1.36E-01	4.86E-01
	380.45	1.52	-3.66E-01		2.53E+00
	427.87	29.60	8.23E-02		1.36E-01
	463.36	10.49	1.15E-01		3.78E-01
	600.60	17.65	-1.43E-02		2.35E-01
	606.71	4.98	1.71E+00		1.32E+00
	635.95	11.22	2.53E-01		4.19E-01

Analysis Report for 19-Jun-19-10010

L1-10208B-AJGS-101SS

<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Nuclide MDA (pCi/grams)</b>	<b>Line MDA (pCi/grams)</b>
Sb-125	671.44	1.79	-2.11E+00	1.36E-01	2.27E+00
Ba-133	79.61	2.65	1.87E+00	6.76E-02	3.13E+00
	81.00	32.90	-2.74E-01		2.08E-01
	276.40	7.16	3.77E-01		5.04E-01
	302.85	18.34	5.04E-02		1.93E-01
	356.01	62.05	-7.75E-02		6.76E-02
	383.85	8.94	7.29E-02		4.16E-01
Cs-134	475.36	1.48	-1.17E+00	6.06E-02	2.73E+00
	563.25	8.34	-1.80E-01		5.29E-01
	569.33	15.37	-2.69E-01		2.26E-01
	604.72	97.62	-2.77E-02		6.39E-02
	795.86	85.46	2.98E-02		6.06E-02
	801.95	8.69	-2.14E-01		5.12E-01
	1038.61	0.99	-1.33E+00		5.59E+00
	1167.97	1.79	-4.19E+00		3.69E+00
	1365.19	3.02	5.32E-01		1.53E+00
Cs-137	661.66	85.10	3.96E-02	6.10E-02	6.10E-02
Eu-152	121.78	28.67	-9.76E-02	1.17E-01	1.17E-01
	244.70	7.61	6.32E-01		5.30E-01
	295.94	0.45	5.82E+00		9.90E+00
	344.28	26.60	3.87E-02		1.41E-01
	367.79	0.86	-5.86E-01		3.76E+00
	411.12	2.24	3.96E-01		1.60E+00
	443.96	2.83	-6.40E-01		1.26E+00
	488.68	0.42	-1.23E+01		7.20E+00
	563.99	0.49	-8.60E+00		8.45E+00
	586.26	0.46	-1.53E+00		1.42E+01
	678.62	0.47	3.16E+00		8.55E+00
	688.67	0.86	-8.94E-01		4.67E+00
	719.35	0.28	1.61E+00		1.48E+01
	778.90	12.96	5.91E-02		3.36E-01
	810.45	0.32	-3.38E+00		1.50E+01
	867.37	4.26	-2.76E-01		1.10E+00
	919.33	0.43	-4.26E+00		8.99E+00
	964.08	14.65	-1.63E-01		5.12E-01
	1085.87	10.24	-4.79E-04		5.31E-01
	1089.74	1.73	1.67E+00		3.05E+00
	1112.07	13.69	2.77E-02		4.16E-01
	1212.95	1.43	-1.03E+00		5.11E+00
	1249.94	0.19	-9.62E+00		3.11E+01
	1299.14	1.63	-4.00E+00		2.81E+00
	1408.01	21.07	9.92E-02		2.30E-01
	1457.64	0.50	1.61E+02		4.29E+01
	1528.10	0.28	-6.18E+00		1.25E+01
Eu-154	123.07	40.40	-6.53E-02	7.94E-02	7.94E-02
	247.93	6.89	-3.35E-01		4.20E-01
	591.76	4.95	7.33E-01		8.27E-01
	692.42	1.78	8.71E-01		2.20E+00
	723.30	20.06	7.94E-02		2.31E-01
	756.80	4.52	5.54E-02		1.00E+00
	873.18	12.08	-1.67E-01		3.83E-01



Analysis Report for 19-Jun-19-10010

L1-10208B-AJGS-101SS

<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Nuclide MDA (pCi/grams)</b>	<b>Line MDA (pCi/grams)</b>
Eu-154	996.29	10.48	-1.69E-01	7.94E-02	4.51E-01
	1004.76	18.01	-1.68E-01		2.54E-01
	1274.43	34.80	7.32E-02		1.79E-01
	1596.48	1.80	6.00E-01		2.39E+00
Eu-155	45.30	1.31	3.64E+00	1.94E-01	1.26E+01
	60.01	1.22	-2.04E-01		1.26E+01
	86.55	30.70	1.07E-01		1.97E-01
	105.31	21.10	1.70E-03		1.94E-01
Ra-226	186.21	3.64	3.81E-01	9.96E-01	9.96E-01
Pa-231	27.36	10.30	9.49E-01	1.27E+00	1.27E+00
	283.69	1.70	1.28E-01		1.88E+00
	300.07	2.47	2.47E-01		1.44E+00
	302.65	2.20	-1.02E-01		1.62E+00
	330.06	1.40	1.73E+00		2.76E+00
U-235	143.76	10.96	3.53E-02	6.39E-02	3.26E-01
	163.33	5.08	1.48E-01		6.85E-01
	185.71	57.20	3.71E-02		6.39E-02
	202.11	1.08	1.37E+00		3.32E+00
	205.31	5.01	-5.20E-01		6.37E-01
Am-241	59.54	35.90	-4.16E-01	4.10E-01	4.10E-01

+ = Nuclide identified during the nuclide identification

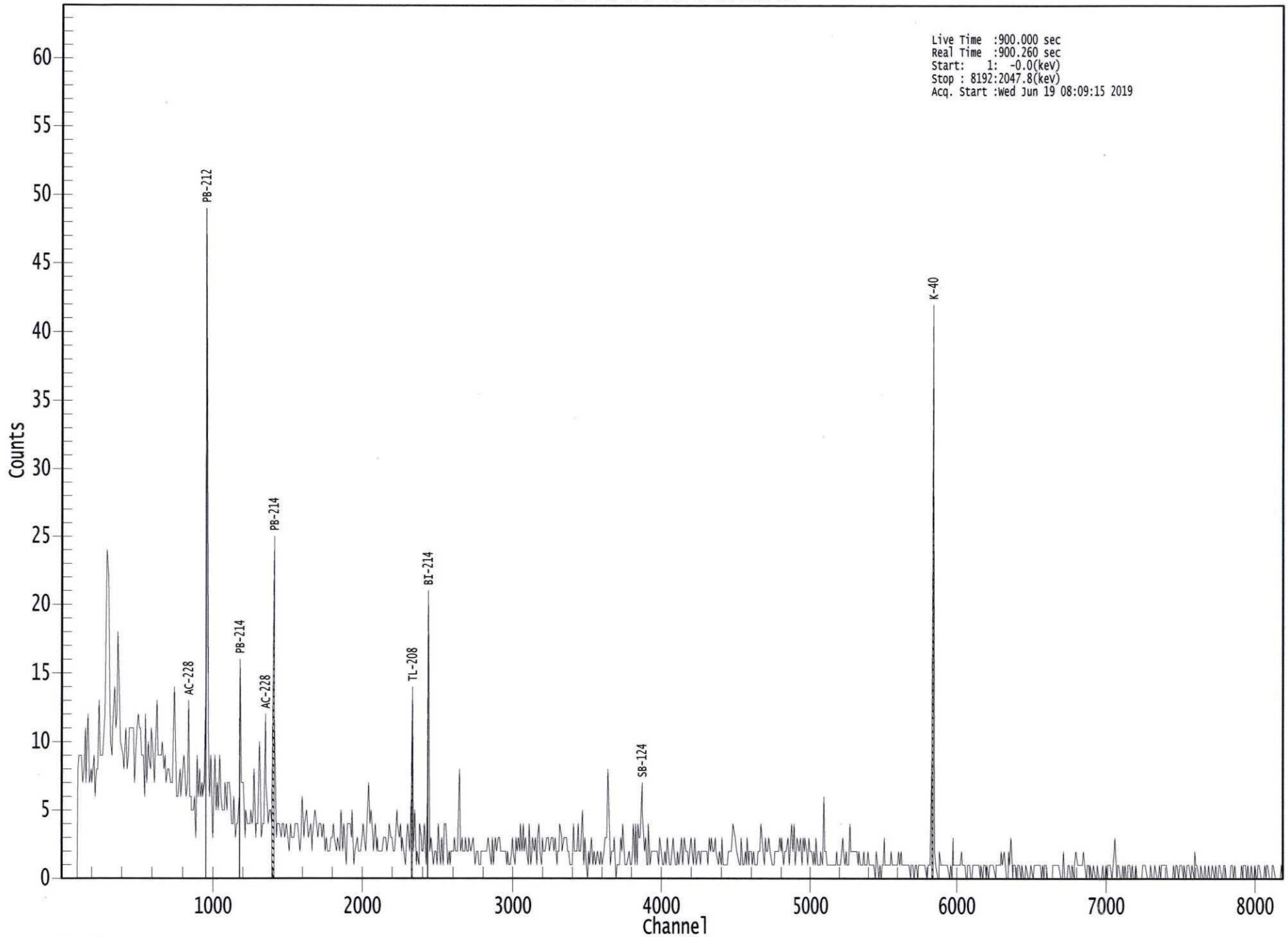
\* = Energy line found in the spectrum

&gt; = MDA value not calculated

@ = Half-life too short to be able to perform the decay correction

? = CAUTION: MDA value is inconsistent with Currie MDA at 95% confidence level

# 000077501.CNF



Live Time : 900.000 sec  
Real Time : 900.260 sec  
Start : 1: -0.0(kev)  
Stop : 8192:2047.8(kev)  
Acq. Start : wed Jun 19 08:09:15 2019

 ROI Type: 1

Analysis Report for 19-Jun-19-10011  
L1-10208B-QJGS-101SS

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## GAMMA SPECTRUM ANALYSIS

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Sample Identification : 19-Jun-19-10011  
Sample Description : L1-10208B-QJGS-101SS  
Sample Type : Soil  
Unit :  
Sample Point :  
  
Sample Size : 1.688E+03 grams  
Facility : Default  
  
Sample Taken On : 6/17/2019 12:36:00PM  
Acquisition Started : 6/19/2019 8:29:36AM  
  
Procedure : 130G\_SOIL\_1  
Operator : Administrator  
Detector Name : P11314  
Geometry : 130G\_SOIL\_1  
Live Time : 900.0 seconds  
Real Time : 900.3 seconds  
  
Dead Time : 0.03 %  
  
Peak Locate Threshold : 3.00  
Peak Locate Range (in channels) : 120 - 8192  
Peak Area Range (in channels) : 120 - 8192  
Identification Energy Tolerance : 1.000 keV  
  
Energy Calibration Used Done On : 1/24/2019  
Efficiency Calibration Used Done On : 6/19/2019  
Efficiency Calibration Description :  
  
Sample Number : 77503  
Fill Height : 1688.05 gram  
Certificate Name : Eu155-Na22  
Certificate Date : 12/22/2008 12:00:00PM




6-19-19

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## PEAK ANALYSIS REPORT

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Peak Analysis Performed on : 6/19/2019 8:44:39AM  
Peak Analysis From Channel : 120  
Peak Analysis To Channel : 8192

  
6-19-19

Analysis Report for 19-Jun-19-10011

L1-10208B-QJGS-101SS

Peak No.	Energy (keV)	ROI start	ROI end	Peak Centroid	Net Peak Area	Net Area Uncertainty	Continuum Counts	FWHM (keV)
1	238.83	949 -	961	954.89	1.45E+02	18.38	7.32E+01	0.98
2	295.53	1173 -	1185	1181.41	4.03E+01	11.59	3.58E+01	0.54
3	338.53	1346 -	1359	1353.19	3.01E+01	9.99	2.49E+01	0.87
4	351.94	1400 -	1415	1406.78	9.52E+01	14.04	3.38E+01	0.76
5	583.03	2324 -	2338	2330.25	6.45E+01	9.60	9.51E+00	1.09
6	609.21	2427 -	2441	2434.86	8.10E+01	11.41	1.70E+01	0.40
7	1460.45	5826 -	5850	5839.73	3.26E+02	18.75	6.25E+00	1.94

M = First peak in a multiplet region  
m = Other peak in a multiplet region  
F = Fitted singlet  
Errors quoted at 1.000sigma

No background subtract performed on this spectrum.

## NUCLIDE IDENTIFICATION REPORT

Nuclide Library Used : C:\Canberra\Apex\Root\Default\Library\ZION LIB-BNL.NLB

### IDENTIFIED NUCLIDES

Nuclide Name	Id Confidence	Energy (keV)	Yield(%)	Activity (pCi/grams)	Activity Uncertainty
K-40	0.97	1460.82	* 10.66	7.12E+00	5.13E-01
Tl-208	0.99	583.19	* 85.00	9.50E-02	1.53E-02
Pb-212	0.99	115.18	0.60		
		238.63	* 43.60	2.26E-01	3.40E-02
		300.09	3.30		
Bi-214	0.99	609.32	* 45.49	2.30E-01	3.52E-02
		768.36	4.89		
		806.18	1.26		
		934.06	3.11		
		1120.29	14.92		

Analysis Report for 19-Jun-19-10011

L1-10208B-QJGS-101SS

<b>Nuclide Name</b>	<b>Id Confidence</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Activity Uncertainty</b>
Bi-214	0.99	1155.21	1.63		
		1238.12	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		
		1661.27	1.05		
		1729.59	2.88		
		1764.49	15.30		
		1847.43	2.03		
		2118.51	1.16		
		Pb-214	0.99	241.99	7.25
295.22 *	18.42			1.69E-01	5.05E-02
351.93 *	35.60			2.35E-01	3.95E-02
785.96	1.06				
Ac-228	0.99	129.07	2.42		
		209.25	3.89		
		270.24	3.46		
		328.00	2.95		
		338.32 *	11.27	2.29E-01	7.81E-02
		409.46	1.92		
		463.00	4.40		
		794.95	4.25		
		911.20	25.80		
		964.77	4.99		
		968.97	15.80		
1588.20	3.22				

\* = Energy line found in the spectrum.

- = Manually added nuclide.

? = Manually edited nuclide.

@ = Energy line not used for Weighted Mean Activity

Energy Tolerance : 1.000 keV

Nuclide confidence index threshold = 0.30

Errors quoted at 1.000sigma

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**INTERFERENCE CORRECTED REPORT**

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Analysis Report for 19-Jun-19-10011

L1-10208B-QJGS-101SS

<b>Nuclide Name</b>	<b>Nuclide Id Confidence</b>	<b>Wt mean Activity (pCi/grams)</b>	<b>Wt mean Activity Uncertainty</b>	<b>Comments</b>	
	K-40	0.978	7.12E+00	5.13E-01	
	Tl-208	0.996	9.50E-02	1.53E-02	
X	Bi-211	0.886			
	Pb-212	0.994	2.26E-01	3.40E-02	
	Bi-214	0.999	2.30E-01	3.52E-02	
	Pb-214	0.996	2.10E-01	3.11E-02	
	Ac-228	0.999	2.29E-01	7.81E-02	

? = 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 1.000sigma

Analysis Report for 19-Jun-19-10011  
L1-10208B-QJGS-101SS

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## UNIDENTIFIED PEAKS

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Peak Locate Performed on : 6/19/2019 8:44:39AM  
Peak Locate From Channel : 120  
Peak Locate To Channel : 8192

Peak No.	Energy (keV)	Peak Size (CPS)	Peak CPS (%) Uncertainty	Peak Type	Tolerance Nuclide
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All peaks were identified.

M = First peak in a multiplet region

m = Other peak in a multiplet region

F = Fitted singlet

Errors quoted at 1.000sigma

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## NUCLIDE MDA REPORT

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Nuclide Library Used : C:\Canberra\Apex\Root\Default\Library\ZION LIB-BNL.NLB

Nuclide Name	Energy (keV)	Yield(%)	Activity (pCi/grams)	Nuclide MDA (pCi/grams)	Line MDA (pCi/grams)
An Pk	511.00	100.00	8.40E-02	5.89E-02	5.89E-02
BE-7	477.60	10.44	1.75E-01	4.01E-01	4.01E-01
+ K-40	1460.82	* 10.66	7.12E+00	4.40E-01	4.40E-01
Mn-54	834.85	99.98	2.31E-02	4.59E-02	4.59E-02
Co-60	1173.23	99.85	-1.05E-02	5.05E-02	5.66E-02
	1332.49	99.98	2.72E-02		5.05E-02
Nb-94	702.65	99.81	3.20E-02	4.33E-02	4.33E-02
	871.09	99.89	2.02E-02		4.71E-02
Ag-108m	79.13	6.60	4.27E-01	3.61E-02	1.24E+00
	433.94	90.50	6.99E-03		3.61E-02
	614.28	89.80	-1.05E-01		5.91E-02
	722.94	90.80	-3.24E-02		5.05E-02
Sb-125	176.31	6.84	3.99E-01	1.11E-01	4.70E-01
	380.45	1.52	-4.65E-01		2.36E+00
	427.87	29.60	-4.00E-02		1.11E-01
	463.36	10.49	-1.72E-01		3.39E-01
	600.60	17.65	8.31E-02		2.26E-01
	606.71	4.98	1.51E+00		1.43E+00
	635.95	11.22	2.28E-01		3.40E-01

Analysis Report for 19-Jun-19-10011

L1-10208B-QJGS-101SS

<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Nuclide MDA (pCi/grams)</b>	<b>Line MDA (pCi/grams)</b>
Sb-125	671.44	1.79	2.19E-01	1.11E-01	2.31E+00
Ba-133	79.61	2.65	2.36E+00	7.37E-02	3.07E+00
	81.00	32.90	-3.75E-01		1.93E-01
	276.40	7.16	2.92E-01		5.02E-01
	302.85	18.34	1.71E-01		2.08E-01
	356.01	62.05	1.66E-02		7.37E-02
	383.85	8.94	-1.68E-01		3.86E-01
Cs-134	475.36	1.48	5.04E-01	5.27E-02	2.81E+00
	563.25	8.34	-3.62E-01		4.88E-01
	569.33	15.37	9.85E-02		2.51E-01
	604.72	97.62	2.12E-03		6.37E-02
	795.86	85.46	3.56E-02		5.27E-02
	801.95	8.69	-8.76E-02		5.59E-01
	1038.61	0.99	-4.88E+00		4.55E+00
	1167.97	1.79	8.36E-01		3.30E+00
	1365.19	3.02	6.63E-01		1.66E+00
Cs-137	661.66	85.10	2.41E-02	6.11E-02	6.11E-02
Eu-152	121.78	28.67	-1.26E-03	1.18E-01	1.19E-01
	244.70	7.61	6.73E-02		4.93E-01
	295.94	0.45	-3.43E+00		9.39E+00
	344.28	26.60	-1.70E-03		1.18E-01
	367.79	0.86	-6.06E-01		3.58E+00
	411.12	2.24	-1.05E+00		1.49E+00
	443.96	2.83	-6.21E-01		1.08E+00
	488.68	0.42	1.57E+00		8.35E+00
	563.99	0.49	-1.38E+01		7.48E+00
	586.26	0.46	-3.99E+00		1.35E+01
	678.62	0.47	4.61E+00		7.76E+00
	688.67	0.86	3.13E+00		4.83E+00
	719.35	0.28	-3.41E-01		1.39E+01
	778.90	12.96	-1.11E-01		3.15E-01
	810.45	0.32	5.12E+00		1.40E+01
	867.37	4.26	-5.80E-01		1.07E+00
	919.33	0.43	8.76E+00		1.01E+01
	964.08	14.65	3.92E-01		4.58E-01
	1085.87	10.24	-7.64E-03		4.21E-01
	1089.74	1.73	-1.16E+00		2.68E+00
	1112.07	13.69	3.30E-01		4.05E-01
	1212.95	1.43	1.68E+00		4.87E+00
	1249.94	0.19	-3.37E+01		2.91E+01
	1299.14	1.63	-3.23E-01		3.47E+00
	1408.01	21.07	-5.84E-02		2.24E-01
	1457.64	0.50	1.55E+02		4.22E+01
	1528.10	0.28	-5.02E+00		1.07E+01
Eu-154	123.07	40.40	-3.45E-03	8.26E-02	8.26E-02
	247.93	6.89	1.45E-01		4.84E-01
	591.76	4.95	2.35E-01		7.67E-01
	692.42	1.78	4.37E-02		2.27E+00
	723.30	20.06	-4.77E-02		2.34E-01
	756.80	4.52	1.42E-01		9.77E-01
	873.18	12.08	-1.35E-01		3.90E-01



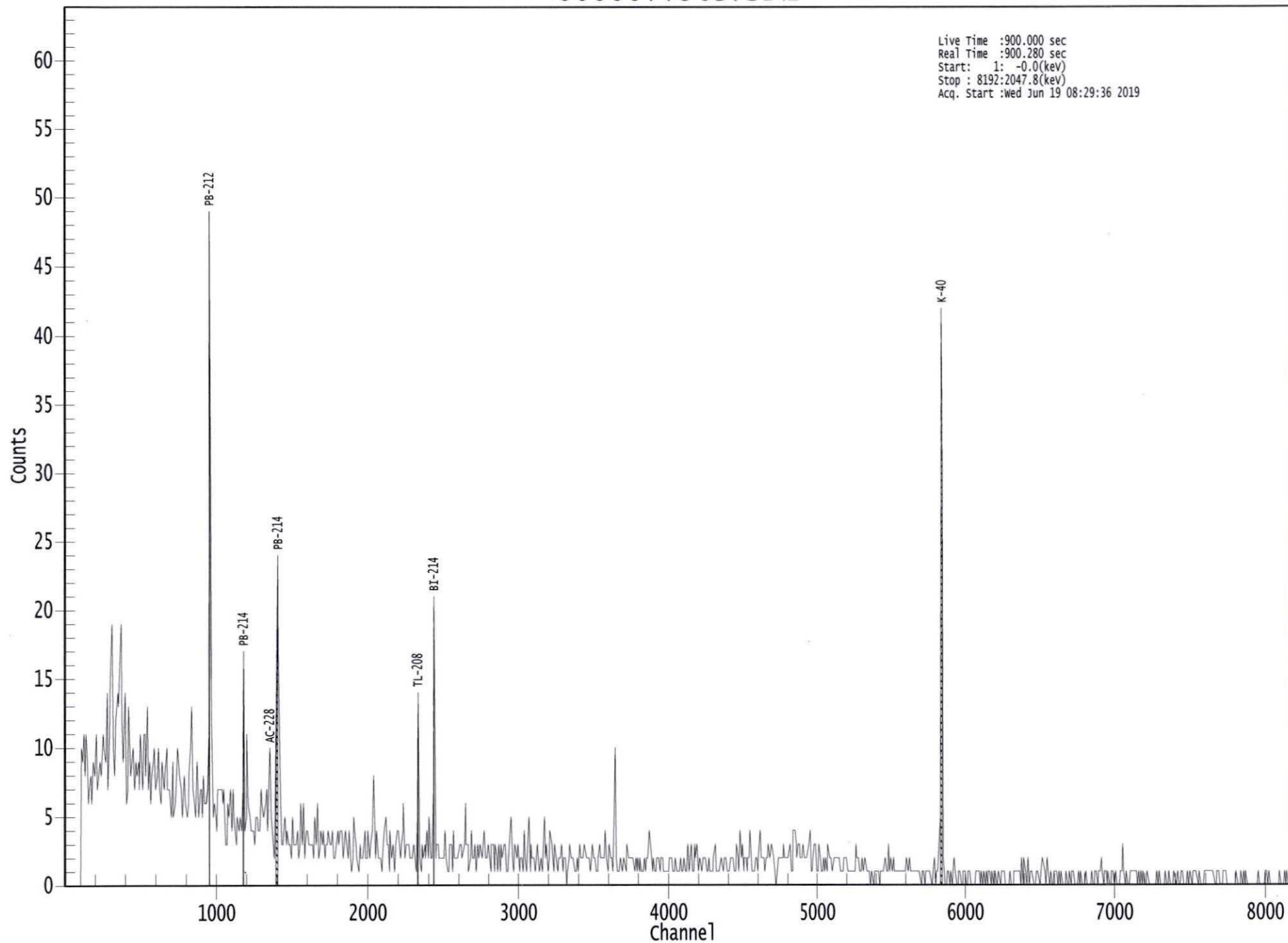
Analysis Report for 19-Jun-19-10011

L1-10208B-QJGS-101SS

<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Nuclide MDA (pCi/grams)</b>	<b>Line MDA (pCi/grams)</b>
Eu-154	996.29	10.48	1.51E-02	8.26E-02	4.44E-01
	1004.76	18.01	-6.69E-03		2.79E-01
	1274.43	34.80	-1.00E-01		1.71E-01
	1596.48	1.80	-2.78E-01		2.71E+00
Eu-155	45.30	1.31	2.70E-01	1.95E-01	1.07E+01
	60.01	1.22	-1.89E+00		1.30E+01
	86.55	30.70	-2.86E-02		1.95E-01
	105.31	21.10	9.68E-02		2.08E-01
Ra-226	186.21	3.64	8.38E-01	9.97E-01	9.97E-01
Pa-231	27.36	10.30	1.06E+00	1.37E+00	1.37E+00
	283.69	1.70	-4.69E-01		1.85E+00
	300.07	2.47	-1.25E+00		1.46E+00
	302.65	2.20	1.38E+00		1.72E+00
	330.06	1.40	2.59E-01		2.84E+00
U-235	143.76	10.96	-2.63E-01	6.25E-02	2.98E-01
	163.33	5.08	4.73E-01		6.49E-01
	185.71	57.20	3.61E-02		6.25E-02
	202.11	1.08	-1.27E+00		2.98E+00
	205.31	5.01	-3.63E-01		6.54E-01
Am-241	59.54	35.90	2.82E-01	4.61E-01	4.61E-01

- + = 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  
 ? = CAUTION: MDA value is inconsistent with Currie MDA at 95% confidence level

0000077503.CNF



ROI Type: 1

Analysis Report for 19-Jun-19-10012  
L1-10208B-AJGS-102SS

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## GAMMA SPECTRUM ANALYSIS

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Sample Identification : 19-Jun-19-10012  
Sample Description : L1-10208B-AJGS-102SS  
Sample Type : Soil  
Unit :  
Sample Point :  
  
Sample Size : 1.766E+03 grams  
Facility : Default  
  
Sample Taken On : 6/17/2019 12:38:00PM  
Acquisition Started : 6/19/2019 8:09:53AM  
  
Procedure : 130G\_SOIL\_1  
Operator : Administrator  
Detector Name : 352  
Geometry : 130G\_SOIL\_1  
Live Time : 900.0 seconds  
Real Time : 900.3 seconds  
  
Dead Time : 0.03 %  
  
Peak Locate Threshold : 3.00  
Peak Locate Range (in channels) : 120 - 8192  
Peak Area Range (in channels) : 120 - 8192  
Identification Energy Tolerance : 1.000 keV  
  
Energy Calibration Used Done On : 9/29/2018  
Efficiency Calibration Used Done On : 6/19/2019  
Efficiency Calibration Description :  
  
Sample Number : 77502  
Fill Height : 1766.26 gram  
Certificate Name : Eu155-Na22  
Certificate Date : 1/7/2013 12:00:00PM



6-19-19

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## PEAK ANALYSIS REPORT

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Peak Analysis Performed on : 6/19/2019 8:24:56AM  
Peak Analysis From Channel : 120  
Peak Analysis To Channel : 8192



6-19-19

Analysis Report for 19-Jun-19-10012

L1-10208B-AJGS-102SS

	<b>Peak No.</b>	<b>Energy (keV)</b>	<b>ROI start</b>	<b>ROI end</b>	<b>Peak Centroid</b>	<b>Net Peak Area</b>	<b>Net Area Uncertainty</b>	<b>Continuum Counts</b>	<b>FWHM (keV)</b>
M	1	74.82	295 -	315	300.62	2.54E+01	7.03	3.97E+01	0.51
m	2	77.37	295 -	315	310.79	2.64E+01	7.20	3.89E+01	0.52
	3	238.60	948 -	960	954.88	1.25E+02	18.15	7.57E+01	1.09
	4	295.18	1175 -	1187	1180.94	4.71E+01	11.10	2.89E+01	1.00
	5	338.12	1347 -	1361	1352.54	4.01E+01	10.44	2.39E+01	0.64
	6	351.78	1400 -	1414	1407.12	7.18E+01	12.94	3.32E+01	1.09
	7	510.56	2035 -	2049	2041.74	3.86E+01	11.56	3.24E+01	1.07
	8	583.23	2325 -	2339	2332.25	4.28E+01	9.34	1.52E+01	0.55
	9	609.01	2429 -	2444	2435.29	6.08E+01	9.20	8.21E+00	1.17
	10	661.31	2637 -	2651	2644.41	4.93E+01	8.49	7.66E+00	0.87
	11	911.14	3636 -	3650	3643.61	3.98E+01	8.50	1.13E+01	0.94
	12	1238.28	4946 -	4959	4952.67	2.06E+01	6.65	8.36E+00	0.31
	13	1460.42	5832 -	5853	5842.05	2.76E+02	18.39	1.75E+01	0.59

M = First peak in a multiplet region

m = Other peak in a multiplet region

F = Fitted singlet

Errors quoted at 1.000sigma

No background subtract performed on this spectrum.

## NUCLIDE IDENTIFICATION REPORT

Nuclide Library Used : C:\Canberra\Apex\Root\Default\Library\ZION LIB-BNL.NLB

### IDENTIFIED NUCLIDES

<b>Nuclide Name</b>	<b>Id Confidence</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Activity Uncertainty</b>
An Pk	0.97	511.00 *	100.00	4.30E-02	1.32E-02
K-40	0.97	1460.82 *	10.66	5.56E+00	4.43E-01
Cs-137	0.98	661.66 *	85.10	7.43E-02	1.35E-02
Tl-208	1.00	583.19 *	85.00	5.96E-02	1.35E-02

Analysis Report for 19-Jun-19-10012

L1-10208B-AJGS-102SS

<b>Nuclide Name</b>	<b>Id Confidence</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Activity Uncertainty</b>
Pb-212	1.00	115.18	0.60		
		238.63 *	43.60	1.92E-01	3.19E-02
		300.09	3.30		
Pb212-XR	0.99	74.82 *	10.28	4.35E-01	1.28E-01
		77.11 *	17.10	2.40E-01	7.02E-02
		87.35	3.97		
		89.78	1.46		
Bi-214	0.99	609.32 *	45.49	1.63E-01	2.65E-02
		768.36	4.89		
		806.18	1.26		
		934.06	3.11		
		1120.29	14.92		
		1155.21	1.63		
		1238.12 *	5.83	6.80E-01	2.21E-01
		1280.98	1.43		
		1377.67	3.99		
		1385.31	0.79		
		1401.52	1.33		
		1407.99	2.39		
		1509.21	2.13		
		1661.27	1.05		
		1729.59	2.88		
		1764.49	15.30		
		1847.43	2.03		
		2118.51	1.16		
Pb-214	0.99	241.99	7.25		
		295.22 *	18.42	1.92E-01	4.77E-02
		351.93 *	35.60	1.70E-01	3.36E-02
		785.96	1.06		
Ac-228	0.99	129.07	2.42		
		209.25	3.89		
		270.24	3.46		
		328.00	2.95		
		338.32 *	11.27	2.93E-01	7.99E-02
		409.46	1.92		
		463.00	4.40		
		794.95	4.25		
		911.20 *	25.80	2.44E-01	5.31E-02
		964.77	4.99		
		968.97	15.80		
		1588.20	3.22		

\* = Energy line found in the spectrum.

- = Manually added nuclide.

? = Manually edited nuclide.

@ = Energy line not used for Weighted Mean Activity

Energy Tolerance : 1.000 keV

Nuclide confidence index threshold = 0.30

Errors quoted at 1.000sigma

Analysis Report for 19-Jun-19-10012

L1-10208B-AJGS-102SS

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## INTERFERENCE CORRECTED REPORT

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<b>Nuclide Name</b>	<b>Nuclide Id Confidence</b>	<b>Wt mean Activity (pCi/grams)</b>	<b>Wt mean Activity Uncertainty</b>	<b>Comments</b>
An Pk	0.970	4.30E-02	1.32E-02	
K-40	0.975	5.56E+00	4.43E-01	
Cs-137	0.981	7.43E-02	1.35E-02	
Tl-208	1.000	5.96E-02	1.35E-02	
X Bi-211	0.922			
Pb-212	1.000	1.92E-01	3.19E-02	
Pb212-XR	0.994	2.85E-01	6.16E-02	
Bi-214	0.993	1.70E-01	2.63E-02	
Pb-214	0.998	1.77E-01	2.75E-02	
X Pb214-XR	0.994			
Ac-228	0.999	2.59E-01	4.42E-02	

- ? = 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 1.000sigma

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Analysis Report for 19-Jun-19-10012

L1-10208B-AJGS-102SS

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**UNIDENTIFIED PEAKS**


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Peak Locate Performed on : 6/19/2019 8:24:56AM  
 Peak Locate From Channel : 120  
 Peak Locate To Channel : 8192

Peak No.	Energy (keV)	Peak Size (CPS)	Peak CPS (%) Uncertainty	Peak Type	Tolerance Nuclide
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All peaks were identified.

M = First peak in a multiplet region

m = Other peak in a multiplet region

F = Fitted singlet

Errors quoted at 1.000sigma

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**NUCLIDE MDA REPORT**


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Nuclide Library Used : C:\Canberra\Apex\Root\Default\Library\ZION LIB-BNL.NLB

	Nuclide Name	Energy (keV)	Yield(%)	Activity (pCi/grams)	Nuclide MDA (pCi/grams)	Line MDA (pCi/grams)
+	An Pk	511.00	* 100.00	4.30E-02	4.00E-02	4.00E-02
	BE-7	477.60	10.44	3.38E-01	4.35E-01	4.35E-01
+	K-40	1460.82	* 10.66	5.56E+00	6.01E-01	6.01E-01
	Mn-54	834.85	99.98	-1.59E-02	4.36E-02	4.36E-02
	Co-60	1173.23	99.85	-2.36E-02	6.30E-02	7.27E-02
		1332.49	99.98	4.68E-02		6.30E-02
	Nb-94	702.65	99.81	1.07E-02	4.47E-02	4.78E-02
		871.09	99.89	1.77E-02		4.47E-02
	Ag-108m	79.13	6.60	1.16E-01	3.78E-02	1.41E+00
		433.94	90.50	1.72E-02		3.78E-02
		614.28	89.80	-2.33E-02		5.97E-02
		722.94	90.80	3.66E-02		5.14E-02
	Sb-125	176.31	6.84	3.78E-01	1.03E-01	5.43E-01
		380.45	1.52	-5.65E-01		2.45E+00
		427.87	29.60	-4.55E-02		1.03E-01
		463.36	10.49	1.78E-02		4.01E-01
		600.60	17.65	-1.57E-01		2.65E-01
		606.71	4.98	1.58E+00		1.24E+00
		635.95	11.22	3.93E-01		3.87E-01

Analysis Report for 19-Jun-19-10012

L1-10208B-AJGS-102SS

Nuclide Name	Energy (keV)	Yield(%)	Activity (pCi/grams)	Nuclide MDA (pCi/grams)	Line MDA (pCi/grams)
Sb-125	671.44	1.79	-2.90E-01	1.03E-01	2.43E+00
Ba-133	79.61	2.65	-2.41E-01	7.34E-02	3.50E+00
	81.00	32.90	-1.49E-01		2.36E-01
	276.40	7.16	7.83E-02		5.23E-01
	302.85	18.34	3.70E-02		2.06E-01
	356.01	62.05	1.53E-02		7.34E-02
	383.85	8.94	8.54E-02		4.14E-01
Cs-134	475.36	1.48	1.90E+00	5.30E-02	3.04E+00
	563.25	8.34	-1.24E-01		4.17E-01
	569.33	15.37	1.62E-01		2.43E-01
	604.72	97.62	-2.32E-02		6.16E-02
	795.86	85.46	4.86E-02		5.30E-02
	801.95	8.69	-1.70E-01		4.95E-01
	1038.61	0.99	-6.09E-01		4.41E+00
	1167.97	1.79	-4.14E-01		3.84E+00
	1365.19	3.02	-5.95E-01		1.46E+00
+ Cs-137	661.66	* 85.10	7.43E-02	2.87E-02	2.87E-02
Eu-152	121.78	28.67	-7.18E-02	1.24E-01	1.43E-01
	244.70	7.61	3.24E-02		5.45E-01
	295.94	0.45	7.74E+00		9.72E+00
	344.28	26.60	-7.61E-02		1.25E-01
	367.79	0.86	1.17E+00		3.99E+00
	411.12	2.24	-9.47E-01		1.60E+00
	443.96	2.83	7.56E-01		1.29E+00
	488.68	0.42	5.60E+00		9.08E+00
	563.99	0.49	-6.18E+00		6.88E+00
	586.26	0.46	9.65E+00		1.20E+01
	678.62	0.47	-1.54E+00		8.18E+00
	688.67	0.86	2.45E+00		4.67E+00
	719.35	0.28	-2.90E+00		1.35E+01
	778.90	12.96	-1.74E-01		3.30E-01
	810.45	0.32	-5.08E+00		1.31E+01
	867.37	4.26	-1.28E+00		9.81E-01
	919.33	0.43	-7.58E+00		9.80E+00
	964.08	14.65	3.71E-01		4.37E-01
	1085.87	10.24	1.90E-01		5.03E-01
	1089.74	1.73	-2.77E+00		2.55E+00
	1112.07	13.69	-2.68E-01		3.76E-01
	1212.95	1.43	6.46E-02		4.16E+00
	1249.94	0.19	-5.45E+00		2.89E+01
	1299.14	1.63	5.60E-01		3.39E+00
	1408.01	21.07	-1.51E-01		1.24E-01
	1457.64	0.50	1.26E+02		3.73E+01
	1528.10	0.28	2.31E+00		1.23E+01
Eu-154	123.07	40.40	5.80E-03	1.01E-01	1.01E-01
	247.93	6.89	-1.35E-01		4.99E-01
	591.76	4.95	-2.79E-01		9.35E-01
	692.42	1.78	3.28E-01		2.20E+00
	723.30	20.06	1.39E-01		2.33E-01
	756.80	4.52	-8.39E-01		9.03E-01
	873.18	12.08	4.27E-02		3.59E-01



Analysis Report for 19-Jun-19-10012

L1-10208B-AJGS-102SS

<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Nuclide MDA (pCi/grams)</b>	<b>Line MDA (pCi/grams)</b>
Eu-154	996.29	10.48	-4.95E-02	1.01E-01	4.59E-01
	1004.76	18.01	-6.37E-03		2.37E-01
	1274.43	34.80	2.62E-02		1.71E-01
	1596.48	1.80	-1.02E+00		2.31E+00
Eu-155	45.30	1.31	-1.95E+00	2.10E-01	2.02E+01
	60.01	1.22	-1.17E+01		2.15E+01
	86.55	30.70	3.79E-02		2.26E-01
	105.31	21.10	-3.60E-02		2.10E-01
Ra-226	186.21	3.64	8.02E-01	1.11E+00	1.11E+00
Pa-231	27.36	10.30	2.53E+00	1.57E+00	2.43E+00
	283.69	1.70	-8.18E-01		1.95E+00
	300.07	2.47	8.29E-01		1.57E+00
	302.65	2.20	1.11E+00		1.75E+00
	330.06	1.40	2.68E-01		2.55E+00
U-235	143.76	10.96	-4.30E-02	7.11E-02	3.66E-01
	163.33	5.08	-1.15E-01		7.09E-01
	185.71	57.20	7.15E-02		7.11E-02
	202.11	1.08	-8.11E-01		3.13E+00
	205.31	5.01	-1.17E-01		7.14E-01
Am-241	59.54	35.90	-4.32E-01	7.50E-01	7.50E-01

+ = Nuclide identified during the nuclide identification

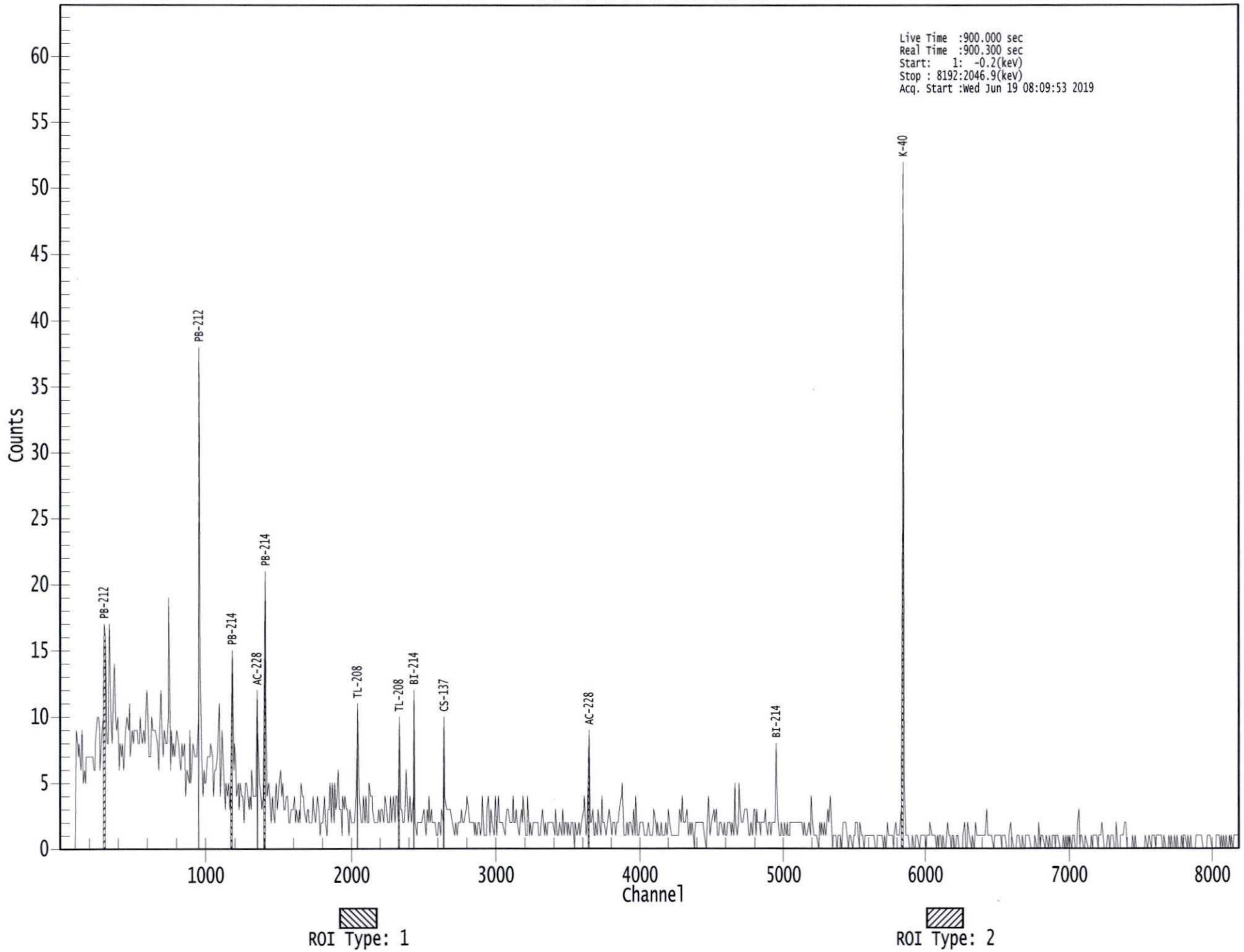
\* = Energy line found in the spectrum

&gt; = MDA value not calculated

@ = Half-life too short to be able to perform the decay correction

? = CAUTION: MDA value is inconsistent with Currie MDA at 95% confidence level

# 000077502.CNF




Analysis Report for 19-Jun-19-10013  
L1-10208B-AJGS-103SS

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## GAMMA SPECTRUM ANALYSIS

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Sample Identification : 19-Jun-19-10013  
Sample Description : L1-10208B-AJGS-103SS  
Sample Type : Soil  
Unit :  
Sample Point :  
  
Sample Size : 1.648E+03 grams  
Facility : Default  
  
Sample Taken On : 6/17/2019 12:40:00PM  
Acquisition Started : 6/19/2019 8:29:43AM  
  
Procedure : 130G\_SOIL\_1  
Operator : Administrator  
Detector Name : 352  
Geometry : 130G\_SOIL\_1  
Live Time : 900.0 seconds  
Real Time : 900.3 seconds  
  
Dead Time : 0.03 %  
  
Peak Locate Threshold : 3.00  
Peak Locate Range (in channels) : 120 - 8192  
Peak Area Range (in channels) : 120 - 8192  
Identification Energy Tolerance : 1.000 keV  
  
Energy Calibration Used Done On : 9/29/2018  
Efficiency Calibration Used Done On : 6/19/2019  
Efficiency Calibration Description :  
  
Sample Number : 77504  
Fill Height : 1647.58 gram  
Certificate Name : Eu155-Na22  
Certificate Date : 1/7/2013 12:00:00PM


  
6-19-19

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## PEAK ANALYSIS REPORT

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Peak Analysis Performed on : 6/19/2019 8:44:46AM  
Peak Analysis From Channel : 120  
Peak Analysis To Channel : 8192

  
6-19-19

Analysis Report for 19-Jun-19-10013

L1-10208B-AJGS-103SS

Peak No.	Energy (keV)	ROI start	ROI end	Peak Centroid	Net Peak Area	Net Area Uncertainty	Continuum Counts	FWHM (keV)
1	185.85	738 -	749	744.12	3.52E+01	12.14	4.48E+01	0.85
2	238.63	948 -	963	955.00	1.13E+02	19.34	8.37E+01	0.88
3	295.16	1173 -	1186	1180.87	4.73E+01	11.13	2.77E+01	0.73
4	351.77	1400 -	1414	1407.06	8.39E+01	11.90	2.01E+01	0.87
5	583.17	2326 -	2339	2332.00	5.85E+01	9.36	1.05E+01	1.03
6	609.16	2428 -	2444	2435.89	6.93E+01	10.46	1.28E+01	1.35
7	661.43	2638 -	2652	2644.89	6.80E+01	10.26	1.30E+01	1.29
8	911.13	3638 -	3650	3643.56	4.51E+01	7.76	5.86E+00	0.63
9	968.86	3869 -	3881	3874.53	3.12E+01	6.03	1.79E+00	0.62
10	1460.25	5830 -	5854	5841.37	2.73E+02	17.93	1.20E+01	1.28

M = First peak in a multiplet region  
m = Other peak in a multiplet region  
F = Fitted singlet  
Errors quoted at 1.000sigma

No background subtract performed on this spectrum.

## NUCLIDE IDENTIFICATION REPORT

Nuclide Library Used : C:\Canberra\Apex\Root\Default\Library\ZION LIB-BNL.NLB

### IDENTIFIED NUCLIDES

Nuclide Name	Id Confidence	Energy (keV)	Yield(%)	Activity (pCi/grams)	Activity Uncertainty
K-40	0.94	1460.82	* 10.66	5.60E+00	4.41E-01
Cs-137	0.99	661.66	* 85.10	1.04E-01	1.69E-02
Tl-208	1.00	583.19	* 85.00	8.24E-02	1.41E-02
Pb-212	1.00	115.18	0.60		
		238.63	* 43.60	1.75E-01	3.31E-02
		300.09	3.30		
Bi-214	0.99	609.32	* 45.49	1.87E-01	3.05E-02

Analysis Report for 19-Jun-19-10013

L1-10208B-AJGS-103SS

<b>Nuclide Name</b>	<b>Id Confidence</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Activity Uncertainty</b>
Bi-214	0.99	768.36	4.89		
		806.18	1.26		
		934.06	3.11		
		1120.29	14.92		
		1155.21	1.63		
		1238.12	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		
		1661.27	1.05		
		1729.59	2.88		
		1764.49	15.30		
		1847.43	2.03		
2118.51	1.16				
Pb-214	0.99	241.99	7.25		
		295.22 *	18.42	1.94E-01	4.83E-02
		351.93 *	35.60	2.01E-01	3.28E-02
		785.96	1.06		
Ra-226	0.97	186.21 *	3.64	5.85E-01	2.07E-01
Ac-228	0.99	129.07	2.42		
		209.25	3.89		
		270.24	3.46		
		328.00	2.95		
		338.32	11.27		
		409.46	1.92		
		463.00	4.40		
		794.95	4.25		
		911.20 *	25.80	2.80E-01	4.97E-02
		964.77	4.99		
		968.97 *	15.80	3.30E-01	6.53E-02
		1588.20	3.22		
		U-235	0.99	143.76	10.96
163.33	5.08				
185.71 *	57.20			3.72E-02	1.32E-02
202.11	1.08				
205.31	5.01				

\* = Energy line found in the spectrum.

- = Manually added nuclide.

? = Manually edited nuclide.

@ = Energy line not used for Weighted Mean Activity

Energy Tolerance : 1.000 keV

Nuclide confidence index threshold = 0.30

Errors quoted at 1.000sigma

Analysis Report for 19-Jun-19-10013

L1-10208B-AJGS-103SS

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## INTERFERENCE CORRECTED REPORT

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Nuclide Name	Nuclide Id Confidence	Wt mean Activity (pCi/grams)	Wt mean Activity Uncertainty	Comments
K-40	0.949	5.60E+00	4.41E-01	
Cs-137	0.992	1.04E-01	1.69E-02	
Tl-208	1.000	8.24E-02	1.41E-02	
X Bi-211	0.925			
Pb-212	1.000	1.75E-01	3.31E-02	
Bi-214	0.998	1.87E-01	3.05E-02	
Pb-214	0.997	1.99E-01	2.71E-02	
? Ra-226	0.979	5.85E-01	2.07E-01	
Ac-228	0.999	2.98E-01	3.95E-02	
? U-235 <i>Ro-226</i>	0.998	3.72E-02	1.32E-02	

? = 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 1.000sigma

*JJ* 6-19-19

U-235

ONLY

1

PEAK

Analysis Report for 19-Jun-19-10013

L1-10208B-AJGS-103SS

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**UNIDENTIFIED PEAKS**


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Peak Locate Performed on : 6/19/2019 8:44:46AM  
 Peak Locate From Channel : 120  
 Peak Locate To Channel : 8192

<i>Peak No.</i>	<i>Energy (keV)</i>	<i>Peak Size (CPS)</i>	<i>Peak CPS (%) Uncertainty</i>	<i>Peak Type</i>	<i>Tolerance Nuclide</i>
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All peaks were identified.

M = First peak in a multiplet region  
 m = Other peak in a multiplet region  
 F = Fitted singlet  
 Errors quoted at 1.000sigma

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**NUCLIDE MDA REPORT**


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Nuclide Library Used : C:\Canberra\Apex\Root\Default\Library\ZION LIB-BNL.NLB

<i>Nuclide Name</i>	<i>Energy (keV)</i>	<i>Yield(%)</i>	<i>Activity (pCi/grams)</i>	<i>Nuclide MDA (pCi/grams)</i>	<i>Line MDA (pCi/grams)</i>
An Pk	511.00	100.00	5.67E-02	5.08E-02	5.08E-02
BE-7	477.60	10.44	2.08E-01	3.82E-01	3.82E-01
+ K-40	1460.82	* 10.66	5.60E+00	5.44E-01	5.44E-01
Mn-54	834.85	99.98	3.54E-04	4.42E-02	4.42E-02
Co-60	1173.23	99.85	-1.32E-02	6.48E-02	6.82E-02
	1332.49	99.98	4.84E-02		6.48E-02
Nb-94	702.65	99.81	-5.49E-03	3.89E-02	3.89E-02
	871.09	99.89	1.52E-02		3.95E-02
Ag-108m	79.13	6.60	8.81E-01	3.97E-02	1.49E+00
	433.94	90.50	-1.61E-02		3.97E-02
	614.28	89.80	-1.33E-02		6.71E-02
	722.94	90.80	2.15E-02		5.26E-02
Sb-125	176.31	6.84	-1.55E-01	1.18E-01	4.91E-01
	380.45	1.52	-2.61E-01		2.21E+00
	427.87	29.60	2.43E-02		1.18E-01
	463.36	10.49	5.30E-02		3.74E-01
	600.60	17.65	1.47E-01		2.45E-01
	606.71	4.98	1.21E+00		1.30E+00
	635.95	11.22	-3.13E-02		3.44E-01

Analysis Report for 19-Jun-19-10013

L1-10208B-AJGS-103SS

<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Nuclide MDA (pCi/grams)</b>	<b>Line MDA (pCi/grams)</b>
Sb-125	671.44	1.79	-4.32E-01	1.18E-01	1.82E+00
Ba-133	79.61	2.65	1.82E+00	7.32E-02	3.59E+00
	81.00	32.90	-4.15E-01		2.41E-01
	276.40	7.16	1.70E-01		5.06E-01
	302.85	18.34	6.53E-02		1.83E-01
	356.01	62.05	-1.80E-03		7.32E-02
	383.85	8.94	2.54E-02		4.00E-01
Cs-134	475.36	1.48	3.75E-01	5.08E-02	2.56E+00
	563.25	8.34	-3.30E-01		4.51E-01
	569.33	15.37	1.36E-01		2.64E-01
	604.72	97.62	-2.30E-02		6.21E-02
	795.86	85.46	1.61E-02		5.08E-02
	801.95	8.69	-1.18E-01		4.31E-01
	1038.61	0.99	2.16E+00		4.74E+00
	1167.97	1.79	3.81E+00		4.01E+00
	1365.19	3.02	3.61E-01		1.35E+00
+ Cs-137	661.66	* 85.10	1.04E-01	3.61E-02	3.61E-02
Eu-152	121.78	28.67	4.93E-02	1.26E-01	1.34E-01
	244.70	7.61	-9.18E-02		4.94E-01
	295.94	0.45	3.85E+00		9.34E+00
	344.28	26.60	-7.73E-03		1.26E-01
	367.79	0.86	-1.72E+00		3.66E+00
	411.12	2.24	-5.38E-01		1.56E+00
	443.96	2.83	6.83E-01		1.21E+00
	488.68	0.42	1.33E+00		7.40E+00
	563.99	0.49	-5.28E+00		7.74E+00
	586.26	0.46	1.68E+01		1.27E+01
	678.62	0.47	9.05E-01		7.39E+00
	688.67	0.86	7.77E-02		4.02E+00
	719.35	0.28	-1.31E+01		1.37E+01
	778.90	12.96	7.40E-02		3.44E-01
	810.45	0.32	-7.95E+00		1.05E+01
	867.37	4.26	-1.38E+00		9.04E-01
	919.33	0.43	-1.60E+01		1.06E+01
	964.08	14.65	-2.19E-01		4.51E-01
	1085.87	10.24	-5.86E-01		3.87E-01
	1089.74	1.73	1.56E-02		2.53E+00
	1112.07	13.69	-1.55E-01		3.70E-01
	1212.95	1.43	-4.91E-02		4.11E+00
	1249.94	0.19	6.21E+00		2.89E+01
	1299.14	1.63	2.49E-01		3.20E+00
	1408.01	21.07	4.80E-02		2.40E-01
	1457.64	0.50	1.27E+02		3.69E+01
	1528.10	0.28	4.35E-01		1.17E+01
Eu-154	123.07	40.40	1.07E-02	9.68E-02	9.68E-02
	247.93	6.89	-1.57E-01		5.04E-01
	591.76	4.95	1.74E-01		8.21E-01
	692.42	1.78	1.41E+00		2.20E+00
	723.30	20.06	1.43E-01		2.43E-01
	756.80	4.52	-3.46E-01		9.15E-01
	873.18	12.08	-2.02E-01		3.20E-01



Analysis Report for 19-Jun-19-10013

L1-10208B-AJGS-103SS

<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Nuclide MDA (pCi/grams)</b>	<b>Line MDA (pCi/grams)</b>
Eu-154	996.29	10.48	-5.00E-01	9.68E-02	4.03E-01
	1004.76	18.01	1.20E-01		2.64E-01
	1274.43	34.80	-1.66E-01		1.53E-01
	1596.48	1.80	-1.92E+00		2.14E+00
Eu-155	45.30	1.31	-6.10E+00	2.08E-01	1.96E+01
	60.01	1.22	-1.70E+01		1.91E+01
	86.55	30.70	1.80E-01		2.30E-01
	105.31	21.10	-4.10E-04		2.08E-01
+ Ra-226	186.21	* 3.64	5.85E-01	6.45E-01	6.45E-01
Pa-231	27.36	10.30	2.26E+00	1.44E+00	2.18E+00
	283.69	1.70	-9.20E-01		1.98E+00
	300.07	2.47	-1.19E-01		1.44E+00
	302.65	2.20	-1.09E-01		1.51E+00
	330.06	1.40	-1.32E-01		2.49E+00
+ U-235	143.76	10.96	-9.06E-02	4.10E-02	3.36E-01
U-235	163.33	5.08	-2.31E-01	4.10E-02	6.82E-01
	185.71	* 57.20	3.72E-02		4.10E-02
	202.11	1.08	-1.22E+00		3.04E+00
	205.31	5.01	-9.02E-01		6.32E-01
Am-241	59.54	35.90	-5.21E-01	6.79E-01	6.79E-01

+ = Nuclide identified during the nuclide identification

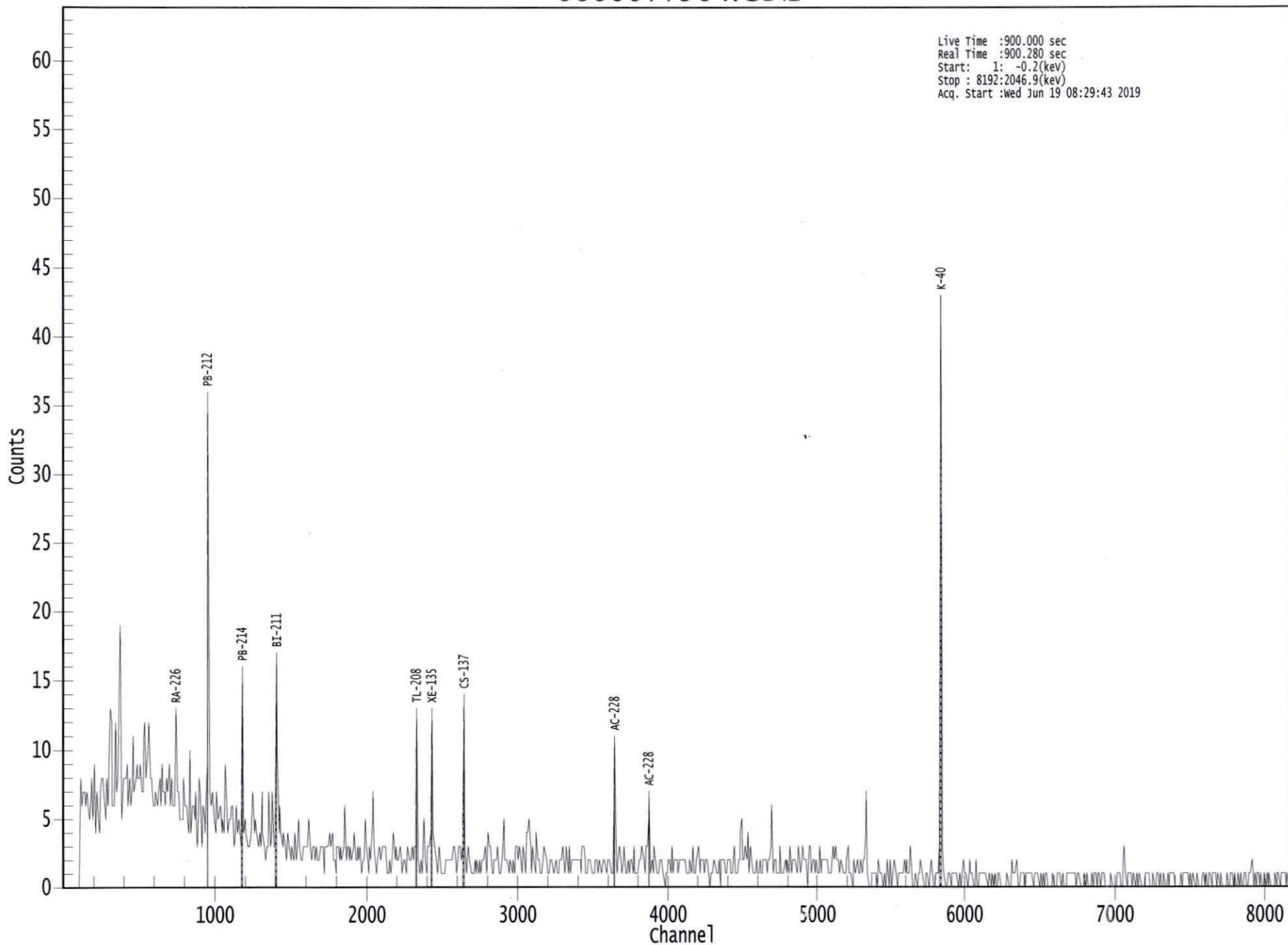
\* = Energy line found in the spectrum

&gt; = MDA value not calculated

@ = Half-life too short to be able to perform the decay correction

? = CAUTION: MDA value is inconsistent with Currie MDA at 95% confidence level

000077504.CNF



ROI Type: 1

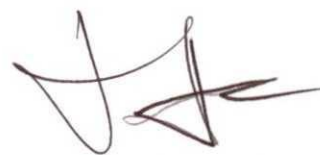
Analysis Report for 19-Jun-19-10014  
L1-10208A-AJGS-101SS

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## GAMMA SPECTRUM ANALYSIS

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Sample Identification : 19-Jun-19-10014  
Sample Description : L1-10208A-AJGS-101SS  
Sample Type : Soil  
Unit :  
Sample Point :  
  
Sample Size : 1.595E+03 grams  
Facility : Default  
  
Sample Taken On : 6/17/2019 12:42:00PM  
Acquisition Started : 6/19/2019 9:30:29AM  
  
Procedure : 130G\_SOIL\_1  
Operator : Administrator  
Detector Name : 324  
Geometry : 130G\_SOIL\_1  
Live Time : 900.0 seconds  
Real Time : 900.3 seconds  
  
Dead Time : 0.03 %  
  
Peak Locate Threshold : 3.00  
Peak Locate Range (in channels) : 120 - 4096  
Peak Area Range (in channels) : 120 - 4096  
Identification Energy Tolerance : 1.000 keV  
  
Energy Calibration Used Done On : 9/29/2018  
Efficiency Calibration Used Done On : 6/19/2019  
Efficiency Calibration Description :  
  
Sample Number : 77506  
Fill Height : 1594.89 gram  
Certificate Name : Eu155-Na22  
Certificate Date : 1/30/2013 12:00:00PM


  
6-19-19

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## PEAK ANALYSIS REPORT

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Peak Analysis Performed on : 6/19/2019 9:45:31AM  
Peak Analysis From Channel : 120  
Peak Analysis To Channel : 4096

  
6-19-19

Analysis Report for 19-Jun-19-10014

L1-10208A-AJGS-101SS

Peak No.	Energy (keV)	ROI start	ROI end	Peak Centroid	Net Peak Area	Net Area Uncertainty	Continuum Counts	FWHM (keV)
1	238.66	473 -	481	477.49	1.05E+02	18.21	1.05E+02	1.08
2	295.41	586 -	595	590.87	4.37E+01	13.00	5.53E+01	1.16
3	351.80	699 -	708	703.54	6.98E+01	12.75	4.12E+01	1.20
4	583.26	1160 -	1171	1166.13	7.36E+01	11.41	2.24E+01	1.42
5	609.59	1213 -	1224	1218.76	6.12E+01	11.02	2.38E+01	1.21
6	1460.98	2914 -	2928	2922.01	2.41E+02	16.19	7.50E+00	2.20

M = First peak in a multiplet region  
m = Other peak in a multiplet region  
F = Fitted singlet  
Errors quoted at 1.000sigma

No background subtract performed on this spectrum.

## NUCLIDE IDENTIFICATION REPORT

Nuclide Library Used : C:\Canberra\Apex\Root\Default\Library\ZION LIB-BNL.NLB

### IDENTIFIED NUCLIDES

Nuclide Name	Id Confidence	Energy (keV)	Yield(%)	Activity (pCi/grams)	Activity Uncertainty
K-40	0.99	1460.82 *	10.66	4.47E+00	3.58E-01
Tl-208	0.99	583.19 *	85.00	9.40E-02	1.56E-02
Pb-212	1.00	115.18	0.60		
		238.63 *	43.60	1.46E-01	2.80E-02
		300.09	3.30		
Bi-214	0.99	609.32 *	45.49	1.50E-01	2.86E-02
		768.36	4.89		
		806.18	1.26		
		934.06	3.11		
		1120.29	14.92		
		1155.21	1.63		

Analysis Report for 19-Jun-19-10014

L1-10208A-AJGS-101SS

<b>Nuclide Name</b>	<b>Id Confidence</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Activity Uncertainty</b>
Bi-214	0.99	1238.12	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		
		1661.27	1.05		
		1729.59	2.88		
		1764.49	15.30		
		1847.43	2.03		
		2118.51	1.16		
		Pb-214	0.99	241.99	7.25
295.22 *	18.42			1.62E-01	5.00E-02
351.93 *	35.60			1.52E-01	3.03E-02
785.96	1.06				

\* = Energy line found in the spectrum.  
 - = Manually added nuclide.  
 ? = Manually edited nuclide.  
 @ = Energy line not used for Weighted Mean Activity  
 Energy Tolerance : 1.000 keV  
 Nuclide confidence index threshold = 0.30  
 Errors quoted at 1.000sigma

## INTERFERENCE CORRECTED REPORT

	<b>Nuclide Name</b>	<b>Nuclide Id Confidence</b>	<b>Wt mean Activity (pCi/grams)</b>	<b>Wt mean Activity Uncertainty</b>	<b>Comments</b>
	K-40	0.996	4.47E+00	3.58E-01	
	Tl-208	0.999	9.40E-02	1.56E-02	
X	Bi-211	0.919			
	Pb-212	1.000	1.46E-01	2.80E-02	
	Bi-214	0.995	1.50E-01	2.86E-02	
	Pb-214	0.997	1.55E-01	2.59E-02	

Analysis Report for 19-Jun-19-10014

L1-10208A-AJGS-101SS

- ? = 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 1.000sigma

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Analysis Report for 19-Jun-19-10014

L1-10208A-AJGS-101SS

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**UNIDENTIFIED PEAKS**


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Peak Locate Performed on : 6/19/2019 9:45:31AM  
 Peak Locate From Channel : 120  
 Peak Locate To Channel : 4096

<i>Peak No.</i>	<i>Energy (keV)</i>	<i>Peak Size (CPS)</i>	<i>Peak CPS (%) Uncertainty</i>	<i>Peak Type</i>	<i>Tolerance Nuclide</i>
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All peaks were identified.

M = First peak in a multiplet region

m = Other peak in a multiplet region

F = Fitted singlet

Errors quoted at 1.000sigma

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**NUCLIDE MDA REPORT**


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Nuclide Library Used : C:\Canberra\Apex\Root\Default\Library\ZION LIB-BNL.NLB

<i>Nuclide Name</i>	<i>Energy (keV)</i>	<i>Yield(%)</i>	<i>Activity (pCi/grams)</i>	<i>Nuclide MDA (pCi/grams)</i>	<i>Line MDA (pCi/grams)</i>
An Pk	511.00	100.00	5.18E-02	4.80E-02	4.80E-02
BE-7	477.60	10.44	5.74E-02	3.03E-01	3.03E-01
+ K-40	1460.82	* 10.66	4.47E+00	3.46E-01	3.46E-01
Mn-54	834.85	99.98	1.24E-02	3.89E-02	3.89E-02
Co-60	1173.23	99.85	4.06E-02	5.15E-02	5.74E-02
	1332.49	99.98	3.85E-02		5.15E-02
Nb-94	702.65	99.81	-5.83E-03	3.53E-02	3.53E-02
	871.09	99.89	-2.87E-03		3.65E-02
Ag-108m	79.13	6.60	-4.95E-01	3.28E-02	9.51E-01
	433.94	90.50	-1.82E-02		3.28E-02
	614.28	89.80	-2.39E-02		5.38E-02
	722.94	90.80	2.15E-02		4.67E-02
Sb-125	176.31	6.84	-5.85E-02	1.06E-01	4.72E-01
	380.45	1.52	3.42E-02		1.77E+00
	427.87	29.60	4.77E-02		1.06E-01
	463.36	10.49	3.09E-02		3.24E-01
	600.60	17.65	-1.82E-02		1.91E-01
	606.71	4.98	-2.52E-02		1.12E+00
	635.95	11.22	-7.56E-02		2.80E-01

Analysis Report for 19-Jun-19-10014

L1-10208A-AJGS-101SS

<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Nuclide MDA (pCi/grams)</b>	<b>Line MDA (pCi/grams)</b>
Sb-125	671.44	1.79	-4.20E-01	1.06E-01	1.91E+00
Ba-133	79.61	2.65	-5.24E-01	6.33E-02	2.30E+00
	81.00	32.90	-1.70E-01		1.59E-01
	276.40	7.16	2.92E-02		4.22E-01
	302.85	18.34	3.96E-02		1.65E-01
	356.01	62.05	-1.82E-02		6.33E-02
	383.85	8.94	3.22E-02		3.09E-01
Cs-134	475.36	1.48	5.14E-01	3.95E-02	2.09E+00
	563.25	8.34	-2.92E-02		4.23E-01
	569.33	15.37	8.01E-02		2.23E-01
	604.72	97.62	7.98E-03		4.60E-02
	795.86	85.46	3.29E-03		3.95E-02
	801.95	8.69	1.19E-01		3.66E-01
	1038.61	0.99	-9.74E-01		4.06E+00
	1167.97	1.79	4.05E-01		2.90E+00
	1365.19	3.02	-6.02E-01		1.13E+00
Cs-137	661.66	85.10	5.14E-02	5.96E-02	5.96E-02
Eu-152	121.78	28.67	-1.25E-02	1.06E-01	1.06E-01
	244.70	7.61	-3.82E-01		4.12E-01
	295.94	0.45	3.02E+00		8.25E+00
	344.28	26.60	-8.54E-02		1.14E-01
	367.79	0.86	-4.01E-01		3.25E+00
	411.12	2.24	5.36E-01		1.44E+00
	443.96	2.83	2.76E-01		1.21E+00
	488.68	0.42	3.55E+00		8.06E+00
	563.99	0.49	4.11E-01		7.19E+00
	586.26	0.46	-1.07E+00		1.26E+01
	678.62	0.47	-2.31E+00		6.70E+00
	688.67	0.86	2.01E-01		4.52E+00
	719.35	0.28	-1.98E+00		1.32E+01
	778.90	12.96	4.08E-02		2.91E-01
	810.45	0.32	-1.89E+00		1.11E+01
	867.37	4.26	-2.53E-01		8.86E-01
	919.33	0.43	-7.82E+00		7.74E+00
	964.08	14.65	4.22E-02		3.22E-01
	1085.87	10.24	-4.92E-02		3.86E-01
	1089.74	1.73	-1.49E+00		2.24E+00
	1112.07	13.69	-1.29E-01		3.12E-01
	1212.95	1.43	9.99E-01		3.34E+00
	1249.94	0.19	1.27E+01		2.39E+01
	1299.14	1.63	9.05E-01		2.54E+00
	1408.01	21.07	4.35E-02		1.72E-01
	1457.64	0.50	-5.90E-01		3.12E+01
	1528.10	0.28	-4.97E+00		8.13E+00
Eu-154	123.07	40.40	6.23E-03	7.75E-02	7.75E-02
	247.93	6.89	1.85E-01		4.40E-01
	591.76	4.95	-2.32E-01		7.10E-01
	692.42	1.78	2.57E-01		2.19E+00
	723.30	20.06	1.27E-01		2.16E-01
	756.80	4.52	-2.39E-02		6.45E-01
	873.18	12.08	-1.25E-01		2.84E-01



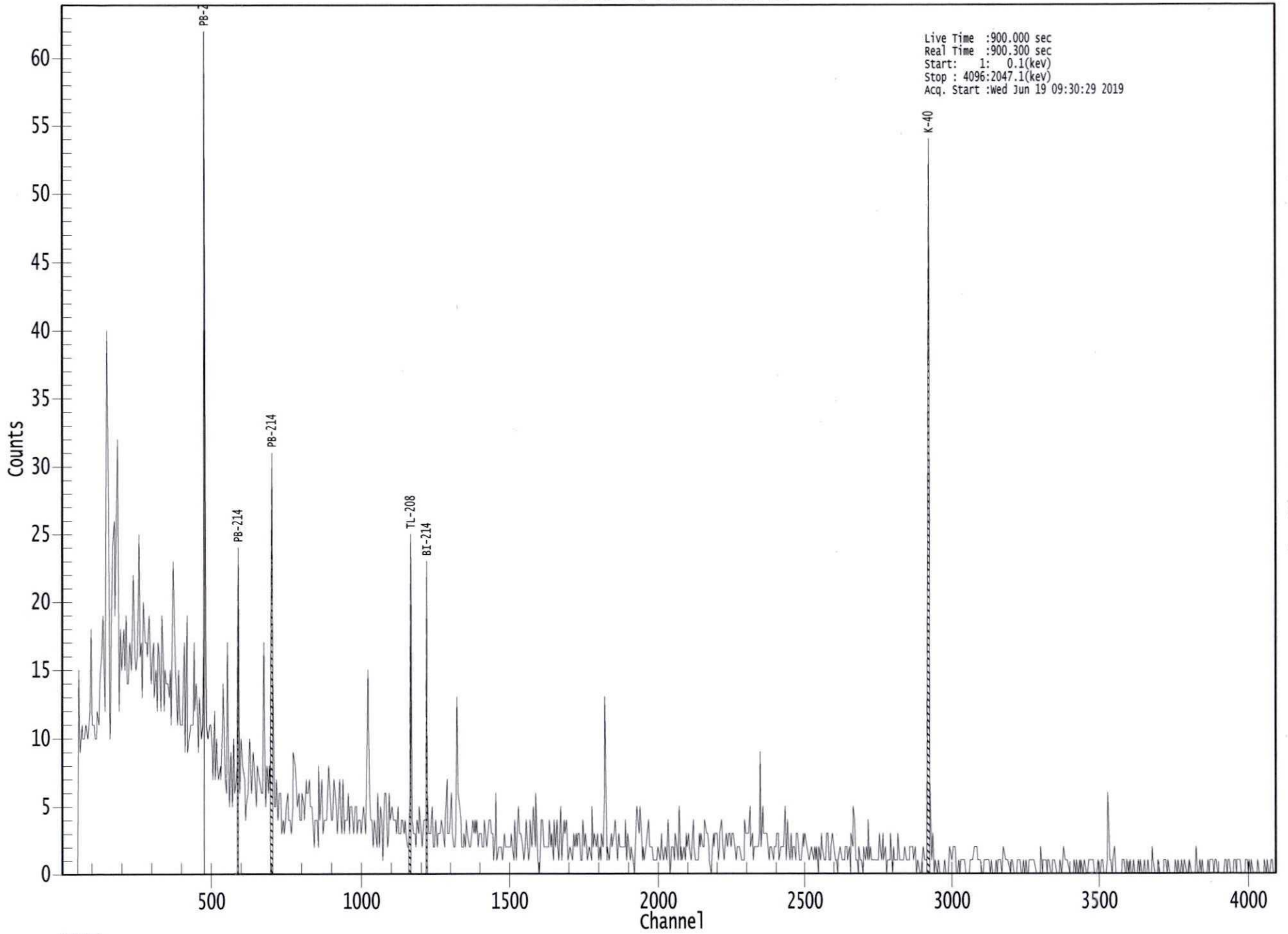
Analysis Report for 19-Jun-19-10014

L1-10208A-AJGS-101SS

<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Nuclide MDA (pCi/grams)</b>	<b>Line MDA (pCi/grams)</b>
Eu-154	996.29	10.48	1.96E-02	7.75E-02	3.41E-01
	1004.76	18.01	2.86E-02		2.18E-01
	1274.43	34.80	-3.42E-02		1.14E-01
	1596.48	1.80	-2.52E-01		2.04E+00
Eu-155	45.30	1.31	2.23E-01	1.80E-01	1.04E+01
	60.01	1.22	-1.78E+00		1.11E+01
	86.55	30.70	8.48E-02		1.80E-01
	105.31	21.10	6.05E-02		1.82E-01
Ra-226	186.21	3.64	4.01E-01	1.00E+00	1.00E+00
Pa-231	27.36	10.30	8.88E-01	1.12E+00	1.12E+00
	283.69	1.70	-1.00E+00		1.62E+00
	300.07	2.47	3.05E-01		1.24E+00
	302.65	2.20	3.30E-01		1.37E+00
	330.06	1.40	4.92E-01		2.27E+00
U-235	143.76	10.96	5.88E-02	6.29E-02	2.81E-01
	163.33	5.08	3.48E-01		6.90E-01
	185.71	57.20	1.47E-02		6.29E-02
	202.11	1.08	-1.43E+00		2.75E+00
	205.31	5.01	-6.86E-02		6.17E-01
Am-241	59.54	35.90	-1.51E-01	3.81E-01	3.81E-01

- + = 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  
 ? = CAUTION: MDA value is inconsistent with Currie MDA at 95% confidence level

000077506.CNF



 ROI Type: 1

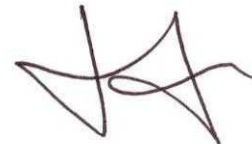
Analysis Report for 19-Jun-19-10015  
L1-10208A-QJGS-101SS

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## GAMMA SPECTRUM ANALYSIS

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Sample Identification : 19-Jun-19-10015  
Sample Description : L1-10208A-QJGS-101SS  
Sample Type : Soil  
Unit :  
Sample Point :  
  
Sample Size : 1.622E+03 grams  
Facility : Default  
  
Sample Taken On : 6/17/2019 12:42:00PM  
Acquisition Started : 6/19/2019 9:57:25AM  
  
Procedure : 130G\_SOIL\_1  
Operator : Administrator  
Detector Name : 324  
Geometry : 130G\_SOIL\_1  
Live Time : 900.0 seconds  
Real Time : 900.3 seconds  
  
Dead Time : 0.03 %  
  
Peak Locate Threshold : 3.00  
Peak Locate Range (in channels) : 120 - 4096  
Peak Area Range (in channels) : 120 - 4096  
Identification Energy Tolerance : 1.000 keV  
  
Energy Calibration Used Done On : 9/29/2018  
Efficiency Calibration Used Done On : 6/19/2019  
Efficiency Calibration Description :  
  
Sample Number : 77510  
Fill Height : 1622.34 gram  
Certificate Name : Eu155-Na22  
Certificate Date : 1/30/2013 12:00:00PM



6-19-19

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## PEAK ANALYSIS REPORT

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Peak Analysis Performed on : 6/19/2019 10:12:27AM  
Peak Analysis From Channel : 120  
Peak Analysis To Channel : 4096

  
6-19-19

Analysis Report for 19-Jun-19-10015

L1-10208A-QJGS-101SS

Peak No.	Energy (keV)	ROI start	ROI end	Peak Centroid	Net Peak Area	Net Area Uncertainty	Continuum Counts	FWHM (keV)
1	238.69	474 -	482	477.55	1.25E+02	17.74	8.90E+01	1.10
2	295.23	587 -	595	590.51	4.38E+01	11.95	4.62E+01	1.09
3	338.35	674 -	680	676.66	2.09E+01	8.88	3.01E+01	1.03
4	352.04	699 -	708	704.03	6.88E+01	12.35	3.72E+01	1.54
5	583.12	1162 -	1171	1165.85	5.33E+01	9.19	1.37E+01	1.32
6	609.49	1213 -	1224	1218.55	7.29E+01	10.54	1.51E+01	1.81
7	661.64	1319 -	1326	1322.81	3.38E+01	7.52	1.11E+01	0.83
8	911.42	1818 -	1828	1822.29	2.95E+01	8.33	1.65E+01	1.05
9	1460.96	2915 -	2929	2921.99	2.62E+02	16.19	0.00E+00	1.41

M = First peak in a multiplet region  
m = Other peak in a multiplet region  
F = Fitted singlet  
Errors quoted at 1.000sigma

No background subtract performed on this spectrum.

## NUCLIDE IDENTIFICATION REPORT

Nuclide Library Used : C:\Canberra\Apex\Root\Default\Library\ZION LIB-BNL.NLB

### IDENTIFIED NUCLIDES

Nuclide Name	Id Confidence	Energy (keV)	Yield(%)	Activity (pCi/grams)	Activity Uncertainty
K-40	0.99	1460.82 *	10.66	4.85E+00	3.66E-01
Cs-137	1.00	661.66 *	85.10	4.68E-02	1.08E-02
Tl-208	0.99	583.19 *	85.00	6.78E-02	1.24E-02
Pb-212	1.00	115.18	0.60		
		238.63 *	43.60	1.74E-01	2.83E-02
		300.09	3.30		
Bi-214	0.99	609.32 *	45.49	1.78E-01	2.79E-02
		768.36	4.89		

Analysis Report for 19-Jun-19-10015

L1-10208A-QJGS-101SS

<b>Nuclide Name</b>	<b>Id Confidence</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Activity Uncertainty</b>
Bi-214	0.99	806.18	1.26		
		934.06	3.11		
		1120.29	14.92		
		1155.21	1.63		
		1238.12	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		
		1661.27	1.05		
		1729.59	2.88		
		1764.49	15.30		
		1847.43	2.03		
2118.51	1.16				
Pb-214	0.99	241.99	7.25		
		295.22 *	18.42	1.62E-01	4.61E-02
		351.93 *	35.60	1.49E-01	2.93E-02
Ac-228	0.99	785.96	1.06		
		129.07	2.42		
		209.25	3.89		
		270.24	3.46		
		328.00	2.95		
		338.32 *	11.27	1.39E-01	6.02E-02
		409.46	1.92		
		463.00	4.40		
		794.95	4.25		
		911.20 *	25.80	1.66E-01	4.73E-02
964.77	4.99				
968.97	15.80				
1588.20	3.22				

\* = Energy line found in the spectrum.

- = Manually added nuclide.

? = Manually edited nuclide.

@ = Energy line not used for Weighted Mean Activity

Energy Tolerance : 1.000 keV

Nuclide confidence index threshold = 0.30

Errors quoted at 1.000sigma

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**INTERFERENCE CORRECTED REPORT**

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Analysis Report for 19-Jun-19-10015

L1-10208A-QJGS-101SS

<b>Nuclide Name</b>	<b>Nuclide Id Confidence</b>	<b>Wt mean Activity (pCi/grams)</b>	<b>Wt mean Activity Uncertainty</b>	<b>Comments</b>
K-40	0.997	4.85E+00	3.66E-01	
Cs-137	1.000	4.68E-02	1.08E-02	
Tl-208	0.999	6.78E-02	1.24E-02	
X Bi-211	0.859			
Pb-212	1.000	1.74E-01	2.83E-02	
Bi-214	0.998	1.78E-01	2.79E-02	
Pb-214	0.999	1.53E-01	2.47E-02	
Ac-228	0.998	1.56E-01	3.72E-02	

? = 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 1.000sigma

Analysis Report for 19-Jun-19-10015  
L1-10208A-QJGS-101SS

## UNIDENTIFIED PEAKS

Peak Locate Performed on : 6/19/2019 10:12:27AM  
Peak Locate From Channel : 120  
Peak Locate To Channel : 4096

Peak No.	Energy (keV)	Peak Size (CPS)	Peak CPS (%) Uncertainty	Peak Type	Tolerance Nuclide
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All peaks were identified.

M = First peak in a multiplet region  
m = Other peak in a multiplet region  
F = Fitted singlet  
Errors quoted at 1.000sigma

## NUCLIDE MDA REPORT

Nuclide Library Used : C:\Canberra\Apex\Root\Default\Library\ZION LIB-BNL.NLB

Nuclide Name	Energy (keV)	Yield(%)	Activity (pCi/grams)	Nuclide MDA (pCi/grams)	Line MDA (pCi/grams)
An Pk	511.00	100.00	4.34E-02	4.62E-02	4.62E-02
BE-7	477.60	10.44	2.02E-01	3.42E-01	3.42E-01
+ K-40	1460.82	* 10.66	4.85E+00	5.32E-02	5.32E-02
Mn-54	834.85	99.98	-7.22E-03	3.41E-02	3.41E-02
Co-60	1173.23	99.85	1.97E-02	5.11E-02	5.11E-02
	1332.49	99.98	4.15E-02		5.54E-02
Nb-94	702.65	99.81	-4.78E-04	3.57E-02	3.67E-02
	871.09	99.89	1.48E-02		3.57E-02
Ag-108m	79.13	6.60	9.20E-01	3.26E-02	1.12E+00
	433.94	90.50	-4.95E-03		3.26E-02
	614.28	89.80	-1.87E-02		5.14E-02
	722.94	90.80	-1.19E-02		4.11E-02
Sb-125	176.31	6.84	8.93E-02	9.79E-02	4.66E-01
	380.45	1.52	-2.19E-03		1.85E+00
	427.87	29.60	7.05E-03		9.79E-02
	463.36	10.49	1.23E-01		3.47E-01
	600.60	17.65	-5.55E-02		1.59E-01
	606.71	4.98	-1.03E-01		1.10E+00
	635.95	11.22	5.07E-02		3.28E-01

Analysis Report for 19-Jun-19-10015

L1-10208A-QJGS-101SS

<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Nuclide MDA (pCi/grams)</b>	<b>Line MDA (pCi/grams)</b>
Sb-125	671.44	1.79	-4.02E-01	9.79E-02	1.87E+00
Ba-133	79.61	2.65	1.98E+00	6.13E-02	2.66E+00
	81.00	32.90	-2.30E-01		1.65E-01
	276.40	7.16	2.60E-01		4.67E-01
	302.85	18.34	1.89E-03		1.65E-01
	356.01	62.05	-3.82E-02		6.13E-02
	383.85	8.94	-1.38E-01		3.21E-01
Cs-134	475.36	1.48	1.01E+00	4.37E-02	2.29E+00
	563.25	8.34	4.76E-02		4.32E-01
	569.33	15.37	3.22E-02		2.05E-01
	604.72	97.62	-4.14E-03		4.37E-02
	795.86	85.46	1.68E-02		4.46E-02
	801.95	8.69	-1.72E-01		3.89E-01
	1038.61	0.99	-1.54E+00		2.48E+00
	1167.97	1.79	-2.06E+00		2.63E+00
	1365.19	3.02	-6.05E-01		1.17E+00
+ Cs-137	661.66	* 85.10	4.68E-02	2.63E-02	2.63E-02
Eu-152	121.78	28.67	-3.70E-02	9.83E-02	9.83E-02
	244.70	7.61	-1.35E-01		4.12E-01
	295.94	0.45	5.48E+00		8.04E+00
	344.28	26.60	-8.55E-02		1.17E-01
	367.79	0.86	-1.69E-01		3.36E+00
	411.12	2.24	7.84E-01		1.49E+00
	443.96	2.83	-2.37E-01		1.05E+00
	488.68	0.42	-4.75E+00		6.88E+00
	563.99	0.49	-1.21E-02		7.16E+00
	586.26	0.46	7.46E-02		1.11E+01
	678.62	0.47	-1.75E+00		6.92E+00
	688.67	0.86	1.24E+00		3.84E+00
	719.35	0.28	5.15E+00		1.26E+01
	778.90	12.96	4.46E-02		2.51E-01
	810.45	0.32	-4.13E+00		1.12E+01
	867.37	4.26	3.42E-01		9.29E-01
	919.33	0.43	-2.95E+00		8.10E+00
	964.08	14.65	-1.62E-01		2.90E-01
	1085.87	10.24	2.54E-01		4.88E-01
	1089.74	1.73	-2.70E-01		2.56E+00
	1112.07	13.69	-1.64E-01		3.11E-01
	1212.95	1.43	-1.72E+00		3.27E+00
	1249.94	0.19	1.64E+01		2.73E+01
	1299.14	1.63	-9.45E-02		2.25E+00
	1408.01	21.07	-2.28E-02		1.64E-01
	1457.64	0.50	-3.40E+00		3.18E+01
	1528.10	0.28	-2.32E+00		9.84E+00
Eu-154	123.07	40.40	-2.14E-02	7.14E-02	7.14E-02
	247.93	6.89	-1.03E-01		4.25E-01
	591.76	4.95	2.33E-01		6.90E-01
	692.42	1.78	8.52E-01		2.02E+00
	723.30	20.06	-4.14E-03		1.97E-01
	756.80	4.52	-4.44E-01		7.34E-01
	873.18	12.08	-5.50E-02		2.70E-01



Analysis Report for 19-Jun-19-10015

L1-10208A-QJGS-101SS

<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Nuclide MDA (pCi/grams)</b>	<b>Line MDA (pCi/grams)</b>
Eu-154	996.29	10.48	7.51E-02	7.14E-02	4.58E-01
	1004.76	18.01	3.94E-02		2.42E-01
	1274.43	34.80	-3.64E-02		1.28E-01
	1596.48	1.80	1.06E+00		2.03E+00
Eu-155	45.30	1.31	4.66E+00	1.64E-01	1.10E+01
	60.01	1.22	-5.56E+00		1.10E+01
	86.55	30.70	2.83E-03		1.64E-01
	105.31	21.10	-3.24E-02		1.67E-01
Ra-226	186.21	3.64	9.04E-01	9.07E-01	9.07E-01
Pa-231	27.36	10.30	6.01E-01	1.05E+00	1.05E+00
	283.69	1.70	1.62E-02		1.70E+00
	300.07	2.47	-2.35E-01		1.23E+00
	302.65	2.20	1.58E-02		1.38E+00
	330.06	1.40	1.32E+00		2.38E+00
U-235	143.76	10.96	5.85E-02	5.69E-02	2.68E-01
	163.33	5.08	1.08E-01		6.39E-01
	185.71	57.20	4.18E-02		5.69E-02
	202.11	1.08	-3.86E-01		2.98E+00
	205.31	5.01	-3.65E-03		6.66E-01
Am-241	59.54	35.90	-1.91E-01	3.83E-01	3.83E-01

+ = Nuclide identified during the nuclide identification

\* = Energy line found in the spectrum

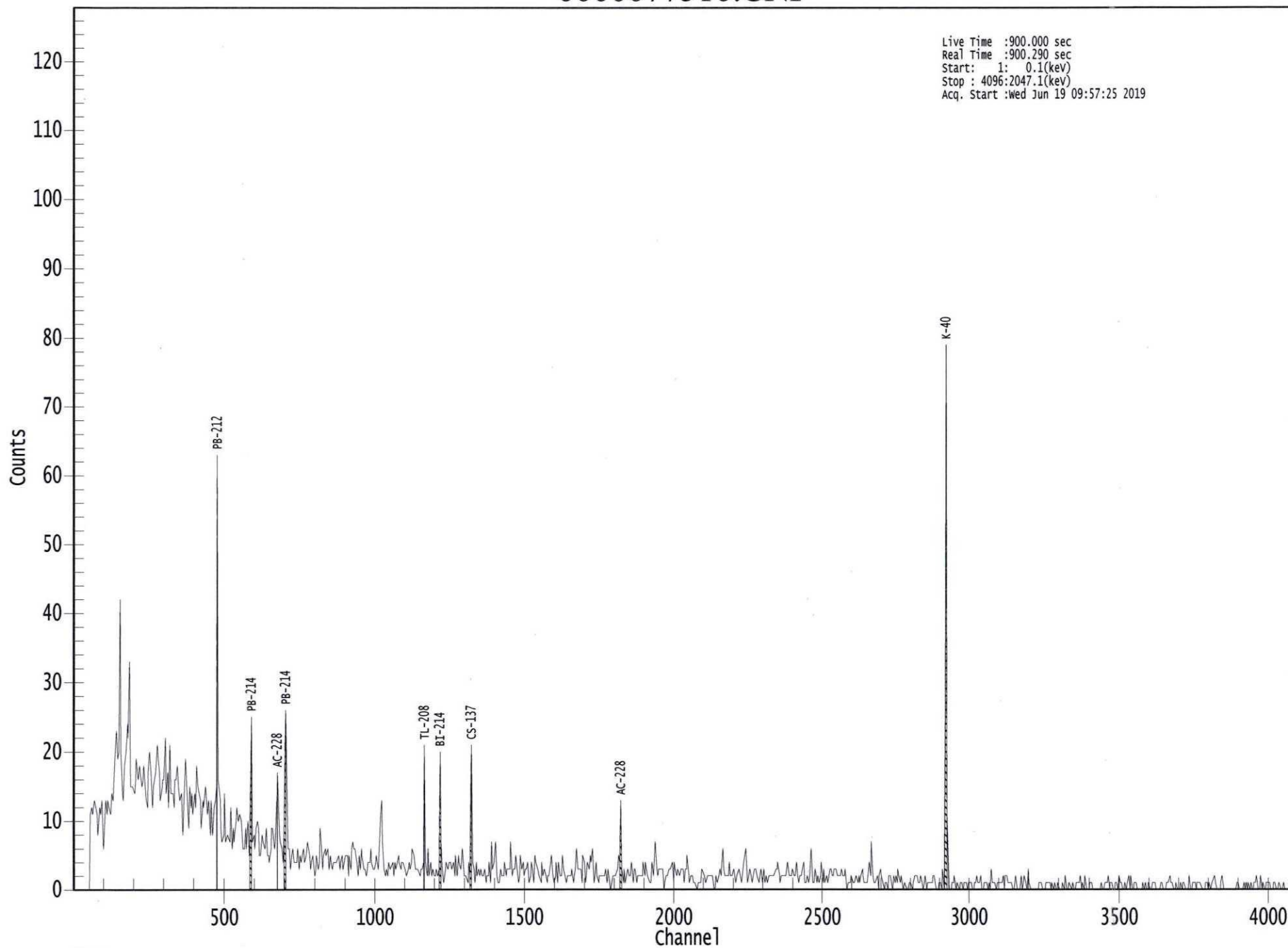
&gt; = MDA value not calculated

@ = Half-life too short to be able to perform the decay correction

? = CAUTION: MDA value is inconsistent with Currie MDA at 95% confidence level

# 0000077510.CNF

Live Time :900.000 sec  
Real Time :900.290 sec  
Start: 1: 0.1(keV)  
Stop : 4096:2047.1(keV)  
Acq. Start :Wed Jun 19 09:57:25 2019



ROI Type: 1

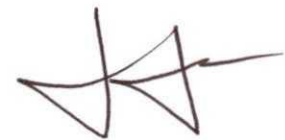
Analysis Report for 19-Jun-19-10016  
L1-10208A-AJGS-102SS

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## GAMMA SPECTRUM ANALYSIS

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Sample Identification : 19-Jun-19-10016  
Sample Description : L1-10208A-AJGS-102SS  
Sample Type : Soil  
Unit :  
Sample Point :  
  
Sample Size : 1.519E+03 grams  
Facility : Default  
  
Sample Taken On : 6/17/2019 12:44:00PM  
Acquisition Started : 6/19/2019 9:30:36AM  
  
Procedure : 130G\_SOIL\_1  
Operator : Administrator  
Detector Name : P40818B  
Geometry : 130G\_SOIL\_1  
Live Time : 900.0 seconds  
Real Time : 901.1 seconds  
  
Dead Time : 0.13 %  
  
Peak Locate Threshold : 3.00  
Peak Locate Range (in channels) : 120 - 8192  
Peak Area Range (in channels) : 120 - 8192  
Identification Energy Tolerance : 1.000 keV  
  
Energy Calibration Used Done On : 1/29/2019  
Efficiency Calibration Used Done On : 6/19/2019  
Efficiency Calibration Description :  
  
Sample Number : 77507  
Fill Height : 1519.08 gram  
Certificate Name : Eu155-Na22  
Certificate Date : 1/30/2012 12:00:00PM




6-19-19

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## PEAK ANALYSIS REPORT

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Peak Analysis Performed on : 6/19/2019 9:45:39AM  
Peak Analysis From Channel : 120  
Peak Analysis To Channel : 8192

  
6-19-19

Analysis Report for 19-Jun-19-10016

L1-10208A-AJGS-102SS

Peak No.	Energy (keV)	ROI start	ROI end	Peak Centroid	Net Peak Area	Net Area Uncertainty	Continuum Counts	FWHM (keV)
1	238.57	948 -	959	954.37	9.33E+01	13.52	3.47E+01	0.82
2	295.13	1174 -	1186	1180.42	4.28E+01	8.50	1.12E+01	1.02
3	582.67	2324 -	2337	2329.90	4.24E+01	7.76	6.55E+00	1.01
4	609.00	2430 -	2441	2435.15	3.67E+01	6.89	4.35E+00	0.99
5	661.48	2639 -	2652	2645.03	3.76E+01	7.80	8.41E+00	0.54
6	1459.87	5828 -	5849	5839.32	1.75E+02	14.34	8.25E+00	1.15

M = First peak in a multiplet region

m = Other peak in a multiplet region

F = Fitted singlet

Errors quoted at 1.000sigma

No background subtract performed on this spectrum.

## NUCLIDE IDENTIFICATION REPORT

Nuclide Library Used : C:\Canberra\Apex\Root\Default\Library\ZION LIB-BNL.NLB

### IDENTIFIED NUCLIDES

Nuclide Name	Id Confidence	Energy (keV)	Yield(%)	Activity (pCi/grams)	Activity Uncertainty
K-40	0.86	1460.82 *	10.66	4.36E+00	4.05E-01
Cs-137	0.99	661.66 *	85.10	6.85E-02	1.48E-02
Tl-208	0.95	583.19 *	85.00	7.09E-02	1.37E-02
Pb-212	0.99	115.18	0.60		
		238.63 *	43.60	1.67E-01	2.77E-02
		300.09	3.30		
Bi-214	0.99	609.32 *	45.49	1.18E-01	2.33E-02
		768.36	4.89		
		806.18	1.26		
		934.06	3.11		
		1120.29	14.92		

Analysis Report for 19-Jun-19-10016

L1-10208A-AJGS-102SS

<b>Nuclide Name</b>	<b>Id Confidence</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Activity Uncertainty</b>
Bi-214	0.99	1155.21	1.63		
		1238.12	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		
		1661.27	1.05		
		1729.59	2.88		
		1764.49	15.30		
		1847.43	2.03		
		2118.51	1.16		

\* = Energy line found in the spectrum.

- = Manually added nuclide.

? = Manually edited nuclide.

@ = Energy line not used for Weighted Mean Activity

Energy Tolerance : 1.000 keV

Nuclide confidence index threshold = 0.30

Errors quoted at 1.000sigma

## INTERFERENCE CORRECTED REPORT

<b>Nuclide Name</b>	<b>Nuclide Id Confidence</b>	<b>Wt mean Activity (pCi/grams)</b>	<b>Wt mean Activity Uncertainty</b>	<b>Comments</b>
K-40	0.866	4.36E+00	4.05E-01	
Cs-137	0.995	6.85E-02	1.48E-02	
Tl-208	0.958	7.09E-02	1.37E-02	
Pb-212	0.999	1.67E-01	2.77E-02	
Bi-214	0.993	1.18E-01	2.33E-02	

? = 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 1.000sigma

Analysis Report for 19-Jun-19-10016  
L1-10208A-AJGS-102SS

## UNIDENTIFIED PEAKS

Peak Locate Performed on : 6/19/2019 9:45:39AM  
Peak Locate From Channel : 120  
Peak Locate To Channel : 8192

Peak No.	Energy (keV)	Peak Size (CPS)	Peak CPS (%) Uncertainty	Peak Type	Tolerance Nuclide
2	295.13	4.75566E-02	19.85	Tol.	Eu-152 Pb-214

M = First peak in a multiplet region  
m = Other peak in a multiplet region  
F = Fitted singlet  
Errors quoted at 1.000sigma

## NUCLIDE MDA REPORT

Nuclide Library Used : C:\Canberra\Apex\Root\Default\Library\ZION LIB-BNL.NLB

Nuclide Name	Energy (keV)	Yield(%)	Activity (pCi/grams)	Nuclide MDA (pCi/grams)	Line MDA (pCi/grams)
An Pk	511.00	100.00	7.39E-02	5.52E-02	5.52E-02
BE-7	477.60	10.44	1.69E-01	4.26E-01	4.26E-01
+ K-40	1460.82	* 10.66	4.36E+00	5.43E-01	5.43E-01
Mn-54	834.85	99.98	5.08E-03	4.80E-02	4.80E-02
Co-60	1173.23	99.85	5.76E-03	5.77E-02	5.80E-02
	1332.49	99.98	-1.86E-02		5.77E-02
Nb-94	702.65	99.81	1.37E-02	4.64E-02	4.64E-02
	871.09	99.89	1.85E-02		4.92E-02
Ag-108m	79.13	6.60	7.66E-01	3.67E-02	1.77E+00
	433.94	90.50	3.52E-03		3.67E-02
	614.28	89.80	-3.13E-02		5.06E-02
	722.94	90.80	4.36E-03		5.04E-02
Sb-125	176.31	6.84	-1.14E-02	1.16E-01	5.23E-01
	380.45	1.52	-1.98E-01		2.23E+00
	427.87	29.60	3.73E-02		1.16E-01
	463.36	10.49	7.47E-02		3.97E-01
	600.60	17.65	1.00E-01		2.43E-01

Analysis Report for 19-Jun-19-10016

L1-10208A-AJGS-102SS

<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Nuclide MDA (pCi/grams)</b>	<b>Line MDA (pCi/grams)</b>
Sb-125	606.71	4.98	9.32E-01	1.16E-01	1.18E+00
	635.95	11.22	1.63E-01		3.86E-01
	671.44	1.79	8.51E-01		2.74E+00
Ba-133	79.61	2.65	-1.18E+00	6.29E-02	4.13E+00
	81.00	32.90	-3.63E-02		3.00E-01
	276.40	7.16	-7.56E-03		5.23E-01
	302.85	18.34	-5.62E-03		1.96E-01
	356.01	62.05	-1.04E-01		6.29E-02
	383.85	8.94	2.12E-01		4.25E-01
Cs-134	475.36	1.48	9.28E-01	5.52E-02	2.81E+00
	563.25	8.34	-9.86E-02		4.63E-01
	569.33	15.37	8.85E-02		2.77E-01
	604.72	97.62	-2.78E-02		5.98E-02
	795.86	85.46	1.67E-02		5.52E-02
	801.95	8.69	3.05E-01		4.36E-01
	1038.61	0.99	-6.05E+00		4.43E+00
	1167.97	1.79	1.47E+00		3.54E+00
	1365.19	3.02	8.89E-01		1.75E+00
	+ Cs-137	661.66	* 85.10		6.85E-02
Eu-152	121.78	28.67	-1.79E-02	1.18E-01	1.52E-01
	244.70	7.61	-4.40E-01		4.79E-01
	295.94	0.45	-4.47E+00		9.00E+00
	344.28	26.60	-6.96E-02		1.18E-01
	367.79	0.86	2.73E-01		4.02E+00
	411.12	2.24	8.82E-01		1.64E+00
	443.96	2.83	-6.04E-01		1.12E+00
	488.68	0.42	-9.80E+00		7.90E+00
	563.99	0.49	5.59E+00		8.12E+00
	586.26	0.46	-5.70E-01		1.27E+01
	678.62	0.47	1.37E+00		9.44E+00
	688.67	0.86	-7.76E-01		4.51E+00
	719.35	0.28	-2.11E-01		1.52E+01
	778.90	12.96	-1.69E-01		3.32E-01
	810.45	0.32	-1.21E+00		1.15E+01
	867.37	4.26	3.00E-01		1.15E+00
	919.33	0.43	7.03E+00		1.15E+01
	964.08	14.65	2.12E-01		4.59E-01
	1085.87	10.24	2.17E-01		5.37E-01
	1089.74	1.73	1.90E+00		3.12E+00
	1112.07	13.69	-2.08E-01		4.00E-01
	1212.95	1.43	3.27E-01		4.06E+00
	1249.94	0.19	-3.46E+00		2.27E+01
1299.14	1.63	9.71E-01	3.03E+00		
1408.01	21.07	7.53E-02	2.40E-01		
1457.64	0.50	1.02E+02	3.67E+01		
1528.10	0.28	-1.15E+01	9.45E+00		
Eu-154	123.07	40.40	-1.13E-03	1.08E-01	1.08E-01
	247.93	6.89	-1.66E-02		4.84E-01
	591.76	4.95	4.29E-02		7.79E-01
	692.42	1.78	1.11E+00		2.33E+00
	723.30	20.06	1.09E-01		2.32E-01

Analysis Report for 19-Jun-19-10016

L1-10208A-AJGS-102SS

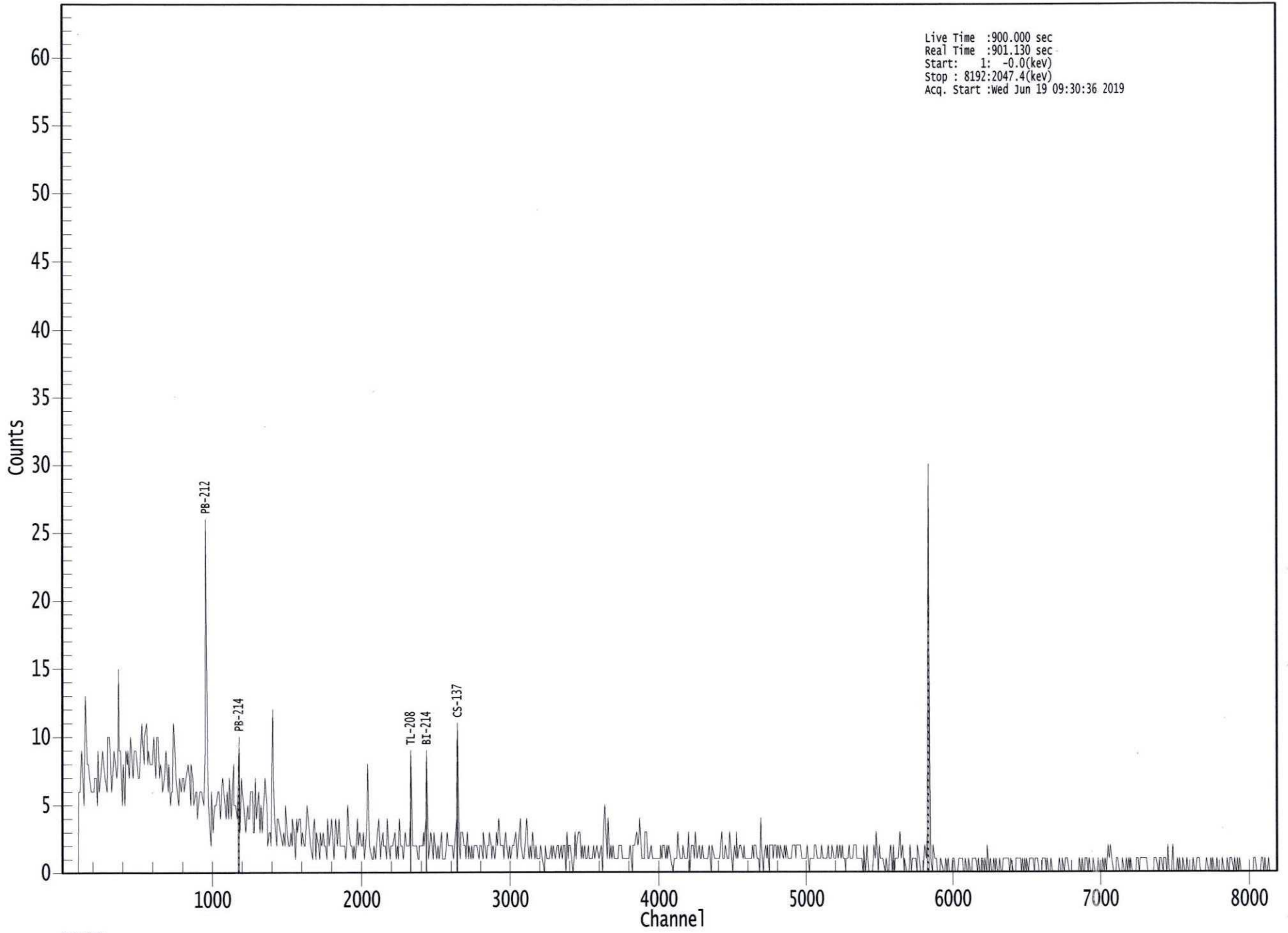
<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Nuclide MDA (pCi/grams)</b>	<b>Line MDA (pCi/grams)</b>
Eu-154	756.80	4.52	3.49E-01	1.08E-01	8.93E-01
	873.18	12.08	-1.20E-01		3.76E-01
	996.29	10.48	-2.76E-01		3.37E-01
	1004.76	18.01	1.45E-01		2.72E-01
	1274.43	34.80	-1.15E-01		1.49E-01
	1596.48	1.80	9.53E-01		2.32E+00
Eu-155	45.30	1.31	4.74E+00	2.25E-01	2.91E+01
	60.01	1.22	2.67E+00		3.06E+01
	86.55	30.70	-1.94E-01		2.25E-01
	105.31	21.10	-1.47E-01		2.47E-01
Ra-226	186.21	3.64	1.95E-01	1.12E+00	1.12E+00
Pa-231	27.36	10.30	1.69E+00	1.36E+00	2.96E+00
	283.69	1.70	5.79E-01		2.22E+00
	300.07	2.47	-1.08E-01		1.36E+00
	302.65	2.20	-2.54E-01		1.62E+00
	330.06	1.40	-8.44E-01		2.50E+00
U-235	143.76	10.96	1.36E-01	7.18E-02	3.86E-01
	163.33	5.08	1.24E-01		7.29E-01
	185.71	57.20	3.47E-02		7.18E-02
	202.11	1.08	-1.27E+00		3.45E+00
	205.31	5.01	-1.83E-01		7.33E-01
Am-241	59.54	35.90	2.63E-01	1.09E+00	1.09E+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  
 ? = CAUTION: MDA value is inconsistent with Currie MDA at 95% confidence level



0000077507.CNF

Live Time :900.000 sec  
Real Time :901.130 sec  
Start: 1: -0.0(kev)  
Stop : 8192:2047.4(kev)  
Acq. Start :Wed Jun 19 09:30:36 2019



 ROI Type: 1


Analysis Report for 19-Jun-19-10017  
L1-10208A-AJGS-103SS

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## GAMMA SPECTRUM ANALYSIS

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Sample Identification : 19-Jun-19-10017  
Sample Description : L1-10208A-AJGS-103SS  
Sample Type : Soil  
Unit :  
Sample Point :  
  
Sample Size : 1.555E+03 grams  
Facility : Default  
  
Sample Taken On : 6/17/2019 12:46:00PM  
Acquisition Started : 6/19/2019 9:30:43AM  
  
Procedure : 130G\_SOIL\_1  
Operator : Administrator  
Detector Name : P11314  
Geometry : 130G\_SOIL\_1  
Live Time : 900.0 seconds  
Real Time : 900.3 seconds  
  
Dead Time : 0.03 %  
  
Peak Locate Threshold : 3.00  
Peak Locate Range (in channels) : 120 - 8192  
Peak Area Range (in channels) : 120 - 8192  
Identification Energy Tolerance : 1.000 keV  
  
Energy Calibration Used Done On : 1/24/2019  
Efficiency Calibration Used Done On : 6/19/2019  
Efficiency Calibration Description :  
  
Sample Number : 77508  
Fill Height : 1555.47 gram  
Certificate Name : Eu155-Na22  
Certificate Date : 12/22/2008 12:00:00PM

  
6-19-19

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## PEAK ANALYSIS REPORT

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Peak Analysis Performed on : 6/19/2019 9:46:00AM  
Peak Analysis From Channel : 120  
Peak Analysis To Channel : 8192

  
6-19-19

Analysis Report for 19-Jun-19-10017

L1-10208A-AJGS-103SS

Peak No.	Energy (keV)	ROI start	ROI end	Peak Centroid	Net Peak Area	Net Area Uncertainty	Continuum Counts	FWHM (keV)
1	74.92	294 -	304	300.22	3.08E+01	11.67	4.32E+01	0.77
2	238.85	946 -	961	954.98	1.20E+02	17.64	6.33E+01	0.98
3	295.40	1175 -	1185	1180.88	2.66E+01	9.07	2.34E+01	0.96
4	351.99	1399 -	1414	1406.97	5.40E+01	12.00	3.00E+01	0.72
5	583.32	2326 -	2336	2331.40	3.25E+01	6.93	6.48E+00	0.48
6	608.99	2430 -	2439	2434.01	2.74E+01	6.84	8.56E+00	0.46
7	968.38	3866 -	3875	3870.94	1.94E+01	6.33	8.57E+00	0.27
8	1460.43	5827 -	5850	5839.64	2.60E+02	16.87	6.06E+00	1.78

M = First peak in a multiplet region

m = Other peak in a multiplet region

F = Fitted singlet

Errors quoted at 1.000sigma

No background subtract performed on this spectrum.

## NUCLIDE IDENTIFICATION REPORT

Nuclide Library Used : C:\Canberra\Apex\Root\Default\Library\ZION LIB-BNL.NLB

### IDENTIFIED NUCLIDES

Nuclide Name	Id Confidence	Energy (keV)	Yield(%)	Activity (pCi/grams)	Activity Uncertainty
K-40	0.97	1460.82 *	10.66	5.80E+00	4.53E-01
Tl-208	0.99	583.19 *	85.00	4.88E-02	1.08E-02
Pb-212	0.99	115.18	0.60		
		238.63 *	43.60	1.90E-01	3.19E-02
		300.09	3.30		
Pb212-XR	0.99	74.82 *	10.28	3.94E-01	1.55E-01
		77.11	17.10		
		87.35	3.97		
		89.78	1.46		

Analysis Report for 19-Jun-19-10017

L1-10208A-AJGS-103SS

<b>Nuclide Name</b>	<b>Id Confidence</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Activity Uncertainty</b>
Bi-214	0.99	609.32 *	45.49	7.92E-02	2.03E-02
		768.36	4.89		
		806.18	1.26		
		934.06	3.11		
		1120.29	14.92		
		1155.21	1.63		
		1238.12	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		
		1661.27	1.05		
		1729.59	2.88		
		1764.49	15.30		
Pb-214	0.99	1847.43	2.03	1.13E-01	3.97E-02
		2118.51	1.16		
		241.99	7.25		
Pb-214	0.99	295.22 *	18.42	1.36E-01	3.20E-02
		351.93 *	35.60		
		785.96	1.06		
Pb214-XR	0.99	74.82 *	5.80	6.98E-01	2.76E-01
		77.11	9.70		
		87.35	2.24		
Ac-228	0.99	89.78	0.82	2.21E-01	7.28E-02
		129.07	2.42		
		209.25	3.89		
		270.24	3.46		
		328.00	2.95		
		338.32	11.27		
		409.46	1.92		
		463.00	4.40		
		794.95	4.25		
		911.20	25.80		
		964.77	4.99		
Ac-228	0.99	968.97 *	15.80	2.21E-01	7.28E-02
		1588.20	3.22		

\* = Energy line found in the spectrum.

- = Manually added nuclide.

? = Manually edited nuclide.

@ = Energy line not used for Weighted Mean Activity

Energy Tolerance : 1.000 keV

Nuclide confidence index threshold = 0.30

Errors quoted at 1.000sigma

Analysis Report for 19-Jun-19-10017

L1-10208A-AJGS-103SS

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## INTERFERENCE CORRECTED REPORT

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<b>Nuclide Name</b>	<b>Nuclide Id Confidence</b>	<b>Wt mean Activity (pCi/grams)</b>	<b>Wt mean Activity Uncertainty</b>	<b>Comments</b>
	0.975	5.80E+00	4.53E-01	
	0.997	4.88E-02	1.08E-02	
X	0.873			
	0.993	1.90E-01	3.19E-02	
?	0.999	3.94E-01	1.55E-01	
	0.993	7.92E-02	2.03E-02	
	0.998	1.27E-01	2.49E-02	
?	0.999	6.98E-01	2.76E-01	
	0.990	2.21E-01	7.28E-02	

- ? = 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 1.000sigma

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Analysis Report for 19-Jun-19-10017  
L1-10208A-AJGS-103SS

## UNIDENTIFIED PEAKS

Peak Locate Performed on : 6/19/2019 9:46:00AM  
Peak Locate From Channel : 120  
Peak Locate To Channel : 8192

Peak No.	Energy (keV)	Peak Size (CPS)	Peak CPS (%) Uncertainty	Peak Type	Tolerance Nuclide
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All peaks were identified.

M = First peak in a multiplet region  
m = Other peak in a multiplet region  
F = Fitted singlet  
Errors quoted at 1.000sigma

## NUCLIDE MDA REPORT

Nuclide Library Used : C:\Canberra\Apex\Root\Default\Library\ZION LIB-BNL.NLB

Nuclide Name	Energy (keV)	Yield(%)	Activity (pCi/grams)	Nuclide MDA (pCi/grams)	Line MDA (pCi/grams)
An Pk	511.00	100.00	6.22E-02	5.42E-02	5.42E-02
BE-7	477.60	10.44	4.89E-02	3.78E-01	3.78E-01
+ K-40	1460.82	* 10.66	5.80E+00	4.40E-01	4.40E-01
Mn-54	834.85	99.98	-2.51E-03	4.38E-02	4.38E-02
Co-60	1173.23	99.85	5.53E-03	6.18E-02	7.02E-02
	1332.49	99.98	3.17E-02		6.18E-02
Nb-94	702.65	99.81	-1.92E-03	3.82E-02	3.82E-02
	871.09	99.89	1.80E-02		4.16E-02
Ag-108m	79.13	6.60	6.91E-01	3.58E-02	9.82E-01
	433.94	90.50	-5.89E-03		3.58E-02
	614.28	89.80	-3.63E-02		5.26E-02
	722.94	90.80	3.00E-03		4.44E-02
Sb-125	176.31	6.84	1.58E-01	1.07E-01	4.34E-01
	380.45	1.52	-1.03E+00		1.79E+00
	427.87	29.60	-7.66E-04		1.07E-01
	463.36	10.49	2.02E-01		3.48E-01
	600.60	17.65	8.42E-02		1.98E-01
	606.71	4.98	6.32E-01		1.03E+00
	635.95	11.22	-1.89E-01		3.41E-01

Analysis Report for 19-Jun-19-10017

L1-10208A-AJGS-103SS

<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Nuclide MDA (pCi/grams)</b>	<b>Line MDA (pCi/grams)</b>
Sb-125	671.44	1.79	-1.51E+00	1.07E-01	1.95E+00
Ba-133	79.61	2.65	1.73E+00	6.12E-02	2.42E+00
	81.00	32.90	-2.78E-01		1.63E-01
	276.40	7.16	3.11E-01		4.50E-01
	302.85	18.34	7.89E-02		1.82E-01
	356.01	62.05	-2.43E-02		6.12E-02
	383.85	8.94	-6.71E-02		3.24E-01
Cs-134	475.36	1.48	-1.17E+00	4.93E-02	2.60E+00
	563.25	8.34	-5.87E-01		4.42E-01
	569.33	15.37	-2.77E-02		2.42E-01
	604.72	97.62	-4.35E-02		4.93E-02
	795.86	85.46	1.38E-02		5.21E-02
	801.95	8.69	2.69E-01		4.90E-01
	1038.61	0.99	-3.85E+00		4.84E+00
	1167.97	1.79	-1.81E+00		3.32E+00
	1365.19	3.02	7.30E-01		1.66E+00
Cs-137	661.66	85.10	4.37E-02	6.12E-02	6.12E-02
Eu-152	121.78	28.67	4.20E-02	1.10E-01	1.14E-01
	244.70	7.61	-4.47E-02		4.41E-01
	295.94	0.45	-1.96E+00		8.36E+00
	344.28	26.60	-9.83E-02		1.10E-01
	367.79	0.86	-1.12E+00		3.87E+00
	411.12	2.24	2.20E-01		1.47E+00
	443.96	2.83	-7.17E-01		1.27E+00
	488.68	0.42	4.70E-01		7.58E+00
	563.99	0.49	-1.28E+01		6.57E+00
	586.26	0.46	1.05E+01		1.10E+01
	678.62	0.47	3.07E+00		7.29E+00
	688.67	0.86	1.64E+00		4.04E+00
	719.35	0.28	7.63E+00		1.28E+01
	778.90	12.96	1.84E-01		3.16E-01
	810.45	0.32	2.48E-01		1.23E+01
	867.37	4.26	-8.61E-01		9.31E-01
	919.33	0.43	4.91E-01		1.07E+01
	964.08	14.65	-2.12E-01		4.42E-01
	1085.87	10.24	1.34E-01		4.51E-01
	1089.74	1.73	-1.20E+00		2.48E+00
	1112.07	13.69	1.48E-01		3.65E-01
	1212.95	1.43	1.72E+00		4.26E+00
	1249.94	0.19	-3.08E+01		2.42E+01
	1299.14	1.63	-2.62E+00		2.52E+00
	1408.01	21.07	7.64E-02		2.36E-01
	1457.64	0.50	1.26E+02		3.86E+01
	1528.10	0.28	-9.84E+00		8.45E+00
Eu-154	123.07	40.40	4.11E-02	8.24E-02	8.24E-02
	247.93	6.89	-1.06E-01		4.38E-01
	591.76	4.95	-6.89E-02		7.58E-01
	692.42	1.78	-7.88E-01		2.05E+00
	723.30	20.06	9.55E-02		2.05E-01
	756.80	4.52	1.33E-01		8.19E-01
	873.18	12.08	1.18E-01		3.52E-01

Analysis Report for 19-Jun-19-10017

L1-10208A-AJGS-103SS

<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Nuclide MDA (pCi/grams)</b>	<b>Line MDA (pCi/grams)</b>
Eu-154	996.29	10.48	-2.97E-02	8.24E-02	4.16E-01
	1004.76	18.01	1.61E-01		2.55E-01
	1274.43	34.80	3.63E-02		1.21E-01
	1596.48	1.80	-6.32E-01		2.56E+00
Eu-155	45.30	1.31	-3.49E+00	1.69E-01	9.88E+00
	60.01	1.22	1.10E+00		1.16E+01
	86.55	30.70	1.68E-02		1.74E-01
	105.31	21.10	3.68E-03		1.69E-01
Ra-226	186.21	3.64	2.77E-01	9.12E-01	9.12E-01
Pa-231	27.36	10.30	4.43E-01	1.22E+00	1.22E+00
	283.69	1.70	-8.84E-01		1.66E+00
	300.07	2.47	-6.74E-01		1.35E+00
	302.65	2.20	1.20E+00		1.54E+00
	330.06	1.40	1.37E+00		2.58E+00
U-235	143.76	10.96	1.08E-01	5.86E-02	2.94E-01
	163.33	5.08	9.60E-02		5.64E-01
	185.71	57.20	4.41E-02		5.86E-02
	202.11	1.08	3.72E-01		2.89E+00
	205.31	5.01	-6.07E-02		5.86E-01
Am-241	59.54	35.90	-1.78E-01	3.97E-01	3.97E-01

+ = Nuclide identified during the nuclide identification

\* = Energy line found in the spectrum

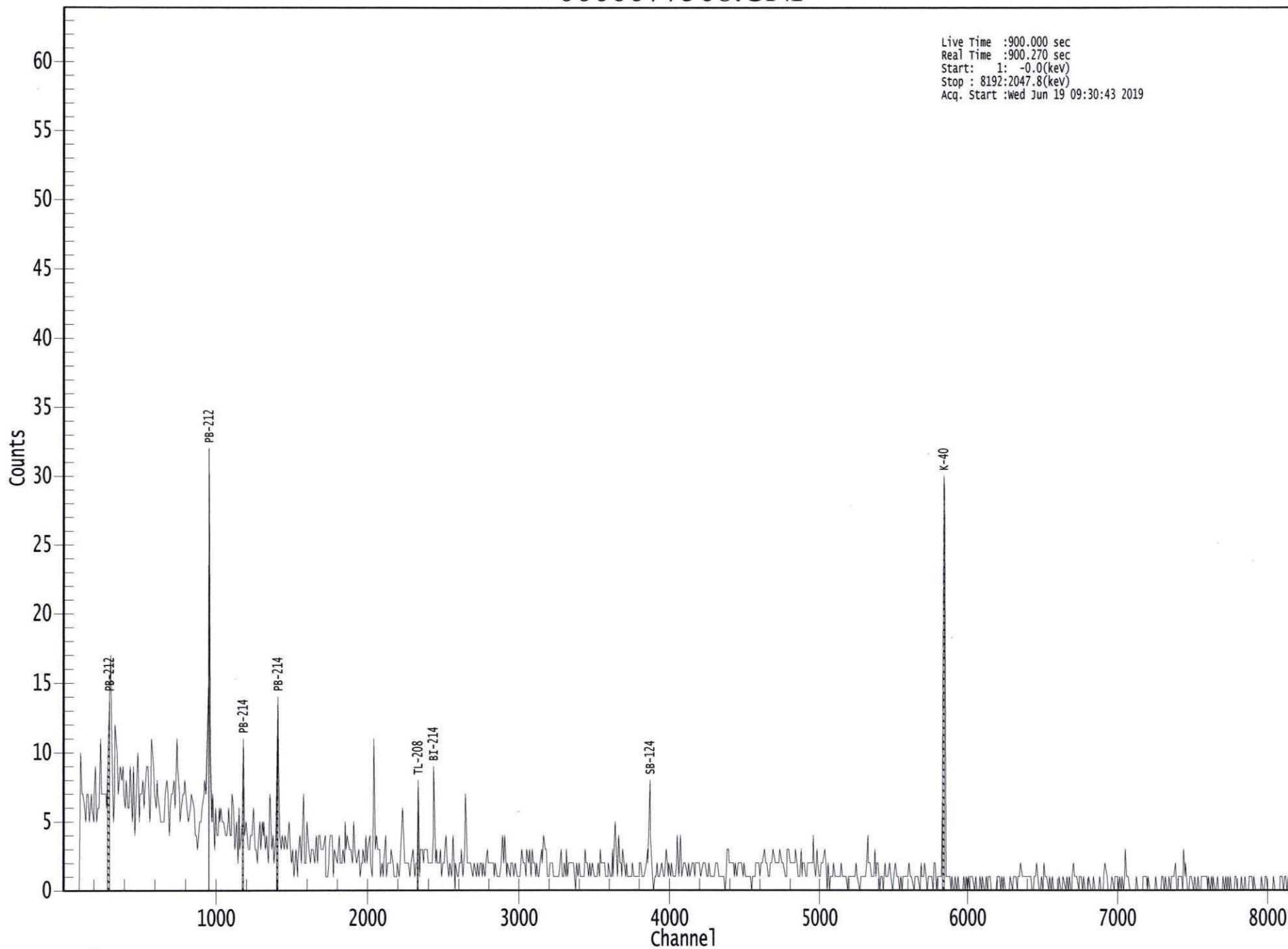
&gt; = MDA value not calculated

@ = Half-life too short to be able to perform the decay correction

? = CAUTION: MDA value is inconsistent with Currie MDA at 95% confidence level



000077508.CNF



ROI Type: 1

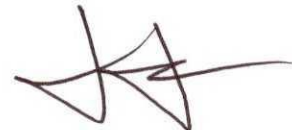
Analysis Report for 19-Jun-19-10018  
L1-10208A-AJGS-104SS

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## GAMMA SPECTRUM ANALYSIS

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Sample Identification : 19-Jun-19-10018  
Sample Description : L1-10208A-AJGS-104SS  
Sample Type : Soil  
Unit :  
Sample Point :  
  
Sample Size : 1.557E+03 grams  
Facility : Default  
  
Sample Taken On : 6/17/2019 12:48:00PM  
Acquisition Started : 6/19/2019 9:30:51AM  
  
Procedure : 130G\_SOIL\_1  
Operator : Administrator  
Detector Name : 352  
Geometry : 130G\_SOIL\_1  
Live Time : 900.0 seconds  
Real Time : 900.3 seconds  
  
Dead Time : 0.03 %  
  
Peak Locate Threshold : 3.00  
Peak Locate Range (in channels) : 120 - 8192  
Peak Area Range (in channels) : 120 - 8192  
Identification Energy Tolerance : 1.000 keV  
  
Energy Calibration Used Done On : 9/29/2018  
Efficiency Calibration Used Done On : 6/19/2019  
Efficiency Calibration Description :  
  
Sample Number : 77509  
Fill Height : 1557.32 gram  
Certificate Name : Eu155-Na22  
Certificate Date : 1/7/2013 12:00:00PM


  
6-19-19

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## PEAK ANALYSIS REPORT

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Peak Analysis Performed on : 6/19/2019 9:45:54AM  
Peak Analysis From Channel : 120  
Peak Analysis To Channel : 8192

  
6-19-19

Analysis Report for 19-Jun-19-10018

L1-10208A-AJGS-104SS

Peak No.	Energy (keV)	ROI start	ROI end	Peak Centroid	Net Peak Area	Net Area Uncertainty	Continuum Counts	FWHM (keV)
1	238.50	947 -	963	954.48	1.01E+02	17.16	6.17E+01	1.30
2	295.06	1176 -	1186	1180.46	3.66E+01	9.25	2.04E+01	0.33
3	351.88	1398 -	1414	1407.50	5.38E+01	11.53	2.52E+01	1.05
4	477.38	1905 -	1915	1909.10	1.48E+01	6.99	1.32E+01	0.77
5	582.96	2324 -	2338	2331.18	4.60E+01	9.45	1.50E+01	1.10
6	609.42	2430 -	2443	2436.93	4.60E+01	8.08	7.00E+00	0.45
7	911.09	3638 -	3649	3643.39	2.53E+01	7.27	1.07E+01	0.51
8	1460.54	5831 -	5853	5842.51	2.42E+02	17.19	1.40E+01	2.06

M = First peak in a multiplet region

m = Other peak in a multiplet region

F = Fitted singlet

Errors quoted at 1.000sigma

No background subtract performed on this spectrum.

## NUCLIDE IDENTIFICATION REPORT

Nuclide Library Used : C:\Canberra\Apex\Root\Default\Library\ZION LIB-BNL.NLB

### IDENTIFIED NUCLIDES

Nuclide Name	Id Confidence	Energy (keV)	Yield(%)	Activity (pCi/grams)	Activity Uncertainty
BE-7	0.99	477.60 *	10.44	1.55E-01	7.38E-02
K-40	0.98	1460.82 *	10.66	5.04E+00	4.20E-01
Tl-208	0.99	583.19 *	85.00	6.56E-02	1.40E-02
Pb-212	0.99	115.18	0.60		
		238.63 *	43.60	1.58E-01	2.97E-02
		300.09	3.30		
Bi-214	0.99	609.32 *	45.49	1.26E-01	2.34E-02
		768.36	4.89		
		806.18	1.26		

Analysis Report for 19-Jun-19-10018

L1-10208A-AJGS-104SS

<b>Nuclide Name</b>	<b>Id Confidence</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Activity Uncertainty</b>
Bi-214	0.99	934.06	3.11		
		1120.29	14.92		
		1155.21	1.63		
		1238.12	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		
		1661.27	1.05		
		1729.59	2.88		
		1764.49	15.30		
		1847.43	2.03		
		2118.51	1.16		
Pb-214	0.99	241.99	7.25		
		295.22 *	18.42	1.52E-01	4.02E-02
		351.93 *	35.60	1.30E-01	2.99E-02
Ac-228	0.99	785.96	1.06		
		129.07	2.42		
		209.25	3.89		
		270.24	3.46		
		328.00	2.95		
		338.32	11.27		
		409.46	1.92		
		463.00	4.40		
		794.95	4.25		
		911.20 *	25.80	1.59E-01	4.62E-02
		964.77	4.99		
968.97	15.80				
1588.20	3.22				

\* = Energy line found in the spectrum.

- = Manually added nuclide.

? = Manually edited nuclide.

@ = Energy line not used for Weighted Mean Activity

Energy Tolerance : 1.000 keV

Nuclide confidence index threshold = 0.30

Errors quoted at 1.000sigma

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**INTERFERENCE CORRECTED REPORT**

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Analysis Report for 19-Jun-19-10018

L1-10208A-AJGS-104SS

<b>Nuclide Name</b>	<b>Nuclide Id Confidence</b>	<b>Wt mean Activity (pCi/grams)</b>	<b>Wt mean Activity Uncertainty</b>	<b>Comments</b>
BE-7	0.992	1.55E-01	7.38E-02	
K-40	0.987	5.04E+00	4.20E-01	
Tl-208	0.992	6.56E-02	1.40E-02	
X Bi-211	0.901			
Pb-212	0.998	1.58E-01	2.97E-02	
Bi-214	0.999	1.26E-01	2.34E-02	
Pb-214	0.998	1.38E-01	2.40E-02	
Ac-228	0.999	1.59E-01	4.62E-02	

? = 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 1.000sigma

Analysis Report for 19-Jun-19-10018

L1-10208A-AJGS-104SS

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**UNIDENTIFIED PEAKS**


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Peak Locate Performed on : 6/19/2019 9:45:54AM  
 Peak Locate From Channel : 120  
 Peak Locate To Channel : 8192

Peak No.	Energy (keV)	Peak Size (CPS)	Peak CPS (%) Uncertainty	Peak Type	Tolerance Nuclide
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All peaks were identified.

M = First peak in a multiplet region  
 m = Other peak in a multiplet region  
 F = Fitted singlet  
 Errors quoted at 1.000sigma

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**NUCLIDE MDA REPORT**


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Nuclide Library Used : C:\Canberra\Apex\Root\Default\Library\ZION LIB-BNL.NLB

	Nuclide Name	Energy (keV)	Yield(%)	Activity (pCi/grams)	Nuclide MDA (pCi/grams)	Line MDA (pCi/grams)
	An Pk	511.00	100.00	4.46E-02	5.54E-02	5.54E-02
+	BE-7	477.60	* 10.44	1.55E-01	2.37E-01	2.37E-01
+	K-40	1460.82	* 10.66	5.04E+00	5.77E-01	5.77E-01
	Mn-54	834.85	99.98	-1.42E-02	4.20E-02	4.20E-02
	Co-60	1173.23	99.85	1.54E-02	4.94E-02	6.06E-02
		1332.49	99.98	-6.31E-03		4.94E-02
	Nb-94	702.65	99.81	-1.54E-02	4.17E-02	4.17E-02
		871.09	99.89	7.87E-04		4.23E-02
	Ag-108m	79.13	6.60	-2.17E-01	3.21E-02	1.34E+00
		433.94	90.50	-1.53E-02		3.21E-02
		614.28	89.80	-1.96E-02		5.92E-02
		722.94	90.80	-7.29E-03		4.41E-02
	Sb-125	176.31	6.84	-1.29E-01	1.06E-01	4.57E-01
		380.45	1.52	-9.89E-01		2.09E+00
		427.87	29.60	6.77E-03		1.06E-01
		463.36	10.49	1.10E-03		3.07E-01
		600.60	17.65	9.38E-02		2.48E-01
		606.71	4.98	1.26E+00		1.12E+00
		635.95	11.22	2.70E-01		3.58E-01

Analysis Report for 19-Jun-19-10018

L1-10208A-AJGS-104SS

<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Nuclide MDA (pCi/grams)</b>	<b>Line MDA (pCi/grams)</b>
Sb-125	671.44	1.79	-8.97E-01	1.06E-01	1.81E+00
Ba-133	79.61	2.65	2.38E-01	6.61E-02	3.23E+00
	81.00	32.90	-3.86E-01		2.17E-01
	276.40	7.16	1.28E-01		4.66E-01
	302.85	18.34	6.98E-02		1.86E-01
	356.01	62.05	-5.80E-03		6.61E-02
	383.85	8.94	1.88E-01		3.74E-01
Cs-134	475.36	1.48	2.14E+00	4.84E-02	2.67E+00
	563.25	8.34	3.56E-03		4.21E-01
	569.33	15.37	9.59E-02		2.52E-01
	604.72	97.62	-2.16E-02		5.25E-02
	795.86	85.46	-1.43E-02		4.84E-02
	801.95	8.69	1.38E-01		5.16E-01
	1038.61	0.99	-1.19E+00		4.72E+00
	1167.97	1.79	2.98E+00		3.01E+00
	1365.19	3.02	-5.95E-01		1.37E+00
Cs-137	661.66	85.10	1.46E-02	4.15E-02	4.15E-02
Eu-152	121.78	28.67	3.53E-02	1.23E-01	1.25E-01
	244.70	7.61	-1.59E-01		4.22E-01
	295.94	0.45	7.16E+00		9.47E+00
	344.28	26.60	6.40E-02		1.23E-01
	367.79	0.86	2.87E+00		4.38E+00
	411.12	2.24	6.92E-01		1.61E+00
	443.96	2.83	6.95E-01		1.20E+00
	488.68	0.42	2.72E+00		8.24E+00
	563.99	0.49	-5.11E+00		7.04E+00
	586.26	0.46	-6.18E+00		1.19E+01
	678.62	0.47	7.49E+00		8.51E+00
	688.67	0.86	2.81E-01		4.30E+00
	719.35	0.28	-1.10E+01		1.36E+01
	778.90	12.96	-2.03E-01		3.24E-01
	810.45	0.32	8.54E+00		1.36E+01
	867.37	4.26	-6.08E-01		9.16E-01
	919.33	0.43	8.78E-02		1.03E+01
	964.08	14.65	9.65E-02		4.23E-01
	1085.87	10.24	8.98E-02		4.02E-01
	1089.74	1.73	-3.06E-01		2.45E+00
	1112.07	13.69	-3.40E-02		3.62E-01
	1212.95	1.43	8.59E-01		3.81E+00
	1249.94	0.19	7.64E+00		2.62E+01
	1299.14	1.63	-1.18E+00		2.45E+00
	1408.01	21.07	1.03E-02		1.77E-01
	1457.64	0.50	1.14E+02		3.60E+01
	1528.10	0.28	2.44E+00		9.11E+00
Eu-154	123.07	40.40	-2.88E-02	8.56E-02	8.56E-02
	247.93	6.89	1.30E-01		4.67E-01
	591.76	4.95	2.87E-01		8.21E-01
	692.42	1.78	4.74E-01		2.16E+00
	723.30	20.06	7.28E-02		2.03E-01
	756.80	4.52	-5.58E-01		8.38E-01
	873.18	12.08	-1.88E-01		3.44E-01

Analysis Report for 19-Jun-19-10018

L1-10208A-AJGS-104SS

<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Nuclide MDA (pCi/grams)</b>	<b>Line MDA (pCi/grams)</b>
Eu-154	996.29	10.48	1.80E-01	8.56E-02	3.72E-01
	1004.76	18.01	-1.56E-01		2.44E-01
	1274.43	34.80	-8.26E-02		1.31E-01
	1596.48	1.80	-5.05E-01		2.06E+00
Eu-155	45.30	1.31	1.07E+00	1.99E-01	1.77E+01
	60.01	1.22	1.31E+00		2.02E+01
	86.55	30.70	-4.46E-02		1.99E-01
	105.31	21.10	8.41E-02		2.10E-01
Ra-226	186.21	3.64	5.87E-01	1.01E+00	1.01E+00
Pa-231	27.36	10.30	2.22E+00	1.38E+00	2.38E+00
	283.69	1.70	-6.30E-01		1.73E+00
	300.07	2.47	-2.71E-01		1.38E+00
	302.65	2.20	2.10E-02		1.53E+00
	330.06	1.40	9.79E-01		2.54E+00
U-235	143.76	10.96	-2.01E-01	6.47E-02	3.16E-01
	163.33	5.08	-8.94E-01		5.52E-01
	185.71	57.20	5.66E-02		6.47E-02
	202.11	1.08	-3.12E+00		2.86E+00
	205.31	5.01	5.16E-02		6.46E-01
Am-241	59.54	35.90	4.00E-02	7.18E-01	7.18E-01

+ = Nuclide identified during the nuclide identification

\* = Energy line found in the spectrum

&gt; = MDA value not calculated

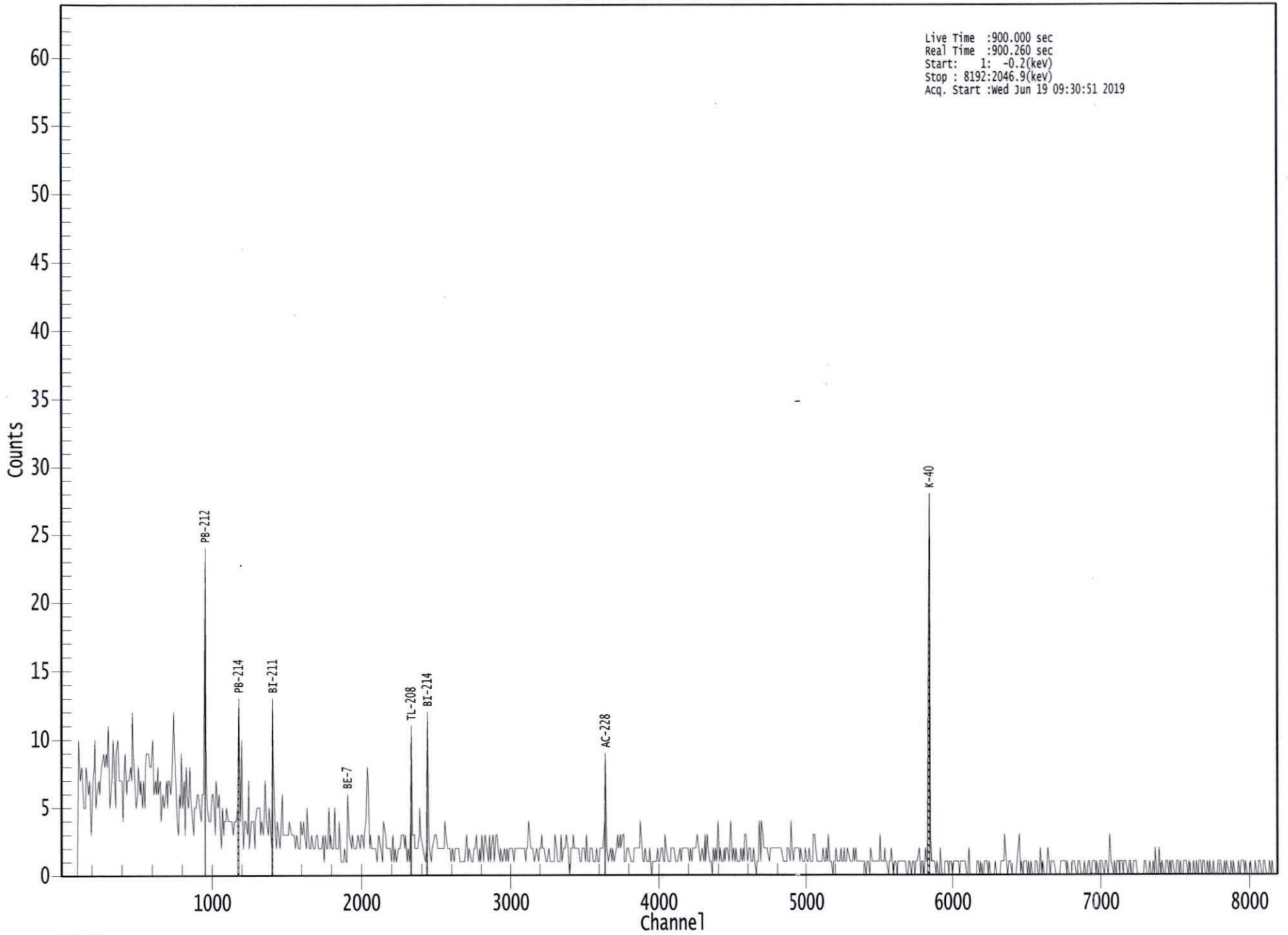
@ = Half-life too short to be able to perform the decay correction

? = CAUTION: MDA value is inconsistent with Currie MDA at 95% confidence level



000077509.CNF

Live Time :900.000 sec  
Real Time :900.260 sec  
Start: 1: -0.2(kev)  
Stop : 8192:2046.9(kev)  
Acq. Start :Wed Jun 19 09:30:51 2019



ROI Type: 1


Analysis Report for 19-Jun-19-10019  
L1-10208A-AJGS-105SS

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## GAMMA SPECTRUM ANALYSIS

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Sample Identification : 19-Jun-19-10019  
Sample Description : L1-10208A-AJGS-105SS  
Sample Type : Soil  
Unit :  
Sample Point :  
  
Sample Size : 1.586E+03 grams  
Facility : Default  
  
Sample Taken On : 6/17/2019 12:50:00PM  
Acquisition Started : 6/19/2019 9:57:31AM  
  
Procedure : 130G\_SOIL\_1  
Operator : Administrator  
Detector Name : P40818B  
Geometry : 130G\_SOIL\_1  
Live Time : 900.0 seconds  
Real Time : 901.2 seconds  
  
Dead Time : 0.13 %  
  
Peak Locate Threshold : 3.00  
Peak Locate Range (in channels) : 120 - 8192  
Peak Area Range (in channels) : 120 - 8192  
Identification Energy Tolerance : 1.000 keV  
  
Energy Calibration Used Done On : 1/29/2019  
Efficiency Calibration Used Done On : 6/19/2019  
Efficiency Calibration Description :  
  
Sample Number : 77511  
Fill Height : 1585.70 gram  
Certificate Name : Eu155-Na22  
Certificate Date : 1/30/2012 12:00:00PM




6-19-19

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## PEAK ANALYSIS REPORT

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Peak Analysis Performed on : 6/19/2019 10:12:35AM  
Peak Analysis From Channel : 120  
Peak Analysis To Channel : 8192

  
6-19-19

Analysis Report for 19-Jun-19-10019

L1-10208A-AJGS-105SS

Peak No.	Energy (keV)	ROI start	ROI end	Peak Centroid	Net Peak Area	Net Area Uncertainty	Continuum Counts	FWHM (keV)
1	238.57	950 -	960	954.38	1.12E+02	15.68	5.50E+01	0.61
2	582.93	2324 -	2337	2330.95	2.05E+01	8.69	1.95E+01	0.61
3	608.87	2429 -	2439	2434.65	3.45E+01	6.95	5.45E+00	0.65
4	910.61	3634 -	3646	3641.39	2.82E+01	6.61	5.82E+00	0.59
5	1459.78	5828 -	5849	5838.93	1.99E+02	15.15	8.20E+00	1.73

M = First peak in a multiplet region  
m = Other peak in a multiplet region  
F = Fitted singlet  
Errors quoted at 1.000sigma

No background subtract performed on this spectrum.

## NUCLIDE IDENTIFICATION REPORT

Nuclide Library Used : C:\Canberra\Apex\Root\Default\Library\ZION LIB-BNL.NLB

### IDENTIFIED NUCLIDES

Nuclide Name	Id Confidence	Energy (keV)	Yield(%)	Activity (pCi/grams)	Activity Uncertainty
Tl-208	0.99	583.19 *	85.00	3.39E-02	1.45E-02
Pb-212	0.99	115.18	0.60		
		238.63 *	43.60	1.99E-01	3.22E-02
		300.09	3.30		
Bi-214	0.98	609.32 *	45.49	1.10E-01	2.31E-02
		768.36	4.89		
		806.18	1.26		
		934.06	3.11		
		1120.29	14.92		
		1155.21	1.63		
		1238.12	5.83		
		1280.98	1.43		

Analysis Report for 19-Jun-19-10019

L1-10208A-AJGS-105SS

<b>Nuclide Name</b>	<b>Id Confidence</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Activity Uncertainty</b>
Bi-214	0.98	1377.67	3.99		
		1385.31	0.79		
		1401.52	1.33		
		1407.99	2.39		
		1509.21	2.13		
		1661.27	1.05		
		1729.59	2.88		
		1764.49	15.30		
		1847.43	2.03		
		2118.51	1.16		
Ac-228	0.98	129.07	2.42		
		209.25	3.89		
		270.24	3.46		
		328.00	2.95		
		338.32	11.27		
		409.46	1.92		
		463.00	4.40		
		794.95	4.25		
		911.20 *	25.80	2.08E-01	4.96E-02
		964.77	4.99		
968.97	15.80				
1588.20	3.22				

\* = Energy line found in the spectrum.

- = Manually added nuclide.

? = Manually edited nuclide.

@ = Energy line not used for Weighted Mean Activity

Energy Tolerance : 1.000 keV

Nuclide confidence index threshold = 0.30

Errors quoted at 1.000sigma

## INTERFERENCE CORRECTED REPORT

<b>Nuclide Name</b>	<b>Nuclide Id Confidence</b>	<b>Wt mean Activity (pCi/grams)</b>	<b>Wt mean Activity Uncertainty</b>	<b>Comments</b>
Tl-208	0.990	3.39E-02	1.45E-02	
Pb-212	0.999	1.99E-01	3.22E-02	
Bi-214	0.987	1.10E-01	2.31E-02	
Ac-228	0.983	2.08E-01	4.96E-02	

Analysis Report for 19-Jun-19-10019

L1-10208A-AJGS-105SS

- 
- ? = 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 1.000sigma

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Analysis Report for 19-Jun-19-10019

L1-10208A-AJGS-105SS

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**UNIDENTIFIED PEAKS**


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Peak Locate Performed on : 6/19/2019 10:12:35AM  
 Peak Locate From Channel : 120  
 Peak Locate To Channel : 8192

Peak No.	Energy (keV)	Peak Size (CPS)	Peak CPS (%) Uncertainty	Peak Type	Tolerance Nuclide
5	1459.78	2.20884E-01	7.62		K-40

JS 6-19-19

M = First peak in a multiplet region  
 m = Other peak in a multiplet region  
 F = Fitted singlet  
 Errors quoted at 1.000sigma

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**NUCLIDE MDA REPORT**


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Nuclide Library Used : C:\Canberra\Apex\Root\Default\Library\ZION LIB-BNL.NLB

Nuclide Name	Energy (keV)	Yield(%)	Activity (pCi/grams)	Nuclide MDA (pCi/grams)	Line MDA (pCi/grams)
An Pk	511.00	100.00	5.48E-02	5.73E-02	5.73E-02
BE-7	477.60	10.44	1.34E-01	4.04E-01	4.04E-01
K-40	1460.82	10.66	5.04E+00	1.79E+00	1.79E+00
Mn-54	834.85	99.98	-7.63E-03	4.57E-02	4.57E-02
Co-60	1173.23	99.85	-4.73E-02	6.82E-02	6.97E-02
	1332.49	99.98	3.50E-02		6.82E-02
Nb-94	702.65	99.81	-1.75E-02	4.30E-02	4.30E-02
	871.09	99.89	1.46E-03		4.96E-02
Ag-108m	79.13	6.60	3.98E-01	4.21E-02	1.86E+00
	433.94	90.50	-1.23E-02		4.21E-02
	614.28	89.80	-8.24E-02		5.01E-02
	722.94	90.80	-1.25E-03		5.45E-02
Sb-125	176.31	6.84	4.72E-01	1.39E-01	5.76E-01
	380.45	1.52	-5.54E-01		2.24E+00
	427.87	29.60	6.56E-02		1.39E-01
	463.36	10.49	3.42E-01		3.76E-01
	600.60	17.65	8.55E-02		2.37E-01
	606.71	4.98	6.96E-01		1.17E+00

Analysis Report for 19-Jun-19-10019

L1-10208A-AJGS-105SS

<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Nuclide MDA (pCi/grams)</b>	<b>Line MDA (pCi/grams)</b>
Sb-125	635.95	11.22	-1.10E-01	1.39E-01	3.31E-01
	671.44	1.79	-2.32E+00		2.20E+00
Ba-133	79.61	2.65	2.59E+00	6.64E-02	4.51E+00
	81.00	32.90	-1.79E-01		3.08E-01
	276.40	7.16	3.12E-01		4.82E-01
	302.85	18.34	6.14E-02		1.90E-01
	356.01	62.05	-9.30E-02		6.64E-02
	383.85	8.94	-1.78E-01		4.05E-01
Cs-134	475.36	1.48	-9.32E-01	4.61E-02	2.78E+00
	563.25	8.34	2.68E-02		5.02E-01
	569.33	15.37	7.76E-02		2.71E-01
	604.72	97.62	-2.86E-02		5.88E-02
	795.86	85.46	1.88E-02		4.61E-02
	801.95	8.69	-2.31E-01		3.47E-01
	1038.61	0.99	-3.44E+00		5.34E+00
	1167.97	1.79	1.10E+00		3.66E+00
	1365.19	3.02	4.98E-01		1.21E+00
	Cs-137	661.66	85.10		4.85E-02
Eu-152		121.78	28.67	5.86E-02	1.31E-01
Eu-152	244.70	7.61	3.50E-01	1.31E-01	5.03E-01
	295.94	0.45	-8.77E-01		8.63E+00
	344.28	26.60	-2.66E-02		1.31E-01
	367.79	0.86	1.52E+00		4.15E+00
	411.12	2.24	-1.36E-01		1.68E+00
	443.96	2.83	-1.69E+00		1.18E+00
	488.68	0.42	-1.47E+00		9.27E+00
	563.99	0.49	-1.14E+01		7.91E+00
	586.26	0.46	4.28E-01		1.23E+01
	678.62	0.47	2.17E+00		8.39E+00
	688.67	0.86	9.45E-01		5.18E+00
	719.35	0.28	2.04E+00		1.53E+01
	778.90	12.96	-1.70E-01		3.48E-01
	810.45	0.32	4.03E+00		1.30E+01
	867.37	4.26	-1.49E-01		1.16E+00
	919.33	0.43	9.40E+00		1.11E+01
	964.08	14.65	4.15E-01		4.59E-01
	1085.87	10.24	-1.41E-01		5.52E-01
	1089.74	1.73	9.56E-01		2.81E+00
	1112.07	13.69	-1.61E-01		3.41E-01
	1212.95	1.43	7.85E-01		4.18E+00
	1249.94	0.19	7.58E+00		3.28E+01
	1299.14	1.63	-4.59E-01		3.27E+00
1408.01	21.07	9.78E-02	2.45E-01		
1457.64	0.50	1.06E+02	3.80E+01		
1528.10	0.28	5.80E+00	1.41E+01		
Eu-154	123.07	40.40	5.29E-02	1.08E-01	1.08E-01
	247.93	6.89	-1.41E-01		5.12E-01
	591.76	4.95	2.96E-02		7.71E-01
	692.42	1.78	2.23E-01		2.52E+00
	723.30	20.06	1.18E-01		2.54E-01
	756.80	4.52	5.49E-01		1.11E+00

Analysis Report for 19-Jun-19-10019

L1-10208A-AJGS-105SS

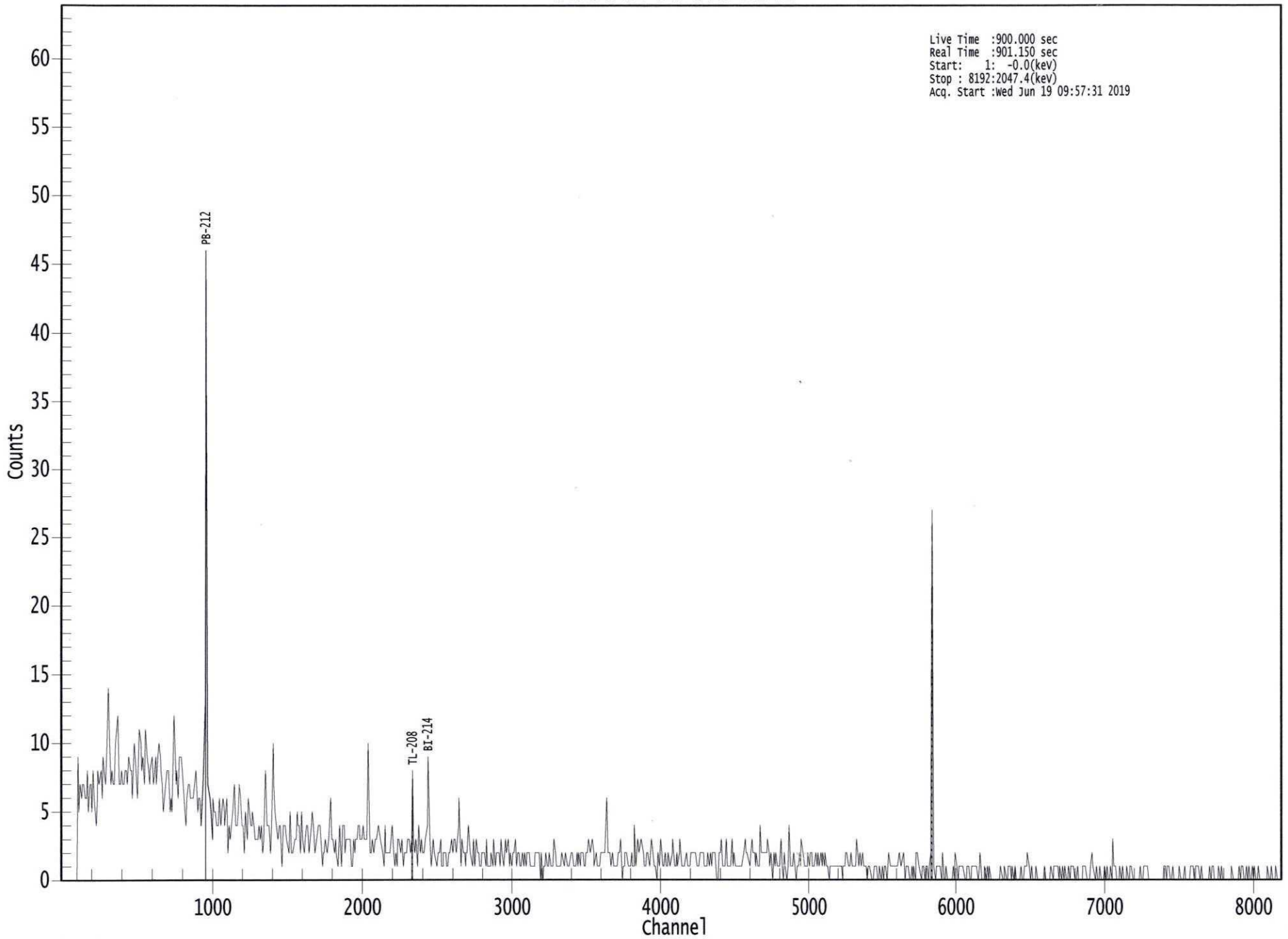
<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Nuclide MDA (pCi/grams)</b>	<b>Line MDA (pCi/grams)</b>
Eu-154	873.18	12.08	-1.64E-01	1.08E-01	3.96E-01
	996.29	10.48	-6.76E-02		4.59E-01
	1004.76	18.01	8.91E-02		3.04E-01
	1274.43	34.80	2.91E-02		1.55E-01
	1596.48	1.80	1.10E+00		2.44E+00
Eu-155	45.30	1.31	-1.96E+01	2.45E-01	2.71E+01
	60.01	1.22	1.04E+01		3.01E+01
	86.55	30.70	-7.63E-02		2.45E-01
Ra-226	105.31	21.10	-2.00E-02	1.05E+00	2.51E-01
Pa-231	186.21	3.64	8.82E-02	1.36E+00	1.05E+00
	27.36	10.30	2.78E+00		3.39E+00
	283.69	1.70	2.21E-01		2.02E+00
	300.07	2.47	7.87E-02		1.36E+00
	302.65	2.20	5.29E-01		1.59E+00
U-235	330.06	1.40	1.02E+00	6.59E-02	2.63E+00
	143.76	10.96	-1.88E-02		3.70E-01
	163.33	5.08	-4.03E-02		7.90E-01
	185.71	57.20	5.73E-03		6.59E-02
	202.11	1.08	1.80E-02		3.32E+00
Am-241	205.31	5.01	-3.28E-01	1.05E+00	6.76E-01
	59.54	35.90	6.16E-02		1.05E+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  
 ? = CAUTION: MDA value is inconsistent with Currie MDA at 95% confidence level



0000077511.CNF

Live Time :900.000 sec  
Real Time :901.150 sec  
Start: 1: -0.0(kev)  
Stop : 8192:2047.4(kev)  
Acq. Start :wed Jun 19 09:57:31 2019



 ROI Type: 1

Analysis Report for 19-Jun-19-10020  
L1-10208A-AJGS-106SS

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## GAMMA SPECTRUM ANALYSIS

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Sample Identification : 19-Jun-19-10020  
Sample Description : L1-10208A-AJGS-106SS  
Sample Type : Soil  
Unit :  
Sample Point :  
  
Sample Size : 1.728E+03 grams  
Facility : Default  
  
Sample Taken On : 6/17/2019 12:52:00PM  
Acquisition Started : 6/19/2019 9:57:39AM  
  
Procedure : 130G\_SOIL\_1  
Operator : Administrator  
Detector Name : P11314  
Geometry : 130G\_SOIL\_1  
Live Time : 900.0 seconds  
Real Time : 900.2 seconds  
  
Dead Time : 0.03 %  
  
Peak Locate Threshold : 3.00  
Peak Locate Range (in channels) : 120 - 8192  
Peak Area Range (in channels) : 120 - 8192  
Identification Energy Tolerance : 1.000 keV  
  
Energy Calibration Used Done On : 1/24/2019  
Efficiency Calibration Used Done On : 6/19/2019  
Efficiency Calibration Description :  
  
Sample Number : 77512  
Fill Height : 1727.66 gram  
Certificate Name : Eu155-Na22  
Certificate Date : 12/22/2008 12:00:00PM



6-19-19

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## PEAK ANALYSIS REPORT

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Peak Analysis Performed on : 6/19/2019 10:12:56AM  
Peak Analysis From Channel : 120  
Peak Analysis To Channel : 8192

  
6-19-19

Analysis Report for 19-Jun-19-10020

L1-10208A-AJGS-106SS

Peak No.	Energy (keV)	ROI start	ROI end	Peak Centroid	Net Peak Area	Net Area Uncertainty	Continuum Counts	FWHM (keV)
1	186.22	740 -	749	744.75	2.48E+01	11.27	4.52E+01	0.71
2	238.80	950 -	961	954.78	1.21E+02	16.66	6.04E+01	1.08
3	295.22	1174 -	1186	1180.17	3.12E+01	8.80	1.68E+01	0.54
4	338.41	1349 -	1358	1352.71	2.72E+01	8.56	1.98E+01	0.47
5	352.05	1400 -	1413	1407.21	6.90E+01	10.38	1.40E+01	1.10
6	583.22	2323 -	2337	2331.01	5.98E+01	9.60	1.13E+01	1.51
7	609.31	2428 -	2441	2435.27	4.38E+01	8.80	1.22E+01	0.88
8	911.04	3635 -	3649	3641.63	4.53E+01	8.61	9.65E+00	0.91
9	1460.37	5827 -	5852	5839.41	2.85E+02	16.88	0.00E+00	1.83

M = First peak in a multiplet region

m = Other peak in a multiplet region

F = Fitted singlet

Errors quoted at 1.000sigma

No background subtract performed on this spectrum.

## NUCLIDE IDENTIFICATION REPORT

Nuclide Library Used : C:\Canberra\Apex\Root\Default\Library\ZION LIB-BNL.NLB

### IDENTIFIED NUCLIDES

Nuclide Name	Id Confidence	Energy (keV)	Yield(%)	Activity (pCi/grams)	Activity Uncertainty
K-40	0.96	1460.82	* 10.66	6.19E+00	4.55E-01
Tl-208	1.00	583.19	* 85.00	8.76E-02	1.50E-02
Pb-212	0.99	115.18	0.60		
		238.63	* 43.60	1.88E-01	3.01E-02
		300.09	3.30		
Bi-214	1.00	609.32	* 45.49	1.24E-01	2.59E-02
		768.36	4.89		
		806.18	1.26		

Analysis Report for 19-Jun-19-10020

L1-10208A-AJGS-106SS

<b>Nuclide Name</b>	<b>Id Confidence</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Activity Uncertainty</b>
Bi-214	1.00	934.06	3.11		
		1120.29	14.92		
		1155.21	1.63		
		1238.12	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		
		1661.27	1.05		
		1729.59	2.88		
		1764.49	15.30		
		1847.43	2.03		
		2118.51	1.16		
Pb-214	0.99	241.99	7.25		
		295.22 *	18.42	1.30E-01	3.83E-02
		351.93 *	35.60	1.70E-01	2.89E-02
		785.96	1.06		
Ra-226	1.00	186.21 *	3.64	4.07E-01	1.88E-01
Ac-228	0.99	129.07	2.42		
		209.25	3.89		
		270.24	3.46		
		328.00	2.95		
		338.32 *	11.27	2.05E-01	6.68E-02
		409.46	1.92		
		463.00	4.40		
		794.95	4.25		
		911.20 *	25.80	2.96E-01	5.76E-02
		964.77	4.99		
968.97	15.80				
U-235	0.97	1588.20	3.22		
		143.76	10.96		
		163.33	5.08		
		185.71 *	57.20	2.59E-02	1.19E-02
		202.11	1.08		
205.31	5.01				

\* = Energy line found in the spectrum.

- = Manually added nuclide.

? = Manually edited nuclide.

@ = Energy line not used for Weighted Mean Activity

Energy Tolerance : 1.000 keV

Nuclide confidence index threshold = 0.30

Errors quoted at 1.000sigma

Analysis Report for 19-Jun-19-10020

L1-10208A-AJGS-106SS

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## INTERFERENCE CORRECTED REPORT

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Nuclide Name	Nuclide Id Confidence	Wt mean Activity (pCi/grams)	Wt mean Activity Uncertainty	Comments
K-40	0.967	6.19E+00	4.55E-01	
Tl-208	1.000	8.76E-02	1.50E-02	
X Bi-211	0.858			
Pb-212	0.996	1.88E-01	3.01E-02	
Bi-214	1.000	1.24E-01	2.59E-02	
Pb-214	0.999	1.56E-01	2.31E-02	
? Ra-226	1.000	4.07E-01	1.88E-01	
Ac-228	0.999	2.57E-01	4.36E-02	
? U-235	0.971	2.59E-02	1.19E-02	

? = 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 1.000sigma

JJ 6-19-19

U-235

ONLY

1 PEAK

Analysis Report for 19-Jun-19-10020  
L1-10208A-AJGS-106SS

## UNIDENTIFIED PEAKS

Peak Locate Performed on : 6/19/2019 10:12:56AM  
Peak Locate From Channel : 120  
Peak Locate To Channel : 8192

Peak No.	Energy (keV)	Peak Size (CPS)	Peak CPS (%) Uncertainty	Peak Type	Tolerance Nuclide
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All peaks were identified.

M = First peak in a multiplet region  
m = Other peak in a multiplet region  
F = Fitted singlet  
Errors quoted at 1.000sigma

## NUCLIDE MDA REPORT

Nuclide Library Used : C:\Canberra\Apex\Root\Default\Library\ZION LIB-BNL.NLB

Nuclide Name	Energy (keV)	Yield(%)	Activity (pCi/grams)	Nuclide MDA (pCi/grams)	Line MDA (pCi/grams)
An Pk	511.00	100.00	2.57E-02	5.18E-02	5.18E-02
BE-7	477.60	10.44	1.90E-01	3.85E-01	3.85E-01
+ K-40	1460.82	* 10.66	6.19E+00	6.25E-02	6.25E-02
Mn-54	834.85	99.98	-4.26E-02	4.50E-02	4.50E-02
Co-60	1173.23	99.85	1.60E-02	4.22E-02	5.45E-02
	1332.49	99.98	2.59E-02		4.22E-02
Nb-94	702.65	99.81	-4.23E-02	4.00E-02	4.00E-02
	871.09	99.89	1.06E-02		4.54E-02
Ag-108m	79.13	6.60	4.98E-01	3.60E-02	1.09E+00
	433.94	90.50	2.61E-02		3.60E-02
	614.28	89.80	-1.49E-02		5.09E-02
	722.94	90.80	-9.98E-03		5.02E-02
Sb-125	176.31	6.84	1.56E-01	1.18E-01	4.23E-01
	380.45	1.52	1.64E-01		2.01E+00
	427.87	29.60	-4.38E-02		1.18E-01
	463.36	10.49	1.85E-01		3.70E-01
	600.60	17.65	9.27E-02		2.28E-01
	606.71	4.98	8.14E-01		1.14E+00
	635.95	11.22	-3.51E-01		2.81E-01

Analysis Report for 19-Jun-19-10020

L1-10208A-AJGS-106SS

<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Nuclide MDA (pCi/grams)</b>	<b>Line MDA (pCi/grams)</b>
Sb-125	671.44	1.79	7.92E-01	1.18E-01	2.24E+00
Ba-133	79.61	2.65	1.30E+00	6.25E-02	2.62E+00
	81.00	32.90	-2.71E-01		1.67E-01
	276.40	7.16	-1.26E-01		4.39E-01
	302.85	18.34	-1.34E-01		1.67E-01
	356.01	62.05	-3.99E-03		6.25E-02
	383.85	8.94	-5.81E-02		3.47E-01
Cs-134	475.36	1.48	-3.74E-01	4.57E-02	2.60E+00
	563.25	8.34	-2.71E-01		4.97E-01
	569.33	15.37	-7.08E-02		2.18E-01
	604.72	97.62	-7.98E-03		5.25E-02
	795.86	85.46	2.70E-03		4.57E-02
	801.95	8.69	-7.77E-01		4.03E-01
	1038.61	0.99	4.62E-01		4.52E+00
	1167.97	1.79	-8.03E-01		2.87E+00
	1365.19	3.02	-3.47E-01		1.20E+00
Cs-137	661.66	85.10	-9.46E-03	4.86E-02	4.86E-02
Eu-152	121.78	28.67	5.37E-04	1.08E-01	1.08E-01
	244.70	7.61	1.31E-01		4.36E-01
	295.94	0.45	-2.38E+00		7.46E+00
	344.28	26.60	-5.39E-02		1.10E-01
	367.79	0.86	-2.92E+00		3.37E+00
	411.12	2.24	-4.60E-01		1.44E+00
	443.96	2.83	-1.97E-01		1.01E+00
	488.68	0.42	3.54E+00		8.42E+00
	563.99	0.49	-4.08E-01		8.05E+00
	586.26	0.46	-6.38E-01		1.34E+01
	678.62	0.47	4.07E+00		8.41E+00
	688.67	0.86	3.76E-01		4.52E+00
	719.35	0.28	1.10E+00		1.33E+01
	778.90	12.96	2.98E-02		3.30E-01
	810.45	0.32	1.82E+00		1.20E+01
	867.37	4.26	2.86E-01		1.08E+00
	919.33	0.43	-4.43E+00		1.06E+01
	964.08	14.65	-6.61E-02		3.73E-01
	1085.87	10.24	-4.82E-01		3.96E-01
	1089.74	1.73	-3.36E-01		2.61E+00
	1112.07	13.69	2.54E-02		3.49E-01
	1212.95	1.43	1.71E+00		4.84E+00
	1249.94	0.19	6.67E+00		2.78E+01
	1299.14	1.63	1.41E+00		2.96E+00
	1408.01	21.07	4.11E-03		2.16E-01
	1457.64	0.50	1.30E+02		3.86E+01
	1528.10	0.28	5.95E+00		1.32E+01
Eu-154	123.07	40.40	2.85E-02	7.68E-02	7.68E-02
	247.93	6.89	5.42E-02		4.16E-01
	591.76	4.95	-4.96E-01		7.53E-01
	692.42	1.78	-2.42E-01		2.12E+00
	723.30	20.06	-8.86E-02		2.30E-01
	756.80	4.52	4.85E-01		8.83E-01
	873.18	12.08	-2.12E-01		3.76E-01

Analysis Report for 19-Jun-19-10020

L1-10208A-AJGS-106SS

<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Nuclide MDA (pCi/grams)</b>	<b>Line MDA (pCi/grams)</b>
Eu-154	996.29	10.48	5.52E-02	7.68E-02	3.44E-01
	1004.76	18.01	1.18E-01		2.32E-01
	1274.43	34.80	4.29E-02		1.26E-01
	1596.48	1.80	9.66E-01		2.15E+00
Eu-155	45.30	1.31	-1.92E+00	1.66E-01	9.98E+00
	60.01	1.22	-3.88E+00		1.08E+01
	86.55	30.70	5.38E-02		1.66E-01
	105.31	21.10	2.92E-02		1.81E-01
+ Ra-226	186.21	* 3.64	4.07E-01	6.09E-01	6.09E-01
Pa-231	27.36	10.30	6.66E-01	1.21E+00	1.23E+00
	283.69	1.70	-1.46E+00		1.55E+00
	300.07	2.47	2.97E-01		1.21E+00
	302.65	2.20	-6.84E-01		1.38E+00
	330.06	1.40	-4.32E-01		2.05E+00
	+ U-235	143.76	10.96		-1.45E-01
U-235	163.33	5.08	-7.18E-02	3.88E-02	5.62E-01
	185.71	* 57.20	2.59E-02		3.88E-02
	202.11	1.08	3.81E-01		2.56E+00
	205.31	5.01	-7.47E-03		5.67E-01
Am-241	59.54	35.90	-1.87E-01	3.79E-01	3.79E-01

+ = Nuclide identified during the nuclide identification

\* = Energy line found in the spectrum

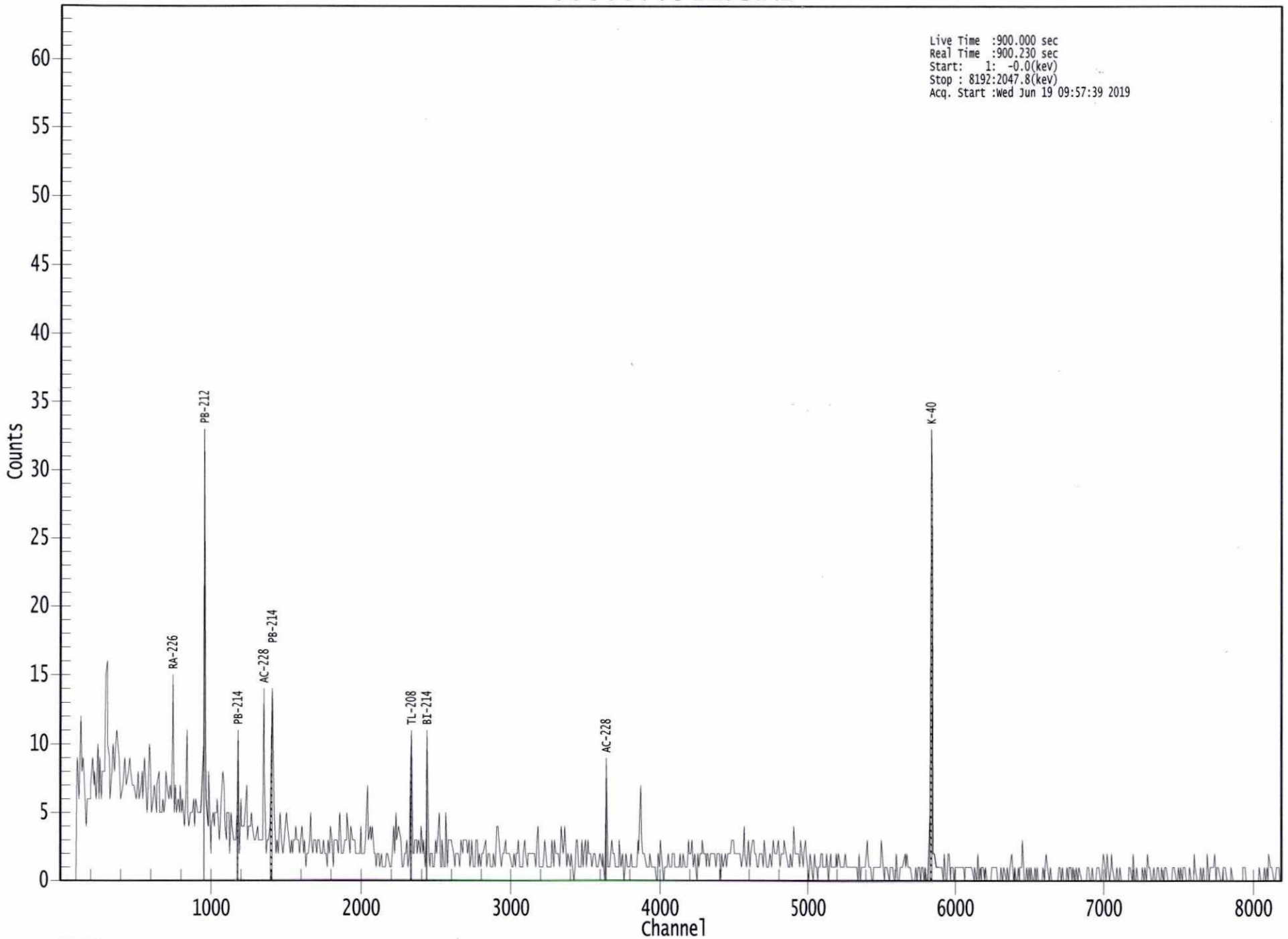
&gt; = MDA value not calculated

@ = Half-life too short to be able to perform the decay correction

? = CAUTION: MDA value is inconsistent with Currie MDA at 95% confidence level



000077512.CNF



Live Time :900.000 sec  
Real Time :900.230 sec  
Start: 1: -0.0(kev)  
Stop : 8192:2047.8(kev)  
Acq. Start :Wed Jun 19 09:57:39 2019

ROI Type: 1


Analysis Report for 19-Jun-19-10021  
L1-10208A-AJGS-107SS

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## GAMMA SPECTRUM ANALYSIS

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Sample Identification : 19-Jun-19-10021  
Sample Description : L1-10208A-AJGS-107SS  
Sample Type : Soil  
Unit :  
Sample Point :  
  
Sample Size : 1.561E+03 grams  
Facility : Default  
  
Sample Taken On : 6/17/2019 12:54:00PM  
Acquisition Started : 6/19/2019 9:57:47AM  
  
Procedure : 130G\_SOIL\_1  
Operator : Administrator  
Detector Name : 352  
Geometry : 130G\_SOIL\_1  
Live Time : 900.0 seconds  
Real Time : 900.2 seconds  
  
Dead Time : 0.03 %  
  
Peak Locate Threshold : 3.00  
Peak Locate Range (in channels) : 120 - 8192  
Peak Area Range (in channels) : 120 - 8192  
Identification Energy Tolerance : 1.000 keV  
  
Energy Calibration Used Done On : 9/29/2018  
Efficiency Calibration Used Done On : 6/19/2019  
Efficiency Calibration Description :  
  
Sample Number : 77513  
Fill Height : 1560.88 gram  
Certificate Name : Eu155-Na22  
Certificate Date : 1/7/2013 12:00:00PM


  
6-19-19

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## PEAK ANALYSIS REPORT

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Peak Analysis Performed on : 6/19/2019 10:12:50AM  
Peak Analysis From Channel : 120  
Peak Analysis To Channel : 8192

  
6-19-19

Analysis Report for 19-Jun-19-10021

L1-10208A-AJGS-107SS

Peak No.	Energy (keV)	ROI start	ROI end	Peak Centroid	Net Peak Area	Net Area Uncertainty	Continuum Counts	FWHM (keV)
1	238.57	950 -	960	954.74	8.43E+01	13.05	3.58E+01	1.07
2	338.42	1349 -	1358	1353.73	1.86E+01	7.51	1.64E+01	0.56
3	351.92	1402 -	1415	1407.68	4.51E+01	9.58	1.69E+01	0.99
4	582.87	2326 -	2339	2330.81	3.25E+01	8.25	1.25E+01	0.53
5	609.07	2431 -	2441	2435.54	1.69E+01	7.80	1.81E+01	0.43
6	661.58	2637 -	2653	2645.50	5.63E+01	9.17	8.67E+00	0.36
7	911.14	3638 -	3650	3643.58	3.04E+01	6.75	5.61E+00	0.72
8	1460.48	5831 -	5852	5842.28	1.70E+02	14.17	8.24E+00	0.82

M = First peak in a multiplet region

m = Other peak in a multiplet region

F = Fitted singlet

Errors quoted at 1.000sigma

No background subtract performed on this spectrum.

## NUCLIDE IDENTIFICATION REPORT

Nuclide Library Used : C:\Canberra\Apex\Root\Default\Library\ZION LIB-BNL.NLB

### IDENTIFIED NUCLIDES

Nuclide Name	Id Confidence	Energy (keV)	Yield(%)	Activity (pCi/grams)	Activity Uncertainty
K-40	0.98	1460.82	* 10.66	3.53E+00	3.32E-01
Cs-137	0.99	661.66	* 85.10	8.70E-02	1.51E-02
Tl-208	0.98	583.19	* 85.00	4.62E-02	1.21E-02
Bi-211	0.89	351.07	* 13.02	2.99E-01	6.79E-02
Pb-212	0.99	115.18	0.60		
		238.63	* 43.60	1.31E-01	2.30E-02
		300.09	3.30		
Bi-214	0.99	609.32	* 45.49	4.63E-02	2.15E-02
		768.36	4.89		

Analysis Report for 19-Jun-19-10021

L1-10208A-AJGS-107SS

<b>Nuclide Name</b>	<b>Id Confidence</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Activity Uncertainty</b>
Bi-214	0.99	806.18	1.26		
		934.06	3.11		
		1120.29	14.92		
		1155.21	1.63		
		1238.12	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		
		1661.27	1.05		
		1729.59	2.88		
		1764.49	15.30		
		1847.43	2.03		
Pb-214	1.00	2118.51	1.16		
		241.99	7.25		
		295.22	18.42		
Ac-228	1.00	351.93 *	35.60	1.09E-01	2.48E-02
		785.96	1.06		
		129.07	2.42		
		209.25	3.89		
		270.24	3.46		
		328.00	2.95		
		338.32 *	11.27	1.38E-01	5.71E-02
		409.46	1.92		
		463.00	4.40		
		794.95	4.25		
911.20 *	25.80	1.91E-01	4.33E-02		
964.77	4.99				
968.97	15.80				
1588.20	3.22				

\* = Energy line found in the spectrum.

- = Manually added nuclide.

? = Manually edited nuclide.

@ = Energy line not used for Weighted Mean Activity

Energy Tolerance : 1.000 keV

Nuclide confidence index threshold = 0.30

Errors quoted at 1.000sigma

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**INTERFERENCE CORRECTED REPORT**

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Analysis Report for 19-Jun-19-10021

L1-10208A-AJGS-107SS

<b>Nuclide Name</b>	<b>Nuclide Id Confidence</b>	<b>Wt mean Activity (pCi/grams)</b>	<b>Wt mean Activity Uncertainty</b>	<b>Comments</b>
K-40	0.981	3.53E+00	3.32E-01	
Cs-137	0.999	8.70E-02	1.51E-02	
Tl-208	0.984	4.62E-02	1.21E-02	
? Bi-211	0.890	2.99E-01	6.79E-02	
Pb-212	0.999	1.31E-01	2.30E-02	
Bi-214	0.996	4.63E-02	2.15E-02	
? Pb-214	1.000	1.09E-01	2.48E-02	
Ac-228	1.000	1.72E-01	3.45E-02	

? = 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 1.000sigma

Analysis Report for 19-Jun-19-10021

L1-10208A-AJGS-107SS

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**UNIDENTIFIED PEAKS**


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Peak Locate Performed on : 6/19/2019 10:12:50AM  
 Peak Locate From Channel : 120  
 Peak Locate To Channel : 8192

<b>Peak No.</b>	<b>Energy (keV)</b>	<b>Peak Size (CPS)</b>	<b>Peak CPS (%) Uncertainty</b>	<b>Peak Type</b>	<b>Tolerance Nuclide</b>
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All peaks were identified.

M = First peak in a multiplet region

m = Other peak in a multiplet region

F = Fitted singlet

Errors quoted at 1.000sigma

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**NUCLIDE MDA REPORT**


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Nuclide Library Used : C:\Canberra\Apex\Root\Default\Library\ZION LIB-BNL.NLB

<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Nuclide MDA (pCi/grams)</b>	<b>Line MDA (pCi/grams)</b>
An Pk	511.00	100.00	4.39E-02	5.08E-02	5.08E-02
BE-7	477.60	10.44	2.70E-02	3.17E-01	3.17E-01
+ K-40	1460.82	* 10.66	3.53E+00	4.52E-01	4.52E-01
Mn-54	834.85	99.98	5.57E-03	3.90E-02	3.90E-02
Co-60	1173.23	99.85	-1.57E-02	5.37E-02	5.40E-02
	1332.49	99.98	1.91E-02		5.37E-02
Nb-94	702.65	99.81	2.77E-02	3.83E-02	4.39E-02
	871.09	99.89	-7.08E-03		3.83E-02
Ag-108m	79.13	6.60	9.01E-02	3.11E-02	1.25E+00
	433.94	90.50	-2.20E-02		3.11E-02
	614.28	89.80	8.73E-03		5.22E-02
	722.94	90.80	-8.82E-03		4.34E-02
Sb-125	176.31	6.84	-1.64E-01	1.03E-01	4.19E-01
	380.45	1.52	-3.98E-02		1.93E+00
	427.87	29.60	8.06E-02		1.03E-01
	463.36	10.49	-2.64E-02		2.93E-01
	600.60	17.65	-1.70E-01		2.01E-01
	606.71	4.98	1.04E+00		1.03E+00
	635.95	11.22	3.86E-02		2.96E-01

Analysis Report for 19-Jun-19-10021

L1-10208A-AJGS-107SS

<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Nuclide MDA (pCi/grams)</b>	<b>Line MDA (pCi/grams)</b>
Sb-125	671.44	1.79	-1.20E+00	1.03E-01	1.72E+00
Ba-133	79.61	2.65	9.68E-01	5.91E-02	2.99E+00
	81.00	32.90	-2.12E-01		2.00E-01
	276.40	7.16	-2.22E-01		3.99E-01
	302.85	18.34	3.41E-02		1.80E-01
	356.01	62.05	-5.38E-03		5.91E-02
	383.85	8.94	5.64E-02		3.21E-01
Cs-134	475.36	1.48	-5.28E-01	4.50E-02	2.15E+00
	563.25	8.34	-3.57E-01		4.20E-01
	569.33	15.37	7.35E-02		2.19E-01
	604.72	97.62	-3.06E-02		4.89E-02
	795.86	85.46	-4.99E-03		4.50E-02
	801.95	8.69	-5.05E-02		3.89E-01
	1038.61	0.99	1.98E+00		4.15E+00
	1167.97	1.79	4.64E-01		3.06E+00
	1365.19	3.02	4.90E-01		1.09E+00
+ Cs-137	661.66	* 85.10	8.70E-02	3.21E-02	3.21E-02
Eu-152	121.78	28.67	1.87E-02	1.11E-01	1.17E-01
	244.70	7.61	1.50E-02		4.28E-01
	295.94	0.45	-8.37E-01		8.10E+00
	344.28	26.60	5.88E-03		1.11E-01
	367.79	0.86	0.00E+00		3.31E+00
	411.12	2.24	2.94E-01		1.38E+00
	443.96	2.83	-1.59E-01		1.23E+00
	488.68	0.42	1.79E+00		7.80E+00
	563.99	0.49	5.43E-01		7.34E+00
	586.26	0.46	1.54E+01		1.10E+01
	678.62	0.47	-2.51E+00		6.89E+00
	688.67	0.86	-1.83E+00		3.65E+00
	719.35	0.28	5.35E+00		1.26E+01
	778.90	12.96	-5.56E-01		2.42E-01
	810.45	0.32	-2.66E+00		1.09E+01
	867.37	4.26	3.29E-02		8.76E-01
	919.33	0.43	-1.06E+01		9.28E+00
	964.08	14.65	1.44E-01		3.73E-01
	1085.87	10.24	2.39E-01		4.12E-01
	1089.74	1.73	-1.71E-02		2.56E+00
	1112.07	13.69	-4.85E-01		3.13E-01
	1212.95	1.43	5.90E-01		3.61E+00
	1249.94	0.19	1.29E+01		2.88E+01
	1299.14	1.63	1.08E+00		2.92E+00
	1408.01	21.07	-9.12E-02		1.85E-01
	1457.64	0.50	7.72E+01		3.00E+01
	1528.10	0.28	-9.97E+00		9.11E+00
Eu-154	123.07	40.40	3.34E-02	8.39E-02	8.39E-02
	247.93	6.89	4.29E-02		4.11E-01
	591.76	4.95	6.21E-02		7.41E-01
	692.42	1.78	-2.06E-01		1.81E+00
	723.30	20.06	-9.59E-02		1.93E-01
	756.80	4.52	1.83E-01		8.06E-01
	873.18	12.08	-3.49E-01		2.95E-01

Analysis Report for 19-Jun-19-10021

L1-10208A-AJGS-107SS

<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Nuclide MDA (pCi/grams)</b>	<b>Line MDA (pCi/grams)</b>
Eu-154	996.29	10.48	-2.20E-02	8.39E-02	3.91E-01
	1004.76	18.01	-7.46E-02		2.39E-01
	1274.43	34.80	-4.34E-03		1.17E-01
	1596.48	1.80	1.06E+00		2.17E+00
Eu-155	45.30	1.31	6.11E+00	1.92E-01	1.69E+01
	60.01	1.22	-8.87E+00		1.84E+01
	86.55	30.70	5.66E-03		2.00E-01
	105.31	21.10	3.77E-02		1.92E-01
Ra-226	186.21	3.64	9.38E-01	9.35E-01	9.35E-01
Pa-231	27.36	10.30	1.80E+00	1.42E+00	2.01E+00
	283.69	1.70	1.62E-01		1.78E+00
	300.07	2.47	-9.86E-01		1.42E+00
	302.65	2.20	2.05E-01		1.50E+00
	330.06	1.40	-9.32E-01		2.31E+00
	U-235	143.76	10.96		5.85E-03
U-235	163.33	5.08	1.40E-01	5.94E-02	5.73E-01
	185.71	57.20	5.96E-02		5.94E-02
	202.11	1.08	-2.61E+00		2.52E+00
	205.31	5.01	-6.94E-02		5.67E-01
Am-241	59.54	35.90	1.38E-01	6.81E-01	6.81E-01

+ = Nuclide identified during the nuclide identification

\* = Energy line found in the spectrum

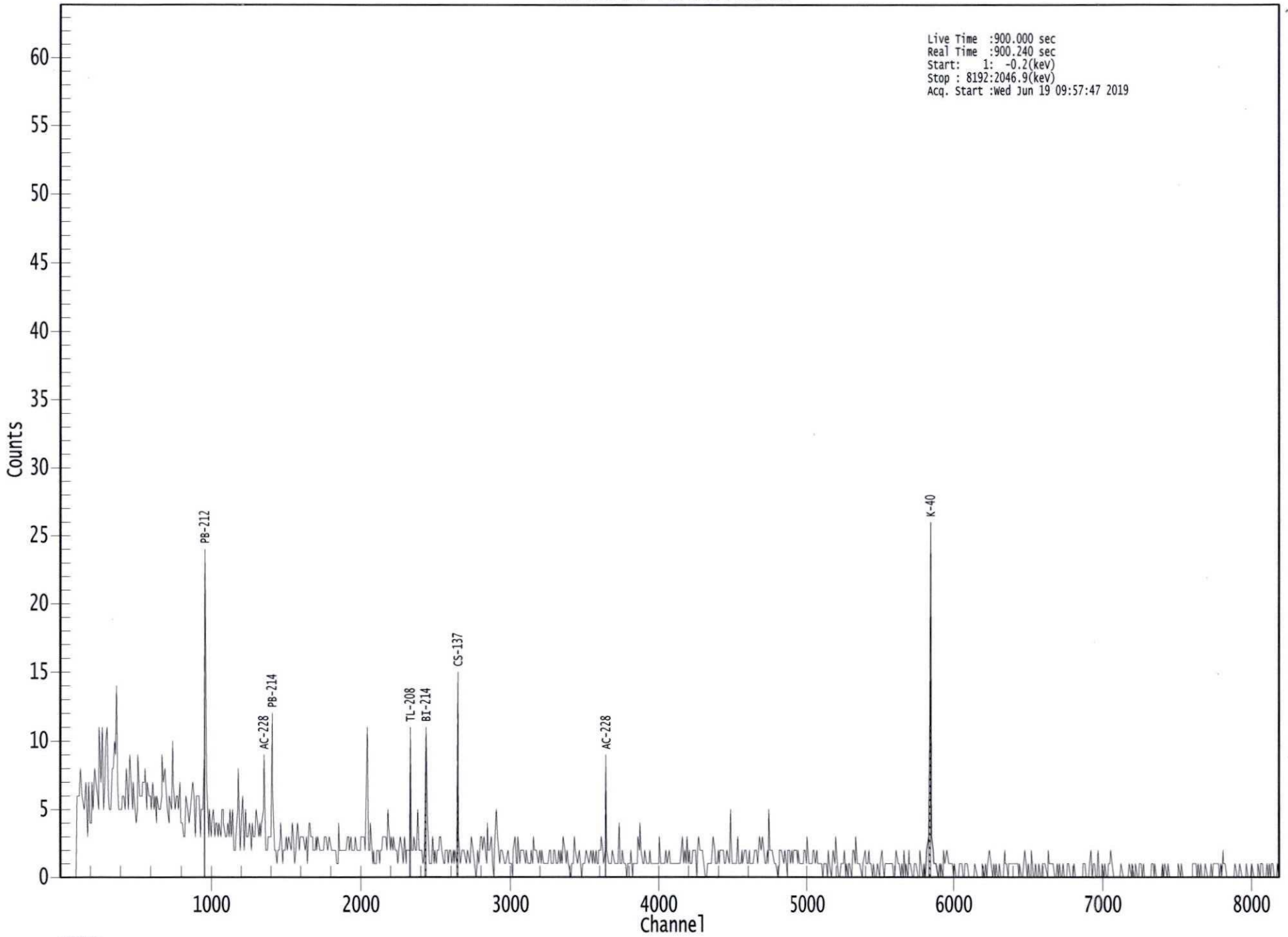
&gt; = MDA value not calculated

@ = Half-life too short to be able to perform the decay correction

? = CAUTION: MDA value is inconsistent with Currie MDA at 95% confidence level



000077513.CNF



Live Time :900.000 sec  
Real Time :900.240 sec  
Start: 1: -0.2(keV)  
Stop : 8192:2046.9(keV)  
Acq. Start :wed Jun 19 09:57:47 2019

 ROI Type: 1


Analysis Report for 19-Jun-19-10022  
L1-10208A-AJGS-108SS

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## GAMMA SPECTRUM ANALYSIS

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Sample Identification : 19-Jun-19-10022  
Sample Description : L1-10208A-AJGS-108SS  
Sample Type : Soil  
Unit :  
Sample Point :  
  
Sample Size : 1.757E+03 grams  
Facility : Default  
  
Sample Taken On : 6/17/2019 12:56:00PM  
Acquisition Started : 6/19/2019 10:19:43AM  
  
Procedure : 130G\_SOIL\_1  
Operator : Administrator  
Detector Name : 324  
Geometry : 130G\_SOIL\_1  
Live Time : 900.0 seconds  
Real Time : 900.3 seconds  
  
Dead Time : 0.04 %  
  
Peak Locate Threshold : 3.00  
Peak Locate Range (in channels) : 120 - 4096  
Peak Area Range (in channels) : 120 - 4096  
Identification Energy Tolerance : 1.000 keV  
  
Energy Calibration Used Done On : 9/29/2018  
Efficiency Calibration Used Done On : 6/19/2019  
Efficiency Calibration Description :  
  
Sample Number : 77514  
Fill Height : 1756.82 gram  
Certificate Name : Eu155-Na22  
Certificate Date : 1/30/2013 12:00:00PM


  
6-19-19

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## PEAK ANALYSIS REPORT

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Peak Analysis Performed on : 6/19/2019 10:34:46AM  
Peak Analysis From Channel : 120  
Peak Analysis To Channel : 4096

  
6-19-19

Analysis Report for 19-Jun-19-10022

L1-10208A-AJGS-108SS

Peak No.	Energy (keV)	ROI start	ROI end	Peak Centroid	Net Peak Area	Net Area Uncertainty	Continuum Counts	FWHM (keV)
1	238.68	473 -	481	477.54	8.23E+01	19.70	1.41E+02	1.17
2	295.26	585 -	595	590.57	5.18E+01	13.27	5.23E+01	1.07
3	351.88	700 -	708	703.70	9.08E+01	13.37	4.12E+01	1.40
4	583.20	1161 -	1171	1166.01	5.13E+01	10.86	2.77E+01	0.95
5	609.77	1214 -	1223	1219.11	5.73E+01	11.40	3.17E+01	1.11
6	661.52	1319 -	1327	1322.57	2.12E+01	7.31	1.48E+01	0.98
7	911.61	1817 -	1827	1822.67	3.03E+01	8.88	1.98E+01	1.21
8	1460.90	2915 -	2928	2921.86	3.66E+02	19.50	5.26E+00	2.09

M = First peak in a multiplet region

m = Other peak in a multiplet region

F = Fitted singlet

Errors quoted at 1.000sigma

No background subtract performed on this spectrum.

## NUCLIDE IDENTIFICATION REPORT

Nuclide Library Used : C:\Canberra\Apex\Root\Default\Library\ZION LIB-BNL.NLB

### IDENTIFIED NUCLIDES

Nuclide Name	Id Confidence	Energy (keV)	Yield(%)	Activity (pCi/grams)	Activity Uncertainty
K-40	0.99	1460.82 *	10.66	6.64E+00	4.57E-01
Cs-137	0.99	661.66 *	85.10	2.88E-02	1.01E-02
Tl-208	1.00	583.19 *	85.00	6.43E-02	1.42E-02
Pb-212	1.00	115.18	0.60		
		238.63 *	43.60	1.13E-01	2.85E-02
		300.09	3.30		
Bi-214	0.98	609.32 *	45.49	1.38E-01	2.87E-02
		768.36	4.89		
		806.18	1.26		

Analysis Report for 19-Jun-19-10022

L1-10208A-AJGS-108SS

<b>Nuclide Name</b>	<b>Id Confidence</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/grams)</b>	<b>Activity Uncertainty</b>
Bi-214	0.98	934.06	3.11		
		1120.29	14.92		
		1155.21	1.63		
		1238.12	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		
		1661.27	1.05		
		1729.59	2.88		
		1764.49	15.30		
		1847.43	2.03		
Pb-214	1.00	2118.51	1.16		
		241.99	7.25		
		295.22 *	18.42	1.89E-01	5.09E-02
		351.93 *	35.60	1.94E-01	3.26E-02
		785.96	1.06		
Ac-228	0.99	129.07	2.42		
		209.25	3.89		
		270.24	3.46		
		328.00	2.95		
		338.32	11.27		
		409.46	1.92		
		463.00	4.40		
		794.95	4.25		
		911.20 *	25.80	1.67E-01	4.96E-02
		964.77	4.99		
		968.97	15.80		
1588.20	3.22				

\* = Energy line found in the spectrum.

- = Manually added nuclide.

? = Manually edited nuclide.

@ = Energy line not used for Weighted Mean Activity

Energy Tolerance : 1.000 keV

Nuclide confidence index threshold = 0.30

Errors quoted at 1.000sigma

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**INTERFERENCE CORRECTED REPORT**

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