

Sample description
FSS-OOL-16-01-006-F-RC

Spectrum Filename: C:\GammaVision\Spectra\107F_26JUL2006_1833.An1

Acquisition information

Start time: 26-Jul-2006 18:33:14
Live time: 2000
Real time: 2002
Dead time: 0.11 %
Detector ID: 2

Detector system

Det 107- DSPE- 634

Calibration

Filename: D7_1LSa.Clb
Detector 107 Calibration for 1 Liter Sand Marinelli

Energy Calibration

Created: 29-Oct-2004 06:48:53
Zero offset: 0.157 keV
Gain: 0.500 keV/channel
Quadratic: -1.676E-08 keV/channel²

Efficiency Calibration

Created: 29-Oct-2004 06:51:32
Type: Polynomial
Uncertainty: 1.174 %
Coefficients: -0.279532 -4.778179 0.614896
-0.087174 0.005356 -0.000131

Library Files

Main analysis library: FSS_Rev_1.Lib
Library Match Width: 1.000
Peak stripping: Library based

Analysis parameters

Analysis engine: Env32 G53W4.20
Start channel: 100 (50.16keV)
Stop channel: 4000 (2000.15keV)
Peak rejection level: 41.667%
Peak search sensitivity: 3
Sample Size: 1.9340E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.9340E+03) =
5.1706E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

Fraction Limit: 0.000%
Background width: average of five points.

Half lives decay limit: 12.000
 Activity range factor: 2.000
 Min. step backg. energy 0.000
 Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	25-Jul-2006 10:05:00
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	107_150K_28APR05.Pbc 01-May-2005 05:30:33
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 22 cutoff 20.00000 %
 Energy Calibration
 Normalized diff: 0.1941

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. pCi/gm	Nuc
74.57	295.	14.14	1.18	2.842E-02	70.83	3.520	2.280E+00	HG203
					72.87	6.400	1.191E+00	HG203
					74.81	9.600	7.447E-01	PB212
77.10	547.	8.06	1.18	2.961E-02	77.11	17.500	7.389E-01	PB212
					77.11	10.700	1.198E+00	PB214
92.80	172.	32.03	1.89	3.438E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
186.05	159.	27.76	1.66	3.610E-02	185.99	3.280	9.382E-01	RA226
209.56	101.	25.87	1.28	3.425E-02				
238.81	1185.	3.73	1.30	3.187E-02	238.63	43.100	5.942E-01	PB212
241.43	232.	18.44	1.30	3.166E-02	241.00	3.900	1.301E+00	RA224
					241.92	7.470	6.833E-01	PB214
269.87	122.	23.32	1.57	2.947E-02				
277.35	73.	36.07	1.45	2.892E-02				
295.29	302.	8.46	1.34	2.767E-02	295.22	19.200	3.914E-01	PB214
300.84	76.	27.51	1.34	2.730E-02				
338.53	354.	10.08	1.61	2.500E-02	338.40	12.010	8.160E-01	AC228
352.15	576.	6.69	1.44	2.425E-02	351.99	37.100	4.432E-01	PB214
463.07	120.	22.60	1.86	1.954E-02				
463.07	120.	22.60	1.86	1.954E-02	463.51	10.000	4.215E-01	SB125
511.19	215.	12.61	2.06	1.807E-02	510.72	22.500	3.122E-01	TL208
583.45	506.	6.60	1.86	1.628E-02	583.14	86.000	2.503E-01	TL208
609.56	419.	8.72	1.73	1.574E-02	609.32	46.090	3.990E-01	BI214
727.12	121.	20.40	1.78	1.374E-02	727.17	11.800	5.150E-01	BI212
795.19	50.	27.74	1.68	1.284E-02	795.76	85.400	3.187E-02	CS134
911.75	325.	7.50	1.92	1.160E-02	911.07	29.000	6.660E-01	AC228
964.37	63.	19.83	1.80	1.113E-02	964.00	14.580	PBC<MDA	EU152

969.27	188.	8.67	1.80	1.109E-02	968.90	17.460	6.705E-01	AC228
1120.67	119.	21.30	1.53	9.967E-03	1120.28	15.040	5.504E-01	BI214
1461.23	1460.	2.70	2.13	8.189E-03	1460.75	10.700	1.160E+01	K40
1765.21	79.	13.32	2.29	7.084E-03	1764.51	15.920	4.889E-01	BI214

***** U N I D E N T I F I E D P E A K S U M M A R Y *****

Channel	Peak Energy	Centroid	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV	Suspected Nuclide	
418.76	209.72		294.	101.	0.051	77.62	1.276	NP-239	D
539.37	269.87		278.	122.	0.061	69.97	1.569	AC-228	s
601.32	300.85		280.	82.	0.041	102.99	1.469	PB-212	s
925.74	463.07		239.	59.	0.029	117.96	1.857	AC-228	s
1929.08	964.43		41.	68.	0.034	54.45	1.796	AC-228	D

s - Peak fails shape tests.
 D - Peak area deconvoluted.
 L - Peak written from unknown list.
 C - Area < Critical level.

 This section based on library: FSS_Rev_1.Lib

***** I D E N T I F I E D P E A K S U M M A R Y *****

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV	
PB-212	149.29	74.81		717.	303.	0.152	40.68	1.178D
PB-212	153.89	77.11		698.	375.	0.187	28.42	1.179A
PB-214	153.89	77.11		1263.	143.	0.071	104.74	1.500A
TH-234	185.26	92.80		1370.	132.	0.066	105.86	1.500D
RA-226	371.75	186.05		688.	159.	0.079	83.27	1.662s
PB-212	476.89	238.63		316.	1169.	0.585	10.70	1.297D
RA-224	482.60	241.49		951.	144.	0.072	93.00	1.500
PB-214	483.47	241.92		480.	200.	0.100	50.69	1.299D
PB-214	590.22	295.30		236.	281.	0.140	29.64	1.302
AC-228	676.67	338.53		299.	351.	0.175	30.23	1.614s
PB-214	703.90	352.15		281.	571.	0.285	20.08	1.437s
SB-125	926.15	463.28		160.	59.	0.029	94.39	1.500s
TL-208	1021.96	511.19		187.	182.	0.091	37.83	2.062s
TL-208	1166.49	583.45		169.	502.	0.251	19.79	1.859s
BI-214	1218.70	609.56		212.	414.	0.207	26.15	1.729
BI-212	1453.81	727.12		136.	120.	0.060	61.21	1.777
CS-134	1589.94	795.19		73.	50.	0.025	83.21	1.684s
AC-228	1823.06	911.75		77.	321.	0.160	22.51	1.920
AC-228	1937.36	968.90		44.	186.	0.093	26.28	1.799D
BI-214	2240.90	1120.67		120.	118.	0.059	63.91	1.532s
K-40	2922.05	1461.23		28.	1455.	0.728	8.11	2.134
BI-214	3530.06	1765.21		8.	79.	0.039	39.95	2.290

s - Peak fails shape tests.
 D - Peak area deconvoluted.
 A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****							
- Nuclide -	Average	----- Peak -----					
Name	Code	Activity	Energy	Activity	Code	MDA Value	COMMENTS
		pCi/gm	keV	pCi/gm		pCi/gm	
BE-7		-5.9927E-02	477.56	5.993E-02	% (	2.172E-01 6.46E-02	G
K-40		1.1601E+01	1460.75	1.160E+01	(P	2.176E-01 3.15E-01	G
MN-54		1.8180E-03	834.81	1.818E-03	&(P	3.186E-02 9.25E-03	G
CO-57		6.3029E-04	122.07	6.303E-04	%(P	3.279E-02 9.78E-03	G K
			136.43	1.823E-04	& P	2.682E-01 8.00E-02	G
CO-60		-8.1942E-03	1332.51	8.194E-03	%(P	3.101E-02 8.72E-03	G K
			1173.23	3.443E-03	& P	3.481E-02 9.76E-03	G K
Sr-85		-1.4669E-02	514.00	1.467E-02	% (	3.177E-02 9.62E-03	G
Kr-85		-3.6080E+02	513.99	3.608E+02	%(P	7.267E+02 2.19E+02	G
Y-88		-8.4067E-04	1836.01	8.407E-04	&(P	4.428E-02 1.25E-02	G K
			898.02	8.233E-03	% P	2.737E-02 7.99E-03	G
NB-94		2.0277E-03	871.10	2.028E-03	%(P	2.257E-02 6.46E-03	G K
			702.50	2.641E-04	% P	2.985E-02 8.64E-03	G K
Ag-108M		-6.2010E-03	722.95	6.201E-03	&(	3.458E-02 1.02E-02	G K
			614.37	2.454E-02	%	3.418E-02 1.06E-02	G
			433.93	4.849E-03	% P	2.388E-02 7.02E-03	G
CD-109		-2.6424E-02	88.04	2.642E-02	%(P	1.072E+00 3.21E-01	G
SN-113		8.6268E-03	391.71	8.627E-03	%(P	3.421E-02 1.02E-02	G K
			255.04	4.042E-01	%	1.135E+00 3.42E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	5.6019E-02	427.95	3.858E-03	&(P	7.223E-02	2.10E-02	G K
		600.77	1.254E-02	% P	1.199E-01	3.47E-02	G
		636.15	5.984E-02	& P	2.043E-01	6.06E-02	G
		463.51	2.104E-01	*(P	2.206E-01	6.94E-02	G
		176.29	3.699E-03	% P	4.051E-01	1.20E-01	G
I-131	-4.2372E-04	364.48	4.237E-04	% (	2.763E-02	8.06E-03	G K
		636.97	1.121E-01	%	3.336E-01	9.95E-02	G
		284.29	5.948E-02	&	4.415E-01	1.31E-01	G
CS-134	1.5526E-02	604.66	1.226E-03	%(P	2.504E-02	7.26E-03	G K
		795.76	3.187E-02	(P	2.718E-02	8.93E-03	G
		569.29	8.193E-03	&	1.535E-01	4.46E-02	G
		801.84	4.199E-02	% P	2.557E-01	7.42E-02	G
CS-137	8.7327E-03	661.62	8.733E-03	&(P	2.717E-02	8.03E-03	G
CE-139	6.4875E-03	165.85	6.487E-03	%(P	3.037E-02	9.11E-03	G
EU-152	3.5277E-02	121.78	3.528E-02	%(P	9.118E-02	2.76E-02	G K
		344.30	2.568E-02	% P	8.091E-02	2.42E-02	G
		1408.08	1.029E-02	% P	9.080E-02	2.49E-02	G
		964.00	1.855E-03	& P	3.326E-01	9.74E-02	G
		1112.07	1.229E-01	% P	1.785E-01	5.58E-02	G
		778.90	4.769E-02	& P	1.741E-01	5.13E-02	G
EU-154	2.0896E-02	123.10	2.090E-02	%(P	6.759E-02	2.04E-02	G K
		1274.80	5.343E-03	% P	8.691E-02	2.48E-02	G
		723.30	3.108E-02	& P	1.579E-01	4.66E-02	G
		1004.80	7.059E-03	& P	1.538E-01	4.39E-02	G
EU-155	7.6631E-02	86.45	7.663E-02	%(	1.195E-01	3.64E-02	G K
		105.31	2.387E-02	% P	1.338E-01	4.01E-02	G
HG-203	-5.6570E-03	279.17	5.657E-03	&(P	3.028E-02	9.02E-03	G K
		72.87	9.585E-03	& P	8.953E-01	2.68E-01	G
		70.83	1.979E-02	&	1.370E+00	4.10E-01	G
		82.50	3.436E-01	%	1.770E+00	5.32E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	2.5026E-01	583.14	2.503E-01	@(P	3.159E-02	1.67E-02	G
		510.72	3.122E-01	+ P	1.142E-01	4.67E-02	G
PB-212	5.9435E-01	238.63	5.944E-01	(P	4.346E-02	2.15E-02	G K
		77.11	5.062E-01	}	1.699E-01	4.79E-02	G
		74.81	7.744E-01	+ P	3.256E-01	1.06E-01	G
PB-214	4.4323E-01	351.99	4.432E-01	*(P	6.276E-02	3.00E-02	G K
		295.22	3.693E-01	- P	9.773E-02	3.71E-02	G
		77.11	3.149E-01	} P	3.716E-01	1.10E-01	G
		241.92	5.914E-01	+ P	3.099E-01	1.01E-01	G
BI-212	5.1496E-01	727.17	5.150E-01	(P	2.463E-01	1.06E-01	G K
		1620.56	2.397E-01	% P	6.352E-01	1.86E-01	G
		785.42	7.743E-01	% P	1.116E+00	3.47E-01	G
BI-214	4.2205E-01	609.32	3.990E-01	(P	6.791E-02	3.51E-02	G K
		1764.51	4.889E-01	(P	9.895E-02	6.59E-02	G
		1120.28	5.504E-01	+ P	2.504E-01	1.18E-01	G
RA-224	8.1163E-01	241.00	8.116E-01	(P	8.276E-01	2.56E-01	G
RA-226	9.3823E-01	185.99	9.382E-01	(	7.373E-01	2.60E-01	G
AC-228	6.9828E-01	911.07	6.660E-01	(P	9.058E-02	5.07E-02	G K
		968.90	6.709E-01	(P	1.213E-01	5.95E-02	G
		338.40	8.160E-01	*(P	1.939E-01	8.30E-02	G
TH-227	2.0593E-02	236.00	2.059E-02	&(P	3.056E-01	9.14E-02	G K
		256.25	1.205E-01	% P	3.222E-01	9.67E-02	G
PA-234	4.2600E-02	98.44	4.260E-02	%(	1.241E-01	3.75E-02	G K
		946.00	5.274E-02	&	1.618E-01	4.83E-02	G
		131.28	2.102E-02	%	1.490E-01	4.47E-02	G
		94.67	1.277E-01	%	2.318E-01	7.05E-02	G
		883.24	7.553E-02	%	2.162E-01	6.45E-02	G
		926.70	9.537E-02	%	1.821E-01	5.57E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak MDA	Comments
		569.26	1.214E-02	&	2.274E-01	6.61E-02 G
TH-234	5.0311E-01	63.29	2.042E-01	%(P	1.487E+00	4.45E-01 G K
		92.80	8.917E-01	(P	1.187E+00	3.62E-01 G
		92.38	1.729E-01	% P	1.412E+00	4.22E-01 G

AM-241	-3.5153E-02	59.54	3.515E-02	%(P	1.955E-01	5.87E-02 G
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(- This peak used in the nuclide activity average.

- * - Peak is too wide, but only one peak in library.
- ! - Peak is part of a multiplet and this area went negative during deconvolution.
- ? - Peak is too narrow.
- @ - Peak is too wide at FW25M, but ok at FWHM.
- % - Peak fails sensitivity test.
- \$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
- + - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
- = - Peak outside analysis energy range.
- & - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
- P - Peakbackground subtraction
- } - Peak is too close to another for the activity to be found directly.

Nuclide Codes:

T - Thermal Neutron Activation
 F - Fast Neutron Activation
 I - Fission Product
 N - Naturally Occurring Isotope
 P - Photon Reaction
 C - Charged Particle Reaction
 M - No MDA Calculation
 R - Coincidence Corrected
 H - Half-life limit exceeded

Peak Codes:

G - Gamma Ray
 X - X-Ray
 P - Positron Decay
 S - Single-Escape
 D - Double-Escape
 K - Key Line
 A - Not in Average
 C - Coincidence Peak

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****						
Nuclide		Time of Count	Time Corrected	Uncertainty	3 Sigma	MDA
		Activity	Activity	Counting	Total	MDA
		pCi/gm	pCi/gm	pCi/gm	pCi/gm	pCi/gm
BE-7	#A	-5.8884E-02	-5.9927E-02	1.9389E-01	1.9392E-01	2.134E-01
K-40		1.1601E+01	1.1601E+01	9.4443E-01	1.1668E+00	
MN-54	#A	1.8125E-03	1.8180E-03	2.7760E-02	2.7760E-02	3.177E-02
CO-57	#B	6.2811E-04	6.3029E-04	2.9342E-02	2.9342E-02	3.268E-02

CO-60 #B -8.1902E-03 -8.1942E-03 5.6339E-02 5.6341E-02 3.099E-02

Sr-85	#A	-1.4458E-02	-1.4669E-02	2.8869E-02	2.8882E-02	3.132E-02
Kr-85	#A	-3.6080E+02	-3.6080E+02	7.6327E+02	7.6357E+02	7.267E+02
Y-88	#B	-8.3331E-04	-8.4067E-04	6.1089E-02	6.1089E-02	4.389E-02
NB-94	#B	2.0277E-03	2.0277E-03	1.9377E-02	1.9377E-02	2.257E-02
Ag-108M	#B	-6.2008E-03	-6.2010E-03	3.0618E-02	3.0621E-02	3.458E-02
CD-109	#A	-2.6370E-02	-2.6424E-02	1.1017E+00	1.1017E+00	1.070E+00
SN-113	#B	8.5568E-03	8.6268E-03	3.0500E-02	3.0504E-02	3.393E-02
SB-125	#B	5.5967E-02	5.6019E-02	5.5409E-02	5.5507E-02	7.216E-02
I-131	#B	-3.7707E-04	-4.2372E-04	2.4177E-02	2.4177E-02	2.459E-02
CS-134	#B	1.5506E-02	1.5526E-02	1.3056E-02	1.3088E-02	2.501E-02
CS-137	#A	8.7320E-03	8.7327E-03	2.4075E-02	2.4081E-02	2.717E-02
CE-139	#A	6.4434E-03	6.4875E-03	2.7318E-02	2.7321E-02	3.016E-02
EU-152	#B	3.5270E-02	3.5277E-02	8.2678E-02	8.2701E-02	9.116E-02
EU-154	#B	2.0890E-02	2.0896E-02	6.1106E-02	6.1117E-02	6.757E-02
EU-155	#B	7.6592E-02	7.6631E-02	1.0922E-01	1.0931E-01	1.194E-01
HG-203	#B	-5.5443E-03	-5.6570E-03	3.1093E-02	3.1095E-02	2.968E-02
TL-208	#	2.5026E-01	2.5026E-01	4.9979E-02	5.2119E-02	
PB-212		5.9435E-01	5.9435E-01	6.4424E-02	7.3367E-02	
PB-214		4.4323E-01	4.4323E-01	8.9810E-02	9.3547E-02	
BI-212		5.1496E-01	5.1496E-01	3.1861E-01	3.2006E-01	
BI-214		4.2205E-01	4.2205E-01	1.0187E-01	1.0488E-01	
RA-224	#A	8.1163E-01	8.1163E-01	7.6651E-01	7.6801E-01	8.276E-01
RA-226		9.3823E-01	9.3823E-01	7.8128E-01	7.8324E-01	
AC-228		6.9828E-01	6.9828E-01	1.0813E-01	1.1573E-01	
TH-227	#B	2.0593E-02	2.0593E-02	2.7406E-01	2.7406E-01	3.056E-01
PA-234	#B	4.2600E-02	4.2600E-02	1.1237E-01	1.1240E-01	1.241E-01
TH-234	#B	5.0311E-01	5.0311E-01	6.1241E-01	6.1305E-01	1.487E+00
AM-241	#A	-3.5153E-02	-3.5153E-02	1.8390E-01	1.8391E-01	1.955E-01

- All peaks for activity calculation had bad shape.
 * - Activity omitted from total
 & - Activity omitted from total and all peaks had bad shape.
 < - MDA value printed.
 A - Activity printed, but activity < MDA.
 B - Activity < MDA and failed test.
 C - Area < Critical level.
 F - Failed fraction or key line test.
 H - Halflife limit exceeded

----- S U M M A R Y -----
 Total Activity (1120.2 to 2000.1 keV) 1.5462669E+01 pCi/gm
 Total Decayed Activity (1120.2 to 2000.1 keV) 1.5462671E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
 DAT

Reviewed by: _____
 Supervisor

Laboratory: YAEC Chemistry Lab

Sample description
OOL-16-01-017-F-S WET

Spectrum Filename: C:\GammaVision\Spectra\101_25JUL2006_1615.An1

Acquisition information

Start time: 25-Jul-2006 16:15:10
Live time: 2000
Real time: 2001
Dead time: 0.07 %
Detector ID: 1

Detector system

Det 101- DSPE-633

Calibration

Filename: D1_1LSa.Clb
Detector 101 1.0 Liter Marinelli Sand

Energy Calibration

Created: 03-Sep-2004 08:50:48
Zero offset: 0.244 keV
Gain: 0.500 keV/channel
Quadratic: -2.493E-08 keV/channel²

Efficiency Calibration

Created: 03-Sep-2004 08:52:26
Type: Polynomial
Uncertainty: 0.626 %
Coefficients: -0.321775 -5.816463 0.734234
-0.099357 0.006049 -0.000149

Library Files

Main analysis library: FSS_Rev_1.Lib
Library Match Width: 1.000
Peak stripping: Library based

Analysis parameters

Analysis engine: Env32 G53W4.20
Start channel: 100 (50.23keV)
Stop channel: 4000 (1999.11keV)
Peak rejection level: 41.667%
Peak search sensitivity: 3
Sample Size: 2.0600E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 2.0600E+03) =
4.8544E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

Fraction Limit: 0.000%
Background width: average of five points.

Half lives decay limit: 12.000
 Activity range factor: 2.000
 Min. step backg. energy 0.000
 Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	25-Jul-2006 11:20:00
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	101_150K_28APR05.Pbc 01-May-2005 05:24:47
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 14 cutoff 20.00000 %
 Energy Calibration
 Normalized diff: 0.5333

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. pCi/gm	Nuc
74.94	179.	21.58	1.50	1.654E-02	72.87	6.400	1.159E+00	HG203
					74.81	9.600	7.403E-01	PB212
74.99	100.	38.47	1.50	1.590E-02	72.87	6.400	PBC<MDA	HG203
					74.81	9.600	PBC<MDA	PB212
77.07	185.	20.26	1.50	1.720E-02	77.11	10.700	6.605E-01	PB214
					77.11	17.500	PBC<MDA	PB212
77.07	189.	20.26	1.50	1.720E-02	77.11	10.700	6.605E-01	PB214
					77.11	17.500	4.119E-01	PB212
93.41	124.	20.46	1.02	1.997E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	1.300E+00	TH234
185.76	104.	27.22	1.28	1.860E-02				
185.76	104.	27.22	1.28	1.860E-02	185.99	3.280	1.119E+00	RA226
238.99	494.	5.41	1.12	1.556E-02	238.63	43.100	4.768E-01	PB212
295.56	107.	18.91	1.23	1.291E-02	295.22	19.200	2.782E-01	PB214
338.89	130.	15.49	1.19	1.133E-02	338.40	12.010	6.151E-01	AC228
352.30	170.	12.79	1.14	1.092E-02	351.99	37.100	2.719E-01	PB214
463.57	28.	41.28	0.99	8.341E-03	463.51	10.000	PBC<MDA	SB125
511.61	83.	18.86	1.35	7.578E-03	510.72	22.500	2.572E-01	TL208
583.59	179.	9.66	1.10	6.680E-03	583.14	86.000	2.016E-01	TL208
609.88	138.	11.65	1.59	6.407E-03	609.32	46.090	3.043E-01	BI214
727.93	29.	36.10	1.50	5.443E-03	727.17	11.800	PBC<MDA	BI212
795.43	23.	31.50	1.50	5.016E-03	795.76	85.400	3.532E-02	CS134
911.50	118.	12.37	1.75	4.445E-03	911.07	29.000	5.888E-01	AC228
968.53	88.	16.10	1.59	4.214E-03	968.90	17.460	7.821E-01	AC228
1120.24	59.	19.69	1.48	3.711E-03	1120.28	15.040	6.890E-01	BI214
1461.96	390.	5.12	1.98	2.940E-03	1460.75	10.700	8.089E+00	K40
1765.86	19.	26.52	1.11	2.481E-03	1764.51	15.920	3.199E-01	BI214

```
***** UNIDENTIFIED PEAK SUMMARY *****
```

Channel	Peak Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV	Suspected Nuclide
477.68	238.87	110.	494.	0.247	16.22	1.122	PB-212 D
927.04	463.57	48.	28.	0.014	123.84	0.986	SB-125 L

s - Peak fails shape tests.
 D - Peak area deconvoluted.
 L - Peak written from unknown list.
 C - Area < Critical level.

 This section based on library: FSS_Rev_1.Lib

```
***** IDENTIFIED PEAK SUMMARY *****
```

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV
HG-203	149.54	74.99	735.	100.	0.050	115.41	1.499s
PB-212	149.46	74.94	705.	179.	0.090	64.74	1.499
PB-214	153.79	77.11	643.	185.	0.093	60.79	1.499D
PB-212	153.79	77.11	639.	189.	0.095	60.79	1.499D
TH-234	185.84	93.13	631.	128.	0.064	80.45	1.499s
TH-234	185.83	93.12	593.	138.	0.069	75.69	1.499s
RA-226	372.02	186.18	326.	85.	0.043	95.34	1.499s
PB-212	477.55	238.92	289.	447.	0.224	21.11	1.499
PB-214	590.90	295.57	151.	102.	0.051	58.01	1.499s
AC-228	677.57	338.89	104.	128.	0.064	46.46	1.192s
PB-214	704.42	352.31	105.	148.	0.074	37.65	1.499s
TL-208	1023.16	511.61	70.	67.	0.033	56.58	1.347s
TL-208	1167.19	583.59	42.	177.	0.088	28.98	1.100
BI-214	1219.79	609.88	43.	137.	0.069	34.96	1.592s
BI-212	1456.02	727.93	43.	29.	0.014	108.30	1.499s
CS-134	1591.09	795.43	16.	23.	0.012	94.51	1.502s
AC-228	1823.35	911.50	24.	116.	0.058	37.12	1.752s
AC-228	1937.47	968.53	34.	88.	0.044	48.31	1.592s
BI-214	2241.06	1120.24	23.	59.	0.029	59.06	1.480s
K-40	2924.93	1461.96	5.	388.	0.194	15.35	1.980
BI-214	3533.16	1765.86	3.	19.	0.010	79.55	1.108s

s - Peak fails shape tests.
 D - Peak area deconvoluted.
 A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****							
- Nuclide -	Average	----- Peak -----					
Name	Code	Activity	Energy	Activity	Code	MDA Value	COMMENTS
		pCi/gm	keV	pCi/gm		pCi/gm	
BE-7		1.1651E-01	477.56	1.165E-01	% (	3.221E-01 9.62E-02	G
K-40		8.0888E+00	1460.75	8.089E+00	(P	2.687E-01 4.17E-01	G
MN-54		-7.9970E-03	834.81	-7.997E-03	&(P	3.742E-02 1.06E-02	G
CO-57		-5.3125E-03	122.07	-5.312E-03	% (	3.588E-02 1.07E-02	G K
			136.43	9.487E-02	%	3.018E-01 9.07E-02	G
CO-60		2.6315E-03	1332.51	2.632E-03	% (P	4.320E-02 1.16E-02	G K
			1173.23	5.460E-03	& P	5.633E-02 1.59E-02	G K
Sr-85		-5.2556E-03	514.00	-5.256E-03	&(	3.975E-02 1.15E-02	G
Kr-85		-1.4485E+02	513.99	-1.448E+02	&(P	9.218E+02 2.66E+02	G
Y-88		0.0000E+00	1836.01	0.000E+00	% (	6.170E-02 1.65E-02	G K
			898.02	9.618E-03	% P	2.553E-02 7.51E-03	G
NB-94		3.7314E-03	871.10	3.731E-03	% (P	3.308E-02 9.15E-03	G K
			702.50	-6.504E-03	% P	3.454E-02 9.90E-03	G K
Ag-108M		1.2018E-03	722.95	1.202E-03	&(	4.958E-02 1.40E-02	G K
			614.37	-1.425E-02	% P	4.598E-02 1.36E-02	G
			433.93	-7.753E-03	%	3.630E-02 1.06E-02	G
CD-109		-1.3654E-01	88.04	-1.365E-01	&(P	9.237E-01 2.75E-01	G
SN-113		-8.8399E-03	391.71	-8.840E-03	% (	4.941E-02 1.45E-02	G K
			255.04	4.302E-01	% P	1.409E+00 4.21E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	-7.2305E-04	427.95	7.230E-04	&(P	9.859E-02	2.78E-02	G K
		600.77	2.033E-02	& P	1.735E-01	4.92E-02	G
		636.15	5.918E-02	% P	3.311E-01	9.52E-02	G
		463.51	1.849E-01	% P	3.118E-01	9.56E-02	G
		176.29	6.518E-02	% P	5.184E-01	1.53E-01	G
I-131	-9.4163E-04	364.48	9.416E-04	%(	3.430E-02	9.81E-03	G K
		636.97	5.361E-02	&	4.650E-01	1.32E-01	G
		284.29	1.057E-01	%	5.605E-01	1.66E-01	G
CS-134	1.3709E-02	604.66	5.199E-03	%(P	3.124E-02	8.82E-03	G K
		795.76	3.532E-02	*(P	3.273E-02	1.13E-02	G
		569.29	4.176E-02	% P	2.348E-01	6.77E-02	G
		801.84	1.621E-01	%	3.585E-01	1.08E-01	G
CS-137	2.4082E-02	661.62	2.408E-02	%(P	4.856E-02	1.47E-02	G
CE-139	4.1307E-03	165.85	4.131E-03	%(P	3.878E-02	1.15E-02	G
EU-152	2.6638E-03	121.78	2.664E-03	%(P	1.167E-01	3.46E-02	G K
		344.30	3.415E-02	% P	1.145E-01	3.39E-02	G
		1408.08	2.700E-02	& P	1.407E-01	3.79E-02	G
		964.00	5.319E-02	& P	3.978E-01	1.14E-01	G
		1112.07	4.901E-02	% P	3.215E-01	9.04E-02	G
		778.90	7.504E-02	% P	2.377E-01	6.95E-02	G
EU-154	-6.9978E-04	123.10	6.998E-04	&(P	8.440E-02	2.50E-02	G K
		1274.80	1.238E-04	% P	1.808E-01	5.03E-02	G
		723.30	4.478E-02	& P	2.491E-01	7.22E-02	G
		1004.80	5.684E-04	& P	2.578E-01	7.07E-02	G
EU-155	8.0062E-02	86.45	8.006E-02	%(	1.250E-01	3.82E-02	G K
		105.31	6.081E-02	%	1.630E-01	4.92E-02	G
HG-203	4.6186E-02	279.17	1.070E-03	&(	3.814E-02	1.11E-02	G K
		72.87	6.480E-01	?(P	8.348E-01	2.56E-01	G
		70.83	9.211E-02	%	1.536E+00	4.57E-01	G
		82.50	1.114E-01	%	1.900E+00	5.65E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	2.1310E-01	583.14	2.016E-01	(P	3.771E-02	1.97E-02	G
		510.72	2.572E-01	*(P	1.602E-01	6.02E-02	G
PB-212	4.2986E-01	238.63	4.371E-01	(P	8.001E-02	3.12E-02	G K
		77.11	4.119E-01	(	2.626E-01	8.35E-02	G
		74.81	7.403E-01	& P	5.224E-01	1.64E-01	G
PB-214	2.5025E-01	351.99	2.403E-01	@(P	8.169E-02	3.06E-02	G K
		295.22	2.694E-01	@(P	1.585E-01	5.30E-02	G
		77.11	6.605E-01	+ P	4.307E-01	1.37E-01	G
		241.92	1.511E-02	% P	5.780E-01	1.71E-01	G
BI-212	2.9494E-01	727.17	2.949E-01	(P	3.391E-01	1.09E-01	G K
		1620.56	0.000E+00	%	1.414E+00	3.56E-01	G
		785.42	7.081E-01	% P	1.654E+00	4.96E-01	G
BI-214	3.0828E-01	609.32	3.043E-01	@(P	7.377E-02	3.58E-02	G K
		1764.51	3.199E-01	(P	1.730E-01	8.68E-02	G
		1120.28	6.890E-01	+ P	2.967E-01	1.37E-01	G
RA-224	4.9024E-01	241.00	4.902E-01	%(P	9.730E-01	2.95E-01	G
RA-226	9.1945E-01	185.99	9.194E-01	(	9.345E-01	2.92E-01	G
AC-228	6.5191E-01	911.07	5.888E-01	*(P	1.306E-01	7.41E-02	G K
		968.90	7.821E-01	@(P	2.677E-01	1.27E-01	G
		338.40	6.151E-01	*(P	2.420E-01	9.70E-02	G
TH-227	6.3092E-03	236.00	6.309E-03	%(P	4.134E-01	1.22E-01	G K
		256.25	4.262E-02	% P	4.843E-01	1.42E-01	G
PA-234	-4.7849E-02	98.44	4.785E-02	%(	1.399E-01	4.21E-02	G K
		946.00	6.939E-03	%	1.654E-01	4.45E-02	G
		131.28	1.685E-03	%	1.634E-01	4.83E-02	G
		94.67	2.515E-02	%	2.040E-01	6.06E-02	G
		883.24	3.193E-02	&	3.058E-01	8.52E-02	G
		926.70	2.358E-02	%	3.451E-01	9.52E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak MDA	Comments
		569.26	5.764E-02	%	3.469E-01	1.00E-01 G
TH-234	9.7182E-01					
		63.29	1.142E-01	%(P	1.735E+00	5.14E-01 G K
		92.80	1.513E+00	*(P	1.277E+00	3.99E-01 G
		92.38	1.641E+00	*(P	1.540E+00	4.78E-01 G

AM-241 5.8070E-02
 59.54 5.807E-02 &(P 2.036E-01 6.10E-02 G
 (- This peak used in the nuclide activity average.

- * - Peak is too wide, but only one peak in library.
- ! - Peak is part of a multiplet and this area went negative during deconvolution.
- ? - Peak is too narrow.
- @ - Peak is too wide at FW25M, but ok at FWHM.
- % - Peak fails sensitivity test.
- \$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
- + - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
- = - Peak outside analysis energy range.
- & - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
- P - Peakbackground subtraction
- } - Peak is too close to another for the activity to be found directly.

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape
P - Photon Reaction	D - Double-Escape
C - Charged Particle Reaction	K - Key Line
M - No MDA Calculation	A - Not in Average
R - Coincidence Corrected	C - Coincidence Peak
H - Half-life limit exceeded	

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****						
Nuclide		Time of Count	Time Corrected	Uncertainty	3 Sigma	
		Activity	Activity	Counting	Total	MDA
		pCi/gm	pCi/gm	pCi/gm	pCi/gm	pCi/gm
BE-7	#A	1.1620E-01	1.1651E-01	2.8847E-01	2.8854E-01	3.212E-01
K-40		8.0888E+00	8.0888E+00	1.2490E+00	1.3300E+00	
MN-54	#A	-7.9933E-03	-7.9970E-03	3.6838E-02	3.6841E-02	3.740E-02
CO-57	#B	-5.3097E-03	-5.3125E-03	3.2046E-02	3.2047E-02	3.586E-02
CO-60	#B	2.6313E-03	2.6315E-03	3.4910E-02	3.4910E-02	4.319E-02

Sr-85	#A	-5.2441E-03	-5.2556E-03	3.4632E-02	3.4633E-02	3.967E-02
Kr-85	#A	-1.4485E+02	-1.4485E+02	1.1113E+03	1.1113E+03	9.218E+02
Y-88	#B	0.0000E+00	0.0000E+00	4.9353E-02	4.9353E-02	6.162E-02
NB-94	#B	3.7314E-03	3.7314E-03	2.7458E-02	2.7458E-02	3.308E-02
Ag-108M	#B	1.2018E-03	1.2018E-03	4.2045E-02	4.2045E-02	4.958E-02
CD-109	#A	-1.3650E-01	-1.3654E-01	8.7728E-01	8.7732E-01	9.234E-01
SN-113	#B	-8.8290E-03	-8.8399E-03	4.3379E-02	4.3382E-02	4.934E-02
SB-125	#B	-7.2295E-04	-7.2305E-04	1.6360E+00	1.6360E+00	9.858E-02
I-131	#B	-9.2514E-04	-9.4163E-04	2.9417E-02	2.9417E-02	3.370E-02
CS-134	#B	1.3707E-02	1.3709E-02	1.3191E-02	1.3214E-02	3.124E-02
CS-137	#A	2.4082E-02	2.4082E-02	4.4151E-02	4.4172E-02	4.856E-02
CE-139	#A	4.1265E-03	4.1307E-03	3.4495E-02	3.4495E-02	3.874E-02
EU-152	#B	2.6637E-03	2.6638E-03	1.0372E-01	1.0372E-01	1.167E-01
EU-154	#B	-6.9975E-04	-6.9978E-04	1.3670E-01	1.3670E-01	8.440E-02
EU-155	#B	8.0056E-02	8.0062E-02	1.1456E-01	1.1465E-01	1.250E-01
HG-203	#F	4.6045E-02	4.6186E-02	5.4764E-02	5.4826E-02	3.802E-02
TL-208		2.1310E-01	2.1310E-01	6.2588E-02	6.3736E-02	
PB-212	#	4.2986E-01	4.2986E-01	9.1999E-02	9.5151E-02	8.001E-02
PB-214	#	2.5025E-01	2.5025E-01	8.7943E-02	8.9072E-02	8.169E-02
BI-212	#A	2.9494E-01	2.9494E-01	3.2690E-01	3.2733E-01	3.391E-01
BI-214		3.0828E-01	3.0828E-01	1.0866E-01	1.1004E-01	
RA-224	#A	4.9024E-01	4.9024E-01	8.8610E-01	8.8653E-01	9.730E-01
RA-226	#A	9.1945E-01	9.1945E-01	8.7658E-01	8.7812E-01	9.345E-01
AC-228	#	6.5191E-01	6.5191E-01	1.6871E-01	1.7269E-01	
TH-227	#B	6.3092E-03	6.3092E-03	3.6741E-01	3.6741E-01	4.134E-01
PA-234	#B	-4.7849E-02	-4.7849E-02	1.2640E-01	1.2643E-01	1.399E-01
TH-234	#B	9.7182E-01	9.7182E-01	7.6858E-01	7.7046E-01	1.735E+00
AM-241	#A	5.8069E-02	5.8070E-02	1.8306E-01	1.8309E-01	2.036E-01

- All peaks for activity calculation had bad shape.
 * - Activity omitted from total
 & - Activity omitted from total and all peaks had bad shape.
 < - MDA value printed.
 A - Activity printed, but activity < MDA.
 B - Activity < MDA and failed test.
 C - Area < Critical level.
 F - Failed fraction or key line test.
 H - Half-life limit exceeded

S U M M A R Y

 Total Activity (271.1 to 1999.1 keV) 9.2620993E+00 pCi/gm
 Total Decayed Activity (271.1 to 1999.1 keV) 9.2620993E+00 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
 DAT

Reviewed by: _____
 Supervisor

Laboratory: YAEC Chemistry Lab

Sample description
FSS-OOL-16-01-014-F

Spectrum Filename: C:\GammaVision\Spectra\101F_26JUL2006_1552.An1

Acquisition information

Start time: 26-Jul-2006 15:52:34
Live time: 2000
Real time: 2002
Dead time: 0.09 %
Detector ID: 1

Detector system

Det 101- DSPE-633

Calibration

Filename: D1_1LSa.Clb
Detector 101 1.0 Liter Marinelli Sand

Energy Calibration

Created: 03-Sep-2004 08:50:48
Zero offset: 0.244 keV
Gain: 0.500 keV/channel
Quadratic: -2.493E-08 keV/channel²

Efficiency Calibration

Created: 03-Sep-2004 08:52:26
Type: Polynomial
Uncertainty: 0.626 %
Coefficients: -0.321775 -5.816463 0.734234
-0.099357 0.006049 -0.000149

Library Files

Main analysis library: FSS_Rev_1.Lib
Library Match Width: 1.000
Peak stripping: Library based

Analysis parameters

Analysis engine: Env32 G53W4.20
Start channel: 100 (50.23keV)
Stop channel: 4000 (1999.11keV)
Peak rejection level: 41.667%
Peak search sensitivity: 3
Sample Size: 2.1570E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 2.1570E+03) =
4.6361E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

Fraction Limit: 0.000%
Background width: average of five points.

Half lives decay limit: 12.000
 Activity range factor: 2.000
 Min. step backg. energy 0.000
 Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	25-Jul-2006 11:17:00
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	101_150K_28APR05.Pbc 01-May-2005 05:24:47
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 14 cutoff 20.00000 %
 Energy Calibration
 Normalized diff: 0.4370

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. pCi/gm	Nuc
75.38	134.	26.47	1.01	1.671E-02	74.81	9.600	PBC<MDA	PB212
77.94	149.	23.68	1.01	1.742E-02	77.11	10.700	PBC<MDA	PB214
					77.11	17.500	3.096E-01	PB212
93.26	102.	40.95	1.50	1.989E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
					94.67	15.500	PBC<MDA	PA234
186.32	109.	22.84	1.27	1.856E-02	185.99	3.280	1.117E+00	RA226
209.87	122.	26.01	1.16	1.718E-02				
238.99	797.	4.24	1.12	1.556E-02	238.63	43.100	7.381E-01	PB212
242.15	80.	27.48	1.12	1.539E-02	241.00	3.900	PBC<MDA	RA224
270.93	101.	28.12	1.39	1.397E-02				
295.64	163.	11.93	1.16	1.290E-02	295.22	19.200	4.062E-01	PB214
300.32	66.	24.14	1.16	1.271E-02				
328.33	59.	35.00	1.16	1.168E-02				
338.66	140.	19.33	1.07	1.134E-02	338.40	12.010	6.320E-01	AC228
352.50	332.	8.79	1.37	1.091E-02	351.99	37.100	5.104E-01	PB214
463.61	46.	31.08	1.23	8.340E-03	463.51	10.000	PBC<MDA	SB125
511.25	126.	17.21	1.49	7.583E-03	510.72	22.500	4.016E-01	TL208
583.72	266.	7.76	1.57	6.678E-03	583.14	86.000	2.872E-01	TL208
609.95	205.	11.08	1.48	6.406E-03	609.32	46.090	4.318E-01	BI214
727.86	74.	20.28	1.48	5.438E-03	727.17	11.800	7.152E-01	BI212
795.36	65.	24.66	1.09	5.018E-03				
795.36	65.	24.66	1.09	5.018E-03	795.76	85.400	9.412E-02	CS134
860.96	51.	26.56	1.46	4.675E-03				
912.00	176.	9.54	1.42	4.442E-03	911.07	29.000	8.455E-01	AC228
968.81	121.	12.92	1.62	4.212E-03	968.90	17.460	1.025E+00	AC228
1121.02	79.	19.07	1.94	3.709E-03	1120.28	15.040	8.870E-01	BI214

1461.95	670.	4.07	1.79	2.940E-03	1460.75	10.700	1.329E+01	K40
1621.25	12.	28.87	0.75	2.682E-03	1620.56	2.750	1.019E+00	BI212
1765.95	36.	16.67	2.66	2.481E-03	1764.51	15.920	5.640E-01	BI214

***** U N I D E N T I F I E D P E A K S U M M A R Y *****									
Channel	Peak Energy	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV	Suspected Nuclide	
150.33	75.38		562.	134.	0.067	79.41	1.005	PB-214	D
155.45	77.94		546.	149.	0.074	71.05	1.007	PB-214	D
419.42	209.87		354.	122.	0.061	78.03	1.162	NP-239	s
477.68	238.99		174.	797.	0.399	12.73	1.122	PB-212	D
484.01	242.15		200.	80.	0.040	82.43	1.124	PB-214	D
541.58	270.93		252.	101.	0.051	84.36	1.387	AC-228	s
600.72	300.48		187.	70.	0.035	101.39	1.078	PB-212	s
656.43	328.33		147.	59.	0.030	105.01	1.160	RH-106M	
1590.94	795.36		79.	37.	0.019	113.14	1.094	CS-134	
1722.22	860.96		42.	51.	0.026	79.69	1.458	TL-208	

s - Peak fails shape tests.
 D - Peak area deconvoluted.
 L - Peak written from unknown list.
 C - Area < Critical level.

 This section based on library: FSS_Rev_1.Lib

***** I D E N T I F I E D P E A K S U M M A R Y *****								
Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV	
PB-212	149.16	74.80	1184.	165.	0.083	88.34	1.499	
PB-214	153.79	77.11	1047.	296.	0.148	48.97	1.499D	
PB-212	153.79	77.11	1043.	299.	0.150	48.97	1.499D	
RA-226	372.30	186.32	267.	109.	0.054	68.53	1.270	
PB-212	477.65	238.98	459.	668.	0.334	17.69	1.499	
PB-214	590.83	295.54	210.	146.	0.073	48.27	1.499	
AC-228	677.10	338.66	205.	138.	0.069	57.99	1.067	
PB-214	704.48	352.34	150.	298.	0.149	24.40	1.499s	
SB-125	927.46	463.78	97.	50.	0.025	91.42	1.499	
TL-208	1022.44	511.25	114.	109.	0.055	51.64	1.491s	
TL-208	1167.44	583.72	57.	264.	0.132	23.28	1.565s	
BI-214	1219.93	609.95	92.	204.	0.102	33.24	1.477	
BI-212	1455.87	727.86	55.	73.	0.037	60.84	1.478s	
CS-134	1591.65	795.71	38.	27.	0.014	110.17	1.502	
AC-228	1824.35	912.00	41.	174.	0.087	28.61	1.416s	
AC-228	1938.03	968.81	41.	120.	0.060	38.76	1.625s	
BI-214	2242.62	1121.02	42.	79.	0.040	57.20	1.938s	
K-40	2924.91	1461.95	20.	668.	0.334	12.20	1.789	
BI-212	3243.73	1621.25	0.	12.	0.006	86.60	0.750s	
BI-214	3533.33	1765.95	0.	36.	0.018	50.00	2.665s	

s - Peak fails shape tests.
 D - Peak area deconvoluted.
 A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****						
- Nuclide - Name	Average Code Activity pCi/gm	----- Energy keV	Peak Activity pCi/gm	----- Code MDA Value pCi/gm	COMMENTS	
BE-7	8.4540E-03	477.56	8.454E-03	%(3.388E-01	9.69E-02	G
K-40	1.3287E+01	1460.75	1.329E+01	(P 4.715E-01	5.42E-01	G
MN-54	2.1981E-03	834.81	2.198E-03	%(P 4.343E-02	1.22E-02	G
CO-57	4.9086E-03	122.07	4.909E-03	&(4.531E-02	1.35E-02	G K
		136.43	1.754E-02	% 3.654E-01	1.09E-01	G
CO-60	-1.6677E-04	1332.51	1.668E-04	&(P 4.560E-02	1.22E-02	G K
		1173.23	4.950E-03	% P 6.329E-02	1.80E-02	G K
Sr-85	-9.6066E-03	514.00	9.607E-03	&(4.726E-02	1.39E-02	G
Kr-85	-2.4169E+02	513.99	2.417E+02	&(P 1.082E+03	3.18E+02	G
Y-88	-4.1965E-03	1836.01	4.197E-03	%(4.669E-02	1.24E-02	G K
		898.02	9.667E-03	& P 4.754E-02	1.37E-02	G
NB-94	1.7477E-03	871.10	1.748E-03	&(P 3.476E-02	9.55E-03	G K
		702.50	4.956E-05	& P 4.391E-02	1.24E-02	G K
Ag-108M	-1.5595E-02	722.95	1.560E-02	%(5.511E-02	1.63E-02	G K
		614.37	1.379E-02	% P 5.597E-02	1.65E-02	G
		433.93	2.585E-03	& 3.558E-02	1.03E-02	G
CD-109	3.2177E-01	88.04	3.218E-01	%(P 1.332E+00	4.01E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SN-113	1.6149E-02	391.71	1.615E-02	&(	4.245E-02	1.27E-02	G K
		255.04	1.532E-02	% P	1.453E+00	4.24E-01	G
SB-125	1.0916E-01	427.95	1.993E-02	% (P	1.005E-01	2.93E-02	G K
		600.77	5.506E-02	% P	2.273E-01	6.67E-02	G
		636.15	2.402E-02	% P	3.464E-01	9.87E-02	G
		463.51	3.733E-01	(P	3.657E-01	1.17E-01	G
		176.29	9.242E-02	% P	6.146E-01	1.83E-01	G
I-131	1.7385E-03	364.48	1.738E-03	&(	4.652E-02	1.35E-02	G K
		636.97	7.589E-02	%	6.443E-01	1.86E-01	G
		284.29	5.896E-03	%	6.813E-01	2.00E-01	G
CS-134	1.7411E-02	604.66	2.273E-03	% (P	3.922E-02	1.11E-02	G K
		795.76	3.991E-02	(P	4.615E-02	1.49E-02	G
		569.29	8.211E-02	% P	2.593E-01	7.69E-02	G
		801.84	2.916E-02	%	4.126E-01	1.15E-01	G
CS-137	-6.9927E-03	661.62	6.993E-03	% (P	4.756E-02	1.36E-02	G
CE-139	-8.2145E-04	165.85	8.214E-04	% (P	4.589E-02	1.36E-02	G
EU-152	1.5112E-02	121.78	1.511E-02	& (P	1.360E-01	4.06E-02	G K
		344.30	1.751E-02	& P	1.321E-01	3.88E-02	G
		1408.08	1.728E-03	% P	1.124E-01	2.55E-02	G
		964.00	1.857E-02	% P	4.796E-01	1.38E-01	G
		1112.07	1.819E-02	% P	2.857E-01	7.79E-02	G
		778.90	2.123E-02	& P	2.992E-01	8.41E-02	G
EU-154	-1.5249E-02	123.10	1.525E-02	& (P	9.930E-02	2.97E-02	G K
		1274.80	3.826E-02	% P	1.940E-01	5.63E-02	G
		723.30	4.076E-03	% P	3.872E-01	1.13E-01	G
		1004.80	4.222E-02	& P	2.801E-01	8.01E-02	G
EU-155	8.5276E-02	86.45	8.528E-02	% (	1.539E-01	4.68E-02	G K
		105.31	2.943E-03	%	1.831E-01	5.45E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
HG-203	2.7812E-02	279.17	2.781E-02	% (	3.830E-02	1.18E-02	G K
		72.87	1.025E-01	% P	1.103E+00	3.30E-01	G
		70.83	7.970E-02	%	1.955E+00	5.84E-01	G
		82.50	3.196E-01	%	2.311E+00	6.92E-01	G
TL-208	2.8719E-01	583.14	2.872E-01	@(P	4.146E-02	2.25E-02	G
		510.72	4.016E-01	+ P	1.921E-01	7.93E-02	G
PB-212	6.2704E-01	238.63	6.230E-01	(P	9.569E-02	3.71E-02	G K
							Energy duplication
		77.11	6.227E-01	(	3.189E-01	1.02E-01	G
PB-214	4.6063E-01	74.81	6.530E-01	&(P	6.433E-01	1.98E-01	G
		351.99	4.606E-01	@(P	9.228E-02	3.77E-02	G K
		295.22	3.680E-01	- P	1.772E-01	5.99E-02	G
							Energy duplication
BI-212	7.7271E-01	77.11	1.006E+00	+ P	5.224E-01	1.66E-01	G
		241.92	1.838E-01	% P	6.956E-01	2.09E-01	G
		727.17	7.152E-01	*(P	3.626E-01	1.47E-01	G K
		1620.56	1.019E+00	(	6.261E-01	2.94E-01	G
BI-214	4.6571E-01	785.42	2.629E-02	& P	1.800E+00	4.94E-01	G
		609.32	4.318E-01	(P	1.006E-01	4.81E-02	G K
		1764.51	5.640E-01	(P	1.169E-01	9.52E-02	G
RA-224	3.7476E-01	1120.28	8.870E-01	+ P	3.694E-01	1.70E-01	G
		241.00	3.748E-01	&(P	1.230E+00	3.70E-01	G
RA-226	1.1173E+00	185.99	1.117E+00	(	8.110E-01	2.55E-01	G
AC-228	9.1317E-01	911.07	8.455E-01	@(P	1.581E-01	8.16E-02	G K
		968.90	1.025E+00	@(P	2.761E-01	1.33E-01	G
		338.40	6.320E-01	- P	3.195E-01	1.24E-01	G
TH-227	-2.0850E-01	236.00	2.085E-01	%(P	4.321E-01	1.31E-01	G K
		256.25	5.708E-02	& P	5.175E-01	1.53E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PA-234	-6.4519E-02						
		98.44	6.452E-02	%	(	1.656E-01	5.00E-02 G K
		946.00	3.991E-02	%		2.588E-01	7.45E-02 G
		131.28	2.109E-03	&		1.659E-01	4.91E-02 G
		94.67	3.856E-02	%		2.504E-01	7.49E-02 G
		883.24	9.013E-02	&		3.077E-01	8.99E-02 G
		926.70	1.263E-02	%		3.881E-01	1.08E-01 G
		569.26	1.254E-01	%		3.832E-01	1.14E-01 G

TH-234	3.4407E-01						
		63.29	3.441E-01	&	(P	1.979E+00	5.91E-01 G K
		92.80	1.073E+00	%	P	1.525E+00	4.66E-01 G
		92.38	2.874E-02	%	P	1.867E+00	5.55E-01 G

AM-241	1.0033E-02						
		59.54	1.003E-02	&	(P	2.191E-01	6.49E-02 G

(- This peak used in the nuclide activity average.

- * - Peak is too wide, but only one peak in library.
- ! - Peak is part of a multiplet and this area went negative during deconvolution.
- ? - Peak is too narrow.
- @ - Peak is too wide at FW25M, but ok at FWHM.
- % - Peak fails sensitivity test.
- \$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
- + - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
- = - Peak outside analysis energy range.
- & - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
- P - Peakbackground subtraction
- } - Peak is too close to another for the activity to be found directly.

Nuclide Codes:

T - Thermal Neutron Activation
 F - Fast Neutron Activation
 I - Fission Product
 N - Naturally Occurring Isotope
 P - Photon Reaction
 C - Charged Particle Reaction
 M - No MDA Calculation
 R - Coincidence Corrected
 H - Half-life limit exceeded

Peak Codes:

G - Gamma Ray
 X - X-Ray
 P - Positron Decay
 S - Single-Escape
 D - Double-Escape
 K - Key Line
 A - Not in Average
 C - Coincidence Peak

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****						
Nuclide		Time of Count Activity pCi/gm	Time Corrected Activity pCi/gm	Uncertainty Counting pCi/gm	3 Sigma Total pCi/gm	MDA pCi/gm
BE-7	#A	8.3243E-03	8.4540E-03	2.9067E-01	2.9067E-01	3.336E-01
K-40		1.3287E+01	1.3287E+01	1.6261E+00	1.7910E+00	
MN-54	#A	2.1923E-03	2.1981E-03	3.6578E-02	3.6579E-02	4.331E-02
CO-57	#B	4.8937E-03	4.9086E-03	4.0587E-02	4.0587E-02	4.517E-02
CO-60	#B	-1.6669E-04	-1.6677E-04	3.4849E+00	3.4849E+00	4.558E-02
Sr-85	#A	-9.4851E-03	-9.6066E-03	4.1818E-02	4.1821E-02	4.666E-02
Kr-85	#A	-2.4169E+02	-2.4169E+02	1.1510E+03	1.1511E+03	1.082E+03
Y-88	#B	-4.1641E-03	-4.1965E-03	3.7324E-02	3.7325E-02	4.633E-02
NB-94	#B	1.7477E-03	1.7477E-03	2.8643E-02	2.8644E-02	3.476E-02
Ag-108M	#B	-1.5595E-02	-1.5595E-02	4.8906E-02	4.8914E-02	5.511E-02
CD-109	#A	3.2119E-01	3.2177E-01	1.2020E+00	1.2021E+00	1.330E+00
SN-113	#B	1.6033E-02	1.6149E-02	3.8134E-02	3.8145E-02	4.214E-02
SB-125	#F	1.0907E-01	1.0916E-01	1.0271E-01	1.0289E-01	1.004E-01
I-131	#B	1.5688E-03	1.7385E-03	4.0516E-02	4.0516E-02	4.198E-02
CS-134	#B	1.7392E-02	1.7411E-02	1.9476E-02	1.9501E-02	3.918E-02
CS-137	#A	-6.9922E-03	-6.9927E-03	5.5978E-02	5.5979E-02	4.755E-02
CE-139	#A	-8.1653E-04	-8.2145E-04	5.6274E-02	5.6274E-02	4.562E-02
EU-152	#B	1.5109E-02	1.5112E-02	1.2189E-01	1.2189E-01	1.360E-01
EU-154	#B	-1.5245E-02	-1.5249E-02	9.7259E-02	9.7263E-02	9.927E-02
EU-155	#B	8.5237E-02	8.5276E-02	1.4038E-01	1.4046E-01	1.538E-01
HG-203	#B	2.7323E-02	2.7812E-02	3.5535E-02	3.5569E-02	3.762E-02
TL-208	#	2.8719E-01	2.8719E-01	6.7456E-02	6.9380E-02	
PB-212	#	6.2704E-01	6.2704E-01	1.1197E-01	1.1745E-01	9.569E-02
PB-214	#	4.6063E-01	4.6063E-01	1.1313E-01	1.1608E-01	9.228E-02
BI-212		7.7271E-01	7.7271E-01	4.1015E-01	4.1247E-01	
BI-214		4.6571E-01	4.6571E-01	1.4123E-01	1.4366E-01	
RA-224	#A	3.7476E-01	3.7476E-01	1.1099E+00	1.1101E+00	1.230E+00
RA-226		1.1173E+00	1.1173E+00	7.6568E-01	7.6828E-01	
AC-228		9.1317E-01	9.1317E-01	2.2165E-01	2.2758E-01	
TH-227	#B	-2.0850E-01	-2.0850E-01	3.9891E-01	3.9908E-01	4.321E-01
PA-234	#B	-6.4519E-02	-6.4519E-02	1.5015E-01	1.5019E-01	1.656E-01
TH-234	#B	3.4407E-01	3.4407E-01	1.7743E+00	1.7744E+00	1.979E+00
AM-241	#A	1.0032E-02	1.0033E-02	1.9485E-01	1.9485E-01	2.191E-01

- # - All peaks for activity calculation had bad shape.
- * - Activity omitted from total
- & - Activity omitted from total and all peaks had bad shape.
- < - MDA value printed.
- A - Activity printed, but activity < MDA.
- B - Activity < MDA and failed test.
- C - Area < Critical level.
- F - Failed fraction or key line test.
- H - Half-life limit exceeded

Sample description
FSS-OOL-16-01-012-F

Spectrum Filename: C:\GammaVision\Spectra\101F_26JUL2006_1631.An1

Acquisition information

Start time: 26-Jul-2006 16:31:38
Live time: 2000
Real time: 2001
Dead time: 0.06 %
Detector ID: 1

Detector system

Det 101- DSPE-633

Calibration

Filename: D1_1LSa.Clb
Detector 101 1.0 Liter Marinelli Sand

Energy Calibration

Created: 03-Sep-2004 08:50:48
Zero offset: 0.244 keV
Gain: 0.500 keV/channel
Quadratic: -2.493E-08 keV/channel²

Efficiency Calibration

Created: 03-Sep-2004 08:52:26
Type: Polynomial
Uncertainty: 0.626 %
Coefficients: -0.321775 -5.816463 0.734234
-0.099357 0.006049 -0.000149

Library Files

Main analysis library: FSS_Rev_1.Lib
Library Match Width: 1.000
Peak stripping: Library based

Analysis parameters

Analysis engine: Env32 G53W4.20
Start channel: 100 (50.23keV)
Stop channel: 4000 (1999.11keV)
Peak rejection level: 41.667%
Peak search sensitivity: 3
Sample Size: 1.6630E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.6630E+03) =
6.0132E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

Fraction Limit: 0.000%
Background width: average of five points.

Half lives decay limit: 12.000
 Activity range factor: 2.000
 Min. step backg. energy 0.000
 Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	25-Jul-2006 11:14:00
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	101_150K_28APR05.Pbc 01-May-2005 05:24:47
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 11 cutoff 20.00000 %
 Energy Calibration
 Normalized diff: 0.4557

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. pCi/gm	Nuc
74.86	107.	34.46	1.50	1.654E-02	70.83	3.520	1.665E+00	HG203
					74.81	9.600	PBC<MDA	PB212
77.17	177.	20.44	1.50	1.720E-02	77.11	10.700	7.819E-01	PB214
					77.11	17.500	PBC<MDA	PB212
77.17	181.	20.44	1.50	1.720E-02	77.11	10.700	7.819E-01	PB214
					77.11	17.500	4.881E-01	PB212
87.38	104.	21.82	1.01	1.928E-02				
87.38	104.	21.82	1.01	1.928E-02	88.04	3.790	PBC<MDA	CD109
89.87	83.	25.81	1.02	1.960E-02				
92.89	81.	28.08	1.02	1.994E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
185.97	101.	24.20	1.33	1.858E-02	185.99	3.280	1.352E+00	RA226
239.01	415.	5.89	1.12	1.556E-02	238.63	43.100	4.954E-01	PB212
241.83	69.	29.20	1.12	1.541E-02	241.00	3.900	PBC<MDA	RA224
295.51	146.	13.66	0.92	1.291E-02	295.22	19.200	4.737E-01	PB214
338.74	70.	18.41	1.14	1.134E-02	338.40	12.010	4.043E-01	AC228
352.28	207.	10.28	1.47	1.092E-02	351.99	37.100	4.110E-01	PB214
511.13	57.	22.84	1.54	7.585E-03	510.72	22.500	1.950E-01	TL208
583.70	113.	14.83	1.29	6.678E-03	583.14	86.000	1.569E-01	TL208
609.90	144.	11.14	1.35	6.407E-03	609.32	46.090	3.923E-01	BI214
912.06	82.	14.27	1.08	4.442E-03	911.07	29.000	5.062E-01	AC228
967.98	70.	15.44	1.55	4.216E-03	968.90	17.460	7.655E-01	AC228
1120.69	38.	26.96	1.85	3.711E-03	1120.28	15.040	5.521E-01	BI214
1461.99	353.	5.42	1.62	2.940E-03	1460.75	10.700	9.049E+00	K40
1765.88	15.	27.18	0.66	2.481E-03	1764.51	15.920	3.160E-01	BI214

```
***** UNIDENTIFIED PEAK SUMMARY *****
```

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV	Suspected Nuclide
174.33	87.71	204.	104.	0.052	65.46	1.014	PB-214 D
179.33	90.21	186.	83.	0.041	77.44	1.016	PB-214 D
185.36	93.22	220.	81.	0.041	84.24	1.018	U-235 D
477.71	238.98	92.	415.	0.208	17.68	1.122	PB-212 D
483.37	241.81	171.	69.	0.035	87.61	1.124	PB-214 D

s - Peak fails shape tests.
 D - Peak area deconvoluted.
 L - Peak written from unknown list.
 C - Area < Critical level.

 This section based on library: FSS_Rev_1.Lib

```
***** IDENTIFIED PEAK SUMMARY *****
```

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV
HG-203	146.59	73.51	702.	-94.	-0.047	123.10	1.499s
PB-212	149.28	74.86	698.	107.	0.054	103.37	1.499
PB-214	153.79	77.11	597.	177.	0.089	61.32	1.499D
PB-212	153.79	77.11	593.	181.	0.090	61.32	1.499D
TH-234	185.60	93.01	462.	86.	0.043	103.05	1.499s
RA-226	371.60	185.97	209.	101.	0.051	72.59	1.331s
PB-212	477.76	239.03	244.	305.	0.153	27.02	1.499
PB-214	591.12	295.68	105.	127.	0.064	42.60	1.499
AC-228	677.27	338.74	50.	68.	0.034	55.22	1.136
PB-214	704.59	352.40	63.	192.	0.096	27.45	1.499s
TL-208	1022.21	511.13	61.	41.	0.020	68.52	1.538
TL-208	1167.41	583.70	57.	111.	0.056	44.48	1.286
BI-214	1219.84	609.90	36.	143.	0.071	33.41	1.353
AC-228	1824.47	912.06	22.	80.	0.040	42.82	1.077s
AC-228	1936.37	967.98	14.	69.	0.035	46.32	1.548s
BI-214	2241.96	1120.69	21.	38.	0.019	80.88	1.846s
K-40	2925.01	1461.99	5.	351.	0.175	16.25	1.615
BI-214	3533.19	1765.88	2.	15.	0.008	81.54	0.661s

s - Peak fails shape tests.
 D - Peak area deconvoluted.
 A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****							
- Nuclide -	Average	----- Peak -----					
Name	Code	Activity	Energy	Activity	Code	MDA Value	COMMENTS
		pCi/gm	keV	pCi/gm		pCi/gm	
BE-7		1.8765E-01	477.56	1.877E-01	% (	3.158E-01 9.77E-02	G
K-40		9.0494E+00	1460.75	9.049E+00	(P	3.489E-01 4.94E-01	G
MN-54		-2.7444E-03	834.81	-2.744E-03	%(P	3.991E-02 1.08E-02	G
CO-57		-2.7088E-03	122.07	-2.709E-03	&(	4.281E-02 1.27E-02	G K
			136.43	9.317E-02	&	3.158E-01 9.46E-02	G
CO-60		-2.2090E-04	1332.51	-2.209E-04	&(P	5.306E-02 1.40E-02	G K
			1173.23	2.466E-02	% P	5.174E-02 1.57E-02	G K
Sr-85		-6.5368E-03	514.00	-6.537E-03	&(	4.690E-02 1.36E-02	G
Kr-85		-1.7887E+02	513.99	-1.789E+02	&(P	1.077E+03 3.10E+02	G
Y-88		0.0000E+00	1836.01	0.000E+00	%(	7.694E-02 2.05E-02	G K
			898.02	-3.440E-04	& P	5.207E-02 1.42E-02	G
NB-94		-2.3418E-04	871.10	-2.342E-04	%(P	5.258E-02 1.45E-02	G K
			702.50	1.167E-02	& P	3.974E-02 1.16E-02	G K
Ag-108M		5.0094E-03	722.95	5.009E-03	%(	5.516E-02 1.57E-02	G K
			614.37	-1.586E-02	% P	4.977E-02 1.47E-02	G
			433.93	-5.043E-03	%	3.529E-02 1.01E-02	G
CD-109		-2.9456E-01	88.04	-2.946E-01	&(P	1.322E+00 3.96E-01	G
SN-113		2.2707E-02	391.71	2.271E-02	%(	4.546E-02 1.38E-02	G K
			255.04	-1.242E-01	% P	1.615E+00 4.71E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	1.3864E-03	427.95	1.386E-03	% (P	1.109E-01	3.12E-02	G K
		600.77	2.937E-02	% P	1.550E-01	4.37E-02	G
		636.15	1.045E-02	& P	3.089E-01	8.46E-02	G
		463.51	1.358E-01	% P	4.163E-01	1.23E-01	G
		176.29	1.493E-02	% P	6.022E-01	1.77E-01	G
I-131	1.5521E-02	364.48	1.552E-02	% (	4.107E-02	1.23E-02	G K
		636.97	4.341E-02	%	5.727E-01	1.60E-01	G
		284.29	1.189E-01	%	6.086E-01	1.79E-01	G
CS-134	4.9446E-03	604.66	4.945E-03	& (P	3.401E-02	9.54E-03	G K
		795.76	2.227E-02	& P	4.813E-02	1.45E-02	G
		569.29	3.273E-02	% P	2.513E-01	7.11E-02	G
		801.84	1.521E-02	%	4.186E-01	1.13E-01	G
CS-137	6.7928E-03	661.62	6.793E-03	& (P	4.840E-02	1.37E-02	G
CE-139	8.3806E-03	165.85	8.381E-03	& (P	4.158E-02	1.24E-02	G
EU-152	-1.3246E-02	121.78	1.325E-02	& (P	1.299E-01	3.85E-02	G K
		344.30	1.629E-02	& P	1.260E-01	3.65E-02	G
		1408.08	3.614E-02	% P	2.129E-01	5.76E-02	G
		964.00	1.129E-01	% P	3.496E-01	1.02E-01	G
		1112.07	9.202E-02	% P	3.580E-01	1.03E-01	G
		778.90	2.188E-02	% P	3.358E-01	9.32E-02	G
EU-154	1.2199E-02	123.10	1.220E-02	& (P	8.888E-02	2.64E-02	G K
		1274.80	1.803E-03	& P	1.524E-01	4.07E-02	G
		723.30	1.576E-02	% P	2.683E-01	7.59E-02	G
		1004.80	2.081E-02	% P	2.843E-01	7.83E-02	G
EU-155	4.9203E-02	86.45	4.920E-02	% (	1.244E-01	3.76E-02	G K
		105.31	1.261E-03	&	1.766E-01	5.21E-02	G
HG-203	-1.5894E-03	279.17	1.589E-03	% (	4.407E-02	1.28E-02	G K
		72.87	3.962E-01	& P	1.132E+00	3.41E-01	G
		70.83	1.466E+00	+	1.961E+00	6.02E-01	G
		82.50	6.987E-01	%	2.322E+00	6.98E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	1.6482E-01	583.14	1.569E-01	(P	5.355E-02	2.38E-02	G
		510.72	1.950E-01	(P	1.861E-01	6.20E-02	G
PB-212	3.6958E-01	238.63	3.696E-01	(P	9.135E-02	3.40E-02	G K
		77.11	4.881E-01	+	3.135E-01	9.98E-02	G
		74.81	5.481E-01	& P	6.441E-01	1.98E-01	G
PB-214	3.9614E-01	351.99	3.852E-01	(P	7.938E-02	3.56E-02	G K
		295.22	4.173E-01	(P	1.656E-01	6.01E-02	G
		77.11	7.819E-01	+	5.144E-01	1.63E-01	G
		241.92	1.572E-02	% P	5.401E-01	1.58E-01	G
BI-212	1.8578E-01	727.17	1.858E-01	%(P	4.502E-01	1.35E-01	G K
		1620.56	0.000E+00	%	2.353E+00	6.23E-01	G
		785.42	1.656E-01	% P	2.237E+00	6.20E-01	G
BI-214	3.7272E-01	609.32	3.923E-01	(P	8.465E-02	4.41E-02	G K
		1764.51	3.160E-01	(P	1.784E-01	8.84E-02	G
		1120.28	5.521E-01	+	3.510E-01	1.50E-01	G
RA-224	7.4143E-01	241.00	7.414E-01	&(P	1.067E+00	3.28E-01	G
RA-226	1.3519E+00	185.99	1.352E+00	*(	9.334E-01	3.27E-01	G
AC-228	4.7637E-01	911.07	5.062E-01	(P	1.538E-01	7.40E-02	G K
		968.90	7.655E-01	+	2.206E-01	1.19E-01	G
		338.40	4.043E-01	(P	2.130E-01	7.69E-02	G
TH-227	1.9237E-02	236.00	1.924E-02	&(P	3.208E-01	9.40E-02	G K
		256.25	6.240E-03	& P	4.655E-01	1.34E-01	G
PA-234	-4.0441E-02	98.44	4.044E-02	%(	1.611E-01	4.83E-02	G K
		946.00	3.570E-02	&	2.638E-01	7.46E-02	G
		131.28	4.243E-02	&	1.682E-01	5.03E-02	G
		94.67	6.848E-02	%	2.769E-01	8.30E-02	G
		883.24	1.175E-03	%	3.591E-01	9.69E-02	G
		926.70	1.122E-01	%	3.897E-01	1.13E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak MDA	Comments
		569.26	4.357E-02	%	3.705E-01	1.05E-01 G
TH-234	7.3932E-01					
		63.29	4.070E-01	%(P	1.966E+00	5.85E-01 G K
		92.80	1.171E+00	*(P	1.400E+00	4.31E-01 G
		92.38	1.233E+00	% P	1.682E+00	5.14E-01 G
AM-241	-1.2804E-02					
		59.54	1.280E-02	%(P	2.396E-01	7.07E-02 G

(- This peak used in the nuclide activity average.

- * - Peak is too wide, but only one peak in library.
- ! - Peak is part of a multiplet and this area went negative during deconvolution.
- ? - Peak is too narrow.
- @ - Peak is too wide at FW25M, but ok at FWHM.
- % - Peak fails sensitivity test.
- \$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
- + - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
- = - Peak outside analysis energy range.
- & - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
- P - Peakbackground subtraction
- } - Peak is too close to another for the activity to be found directly.

Nuclide Codes:

T - Thermal Neutron Activation
 F - Fast Neutron Activation
 I - Fission Product
 N - Naturally Occurring Isotope
 P - Photon Reaction
 C - Charged Particle Reaction
 M - No MDA Calculation
 R - Coincidence Corrected
 H - Half-life limit exceeded

Peak Codes:

G - Gamma Ray
 X - X-Ray
 P - Positron Decay
 S - Single-Escape
 D - Double-Escape
 K - Key Line
 A - Not in Average
 C - Coincidence Peak

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****						
Nuclide		Time of Count	Time Corrected	Uncertainty	3 Sigma	
		Activity	Activity	Counting	Total	MDA
		pCi/gm	pCi/gm	pCi/gm	pCi/gm	pCi/gm
BE-7	#A	1.8470E-01	1.8765E-01	2.9314E-01	2.9334E-01	3.108E-01
K-40		9.0494E+00	9.0494E+00	1.4805E+00	1.5663E+00	
MN-54	#A	-2.7370E-03	-2.7444E-03	5.4781E-02	5.4782E-02	3.980E-02
CO-57	#B	-2.7003E-03	-2.7088E-03	3.8008E-02	3.8008E-02	4.267E-02
CO-60	#B	-2.2080E-04	-2.2090E-04	7.2623E-03	7.2624E-03	5.304E-02

Sr-85	#A	-6.4520E-03	-6.5368E-03	4.0783E-02	4.0785E-02	4.629E-02
Kr-85	#A	-1.7887E+02	-1.7887E+02	1.2962E+03	1.2962E+03	1.077E+03
Y-88	#B	0.0000E+00	0.0000E+00	6.1540E-02	6.1540E-02	7.633E-02
NB-94	#B	-2.3418E-04	-2.3418E-04	1.1587E-02	1.1587E-02	5.258E-02
Ag-108M	#B	5.0094E-03	5.0094E-03	4.6963E-02	4.6963E-02	5.516E-02
CD-109	#A	-2.9401E-01	-2.9456E-01	1.2305E+00	1.2306E+00	1.319E+00
SN-113	#B	2.2541E-02	2.2707E-02	4.1510E-02	4.1530E-02	4.512E-02
SB-125	#B	1.3853E-03	1.3864E-03	9.3483E-02	9.3483E-02	1.108E-01
I-131	#B	1.3971E-02	1.5521E-02	3.6850E-02	3.6860E-02	3.697E-02
CS-134	#B	4.9390E-03	4.9446E-03	2.8630E-02	2.8631E-02	3.397E-02
CS-137	#A	6.7923E-03	6.7928E-03	4.1037E-02	4.1039E-02	4.840E-02
CE-139	#A	8.3292E-03	8.3806E-03	3.7098E-02	3.7101E-02	4.133E-02
EU-152	#B	-1.3244E-02	-1.3246E-02	1.3502E-01	1.3502E-01	1.299E-01
EU-154	#B	1.2195E-02	1.2199E-02	7.9187E-02	7.9190E-02	8.885E-02
EU-155	#B	4.9180E-02	4.9203E-02	1.1266E-01	1.1269E-01	1.244E-01
HG-203	#B	-1.5608E-03	-1.5894E-03	3.8422E-02	3.8422E-02	4.328E-02
TL-208		1.6482E-01	1.6482E-01	7.4877E-02	7.5454E-02	
PB-212	#	3.6958E-01	3.6958E-01	1.0186E-01	1.0397E-01	9.135E-02
PB-214	#	3.9614E-01	3.9614E-01	1.0167E-01	1.0410E-01	7.938E-02
BI-212	#B	1.8578E-01	1.8578E-01	4.0439E-01	4.0453E-01	4.502E-01
BI-214		3.7272E-01	3.7272E-01	1.2549E-01	1.2724E-01	
RA-224	#A	7.4143E-01	7.4143E-01	9.8441E-01	9.8531E-01	1.067E+00
RA-226	#	1.3519E+00	1.3519E+00	9.8136E-01	9.8433E-01	
AC-228		4.7637E-01	4.7637E-01	1.7124E-01	1.7334E-01	
TH-227	#B	1.9237E-02	1.9237E-02	2.8196E-01	2.8196E-01	3.208E-01
PA-234	#B	-4.0441E-02	-4.0441E-02	1.4481E-01	1.4483E-01	1.611E-01
TH-234	#B	7.3932E-01	7.3932E-01	8.1657E-01	8.1759E-01	1.966E+00
AM-241	#A	-1.2804E-02	-1.2804E-02	3.0617E-01	3.0617E-01	2.396E-01

- All peaks for activity calculation had bad shape.
 * - Activity omitted from total
 & - Activity omitted from total and all peaks had bad shape.
 < - MDA value printed.
 A - Activity printed, but activity < MDA.
 B - Activity < MDA and failed test.
 C - Area < Critical level.
 F - Failed fraction or key line test.
 H - Half-life limit exceeded

S U M M A R Y

 Total Activity (295.1 to 1999.1 keV) 1.1415142E+01 pCi/gm
 Total Decayed Activity (295.1 to 1999.1 keV) 1.1415144E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
 DAT

Reviewed by: _____
 Supervisor

Laboratory: YAEC Chemistry Lab

Sample description
FSS-OOL-16-01-007-F

Spectrum Filename: C:\GammaVision\Spectra\101F_26JUL2006_1707.An1

Acquisition information

Start time: 26-Jul-2006 17:07:58
Live time: 2000
Real time: 2001
Dead time: 0.06 %
Detector ID: 1

Detector system

Det 101- DSPE-633

Calibration

Filename: D1_1LSa.Clb
Detector 101 1.0 Liter Marinelli Sand

Energy Calibration

Created: 03-Sep-2004 08:50:48
Zero offset: 0.244 keV
Gain: 0.500 keV/channel
Quadratic: -2.493E-08 keV/channel²

Efficiency Calibration

Created: 03-Sep-2004 08:52:26
Type: Polynomial
Uncertainty: 0.626 %
Coefficients: -0.321775 -5.816463 0.734234
-0.099357 0.006049 -0.000149

Library Files

Main analysis library: FSS_Rev_1.Lib
Library Match Width: 1.000
Peak stripping: Library based

Analysis parameters

Analysis engine: Env32 G53W4.20
Start channel: 100 (50.23keV)
Stop channel: 4000 (1999.11keV)
Peak rejection level: 41.667%
Peak search sensitivity: 3
Sample Size: 2.0660E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 2.0660E+03) =
4.8403E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

Fraction Limit: 0.000%
Background width: average of five points.

Half lives decay limit: 12.000
 Activity range factor: 2.000
 Min. step backg. energy 0.000
 Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	25-Jul-2006 09:45:00
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	101_150K_28APR05.Pbc 01-May-2005 05:24:47
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 10 cutoff 20.00000 %
 Energy Calibration
 Normalized diff: 0.6033

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. pCi/gm	Nuc
74.40	81.	32.42	1.00	1.653E-02				
74.40	81.	32.42	1.00	1.653E-02	74.81	9.600	PBC<MDA	PB212
77.25	218.	11.92	1.01	1.734E-02	77.11	17.500	4.742E-01	PB212
					77.11	10.700	7.623E-01	PB214
239.08	495.	7.72	1.11	1.555E-02	238.63	43.100	4.761E-01	PB212
295.62	115.	15.53	1.28	1.290E-02	295.22	19.200	2.996E-01	PB214
338.98	108.	16.16	1.31	1.133E-02	338.40	12.010	5.068E-01	AC228
352.26	238.	9.91	1.23	1.092E-02	351.99	37.100	3.811E-01	PB214
511.57	86.	18.27	1.88	7.578E-03	510.72	22.500	2.668E-01	TL208
583.45	138.	12.34	1.34	6.681E-03	583.14	86.000	1.543E-01	TL208
610.03	178.	9.58	1.63	6.406E-03	609.32	46.090	3.926E-01	BI214
727.58	24.	35.75	1.50	5.443E-03	727.17	11.800	PBC<MDA	BI212
912.21	74.	15.60	1.29	4.442E-03	911.07	29.000	3.639E-01	AC228
969.20	64.	20.75	1.24	4.211E-03	968.90	17.460	5.664E-01	AC228
1247.03	30.	40.00	0.49	3.380E-03				
1461.95	444.	4.88	1.89	2.940E-03	1460.75	10.700	9.166E+00	K40
1765.78	23.	20.85	0.69	2.481E-03	1764.51	15.920	3.736E-01	BI214

***** U N I D E N T I F I E D P E A K S U M M A R Y *****

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma	FWHM %	Suspected Nuclide
148.37	74.77	300.	81.	0.040	97.26	1.005	BI-207 D
154.07	77.62	229.	218.	0.109	35.76	1.007	PB-214 D
477.86	239.08	648.	130.	0.065	87.08	1.106	PB-212
1023.08	511.57	94.	40.	0.020	112.41	1.879	RH-106M s

2494.80 1247.03 31. 30. 0.015 120.01 0.490 - s

s - Peak fails shape tests.
 D - Peak area deconvoluted.
 L - Peak written from unknown list.
 C - Area < Critical level.

 This section based on library: FSS_Rev_1.Lib

***** I D E N T I F I E D P E A K S U M M A R Y *****

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma	FWHM %	keV
PB-212	149.42	74.93	712.	107.	0.054	104.04	1.499s	
PB-212	153.79	77.11	625.	183.	0.092	61.95	1.499D	
PB-214	153.79	77.11	629.	180.	0.090	61.95	1.499D	
PB-212	477.57	238.94	308.	296.	0.148	29.88	1.499	
PB-214	590.97	295.61	126.	118.	0.059	47.96	1.499	
AC-228	677.75	338.98	77.	106.	0.053	48.47	1.310s	
PB-214	704.48	352.34	72.	221.	0.110	25.62	1.499	
TL-208	1022.45	511.26	66.	36.	0.018	70.84	1.499s	
TL-208	1167.76	583.88	34.	108.	0.054	35.84	1.499s	
BI-214	1220.09	610.03	36.	177.	0.089	28.74	1.635s	
BI-212	1455.32	727.58	26.	24.	0.012	107.25	1.499s	
AC-228	1824.77	912.21	24.	72.	0.036	46.80	1.287s	
AC-228	1938.82	969.20	34.	64.	0.032	62.26	1.239s	
K-40	2924.93	1461.95	7.	441.	0.221	14.64	1.893s	
BI-214	3533.00	1765.78	0.	23.	0.011	62.55	0.687s	

s - Peak fails shape tests.
 D - Peak area deconvoluted.
 A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide -	Average	Energy	Activity	Code	MDA Value	COMMENTS
Name	Code	Activity	Energy	Activity	Code	MDA Value
		pCi/gm	keV	pCi/gm	pCi/gm	
BE-7		5.1016E-02	477.56	5.102E-02	%(2.494E-01	7.20E-02 G
K-40		9.1664E+00	1460.75	9.166E+00	@(P 3.084E-01	4.50E-01 G
MN-54		-5.7045E-04	834.81	-5.705E-04	&(P 4.195E-02	1.15E-02 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CO-57	-6.8171E-03	122.07	6.817E-03	% (	3.778E-02	1.13E-02	G K
		136.43	5.830E-02	%	3.011E-01	8.99E-02	G
CO-60	9.6693E-03	1332.51	9.669E-03	% (P	4.239E-02	1.20E-02	G K
		1173.23	5.278E-03	% P	6.013E-02	1.70E-02	G K
Sr-85	-6.1494E-03	514.00	6.149E-03	& (	3.783E-02	1.10E-02	G
Kr-85	-1.6273E+02	513.99	1.627E+02	& (P	8.676E+02	2.50E+02	G
Y-88	3.9389E-03	1836.01	3.939E-03	% (	3.431E-02	8.78E-03	G K
		898.02	2.770E-04	% P	4.839E-02	1.34E-02	G
NB-94	4.5853E-03	871.10	4.585E-03	% (P	3.253E-02	9.06E-03	G K
		702.50	7.828E-03	% P	3.485E-02	1.01E-02	G K
Ag-108M	-6.6330E-03	722.95	6.633E-03	% (	4.491E-02	1.29E-02	G K
		614.37	1.536E-02	% P	5.030E-02	1.49E-02	G
		433.93	3.136E-04	%	2.034E-02	5.52E-03	G
CD-109	6.2373E-03	88.04	6.237E-03	& (P	1.049E+00	3.11E-01	G
SN-113	-1.0026E-02	391.71	1.003E-02	% (	5.218E-02	1.53E-02	G K
		255.04	1.033E-01	& P	1.352E+00	3.95E-01	G
SB-125	4.0361E-02	427.95	4.036E-02	% (P	7.736E-02	2.36E-02	G K
		600.77	2.163E-03	% P	1.607E-01	4.42E-02	G
		636.15	9.237E-02	% P	2.490E-01	7.38E-02	G
		463.51	1.651E-01	% P	2.695E-01	8.30E-02	G
		176.29	2.216E-02	& P	4.402E-01	1.29E-01	G
I-131	1.9036E-03	364.48	1.904E-03	% (	3.705E-02	1.06E-02	G K
		636.97	5.704E-02	%	5.159E-01	1.46E-01	G
		284.29	1.324E-01	%	5.334E-01	1.58E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CS-134	-3.9466E-03	604.66	3.947E-03	% (P	3.300E-02	9.28E-03	G K
		795.76	2.343E-02	% P	3.929E-02	1.22E-02	G
		569.29	1.466E-02	% P	2.082E-01	5.84E-02	G
		801.84	7.177E-02	%	4.057E-01	1.16E-01	G
CS-137	-3.1053E-03	661.62	3.105E-03	& (P	3.571E-02	9.74E-03	G
CE-139	-4.0451E-03	165.85	4.045E-03	% (P	3.809E-02	1.13E-02	G
EU-152	-1.9315E-02	121.78	1.931E-02	& (P	1.127E-01	3.36E-02	G K
		344.30	4.222E-02	% P	7.999E-02	2.44E-02	G
		1408.08	1.877E-02	& P	1.994E-01	5.38E-02	G
		964.00	4.461E-02	& P	2.255E-01	6.31E-02	G
		1112.07	6.474E-02	% P	3.636E-01	1.04E-01	G
		778.90	6.102E-02	% P	2.082E-01	6.02E-02	G
EU-154	-6.0078E-04	123.10	6.008E-04	& (P	6.718E-02	1.97E-02	G K
		1274.80	1.110E-02	% P	1.123E-01	3.05E-02	G
		723.30	4.458E-02	% P	2.196E-01	6.35E-02	G
		1004.80	3.620E-02	% P	2.397E-01	6.76E-02	G
EU-155	2.4020E-02	86.45	2.402E-02	% (	1.217E-01	3.64E-02	G K
		105.31	4.128E-02	&	1.465E-01	4.40E-02	G
HG-203	8.8118E-03	279.17	8.812E-03	& (	3.459E-02	1.03E-02	G K
		72.87	1.645E-01	% P	9.166E-01	2.74E-01	G
		70.83	4.426E-04	%	1.416E+00	4.19E-01	G
		82.50	3.080E-01	&	1.827E+00	5.46E-01	G
TL-208	1.2586E-01	583.14	1.224E-01	@ (P	3.386E-02	1.49E-02	G
		510.72	1.390E-01	* (P	1.556E-01	4.73E-02	G
PB-212	2.8850E-01	238.63	2.885E-01	(P	8.236E-02	2.93E-02	G K
							Energy duplication
		77.11	3.983E-01	+	2.590E-01	8.22E-02	G
		74.81	4.424E-01	& P	5.234E-01	1.61E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PB-214	3.4140E-01	351.99	3.565E-01	(P	6.804E-02	3.07E-02	G K
		295.22	3.122E-01	(P	1.452E-01	5.07E-02	G
		77.11	6.382E-01	+ P	4.248E-01	1.35E-01	G
		241.92	2.615E-01	% P	5.015E-01	1.52E-01	G
BI-212	2.4046E-01	727.17	2.405E-01	(P	2.707E-01	8.84E-02	G K
		1620.56	0.000E+00	%	6.537E-01	8.87E-02	G
		785.42	9.604E-02	% P	1.658E+00	4.54E-01	G
BI-214	3.8770E-01	609.32	3.926E-01	@(P	6.754E-02	3.79E-02	G K
		1764.51	3.736E-01	(P	1.220E-01	7.95E-02	G
		1120.28	1.882E-01	% P	3.146E-01	9.76E-02	G
RA-224	6.7042E-01	241.00	6.704E-01	%(P	9.337E-01	2.87E-01	G
RA-226	6.2142E-01	185.99	6.214E-01	%(	9.580E-01	2.93E-01	G
AC-228	4.0572E-01	911.07	3.639E-01	*(P	1.302E-01	5.83E-02	G K
		968.90	5.664E-01	+ P	2.669E-01	1.19E-01	G
		338.40	5.068E-01	(P	2.097E-01	8.37E-02	G
TH-227	-4.1126E-02	236.00	4.113E-02	&(P	3.199E-01	9.47E-02	G K
		256.25	5.881E-04	% P	4.420E-01	1.29E-01	G
PA-234	-3.4637E-03	98.44	3.464E-03	&(	1.279E-01	3.78E-02	G K
		946.00	5.532E-02	%	1.991E-01	5.79E-02	G
		131.28	1.672E-02	%	1.604E-01	4.77E-02	G
		94.67	1.133E-03	&	2.477E-01	7.35E-02	G
		883.24	2.487E-02	&	3.027E-01	8.39E-02	G
		926.70	0.000E+00	%	4.267E-01	1.18E-01	G
		569.26	1.853E-02	%	3.074E-01	8.67E-02	G
TH-234	3.4279E-01	63.29	3.428E-01	%(P	1.568E+00	4.67E-01	G K
		92.80	7.630E-01	% P	1.234E+00	3.76E-01	G
		92.38	1.665E-01	% P	1.490E+00	4.38E-01	G

Nuclide Ave activity Energy Activity Code Peak MDA Comments
 AM-241 3.7220E-04 59.54 3.722E-04 &(P 2.235E-01 6.61E-02 G

(- This peak used in the nuclide activity average.

- * - Peak is too wide, but only one peak in library.
- ! - Peak is part of a multiplet and this area went negative during deconvolution.
- ? - Peak is too narrow.
- @ - Peak is too wide at FW25M, but ok at FWHM.
- % - Peak fails sensitivity test.
- \$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
- + - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
- = - Peak outside analysis energy range.
- & - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
- P - Peakbackground subtraction
- } - Peak is too close to another for the activity to be found directly.

Nuclide Codes:

- T - Thermal Neutron Activation
- F - Fast Neutron Activation
- I - Fission Product
- N - Naturally Occurring Isotope
- P - Photon Reaction
- C - Charged Particle Reaction
- M - No MDA Calculation
- R - Coincidence Corrected
- H - Halflife limit exceeded

Peak Codes:

- G - Gamma Ray
- X - X-Ray
- P - Positron Decay
- S - Single-Escape
- D - Double-Escape
- K - Key Line
- A - Not in Average
- C - Coincidence Peak

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count	Time Corrected	Uncertainty	3 Sigma	MDA
	Activity	Activity	Counting	Total	pCi/gm
	pCi/gm	pCi/gm	pCi/gm	pCi/gm	
BE-7 #A	5.0157E-02	5.1016E-02	2.1607E-01	2.1609E-01	2.452E-01
K-40 #	9.1664E+00	9.1664E+00	1.3487E+00	1.4447E+00	
MN-54 #A	-5.6880E-04	-5.7045E-04	2.8928E-02	2.8928E-02	4.183E-02
CO-57 #B	-6.7942E-03	-6.8171E-03	3.3836E-02	3.3838E-02	3.766E-02
CO-60 #B	9.6647E-03	9.6693E-03	3.6050E-02	3.6054E-02	4.237E-02
Sr-85 #A	-6.0641E-03	-6.1494E-03	3.3007E-02	3.3009E-02	3.730E-02
Kr-85 #A	-1.6273E+02	-1.6273E+02	1.0077E+03	1.0077E+03	8.676E+02
Y-88 #B	3.9056E-03	3.9389E-03	2.6325E-02	2.6326E-02	3.402E-02
NB-94 #B	4.5853E-03	4.5853E-03	2.7175E-02	2.7177E-02	3.253E-02
Ag-108M#B	-6.6329E-03	-6.6330E-03	3.8665E-02	3.8666E-02	4.491E-02
CD-109 #A	6.2249E-03	6.2373E-03	9.3303E-01	9.3303E-01	1.047E+00

SN-113 #B	-9.9478E-03	-1.0026E-02	4.5969E-02	4.5973E-02	5.177E-02
SB-125 #B	4.0325E-02	4.0361E-02	7.0841E-02	7.0877E-02	7.729E-02
I-131 #B	1.7006E-03	1.9036E-03	3.1861E-02	3.1861E-02	3.310E-02
CS-134 #B	-3.9419E-03	-3.9466E-03	3.8645E-02	3.8645E-02	3.296E-02
CS-137 #A	-3.1051E-03	-3.1053E-03	6.3669E-02	6.3670E-02	3.571E-02
CE-139 #A	-4.0185E-03	-4.0451E-03	3.6223E-02	3.6223E-02	3.784E-02
EU-152 #B	-1.9311E-02	-1.9315E-02	1.0984E-01	1.0984E-01	1.127E-01
EU-154 #B	-6.0060E-04	-6.0078E-04	7.9137E-01	7.9137E-01	6.716E-02
EU-155 #B	2.4008E-02	2.4020E-02	1.0924E-01	1.0925E-01	1.216E-01
HG-203 #B	8.6420E-03	8.8118E-03	3.0789E-02	3.0793E-02	3.392E-02
TL-208 #	1.2586E-01	1.2586E-01	4.6104E-02	4.6649E-02	3.386E-02
PB-212 #	2.8850E-01	2.8850E-01	8.8009E-02	8.9506E-02	8.236E-02
PB-214 #	3.4140E-01	3.4140E-01	8.8243E-02	9.0327E-02	6.804E-02
BI-212 #A	2.4046E-01	2.4046E-01	2.6530E-01	2.6565E-01	2.707E-01
BI-214	3.8770E-01	3.8770E-01	1.1211E-01	1.1423E-01	
RA-224 #A	6.7042E-01	6.7042E-01	8.6172E-01	8.6255E-01	9.337E-01
RA-226 #A	6.2142E-01	6.2142E-01	8.8047E-01	8.8117E-01	9.580E-01
AC-228 #	4.0572E-01	4.0572E-01	1.3986E-01	1.4173E-01	
TH-227 #B	-4.1126E-02	-4.1126E-02	3.0755E-01	3.0756E-01	3.199E-01
PA-234 #B	-3.4637E-03	-3.4637E-03	1.1349E-01	1.1349E-01	1.279E-01
TH-234 #B	3.4279E-01	3.4279E-01	1.4009E+00	1.4010E+00	1.568E+00
AM-241 #A	3.7220E-04	3.7220E-04	1.9820E-01	1.9820E-01	2.235E-01

- All peaks for activity calculation had bad shape.
 * - Activity omitted from total
 & - Activity omitted from total and all peaks had bad shape.
 < - MDA value printed.
 A - Activity printed, but activity < MDA.
 B - Activity < MDA and failed test.
 C - Area < Critical level.
 F - Failed fraction or key line test.
 H - Half-life limit exceeded

----- S U M M A R Y -----
 Total Activity (86.2 to 1999.1 keV) 9.9598207E+00 pCi/gm
 Total Decayed Activity (86.2 to 1999.1 keV) 9.9598207E+00 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
 DAT

Reviewed by: _____
 Supervisor

Laboratory: YAEC Chemistry Lab

Sample description
FSS-OOL-16-01-015-F

Spectrum Filename: C:\GammaVision\Spectra\101F_26JUL2006_1744.An1

Acquisition information

Start time: 26-Jul-2006 17:44:32
Live time: 2000
Real time: 2002
Dead time: 0.08 %
Detector ID: 1

Detector system

Det 101- DSPE-633

Calibration

Filename: D1_1LSa.Clb
Detector 101 1.0 Liter Marinelli Sand

Energy Calibration

Created: 03-Sep-2004 08:50:48
Zero offset: 0.244 keV
Gain: 0.500 keV/channel
Quadratic: -2.493E-08 keV/channel²

Efficiency Calibration

Created: 03-Sep-2004 08:52:26
Type: Polynomial
Uncertainty: 0.626 %
Coefficients: -0.321775 -5.816463 0.734234
-0.099357 0.006049 -0.000149

Library Files

Main analysis library: FSS_Rev_1.Lib
Library Match Width: 1.000
Peak stripping: Library based

Analysis parameters

Analysis engine: Env32 G53W4.20
Start channel: 100 (50.23keV)
Stop channel: 4000 (1999.11keV)
Peak rejection level: 41.667%
Peak search sensitivity: 3
Sample Size: 2.0560E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 2.0560E+03) =
4.8638E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

Fraction Limit: 0.000%
Background width: average of five points.

Half lives decay limit: 12.000
 Activity range factor: 2.000
 Min. step backg. energy 0.000
 Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	25-Jul-2006 11:17:00
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	101_150K_28APR05.Pbc 01-May-2005 05:24:47
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 12 cutoff 20.00000 %
 Energy Calibration
 Normalized diff: 0.4154

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. pCi/gm	Nuc
74.33	143.	23.17	1.00	1.651E-02	70.83	3.520	1.802E+00	HG203
					74.81	9.600	PBC<MDA	PB212
77.50	294.	10.49	1.01	1.741E-02	77.11	17.500	6.416E-01	PB212
					77.11	10.700	1.036E+00	PB214
87.22	128.	22.19	1.01	1.919E-02	86.45	32.740	1.351E-01	EU155
90.21	53.	37.94	0.00	1.960E-02				
93.56	85.	32.02	1.02	1.996E-02	92.80	3.000	PBC<MDA	TH234
186.30	147.	24.48	1.18	1.856E-02	185.99	3.280	1.585E+00	RA226
238.96	720.	4.26	1.12	1.556E-02	238.63	43.100	6.987E-01	PB212
241.85	101.	24.52	1.12	1.541E-02	241.00	3.900	PBC<MDA	RA224
270.80	82.	29.89	0.97	1.398E-02				
277.63	51.	35.52	0.96	1.367E-02				
295.55	172.	11.81	0.89	1.291E-02	295.22	19.200	4.523E-01	PB214
300.51	41.	34.34	0.76	1.271E-02				
338.70	157.	17.86	1.34	1.134E-02	338.40	12.010	7.470E-01	AC228
352.31	237.	10.66	1.33	1.092E-02	351.99	37.100	3.816E-01	PB214
462.51	61.	30.74	1.09	8.359E-03				
462.51	61.	30.74	1.09	8.359E-03	463.51	10.000	4.665E-01	SB125
511.14	90.	16.96	1.24	7.584E-03	510.72	22.500	2.831E-01	TL208
583.71	188.	11.38	1.33	6.678E-03	583.14	86.000	2.120E-01	TL208
609.83	168.	10.24	1.53	6.408E-03	609.32	46.090	3.707E-01	BI214
727.64	54.	26.03	1.68	5.440E-03	727.17	11.800	5.416E-01	BI212
795.54	22.	37.53	1.50	5.016E-03	795.76	85.400	PBC<MDA	CS134
911.78	146.	12.73	1.81	4.443E-03	911.07	29.000	7.372E-01	AC228
969.15	124.	14.15	1.98	4.211E-03	964.00	14.580	1.318E+00	EU152
					968.90	17.460	1.103E+00	AC228
1120.57	56.	30.84	1.93	3.711E-03	1120.28	15.040	6.538E-01	BI214

1461.97	547.	4.35	2.09	2.940E-03	1460.75	10.700	1.137E+01	K40
1765.82	36.	16.67	2.00	2.481E-03	1764.51	15.920	5.917E-01	BI214

***** U N I D E N T I F I E D P E A K S U M M A R Y *****

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV	Suspected Nuclide
477.62	238.89	111.	720.	0.360	12.79	1.122	PB-212 D
483.41	241.78	256.	101.	0.050	73.56	1.124	PB-214 D
541.32	270.80	202.	82.	0.041	89.67	0.973	AC-228 s
555.00	277.63	132.	51.	0.026	103.82	0.960	NP-239
600.77	300.51	85.	41.	0.021	103.03	0.759	PB-212

s - Peak fails shape tests.
 D - Peak area deconvoluted.
 L - Peak written from unknown list.
 C - Area < Critical level.

 This section based on library: FSS_Rev_1.Lib

***** I D E N T I F I E D P E A K S U M M A R Y *****

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV
HG-203	146.72	73.57	964.	-119.	-0.059	114.35	1.499s
PB-212	149.35	74.89	973.	194.	0.097	69.64	1.499
PB-212	153.79	77.11	869.	268.	0.134	50.11	1.499D
PB-214	153.79	77.11	873.	264.	0.132	50.11	1.499D
EU-155	174.18	87.30	823.	133.	0.067	95.11	1.499
RA-226	372.15	186.25	459.	124.	0.062	78.03	1.499s
PB-212	477.57	238.94	413.	585.	0.292	19.03	1.499
PB-214	590.94	295.60	168.	174.	0.087	38.43	1.499
AC-228	677.19	338.70	193.	155.	0.077	53.57	1.343
PB-214	704.37	352.29	116.	217.	0.108	29.02	1.499
TL-208	1022.22	511.14	70.	74.	0.037	50.89	1.235s
TL-208	1167.43	583.71	82.	185.	0.093	34.15	1.326s
BI-214	1219.69	609.83	54.	167.	0.083	30.73	1.529
BI-212	1455.67	727.76	51.	38.	0.019	91.15	1.499s
CS-134	1591.30	795.54	25.	22.	0.011	112.59	1.502s
AC-228	1823.90	911.78	59.	145.	0.072	38.19	1.806
AC-228	1938.72	969.15	44.	123.	0.062	42.46	1.978s
BI-214	2241.74	1120.57	56.	56.	0.028	92.51	1.926
K-40	2924.95	1461.97	7.	545.	0.272	13.05	2.087
BI-214	3533.07	1765.82	0.	36.	0.018	50.00	1.999

s - Peak fails shape tests.
 D - Peak area deconvoluted.
 A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide -	Average	-----	Peak	-----				
Name	Code	Activity	Energy	Activity	Code	MDA	Value	COMMENTS
		pCi/gm	keV	pCi/gm		pCi/gm		
BE-7		1.3898E-02	477.56	1.390E-02	&(	3.243E-01	9.24E-02	G
K-40		1.1367E+01	1460.75	1.137E+01	(P	3.226E-01	4.97E-01	G
MN-54		-6.9931E-04	834.81	-6.993E-04	%(P	3.819E-02	1.04E-02	G
CO-57		0.0000E+00	122.07	0.000E+00	&(	4.150E-02	1.23E-02	G K
			136.43	-1.232E-02	&	3.526E-01	1.05E-01	G
CO-60		1.1481E-03	1332.51	1.148E-03	&(P	4.640E-02	1.25E-02	G K
			1173.23	-1.743E-02	% P	6.559E-02	1.92E-02	G K
Sr-85		-1.4788E-02	514.00	-1.479E-02	%(	4.551E-02	1.36E-02	G
Kr-85		-3.6045E+02	513.99	-3.605E+02	%(P	1.042E+03	3.09E+02	G
Y-88		0.0000E+00	1836.01	0.000E+00	%(	4.623E-02	1.17E-02	G K
			898.02	-4.431E-03	% P	4.219E-02	1.18E-02	G
NB-94		-1.4580E-03	871.10	-1.458E-03	%(P	3.077E-02	8.25E-03	G K
			702.50	-5.200E-05	% P	4.549E-02	1.28E-02	G K
Ag-108M		-5.5867E-04	722.95	-5.587E-04	&(	4.317E-02	1.20E-02	G K
			614.37	-1.621E-02	% P	5.338E-02	1.58E-02	G
			433.93	1.431E-02	%	3.526E-02	1.06E-02	G
CD-109		1.0590E-01	88.04	1.059E-01	%(P	1.259E+00	3.76E-01	G
SN-113		-8.4756E-04	391.71	-8.476E-04	%(	5.618E-02	1.62E-02	G K
			255.04	-4.207E-01	% P	1.705E+00	5.08E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	-8.0296E-04	427.95	8.030E-04	% (P	1.296E-01	3.73E-02	G K
		600.77	4.208E-02	% P	2.137E-01	6.22E-02	G
		636.15	3.645E-02	% P	3.568E-01	1.02E-01	G
		463.51	2.592E-01	% P	3.529E-01	1.10E-01	G
		176.29	4.604E-04	& P	5.641E-01	1.67E-01	G
I-131	8.5442E-04	364.48	8.544E-04	% (	4.593E-02	1.33E-02	G K
		636.97	1.358E-01	%	5.225E-01	1.53E-01	G
		284.29	5.752E-02	%	6.270E-01	1.84E-01	G
CS-134	1.5684E-02	604.66	1.844E-04	& (P	2.870E-02	7.80E-03	G K
		795.76	3.382E-02	(P	3.970E-02	1.29E-02	G
		569.29	1.294E-02	% P	2.307E-01	6.51E-02	G
		801.84	2.613E-02	%	3.369E-01	9.20E-02	G
CS-137	1.0642E-02	661.62	1.064E-02	& (P	4.496E-02	1.31E-02	G
CE-139	-1.0283E-02	165.85	1.028E-02	% (P	4.684E-02	1.40E-02	G
EU-152	-3.9354E-02	121.78	3.935E-02	& (P	1.329E-01	3.99E-02	G K
		344.30	7.302E-03	% P	1.239E-01	3.59E-02	G
		1408.08	1.020E-01	% P	1.990E-01	6.10E-02	G
		964.00	5.702E-02	& P	3.631E-01	1.04E-01	G
		1112.07	3.370E-03	% P	4.020E-01	1.11E-01	G
		778.90	6.031E-02	% P	2.508E-01	7.22E-02	G
EU-154	-2.0944E-02	123.10	2.094E-02	% (P	8.757E-02	2.62E-02	G K
		1274.80	2.207E-02	% P	1.809E-01	5.15E-02	G
		723.30	9.094E-02	& P	2.788E-01	8.28E-02	G
		1004.80	4.716E-05	% P	2.585E-01	7.09E-02	G
EU-155	1.3991E-01	86.45	1.399E-01	(	1.434E-01	4.44E-02	G K
		105.31	4.965E-02	&	1.818E-01	5.46E-02	G
HG-203	-1.6094E-04	279.17	1.609E-04	& (	4.372E-02	1.28E-02	G K
		72.87	3.847E-01	% P	1.087E+00	3.28E-01	G
		70.83	1.493E+00	+	1.855E+00	5.69E-01	G
		82.50	2.805E-01	%	1.909E+00	5.70E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	2.2676E-01	583.14	2.120E-01	*	(P	5.122E-02	2.45E-02 G
		510.72	2.831E-01	*	(P	1.609E-01	5.85E-02 G
PB-212	5.7645E-01	238.63	5.728E-01	(	P	9.541E-02	3.67E-02 G K
		77.11	5.856E-01	(		3.059E-01	9.78E-02 G
		74.81	8.022E-01	&	P	6.129E-01	1.91E-01 G
PB-214	3.5149E-01	351.99	3.515E-01	(	P	8.594E-02	3.43E-02 G K
		295.22	4.614E-01	+	P	1.671E-01	5.97E-02 G
		77.11	9.444E-01	+	P	5.013E-01	1.60E-01 G
		241.92	-2.099E-02	%	P	6.706E-01	1.99E-01 G
BI-212	3.9115E-01	727.17	3.912E-01	*	(P	3.686E-01	1.21E-01 G K
		1620.56	2.156E-01	%		1.448E+00	3.91E-01 G
		785.42	5.474E-01	%	P	1.866E+00	5.45E-01 G
BI-214	3.7069E-01	609.32	3.707E-01	(	P	8.240E-02	3.83E-02 G K
		1764.51	5.917E-01	+	P	1.226E-01	9.99E-02 G
		1120.28	6.538E-01	+	P	4.444E-01	2.03E-01 G
RA-224	7.9857E-01	241.00	7.986E-01	%	(P	1.133E+00	3.47E-01 G
RA-226	1.3387E+00	185.99	1.339E+00	*	(	1.106E+00	3.48E-01 G
AC-228	7.4008E-01	911.07	7.372E-01	(	P	1.968E-01	9.51E-02 G K
		968.90	1.103E+00	+	P	2.993E-01	1.57E-01 G
		338.40	7.470E-01	(	P	3.253E-01	1.35E-01 G
TH-227	-1.2501E-01	236.00	-1.250E-01	%	(P	4.019E-01	1.21E-01 G K
		256.25	-1.388E-01	%	P	4.897E-01	1.46E-01 G
PA-234	-2.2104E-02	98.44	-2.210E-02	%	(	1.585E-01	4.73E-02 G K
		946.00	-7.267E-03	%		2.375E-01	6.62E-02 G
		131.28	1.159E-02	&		1.992E-01	5.93E-02 G
		94.67	-4.147E-02	&		2.855E-01	8.54E-02 G
		883.24	-2.414E-03	&		3.379E-01	9.28E-02 G
		926.70	1.623E-01	&		3.146E-01	9.65E-02 G

Nuclide	Ave activity	Energy	Activity	Code	Peak MDA	Comments
		569.26	1.182E-01	%	3.454E-01	1.03E-01 G
TH-234	9.8807E-01					
		63.29	9.881E-01	%(P	1.775E+00	5.38E-01 G K
		92.80	1.081E+00	% P	1.498E+00	4.58E-01 G
		92.38-8.611E-01		& P	1.800E+00	5.41E-01 G

AM-241 -5.8125E-02
 59.54-5.812E-02 %(P 2.461E-01 7.37E-02 G
 (- This peak used in the nuclide activity average.

- * - Peak is too wide, but only one peak in library.
- ! - Peak is part of a multiplet and this area went negative during deconvolution.
- ? - Peak is too narrow.
- @ - Peak is too wide at FW25M, but ok at FWHM.
- % - Peak fails sensitivity test.
- \$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
- + - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
- = - Peak outside analysis energy range.
- & - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
- P - Peakbackground subtraction
- } - Peak is too close to another for the activity to be found directly.

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape
P - Photon Reaction	D - Double-Escape
C - Charged Particle Reaction	K - Key Line
M - No MDA Calculation	A - Not in Average
R - Coincidence Corrected	C - Coincidence Peak
H - Half-life limit exceeded	

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****						
Nuclide		Time of Count	Time Corrected	Uncertainty	3 Sigma	
		Activity	Activity	Counting	Total	MDA
		pCi/gm	pCi/gm	pCi/gm	pCi/gm	pCi/gm
BE-7	#A	1.3671E-02	1.3898E-02	2.7730E-01	2.7730E-01	3.190E-01
K-40		1.1367E+01	1.1367E+01	1.4893E+00	1.6219E+00	
MN-54	#A	-6.9734E-04	-6.9931E-04	3.1460E-01	3.1460E-01	3.808E-02
CO-57	#B	0.0000E+00	0.0000E+00	3.6884E-02	3.6884E-02	4.136E-02
CO-60	#B	1.1476E-03	1.1481E-03	3.7395E-02	3.7395E-02	4.637E-02

Sr-85	#A	-1.4589E-02	-1.4788E-02	4.0717E-02	4.0726E-02	4.489E-02
Kr-85	#A	-3.6045E+02	-3.6045E+02	1.0586E+03	1.0588E+03	1.042E+03
Y-88	#B	0.0000E+00	0.0000E+00	3.5209E-02	3.5209E-02	4.585E-02
NB-94	#B	-1.4580E-03	-1.4580E-03	3.2133E-02	3.2133E-02	3.077E-02
Ag-108M	#B	-5.5866E-04	-5.5867E-04	3.6123E-02	3.6123E-02	4.317E-02
CD-109	#A	1.0570E-01	1.0590E-01	1.1275E+00	1.1275E+00	1.256E+00
SN-113	#B	-8.4111E-04	-8.4756E-04	4.8647E-02	4.8647E-02	5.576E-02
SB-125	#B	-8.0227E-04	-8.0296E-04	7.2859E-02	7.2859E-02	1.295E-01
I-131	#B	7.6587E-04	8.5442E-04	3.9788E-02	3.9788E-02	4.117E-02
CS-134	#B	1.5666E-02	1.5684E-02	1.7994E-02	1.8015E-02	2.867E-02
CS-137	#A	1.0642E-02	1.0642E-02	3.9158E-02	3.9163E-02	4.496E-02
CE-139	#A	-1.0217E-02	-1.0283E-02	4.3197E-02	4.3201E-02	4.654E-02
EU-152	#B	-3.9346E-02	-3.9354E-02	1.2501E-01	1.2503E-01	1.328E-01
EU-154	#B	-2.0938E-02	-2.0944E-02	8.4115E-02	8.4123E-02	8.755E-02
EU-155	#A	1.3984E-01	1.3991E-01	1.3307E-01	1.3329E-01	1.434E-01
HG-203	#B	-1.5793E-04	-1.6094E-04	3.8329E-02	3.8329E-02	4.291E-02
TL-208	#	2.2676E-01	2.2676E-01	7.8436E-02	7.9475E-02	
PB-212	#	5.7645E-01	5.7645E-01	1.1083E-01	1.1551E-01	9.541E-02
PB-214	#	3.5149E-01	3.5149E-01	1.0293E-01	1.0483E-01	8.594E-02
BI-212	#	3.9115E-01	3.9115E-01	3.6286E-01	3.6354E-01	3.686E-01
BI-214	#	3.7069E-01	3.7069E-01	1.1468E-01	1.1658E-01	
RA-224	#A	7.9857E-01	7.9857E-01	1.0422E+00	1.0432E+00	1.133E+00
RA-226	#	1.3387E+00	1.3387E+00	1.0446E+00	1.0473E+00	1.106E+00
AC-228	#	7.4008E-01	7.4008E-01	2.4679E-01	2.5031E-01	
TH-227	#B	-1.2501E-01	-1.2501E-01	3.7190E-01	3.7197E-01	4.019E-01
PA-234	#B	-2.2104E-02	-2.2104E-02	1.4201E-01	1.4202E-01	1.585E-01
TH-234	#B	9.8807E-01	9.8807E-01	1.6154E+00	1.6163E+00	1.775E+00
AM-241	#A	-5.8124E-02	-5.8125E-02	2.3591E-01	2.3593E-01	2.461E-01

- All peaks for activity calculation had bad shape.
 * - Activity omitted from total
 & - Activity omitted from total and all peaks had bad shape.
 < - MDA value printed.
 A - Activity printed, but activity < MDA.
 B - Activity < MDA and failed test.
 C - Area < Critical level.
 F - Failed fraction or key line test.
 H - Half-life limit exceeded

S U M M A R Y

 Total Activity (270.6 to 1999.1 keV) 1.2705014E+01 pCi/gm
 Total Decayed Activity (270.6 to 1999.1 keV) 1.2705014E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
 DAT

Reviewed by: _____
 Supervisor

Laboratory: YAEC Chemistry Lab

Sample description
FSS-OOL-16-01-001-F

Spectrum Filename: C:\GammaVision\Spectra\101F_26JUL2006_1821.An1

Acquisition information

Start time: 26-Jul-2006 18:21:11
Live time: 2000
Real time: 2002
Dead time: 0.08 %
Detector ID: 1

Detector system

Det 101- DSPE-633

Calibration

Filename: D1_1LSa.Clb
Detector 101 1.0 Liter Marinelli Sand

Energy Calibration

Created: 03-Sep-2004 08:50:48
Zero offset: 0.244 keV
Gain: 0.500 keV/channel
Quadratic: -2.493E-08 keV/channel²

Efficiency Calibration

Created: 03-Sep-2004 08:52:26
Type: Polynomial
Uncertainty: 0.626 %
Coefficients: -0.321775 -5.816463 0.734234
-0.099357 0.006049 -0.000149

Library Files

Main analysis library: FSS_Rev_1.Lib
Library Match Width: 1.000
Peak stripping: Library based

Analysis parameters

Analysis engine: Env32 G53W4.20
Start channel: 100 (50.23keV)
Stop channel: 4000 (1999.11keV)
Peak rejection level: 41.667%
Peak search sensitivity: 3
Sample Size: 1.8090E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.8090E+03) =
5.5279E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

Fraction Limit: 0.000%
Background width: average of five points.

Half lives decay limit: 12.000
 Activity range factor: 2.000
 Min. step backg. energy 0.000
 Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	25-Jul-2006 11:05:00
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	101_150K_28APR05.Pbc 01-May-2005 05:24:47
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 9 cutoff 20.00000 %
 Energy Calibration
 Normalized diff: 0.6596

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. pCi/gm	Nuc
74.87	184.	23.91	1.50	1.654E-02				
74.87	184.	23.91	1.50	1.654E-02	74.81	9.600	8.673E-01	PB212
77.20	222.	19.53	1.50	1.720E-02	77.11	10.700	9.023E-01	PB214
					77.11	17.500		PBC<MDA PB212
77.20	226.	19.53	1.50	1.720E-02	77.11	10.700	9.023E-01	PB214
					77.11	17.500	5.609E-01	PB212
87.43	108.	23.93	1.01	1.923E-02	86.45	32.740	1.290E-01	EU155
					88.04	3.790		PBC<MDA CD109
89.75	80.	35.36	1.02	1.954E-02				
89.75	80.	35.36	1.02	1.954E-02	92.38	2.570		PBC<MDA TH234
93.43	123.	20.63	1.02	1.995E-02	92.80	3.000		PBC<MDA TH234
186.07	107.	24.45	1.67	1.858E-02	185.99	3.280	1.306E+00	RA226
209.97	75.	33.62	1.66	1.718E-02				
238.98	468.	7.55	1.50	1.557E-02	238.63	43.100	5.213E-01	PB212
241.72	99.	30.67	1.50	1.545E-02	241.00	3.900	1.229E+00	RA224
					241.92	7.470		PBC<MDA PB214
					295.22	19.200	2.699E-01	PB214
295.60	91.	22.53	1.15	1.290E-02				
328.24	37.	36.56	0.92	1.169E-02				
338.66	114.	19.24	1.06	1.134E-02	338.40	12.010	6.128E-01	AC228
352.24	253.	8.77	1.29	1.092E-02	351.99	37.100	4.619E-01	PB214
463.79	44.	32.97	1.05	8.337E-03	463.51	10.000	3.814E-01	SB125
511.02	85.	21.64	1.42	7.586E-03	510.72	22.500	3.021E-01	TL208
583.57	184.	12.07	1.47	6.680E-03	583.14	86.000	2.358E-01	TL208
609.89	183.	10.46	1.20	6.407E-03	609.32	46.090	4.592E-01	BI214
727.62	46.	31.35	1.26	5.440E-03	727.17	11.800	5.271E-01	BI212
912.07	130.	12.48	1.52	4.442E-03	911.07	29.000	7.435E-01	AC228
969.26	111.	13.81	1.79	4.211E-03	968.90	17.460	1.121E+00	AC228

1121.49	63.	25.00	2.14	3.711E-03	1120.28	15.040	8.475E-01	BI214
1462.02	595.	4.14	1.62	2.940E-03	1460.75	10.700	1.407E+01	K40


```
***** UNIDENTIFIED PEAK SUMMARY *****
```

Channel	Peak Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV	Suspected Nuclide
174.44	87.40	279.	108.	0.054	71.79	1.014	PB-214 1D
179.07	89.71	355.	80.	0.040	106.09	1.016	PB-214 1D
419.61	209.97	243.	75.	0.037	100.85	1.664	NP-239 s
656.25	328.24	73.	37.	0.019	109.68	0.918	AC-228
1455.38	727.62	54.	46.	0.023	80.93	1.260	J-132 s
1938.93	969.26	98.	45.	0.023	102.84	1.789	AC-228

s - Peak fails shape tests.
 D - Peak area deconvoluted.
 L - Peak written from unknown list.
 C - Area < Critical level.

 This section based on library: FSS_Rev_1.Lib

```
***** IDENTIFIED PEAK SUMMARY *****
```

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV
PB-212	149.19	74.81	938.	184.	0.092	71.73	1.499D
PB-214	153.79	77.11	866.	222.	0.111	58.59	1.499D
PB-212	153.79	77.11	862.	226.	0.113	58.59	1.499D
TH-234	186.03	93.22	693.	125.	0.062	88.78	1.499s
RA-226	372.16	186.25	394.	95.	0.047	94.13	1.499s
PB-212	477.67	238.98	411.	468.	0.234	22.66	1.499
RA-224	483.15	241.72	419.	99.	0.050	92.00	1.499
PB-214	590.85	295.55	164.	99.	0.049	61.48	1.499
AC-228	677.36	338.79	126.	101.	0.051	54.26	1.499
PB-214	704.53	352.37	115.	242.	0.121	26.65	1.499
SB-125	927.45	463.78	70.	37.	0.018	104.25	1.499
TL-208	1021.97	511.02	98.	69.	0.035	64.91	1.420s
TL-208	1167.16	583.57	84.	181.	0.091	36.22	1.468s
BI-214	1219.81	609.89	58.	182.	0.091	31.39	1.197s
AC-228	1824.40	912.03	42.	110.	0.055	37.20	1.578
AC-228	1939.98	969.78	36.	65.	0.033	53.04	1.616
BI-214	2243.58	1121.49	52.	63.	0.032	74.99	2.139s
K-40	2925.06	1462.02	5.	593.	0.296	12.41	1.621

s - Peak fails shape tests.
 D - Peak area deconvoluted.
 A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****							
- Nuclide -	Average	----- Peak -----					
Name	Code	Activity	Energy	Activity	Code	MDA Value	COMMENTS
		pCi/gm	keV	pCi/gm		pCi/gm	
BE-7		1.5453E-01	477.56	1.545E-01	%	3.684E-01 1.11E-01	G
K-40		1.4066E+01	1460.75	1.407E+01	(P	3.159E-01 5.85E-01	G
MN-54		-1.0562E-02	834.81	-1.056E-02	%(P	5.676E-02 1.64E-02	G
CO-57		1.0724E-02	122.07	1.072E-02	%(	4.400E-02 1.32E-02	G K
			136.43	1.461E-02	&	3.859E-01 1.15E-01	G
CO-60		2.5311E-02	1332.51	2.531E-02	%(P	5.346E-02 1.62E-02	G K
			1173.23	4.873E-03	& P	7.898E-02 2.25E-02	G K
Sr-85		-1.1829E-02	514.00	-1.183E-02	%(	5.487E-02 1.62E-02	G
Kr-85		-2.9643E+02	513.99	-2.964E+02	%(P	1.255E+03 3.69E+02	G
Y-88		-8.1236E-03	1836.01	-8.124E-03	%(	5.541E-02 1.51E-02	G K
			898.02	3.802E-03	& P	3.491E-02 9.46E-03	G
NB-94		7.0085E-03	871.10	7.009E-03	%(P	3.892E-02 1.10E-02	G K
			702.50	-3.013E-04	& P	4.234E-02 1.18E-02	G K
Ag-108M		7.1679E-03	722.95	7.168E-03	&(	5.286E-02 1.52E-02	G K
			614.37	-1.212E-02	% P	5.839E-02 1.71E-02	G
			433.93	-5.681E-03	%	4.445E-02 1.29E-02	G
CD-109		8.9067E-01	88.04	8.907E-01	%(P	1.312E+00 4.01E-01	G
SN-113		-1.2286E-02	391.71	-1.229E-02	%(	5.840E-02 1.72E-02	G K
			255.04	-2.922E-01	& P	1.846E+00 5.46E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	5.8660E-02	427.95	3.238E-02	&(P	1.326E-01	3.90E-02	G K
		600.77	4.492E-03	% P	2.154E-01	6.04E-02	G
		636.15	8.539E-03	% P	3.629E-01	1.01E-01	G
		463.51	3.281E-01	(P	3.734E-01	1.19E-01	G
		176.29	9.738E-02	& P	5.342E-01	1.59E-01	G
I-131	-1.1172E-02	364.48	1.117E-02	% (	5.263E-02	1.55E-02	G K
		636.97	1.273E-01	%	6.245E-01	1.81E-01	G
		284.29	9.641E-02	%	7.291E-01	2.15E-01	G
CS-134	-7.0142E-03	604.66	7.014E-03	&(P	4.506E-02	1.29E-02	G K
		795.76	1.495E-02	% P	5.168E-02	1.51E-02	G
		569.29	2.888E-03	& P	2.557E-01	7.18E-02	G
		801.84	6.690E-03	%	4.671E-01	1.28E-01	G
CS-137	2.6621E-02	661.62	2.662E-02	% (P	4.368E-02	1.35E-02	G
CE-139	1.2218E-02	165.85	1.222E-02	% (P	4.807E-02	1.44E-02	G
EU-152	3.0145E-02	121.78	3.015E-02	% (P	1.324E-01	3.96E-02	G K
		344.30	5.796E-03	& P	1.347E-01	3.90E-02	G
		1408.08	4.746E-02	% P	2.044E-01	5.73E-02	G
		964.00	8.214E-02	% P	3.843E-01	1.10E-01	G
		1112.07	1.539E-01	% P	3.780E-01	1.13E-01	G
		778.90	3.044E-02	& P	2.560E-01	7.08E-02	G
EU-154	-1.3683E-03	123.10	1.368E-03	&(P	9.095E-02	2.69E-02	G K
		1274.80	4.670E-02	% P	1.581E-01	4.61E-02	G
		723.30	1.183E-03	& P	2.743E-01	7.75E-02	G
		1004.80	6.475E-04	% P	2.707E-01	7.35E-02	G
EU-155	-1.2725E-02	86.45	1.273E-02	% (	1.805E-01	5.39E-02	G K
		105.31	6.156E-02	%	1.945E-01	5.85E-02	G
HG-203	-1.3777E-03	279.17	1.378E-03	&(	4.968E-02	1.45E-02	G K
		72.87	9.086E-02	% P	1.036E+00	3.09E-01	G
		70.83	1.061E+00	&	2.037E+00	6.19E-01	G
		82.50	2.101E-01	&	2.240E+00	6.68E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	2.4952E-01	583.14	2.358E-01	@(P	5.888E-02	2.89E-02	G
		510.72	3.021E-01	*(P	2.136E-01	8.06E-02	G
PB-212	5.3272E-01	238.63	5.213E-01	(P	1.082E-01	3.99E-02	G K
		77.11	5.609E-01	(	3.462E-01	1.10E-01	G Energy duplication
		74.81	8.673E-01	& P	6.842E-01	2.13E-01	G Energy duplication
PB-214	4.4581E-01	351.99	4.458E-01	(P	9.700E-02	3.99E-02	G K
		295.22	2.977E-01	- P	1.879E-01	6.21E-02	G
		77.11	9.023E-01	+ P	5.673E-01	1.79E-01	G Energy duplication
		241.92	3.841E-01	% P	6.868E-01	2.09E-01	G
BI-212	-7.8821E-03	727.17	7.882E-03	%(P	4.539E-01	1.27E-01	G K
		1620.56	1.332E-02	%	1.618E+00	4.09E-01	G
		785.42	6.870E-01	& P	1.995E+00	5.88E-01	G
BI-214	4.5922E-01	609.32	4.592E-01	@(P	9.679E-02	4.84E-02	G K
		1764.51	5.926E-02	& P	3.639E-01	9.82E-02	G
		1120.28	8.475E-01	+ P	4.847E-01	2.13E-01	G
RA-224	1.2286E+00	241.00	1.229E+00	(P	1.217E+00	3.80E-01	G
RA-226	1.1599E+00	185.99	1.160E+00	*(	1.166E+00	3.64E-01	G
AC-228	6.2793E-01	911.07	6.379E-01	(P	1.913E-01	8.04E-02	G K
		968.90	6.615E-01	(P	3.097E-01	1.18E-01	G
		338.40	5.552E-01	(P	3.011E-01	1.03E-01	G
TH-227	1.0507E-01	236.00	1.051E-01	&(P	2.597E-01	7.82E-02	G K
		256.25	1.138E-01	% P	5.696E-01	1.69E-01	G
PA-234	5.7839E-02	98.44	5.784E-02	%(	1.664E-01	5.02E-02	G K
		946.00	4.905E-02	&	2.573E-01	7.39E-02	G
		131.28	0.000E+00	&	2.113E-01	6.27E-02	G
		94.67	1.731E-01	%	3.311E-01	1.01E-01	G
		883.24	8.206E-02	&	3.647E-01	1.05E-01	G
		926.70	1.588E-02	&	4.699E-01	1.31E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak MDA	Comments
		569.26	8.963E-03	&	3.773E-01	1.06E-01 G
TH-234	9.3573E-01					
		63.29	4.531E-01	%(P	2.067E+00	6.18E-01 G K
		92.80	1.563E+00	(P	1.569E+00	4.85E-01 G
		92.38	3.219E-01	% P	1.770E+00	5.27E-01 G

AM-241 -1.5447E-03
 59.54-1.545E-03 &(P 2.766E-01 8.19E-02 G
 (- This peak used in the nuclide activity average.

- * - Peak is too wide, but only one peak in library.
- ! - Peak is part of a multiplet and this area went negative during deconvolution.
- ? - Peak is too narrow.
- @ - Peak is too wide at FW25M, but ok at FWHM.
- % - Peak fails sensitivity test.
- \$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
- + - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
- = - Peak outside analysis energy range.
- & - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
- P - Peakbackground subtraction
- } - Peak is too close to another for the activity to be found directly.

Nuclide Codes:

T - Thermal Neutron Activation
 F - Fast Neutron Activation
 I - Fission Product
 N - Naturally Occurring Isotope
 P - Photon Reaction
 C - Charged Particle Reaction
 M - No MDA Calculation
 R - Coincidence Corrected
 H - Halflife limit exceeded

Peak Codes:

G - Gamma Ray
 X - X-Ray
 P - Positron Decay
 S - Single-Escape
 D - Double-Escape
 K - Key Line
 A - Not in Average
 C - Coincidence Peak

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****						
Nuclide		Time of Count	Time Corrected	Uncertainty	3 Sigma	
		Activity	Activity	Counting	Total	MDA
		pCi/gm	pCi/gm	pCi/gm	pCi/gm	pCi/gm
BE-7	#A	1.5194E-01	1.5453E-01	3.3259E-01	3.3271E-01	3.623E-01
K-40		1.4066E+01	1.4066E+01	1.7528E+00	1.9246E+00	
MN-54	#A	-1.0531E-02	-1.0562E-02	5.5524E-02	5.5527E-02	5.659E-02
CO-57	#B	1.0688E-02	1.0724E-02	3.9542E-02	3.9547E-02	4.385E-02
CO-60	#B	2.5300E-02	2.5311E-02	4.8676E-02	4.8697E-02	5.344E-02

Sr-85	#A	-1.1665E-02	-1.1829E-02	4.8579E-02	4.8584E-02	5.411E-02
Kr-85	#A	-2.9643E+02	-2.9643E+02	1.3285E+03	1.3286E+03	1.255E+03
Y-88	#B	-8.0551E-03	-8.1236E-03	4.5265E-02	4.5268E-02	5.495E-02
NB-94	#B	7.0085E-03	7.0085E-03	3.2980E-02	3.2982E-02	3.892E-02
Ag-108M	#B	7.1677E-03	7.1679E-03	4.5485E-02	4.5487E-02	5.286E-02
CD-109	#A	8.8890E-01	8.9067E-01	1.2036E+00	1.2046E+00	1.309E+00
SN-113	#B	-1.2190E-02	-1.2286E-02	5.1523E-02	5.1528E-02	5.794E-02
SB-125	#B	5.8607E-02	5.8660E-02	6.3572E-02	6.3658E-02	1.325E-01
I-131	#B	-9.9853E-03	-1.1172E-02	4.6576E-02	4.6581E-02	4.704E-02
CS-134	#B	-7.0058E-03	-7.0142E-03	4.7817E-02	4.7819E-02	4.500E-02
CS-137	#A	2.6619E-02	2.6621E-02	4.0517E-02	4.0545E-02	4.367E-02
CE-139	#A	1.2138E-02	1.2218E-02	4.3193E-02	4.3198E-02	4.776E-02
EU-152	#B	3.0139E-02	3.0145E-02	1.1893E-01	1.1894E-01	1.324E-01
EU-154	#B	-1.3679E-03	-1.3683E-03	3.0554E-01	3.0554E-01	9.092E-02
EU-155	#B	-1.2719E-02	-1.2725E-02	1.6177E-01	1.6177E-01	1.804E-01
HG-203	#B	-1.3513E-03	-1.3777E-03	4.3632E-02	4.3633E-02	4.873E-02
TL-208	#	2.4952E-01	2.4952E-01	9.1552E-02	9.2632E-02	
PB-212	#	5.3272E-01	5.3272E-01	1.2228E-01	1.2593E-01	1.082E-01
PB-214	#	4.4581E-01	4.4581E-01	1.1979E-01	1.2241E-01	9.700E-02
BI-212	#B	-7.8821E-03	-7.8821E-03	5.1831E-01	5.1831E-01	4.539E-01
BI-214	#	4.5922E-01	4.5922E-01	1.4503E-01	1.4733E-01	
RA-224	#	1.2286E+00	1.2286E+00	1.1385E+00	1.1407E+00	1.217E+00
RA-226	#A	1.1599E+00	1.1599E+00	1.0918E+00	1.0938E+00	1.166E+00
AC-228	#	6.2793E-01	6.2793E-01	1.7980E-01	1.8327E-01	1.913E-01
TH-227	#B	1.0507E-01	1.0507E-01	2.3450E-01	2.3457E-01	2.597E-01
PA-234	#B	5.7839E-02	5.7839E-02	1.5048E-01	1.5052E-01	1.664E-01
TH-234	#B	9.3573E-01	9.3573E-01	8.7186E-01	8.7340E-01	2.067E+00
AM-241	#A	-1.5447E-03	-1.5447E-03	1.5243E+00	1.5243E+00	2.766E-01

- All peaks for activity calculation had bad shape.
 * - Activity omitted from total
 & - Activity omitted from total and all peaks had bad shape.
 < - MDA value printed.
 A - Activity printed, but activity < MDA.
 B - Activity < MDA and failed test.
 C - Area < Critical level.
 F - Failed fraction or key line test.
 H - Halflife limit exceeded

----- S U M M A R Y -----
 Total Activity (50.2 to 1999.1 keV) 1.4774328E+01 pCi/gm
 Total Decayed Activity (50.2 to 1999.1 keV) 1.4774328E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
 DAT

Reviewed by: _____
 Supervisor

Laboratory: YAEC Chemistry Lab

Sample description
FSS-OOL-16-01-018-F

Spectrum Filename: C:\GammaVision\Spectra\101F_26JUL2006_1859.An1

Acquisition information

Start time: 26-Jul-2006 18:59:25
Live time: 2000
Real time: 2001
Dead time: 0.07 %
Detector ID: 1

Detector system

Det 101- DSPE-633

Calibration

Filename: D1_1LSa.Clb
Detector 101 1.0 Liter Marinelli Sand

Energy Calibration

Created: 03-Sep-2004 08:50:48
Zero offset: 0.244 keV
Gain: 0.500 keV/channel
Quadratic: -2.493E-08 keV/channel²

Efficiency Calibration

Created: 03-Sep-2004 08:52:26
Type: Polynomial
Uncertainty: 0.626 %
Coefficients: -0.321775 -5.816463 0.734234
-0.099357 0.006049 -0.000149

Library Files

Main analysis library: FSS_Rev_1.Lib
Library Match Width: 1.000
Peak stripping: Library based

Analysis parameters

Analysis engine: Env32 G53W4.20
Start channel: 100 (50.23keV)
Stop channel: 4000 (1999.11keV)
Peak rejection level: 41.667%
Peak search sensitivity: 3
Sample Size: 1.8800E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.8800E+03) =
5.3191E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

Fraction Limit: 0.000%
Background width: average of five points.

Half lives decay limit: 12.000
 Activity range factor: 2.000
 Min. step backg. energy 0.000
 Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	25-Jul-2006 09:55:00
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	101_150K_28APR05.Pbc 01-May-2005 05:24:47
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 12 cutoff 20.00000 %
 Energy Calibration
 Normalized diff: 0.5276

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. pCi/gm	Nuc
74.71	135.	22.73	1.00	1.651E-02				
74.71	135.	22.73	1.00	1.651E-02	74.81	9.600	PBC<MDA	PB212
77.20	254.	12.04	1.01	1.723E-02	77.11	10.700	9.777E-01	PB214
					77.11	17.500	6.067E-01	PB212
93.04	96.	37.25	1.50	1.989E-02	92.80	3.000	PBC<MDA	TH234
186.13	93.	30.52	1.56	1.857E-02	185.99	3.280	1.101E+00	RA226
238.99	532.	5.18	1.12	1.556E-02	238.63	43.100	5.627E-01	PB212
241.84	86.	26.03	1.12	1.541E-02	241.00	3.900	PBC<MDA	RA224
					241.92	7.470	PBC<MDA	PB214
270.75	52.	39.05	1.09	1.398E-02				
295.53	127.	16.00	0.91	1.291E-02	295.22	19.200	3.634E-01	PB214
328.07	46.	34.33	1.05	1.169E-02				
338.72	132.	16.55	1.38	1.134E-02	338.40	12.010	6.824E-01	AC228
352.21	270.	10.42	1.43	1.092E-02	351.99	37.100	4.759E-01	PB214
463.34	46.	30.43	1.05	8.345E-03				
463.34	46.	30.43	1.05	8.345E-03	463.51	10.000	3.800E-01	SB125
511.47	93.	16.33	1.47	7.580E-03	510.72	22.500	3.240E-01	TL208
583.78	185.	11.67	1.23	6.677E-03	583.14	86.000	2.284E-01	TL208
609.88	168.	10.19	1.26	6.407E-03	609.32	46.090	4.059E-01	BI214
728.07	30.	32.47	1.50	5.443E-03	727.17	11.800	PBC<MDA	BI212
911.91	127.	11.44	1.80	4.443E-03	911.07	29.000	6.975E-01	AC228
969.56	110.	13.45	1.25	4.210E-03	968.90	17.460	1.071E+00	AC228
1120.13	61.	22.53	1.64	3.711E-03	1120.28	15.040	7.884E-01	BI214
1462.04	498.	4.76	1.76	2.940E-03	1460.75	10.700	1.131E+01	K40
1765.93	33.	17.41	1.08	2.480E-03	1764.51	15.920	5.925E-01	BI214

```
***** UNIDENTIFIED PEAK SUMMARY *****
```

Channel	Peak Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV	Suspected Nuclide
148.99	74.72	405.	135.	0.068	68.19	1.005	BI-207 D
153.97	77.20	341.	254.	0.127	36.12	1.007	PB-214 D
477.68	238.97	114.	532.	0.266	15.55	1.122	PB-212 D
483.37	241.81	207.	86.	0.043	78.09	1.124	PB-214 D
541.22	270.75	153.	52.	0.026	117.14	1.091	AC-228 s
655.92	328.07	90.	46.	0.023	102.98	1.051	AC-228

s - Peak fails shape tests.
 D - Peak area deconvoluted.
 L - Peak written from unknown list.
 C - Area < Critical level.

 This section based on library: FSS_Rev_1.Lib

```
***** IDENTIFIED PEAK SUMMARY *****
```

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV
PB-212	149.21	74.82	994.	112.	0.056	116.99	1.499
PB-214	153.79	77.11	830.	214.	0.107	59.55	1.499D
PB-212	153.79	77.11	826.	218.	0.109	59.55	1.499D
TH-234	185.67	93.04	677.	96.	0.048	111.76	1.499
RA-226	371.85	186.10	377.	88.	0.044	99.25	1.499s
PB-212	477.60	238.95	355.	441.	0.220	22.69	1.499
RA-224	483.84	242.07	362.	73.	0.036	114.91	1.499
PB-214	590.97	295.61	133.	134.	0.067	44.18	1.499
AC-228	677.22	338.72	125.	129.	0.065	49.65	1.376s
PB-214	704.36	352.28	137.	218.	0.109	30.12	1.499
SB-125	926.78	463.44	50.	41.	0.021	82.99	1.499
TL-208	1022.88	511.47	67.	77.	0.038	49.00	1.473s
TL-208	1167.58	583.78	80.	183.	0.091	35.00	1.226
BI-214	1219.80	609.88	49.	167.	0.083	30.56	1.264
BI-212	1456.29	728.07	35.	30.	0.015	97.42	1.499s
AC-228	1824.18	911.91	30.	125.	0.063	34.31	1.799
AC-228	1939.53	969.56	30.	110.	0.055	40.36	1.245
BI-214	2240.85	1120.13	37.	61.	0.031	67.59	1.644s
K-40	2925.09	1462.04	18.	495.	0.248	14.28	1.757
BI-214	3533.30	1765.93	0.	33.	0.016	52.22	1.083s

s - Peak fails shape tests.
 D - Peak area deconvoluted.
 A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****							
- Nuclide -		Average	----- Peak -----				
Name	Code	Activity	Energy	Activity	Code	MDA Value	COMMENTS
		pCi/gm	keV	pCi/gm		pCi/gm	
BE-7		9.7613E-03	477.56	9.761E-03	% (	3.876E-01 1.11E-01	G
K-40		1.1306E+01	1460.75	1.131E+01	(P	5.105E-01 5.41E-01	G
MN-54		9.4490E-03	834.81	9.449E-03	&(P	4.311E-02 1.24E-02	G
CO-57		1.0631E-02	122.07	1.063E-02	&(	4.122E-02 1.24E-02	G K
			136.43	4.747E-02	%	3.693E-01 1.10E-01	G
CO-60		8.9844E-03	1332.51	8.984E-03	%(P	5.173E-02 1.45E-02	G K
			1173.23	1.765E-02	% P	6.336E-02 1.85E-02	G K
Sr-85		-8.7442E-03	514.00	8.744E-03	%(	4.152E-02 1.22E-02	G
Kr-85		-2.2496E+02	513.99	2.250E+02	%(P	9.515E+02 2.76E+02	G
Y-88		0.0000E+00	1836.01	0.000E+00	%(	5.059E-02 1.28E-02	G K
			898.02	1.374E-02	% P	4.012E-02 1.18E-02	G
NB-94		-9.1499E-03	871.10	9.150E-03	&(P	4.342E-02 1.24E-02	G K
			702.50	1.299E-02	& P	3.282E-02 9.79E-03	G K
Ag-108M		6.4105E-03	722.95	6.411E-03	&(	4.782E-02 1.37E-02	G K
			614.37	2.386E-02	& P	5.864E-02 1.76E-02	G
			433.93	7.558E-03	&	3.932E-02 1.15E-02	G
CD-109		6.8465E-03	88.04	6.847E-03	%(P	1.340E+00 3.99E-01	G
SN-113		2.7307E-03	391.71	2.731E-03	%(	4.839E-02 1.39E-02	G K
			255.04	4.418E-03	% P	1.721E+00 5.02E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	7.6390E-02	427.95	1.795E-02	% (P	1.099E-01	3.18E-02	G K
		600.77	4.989E-02	& P	1.743E-01	5.09E-02	G
		636.15	6.850E-02	% P	3.803E-01	1.10E-01	G
		463.51	3.556E-01	(P	3.070E-01	1.02E-01	G
		176.29	1.321E-02	% P	5.774E-01	1.70E-01	G
I-131	-5.0757E-03	364.48	5.076E-03	& (	5.236E-02	1.53E-02	G K
		636.97	1.138E-01	&	6.423E-01	1.86E-01	G
		284.29	4.955E-02	%	6.738E-01	1.98E-01	G
CS-134	1.5097E-02	604.66	1.510E-02	& (P	2.995E-02	9.10E-03	G K
		795.76	3.022E-02	% P	4.052E-02	1.30E-02	G
		569.29	2.383E-02	% P	2.092E-01	5.87E-02	G
		801.84	0.000E+00	%	4.809E-01	1.32E-01	G
CS-137	-5.4359E-03	661.62	5.436E-03	& (P	5.448E-02	1.54E-02	G
CE-139	4.5282E-03	165.85	4.528E-03	& (P	4.401E-02	1.31E-02	G
EU-152	2.6491E-02	121.78	2.649E-02	& (P	1.250E-01	3.74E-02	G K
		344.30	5.054E-03	% P	1.183E-01	3.41E-02	G
		1408.08	1.983E-03	% P	2.343E-01	6.16E-02	G
		964.00	9.451E-02	% P	3.857E-01	1.12E-01	G
		1112.07	7.394E-02	% P	4.115E-01	1.17E-01	G
		778.90	1.502E-01	% P	2.400E-01	7.55E-02	G
EU-154	-5.6441E-03	123.10	5.644E-03	% (P	9.481E-02	2.81E-02	G K
		1274.80	2.399E-02	% P	1.509E-01	4.25E-02	G
		723.30	1.959E-02	& P	1.911E-01	5.36E-02	G
		1004.80	6.887E-02	% P	2.716E-01	7.87E-02	G
EU-155	2.9052E-03	86.45	2.905E-03	% (	1.455E-01	4.33E-02	G K
		105.31	2.055E-02	&	1.865E-01	5.56E-02	G
HG-203	1.1761E-02	279.17	1.176E-02	% (	4.713E-02	1.40E-02	G K
		72.87	4.044E-01	& P	1.181E+00	3.56E-01	G
		70.83	1.513E-02	%	1.941E+00	5.78E-01	G
		82.50	1.892E-02	&	2.444E+00	7.27E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	2.2835E-01	583.14	2.284E-01	(P	5.563E-02	2.70E-02	G
		510.72	3.240E-01	+ P	1.720E-01	6.40E-02	G
PB-212	4.8901E-01	238.63	4.722E-01	(P	9.686E-02	3.62E-02	G K
		77.11	5.201E-01	@(	3.262E-01	1.03E-01	G
		74.81	5.077E-01	&(P	6.775E-01	2.07E-01	G
PB-214	3.8726E-01	351.99	3.873E-01	(P	1.014E-01	3.92E-02	G K
		295.22	3.871E-01	(P	1.635E-01	5.78E-02	G
		77.11	8.362E-01	+ P	5.348E-01	1.69E-01	G
		241.92	2.742E-02	% P	7.079E-01	2.10E-01	G
BI-212	3.3447E-01	727.17	3.345E-01	(P	3.373E-01	1.11E-01	G K
		1620.56	7.223E-02	%	1.526E+00	3.92E-01	G
		785.42	1.078E+00	% P	1.712E+00	5.37E-01	G
BI-214	4.0588E-01	609.32	4.059E-01	(P	8.601E-02	4.17E-02	G K
		1764.51	5.925E-01	+ P	1.341E-01	1.05E-01	G
		1120.28	7.884E-01	+ P	3.989E-01	1.79E-01	G
RA-224	8.7088E-01	241.00	8.709E-01	&(P	1.091E+00	3.37E-01	G
RA-226	1.0341E+00	185.99	1.034E+00	(	1.099E+00	3.42E-01	G
AC-228	6.9311E-01	911.07	6.975E-01	(P	1.571E-01	8.10E-02	G K
		968.90	1.071E+00	+ P	2.777E-01	1.45E-01	G
		338.40	6.824E-01	*(P	2.886E-01	1.15E-01	G
TH-227	-1.0796E-01	236.00	1.080E-01	&(P	3.680E-01	1.10E-01	G K
		256.25	4.966E-02	% P	4.583E-01	1.34E-01	G
PA-234	-2.8745E-02	98.44	2.874E-02	&(	1.484E-01	4.43E-02	G K
		946.00	0.000E+00	%	3.491E-01	9.91E-02	G
		131.28	1.213E-02	&	1.998E-01	5.94E-02	G
		94.67	7.993E-02	%	2.967E-01	8.92E-02	G
		883.24	6.738E-02	%	3.299E-01	9.41E-02	G
		926.70	6.520E-03	&	3.739E-01	1.02E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak MDA	Comments
		569.26	2.844E-02	%	3.082E-01	8.69E-02 G
TH-234	9.1953E-01	63.29	7.389E-01	%(P	2.020E+00	6.08E-01 G K
		92.80	1.154E+00	(P	1.493E+00	4.58E-01 G
		92.38	1.239E-01	% P	1.707E+00	5.03E-01 G

AM-241 2.1113E-02
 59.54 2.111E-02 %(P 2.713E-01 8.07E-02 G
 (- This peak used in the nuclide activity average.

- * - Peak is too wide, but only one peak in library.
- ! - Peak is part of a multiplet and this area went negative during deconvolution.
- ? - Peak is too narrow.
- @ - Peak is too wide at FW25M, but ok at FWHM.
- % - Peak fails sensitivity test.
- \$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
- + - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
- = - Peak outside analysis energy range.
- & - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
- P - Peakbackground subtraction
- } - Peak is too close to another for the activity to be found directly.

Nuclide Codes:

T - Thermal Neutron Activation
 F - Fast Neutron Activation
 I - Fission Product
 N - Naturally Occurring Isotope
 P - Photon Reaction
 C - Charged Particle Reaction
 M - No MDA Calculation
 R - Coincidence Corrected
 H - Halflife limit exceeded

Peak Codes:

G - Gamma Ray
 X - X-Ray
 P - Positron Decay
 S - Single-Escape
 D - Double-Escape
 K - Key Line
 A - Not in Average
 C - Coincidence Peak

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****						
Nuclide		Time of Count	Time Corrected	Uncertainty	3 Sigma	
		Activity	Activity	Counting	Total	MDA
		pCi/gm	pCi/gm	pCi/gm	pCi/gm	pCi/gm
BE-7	#A	9.5882E-03	9.7613E-03	3.3239E-01	3.3239E-01	3.807E-01
K-40		1.1306E+01	1.1306E+01	1.6223E+00	1.7436E+00	
MN-54	#A	9.4201E-03	9.4490E-03	3.7183E-02	3.7187E-02	4.298E-02
CO-57	#B	1.0594E-02	1.0631E-02	3.7064E-02	3.7068E-02	4.107E-02
CO-60	#B	8.9799E-03	8.9844E-03	4.3625E-02	4.3628E-02	5.170E-02

Sr-85	#A	-8.6163E-03	-8.7442E-03	3.6464E-02	3.6467E-02	4.091E-02
Kr-85	#A	-2.2496E+02	-2.2496E+02	1.0469E+03	1.0470E+03	9.515E+02
Y-88	#B	0.0000E+00	0.0000E+00	3.8532E-02	3.8532E-02	5.014E-02
NB-94	#B	-9.1499E-03	-9.1499E-03	3.9065E-02	3.9068E-02	4.342E-02
Ag-108M	#B	6.4104E-03	6.4105E-03	4.0986E-02	4.0988E-02	4.781E-02
CD-109	#A	6.8321E-03	6.8465E-03	1.1955E+00	1.1955E+00	1.337E+00
SN-113	#B	2.7081E-03	2.7307E-03	4.1564E-02	4.1564E-02	4.799E-02
SB-125	#B	7.6317E-02	7.6390E-02	6.5621E-02	6.5762E-02	1.098E-01
I-131	#B	-4.5071E-03	-5.0757E-03	4.5818E-02	4.5818E-02	4.650E-02
CS-134	#B	1.5078E-02	1.5097E-02	2.7308E-02	2.7322E-02	2.991E-02
CS-137	#A	-5.4355E-03	-5.4359E-03	7.4376E-02	7.4376E-02	5.447E-02
CE-139	#A	4.4969E-03	4.5282E-03	3.9170E-02	3.9171E-02	4.371E-02
EU-152	#B	2.6486E-02	2.6491E-02	1.1215E-01	1.1216E-01	1.250E-01
EU-154	#B	-5.6423E-03	-5.6441E-03	1.1094E-01	1.1094E-01	9.478E-02
EU-155	#B	2.9037E-03	2.9052E-03	1.2977E-01	1.2977E-01	1.455E-01
HG-203	#B	1.1523E-02	1.1761E-02	4.2119E-02	4.2125E-02	4.618E-02
TL-208		2.2835E-01	2.2835E-01	8.0959E-02	8.1981E-02	
PB-212	#	4.8901E-01	4.8901E-01	1.1252E-01	1.1586E-01	9.686E-02
PB-214	#	3.8726E-01	3.8726E-01	1.0478E-01	1.0704E-01	1.014E-01
BI-212	#A	3.3447E-01	3.3447E-01	3.3324E-01	3.3377E-01	3.373E-01
BI-214		4.0588E-01	4.0588E-01	1.2485E-01	1.2693E-01	
RA-224	#A	8.7088E-01	8.7088E-01	1.0105E+00	1.0117E+00	1.091E+00
RA-226	#A	1.0341E+00	1.0341E+00	1.0263E+00	1.0280E+00	1.099E+00
AC-228		6.9311E-01	6.9311E-01	2.1255E-01	2.1613E-01	
TH-227	#B	-1.0796E-01	-1.0796E-01	3.4185E-01	3.4190E-01	3.680E-01
PA-234	#B	-2.8745E-02	-2.8745E-02	1.3302E-01	1.3303E-01	1.484E-01
TH-234	#B	9.1953E-01	9.1953E-01	1.0939E+00	1.0951E+00	2.020E+00
AM-241	#A	2.1113E-02	2.1113E-02	2.4208E-01	2.4208E-01	2.713E-01

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Half-life limit exceeded

----- S U M M A R Y -----
Total Activity (270.6 to 1999.1 keV) 1.2633481E+01 pCi/gm
Total Decayed Activity (270.6 to 1999.1 keV) 1.2633481E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
DAT

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

Sample description
OOL-16-01-008-F-S WET

Spectrum Filename: C:\GammaVision\Spectra\102_25JUL2006_1612.An1

Acquisition information

Start time: 25-Jul-2006 16:12:19
Live time: 2000
Real time: 2016
Dead time: 0.82 %
Detector ID: 3

Detector system

Det 102 - DSPP-468

Calibration

Filename: D2_1LSa.Clb
DET 102 1 Liter Sand Geometry

Energy Calibration

Created: 15-Jan-2005 03:09:29
Zero offset: 0.220 keV
Gain: 0.500 keV/channel
Quadratic: -6.435E-08 keV/channel²

Efficiency Calibration

Created: 15-Jan-2005 06:48:10
Type: Polynomial
Uncertainty: 0.497 %
Coefficients: -0.294180 -5.980622 0.744607
-0.096737 0.005214 -0.000120

Library Files

Main analysis library: FSS_Rev_1.Lib
Library Match Width: 1.000
Peak stripping: Library based

Analysis parameters

Analysis engine: Env32 G53W4.20
Start channel: 100 (50.22keV)
Stop channel: 4000 (1999.02keV)
Peak rejection level: 41.667%
Peak search sensitivity: 3
Sample Size: 2.1500E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 2.1500E+03) =
4.6512E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

Fraction Limit: 0.000%
Background width: average of five points.

Half lives decay limit: 12.000
 Activity range factor: 2.000
 Min. step backg. energy 0.000
 Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	25-Jul-2006 10:00:00
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	102_150K_28APR05.Pbc 01-May-2005 05:27:47
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 10 cutoff 20.00000 %
 Energy Calibration
 Normalized diff: 0.6922

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. pCi/gm	Nuc
77.14	136.	29.24	1.50	9.541E-03	77.11	17.500	5.120E-01	PB212
					77.11	10.700	8.374E-01	PB214
77.14	136.	29.24	1.50	9.541E-03	77.11	17.500	PBC<MDA	PB212
					77.11	10.700	8.374E-01	PB214
93.02	89.	32.08	0.84	1.337E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	1.399E+00	TH234
186.50	98.	28.15	1.06	1.624E-02	185.99	3.280	1.107E+00	RA226
239.09	380.	6.49	1.22	1.379E-02	238.63	43.100	4.012E-01	PB212
241.99	84.	25.16	1.22	1.366E-02	241.00	3.900	PBC<MDA	RA224
					241.92	7.470	5.204E-01	PB214
295.80	96.	19.14	1.57	1.144E-02	295.22	19.200	2.735E-01	PB214
339.21	112.	20.16	1.37	1.004E-02	338.40	12.010	5.821E-01	AC228
352.58	219.	12.03	1.45	9.663E-03	351.99	37.100	3.834E-01	PB214
464.29	28.	36.07	1.18	7.352E-03	463.51	10.000	PBC<MDA	SB125
512.30	88.	18.85	1.24	6.675E-03	510.72	22.500	3.693E-01	TL208
584.08	132.	11.59	1.43	5.881E-03	583.14	86.000	1.633E-01	TL208
610.48	123.	12.96	1.43	5.639E-03	609.32	46.090	2.979E-01	BI214
913.11	75.	16.08	1.66	3.914E-03	911.07	29.000	4.132E-01	AC228
1463.42	443.	4.84	1.98	2.617E-03				

***** U N I D E N T I F I E D P E A K S U M M A R Y *****

Channel	Peak Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma	FWHM %	Suspected Nuclide
185.63	93.02	363.	89.	0.045	96.23	0.845	TH-234 1
477.81	238.91	114.	380.	0.190	19.48	1.215	PB-212 D

Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	Suspected
483.61	241.81	184.	84.	0.042	75.48	1.217	PB-214 D
928.33	464.29	37.	28.	0.014	108.21	1.176	SB-125 l
1826.35	913.11	20.	77.	0.038	42.42	1.665	AC-228 M
2927.75	1463.42	4.	443.	0.222	14.36	1.983	K-40 M

s - Peak fails shape tests.
 D - Peak area deconvoluted.
 L - Peak written from unknown list.
 C - Area < Critical level.
 M - Peak is close to a library peak.

 This section based on library: FSS_Rev_1.Lib

***** I D E N T I F I E D P E A K S U M M A R Y *****

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma	FWHM %
PB-212	153.80	77.11	723.	136.	0.068	87.71	1.500D
PB-214	153.80	77.11	723.	136.	0.068	87.71	1.500D
RA-226	372.55	186.47	357.	84.	0.042	95.44	1.500s
PB-212	477.73	239.05	281.	346.	0.173	26.16	1.500
PB-214	591.15	295.75	144.	109.	0.055	54.72	1.500s
AC-228	677.63	338.98	115.	90.	0.045	59.78	1.500
PB-214	704.73	352.52	66.	203.	0.101	27.00	1.500
TL-208	1023.56	511.89	52.	55.	0.027	69.05	1.499s
TL-208	1168.38	584.27	27.	121.	0.060	32.73	1.499
BI-214	1220.81	610.48	46.	123.	0.062	38.87	1.428

s - Peak fails shape tests.
 D - Peak area deconvoluted.
 A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide -	Average	Energy	Activity	Code	MDA Value	COMMENTS
Name	Code	Activity	Activity	Code	MDA Value	COMMENTS
		pCi/gm	pCi/gm		pCi/gm	
BE-7		-3.8366E-03				
			477.56-3.837E-03	&(	2.742E-01	7.64E-02 G
K-40		-3.3870E-03				
			1460.75-3.387E-03	%(P	8.079E-01	2.26E-01 G
MN-54		-4.7680E-03				
			834.81-4.768E-03	&(P	4.345E-02	1.22E-02 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CO-57	7.2579E-03	122.07	7.258E-03	% (	4.243E-02	1.26E-02	G K
		136.43	2.734E-02	&	3.480E-01	1.03E-01	G
CO-60	7.0249E-03	1332.51	7.025E-03	% (P	4.549E-02	1.26E-02	G K
		1173.23	6.323E-03	&	5.923E-02	1.67E-02	G K
Sr-85	9.6862E-03	514.00	9.686E-03	& (	4.241E-02	1.25E-02	G
Kr-85	2.2311E+02	513.99	2.231E+02	& (	9.763E+02	2.87E+02	G
Y-88	-1.9357E-05	1836.01	1.936E-05	% (P	2.174E-02	2.95E-03	G K
		898.02	2.246E-03	& P	3.568E-02	9.55E-03	G
NB-94	-6.0791E-03	871.10	6.079E-03	% (	4.405E-02	1.25E-02	G K
		702.50	6.683E-04	%	3.680E-02	1.02E-02	G K
Ag-108M	-6.7052E-03	722.95	6.705E-03	% (	4.504E-02	1.29E-02	G K
		614.37	2.836E-02	% P	5.591E-02	1.70E-02	G
		433.93	2.331E-03	%	2.231E-02	6.21E-03	G
CD-109	-4.8558E-02	88.04	4.856E-02	& (P	1.894E+00	5.64E-01	G
SN-113	1.4681E-02	391.71	1.468E-02	% (	4.511E-02	1.34E-02	G K
		255.04	2.831E-01	%	1.278E+00	3.77E-01	G
SB-125	1.0083E-04	427.95	1.008E-04	% (P	9.029E-02	2.51E-02	G K
		600.77	5.071E-02	& P	2.350E-01	6.86E-02	G
		636.15	2.991E-02	& P	2.949E-01	8.28E-02	G
		463.51	2.150E-01	% P	3.063E-01	9.54E-02	G
		176.29	1.152E-02	& P	5.224E-01	1.53E-01	G
I-131	7.9679E-03	364.48	7.968E-03	% (	3.897E-02	1.14E-02	G K
		636.97	7.411E-03	&	4.120E-01	1.12E-01	G
		284.29	7.264E-02	%	4.996E-01	1.47E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CS-134	8.5585E-03	604.66	8.558E-03	&(	3.653E-02	1.06E-02	G K
		795.76	2.715E-02	%	4.216E-02	1.33E-02	G
		569.29	1.545E-02	&	1.872E-01	5.23E-02	G
		801.84	8.177E-05	% P	4.236E-01	1.15E-01	G
CS-137	0.0000E+00	661.62	0.000E+00	%(	4.948E-02	1.38E-02	G
CE-139	1.3962E-02	165.85	1.396E-02	%(P	3.992E-02	1.20E-02	G
EU-152	2.5164E-02	121.78	2.516E-02	&(P	1.192E-01	3.56E-02	G K
		344.30	1.151E-02	&	1.207E-01	3.51E-02	G
		1408.08	0.000E+00	&	1.609E-01	3.98E-02	G
		964.00-6.440E-02		& P	3.586E-01	1.03E-01	G
		1112.07-2.729E-02		&	3.702E-01	1.03E-01	G
778.90-1.545E-02		% P	3.253E-01	9.07E-02	G		
EU-154	1.6140E-02	123.10	1.614E-02	%(P	9.192E-02	2.74E-02	G K
		1274.80-1.290E-02		%	1.559E-01	4.33E-02	G
		723.30-3.229E-02		% P	2.054E-01	5.85E-02	G
		1004.80-3.033E-02		%	2.502E-01	7.00E-02	G
EU-155	4.1316E-03	86.45	4.132E-03	%(P	1.939E-01	5.75E-02	G K
		105.31	0.000E+00	%	2.140E-01	6.34E-02	G
HG-203	6.2182E-03	279.17	6.218E-03	&(P	3.822E-02	1.12E-02	G K
		72.87-2.531E-01		%	1.640E+00	4.91E-01	G
		70.83-1.218E-01		&	3.137E+00	9.34E-01	G
		82.50-5.645E-03		%	3.145E+00	9.34E-01	G
TL-208	1.4960E-01	583.14	1.496E-01	(P	3.341E-02	1.64E-02	G
		510.72	2.292E-01	&	1.521E-01	5.27E-02	G
PB-212	3.6505E-01	238.63	3.650E-01	(	8.540E-02	3.18E-02	G K
							Energy duplication
		77.11	5.120E-01	+	4.817E-01	1.50E-01	G
						74.81 6.079E-01 % P 9.843E-01 3.00E-01 G	

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PB-214	3.4011E-01	351.99	3.546E-01	(P	7.088E-02	3.20E-02	G K
		295.22	3.121E-01	(	1.675E-01	5.69E-02	G
		77.11	8.374E-01	+	7.879E-01	2.45E-01	G
		241.92	3.602E-01	&	5.371E-01	1.65E-01	G
BI-212	-1.8260E-02	727.17	1.826E-02	%(	2.765E-01	7.61E-02	G K
		1620.56	3.199E-02	% P	7.027E-01	9.53E-02	G
		785.42	2.681E-01	& P	2.417E+00	6.89E-01	G
BI-214	2.9788E-01	609.32	2.979E-01	(	8.250E-02	3.87E-02	G K
		1764.51	9.912E-04	% P	3.514E-01	9.20E-02	G
		1120.28	7.218E-03	&	3.700E-01	1.02E-01	G
RA-224	7.0449E-01	241.00	7.045E-01	&(P	9.834E-01	3.03E-01	G
RA-226	9.9096E-01	185.99	9.910E-01	@(P	1.070E+00	3.32E-01	G
AC-228	1.2948E-01	911.07	1.020E-02	%(P	1.677E-01	4.67E-02	G K
		968.90	7.058E-03	% P	3.345E-01	9.39E-02	G
		338.40	4.668E-01	(	2.740E-01	9.30E-02	G
TH-227	-1.0708E-01	236.00	1.071E-01	%(P	3.714E-01	1.11E-01	G K
		256.25	2.626E-02	&	4.487E-01	1.31E-01	G
PA-234	6.0058E-02	98.44	6.006E-02	%(	1.961E-01	5.90E-02	G K
		946.00	4.904E-02	&	2.101E-01	6.04E-02	G
		131.28	1.811E-03	&	1.784E-01	5.27E-02	G
		94.67	1.044E-02	%	3.494E-01	1.04E-01	G
		883.24	2.817E-02	%	3.265E-01	9.04E-02	G
		926.70	8.120E-02	%	4.438E-01	1.27E-01	G
		569.26	1.349E-02	&	2.832E-01	7.86E-02	G
TH-234	1.2396E+00	63.29	1.240E+00	%(P	3.688E+00	1.11E+00	G K
		92.80	1.405E+00	%	1.915E+00	5.87E-01	G
		92.38	1.641E+00	% P	2.268E+00	6.95E-01	G

Nuclide Ave activity Energy Activity Code Peak MDA Comments
 AM-241 -8.1687E-02 59.54-8.169E-02 &(5.130E-01 1.53E-01 G
 (- This peak used in the nuclide activity average.

- * - Peak is too wide, but only one peak in library.
- ! - Peak is part of a multiplet and this area went negative during deconvolution.
- ? - Peak is too narrow.
- @ - Peak is too wide at FW25M, but ok at FWHM.
- % - Peak fails sensitivity test.
- \$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
- + - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
- = - Peak outside analysis energy range.
- & - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
- P - Peakbackground subtraction
- } - Peak is too close to another for the activity to be found directly.

Nuclide Codes:

T - Thermal Neutron Activation
 F - Fast Neutron Activation
 I - Fission Product
 N - Naturally Occurring Isotope
 P - Photon Reaction
 C - Charged Particle Reaction
 M - No MDA Calculation
 R - Coincidence Corrected
 H - Half-life limit exceeded

Peak Codes:

G - Gamma Ray
 X - X-Ray
 P - Positron Decay
 S - Single-Escape
 D - Double-Escape
 K - Key Line
 A - Not in Average
 C - Coincidence Peak

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count	Time Corrected	Uncertainty	3 Sigma	MDA
		Activity	Activity	Counting	Total	pCi/gm
		pCi/gm	pCi/gm	pCi/gm	pCi/gm	
BE-7	#A	-3.8237E-03	-3.8366E-03	2.2914E-01	2.2914E-01	2.733E-01
K-40	#A	-3.3870E-03	-3.3870E-03	2.0527E-01	2.0527E-01	8.079E-01
MN-54	#A	-4.7652E-03	-4.7680E-03	4.1811E-02	4.1812E-02	4.343E-02
CO-57	#B	7.2530E-03	7.2579E-03	3.7928E-02	3.7930E-02	4.240E-02
CO-60	#B	7.0242E-03	7.0249E-03	3.7798E-02	3.7800E-02	4.549E-02
Sr-85	#A	9.6595E-03	9.6862E-03	3.7385E-02	3.7389E-02	4.229E-02
Kr-85	#A	2.2311E+02	2.2311E+02	8.6068E+02	8.6077E+02	9.763E+02
Y-88	#B	-1.9325E-05	-1.9357E-05	1.1614E-04	1.1615E-04	2.170E-02
NB-94	#B	-6.0791E-03	-6.0791E-03	3.7448E-02	3.7450E-02	4.405E-02
Ag-108M	#B	-6.7052E-03	-6.7052E-03	3.8595E-02	3.8597E-02	4.504E-02
CD-109	#A	-4.8539E-02	-4.8558E-02	4.0494E+00	4.0494E+00	1.893E+00

SN-113	#B	1.4658E-02	1.4681E-02	4.0188E-02	4.0196E-02	4.504E-02
SB-125	#B	1.0081E-04	1.0083E-04	7.5225E-02	7.5225E-02	9.028E-02
I-131	#B	7.7923E-03	7.9679E-03	3.4289E-02	3.4292E-02	3.811E-02
CS-134	#B	8.5564E-03	8.5585E-03	3.1868E-02	3.1871E-02	3.653E-02
CS-137	#A	0.0000E+00	0.0000E+00	4.1547E-02	4.1547E-02	4.948E-02
CE-139	#A	1.3944E-02	1.3962E-02	3.6012E-02	3.6020E-02	3.987E-02
EU-152	#B	2.5163E-02	2.5164E-02	1.0670E-01	1.0671E-01	1.192E-01
EU-154	#B	1.6139E-02	1.6140E-02	8.2224E-02	8.2229E-02	9.191E-02
EU-155	#B	4.1312E-03	4.1316E-03	1.7249E-01	1.7249E-01	1.939E-01
HG-203	#B	6.1943E-03	6.2182E-03	3.3748E-02	3.3750E-02	3.808E-02
TL-208	#	1.4960E-01	1.4960E-01	4.9124E-02	4.9836E-02	3.341E-02
PB-212	#	3.6505E-01	3.6505E-01	9.5483E-02	9.7656E-02	8.540E-02
PB-214	#	3.4011E-01	3.4011E-01	9.2006E-02	9.3965E-02	7.088E-02
BI-212	#B	-1.8260E-02	-1.8260E-02	2.2838E-01	2.2838E-01	2.765E-01
BI-214		2.9788E-01	2.9788E-01	1.1579E-01	1.1699E-01	
RA-224	#A	7.0449E-01	7.0449E-01	9.0756E-01	9.0842E-01	9.834E-01
RA-226	#A	9.9096E-01	9.9096E-01	9.9597E-01	9.9752E-01	1.070E+00
AC-228	B	1.2948E-01	1.2948E-01	7.7396E-02	7.7736E-02	1.677E-01
TH-227	#B	-1.0708E-01	-1.0708E-01	3.4115E-01	3.4121E-01	3.714E-01
PA-234	#B	6.0058E-02	6.0058E-02	1.7695E-01	1.7698E-01	1.961E-01
TH-234	#B	1.2396E+00	1.2396E+00	3.3313E+00	3.3321E+00	3.688E+00
AM-241	#A	-8.1687E-02	-8.1687E-02	4.5874E-01	4.5876E-01	5.130E-01

- # - All peaks for activity calculation had bad shape.
- * - Activity omitted from total
- & - Activity omitted from total and all peaks had bad shape.
- < - MDA value printed.
- A - Activity printed, but activity < MDA.
- B - Activity < MDA and failed test.
- C - Area < Critical level.
- F - Failed fraction or key line test.
- H - Halflife limit exceeded

----- S U M M A R Y -----
 Total Activity (295.7 to 1999.0 keV) 4.2735916E-01 pCi/gm
 Total Decayed Activity (295.7 to 1999.0 keV) 4.2735916E-01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
 DAT

Reviewed by: _____
 Supervisor

Laboratory: YAEC Chemistry Lab

Sample description
FSS-OOL-16-01-019-F

Spectrum Filename: C:\GammaVision\Spectra\102F_19JUL2006_1832.An1

Acquisition information

Start time: 19-Jul-2006 18:32:42
Live time: 2000
Real time: 2018
Dead time: 0.91 %
Detector ID: 3

Detector system

Det 102 - DSPP-468

Calibration

Filename: D2_1LSa.Clb
DET 102 1 Liter Sand Geometry

Energy Calibration

Created: 15-Jan-2005 03:09:29
Zero offset: 0.220 keV
Gain: 0.500 keV/channel
Quadratic: -6.435E-08 keV/channel²

Efficiency Calibration

Created: 15-Jan-2005 06:48:10
Type: Polynomial
Uncertainty: 0.497 %
Coefficients: -0.294180 -5.980622 0.744607
-0.096737 0.005214 -0.000120

Library Files

Main analysis library: FSS_Rev_1.Lib
Library Match Width: 1.000
Peak stripping: Library based

Analysis parameters

Analysis engine: Env32 G53W4.20
Start channel: 100 (50.22keV)
Stop channel: 4000 (1999.02keV)
Peak rejection level: 41.667%
Peak search sensitivity: 3
Sample Size: 1.6720E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.6720E+03) =
5.9809E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

Fraction Limit: 0.000%
Background width: average of five points.

Half lives decay limit: 12.000
 Activity range factor: 2.000
 Min. step backg. energy 0.000
 Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	13-Jul-2006 18:40:00
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	102_150K_28APR05.Pbc 01-May-2005 05:27:47
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 14 cutoff 20.00000 %
 Energy Calibration
 Normalized diff: 0.8864

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. pCi/gm	Nuc
77.18	184.	22.86	1.50	9.541E-03	77.11	10.700	1.455E+00	PB214
					77.11	17.500	8.898E-01	PB212
77.18	184.	22.86	1.50	9.541E-03	77.11	10.700	1.455E+00	PB214
					77.11	17.500	8.898E-01	PB212
186.65	88.	36.07	1.09	1.624E-02	185.99	3.280	PBC<MDA	RA226
239.49	699.	6.41	1.17	1.377E-02	236.00	11.200	3.622E+00	TH227
					238.63	43.100	9.499E-01	PB212
295.83	135.	15.39	1.44	1.144E-02	295.22	19.200	4.971E-01	PB214
301.19	56.	35.26	1.30	1.125E-02				
339.25	142.	17.67	1.49	1.004E-02	338.40	12.010	9.486E-01	AC228
352.54	189.	14.93	1.50	9.664E-03	351.99	37.100	4.252E-01	PB214
463.91	43.	27.12	1.50	7.365E-03	463.51	10.000	4.717E-01	SB125
511.97	97.	17.32	1.58	6.679E-03	510.72	22.500	5.226E-01	TL208
584.35	165.	10.43	1.26	5.878E-03	583.14	86.000	2.633E-01	TL208
610.51	142.	13.57	1.52	5.639E-03	609.32	46.090	4.402E-01	BI214
728.04	53.	23.56	0.94	4.789E-03	723.30	19.700	4.466E-01	EU154
					727.17	11.800	7.515E-01	BI212
912.73	115.	14.76	1.48	3.916E-03				
970.70	70.	21.89	1.34	3.712E-03				
1121.97	75.	23.75	1.70	3.279E-03	1120.28	15.040	1.221E+00	BI214
1463.32	501.	4.51	2.13	2.617E-03	1460.75	10.700	1.444E+01	K40

***** U N I D E N T I F I E D P E A K S U M M A R Y *****

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV	Suspected Nuclide
--------------	-----------------	-------------------	-----------------	-------------------	------------------	----------	-------------------

478.61	239.49	896.	157.	0.078	84.52	1.167	PB-212	sM
602.04	301.19	126.	56.	0.028	105.77	1.297	PB-212	M

Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	Suspected
678.18	339.25	230.	59.	0.029	116.57	1.486	AC-228 sM
1825.61	912.73	36.	121.	0.061	34.36	1.484	AC-228 M
1941.61	970.70	48.	73.	0.036	53.83	1.344	AC-228 sM

s - Peak fails shape tests.
 D - Peak area deconvoluted.
 L - Peak written from unknown list.
 C - Area < Critical level.
 M - Peak is close to a library peak.

 This section based on library: FSS_Rev_1.Lib

***** I D E N T I F I E D P E A K S U M M A R Y *****

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma	FWHM %
PB-214	153.80	77.11	791.	184.	0.092	68.57	1.500D
PB-212	153.80	77.11	791.	184.	0.092	68.57	1.500D
RA-226	372.91	186.65	355.	83.	0.042	108.22	1.086s
PB-212	477.89	239.13	372.	480.	0.240	21.86	1.500
PB-214	591.32	295.83	156.	138.	0.069	46.03	1.500s
AC-228	677.57	338.95	138.	103.	0.052	56.50	1.500
PB-214	704.91	352.61	104.	165.	0.082	35.07	1.500s
SB-125	927.56	463.91	52.	43.	0.021	81.35	1.500s
TL-208	1023.71	511.97	65.	97.	0.049	51.97	1.577s
TL-208	1168.54	584.35	46.	165.	0.082	31.29	1.264
BI-214	1220.87	610.51	67.	142.	0.071	40.71	1.519
BI-212	1456.03	728.04	37.	53.	0.026	70.68	0.939s
BI-214	2244.33	1121.97	54.	75.	0.037	71.26	1.697
K-40	2927.67	1463.38	9.	484.	0.242	13.87	2.042

s - Peak fails shape tests.
 D - Peak area deconvoluted.
 A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide Name	- Average Activity pCi/gm	- Peak Energy keV	- Peak Activity pCi/gm	- Code	- MDA Value pCi/gm	- COMMENTS
BE-7	1.0559E-01	477.56	1.056E-01	&(	3.697E-01	1.08E-01 G
K-40	1.3944E+01	1460.75	1.394E+01	(P	4.703E-01	6.45E-01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
MN-54	-3.1295E-03	834.81	3.130E-03	% (P	5.566E-02	1.54E-02	G
CO-57	4.6789E-03	122.07 136.43	4.679E-03 9.470E-02	& (%	6.343E-02 4.849E-01	1.89E-02 1.45E-01	G K G
CO-60	8.2611E-03	1332.51 1173.23	8.261E-03 2.509E-02	& (P %	6.382E-02 7.344E-02	1.77E-02 2.17E-02	G K G K
Sr-85	-1.6523E-02	514.00	1.652E-02	% (	6.591E-02	1.95E-02	G
Kr-85	-3.5773E+02	513.99	3.577E+02	% (	1.427E+03	4.22E+02	G
Y-88	1.3778E-03	1836.01 898.02	1.378E-03 9.181E-03	% (P & P	4.946E-02 6.820E-02	1.20E-02 1.91E-02	G K G
NB-94	-2.3806E-03	871.10 702.50	2.381E-03 3.499E-03	% (%	4.861E-02 4.552E-02	1.33E-02 1.27E-02	G K G K
Ag-108M	-2.0409E-03	722.95 614.37 433.93	2.041E-03 4.240E-02 2.346E-03	% (% P %	8.349E-02 8.178E-02 5.099E-02	2.39E-02 2.49E-02 1.46E-02	G K G G
CD-109	-6.2990E-02	88.04	6.299E-02	& (P	2.461E+00	7.32E-01	G
SN-113	1.5753E-02	391.71 255.04	1.575E-02 5.231E-01	% (%	7.014E-02 1.623E+00	2.06E-02 4.84E-01	G K G
SB-125	7.8385E-02	427.95 600.77 636.15 463.51 176.29	5.448E-02 2.439E-02 5.505E-02 4.717E-01 1.814E-01	% (P & P % P @ (P % P	1.591E-01 2.939E-01 4.330E-01 3.991E-01 7.397E-01	4.71E-02 8.39E-02 1.23E-01 1.33E-01 2.20E-01	G K G G G G
I-131	1.3899E-02	364.48 636.97	1.390E-02 1.128E-01	& (&	8.063E-02 1.097E+00	2.35E-02 3.11E-01	G K G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		284.29	2.167E-01	&	1.029E+00	3.04E-01	G
CS-134	8.5214E-03	604.66	8.521E-03	&(	5.493E-02	1.59E-02	G K
		795.76	3.587E-02	%	7.205E-02	2.19E-02	G
		569.29	2.342E-02	%	2.319E-01	6.48E-02	G
		801.84	1.218E-01	& P	8.017E-01	2.31E-01	G
CS-137	0.0000E+00	661.62	0.000E+00	&(	8.398E-02	2.40E-02	G
CE-139	9.8256E-03	165.85	9.826E-03	%(P	4.580E-02	1.36E-02	G
EU-152	-5.8816E-04	121.78	5.882E-04	&(P	1.855E-01	5.49E-02	G K
		344.30	6.293E-02	%	1.905E-01	5.70E-02	G
		1408.08	6.467E-02	%	2.233E-01	6.38E-02	G
		964.00	5.950E-03	& P	4.726E-01	1.31E-01	G
		1112.07	1.169E-01	%	5.698E-01	1.65E-01	G
		778.90	5.169E-02	& P	4.923E-01	1.40E-01	G
EU-154	7.0785E-04	123.10	7.078E-04	%(P	1.148E-01	3.39E-02	G K
		1274.80	2.272E-02	%	1.991E-01	5.57E-02	G
		723.30	4.995E-02	% P	2.769E-01	7.96E-02	G
		1004.80	1.644E-03	%	2.799E-01	7.46E-02	G
EU-155	-1.0207E-02	86.45	1.021E-02	&(P	2.700E-01	8.01E-02	G K
		105.31	3.732E-02	&	2.748E-01	8.20E-02	G
HG-203	-1.2783E-02	279.17	1.278E-02	&(P	6.122E-02	1.82E-02	G K
		72.87	5.254E-01	%	2.453E+00	7.37E-01	G
		70.83	2.568E-02	&	4.482E+00	1.33E+00	G
		82.50	8.979E-01	%	4.871E+00	1.46E+00	G
TL-208	2.6326E-01	583.14	2.633E-01	(P	5.476E-02	2.76E-02	G
		510.72	5.226E-01	+	2.155E-01	9.07E-02	G
PB-212	6.5217E-01	238.63	6.522E-01	(	1.258E-01	4.75E-02	G K
		77.11	8.898E-01	+	6.475E-01	2.03E-01	G
		74.81	8.908E-01	& P	1.341E+00	4.09E-01	G

Energy duplication

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PB-214	3.7060E-01	351.99	3.706E-01	@(P	1.131E-01	4.34E-02	G K
		295.22	5.072E-01	+	2.234E-01	7.78E-02	G
		77.11	1.455E+00	+	1.059E+00	3.33E-01	G
		241.92	3.528E-01	%	7.794E-01	2.36E-01	G
BI-212	7.5151E-01	727.17	7.515E-01	*(	4.459E-01	1.77E-01	G K
		1620.56	3.016E-02	& P	2.094E+00	5.33E-01	G
		785.42	4.628E-01	% P	3.061E+00	8.78E-01	G
BI-214	4.4016E-01	609.32	4.402E-01	(	1.270E-01	5.98E-02	G K
		1764.51	1.060E-01	% P	5.370E-01	1.52E-01	G
		1120.28	1.221E+00	+	6.069E-01	2.90E-01	G
RA-224	9.2796E-01	241.00	9.280E-01	&(P	1.404E+00	4.30E-01	G
RA-226	1.2594E+00	185.99	1.259E+00	*(P	1.371E+00	4.79E-01	G
AC-228	1.7196E-01	911.07	4.299E-02	%(P	2.277E-01	6.54E-02	G K
		968.90	2.716E-02	% P	4.631E-01	1.32E-01	G
		338.40	6.910E-01	(	3.838E-01	1.30E-01	G
TH-227	-2.6704E-01	236.00	2.670E-01	%(P	5.302E-01	1.61E-01	G K
		256.25	1.085E-01	%	6.340E-01	1.88E-01	G
PA-234	-2.5233E-02	98.44	2.523E-02	&(	2.584E-01	7.69E-02	G K
		946.00	7.360E-02	%	3.043E-01	8.82E-02	G
		131.28	2.388E-02	%	2.588E-01	7.70E-02	G
		94.67	1.213E-01	%	5.281E-01	1.59E-01	G
		883.24	0.000E+00	&	5.254E-01	1.46E-01	G
		926.70	1.008E-01	%	5.239E-01	1.50E-01	G
		569.26	6.965E-02	%	3.442E-01	9.85E-02	G
TH-234	1.6314E-01	63.29	1.631E-01	%(P	5.126E+00	1.52E+00	G K
		92.80	1.722E+00	&	2.695E+00	8.23E-01	G
		92.38	1.742E-01	& P	3.078E+00	9.16E-01	G

Nuclide Ave activity Energy Activity Code Peak MDA Comments
 AM-241 1.5351E-01 59.54 1.535E-01 %(7.153E-01 2.14E-01 G
 (- This peak used in the nuclide activity average.

- * - Peak is too wide, but only one peak in library.
- ! - Peak is part of a multiplet and this area went negative during deconvolution.
- ? - Peak is too narrow.
- @ - Peak is too wide at FW25M, but ok at FWHM.
- % - Peak fails sensitivity test.
- \$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
- + - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
- = - Peak outside analysis energy range.
- & - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
- P - Peakbackground subtraction
- } - Peak is too close to another for the activity to be found directly.

Nuclide Codes:

T - Thermal Neutron Activation
 F - Fast Neutron Activation
 I - Fission Product
 N - Naturally Occurring Isotope
 P - Photon Reaction
 C - Charged Particle Reaction
 M - No MDA Calculation
 R - Coincidence Corrected
 H - Halflife limit exceeded

Peak Codes:

G - Gamma Ray
 X - X-Ray
 P - Positron Decay
 S - Single-Escape
 D - Double-Escape
 K - Key Line
 A - Not in Average
 C - Coincidence Peak

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count	Time Corrected	Uncertainty	3 Sigma	MDA
	Activity	Activity	Counting	Total	
	pCi/gm	pCi/gm	pCi/gm	pCi/gm	pCi/gm
BE-7 #A	9.7683E-02	1.0559E-01	3.2512E-01	3.2517E-01	3.420E-01
K-40	1.3944E+01	1.3944E+01	1.9348E+00	2.0870E+00	4.703E-01
MN-54 #A	-3.0881E-03	-3.1295E-03	6.0308E-02	6.0309E-02	5.492E-02
CO-57 #B	4.6074E-03	4.6789E-03	5.6556E-02	5.6557E-02	6.246E-02
CO-60 #B	8.2433E-03	8.2611E-03	5.3036E-02	5.3038E-02	6.368E-02
Sr-85 #A	-1.5497E-02	-1.6523E-02	5.8469E-02	5.8476E-02	6.182E-02
Kr-85 #A	-3.5771E+02	-3.5773E+02	1.2660E+03	1.2662E+03	1.427E+03
Y-88 #B	1.3251E-03	1.3778E-03	3.5985E-02	3.5985E-02	4.756E-02
NB-94 #B	-2.3806E-03	-2.3806E-03	3.9907E-02	3.9907E-02	4.861E-02
Ag-108M#B	-2.0407E-03	-2.0409E-03	7.1675E-02	7.1675E-02	8.348E-02
CD-109 #A	-6.2415E-02	-6.2990E-02	5.2610E+00	5.2610E+00	2.438E+00

SN-113	#B	1.5195E-02	1.5753E-02	6.1896E-02	6.1902E-02	6.765E-02
SB-125	#B	7.8063E-02	7.8385E-02	6.6072E-02	6.6218E-02	1.585E-01
I-131	#B	8.2893E-03	1.3899E-02	7.0602E-02	7.0606E-02	4.809E-02
CS-134	#B	8.4745E-03	8.5214E-03	4.7596E-02	4.7599E-02	5.463E-02
CS-137	#A	0.0000E+00	0.0000E+00	7.1952E-02	7.1952E-02	8.395E-02
CE-139	#A	9.5331E-03	9.8256E-03	4.0835E-02	4.0839E-02	4.443E-02
EU-152	#B	-5.8764E-04	-5.8816E-04	3.9136E-01	3.9136E-01	1.854E-01
EU-154	#B	7.0690E-04	7.0785E-04	1.0162E-01	1.0162E-01	1.146E-01
EU-155	#B	-1.0184E-02	-1.0207E-02	1.8643E+00	1.8643E+00	2.694E-01
HG-203	#B	-1.1692E-02	-1.2783E-02	5.5175E-02	5.5180E-02	5.600E-02
TL-208		2.6326E-01	2.6326E-01	8.2582E-02	8.3893E-02	
PB-212	#	6.5217E-01	6.5217E-01	1.4258E-01	1.4721E-01	1.258E-01
PB-214	#	3.7060E-01	3.7060E-01	1.3028E-01	1.3193E-01	1.131E-01
BI-212	#	7.5151E-01	7.5151E-01	5.3117E-01	5.3284E-01	
BI-214		4.4016E-01	4.4016E-01	1.7919E-01	1.8089E-01	
RA-224	#A	9.2796E-01	9.2796E-01	1.2903E+00	1.2914E+00	1.404E+00
RA-226	#A	1.2594E+00	1.2594E+00	1.4361E+00	1.4379E+00	
AC-228	B	1.7196E-01	1.7196E-01	9.7156E-02	9.7634E-02	2.277E-01
TH-227	#B	-2.6704E-01	-2.6704E-01	4.8813E-01	4.8836E-01	5.302E-01
PA-234	#B	-2.5233E-02	-2.5233E-02	2.3080E-01	2.3081E-01	2.584E-01
TH-234	#B	1.6314E-01	1.6314E-01	4.5680E+00	4.5680E+00	5.126E+00
AM-241	#A	1.5351E-01	1.5351E-01	6.4236E-01	6.4242E-01	7.153E-01

- # - All peaks for activity calculation had bad shape.
- * - Activity omitted from total
- & - Activity omitted from total and all peaks had bad shape.
- < - MDA value printed.
- A - Activity printed, but activity < MDA.
- B - Activity < MDA and failed test.
- C - Area < Critical level.
- F - Failed fraction or key line test.
- H - Half-life limit exceeded

----- S U M M A R Y -----

Total Activity (50.2 to 1999.0 keV) 1.6830257E+01 pCi/gm
 Total Decayed Activity (50.2 to 1999.0 keV) 1.6830265E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
 DAT

Reviewed by: _____
 Supervisor

Laboratory: YAEC Chemistry Lab

Sample description
FSS-OOL-16-01-002-F

Spectrum Filename: C:\GammaVision\Spectra\102F_26JUL2006_1715.An1

Acquisition information

Start time: 26-Jul-2006 17:15:57
Live time: 2000
Real time: 2015
Dead time: 0.74 %
Detector ID: 3

Detector system

Det 102 - DSPP-468

Calibration

Filename: D2_1LSa.Clb
DET 102 1 Liter Sand Geometry

Energy Calibration

Created: 15-Jan-2005 03:09:29
Zero offset: 0.220 keV
Gain: 0.500 keV/channel
Quadratic: -6.435E-08 keV/channel²

Efficiency Calibration

Created: 15-Jan-2005 06:48:10
Type: Polynomial
Uncertainty: 0.497 %
Coefficients: -0.294180 -5.980622 0.744607
-0.096737 0.005214 -0.000120

Library Files

Main analysis library: FSS_Rev_1.Lib
Library Match Width: 1.000
Peak stripping: Library based

Analysis parameters

Analysis engine: Env32 G53W4.20
Start channel: 100 (50.22keV)
Stop channel: 4000 (1999.02keV)
Peak rejection level: 41.667%
Peak search sensitivity: 3
Sample Size: 1.6890E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.6890E+03) =
5.9207E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

Fraction Limit: 0.000%
Background width: average of five points.

Half lives decay limit: 12.000
 Activity range factor: 2.000
 Min. step backg. energy 0.000
 Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	25-Jul-2006 11:05:00
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	102_150K_28APR05.Pbc 01-May-2005 05:27:47
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 13 cutoff 20.00000 %
 Energy Calibration
 Normalized diff: 0.7168

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. pCi/gm	Nuc
74.91	93.	41.28	1.50	8.847E-03				
74.91	93.	41.28	1.50	8.847E-03	74.81	9.600	PBC<MDA	PB212
77.15	108.	35.61	1.50	9.541E-03	77.11	10.700	PBC<MDA	PB214
					77.11	17.500	5.152E-01	PB212
77.15	108.	35.61	1.50	9.541E-03	77.11	10.700	8.426E-01	PB214
					77.11	17.500	5.152E-01	PB212
186.31	75.	24.86	1.19	1.625E-02	185.99	3.280	PBC<MDA	RA226
209.82	118.	22.87	1.29	1.517E-02				
239.12	468.	5.76	1.22	1.379E-02	238.63	43.100	6.294E-01	PB212
242.06	78.	29.76	1.22	1.365E-02	241.00	3.900	PBC<MDA	RA224
					241.92	7.470	6.082E-01	PB214
295.72	104.	15.20	1.26	1.147E-02	295.22	19.200	3.794E-01	PB214
301.00	36.	37.09	1.26	1.128E-02				
328.91	38.	30.69	1.00	1.034E-02				
339.17	116.	16.01	1.26	1.004E-02	338.40	12.010	7.682E-01	AC228
352.57	200.	11.16	0.95	9.663E-03	351.99	37.100	4.457E-01	PB214
511.76	84.	23.64	0.91	6.682E-03	510.72	22.500	4.451E-01	TL208
584.39	152.	11.80	1.35	5.878E-03	583.14	86.000	2.396E-01	TL208
610.55	135.	12.52	1.38	5.639E-03	609.32	46.090	4.139E-01	BI214
662.24	35.	37.88	1.52	5.225E-03	661.62	84.620	6.329E-02	CS137
770.25	30.	35.59	1.15	4.551E-03				
796.65	40.	19.41	1.44	4.415E-03	795.76	85.400	8.574E-02	CS134
913.00	82.	16.00	1.87	3.915E-03				
966.50	31.	23.15	1.72	3.725E-03				
970.84	70.	13.57	1.72	3.711E-03	968.90	17.460	8.615E-01	AC228
1121.73	34.	41.09	0.84	3.283E-03	1120.28	15.040	5.477E-01	BI214
1463.40	370.	5.26	1.73	2.617E-03	1460.75	10.700	1.056E+01	K40

***** U N I D E N T I F I E D P E A K S U M M A R Y *****

Channel	Peak Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV	Suspected Nuclide
419.26	209.82	220.	118.	0.059	68.61	1.291	NP-239 sM
477.86	239.00	129.	468.	0.234	17.27	1.215	PB-212 D
483.75	241.95	227.	78.	0.039	89.28	1.217	PB-214 D
600.67	300.50	66.	47.	0.023	85.40	1.542	PB-212 sM
657.48	328.91	49.	38.	0.019	92.07	0.999	LA-140 M
1457.42	728.73	38.	50.	0.025	81.18	0.983	J-132 l
1540.49	770.25	28.	30.	0.015	92.74	1.153	AC-228 M
1593.33	796.65	24.	23.	0.011	110.63	1.445	PA-234 sM
1826.14	913.00	26.	85.	0.043	41.21	1.875	AC-228 M
1933.21	966.67	11.	31.	0.016	69.44	1.716	TB-160 D
1941.90	971.01	10.	70.	0.035	40.71	1.719	J-135 D

s - Peak fails shape tests.
 D - Peak area deconvoluted.
 L - Peak written from unknown list.
 C - Area < Critical level.
 M - Peak is close to a library peak.

 This section based on library: FSS_Rev_1.Lib

***** I D E N T I F I E D P E A K S U M M A R Y *****

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV
PB-214	153.80	77.11	679.	108.	0.054	106.83	1.500D
PB-212	153.80	77.11	679.	108.	0.054	106.83	1.500D
RA-226	372.42	186.40	262.	100.	0.050	71.17	1.500
PB-212	477.80	239.09	300.	426.	0.213	22.58	1.500
PB-214	590.09	295.22	127.	110.	0.055	52.21	1.500D
AC-228	677.68	339.00	113.	90.	0.045	59.31	1.500
PB-214	704.85	352.58	90.	179.	0.090	31.60	1.500
TL-208	1023.22	511.72	81.	81.	0.041	72.26	0.907s
TL-208	1168.61	584.39	46.	152.	0.076	35.39	1.347
BI-214	1220.96	610.55	48.	135.	0.067	37.56	1.377s
CS-137	1324.38	662.24	44.	35.	0.018	113.65	1.517
CS-134	1592.59	796.28	15.	21.	0.010	103.67	1.601s
BI-214	2243.86	1121.73	44.	34.	0.017	123.28	0.835s
K-40	2927.80	1463.45	12.	351.	0.175	16.56	2.042

s - Peak fails shape tests.
 D - Peak area deconvoluted.
 A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide -	Average	----- Peak -----						
Name	Code	Activity	Energy	Activity	Code	MDA	Value	COMMENTS
		pCi/gm	keV	pCi/gm		pCi/gm		
BE-7		9.3267E-02	477.56	9.327E-02	&(	3.425E-01	1.00E-01	G
K-40		1.0007E+01	1460.75	1.001E+01	(P	5.419E-01	5.53E-01	G
MN-54		-4.8921E-03	834.81	-4.892E-03	&(P	4.804E-02	1.33E-02	G
CO-57		1.9702E-02	122.07	1.970E-02	% (	5.278E-02	1.59E-02	G K
			136.43	-5.068E-02	%	3.399E-01	1.01E-01	G
CO-60		-2.1974E-04	1332.51	-2.197E-04	&(P	5.457E-02	1.42E-02	G K
			1173.23	-5.716E-04	%	5.720E-02	1.53E-02	G K
Sr-85		-1.0119E-02	514.00	-1.012E-02	&(	6.364E-02	1.86E-02	G
Kr-85		-2.3049E+02	513.99	-2.305E+02	&(	1.450E+03	4.25E+02	G
Y-88		2.0501E-04	1836.01	2.050E-04	% (P	5.285E-02	1.30E-02	G K
			898.02	-1.956E-03	& P	5.862E-02	1.59E-02	G
NB-94		-6.0726E-03	871.10	-6.073E-03	% (	5.221E-02	1.46E-02	G K
			702.50	-1.330E-02	%	5.841E-02	1.70E-02	G K
Ag-108M		0.0000E+00	722.95	0.000E+00	% (	6.330E-02	1.77E-02	G K
			614.37	-6.373E-02	% P	9.037E-02	2.80E-02	G
			433.93	8.020E-03	&	4.768E-02	1.39E-02	G
CD-109		-1.9041E-01	88.04	-1.904E-01	&(P	1.845E+00	5.48E-01	G
SN-113		1.6705E-02	391.71	1.671E-02	% (	5.737E-02	1.70E-02	G K
			255.04	-2.595E-01	&	1.957E+00	5.76E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	-7.0061E-03	427.95	7.006E-03	% (P	1.527E-01	4.34E-02	G K
		600.77	5.249E-02	% P	2.202E-01	6.37E-02	G
		636.15	1.000E-01	% P	3.620E-01	1.05E-01	G
		463.51	1.904E-01	% P	4.041E-01	1.22E-01	G
		176.29	1.394E-02	% P	5.933E-01	1.73E-01	G
I-131	1.1579E-02	364.48	1.158E-02	% (	4.628E-02	1.36E-02	G K
		636.97	1.715E-01	%	5.905E-01	1.72E-01	G
		284.29	1.469E-01	%	7.607E-01	2.25E-01	G
CS-134	2.0364E-02	604.66	2.688E-04	% (	4.746E-02	1.32E-02	G K
		795.76	4.394E-02	@ (	4.437E-02	1.52E-02	G
		569.29	5.074E-02	%	3.009E-01	8.68E-02	G
		801.84	9.142E-02	% P	5.005E-01	1.41E-01	G
CS-137	6.3286E-02	661.62	6.329E-02	(	6.079E-02	2.40E-02	G
CE-139	9.2093E-03	165.85	9.209E-03	% (P	5.262E-02	1.57E-02	G
EU-152	5.5274E-02	121.78	5.527E-02	% (P	1.588E-01	4.78E-02	G K
		344.30	1.488E-02	%	1.281E-01	3.70E-02	G
		1408.08	6.247E-02	%	2.711E-01	7.67E-02	G
		964.00	6.693E-02	& P	4.498E-01	1.28E-01	G
		1112.07	3.685E-02	%	4.737E-01	1.32E-01	G
		778.90	2.352E-03	% P	4.039E-01	1.11E-01	G
EU-154	4.7444E-02	123.10	4.744E-02	% (P	1.022E-01	3.10E-02	G K
		1274.80	4.764E-03	&	1.654E-01	4.43E-02	G
		723.30	2.490E-02	% P	2.414E-01	6.75E-02	G
		1004.80	4.097E-04	&	2.481E-01	6.49E-02	G
EU-155	1.2341E-01	86.45	1.234E-01	% (P	2.496E-01	7.56E-02	G K
		105.31	7.266E-02	&	2.090E-01	6.29E-02	G
HG-203	8.7379E-03	279.17	8.738E-03	& (P	4.668E-02	1.37E-02	G K
		72.87	1.735E-01	&	2.157E+00	6.44E-01	G
		70.83	1.907E-01	%	3.528E+00	1.05E+00	G
		82.50	1.242E+00	%	3.906E+00	1.18E+00	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	2.3960E-01	583.14	2.396E-01	(P	5.437E-02	2.84E-02	G
		510.72	4.302E-01	+ 2.372E-01		1.04E-01	G
PB-212	5.5591E-01	238.63	5.724E-01	(	1.122E-01	4.31E-02	G K
		77.11	5.152E-01	(	5.949E-01	1.83E-01	G
		74.81	8.767E-01	& P	1.221E+00	3.74E-01	G
PB-214	3.9937E-01	351.99	4.000E-01	(P	1.045E-01	4.22E-02	G K
		295.22	3.982E-01	* (	2.008E-01	6.93E-02	G
		77.11	8.426E-01	+	9.730E-01	3.00E-01	G
		241.92	8.350E-03	%	7.009E-01	2.06E-01	G
BI-212	-9.0215E-02	727.17-9.021E-02		& (	4.458E-01	1.29E-01	G K
		1620.56	2.857E-01	% P	1.524E+00	4.02E-01	G
		785.42-5.989E-03		% P	2.219E+00	6.00E-01	G
BI-214	4.4682E-01	609.32	4.139E-01	@ (	1.078E-01	5.19E-02	G K
		1764.51-1.957E-03		% P	3.787E-01	9.59E-02	G
		1120.28	5.477E-01	(	5.459E-01	2.25E-01	G
RA-224	-9.4591E-02	241.00-9.459E-02		% (P	1.346E+00	3.97E-01	G
RA-226	1.5068E+00	185.99	1.507E+00	(P	1.171E+00	3.73E-01	G
AC-228	1.4360E-01	911.07-4.324E-02		% (P	2.660E-01	7.67E-02	G K
		968.90-5.371E-04		% P	9.084E-02	1.23E-02	G
		338.40	5.948E-01	(	3.456E-01	1.18E-01	G
TH-227	3.9968E-03	236.00	3.997E-03	% (P	5.819E-01	1.72E-01	G K
		256.25	0.000E+00	%	5.765E-01	1.68E-01	G
PA-234	-6.5101E-02	98.44-6.510E-02		% (	2.483E-01	7.45E-02	G K
		946.00-1.691E-03		&	2.842E-01	7.77E-02	G
		131.28	1.118E-01	&	2.007E-01	6.12E-02	G
		94.67	3.435E-03	%	4.295E-01	1.27E-01	G
		883.24	9.683E-02	%	3.686E-01	1.06E-01	G
		926.70	5.366E-02	&	3.695E-01	1.02E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak MDA	Comments
		569.26	7.520E-02	%	4.459E-01	1.29E-01 G
TH-234	1.6405E+00					
		63.29	1.641E+00	%(P	4.752E+00	1.43E+00 G K
		92.80	6.959E-01	%	2.400E+00	7.22E-01 G
		92.38	5.872E-02	% P	2.695E+00	7.99E-01 G
AM-241	9.4597E-04					
		59.54	9.460E-04	%(	7.350E-01	2.18E-01 G

(- This peak used in the nuclide activity average.

- * - Peak is too wide, but only one peak in library.
- ! - Peak is part of a multiplet and this area went negative during deconvolution.
- ? - Peak is too narrow.
- @ - Peak is too wide at FW25M, but ok at FWHM.
- % - Peak fails sensitivity test.
- \$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
- + - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
- = - Peak outside analysis energy range.
- & - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
- P - Peakbackground subtraction
- } - Peak is too close to another for the activity to be found directly.

Nuclide Codes:

T - Thermal Neutron Activation
 F - Fast Neutron Activation
 I - Fission Product
 N - Naturally Occurring Isotope
 P - Photon Reaction
 C - Charged Particle Reaction
 M - No MDA Calculation
 R - Coincidence Corrected
 H - Half-life limit exceeded

Peak Codes:

G - Gamma Ray
 X - X-Ray
 P - Positron Decay
 S - Single-Escape
 D - Double-Escape
 K - Key Line
 A - Not in Average
 C - Coincidence Peak

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****						
Nuclide		Time of Count	Time Corrected	Uncertainty	3 Sigma	
		Activity	Activity	Counting	Total	MDA
		pCi/gm	pCi/gm	pCi/gm	pCi/gm	pCi/gm
BE-7	#A	9.1757E-02	9.3267E-02	3.0044E-01	3.0048E-01	3.370E-01
K-40		1.0007E+01	1.0007E+01	1.6575E+00	1.7501E+00	5.419E-01
MN-54	#A	-4.8785E-03	-4.8921E-03	4.7041E-02	4.7042E-02	4.791E-02
CO-57	#B	1.9638E-02	1.9702E-02	4.7722E-02	4.7734E-02	5.261E-02
CO-60	#B	-2.1964E-04	-2.1974E-04	6.6239E-03	6.6239E-03	5.455E-02

Sr-85	#A	-9.9839E-03	-1.0119E-02	5.5920E-02	5.5923E-02	6.279E-02
Kr-85	#A	-2.3048E+02	-2.3049E+02	1.2737E+03	1.2738E+03	1.450E+03
Y-88	#B	2.0334E-04	2.0501E-04	3.8869E-02	3.8869E-02	5.242E-02
NB-94	#B	-6.0726E-03	-6.0726E-03	4.3930E-02	4.3932E-02	5.221E-02
Ag-108M	#B	0.0000E+00	0.0000E+00	5.3104E-02	5.3104E-02	6.330E-02
CD-109	#A	-1.9005E-01	-1.9041E-01	2.1495E+00	2.1495E+00	1.841E+00
SN-113	#B	1.6579E-02	1.6705E-02	5.0851E-02	5.0859E-02	5.694E-02
SB-125	#B	-7.0001E-03	-7.0061E-03	3.7517E-01	3.7517E-01	1.526E-01
I-131	#B	1.0390E-02	1.1579E-02	4.0769E-02	4.0774E-02	4.153E-02
CS-134	#B	2.0340E-02	2.0364E-02	2.1111E-02	2.1142E-02	4.740E-02
CS-137		6.3281E-02	6.3286E-02	7.1924E-02	7.2012E-02	
CE-139	#A	9.1511E-03	9.2093E-03	4.6960E-02	4.6963E-02	5.229E-02
EU-152	#B	5.5264E-02	5.5274E-02	1.4333E-01	1.4337E-01	1.588E-01
EU-154	#B	4.7431E-02	4.7444E-02	9.2902E-02	9.2940E-02	1.022E-01
EU-155	#B	1.2335E-01	1.2341E-01	2.2692E-01	2.2703E-01	2.495E-01
HG-203	#B	8.5760E-03	8.7379E-03	4.1243E-02	4.1246E-02	4.581E-02
TL-208		2.3960E-01	2.3960E-01	8.5022E-02	8.6078E-02	
PB-212	#	5.5591E-01	5.5591E-01	1.2550E-01	1.2932E-01	1.122E-01
PB-214	#	3.9937E-01	3.9937E-01	1.2194E-01	1.2398E-01	1.045E-01
BI-212	#B	-9.0215E-02	-9.0215E-02	3.8616E-01	3.8619E-01	4.458E-01
BI-214		4.4682E-01	4.4682E-01	1.6783E-01	1.6969E-01	
RA-224	#A	-9.4591E-02	-9.4591E-02	1.7265E+00	1.7265E+00	1.346E+00
RA-226	#	1.5068E+00	1.5068E+00	1.1199E+00	1.1231E+00	1.171E+00
AC-228	B	1.4360E-01	1.4360E-01	8.5177E-02	8.5557E-02	2.660E-01
TH-227	#B	3.9968E-03	3.9968E-03	5.1725E-01	5.1725E-01	5.819E-01
PA-234	#B	-6.5101E-02	-6.5101E-02	2.2353E-01	2.2356E-01	2.483E-01
TH-234	#B	1.6405E+00	1.6405E+00	4.2951E+00	4.2961E+00	4.752E+00
AM-241	#A	9.4596E-04	9.4597E-04	6.5350E-01	6.5350E-01	7.350E-01

- # - All peaks for activity calculation had bad shape.
- * - Activity omitted from total
- & - Activity omitted from total and all peaks had bad shape.
- < - MDA value printed.
- A - Activity printed, but activity < MDA.
- B - Activity < MDA and failed test.
- C - Area < Critical level.
- F - Failed fraction or key line test.
- H - Half-life limit exceeded

S U M M A R Y

 Total Activity (1119.8 to 1999.0 keV) 1.0900136E+01 pCi/gm
 Total Decayed Activity (1119.8 to 1999.0 keV) 1.0900142E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
 DAT

Reviewed by: _____
 Supervisor

Laboratory: YAEC Chemistry Lab

Sample description
FSS-OOL-16-01-008-F

Spectrum Filename: C:\GammaVision\Spectra\102F_26JUL2006_1753.An1

Acquisition information

Start time: 26-Jul-2006 17:53:11
Live time: 2000
Real time: 2015
Dead time: 0.77 %
Detector ID: 3

Detector system

Det 102 - DSPP-468

Calibration

Filename: D2_1LSa.Clb
DET 102 1 Liter Sand Geometry

Energy Calibration

Created: 15-Jan-2005 03:09:29
Zero offset: 0.220 keV
Gain: 0.500 keV/channel
Quadratic: -6.435E-08 keV/channel²

Efficiency Calibration

Created: 15-Jan-2005 06:48:10
Type: Polynomial
Uncertainty: 0.497 %
Coefficients: -0.294180 -5.980622 0.744607
-0.096737 0.005214 -0.000120

Library Files

Main analysis library: FSS_Rev_1.Lib
Library Match Width: 1.000
Peak stripping: Library based

Analysis parameters

Analysis engine: Env32 G53W4.20
Start channel: 100 (50.22keV)
Stop channel: 4000 (1999.02keV)
Peak rejection level: 41.667%
Peak search sensitivity: 3
Sample Size: 2.0630E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 2.0630E+03) =
4.8473E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

Fraction Limit: 0.000%
Background width: average of five points.

Half lives decay limit: 12.000
 Activity range factor: 2.000
 Min. step backg. energy 0.000
 Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	25-Jul-2006 10:00:00
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	102_150K_28APR05.Pbc 01-May-2005 05:27:47
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 13 cutoff 20.00000 %
 Energy Calibration
 Normalized diff: 0.7638

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. pCi/gm	Nuc
75.18	108.	35.86	1.50	8.847E-03	74.81	9.600	PBC<MDA	PB212
76.07	320.	13.71	0.84	9.233E-03				
77.11	148.	26.74	1.50	9.541E-03				
77.11	148.	26.74	1.50	9.541E-03	77.11	10.700	9.504E-01	PB214
					77.11	17.500	5.811E-01	PB212
77.11	148.	26.74	1.50	9.541E-03				
77.11	148.	26.74	1.50	9.541E-03	77.11	10.700	9.504E-01	PB214
					77.11	17.500	5.811E-01	PB212
93.20	93.	41.65	1.50	1.333E-02	92.80	3.000	PBC<MDA	TH234
186.11	102.	33.79	1.03	1.626E-02	185.99	3.280	1.191E+00	RA226
209.46	68.	33.04	1.03	1.518E-02				
239.11	440.	5.94	1.22	1.378E-02	238.63	43.100	4.847E-01	PB212
242.01	94.	25.31	1.22	1.365E-02	241.00	3.900	PBC<MDA	RA224
					241.92	7.470	6.027E-01	PB214
295.50	130.	14.80	1.44	1.146E-02	295.22	19.200	3.868E-01	PB214
339.22	84.	21.66	1.08	1.004E-02	338.40	12.010	4.527E-01	AC228
352.68	220.	11.56	1.30	9.660E-03	351.99	37.100	4.015E-01	PB214
464.02	32.	31.47	1.50	7.365E-03	463.51	10.000	PBC<MDA	SB125
512.00	84.	21.09	2.52	6.695E-03	510.72	22.500	3.644E-01	TL208
					513.99	0.004	1.919E+03	Kr85
584.34	138.	13.32	1.26	5.878E-03	583.14	86.000	1.779E-01	TL208
610.69	130.	11.36	1.67	5.637E-03	609.32	46.090	3.263E-01	BI214
912.75	104.	15.71	1.51	3.916E-03				
970.65	99.	17.75	0.71	3.712E-03				
1121.80	48.	36.57	1.87	3.283E-03	1120.28	15.040	6.315E-01	BI214
1463.43	418.	4.95	2.08	2.617E-03	1460.75	10.700	9.765E+00	K40

***** U N I D E N T I F I E D P E A K S U M M A R Y *****									
Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV	Suspected Nuclide		
151.72	76.07	593.	320.	0.160	41.13	0.837	PB-214 l		
418.53	209.46	182.	68.	0.034	99.12	1.029	AC-228 sM		
477.84	239.07	122.	440.	0.220	17.82	1.215	PB-212 D		
483.65	241.97	235.	94.	0.047	75.93	1.217	PB-214 D		
1457.42	728.73	37.	44.	0.022	87.35	1.171	J-132 l		
1825.65	912.75	27.	115.	0.058	33.82	1.514	AC-228 M		
1941.51	970.65	41.	101.	0.050	40.32	0.709	- sM		

s - Peak fails shape tests.
 D - Peak area deconvoluted.
 L - Peak written from unknown list.
 C - Area < Critical level.
 M - Peak is close to a library peak.

 This section based on library: FSS_Rev_1.Lib

***** I D E N T I F I E D P E A K S U M M A R Y *****								
Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV	
PB-212	149.93	75.18	744.	108.	0.054	107.59	1.500s	
PB-214	153.80	77.11	711.	148.	0.074	80.23	1.500D	
PB-212	153.80	77.11	711.	148.	0.074	80.23	1.500D	
TH-234	185.97	93.20	702.	93.	0.046	124.96	1.500s	
RA-226	372.40	186.39	358.	76.	0.038	104.28	1.500s	
PB-212	477.78	239.08	348.	407.	0.203	24.51	1.500	
PB-214	591.13	295.74	116.	119.	0.060	47.18	1.500	
AC-228	677.85	339.09	113.	95.	0.048	56.50	1.500	
PB-214	705.03	352.67	91.	202.	0.101	28.97	1.500	
SB-125	927.80	464.02	42.	32.	0.016	94.42	1.500s	
TL-208	1023.77	512.00	67.	84.	0.042	63.26	2.516s	
TL-208	1168.52	584.34	54.	138.	0.069	39.96	1.263	
BI-214	1221.23	610.69	32.	130.	0.065	34.07	1.665s	
BI-214	2244.00	1121.80	59.	48.	0.024	109.71	1.875	
K-40	2927.89	1463.49	6.	394.	0.197	15.34	2.042	

s - Peak fails shape tests.
 D - Peak area deconvoluted.
 A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****							
- Nuclide -	Average	----- Peak -----					
Name	Code	Activity	Energy	Activity	Code	MDA Value	COMMENTS
		pCi/gm	keV	pCi/gm		pCi/gm	
BE-7		5.2385E-02	477.56	5.238E-02	% (	2.934E-01 8.44E-02	G
K-40		9.1943E+00	1460.75	9.194E+00	(P	3.262E-01 4.70E-01	G
MN-54		-2.1014E-03	834.81	-2.101E-03	&(P	5.203E-02 1.46E-02	G
CO-57		-2.5141E-03	122.07	-2.514E-03	% (	4.657E-02 1.38E-02	G K
			136.43	-1.420E-02	%	3.872E-01 1.15E-01	G
CO-60		9.7604E-03	1332.51	9.760E-03	% (P	4.150E-02 1.17E-02	G K
			1173.23	-6.627E-04	%	5.700E-02 1.56E-02	G K
Sr-85		-7.6005E-03	514.00	-7.601E-03	% (	4.329E-02 1.26E-02	G
Kr-85		-6.8653E+01	513.99	-6.865E+01	% (	1.104E+03 3.19E+02	G
Y-88		-2.0315E-05	1836.01	-2.031E-05	% (P	2.281E-02 3.10E-03	G K
			898.02	9.389E-03	% P	4.336E-02 1.23E-02	G
NB-94		3.8955E-03	871.10	3.895E-03	% (	4.470E-02 1.25E-02	G K
			702.50	1.320E-03	%	4.177E-02 1.17E-02	G K
Ag-108M		2.2840E-03	722.95	2.284E-03	&(	4.559E-02 1.27E-02	G K
			614.37	2.147E-03	% P	6.183E-02 1.78E-02	G
			433.93	1.078E-03	%	2.875E-02 8.03E-03	G
CD-109		6.8682E-01	88.04	6.868E-01	% (P	1.826E+00 5.51E-01	G
SN-113		2.2071E-02	391.71	2.207E-02	% (	4.838E-02 1.46E-02	G K
			255.04	-3.800E-01	&	1.714E+00 5.09E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	8.5340E-02	427.95	1.650E-02	&(P	1.058E-01	3.05E-02	G K
		600.77	8.299E-02	% P	2.013E-01	6.04E-02	G
		636.15-4.125E-02		& P	3.382E-01	9.60E-02	G
		463.51	2.891E-01	@(P	2.925E-01	9.53E-02	G
		176.29-8.749E-02		% P	5.761E-01	1.70E-01	G
I-131	5.0747E-03	364.48	5.075E-03	&(	4.162E-02	1.20E-02	G K
		636.97-7.794E-02		&	5.706E-01	1.62E-01	G
		284.29-6.439E-02		&	6.266E-01	1.84E-01	G
CS-134	-6.6840E-03	604.66-6.684E-03		% (	3.862E-02	1.11E-02	G K
		795.76	6.387E-03	%	4.499E-02	1.27E-02	G
		569.29-3.459E-03		%	2.299E-01	6.42E-02	G
		801.84	7.494E-02	% P	3.894E-01	1.10E-01	G
CS-137	5.0110E-03	661.62	5.011E-03	&(	4.256E-02	1.20E-02	G
CE-139	1.1489E-03	165.85	1.149E-03	&(P	4.503E-02	1.33E-02	G
EU-152	-5.3905E-04	121.78-5.391E-04		% (P	1.351E-01	3.99E-02	G K
		344.30	4.655E-04	%	1.090E-01	3.11E-02	G
		1408.08-3.862E-02		&	2.230E-01	6.19E-02	G
		964.00	2.020E-01	% P	2.834E-01	9.05E-02	G
		1112.07-1.617E-03		&	4.672E-01	1.30E-01	G
		778.90-1.891E-02		% P	3.209E-01	8.92E-02	G
EU-154	-7.5210E-03	123.10-7.521E-03		% (P	9.463E-02	2.80E-02	G K
		1274.80-3.459E-02		&	1.843E-01	5.29E-02	G
		723.30	2.474E-02	& P	2.226E-01	6.32E-02	G
		1004.80	6.910E-02	%	2.425E-01	7.04E-02	G
EU-155	9.0669E-02	86.45	9.067E-02	% (P	2.150E-01	6.50E-02	G K
		105.31	3.740E-02	%	1.866E-01	5.57E-02	G
HG-203	-2.2888E-03	279.17-2.289E-03		&(P	3.491E-02	1.01E-02	G K
		72.87-1.350E-02		%	1.983E+00	5.92E-01	G
		70.83	1.666E+00	&	2.348E+00	7.21E-01	G
		82.50-1.452E-02		%	3.172E+00	9.41E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	1.7793E-01	583.14	1.779E-01	(P	4.795E-02	2.38E-02	G
		510.72	3.644E-01	+ 1.779E-01		7.70E-02	G
PB-212	4.4756E-01	238.63	4.476E-01	(	9.871E-02	3.66E-02	G K
		77.11	5.811E-01	+ 4.980E-01		1.55E-01	G
		74.81	8.348E-01	& P 1.001E+00		3.08E-01	G
PB-214	3.6415E-01	351.99	3.692E-01	(P	8.592E-02	3.57E-02	G K
		295.22	3.544E-01	(	1.573E-01	5.57E-02	G
		77.11	9.504E-01	+ 8.144E-01		2.54E-01	G
		241.92	3.074E-01	% 6.295E-01		1.91E-01	G
BI-212	6.8398E-02	727.17	6.840E-02	&(	2.568E-01	7.40E-02	G K
		1620.56	3.334E-02	% P 2.176E+00		5.73E-01	G
		785.42	1.760E-01	% P 2.279E+00		6.41E-01	G
BI-214	3.2629E-01	609.32	3.263E-01	*(	7.345E-02	3.71E-02	G K
		1764.51	9.426E-02	% P 4.373E-01		1.24E-01	G
		1120.28	6.315E-01	+ 5.124E-01		2.31E-01	G
RA-224	1.4640E-01	241.00	1.464E-01	&(P	1.218E+00	3.62E-01	G
RA-226	9.3683E-01	185.99	9.368E-01	*(P	1.116E+00	3.45E-01	G
AC-228	1.0277E-01	911.07	6.832E-02	%(P	1.922E-01	5.70E-02	G K
		968.90	1.674E-02	% P 3.756E-01		1.06E-01	G
		338.40	5.159E-01	(	2.833E-01	9.72E-02	G
TH-227	-1.1982E-03	236.00	1.198E-03	%(P	4.843E-01	1.43E-01	G K
		256.25	1.168E-01	%	5.030E-01	1.49E-01	G
PA-234	-3.5387E-02	98.44	3.539E-02	&(	1.868E-01	5.58E-02	G K
		946.00	3.571E-02	%	2.574E-01	7.31E-02	G
		131.28	1.404E-03	&	1.808E-01	5.33E-02	G
		94.67	6.662E-02	%	4.009E-01	1.20E-01	G
		883.24	2.000E-01	%	3.657E-01	1.13E-01	G
		926.70	5.734E-02	%	4.093E-01	1.15E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak MDA	Comments
		569.26	2.327E-02	%	3.337E-01	9.40E-02 G
TH-234	1.8974E-01					
		63.29	8.347E-01	%(P	3.786E+00	1.13E+00 G K
		92.80	1.521E+00	@(	2.067E+00	6.34E-01 G
		92.38	6.670E-01	& P	2.139E+00	6.42E-01 G

AM-241 4.7719E-02
 59.54 4.772E-02 %(5.622E-01 1.67E-01 G
 (- This peak used in the nuclide activity average.

- * - Peak is too wide, but only one peak in library.
- ! - Peak is part of a multiplet and this area went negative during deconvolution.
- ? - Peak is too narrow.
- @ - Peak is too wide at FW25M, but ok at FWHM.
- % - Peak fails sensitivity test.
- \$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
- + - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
- = - Peak outside analysis energy range.
- & - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
- P - Peakbackground subtraction
- } - Peak is too close to another for the activity to be found directly.

Nuclide Codes:

T - Thermal Neutron Activation
 F - Fast Neutron Activation
 I - Fission Product
 N - Naturally Occurring Isotope
 P - Photon Reaction
 C - Charged Particle Reaction
 M - No MDA Calculation
 R - Coincidence Corrected
 H - Halflife limit exceeded

Peak Codes:

G - Gamma Ray
 X - X-Ray
 P - Positron Decay
 S - Single-Escape
 D - Double-Escape
 K - Key Line
 A - Not in Average
 C - Coincidence Peak

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****						
Nuclide		Time of Count	Time Corrected	Uncertainty	3 Sigma	
		Activity	Activity	Counting	Total	MDA
		pCi/gm	pCi/gm	pCi/gm	pCi/gm	pCi/gm
BE-7	#A	5.1489E-02	5.2385E-02	2.5332E-01	2.5334E-01	2.883E-01
K-40		9.1943E+00	9.1943E+00	1.4105E+00	1.5019E+00	3.262E-01
MN-54	#A	-2.0952E-03	-2.1014E-03	6.0069E-02	6.0069E-02	5.188E-02
CO-57	#B	-2.5056E-03	-2.5141E-03	4.1395E-02	4.1395E-02	4.641E-02
CO-60	#B	9.7557E-03	9.7604E-03	3.5050E-02	3.5054E-02	4.148E-02

Sample description
FSS-OOL-16-01-020-F

Spectrum Filename: C:\GammaVision\Spectra\102F_26JUL2006_1830.An1

Acquisition information

Start time: 26-Jul-2006 18:30:20
Live time: 2000
Real time: 2021
Dead time: 1.03 %
Detector ID: 3

Detector system

Det 102 - DSPP-468

Calibration

Filename: D2_1LSa.Clb
DET 102 1 Liter Sand Geometry

Energy Calibration

Created: 15-Jan-2005 03:09:29
Zero offset: 0.220 keV
Gain: 0.500 keV/channel
Quadratic: -6.435E-08 keV/channel²

Efficiency Calibration

Created: 15-Jan-2005 06:48:10
Type: Polynomial
Uncertainty: 0.497 %
Coefficients: -0.294180 -5.980622 0.744607
-0.096737 0.005214 -0.000120

Library Files

Main analysis library: FSS_Rev_1.Lib
Library Match Width: 1.000
Peak stripping: Library based

Analysis parameters

Analysis engine: Env32 G53W4.20
Start channel: 100 (50.22keV)
Stop channel: 4000 (1999.02keV)
Peak rejection level: 41.667%
Peak search sensitivity: 3
Sample Size: 2.0360E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 2.0360E+03) =
4.9116E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

Fraction Limit: 0.000%
Background width: average of five points.

Half lives decay limit: 12.000
 Activity range factor: 2.000
 Min. step backg. energy 0.000
 Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	25-Jul-2006 11:10:00
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	102_150K_28APR05.Pbc 01-May-2005 05:27:47
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 13 cutoff 20.00000 %
 Energy Calibration
 Normalized diff: 0.7188

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. pCi/gm	Nuc
75.00	128.	36.62	1.50	8.847E-03				
75.00	128.	36.62	1.50	8.847E-03	74.81	9.600	PBC<MDA	PB212
77.17	217.	21.16	1.50	9.541E-03	77.11	17.500	8.642E-01	PB212
					77.11	10.700	1.413E+00	PB214
77.17	217.	21.16	1.50	9.541E-03	77.11	17.500	PBC<MDA	PB212
					77.11	10.700	1.413E+00	PB214
88.19	108.	36.76	1.12	1.238E-02	86.45	32.740	PBC<MDA	EU155
					88.04	3.790	PBC<MDA	CD109
129.66	100.	39.96	1.41	1.717E-02				
186.32	94.	32.34	1.07	1.625E-02	185.99	3.280	PBC<MDA	RA226
209.72	86.	34.97	1.12	1.517E-02				
239.13	711.	4.47	1.22	1.378E-02	238.63	43.100	7.933E-01	PB212
242.14	90.	23.99	1.22	1.365E-02	241.00	3.900	PBC<MDA	RA224
					241.92	7.470	5.867E-01	PB214
295.74	130.	14.43	1.26	1.145E-02	295.22	19.200	3.930E-01	PB214
300.91	53.	29.22	1.26	1.127E-02				
328.30	71.	29.37	0.84	1.036E-02				
338.94	159.	14.58	1.25	1.004E-02	338.40	12.010	8.713E-01	AC228
352.81	272.	10.17	1.45	9.657E-03	351.99	37.100	5.028E-01	PB214
464.05	29.	39.77	0.73	7.356E-03	463.51	10.000	PBC<MDA	SB125
511.79	111.	18.35	1.42	6.681E-03	510.72	22.500	4.904E-01	TL208
584.17	200.	9.45	1.48	5.880E-03	583.14	86.000	2.618E-01	TL208
610.40	160.	11.45	1.56	5.640E-03	609.32	46.090	4.084E-01	BI214
728.34	94.	18.34	2.17	4.794E-03	727.17	11.800	1.101E+00	BI212
797.45	70.	22.74	1.94	4.411E-03	795.76	85.400	1.229E-01	CS134
861.33	32.	25.35	1.45	4.120E-03				
912.81	154.	9.74	1.82	3.915E-03	911.07	29.000	8.962E-01	AC228

970.17	104.	16.25	1.83	3.714E-03	968.90	17.460	1.068E+00	AC228
1463.47	594.	4.23	2.19	2.617E-03				


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***** UNIDENTIFIED PEAK SUMMARY *****
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Channel	Peak Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV	Suspected Nuclide
175.95	88.19	662.	108.	0.054	110.29	1.115	PB-214 l
258.91	129.66	595.	97.	0.049	110.52	1.415	AC-228 sM
419.05	209.72	332.	86.	0.043	104.92	1.120	NP-239 M
477.89	239.10	149.	711.	0.356	13.40	1.215	PB-212 D
483.91	242.11	189.	90.	0.045	71.98	1.217	PB-214 D
601.47	300.73	93.	53.	0.026	87.67	1.259	PB-212 lD
656.27	328.30	141.	71.	0.036	88.11	0.839	RH-106M M
927.84	464.05	52.	29.	0.014	119.30	0.730	SB-125 l
1722.76	861.33	14.	32.	0.016	76.06	1.452	TL-208 sM
1825.77	912.81	26.	155.	0.077	27.85	1.822	AC-228 sM
2927.86	1463.47	10.	593.	0.296	12.54	2.186	K-40 M

s - Peak fails shape tests.
 D - Peak area deconvoluted.
 L - Peak written from unknown list.
 C - Area < Critical level.
 M - Peak is close to a library peak.

 This section based on library: FSS_Rev_1.Lib

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***** IDENTIFIED PEAK SUMMARY *****
```

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV
PB-212	149.57	75.00	1083.	128.	0.064	109.85	1.500s
PB-212	153.80	77.11	949.	217.	0.109	63.47	1.500D
PB-214	153.80	77.11	949.	217.	0.109	63.47	1.500D
RA-226	372.52	186.46	484.	88.	0.044	104.82	1.500
PB-212	477.78	239.07	432.	622.	0.311	18.59	1.500
PB-214	591.38	295.86	214.	127.	0.063	55.80	1.500
AC-228	677.75	339.04	160.	134.	0.067	47.66	1.500
PB-214	705.04	352.68	158.	252.	0.126	28.28	1.500s
TL-208	1023.36	511.79	99.	111.	0.056	55.06	1.425s
TL-208	1168.17	584.17	61.	200.	0.100	28.36	1.481
BI-214	1220.65	610.40	61.	160.	0.080	34.35	1.560
BI-212	1456.64	728.34	53.	94.	0.047	55.02	2.169s
CS-134	1592.83	796.40	56.	38.	0.019	95.99	1.601s
AC-228	1941.76	970.77	49.	68.	0.034	56.86	1.718

s - Peak fails shape tests.
 D - Peak area deconvoluted.
 A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****						
- Nuclide -	Average	----- Peak -----				
Name	Code	Activity	Energy	Activity	Code	MDA Value
		pCi/gm	keV	pCi/gm		pCi/gm
						COMMENTS
BE-7		7.9313E-02	477.56	7.931E-02	% (	4.221E-01 1.24E-01 G
K-40		2.6465E-02	1460.75	2.647E-02	% (P	4.590E-01 1.22E-01 G
MN-54		-5.9614E-03	834.81	-5.961E-03	& (P	5.998E-02 1.71E-02 G
CO-57		3.5068E-03	122.07	3.507E-03	& (	5.673E-02 1.69E-02 G K
			136.43	-8.815E-04	&	4.410E-01 1.31E-01 G
CO-60		6.7809E-03	1332.51	6.781E-03	& (P	5.817E-02 1.62E-02 G K
			1173.23	-7.623E-03	&	7.645E-02 2.18E-02 G K
Sr-85		-1.2775E-02	514.00	-1.277E-02	% (	4.871E-02 1.44E-02 G
Kr-85		-1.9168E+01	513.99	-1.917E+01	% (	1.066E+03 3.05E+02 G
Y-88		4.5442E-03	1836.01	4.544E-03	% (P	5.050E-02 1.33E-02 G K
			898.02	6.964E-03	% P	5.597E-02 1.58E-02 G
NB-94		1.4454E-02	871.10	1.445E-02	% (	4.070E-02 1.20E-02 G K
			702.50	6.084E-03	%	4.502E-02 1.29E-02 G K
Ag-108M		-1.4457E-02	722.95	-1.446E-02	% (	5.540E-02 1.63E-02 G K
			614.37	-4.179E-02	& P	7.205E-02 2.20E-02 G
			433.93	-9.998E-04	%	4.241E-02 1.21E-02 G
CD-109		1.2077E+00	88.04	1.208E+00	% (P	2.015E+00 6.14E-01 G
SN-113		0.0000E+00	391.71	0.000E+00	& (	7.561E-02 2.20E-02 G K
			255.04	-3.540E-01	%	1.871E+00 5.55E-01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	2.0720E-02	427.95	2.072E-02	% (P	1.251E-01	3.63E-02	G K
		600.77	5.872E-02	% P	1.979E-01	5.81E-02	G
		636.15	8.400E-02	& P	3.401E-01	9.89E-02	G
		463.51	2.752E-01	% P	4.231E-01	1.30E-01	G
		176.29	3.397E-02	% P	6.881E-01	2.03E-01	G
I-131	1.3155E-02	364.48	1.315E-02	& (	4.456E-02	1.32E-02	G K
		636.97	4.729E-02	%	5.729E-01	1.61E-01	G
		284.29	7.960E-02	&	7.197E-01	2.12E-01	G
CS-134	2.8733E-02	604.66	5.323E-03	& (	4.743E-02	1.36E-02	G K
		795.76	6.765E-02	(	6.637E-02	2.16E-02	G
		569.29	4.948E-02	%	3.397E-01	9.90E-02	G
		801.84	4.924E-03	% P	7.090E-01	2.01E-01	G
CS-137	-6.4607E-03	661.62	6.461E-03	% (	6.347E-02	1.83E-02	G
CE-139	-1.5048E-04	165.85	1.505E-04	& (P	5.403E-02	1.60E-02	G
EU-152	1.5994E-02	121.78	1.599E-02	& (P	1.680E-01	5.01E-02	G K
		344.30	3.299E-02	%	1.544E-01	4.57E-02	G
		1408.08	8.470E-03	&	2.162E-01	5.70E-02	G
		964.00	1.052E-02	& P	3.381E-01	9.27E-02	G
		1112.07	6.828E-02	&	3.814E-01	1.08E-01	G
		778.90	1.032E-02	% P	4.025E-01	1.13E-01	G
EU-154	9.4823E-03	123.10	9.482E-03	% (P	1.187E-01	3.53E-02	G K
		1274.80	1.456E-02	&	2.006E-01	5.65E-02	G
		723.30	7.203E-02	% P	2.561E-01	7.52E-02	G
		1004.80	5.729E-02	&	3.094E-01	8.87E-02	G
EU-155	-4.0871E-03	86.45	4.087E-03	& (P	2.335E-01	6.93E-02	G K
		105.31	2.819E-02	%	2.501E-01	7.46E-02	G
HG-203	-2.2517E-03	279.17	2.252E-03	& (P	4.489E-02	1.31E-02	G K
		72.87	6.398E-01	%	2.161E+00	6.52E-01	G
		70.83	8.579E-01	%	3.670E+00	1.10E+00	G
		82.50	2.707E-02	%	4.028E+00	1.20E+00	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	2.6179E-01	583.14	2.618E-01	(P	5.132E-02	2.48E-02	G
		510.72	4.904E-01	+	2.159E-01	9.02E-02	G
PB-212	6.9400E-01	238.63	6.940E-01	(	1.111E-01	4.30E-02	G K
		77.11	8.642E-01	+	5.814E-01	1.83E-01	G
		74.81	9.976E-01	& P	1.219E+00	3.74E-01	G
PB-214	4.6626E-01	351.99	4.663E-01	*(P	1.131E-01	4.40E-02	G K
		295.22	3.819E-01	-	2.138E-01	7.10E-02	G
		77.11	1.413E+00	+	9.510E-01	2.99E-01	G
		241.92	2.255E-01	%	7.204E-01	2.17E-01	G
BI-212	1.1005E+00	727.17	1.101E+00	*(	4.306E-01	2.02E-01	G K
		1620.56	-2.858E-01	% P	2.047E+00	5.55E-01	G
		785.42	-5.445E-02	% P	2.914E+00	8.25E-01	G
BI-214	4.0837E-01	609.32	4.084E-01	(	9.953E-02	4.68E-02	G K
		1764.51	-3.823E-02	% P	4.027E-01	1.10E-01	G
		1120.28	1.736E-02	&	4.589E-01	1.29E-01	G
RA-224	7.1716E-01	241.00	7.172E-01	&(P	1.351E+00	4.11E-01	G
RA-226	1.0998E+00	185.99	1.100E+00	(P	1.310E+00	4.04E-01	G
AC-228	3.5508E-01	911.07	-8.292E-03	%(P	1.965E-01	5.51E-02	G K
		968.90	6.956E-01	(P	3.621E-01	1.32E-01	G
		338.40	7.374E-01	(	3.390E-01	1.17E-01	G
TH-227	-2.5053E-01	236.00	-2.505E-01	%(P	4.915E-01	1.49E-01	G K
		256.25	-7.914E-02	%	5.655E-01	1.67E-01	G
PA-234	-1.2368E-01	98.44	-1.237E-01	%(	2.397E-01	7.28E-02	G K
		946.00	-1.057E-02	%	3.161E-01	8.93E-02	G
		131.28	4.102E-03	%	2.428E-01	7.22E-02	G
		94.67	1.233E-02	&	4.349E-01	1.30E-01	G
		883.24	-9.316E-02	&	4.400E-01	1.27E-01	G
		926.70	0.000E+00	&	6.256E-01	1.77E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak MDA	Comments
		569.26	7.334E-02	%	5.033E-01	1.47E-01 G
TH-234	8.2374E-01					
		63.29	8.237E-01	%(P	4.528E+00	1.36E+00 G K
		92.80	1.657E+00	%	2.360E+00	7.22E-01 G
		92.38-5.429E-03		& P	2.971E+00	8.85E-01 G

AM-241 5.3559E-02
 59.54 5.356E-02 %(6.370E-01 1.90E-01 G
 (- This peak used in the nuclide activity average.

- * - Peak is too wide, but only one peak in library.
- ! - Peak is part of a multiplet and this area went negative during deconvolution.
- ? - Peak is too narrow.
- @ - Peak is too wide at FW25M, but ok at FWHM.
- % - Peak fails sensitivity test.
- \$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
- + - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
- = - Peak outside analysis energy range.
- & - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
- P - Peakbackground subtraction
- } - Peak is too close to another for the activity to be found directly.

Nuclide Codes:

T - Thermal Neutron Activation
 F - Fast Neutron Activation
 I - Fission Product
 N - Naturally Occurring Isotope
 P - Photon Reaction
 C - Charged Particle Reaction
 M - No MDA Calculation
 R - Coincidence Corrected
 H - Half-life limit exceeded

Peak Codes:

G - Gamma Ray
 X - X-Ray
 P - Positron Decay
 S - Single-Escape
 D - Double-Escape
 K - Key Line
 A - Not in Average
 C - Coincidence Peak

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****						
Nuclide		Time of Count	Time Corrected	Uncertainty	3 Sigma	
		Activity	Activity	Counting	Total	MDA
		pCi/gm	pCi/gm	pCi/gm	pCi/gm	pCi/gm
BE-7	#A	7.7980E-02	7.9313E-02	3.7059E-01	3.7061E-01	4.150E-01
K-40	A	2.6465E-02	2.6465E-02	3.6618E-01	3.6618E-01	4.590E-01
MN-54	#A	-5.9441E-03	-5.9614E-03	5.7541E-02	5.7542E-02	5.980E-02
CO-57	#B	3.4951E-03	3.5068E-03	5.0649E-02	5.0649E-02	5.654E-02
CO-60	#B	6.7777E-03	6.7809E-03	4.8631E-02	4.8633E-02	5.814E-02

Sr-85	#A	-1.2597E-02	-1.2775E-02	4.3206E-02	4.3212E-02	4.803E-02
Kr-85	#A	-1.9168E+01	-1.9168E+01	9.1551E+02	9.1551E+02	1.066E+03
Y-88	#B	4.5058E-03	4.5442E-03	3.9875E-02	3.9875E-02	5.007E-02
NB-94	#B	1.4454E-02	1.4454E-02	3.6105E-02	3.6114E-02	4.070E-02
Ag-108M	#B	-1.4457E-02	-1.4457E-02	4.8754E-02	4.8761E-02	5.539E-02
CD-109	#A	1.2053E+00	1.2077E+00	1.8414E+00	1.8426E+00	2.011E+00
SN-113	#B	0.0000E+00	0.0000E+00	6.5881E-02	6.5881E-02	7.501E-02
SB-125	#B	2.0701E-02	2.0720E-02	1.0904E-01	1.0905E-01	1.250E-01
I-131	#B	1.1754E-02	1.3155E-02	3.9644E-02	3.9651E-02	3.982E-02
CS-134	#B	2.8698E-02	2.8733E-02	2.7580E-02	2.7627E-02	4.737E-02
CS-137	#A	-6.4602E-03	-6.4607E-03	5.4882E-02	5.4883E-02	6.346E-02
CE-139	#A	-1.4950E-04	-1.5048E-04	2.7346E-01	2.7346E-01	5.367E-02
EU-152	#B	1.5991E-02	1.5994E-02	1.5022E-01	1.5023E-01	1.680E-01
EU-154	#B	9.4795E-03	9.4823E-03	1.0601E-01	1.0602E-01	1.186E-01
EU-155	#B	-4.0850E-03	-4.0871E-03	9.2544E-01	9.2544E-01	2.334E-01
HG-203	#B	-2.2084E-03	-2.2517E-03	4.1622E-02	4.1622E-02	4.402E-02
TL-208		2.6179E-01	2.6179E-01	7.4407E-02	7.5843E-02	
PB-212	#	6.9400E-01	6.9400E-01	1.2903E-01	1.3478E-01	1.111E-01
PB-214	#	4.6626E-01	4.6626E-01	1.3204E-01	1.3460E-01	1.131E-01
BI-212	#	1.1005E+00	1.1005E+00	6.0554E-01	6.0868E-01	
BI-214		4.0837E-01	4.0837E-01	1.4029E-01	1.4215E-01	
RA-224	#A	7.1716E-01	7.1716E-01	1.2318E+00	1.2325E+00	1.351E+00
RA-226	#A	1.0998E+00	1.0998E+00	1.2110E+00	1.2126E+00	1.310E+00
AC-228	F	3.5508E-01	3.5508E-01	1.6924E-01	1.7041E-01	1.965E-01
TH-227	#B	-2.5053E-01	-2.5053E-01	4.5199E-01	4.5221E-01	4.915E-01
PA-234	#B	-1.2368E-01	-1.2368E-01	2.1844E-01	2.1855E-01	2.397E-01
TH-234	#B	8.2374E-01	8.2374E-01	4.0678E+00	4.0680E+00	4.528E+00
AM-241	#A	5.3559E-02	5.3559E-02	5.6919E-01	5.6920E-01	6.370E-01

- All peaks for activity calculation had bad shape.
 * - Activity omitted from total
 & - Activity omitted from total and all peaks had bad shape.
 < - MDA value printed.
 A - Activity printed, but activity < MDA.
 B - Activity < MDA and failed test.
 C - Area < Critical level.
 F - Failed fraction or key line test.
 H - Half-life limit exceeded

S U M M A R Y

 Total Activity (277.7 to 1999.0 keV) 2.1257863E+00 pCi/gm
 Total Decayed Activity (277.7 to 1999.0 keV) 2.1257863E+00 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
 DAT

Reviewed by: _____
 Supervisor

Laboratory: YAEC Chemistry Lab

Sample description
FSS-OOL-16-01-011-F

Spectrum Filename: C:\GammaVision\Spectra\103F_19JUL2006_1807.An1

Acquisition information

Start time: 19-Jul-2006 18:07:33
Live time: 2000
Real time: 2002
Dead time: 0.08 %
Detector ID: 4

Detector system

Det 103 - DSPE-471

Calibration

Filename: D3_1LSa.Clb
Detector_103 1.0 Liter Sand Geometry

Energy Calibration

Created: 08-Aug-2005 11:09:41
Zero offset: 0.409 keV
Gain: 0.500 keV/channel
Quadratic: 1.092E-08 keV/channel²

Efficiency Calibration

Created: 08-Aug-2005 11:11:25
Type: Polynomial
Uncertainty: 0.993 %
Coefficients: -0.264059 -5.138468 0.638383
-0.089199 0.005011 -0.000129

Library Files

Main analysis library: FSS_Rev_1.Lib
Library Match Width: 1.000
Peak stripping: Library based

Analysis parameters

Analysis engine: Env32 G53W4.20
Start channel: 100 (50.41keV)
Stop channel: 4000 (2000.67keV)
Peak rejection level: 41.667%
Peak search sensitivity: 3
Sample Size: 1.5440E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.5440E+03) =
6.4767E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

Fraction Limit: 0.000%
Background width: average of five points.

Half lives decay limit: 12.000
 Activity range factor: 2.000
 Min. step backg. energy 0.000
 Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	13-Jul-2006 18:30:00
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	103_150K_05AUG05.Pbc 08-Aug-2005 12:54:15
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 17 cutoff 20.00000 %
 Energy Calibration
 Normalized diff: 0.0890

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. pCi/gm	Nuc
74.84	111.	22.34	0.99	9.052E-03	74.81	9.600	1.116E+00	PB212
77.14	118.	17.95	0.99	1.011E-02	77.11	17.500	7.819E-01	PB212
					77.11	10.700	1.279E+00	PB214
92.85	88.	35.24	1.50	1.645E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
92.88	88.	36.28	1.50	1.631E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
186.24	140.	21.38	1.31	2.566E-02	185.99	3.280	1.325E+00	RA226
209.68	96.	30.40	0.80	2.469E-02				
238.82	868.	3.95	1.09	2.319E-02	238.63	43.100	7.496E-01	PB212
241.96	125.	18.54	1.10	2.302E-02	241.00	3.900	1.216E+00	RA224
					241.92	7.470	6.360E-01	PB214
277.06	69.	34.14	1.36	2.116E-02				
295.17	175.	12.08	1.21	2.025E-02	295.22	19.200	3.848E-01	PB214
300.12	49.	38.56	0.75	2.001E-02				
328.05	74.	32.51	1.02	1.874E-02				
338.42	178.	12.05	1.09	1.830E-02	338.40	12.010	7.064E-01	AC228
351.81	384.	8.48	1.17	1.776E-02	351.99	37.100	5.025E-01	PB214
462.89	75.	21.72	0.94	1.426E-02				
462.89	75.	21.72	0.94	1.426E-02	463.51	10.000	4.560E-01	SB125
511.15	185.	15.49	1.86	1.316E-02	510.72	22.500	4.664E-01	TL208
					513.99	0.004	2.867E+03	Kr85
					514.00	99.270	1.324E-01	Sr85
583.19	306.	9.97	1.39	1.184E-02	583.14	86.000	2.588E-01	TL208
609.40	294.	8.79	1.14	1.144E-02	609.32	46.090	4.773E-01	BI214
661.64	82.	22.86	1.66	1.072E-02	661.62	84.620	7.731E-02	CS137
727.90	96.	18.02	1.84	9.957E-03	727.17	11.800	7.124E-01	BI212

795.26	32.	32.23	1.50	9.301E-03	795.76	85.400	3.582E-02	CS134
911.28	223.	9.50	1.56	8.400E-03	911.07	29.000	7.876E-01	AC228
964.02	39.	24.66	1.54	8.055E-03	964.00	14.580	PBC<MDA	EU152
969.00	110.	12.10	1.54	8.024E-03	968.90	17.460	6.874E-01	AC228

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1119.47	78.	20.64	1.76	7.216E-03	1120.28	15.040	6.157E-01	BI214
1460.79	950.	3.32	1.87	5.932E-03	1460.75	10.700	1.285E+01	K40
1764.25	50.	13.74	1.09	5.142E-03	1764.51	15.920	5.317E-01	BI214

***** U N I D E N T I F I E D P E A K S U M M A R Y *****

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma	FWHM %	Suspected Nuclide
418.53	209.68	326.	96.	0.048	91.19	0.803	NP-239
553.28	277.06	205.	76.	0.038	87.58	1.363	TL-208 s
599.38	300.12	154.	49.	0.024	115.68	0.748	PB-212 s
655.24	328.05	187.	74.	0.037	97.54	1.020	AC-228 s
1927.06	964.14	28.	39.	0.020	73.98	1.538	EU-152 LD

s - Peak fails shape tests.
 D - Peak area deconvoluted.
 L - Peak written from unknown list.
 C - Area < Critical level.

 This section based on library: FSS_Rev_1.Lib

***** I D E N T I F I E D P E A K S U M M A R Y *****

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma	FWHM %
PB-212	148.79	74.81	270.	111.	0.055	67.01	0.993D
PB-212	153.39	77.11	268.	118.	0.059	53.84	0.995A
RA-226	371.50	186.17	502.	143.	0.071	64.94	1.500s
PB-212	476.95	238.90	525.	829.	0.414	16.84	0.972
RA-224	482.61	241.73	497.	122.	0.061	82.09	1.500
PB-214	482.74	241.79	557.	85.	0.042	122.41	1.500s
PB-214	589.48	295.17	140.	171.	0.085	36.24	1.214
AC-228	675.99	338.42	125.	177.	0.089	36.15	1.094
PB-214	702.76	351.81	217.	378.	0.189	25.44	1.165
SB-125	924.82	462.85	81.	69.	0.035	64.58	1.500
TL-208	1021.41	511.15	189.	158.	0.079	46.48	1.862s
TL-208	1165.47	583.19	164.	301.	0.151	29.91	1.390
BI-214	1217.89	609.40	110.	288.	0.144	26.38	1.137
CS-137	1322.36	661.64	82.	80.	0.040	68.58	1.660s
BI-212	1454.87	727.90	64.	96.	0.048	54.05	1.843s
CS-134	1589.57	795.26	38.	32.	0.016	96.69	1.500s
AC-228	1821.59	911.28	66.	219.	0.110	28.50	1.564s
AC-228	1936.34	968.66	48.	175.	0.088	31.60	1.685s
BI-214	2237.91	1119.47	61.	76.	0.038	61.92	1.755s
K-40	2920.45	1460.79	30.	932.	0.466	9.96	1.874
BI-214	3527.26	1764.25	3.	50.	0.025	41.21	1.086s

s - Peak fails shape tests.
 D - Peak area deconvoluted.
 A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****						
- Nuclide - Name	Average Code Activity pCi/gm	----- Energy keV	Peak Activity pCi/gm	----- Code MDA Value pCi/gm	COMMENTS	
BE-7	5.4266E-04	477.56	5.427E-04	&(3.313E-01	9.51E-02	G
K-40	1.2847E+01	1460.75	1.285E+01	(P 3.912E-01	4.35E-01	G
MN-54	5.2071E-03	834.81	5.207E-03	%(P 4.065E-02	1.17E-02	G
CO-57	-1.2558E-02	122.07-1.256E-02		&(P 5.187E-02	1.55E-02	G K
		136.43-1.650E-03		% 3.617E-01	1.07E-01	G
CO-60	-1.0362E-02	1332.51-1.036E-02		%(P 4.044E-02	1.11E-02	G K
		1173.23 4.911E-03		% P 5.153E-02	1.47E-02	G K
Sr-85	-2.3560E-02	514.00-2.356E-02		%(5.314E-02	1.61E-02	G
Kr-85	-5.1024E+02	513.99-5.102E+02		%(1.151E+03	3.48E+02	G
Y-88	5.9809E-03	1836.01 5.981E-03		%(P 2.581E-02	7.12E-03	G K
		898.02-6.186E-03		% P 4.298E-02	1.23E-02	G
NB-94	2.2835E-03	871.10 2.284E-03		%(3.245E-02	9.14E-03	G K
		702.50 1.082E-02		% 3.176E-02	9.44E-03	G K
Ag-108M	2.0571E-03	722.95 2.057E-03		&(6.508E-02	1.90E-02	G K
		614.37-8.151E-03		% P 4.123E-02	1.21E-02	G
		433.93 9.807E-03		% 3.325E-02	9.88E-03	G
CD-109	1.3481E-01	88.04 1.348E-01		%(2.235E+00	6.67E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SN-113	-1.3451E-02	391.71	1.345E-02	&(	5.148E-02	1.53E-02	G K
		255.04	3.137E-01	&	1.780E+00	5.30E-01	G
SB-125	9.5536E-02	427.95	1.628E-02	%(P	1.096E-01	3.21E-02	G K
		600.77	2.099E-02	% P	1.932E-01	5.60E-02	G
		636.15	4.103E-03	& P	3.996E-01	1.15E-01	G
		463.51	4.265E-01	(P	2.754E-01	9.35E-02	G
		176.29	7.477E-02	&	5.303E-01	1.58E-01	G
I-131	-3.3850E-03	364.48	3.385E-03	%(P	6.857E-02	2.00E-02	G K
		636.97	1.952E-01	&	8.831E-01	2.60E-01	G
		284.29	2.109E-02	% P	9.152E-01	2.69E-01	G
CS-134	2.3607E-02	604.66	1.292E-02	%(	2.250E-02	6.95E-03	G K
		795.76	3.582E-02	*(P	3.502E-02	1.16E-02	G
		569.29	5.104E-02	& P	2.239E-01	6.56E-02	G
		801.84	1.355E-02	& P	3.699E-01	1.02E-01	G
CS-137	7.7308E-02	661.62	7.731E-02	*(P	4.331E-02	1.80E-02	G
CE-139	-8.7771E-03	165.85	8.777E-03	%(	5.219E-02	1.56E-02	G
EU-152	-3.6669E-02	121.78	3.667E-02	&(P	1.500E-01	4.49E-02	G K
		344.30	5.386E-04	% P	1.106E-01	3.21E-02	G
		1408.08	0.000E+00	%	1.484E-01	3.95E-02	G
		964.00	2.136E-01	& P	3.116E-01	9.69E-02	G
		1112.07	6.788E-02	&	3.075E-01	8.95E-02	G
		778.90	1.846E-02	&	2.686E-01	7.65E-02	G
EU-154	1.1937E-02	123.10	1.194E-02	%(	1.092E-01	3.25E-02	G K
		1274.80	3.014E-02	%	1.022E-01	2.99E-02	G
		723.30	7.985E-02	&	2.379E-01	7.11E-02	G
		1004.80	4.056E-02	&	2.223E-01	6.43E-02	G
EU-155	4.0442E-03	86.45	4.044E-03	&(	2.567E-01	7.64E-02	G K
		105.31	2.792E-03	&	1.961E-01	5.79E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
HG-203	-4.3689E-03	279.17	4.369E-03	% (P	4.602E-02	1.36E-02	G K
		72.87	4.110E-01	% P	2.591E+00	7.76E-01	G
		70.83	3.657E-02	%	4.941E+00	1.47E+00	G
		82.50	7.299E-01	%	4.362E+00	1.31E+00	G
TL-208	2.5879E-01	583.14	2.588E-01	(P	5.357E-02	2.62E-02	G
		510.72	4.664E-01	+ P	1.972E-01	8.45E-02	G
PB-212	7.4166E-01	238.63	7.253E-01	(P	9.587E-02	4.13E-02	G K
							Energy duplication
		77.11	5.832E-01	} P	3.905E-01	1.05E-01	G
		74.81	1.116E+00	+ P	7.979E-01	2.56E-01	G
PB-214	4.9067E-01	351.99	5.025E-01	(P	9.479E-02	4.32E-02	G K
		295.22	3.848E-01	- P	1.303E-01	4.76E-02	G
							Energy duplication
		77.11	1.701E-01	} P	9.761E-01	2.27E-01	G
		241.92	4.318E-01	? (	5.735E-01	1.76E-01	G
BI-212	7.1238E-01	727.17	7.124E-01	*(P	2.983E-01	1.29E-01	G K
		1620.56	2.822E-01	& P	1.070E+00	3.05E-01	G
		785.42	3.337E-01	%	1.725E+00	5.01E-01	G
BI-214	5.1557E-01	609.32	4.773E-01	(P	8.581E-02	4.29E-02	G K
		1764.51	5.317E-01	(P	1.191E-01	7.78E-02	G
		1120.28	6.157E-01	@(P	3.148E-01	1.30E-01	G
RA-224	1.1871E+00	241.00	1.187E+00	(	1.037E+00	3.25E-01	G
RA-226	1.4826E+00	185.99	1.483E+00	(P	1.114E+00	3.50E-01	G
AC-228	7.6380E-01	911.07	7.876E-01	@(P	1.455E-01	7.60E-02	G K
		968.90	1.095E+00	+ P	2.178E-01	1.15E-01	G
		338.40	7.064E-01	(P	2.179E-01	8.56E-02	G
TH-227	-3.9824E-03	236.00	3.982E-03	% (	3.354E-01	9.91E-02	G K
		256.25	1.265E-01	% P	4.333E-01	1.30E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PA-234	4.5137E-02						
		98.44	4.514E-02	% (P	2.197E-01	6.57E-02	G K
		946.00	2.767E-02	& P	1.913E-01	5.50E-02	G
		131.28	5.604E-02	& P	2.161E-01	6.49E-02	G
		94.67-8.638E-02		% P	3.941E-01	1.18E-01	G
		883.24-7.274E-02		%	2.946E-01	8.61E-02	G
		926.70-3.098E-02		%	2.900E-01	8.20E-02	G
		569.26	7.462E-02	& P	3.305E-01	9.68E-02	G

TH-234	1.2265E+00						
		63.29	1.226E+00	% (P	6.899E+00	2.06E+00	G K
		92.80	1.563E+00	% P	2.171E+00	6.61E-01	G
		92.38	1.843E+00	% P	2.637E+00	8.02E-01	G

AM-241	-1.5537E-01						
		59.54-1.554E-01		% (P	1.200E+00	3.58E-01	G

(- This peak used in the nuclide activity average.

- * - Peak is too wide, but only one peak in library.
- ! - Peak is part of a multiplet and this area went negative during deconvolution.
- ? - Peak is too narrow.
- @ - Peak is too wide at FW25M, but ok at FWHM.
- % - Peak fails sensitivity test.
- \$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
- + - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
- = - Peak outside analysis energy range.
- & - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
- P - Peakbackground subtraction
- } - Peak is too close to another for the activity to be found directly.

Nuclide Codes:

T - Thermal Neutron Activation
 F - Fast Neutron Activation
 I - Fission Product
 N - Naturally Occurring Isotope
 P - Photon Reaction
 C - Charged Particle Reaction
 M - No MDA Calculation
 R - Coincidence Corrected
 H - Half-life limit exceeded

Peak Codes:

G - Gamma Ray
 X - X-Ray
 P - Positron Decay
 S - Single-Escape
 D - Double-Escape
 K - Key Line
 A - Not in Average
 C - Coincidence Peak

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity pCi/gm	Time Corrected Activity pCi/gm	Uncertainty Counting pCi/gm	3 Sigma Total pCi/gm	MDA pCi/gm
BE-7	#A	5.0210E-04	5.4266E-04	2.8541E-01	2.8541E-01	3.066E-01
K-40		1.2847E+01	1.2847E+01	1.3053E+00	1.5034E+00	
MN-54	#A	5.1383E-03	5.2071E-03	3.5186E-02	3.5188E-02	4.011E-02
CO-57	#B	-1.2367E-02	-1.2558E-02	4.8087E-02	4.8092E-02	5.108E-02
CO-60	#B	-1.0340E-02	-1.0362E-02	6.9618E-02	6.9620E-02	4.036E-02
Sr-85	#A	-2.2100E-02	-2.3560E-02	4.8214E-02	4.8234E-02	4.985E-02
Kr-85	#A	-5.1022E+02	-5.1024E+02	1.0441E+03	1.0446E+03	1.151E+03
Y-88	#B	5.7527E-03	5.9809E-03	2.1373E-02	2.1376E-02	2.483E-02
NB-94	#B	2.2835E-03	2.2835E-03	2.7434E-02	2.7434E-02	3.245E-02
Ag-108M	#B	2.0570E-03	2.0571E-03	5.7027E-02	5.7027E-02	6.508E-02
CD-109	#A	1.3358E-01	1.3481E-01	2.0008E+00	2.0008E+00	2.215E+00
SN-113	#B	-1.2975E-02	-1.3451E-02	4.5892E-02	4.5898E-02	4.966E-02
SB-125	#B	9.5145E-02	9.5536E-02	6.2839E-02	6.3084E-02	1.091E-01
I-131	#B	-2.0206E-03	-3.3850E-03	9.2051E-02	9.2051E-02	4.094E-02
CS-134	#F	2.3477E-02	2.3607E-02	2.2231E-02	2.2273E-02	2.238E-02
CS-137	#	7.7279E-02	7.7308E-02	5.3940E-02	5.4126E-02	
CE-139	#A	-8.5163E-03	-8.7771E-03	4.6815E-02	4.6817E-02	5.064E-02
EU-152	#B	-3.6636E-02	-3.6669E-02	1.4411E-01	1.4412E-01	1.498E-01
EU-154	#B	1.1921E-02	1.1937E-02	9.7643E-02	9.7645E-02	1.090E-01
EU-155	#B	4.0349E-03	4.0442E-03	2.2918E-01	2.2918E-01	2.561E-01
HG-203	#B	-3.9967E-03	-4.3689E-03	4.1188E-02	4.1188E-02	4.210E-02
TL-208		2.5879E-01	2.5879E-01	7.8503E-02	7.9928E-02	
PB-212		7.4166E-01	7.4166E-01	1.2671E-01	1.3382E-01	
PB-214		4.9067E-01	4.9067E-01	1.2671E-01	1.2987E-01	
BI-212	#	7.1238E-01	7.1238E-01	3.8700E-01	3.8921E-01	
BI-214		5.1557E-01	5.1557E-01	1.3907E-01	1.4226E-01	
RA-224	#	1.1871E+00	1.1871E+00	9.7454E-01	9.7697E-01	1.037E+00
RA-226	#	1.4826E+00	1.4826E+00	1.0502E+00	1.0538E+00	1.114E+00
AC-228		7.6380E-01	7.6380E-01	1.7750E-01	1.8296E-01	
TH-227	#B	-3.9824E-03	-3.9824E-03	2.9732E-01	2.9732E-01	3.354E-01
PA-234	#B	4.5137E-02	4.5137E-02	1.9721E-01	1.9723E-01	2.197E-01
TH-234	#B	1.2265E+00	1.2265E+00	6.1728E+00	6.1731E+00	6.899E+00
AM-241	#A	-1.5537E-01	-1.5537E-01	1.1024E+00	1.1024E+00	1.200E+00

- # - All peaks for activity calculation had bad shape.
- * - Activity omitted from total
- & - Activity omitted from total and all peaks had bad shape.
- < - MDA value printed.
- A - Activity printed, but activity < MDA.
- B - Activity < MDA and failed test.
- C - Area < Critical level.
- F - Failed fraction or key line test.
- H - Half-life limit exceeded

Sample description
FSS-OOL-16-01-009-F

Spectrum Filename: C:\GammaVision\Spectra\103F_26JUL2006_1556.An1

Acquisition information

Start time: 26-Jul-2006 15:56:15
Live time: 2000
Real time: 2002
Dead time: 0.09 %
Detector ID: 4

Detector system

Det 103 - DSPE-471

Calibration

Filename: D3_1LSa.Clb
Detector_103 1.0 Liter Sand Geometry

Energy Calibration

Created: 08-Aug-2005 11:09:41
Zero offset: 0.409 keV
Gain: 0.500 keV/channel
Quadratic: 1.092E-08 keV/channel²

Efficiency Calibration

Created: 08-Aug-2005 11:11:25
Type: Polynomial
Uncertainty: 0.993 %
Coefficients: -0.264059 -5.138468 0.638383
-0.089199 0.005011 -0.000129

Library Files

Main analysis library: FSS_Rev_1.Lib
Library Match Width: 1.000
Peak stripping: Library based

Analysis parameters

Analysis engine: Env32 G53W4.20
Start channel: 100 (50.41keV)
Stop channel: 4000 (2000.67keV)
Peak rejection level: 41.667%
Peak search sensitivity: 3
Sample Size: 2.0020E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 2.0020E+03) =
4.9950E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

Fraction Limit: 0.000%
Background width: average of five points.

Half lives decay limit: 12.000
 Activity range factor: 2.000
 Min. step backg. energy 0.000
 Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	25-Jul-2006 10:00:00
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	103_150K_05AUG05.Pbc 08-Aug-2005 12:54:15
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 18 cutoff 20.00000 %
 Energy Calibration
 Normalized diff: 0.1662

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. pCi/gm	Nuc
74.91	121.	21.77	0.99	9.052E-03	74.81	9.600	9.424E-01	PB212
77.27	183.	15.20	0.99	1.024E-02	77.11	17.500	6.877E-01	PB212
					77.11	10.700	1.125E+00	PB214
93.68	93.	30.24	1.00	1.682E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
					94.67	15.500	PBC<MDA	PA234
186.21	126.	24.02	0.89	2.566E-02	185.99	3.280	PBC<MDA	RA226
209.71	116.	30.10	1.05	2.469E-02				
238.98	982.	3.78	1.09	2.318E-02	238.63	43.100	6.548E-01	PB212
242.49	113.	21.96	1.10	2.299E-02	241.00	3.900	8.446E-01	RA224
					241.92	7.470	4.419E-01	PB214
269.97	126.	25.46	1.34	2.153E-02				
276.92	64.	36.86	0.73	2.116E-02				
295.24	222.	12.91	1.16	2.025E-02	295.22	19.200	3.775E-01	PB214
300.27	86.	28.34	1.02	2.000E-02				
328.58	76.	31.03	1.30	1.872E-02				
338.35	224.	15.25	0.99	1.830E-02	338.40	12.010	6.839E-01	AC228
351.92	360.	10.17	1.01	1.776E-02	351.99	37.100	3.632E-01	PB214
410.19	54.	31.71	1.43	1.572E-02				
463.25	52.	25.03	0.81	1.425E-02				
463.25	52.	25.03	0.81	1.425E-02	463.51	10.000	PBC<MDA	SB125
511.03	163.	13.95	1.11	1.317E-02	510.72	22.500	3.105E-01	TL208
583.22	342.	8.97	1.55	1.184E-02	583.14	86.000	2.240E-01	TL208
609.44	287.	8.23	1.39	1.144E-02	609.32	46.090	3.590E-01	BI214
727.15	97.	18.59	1.78	9.965E-03	727.17	11.800	5.540E-01	BI212
795.25	62.	30.68	1.38	9.306E-03				
795.25	62.	30.68	1.38	9.306E-03	795.76	85.400	5.284E-02	CS134

860.73	58.	23.48	1.69	8.766E-03					
911.41	242.	7.69	1.39	8.399E-03	911.07	29.000	6.611E-01	AC228	
968.76	184.	10.91	1.67	8.027E-03	968.90	17.460	8.847E-01	AC228	
1120.54	96.	22.01	1.66	7.211E-03	1120.28	15.040	5.888E-01	BI214	
1461.11	1032.	3.15	1.78	5.931E-03	1460.75	10.700	1.078E+01	K40	
1765.14	73.	11.70	1.38	5.140E-03	1764.51	15.920	5.750E-01	BI214	

***** U N I D E N T I F I E D P E A K S U M M A R Y *****

Channel	Peak Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV	Suspected Nuclide
418.58	209.71	456.	116.	0.058	90.31	1.054	NP-239
484.13	242.42	249.	113.	0.056	65.88	1.095	XE-138 LD
539.09	269.97	333.	126.	0.063	76.37	1.345	AC-228 s
599.68	300.27	213.	86.	0.043	85.03	1.021	PB-212
656.30	328.58	192.	76.	0.038	93.08	1.304	RH-106M s
819.52	410.19	104.	54.	0.027	95.13	1.425	AC-228 s
1720.51	860.73	51.	58.	0.029	70.45	1.686	TL-208 s

s - Peak fails shape tests.
 D - Peak area deconvoluted.
 L - Peak written from unknown list.
 C - Area < Critical level.

 This section based on library: FSS_Rev_1.Lib

***** I D E N T I F I E D P E A K S U M M A R Y *****

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV
PB-212	148.79	74.81	308.	121.	0.061	65.31	0.993D
PB-212	153.39	77.11	299.	155.	0.078	42.05	0.995A
TH-234	185.73	93.28	837.	105.	0.053	102.30	1.500s
PA-234	185.68	93.25	602.	130.	0.065	84.24	1.500
RA-226	371.84	186.34	612.	120.	0.060	82.13	1.500
PB-212	477.09	238.97	542.	1087.	0.543	14.02	0.919
PB-214	589.63	295.24	243.	217.	0.109	38.73	1.157s
AC-228	675.85	338.35	286.	223.	0.111	45.75	0.985s
PB-214	702.98	351.92	294.	354.	0.177	30.50	1.013
SB-125	925.98	463.43	110.	45.	0.022	106.11	1.500
TL-208	1021.18	511.03	145.	136.	0.068	41.85	1.106s
TL-208	1165.54	583.22	158.	338.	0.169	26.90	1.546
BI-214	1217.98	609.44	100.	280.	0.140	24.68	1.390
BI-212	1453.38	727.15	76.	97.	0.048	55.76	1.779s
CS-134	1589.41	795.18	68.	45.	0.023	88.97	1.500s
AC-228	1821.85	911.41	43.	239.	0.119	23.06	1.388
AC-228	1936.54	968.76	68.	184.	0.092	32.73	1.672
BI-214	2240.05	1120.54	84.	95.	0.047	66.04	1.661
K-40	2921.09	1461.11	26.	1014.	0.507	9.44	1.776
BI-214	3529.03	1765.14	3.	70.	0.035	35.11	1.375s

s - Peak fails shape tests.
 D - Peak area deconvoluted.
 A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****							
- Nuclide -	Average	----- Peak -----					
Name	Code	Activity	Energy	Activity	Code	MDA Value	COMMENTS
		pCi/gm	keV	pCi/gm		pCi/gm	
BE-7		1.1683E-01	477.56	1.168E-01	%	2.549E-01 7.71E-02	G
K-40		1.0780E+01	1460.75	1.078E+01	(P	2.831E-01 3.45E-01	G
MN-54		3.8926E-03	834.81	3.893E-03	%(P	2.979E-02 8.58E-03	G
CO-57		1.3442E-02	122.07	1.344E-02	&(P	4.575E-02 1.38E-02	G K
			136.43	7.533E-02	%	3.375E-01 1.01E-01	G
CO-60		-8.1374E-03	1332.51	8.137E-03	%(P	3.535E-02 9.84E-03	G K
			1173.23	1.927E-03	& P	4.020E-02 1.14E-02	G K
Sr-85		-1.2156E-02	514.00	1.216E-02	%(	3.468E-02 1.04E-02	G
Kr-85		-2.8238E+02	513.99	2.824E+02	%(	7.911E+02 2.37E+02	G
Y-88		-1.2456E-03	1836.01	1.246E-03	%(P	2.250E-02 5.81E-03	G K
			898.02	4.944E-03	& P	3.187E-02 9.13E-03	G
NB-94		9.4860E-05	871.10	9.486E-05	%(	2.717E-02 7.61E-03	G K
			702.50	7.184E-03	&	2.282E-02 6.74E-03	G K
Ag-108M		-1.1835E-02	722.95	1.183E-02	%(	3.851E-02 1.15E-02	G K
			614.37	8.541E-03	& P	3.584E-02 1.06E-02	G
			433.93	5.216E-03	%	2.606E-02 7.67E-03	G
CD-109		6.3558E-01	88.04	6.356E-01	%(	1.639E+00 4.95E-01	G
SN-113		-5.2976E-03	391.71	5.298E-03	%(	3.957E-02 1.16E-02	G K
			255.04	0.000E+00	%	1.425E+00 4.20E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	5.8262E-02	427.95	6.558E-03	% (P	8.723E-02	2.54E-02	G K
		600.77	3.191E-02	& P	1.678E-01	4.93E-02	G
		636.15	6.117E-02	% P	1.477E-01	4.41E-02	G
		463.51	2.113E-01	(P	2.444E-01	7.69E-02	G
		176.29	8.647E-02	%	4.921E-01	1.47E-01	G
I-131	-1.8461E-03	364.48	1.846E-03	% (P	2.747E-02	7.92E-03	G K
		636.97	1.383E-01	%	4.476E-01	1.33E-01	G
		284.29	4.047E-02	& P	5.055E-01	1.49E-01	G
CS-134	1.7594E-02	604.66	6.404E-04	% (	5.838E-02	1.72E-02	G K
		795.76	3.843E-02	@ (P	3.489E-02	1.14E-02	G
		569.29	4.419E-02	% P	1.569E-01	4.61E-02	G
		801.84	7.056E-02	& P	2.958E-01	8.57E-02	G
CS-137	-5.4143E-04	661.62	5.414E-04	% (P	2.883E-02	8.06E-03	G
CE-139	-4.2158E-04	165.85	4.216E-04	& (	4.058E-02	1.21E-02	G
EU-152	3.8880E-02	121.78	3.888E-02	& (P	1.298E-01	3.91E-02	G K
		344.30	2.248E-03	% P	9.546E-02	2.79E-02	G
		1408.08	6.823E-02	%	1.004E-01	3.23E-02	G
		964.00	7.718E-02	% P	2.703E-01	8.00E-02	G
		1112.07	5.181E-02	&	2.817E-01	8.21E-02	G
		778.90	2.666E-02	%	2.150E-01	6.19E-02	G
EU-154	1.2519E-03	123.10	1.252E-03	& (	8.350E-02	2.48E-02	G K
		1274.80	1.276E-02	&	1.017E-01	2.91E-02	G
		723.30	5.558E-02	%	1.845E-01	5.49E-02	G
		1004.80	1.678E-03	&	1.775E-01	4.99E-02	G
EU-155	8.5471E-02	86.45	8.547E-02	% (	2.087E-01	6.31E-02	G K
		105.31	2.806E-02	%	2.039E-01	6.10E-02	G
HG-203	-4.2756E-03	279.17	4.276E-03	% (P	3.494E-02	1.04E-02	G K
		72.87	6.038E-01	% P	1.912E+00	5.76E-01	G
		70.83	8.053E-01	%	3.787E+00	1.14E+00	G
		82.50	4.728E-02	&	3.163E+00	9.40E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	2.2397E-01	583.14	2.240E-01	(P	4.061E-02	2.03E-02	G
		510.72	3.105E-01	+ P	1.338E-01	5.18E-02	G
PB-212	7.2131E-01	238.63	7.338E-01	(P	7.507E-02	3.47E-02	G K
		77.11	5.927E-01	} P	3.176E-01	8.31E-02	G
		74.81	9.424E-01	+ P	6.560E-01	2.10E-01	G
PB-214	3.6807E-01	351.99	3.632E-01	(P	8.462E-02	3.75E-02	G K
		295.22	3.775E-01	* (P	1.307E-01	4.97E-02	G
		77.11	0.000E+00	} P	7.718E-01	0.00E+00	G
		241.92	2.631E-01	%	5.124E-01	1.56E-01	G
BI-212	5.5400E-01	727.17	5.540E-01	@(P	2.495E-01	1.03E-01	G K
		1620.56	2.640E-02	% P	8.645E-01	2.28E-01	G
		785.42	2.424E-02	%	1.439E+00	4.08E-01	G
BI-214	3.5902E-01	609.32	3.590E-01	(P	6.300E-02	3.02E-02	G K
		1764.51	5.750E-01	+ P	9.186E-02	7.05E-02	G
		1120.28	5.888E-01	+ P	2.833E-01	1.32E-01	G
RA-224	4.8101E-01	241.00	4.810E-01	&(	9.598E-01	2.91E-01	G
RA-226	9.6444E-01	185.99	9.644E-01	(P	9.457E-01	2.92E-01	G
AC-228	6.6781E-01	911.07	6.611E-01	(P	9.253E-02	5.15E-02	G K
		968.90	8.847E-01	+ P	1.986E-01	9.66E-02	G
		338.40	6.839E-01	@(P	2.505E-01	1.05E-01	G
TH-227	-1.0519E-01	236.00	1.052E-01	% (	3.319E-01	1.00E-01	G K
		256.25	6.800E-02	& P	3.911E-01	1.16E-01	G
PA-234	8.0649E-02	98.44	7.370E-02	% (P	1.899E-01	5.73E-02	G K
		946.00	3.321E-02	% P	1.283E-01	3.74E-02	G
		131.28	2.486E-02	& P	1.864E-01	5.57E-02	G
		94.67	3.306E-01	? (P	2.983E-01	9.31E-02	G
		883.24	6.899E-02	%	2.058E-01	6.09E-02	G
		926.70	4.428E-02	%	2.387E-01	6.88E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak MDA	Comments
		569.26	5.234E-02	% P	2.446E-01	7.14E-02 G
TH-234	9.0949E-01					
		63.29	5.000E-01	&(P	5.200E+00	1.54E+00 G K
		92.80	1.442E+00	&(P	1.881E+00	5.74E-01 G
		92.38	1.610E+00	& P	2.259E+00	6.88E-01 G
AM-241	-7.9778E-02					
		59.54	-7.978E-02	%(P	9.379E-01	2.79E-01 G

(- This peak used in the nuclide activity average.

- * - Peak is too wide, but only one peak in library.
- ! - Peak is part of a multiplet and this area went negative during deconvolution.
- ? - Peak is too narrow.
- @ - Peak is too wide at FW25M, but ok at FWHM.
- % - Peak fails sensitivity test.
- \$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
- + - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
- = - Peak outside analysis energy range.
- & - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
- P - Peakbackground subtraction
- } - Peak is too close to another for the activity to be found directly.

Nuclide Codes:

T - Thermal Neutron Activation
 F - Fast Neutron Activation
 I - Fission Product
 N - Naturally Occurring Isotope
 P - Photon Reaction
 C - Charged Particle Reaction
 M - No MDA Calculation
 R - Coincidence Corrected
 H - Halflife limit exceeded

Peak Codes:

G - Gamma Ray
 X - X-Ray
 P - Positron Decay
 S - Single-Escape
 D - Double-Escape
 K - Key Line
 A - Not in Average
 C - Coincidence Peak

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****						
Nuclide		Time of Count	Time Corrected	Uncertainty	3 Sigma	
		Activity	Activity	Counting	Total	MDA
		pCi/gm	pCi/gm	pCi/gm	pCi/gm	pCi/gm
BE-7	#A	1.1495E-01	1.1683E-01	2.3139E-01	2.3149E-01	2.508E-01
K-40		1.0780E+01	1.0780E+01	1.0360E+00	1.2104E+00	
MN-54	#A	3.8818E-03	3.8926E-03	2.5742E-02	2.5743E-02	2.971E-02
CO-57	#B	1.3399E-02	1.3442E-02	4.1313E-02	4.1319E-02	4.560E-02
CO-60	#B	-8.1337E-03	-8.1374E-03	6.0729E-02	6.0731E-02	3.533E-02

Sr-85	#A	-1.1995E-02	-1.2156E-02	3.1216E-02	3.1224E-02	3.423E-02
Kr-85	#A	-2.8237E+02	-2.8238E+02	7.1240E+02	7.1258E+02	7.911E+02
Y-88	#B	-1.2355E-03	-1.2456E-03	2.0048E-02	2.0048E-02	2.231E-02
NB-94	#B	9.4860E-05	9.4860E-05	2.2835E-02	2.2835E-02	2.717E-02
Ag-108M	#B	-1.1835E-02	-1.1835E-02	3.4401E-02	3.4407E-02	3.851E-02
CD-109	#A	6.3437E-01	6.3558E-01	1.4854E+00	1.4858E+00	1.635E+00
SN-113	#B	-5.2580E-03	-5.2976E-03	3.4869E-02	3.4871E-02	3.927E-02
SB-125	#B	5.8212E-02	5.8262E-02	6.3590E-02	6.3680E-02	8.715E-02
I-131	#B	-1.6578E-03	-1.8461E-03	3.5533E-02	3.5533E-02	2.467E-02
CS-134	#B	1.7574E-02	1.7594E-02	1.5683E-02	1.5716E-02	5.831E-02
CS-137	#A	-5.4139E-04	-5.4143E-04	7.7530E-02	7.7530E-02	2.883E-02
CE-139	#A	-4.1894E-04	-4.2158E-04	3.6157E-02	3.6157E-02	4.032E-02
EU-152	#B	3.8873E-02	3.8880E-02	1.1721E-01	1.1723E-01	1.298E-01
EU-154	#B	1.2515E-03	1.2519E-03	7.4329E-02	7.4329E-02	8.347E-02
EU-155	#B	8.5430E-02	8.5471E-02	1.8940E-01	1.8946E-01	2.086E-01
HG-203	#B	-4.1969E-03	-4.2756E-03	3.1291E-02	3.1292E-02	3.429E-02
TL-208		2.2397E-01	2.2397E-01	6.1005E-02	6.2375E-02	
PB-212		7.2131E-01	7.2131E-01	1.0222E-01	1.1046E-01	
PB-214		3.6807E-01	3.6807E-01	9.2318E-02	9.4759E-02	
BI-212	#	5.5400E-01	5.5400E-01	3.1047E-01	3.1213E-01	
BI-214		3.5902E-01	3.5902E-01	9.0637E-02	9.3003E-02	
RA-224	#A	4.8101E-01	4.8101E-01	8.7413E-01	8.7458E-01	9.598E-01
RA-226	#	9.6444E-01	9.6444E-01	8.7738E-01	8.7917E-01	9.457E-01
AC-228		6.6781E-01	6.6781E-01	1.5616E-01	1.6091E-01	
TH-227	#B	-1.0519E-01	-1.0519E-01	2.9995E-01	3.0001E-01	3.319E-01
PA-234	#B	8.0649E-02	8.0649E-02	6.8116E-02	6.8262E-02	1.899E-01
TH-234	#B	9.0949E-01	9.0949E-01	1.0862E+00	1.0873E+00	5.200E+00
AM-241	#A	-7.9778E-02	-7.9778E-02	8.7203E-01	8.7204E-01	9.379E-01

- All peaks for activity calculation had bad shape.
 * - Activity omitted from total
 & - Activity omitted from total and all peaks had bad shape.
 < - MDA value printed.
 A - Activity printed, but activity < MDA.
 B - Activity < MDA and failed test.
 C - Area < Critical level.
 F - Failed fraction or key line test.
 H - Halflife limit exceeded

----- S U M M A R Y -----
 Total Activity (86.9 to 2000.7 keV) 1.3674204E+01 pCi/gm
 Total Decayed Activity (86.9 to 2000.7 keV) 1.3674204E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
 DAT

Reviewed by: _____
 Supervisor

Laboratory: YAEC Chemistry Lab

Sample description
FSS-OOL-16-01-005-F

Spectrum Filename: C:\GammaVision\Spectra\103F_26JUL2006_1634.An1

Acquisition information

Start time: 26-Jul-2006 16:34:38
Live time: 2000
Real time: 2002
Dead time: 0.08 %
Detector ID: 4

Detector system

Det 103 - DSPE-471

Calibration

Filename: D3_1LSa.Clb
Detector_103 1.0 Liter Sand Geometry

Energy Calibration

Created: 08-Aug-2005 11:09:41
Zero offset: 0.409 keV
Gain: 0.500 keV/channel
Quadratic: 1.092E-08 keV/channel²

Efficiency Calibration

Created: 08-Aug-2005 11:11:25
Type: Polynomial
Uncertainty: 0.993 %
Coefficients: -0.264059 -5.138468 0.638383
-0.089199 0.005011 -0.000129

Library Files

Main analysis library: FSS_Rev_1.Lib
Library Match Width: 1.000
Peak stripping: Library based

Analysis parameters

Analysis engine: Env32 G53W4.20
Start channel: 100 (50.41keV)
Stop channel: 4000 (2000.67keV)
Peak rejection level: 41.667%
Peak search sensitivity: 3
Sample Size: 1.9910E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.9910E+03) =
5.0226E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

Fraction Limit: 0.000%
Background width: average of five points.

Half lives decay limit: 12.000
 Activity range factor: 2.000
 Min. step backg. energy 0.000
 Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	25-Jul-2006 10:15:00
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	103_150K_05AUG05.Pbc 08-Aug-2005 12:54:15
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 14 cutoff 20.00000 %
 Energy Calibration
 Normalized diff: 0.1424

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. pCi/gm	Nuc
74.88	57.	40.87	0.99	9.052E-03	74.81	9.600	PBC<MDA	PB212
76.45	199.	19.08	1.04	9.810E-03	77.11	17.500	7.516E-01	PB212
					77.11	10.700	1.229E+00	PB214
185.98	104.	32.51	0.91	2.567E-02				
185.98	104.	32.51	0.91	2.567E-02	185.99	3.280	PBC<MDA	RA226
238.97	744.	4.44	1.09	2.318E-02	238.63	43.100	4.966E-01	PB212
241.62	115.	19.31	1.09	2.304E-02	241.00	3.900	8.658E-01	RA224
					241.92	7.470	4.530E-01	PB214
295.34	219.	9.72	1.13	2.024E-02	295.22	19.200	3.757E-01	PB214
300.07	59.	26.64	1.13	2.001E-02				
327.92	68.	34.07	1.36	1.874E-02				
338.53	143.	14.64	0.99	1.830E-02	338.40	12.010	4.370E-01	AC228
351.99	358.	7.48	1.00	1.775E-02	351.99	37.100	3.631E-01	PB214
463.32	47.	28.47	1.41	1.425E-02				
463.32	47.	28.47	1.41	1.425E-02	463.51	10.000	2.180E-01	SB125
510.95	163.	13.33	1.25	1.317E-02	510.72	22.500	3.127E-01	TL208
583.33	225.	7.95	1.55	1.184E-02	583.14	86.000	1.470E-01	TL208
609.36	299.	8.47	1.44	1.144E-02	609.32	46.090	3.768E-01	BI214
727.88	54.	28.30	1.20	9.957E-03	723.30	19.700	1.870E-01	EU154
					727.17	11.800	3.106E-01	BI212
911.29	183.	10.69	1.51	8.400E-03	911.07	29.000	5.004E-01	AC228
968.83	145.	11.92	1.11	8.026E-03	968.90	17.460	7.035E-01	AC228
1120.30	58.	20.19	1.53	7.212E-03	1120.28	15.040	3.536E-01	BI214
1461.17	844.	3.56	1.94	5.931E-03	1460.75	10.700	8.823E+00	K40
1764.89	53.	13.74	1.90	5.141E-03	1764.51	15.920	4.123E-01	BI214

```
***** UNIDENTIFIED PEAK SUMMARY *****
```

Channel	Peak Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV	Suspected Nuclide
599.47	300.16	169.	59.	0.030	107.59	1.301	PB-212
654.99	327.92	184.	68.	0.034	102.20	1.361	AC-228

s - Peak fails shape tests.
 D - Peak area deconvoluted.
 L - Peak written from unknown list.
 C - Area < Critical level.

 This section based on library: FSS_Rev_1.Lib

```
***** IDENTIFIED PEAK SUMMARY *****
```

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV
PB-212	153.39	77.11	274.	93.	0.046	73.62	0.995A
PB-212	477.12	238.98	432.	695.	0.348	17.57	0.965
RA-224	482.63	241.74	466.	121.	0.061	80.44	1.500
PB-214	482.95	241.90	505.	97.	0.049	102.50	1.500
PB-214	590.00	295.43	161.	201.	0.100	33.90	0.912
AC-228	676.20	338.53	128.	142.	0.071	43.91	0.990
PB-214	703.19	352.03	186.	369.	0.184	24.49	1.001
SB-125	925.30	463.09	77.	51.	0.025	82.45	1.500s
TL-208	1021.02	510.95	123.	137.	0.068	39.98	1.246s
TL-208	1165.75	583.33	49.	221.	0.110	23.85	1.546
BI-214	1217.81	609.36	107.	293.	0.146	25.40	1.438
BI-212	1453.87	727.40	72.	40.	0.020	99.62	1.500s
AC-228	1821.61	911.29	57.	180.	0.090	32.07	1.506
AC-228	1936.67	968.83	46.	145.	0.073	35.76	1.109
BI-214	2239.57	1120.30	35.	57.	0.028	60.57	1.533s
K-40	2921.21	1461.17	32.	825.	0.413	10.67	1.942
BI-214	3528.53	1764.89	3.	50.	0.025	41.21	1.903

s - Peak fails shape tests.
 D - Peak area deconvoluted.
 A - Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****							
- Nuclide -	Average	----- Peak -----					
Name	Code	Activity	Energy	Activity	Code	MDA Value	COMMENTS
		pCi/gm	keV	pCi/gm		pCi/gm	
BE-7		1.1859E-01	477.56	1.186E-01	% (	1.900E-01 5.88E-02	G
K-40		8.8228E+00	1460.75	8.823E+00	(P	3.105E-01 3.21E-01	G
MN-54		-2.7151E-04	834.81	-2.715E-04	%(P	2.590E-02 7.21E-03	G
CO-57		-6.7954E-03	122.07	-6.795E-03	%(P	4.242E-02 1.27E-02	G K
			136.43	-1.956E-02	&	3.043E-01 9.05E-02	G
CO-60		-3.3006E-03	1332.51	-3.301E-03	%(P	2.680E-02 6.86E-03	G K
			1173.23	-5.994E-03	% P	3.140E-02 8.74E-03	G K
Sr-85		-1.5476E-02	514.00	-1.548E-02	%(	3.553E-02 1.07E-02	G
Kr-85		-3.5248E+02	513.99	-3.525E+02	%(	8.092E+02 2.45E+02	G
Y-88		-8.6997E-05	1836.01	-8.700E-05	%(P	2.262E-02 5.71E-03	G K
			898.02	3.711E-04	& P	3.249E-02 9.15E-03	G
NB-94		-4.1052E-03	871.10	-4.105E-03	%(	2.655E-02 7.63E-03	G K
			702.50	-3.389E-03	%	2.559E-02 7.38E-03	G K
Ag-108M		-1.1174E-02	722.95	-1.117E-02	%(	3.959E-02 1.18E-02	G K
			614.37	-1.117E-02	% P	2.974E-02 8.90E-03	G
			433.93	1.000E-03	&	2.680E-02 7.75E-03	G
CD-109		3.3575E-01	88.04	3.358E-01	%(	1.554E+00 4.66E-01	G
SN-113		0.0000E+00	391.71	0.000E+00	%(	3.646E-02 1.05E-02	G K
			255.04	-2.692E-01	%	1.295E+00 3.86E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	5.0477E-02	427.95	1.384E-02	% (P	8.225E-02	2.42E-02	G K
		600.77	1.737E-02	% P	1.330E-01	3.85E-02	G
		636.15	1.499E-03	& P	1.886E-01	5.25E-02	G
		463.51	2.409E-01	*(P	2.075E-01	6.79E-02	G
		176.29	7.491E-02	%	4.756E-01	1.42E-01	G
I-131	8.1265E-03	364.48	8.126E-03	% (P	2.731E-02	8.11E-03	G K
		636.97	4.933E-02	&	3.468E-01	9.99E-02	G
		284.29	2.509E-02	& P	4.552E-01	1.34E-01	G
CS-134	-5.0140E-03	604.66	5.014E-03	% (	2.864E-02	8.38E-03	G K
		795.76	1.439E-02	% P	3.301E-02	9.95E-03	G
		569.29	5.242E-03	% P	1.273E-01	3.56E-02	G
		801.84	3.936E-02	% P	2.808E-01	7.82E-02	G
CS-137	6.9660E-03	661.62	6.966E-03	% (P	2.451E-02	7.14E-03	G
CE-139	6.3249E-03	165.85	6.325E-03	& (	3.653E-02	1.09E-02	G
EU-152	-2.0306E-02	121.78	2.031E-02	% (P	1.241E-01	3.71E-02	G K
		344.30	2.288E-02	% P	6.725E-02	2.01E-02	G
		1408.08	6.904E-03	%	1.205E-01	3.28E-02	G
		964.00	8.022E-02	% P	2.307E-01	6.83E-02	G
		1112.07	3.514E-02	%	1.968E-01	5.63E-02	G
		778.90	2.648E-02	%	1.902E-01	5.45E-02	G
EU-154	-1.3167E-02	123.10	1.317E-02	% (	8.400E-02	2.51E-02	G K
		1274.80	7.139E-03	&	8.902E-02	2.50E-02	G
		723.30	5.649E-03	%	1.672E-01	4.81E-02	G
		1004.80	1.655E-04	%	1.250E-01	3.39E-02	G
EU-155	-6.8291E-02	86.45	6.829E-02	% (	1.878E-01	5.67E-02	G K
		105.31	2.992E-02	&	1.712E-01	5.11E-02	G
HG-203	-3.6833E-03	279.17	3.683E-03	& (P	3.173E-02	9.38E-03	G K
		72.87	2.517E-01	% P	1.805E+00	5.40E-01	G
		70.83	6.412E-01	&	3.310E+00	9.91E-01	G
		82.50	3.113E-02	%	2.607E+00	7.71E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	1.4698E-01	583.14	1.470E-01	(P	2.363E-02	1.19E-02	G
		510.72	3.127E-01	+ P	1.248E-01	4.98E-02	G
PB-212	4.9275E-01	238.63	4.718E-01	(P	6.759E-02	2.81E-02	G K
		77.11	3.548E-01	} P	3.062E-01	8.71E-02	G
		74.81	4.484E-01	% P	6.287E-01	1.93E-01	G
PB-214	3.7158E-01	351.99	3.800E-01	(P	6.833E-02	3.15E-02	G K
		295.22	3.503E-01	(P	1.081E-01	4.04E-02	G
		77.11	2.977E-01	} P	7.272E-01	1.76E-01	G
		241.92	3.844E-01	(	4.240E-01	1.31E-01	G
BI-212	2.3304E-01	727.17	2.330E-01	*(P	2.441E-01	7.83E-02	G K
		1620.56	1.921E-01	% P	9.030E-01	2.54E-01	G
		785.42-1.377E-01	&	1.174E+00	3.34E-01	G	
BI-214	3.7964E-01	609.32	3.768E-01	(P	6.562E-02	3.26E-02	G K
		1764.51	4.123E-01	(P	9.236E-02	6.04E-02	G
		1120.28	3.536E-01	*(P	1.907E-01	7.38E-02	G
RA-224	9.1298E-01	241.00	9.130E-01	(	7.793E-01	2.45E-01	G
RA-226	6.5491E-01						Energy duplication
		185.99	6.549E-01	%(P	8.964E-01	2.74E-01	G
AC-228	4.8184E-01	911.07	5.004E-01	(P	1.059E-01	5.45E-02	G K
		968.90	7.035E-01	+ P	1.658E-01	8.40E-02	G
		338.40	4.370E-01	(P	1.715E-01	6.45E-02	G
TH-227	-1.1055E-02	236.00-1.106E-02	% (	4.137E-01	1.24E-01	G K	
		256.25-7.546E-02	% P	3.563E-01	1.06E-01	G	
PA-234	-3.9759E-04	98.44-3.976E-04	%(P	1.772E-01	5.25E-02	G K	
		946.00	2.160E-02	% P	1.304E-01	3.74E-02	G
		131.28	3.002E-03	& P	1.508E-01	4.47E-02	G
		94.67-1.725E-02	% P	3.139E-01	9.33E-02	G	
		883.24-3.491E-04	%	2.080E-01	5.77E-02	G	
		926.70-7.195E-04	&	1.582E-01	4.20E-02	G	

Nuclide	Ave activity	Energy	Activity	Code	Peak MDA	Comments
		569.26	1.372E-03	% P	1.987E-01	5.55E-02 G
TH-234	8.8646E-01					
		63.29	8.865E-01	%(P	4.900E+00	1.46E+00 G K
		92.80	8.730E-01	% P	1.734E+00	5.23E-01 G
		92.38	1.188E+00	& P	2.059E+00	6.23E-01 G
AM-241	-9.6163E-02					
		59.54	-9.616E-02	%(P	8.613E-01	2.56E-01 G

(- This peak used in the nuclide activity average.

- * - Peak is too wide, but only one peak in library.
- ! - Peak is part of a multiplet and this area went negative during deconvolution.
- ? - Peak is too narrow.
- @ - Peak is too wide at FW25M, but ok at FWHM.
- % - Peak fails sensitivity test.
- \$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
- + - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
- = - Peak outside analysis energy range.
- & - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
- P - Peakbackground subtraction
- } - Peak is too close to another for the activity to be found directly.

Nuclide Codes:

T - Thermal Neutron Activation
 F - Fast Neutron Activation
 I - Fission Product
 N - Naturally Occurring Isotope
 P - Photon Reaction
 C - Charged Particle Reaction
 M - No MDA Calculation
 R - Coincidence Corrected
 H - Halflife limit exceeded

Peak Codes:

G - Gamma Ray
 X - X-Ray
 P - Positron Decay
 S - Single-Escape
 D - Double-Escape
 K - Key Line
 A - Not in Average
 C - Coincidence Peak

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****						
Nuclide		Time of Count	Time Corrected	Uncertainty	3 Sigma	
		Activity	Activity	Counting	Total	MDA
		pCi/gm	pCi/gm	pCi/gm	pCi/gm	pCi/gm
BE-7	#A	1.1666E-01	1.1859E-01	1.7633E-01	1.7647E-01	1.869E-01
K-40		8.8228E+00	8.8228E+00	9.6270E-01	1.0905E+00	
MN-54	#A	-2.7075E-04	-2.7151E-04	1.5469E-02	1.5469E-02	2.582E-02
CO-57	#B	-6.7734E-03	-6.7954E-03	3.9709E-02	3.9711E-02	4.228E-02
CO-60	#B	-3.2991E-03	-3.3006E-03	2.6876E-01	2.6876E-01	2.679E-02

Sr-85	#A	-1.5268E-02	-1.5476E-02	3.2208E-02	3.2220E-02	3.505E-02
Kr-85	#A	-3.5248E+02	-3.5248E+02	7.3357E+02	7.3385E+02	8.092E+02
Y-88	#B	-8.6285E-05	-8.6997E-05	2.1559E-03	2.1559E-03	2.243E-02
NB-94	#B	-4.1052E-03	-4.1052E-03	2.2880E-02	2.2882E-02	2.655E-02
Ag-108M	#B	-1.1174E-02	-1.1174E-02	3.5282E-02	3.5288E-02	3.959E-02
CD-109	#A	3.3510E-01	3.3575E-01	1.3978E+00	1.3980E+00	1.551E+00
SN-113	#B	0.0000E+00	0.0000E+00	3.1586E-02	3.1586E-02	3.619E-02
SB-125	#B	5.0433E-02	5.0477E-02	4.2667E-02	4.2767E-02	8.218E-02
I-131	#B	7.2877E-03	8.1265E-03	2.4317E-02	2.4322E-02	2.449E-02
CS-134	#B	-5.0082E-03	-5.0140E-03	2.5134E-02	2.5136E-02	2.861E-02
CS-137	#A	6.9654E-03	6.9660E-03	2.1424E-02	2.1428E-02	2.451E-02
CE-139	#A	6.2848E-03	6.3249E-03	3.2733E-02	3.2735E-02	3.630E-02
EU-152	#B	-2.0302E-02	-2.0306E-02	1.2209E-01	1.2209E-01	1.240E-01
EU-154	#B	-1.3163E-02	-1.3167E-02	7.5289E-02	7.5292E-02	8.398E-02
EU-155	#B	-6.8258E-02	-6.8291E-02	1.7005E-01	1.7009E-01	1.877E-01
HG-203	#B	-3.6147E-03	-3.6833E-03	2.8370E-02	2.8371E-02	3.114E-02
TL-208		1.4698E-01	1.4698E-01	3.5736E-02	3.6741E-02	
PB-212		4.9275E-01	4.9275E-01	8.8079E-02	9.2608E-02	
PB-214		3.7158E-01	3.7158E-01	9.2399E-02	9.4884E-02	
BI-212	#A	2.3304E-01	2.3304E-01	2.3500E-01	2.3539E-01	2.441E-01
BI-214		3.7964E-01	3.7964E-01	9.8574E-02	1.0101E-01	
RA-224	#	9.1298E-01	9.1298E-01	7.3439E-01	7.3630E-01	7.793E-01
RA-226	#A	6.5491E-01	6.5491E-01	8.2089E-01	8.2177E-01	8.964E-01
AC-228		4.8184E-01	4.8184E-01	1.3252E-01	1.3544E-01	
TH-227	#B	-1.1055E-02	-1.1055E-02	3.7062E-01	3.7063E-01	4.137E-01
PA-234	#B	-3.9759E-04	-3.9759E-04	2.7501E-01	2.7501E-01	1.772E-01
TH-234	#B	8.8646E-01	8.8646E-01	4.3767E+00	4.3770E+00	4.900E+00
AM-241	#A	-9.6162E-02	-9.6163E-02	7.9494E-01	7.9496E-01	8.613E-01

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Half-life limit exceeded

----- S U M M A R Y -----
Total Activity (87.9 to 2000.7 keV) 1.0695615E+01 pCi/gm
Total Decayed Activity (87.9 to 2000.7 keV) 1.0695615E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
DAT

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

Sample description
FSS-OOL-16-01-016-F

Spectrum Filename: C:\GammaVision\Spectra\103F_26JUL2006_1711.An1

Acquisition information

Start time: 26-Jul-2006 17:11:14
Live time: 2000
Real time: 2002
Dead time: 0.08 %
Detector ID: 4

Detector system

Det 103 - DSPE-471

Calibration

Filename: D3_1LSa.Clb
Detector_103 1.0 Liter Sand Geometry

Energy Calibration

Created: 08-Aug-2005 11:09:41
Zero offset: 0.409 keV
Gain: 0.500 keV/channel
Quadratic: 1.092E-08 keV/channel²

Efficiency Calibration

Created: 08-Aug-2005 11:11:25
Type: Polynomial
Uncertainty: 0.993 %
Coefficients: -0.264059 -5.138468 0.638383
-0.089199 0.005011 -0.000129

Library Files

Main analysis library: FSS_Rev_1.Lib
Library Match Width: 1.000
Peak stripping: Library based

Analysis parameters

Analysis engine: Env32 G53W4.20
Start channel: 100 (50.41keV)
Stop channel: 4000 (2000.67keV)
Peak rejection level: 41.667%
Peak search sensitivity: 3
Sample Size: 1.2760E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.2760E+03) =
7.8370E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

Fraction Limit: 0.000%
Background width: average of five points.

Half lives decay limit: 12.000
 Activity range factor: 2.000
 Min. step backg. energy 0.000
 Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	25-Jul-2006 11:23:00
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	103_150K_05AUG05.Pbc 08-Aug-2005 12:54:15
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 17 cutoff 20.00000 %
 Energy Calibration
 Normalized diff: 0.1532

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. pCi/gm	Nuc
74.93	111.	20.52	0.99	9.052E-03	74.81	9.600	1.350E+00	PB212
77.23	129.	15.18	0.99	1.011E-02	77.11	17.500	1.027E+00	PB212
					77.11	10.700	1.680E+00	PB214
83.87	56.	34.14	1.00	1.308E-02				
86.89	78.	30.18	1.00	1.429E-02	86.45	32.740	1.792E-01	EU155
93.43	95.	25.39	1.00	1.668E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
185.90	122.	27.73	1.13	2.567E-02				
185.90	122.	27.73	1.13	2.567E-02	185.99	3.280	1.378E+00	RA226
209.34	87.	28.58	1.20	2.471E-02				
238.98	805.	4.14	1.09	2.318E-02	238.63	43.100	8.404E-01	PB212
241.60	145.	15.48	1.09	2.304E-02	241.00	3.900	1.702E+00	RA224
					241.92	7.470	8.906E-01	PB214
270.81	78.	26.00	0.95	2.148E-02				
276.77	66.	37.60	0.71	2.117E-02				
295.23	200.	13.46	1.20	2.025E-02	295.22	19.200	5.351E-01	PB214
300.58	61.	30.52	1.01	1.999E-02				
338.51	153.	14.09	1.01	1.830E-02	338.40	12.010	7.310E-01	AC228
351.94	304.	8.87	1.00	1.775E-02	351.99	37.100	4.791E-01	PB214
463.22	63.	27.61	1.73	1.425E-02				
463.22	63.	27.61	1.73	1.425E-02	463.51	10.000	4.607E-01	SB125
511.18	140.	17.50	1.79	1.316E-02	510.72	22.500	4.067E-01	TL208
583.31	269.	7.81	1.46	1.184E-02	583.14	86.000	2.748E-01	TL208
609.35	211.	8.91	1.34	1.144E-02	609.32	46.090	4.100E-01	BI214
661.67	150.	15.25	1.10	1.072E-02	661.62	84.620	1.741E-01	CS137
727.53	104.	19.33	1.63	9.961E-03	727.17	11.800	9.323E-01	BI212
768.47	49.	32.92	1.21	9.552E-03				

794.77	59.	28.70	1.02	9.310E-03				
794.77	59.	28.70	1.02	9.310E-03	795.76	85.400	7.864E-02	CS134
911.38	226.	8.45	1.31	8.399E-03	911.07	29.000	9.656E-01	AC228
969.15	123.	17.07	1.80	8.024E-03	968.90	17.460	9.270E-01	AC228
1120.50	76.	19.91	1.93	7.211E-03	1120.28	15.040	7.275E-01	BI214
1461.13	879.	3.41	1.72	5.931E-03	1460.75	10.700	1.435E+01	K40
1620.30	14.	26.73	0.67	5.488E-03	1620.56	2.750	9.794E-01	BI212
1765.11	59.	13.02	1.54	5.140E-03	1764.51	15.920	7.210E-01	BI214

***** U N I D E N T I F I E D P E A K S U M M A R Y *****									
Channel	Peak Energy	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV	Suspected Nuclide	
172.95	86.93		239.	78.	0.039	90.54	1.001	TB-160	LD
417.85	209.34		253.	87.	0.043	85.74	1.196	AC-228	s
540.78	270.81		161.	78.	0.039	78.01	0.947	AC-228	s
552.70	276.77		219.	71.	0.035	95.41	0.705	TL-208	s
600.30	300.58		131.	61.	0.031	91.57	1.008	PB-212	s
1536.00	768.47		66.	49.	0.024	98.76	1.209	BI-214	sM

s - Peak fails shape tests.
 D - Peak area deconvoluted.
 L - Peak written from unknown list.
 C - Area < Critical level.
 M - Peak is close to a library peak.

 This section based on library: FSS_Rev_1.Lib

***** I D E N T I F I E D P E A K S U M M A R Y *****									
Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV		
PB-212	148.79	74.81	219.	111.	0.055	61.56	0.993D		
PB-212	153.39	77.11	223.	129.	0.064	45.53	0.995A		
TH-234	185.20	93.01	594.	105.	0.052	87.48	1.500s		
TH-234	185.18	93.01	575.	106.	0.053	85.36	1.500s		
RA-226	371.51	186.17	492.	106.	0.053	83.06	1.500		
PB-212	477.20	239.02	407.	918.	0.459	14.70	1.013		
RA-224	482.54	241.69	489.	122.	0.061	81.63	1.500		
PB-214	482.80	241.82	526.	88.	0.044	115.69	1.500		
PB-214	589.61	295.23	200.	196.	0.098	40.38	1.203		
AC-228	676.16	338.51	136.	152.	0.076	42.28	1.008s		
PB-214	703.02	351.94	162.	298.	0.149	26.62	0.996		
SB-125	925.32	463.10	98.	48.	0.024	94.30	1.500s		
TL-208	1021.47	511.18	159.	114.	0.057	52.49	1.788s		
TL-208	1165.73	583.31	76.	264.	0.132	23.43	1.456		
BI-214	1217.79	609.35	61.	204.	0.102	26.73	1.341		
CS-137	1322.43	661.67	109.	149.	0.075	45.75	1.098		
BI-212	1454.14	727.53	75.	104.	0.052	57.98	1.633		
CS-134	1589.40	795.17	53.	38.	0.019	93.90	1.500		
AC-228	1821.78	911.38	51.	222.	0.111	25.36	1.309		
AC-228	1937.31	969.15	81.	123.	0.061	51.21	1.803		
BI-214	2239.97	1120.50	47.	75.	0.037	59.74	1.926		
K-40	2921.13	1461.13	25.	860.	0.430	10.23	1.724		
BI-212	3239.42	1620.30	0.	14.	0.007	80.18	0.667s		

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BI-214	3528.96	1765.11	3.	56.	0.028	39.06	1.542

s - Peak fails shape tests.
 D - Peak area deconvoluted.
 A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Average Code Activity pCi/gm	Energy keV	Peak Activity pCi/gm	Code	MDA Value pCi/gm	COMMENTS
BE-7	8.5600E-02	477.56	8.560E-02	&(	3.698E-01 1.09E-01	G
K-40	1.4349E+01	1460.75	1.435E+01	(P	4.341E-01 5.00E-01	G
MN-54	-3.5738E-04	834.81	-3.574E-04	%(P	4.227E-02 1.18E-02	G
CO-57	4.3437E-03	122.07	4.344E-03	%(P	5.807E-02 1.73E-02	G K
		136.43	3.281E-02	%	4.397E-01 1.31E-01	G
CO-60	-4.4410E-03	1332.51	-4.441E-03	%(P	4.063E-02 1.03E-02	G K
		1173.23	1.278E-02	& P	4.607E-02 1.33E-02	G K
Sr-85	-4.7553E-03	514.00	-4.755E-03	&(	4.916E-02 1.44E-02	G
Kr-85	-1.0833E+02	513.99	-1.083E+02	&(	1.120E+03 3.28E+02	G
Y-88	-1.3573E-04	1836.01	-1.357E-04	&(P	1.588E-02 2.16E-03	G K
		898.02	-8.217E-03	% P	4.493E-02 1.28E-02	G
NB-94	5.0909E-03	871.10	5.091E-03	&(	3.824E-02 1.09E-02	G K
		702.50	1.862E-02	%	3.328E-02 1.02E-02	G K
Ag-108M	-9.2533E-03	722.95	-9.253E-03	%(	4.267E-02 1.24E-02	G K
		614.37	-4.938E-05	% P	1.882E-02 4.85E-03	G
		433.93	-5.393E-04	%	3.210E-02 9.12E-03	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CD-109	4.0486E-02	88.04	4.049E-02	&(	2.570E+00	7.65E-01	G
SN-113	-1.6575E-02	391.71-1.657E-02	1.419E-01	&(	6.032E-02	1.79E-02	G K
		255.04	1.419E-01	%	1.897E+00	5.60E-01	G
SB-125	7.9191E-02	427.95-1.574E-02	2.022E-02	% (P	1.262E-01	3.69E-02	G K
		600.77	2.022E-02	& P	1.554E-01	4.42E-02	G
		636.15	6.954E-02	% P	3.165E-01	9.21E-02	G
		463.51	3.602E-01	(P	3.641E-01	1.16E-01	G
		176.29	1.290E-01	%	6.283E-01	1.88E-01	G
I-131	-1.4687E-03	364.48-1.469E-03	1.049E-01	% (P	5.428E-02	1.58E-02	G K
		636.97	1.049E-01	&	5.549E-01	1.61E-01	G
		284.29-1.176E-01	1.176E-01	% P	7.315E-01	2.17E-01	G
CS-134	1.6834E-02	604.66-1.301E-02	5.094E-02	% (	4.508E-02	1.34E-02	G K
		795.76	5.094E-02	(P	4.875E-02	1.60E-02	G
		569.29-4.413E-02	4.413E-02	% P	2.343E-01	6.71E-02	G
		801.84-4.687E-02	4.687E-02	% P	3.756E-01	1.02E-01	G
CS-137	1.7406E-01	661.62	1.741E-01	(P	5.993E-02	2.68E-02	G
CE-139	-9.3849E-03	165.85-9.385E-03	9.385E-03	% (	5.314E-02	1.59E-02	G
EU-152	1.1991E-02	121.78	1.199E-02	% (P	1.699E-01	5.04E-02	G K
		344.30	2.707E-02	% P	1.420E-01	4.20E-02	G
		1408.08	4.755E-02	%	1.331E-01	3.90E-02	G
		964.00-2.243E-02	2.243E-02	& P	2.542E-01	7.02E-02	G
		1112.07	1.141E-01	%	3.625E-01	1.07E-01	G
		778.90	7.069E-02	&	2.858E-01	8.34E-02	G
EU-154	-1.8065E-03	123.10-1.806E-03	1.259E-03	&(	1.242E-01	3.68E-02	G K
		1274.80	1.259E-03	%	1.392E-01	3.86E-02	G
		723.30-9.923E-02	9.923E-02	%	2.614E-01	7.84E-02	G
		1004.80	0.000E+00	%	2.979E-01	8.41E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	1.0018E-01	86.45	1.002E-01	% (	2.809E-01	8.47E-02	G K
		105.31	4.972E-02	&	2.588E-01	7.73E-02	G
HG-203	-8.2782E-03	279.17	8.278E-03	& (P	4.866E-02	1.44E-02	G K
		72.87	9.315E-01	& P	2.695E+00	8.12E-01	G
		70.83	4.980E-01	%	3.799E+00	1.13E+00	G
		82.50	1.817E+00	%	4.462E+00	1.35E+00	G
TL-208	2.7478E-01	583.14	2.748E-01	(P	4.497E-02	2.18E-02	G
		510.72	4.067E-01	+ P	2.198E-01	8.79E-02	G
PB-212	9.8811E-01	238.63	9.722E-01	(P	1.025E-01	4.84E-02	G K
							Energy duplication
		77.11	7.715E-01	} P	4.329E-01	1.17E-01	G
		74.81	1.350E+00	+ P	8.739E-01	2.85E-01	G
PB-214	5.0301E-01	351.99	4.791E-01	(P	9.974E-02	4.33E-02	G K
		295.22	5.351E-01	(P	1.867E-01	7.35E-02	G
							Energy duplication
		77.11	4.320E-01	} P	1.081E+00	2.67E-01	G
		241.92	5.392E-01	(	6.750E-01	2.08E-01	G
BI-212	9.4116E-01	727.17	9.323E-01	(P	3.891E-01	1.81E-01	G K
		1620.56	9.794E-01	(P	5.172E-01	2.63E-01	G
		785.42	4.736E-01	%	2.016E+00	5.89E-01	G
BI-214	4.1003E-01	609.32	4.100E-01	(P	7.847E-02	3.77E-02	G K
		1764.51	7.210E-01	+ P	1.441E-01	9.94E-02	G
		1120.28	7.275E-01	+ P	3.400E-01	1.49E-01	G
RA-224	1.4346E+00	241.00	1.435E+00	& (	1.245E+00	3.90E-01	G
RA-226	1.3277E+00	185.99	1.328E+00	(P	1.334E+00	4.13E-01	G
AC-228	9.5107E-01	911.07	9.656E-01	(P	1.562E-01	8.29E-02	G K
		968.90	9.270E-01	(P	3.381E-01	1.58E-01	G
		338.40	7.310E-01	- P	2.752E-01	1.04E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TH-227	8.2445E-02	236.00	8.245E-02	% (	2.839E-01	8.48E-02	G K
		256.25	5.183E-02	% P	5.970E-01	1.76E-01	G
PA-234	-5.2107E-02	98.44	5.211E-02	% (P	2.410E-01	7.20E-02	G K
		946.00	3.926E-02	& P	2.009E-01	5.79E-02	G
		131.28	2.121E-02	& P	2.459E-01	7.31E-02	G
		94.67	1.276E-01	& P	4.793E-01	1.44E-01	G
		883.24	2.477E-03	%	2.687E-01	7.33E-02	G
		926.70	1.247E-02	%	4.187E-01	1.18E-01	G
TH-234	1.3538E+00	569.26	3.059E-02	% P	3.660E-01	1.04E-01	G
		63.29	2.084E-01	% (P	7.752E+00	2.28E+00	G K
		92.80	2.275E+00	(P	2.456E+00	7.55E-01	G
AM-241	2.6601E-01	92.38	2.649E+00	(P	2.938E+00	9.02E-01	G
		59.54	2.660E-01	% (P	1.313E+00	3.92E-01	G

(- This peak used in the nuclide activity average.

- * - Peak is too wide, but only one peak in library.
- ! - Peak is part of a multiplet and this area went negative during deconvolution.
- ? - Peak is too narrow.
- @ - Peak is too wide at FW25M, but ok at FWHM.
- % - Peak fails sensitivity test.
- \$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
- + - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
- = - Peak outside analysis energy range.
- & - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
- P - Peakbackground subtraction
- } - Peak is too close to another for the activity to be found directly.

Nuclide Codes:

T - Thermal Neutron Activation
 F - Fast Neutron Activation
 I - Fission Product
 N - Naturally Occurring Isotope
 P - Photon Reaction
 C - Charged Particle Reaction
 M - No MDA Calculation

Peak Codes:

G - Gamma Ray
 X - X-Ray
 P - Positron Decay
 S - Single-Escape
 D - Double-Escape
 K - Key Line
 A - Not in Average

R - Coincidence Corrected C - Coincidence Peak
 H - Halflife limit exceeded

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***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****
          Time of Count   Time Corrected   Uncertainty   3 Sigma
Nuclide   Activity       Activity       Counting      Total        MDA
          pCi/gm        pCi/gm        pCi/gm        pCi/gm        pCi/gm
-----
BE-7  #A   8.4232E-02   8.5600E-02   3.2716E-01   3.2719E-01   3.639E-01
K-40                   1.4349E+01   1.4349E+01   1.5002E+00   1.7160E+00
MN-54 #A   -3.5640E-04  -3.5738E-04   4.1789E-01   4.1789E-01   4.216E-02
CO-57 #B    4.3299E-03   4.3437E-03   5.1755E-02   5.1756E-02   5.789E-02
CO-60 #B   -4.4390E-03  -4.4410E-03   1.1597E+01   1.1597E+01   4.061E-02
Sr-85 #A   -4.6925E-03  -4.7553E-03   4.3136E-02   4.3137E-02   4.851E-02
Kr-85 #A   -1.0833E+02  -1.0833E+02   9.8270E+02   9.8272E+02   1.120E+03
Y-88  #B   -1.3464E-04  -1.3573E-04   8.1436E-04   8.1440E-04   1.576E-02
NB-94 #B    5.0909E-03   5.0909E-03   3.2671E-02   3.2672E-02   3.824E-02
Ag-108M#B -9.2531E-03  -9.2533E-03   3.7297E-02   3.7301E-02   4.267E-02
CD-109 #A   4.0409E-02   4.0486E-02   2.2944E+00   2.2944E+00   2.565E+00
SN-113 #B  -1.6451E-02  -1.6575E-02   5.3835E-02   5.3843E-02   5.987E-02
SB-125 #B   7.9123E-02   7.9191E-02   7.6642E-02   7.6779E-02   1.261E-01
I-131 #B  -1.3196E-03  -1.4687E-03   1.0816E-01   1.0816E-01   4.877E-02
CS-134 #B   1.6815E-02   1.6834E-02   1.5843E-02   1.5874E-02   4.503E-02
CS-137   1.7405E-01   1.7406E-01   8.0374E-02   8.1007E-02
CE-139 #A  -9.3263E-03  -9.3849E-03   4.7575E-02   4.7578E-02   5.281E-02
EU-152 #B   1.1988E-02   1.1991E-02   1.5131E-01   1.5131E-01   1.698E-01
EU-154 #B  -1.8060E-03  -1.8065E-03   1.1038E-01   1.1038E-01   1.241E-01
EU-155 #B   1.0013E-01   1.0018E-01   2.5422E-01   2.5428E-01   2.808E-01
HG-203 #B  -8.1267E-03  -8.2782E-03   4.3548E-02   4.3551E-02   4.777E-02
TL-208   2.7478E-01   2.7478E-01   6.5422E-02   6.7339E-02
PB-212   9.8811E-01   9.8811E-01   1.4715E-01   1.5794E-01
PB-214   5.0301E-01   5.0301E-01   1.3645E-01   1.3954E-01
BI-212   9.4116E-01   9.4116E-01   4.6736E-01   4.7054E-01
BI-214   4.1003E-01   4.1003E-01   1.1307E-01   1.1554E-01
RA-224 #   1.4346E+00   1.4346E+00   1.1711E+00   1.1741E+00   1.245E+00
RA-226 #A   1.3277E+00   1.3277E+00   1.2381E+00   1.2405E+00   1.334E+00
AC-228   9.5107E-01   9.5107E-01   2.4481E-01   2.5096E-01
TH-227 #B   8.2445E-02   8.2445E-02   2.5448E-01   2.5453E-01   2.839E-01
PA-234 #B  -5.2107E-02  -5.2107E-02   2.3574E-01   2.3576E-01   2.410E-01
TH-234 #B   1.3538E+00   1.3538E+00   1.3480E+00   1.3501E+00   7.752E+00
AM-241 #A   2.6601E-01   2.6601E-01   1.1770E+00   1.1771E+00   1.313E+00
  
```

- All peaks for activity calculation had bad shape.
 * - Activity omitted from total
 & - Activity omitted from total and all peaks had bad shape.
 < - MDA value printed.
 A - Activity printed, but activity < MDA.
 B - Activity < MDA and failed test.
 C - Area < Critical level.
 F - Failed fraction or key line test.

H - Halflife limit exceeded

----- S U M M A R Y -----
Total Activity (83.9 to 2000.7 keV) 1.8591166E+01 pCi/gm
Total Decayed Activity (83.9 to 2000.7 keV) 1.8591179E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
DAT

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

Sample description
FSS-OOL-16-01-013-F

Spectrum Filename: C:\GammaVision\Spectra\103F_26JUL2006_1747.An1

Acquisition information

Start time: 26-Jul-2006 17:47:46
Live time: 2000
Real time: 2002
Dead time: 0.11 %
Detector ID: 4

Detector system

Det 103 - DSPE-471

Calibration

Filename: D3_1LSa.Clb
Detector_103 1.0 Liter Sand Geometry

Energy Calibration

Created: 08-Aug-2005 11:09:41
Zero offset: 0.409 keV
Gain: 0.500 keV/channel
Quadratic: 1.092E-08 keV/channel²

Efficiency Calibration

Created: 08-Aug-2005 11:11:25
Type: Polynomial
Uncertainty: 0.993 %
Coefficients: -0.264059 -5.138468 0.638383
-0.089199 0.005011 -0.000129

Library Files

Main analysis library: FSS_Rev_1.Lib
Library Match Width: 1.000
Peak stripping: Library based

Analysis parameters

Analysis engine: Env32 G53W4.20
Start channel: 100 (50.41keV)
Stop channel: 4000 (2000.67keV)
Peak rejection level: 41.667%
Peak search sensitivity: 3
Sample Size: 2.0720E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 2.0720E+03) =
4.8263E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

Fraction Limit: 0.000%
Background width: average of five points.

Half lives decay limit: 12.000
 Activity range factor: 2.000
 Min. step backg. energy 0.000
 Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	25-Jul-2006 10:20:00
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	103_150K_05AUG05.Pbc 08-Aug-2005 12:54:15
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 18 cutoff 20.00000 %
 Energy Calibration
 Normalized diff: 0.1683

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. pCi/gm	Nuc
74.92	168.	17.28	0.99	9.052E-03	74.81	9.600	1.262E+00	PB212
77.22	161.	15.07	0.99	1.011E-02	77.11	17.500	7.328E-01	PB212
					77.11	10.700	1.199E+00	PB214
93.02	105.	37.39	1.50	1.645E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
93.03	112.	35.33	1.50	1.631E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
129.47	131.	34.25	0.91	2.442E-02				
129.47	131.	34.25	0.91	2.442E-02	131.28	20.000	1.728E-01	PA234
186.18	230.	18.76	1.39	2.566E-02	185.99	3.280	1.678E+00	RA226
209.67	131.	28.69	1.06	2.470E-02				
238.98	1304.	3.30	1.09	2.318E-02	238.63	43.100	8.425E-01	PB212
241.88	161.	17.85	1.10	2.302E-02	241.00	3.900	1.170E+00	RA224
					241.92	7.470	6.122E-01	PB214
270.36	128.	23.41	1.01	2.150E-02				
294.90	330.	10.51	1.05	2.026E-02	295.22	19.200	5.468E-01	PB214
299.98	54.	35.99	1.06	2.002E-02				
338.37	292.	12.43	1.09	1.830E-02	338.40	12.010	8.632E-01	AC228
351.86	481.	7.80	1.00	1.776E-02	351.99	37.100	4.705E-01	PB214
463.20	121.	19.42	1.19	1.425E-02				
463.20	121.	19.42	1.19	1.425E-02	463.51	10.000	5.477E-01	SB125
511.01	221.	13.34	1.22	1.317E-02	510.72	22.500	4.267E-01	TL208
583.31	408.	6.82	1.20	1.184E-02	583.14	86.000	2.585E-01	TL208
609.45	345.	7.49	1.10	1.144E-02	609.32	46.090	4.185E-01	BI214
727.35	131.	16.56	1.42	9.963E-03	727.17	11.800	7.228E-01	BI212
794.62	67.	24.57	1.72	9.311E-03				
794.62	67.	24.57	1.72	9.311E-03	795.76	85.400	5.501E-02	CS134

860.92	91.	20.58	1.62	8.765E-03				
911.48	313.	7.25	1.70	8.398E-03	911.07	29.000	8.286E-01	AC228
964.80	47.	24.65	1.54	8.051E-03	964.00	14.580	PBC<MDA	EU152
969.32	151.	10.16	1.54	8.023E-03	968.90	17.460	7.042E-01	AC228
1119.74	97.	22.25	2.10	7.214E-03	1120.28	15.040	5.725E-01	BI214
1461.17	1413.	2.70	1.93	5.931E-03	1460.75	10.700	1.432E+01	K40

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1620.91	16.	25.00	0.75	5.488E-03	1620.56	2.750	6.896E-01	BI212
1764.81	65.	12.13	2.25	5.142E-03	1764.51	15.920	5.157E-01	BI214

***** U N I D E N T I F I E D P E A K S U M M A R Y *****

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma	FWHM %	Suspected Nuclide
258.11	129.47	784.	131.	0.065	102.74	0.911	AC-228 l
418.50	209.67	538.	131.	0.066	86.08	1.062	NP-239 s
539.87	270.36	334.	128.	0.064	70.22	1.012	AC-228 s
599.10	299.98	168.	54.	0.027	107.96	1.060	TH-227
1720.88	860.92	77.	91.	0.046	61.74	1.620	TL-208
1929.39	964.80	41.	50.	0.025	68.32	1.538	AC-228 D

s - Peak fails shape tests.
 D - Peak area deconvoluted.
 L - Peak written from unknown list.
 C - Area < Critical level.

 This section based on library: FSS_Rev_1.Lib

***** I D E N T I F I E D P E A K S U M M A R Y *****

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma	FWHM %
PB-212	148.79	74.81	355.	168.	0.084	51.83	0.993D
PB-212	153.39	77.11	376.	161.	0.080	45.22	0.995A
TH-234	185.23	93.03	1009.	112.	0.056	105.99	1.500s
RA-226	371.52	186.18	662.	217.	0.108	56.27	1.394s
TH-227	473.27	237.06	1174.	-139.	-0.070	107.40	1.500s
PB-212	477.22	239.03	631.	1285.	0.642	12.34	0.918
RA-224	482.56	241.70	822.	128.	0.064	98.33	1.500s
PB-214	588.95	294.90	327.	326.	0.163	31.52	1.051s
AC-228	675.89	338.37	343.	291.	0.145	37.30	1.086
PB-214	702.86	351.86	304.	475.	0.238	23.39	1.002s
SB-125	925.46	463.17	149.	86.	0.043	67.25	1.500s
TL-208	1021.13	511.01	206.	194.	0.097	40.03	1.219s
TL-208	1165.73	583.31	126.	404.	0.202	20.46	1.195
BI-214	1218.00	609.45	122.	338.	0.169	22.48	1.105
BI-212	1453.78	727.35	110.	130.	0.065	49.69	1.422s
CS-134	1589.11	795.03	56.	52.	0.026	74.46	1.500
AC-228	1821.99	911.48	68.	310.	0.155	21.75	1.700s
AC-228	1936.81	968.90	48.	151.	0.076	31.08	1.541D
BI-214	2238.45	1119.74	102.	95.	0.048	66.75	2.099s
K-40	2921.21	1461.17	29.	1394.	0.697	8.11	1.931
BI-212	3240.62	1620.91	0.	16.	0.008	75.00	0.750s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BI-214	3528.38	1764.81	3.	65.	0.032	36.38	2.250

s - Peak fails shape tests.
 D - Peak area deconvoluted.
 A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	- Average Code Activity pCi/gm	----- Energy keV	Peak Activity pCi/gm	----- Code MDA Value pCi/gm	----- COMMENTS
---------------------	--------------------------------------	------------------------	----------------------------	-----------------------------------	-------------------

BE-7	8.0541E-02	477.56	8.054E-02	%(2.738E-01	8.16E-02 G
K-40	1.4325E+01	1460.75	1.432E+01	(P 2.853E-01	3.92E-01 G
MN-54	1.5674E-02	834.81	1.567E-02	&(P 2.594E-02	8.01E-03 G
CO-57	6.8653E-03	122.07	6.865E-03	%(P 4.859E-02	1.46E-02 G K
		136.43	3.175E-02	% 2.816E-01	8.39E-02 G
CO-60	-2.5082E-03	1332.51	-2.508E-03	&(P 3.180E-02	8.50E-03 G K
		1173.23	-1.258E-02	& P 4.667E-02	1.36E-02 G K
Sr-85	-1.1401E-02	514.00	-1.140E-02	%(3.995E-02	1.20E-02 G
Kr-85	-2.5919E+02	513.99	-2.592E+02	%(9.093E+02	2.72E+02 G
Y-88	-7.7547E-05	1836.01	-7.755E-05	&(P 1.836E-02	4.46E-03 G K
		898.02	6.337E-03	% P 2.954E-02	8.57E-03 G
NB-94	6.7584E-03	871.10	6.758E-03	%(2.748E-02	8.04E-03 G K
		702.50	-1.261E-04	% 3.333E-02	9.59E-03 G K
Ag-108M	-1.2956E-02	722.95	-1.296E-02	%(3.933E-02	1.17E-02 G K
		614.37	-1.029E-02	% P 3.845E-02	1.14E-02 G
		433.93	2.959E-04	% 3.002E-02	8.72E-03 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CD-109	3.8324E-01	88.04	3.832E-01	&(	1.838E+00	5.52E-01	G
SN-113	1.5723E-02	391.71	1.572E-02	% (	4.093E-02	1.23E-02	G K
		255.04	1.799E-01	%	1.462E+00	4.35E-01	G
SB-125	1.0629E-01	427.95	9.032E-03	&(P	9.638E-02	2.83E-02	G K
		600.77	4.866E-02	& P	1.370E-01	4.09E-02	G
		636.15	1.821E-02	% P	2.534E-01	7.31E-02	G
		463.51	3.942E-01	*(P	2.731E-01	8.97E-02	G
		176.29	3.258E-02	&	5.252E-01	1.57E-01	G
I-131	-1.0798E-02	364.48	1.080E-02	%(P	4.129E-02	1.23E-02	G K
		636.97	1.574E-01	&	4.423E-01	1.32E-01	G
		284.29	6.897E-02	& P	4.706E-01	1.39E-01	G
CS-134	2.2118E-02	604.66	4.404E-03	%(	3.244E-02	9.50E-03	G K
		795.76	4.236E-02	(P	3.098E-02	1.05E-02	G
		569.29	2.271E-02	% P	2.032E-01	5.89E-02	G
		801.84	1.324E-02	% P	3.566E-01	1.01E-01	G
CS-137	3.2644E-03	661.62	3.264E-03	%(P	3.766E-02	1.09E-02	G
CE-139	-6.7066E-04	165.85	6.707E-04	&(	4.336E-02	1.29E-02	G
EU-152	2.0004E-02	121.78	2.000E-02	%(P	1.420E-01	4.25E-02	G K
		344.30	1.366E-02	& P	1.093E-01	3.23E-02	G
		1408.08	3.343E-02	&	1.584E-01	4.58E-02	G
		964.00	1.524E-01	% P	3.059E-01	9.29E-02	G
		1112.07	5.190E-02	%	2.980E-01	8.70E-02	G
		778.90	1.565E-02	%	1.987E-01	5.67E-02	G
EU-154	2.1745E-02	123.10	2.175E-02	&(	9.437E-02	2.83E-02	G K
		1274.80	5.514E-03	&	1.131E-01	3.23E-02	G
		723.30	7.518E-02	%	1.991E-01	5.98E-02	G
		1004.80	4.077E-02	%	2.066E-01	6.04E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	8.9722E-02	86.45	8.972E-02	&(	2.246E-01	6.79E-02	G K
		105.31	9.003E-02	%	2.186E-01	6.61E-02	G
HG-203	-2.6904E-04	279.17	2.690E-04	&(P	3.521E-02	1.04E-02	G K
		72.87	5.683E-01	& P	2.099E+00	6.32E-01	G
		70.83	4.562E-02	%	2.723E+00	8.06E-01	G
		82.50	6.219E-01	%	3.554E+00	1.07E+00	G
TL-208	2.5847E-01	583.14	2.585E-01	(P	3.527E-02	1.78E-02	G
		510.72	4.267E-01	+ P	1.532E-01	6.48E-02	G
PB-212	8.3788E-01	238.63	8.379E-01	(P	7.815E-02	3.49E-02	G K
							Energy duplication
		77.11	5.924E-01	} P	3.430E-01	8.93E-02	G
		74.81	1.262E+00	+ P	6.794E-01	2.22E-01	G
PB-214	4.9653E-01	351.99	4.705E-01	@(P	8.312E-02	3.71E-02	G K
		295.22	5.468E-01	@(P	1.459E-01	5.82E-02	G
							Energy duplication
		77.11	2.813E-02	} P	8.067E-01	1.98E-01	G
		241.92	3.101E-01	%	5.341E-01	1.63E-01	G
BI-212	7.1648E-01	727.17	7.228E-01	@(P	2.857E-01	1.20E-01	G K
		1620.56	6.896E-01	(P	3.185E-01	1.73E-01	G
		785.42	7.756E-01	&	1.469E+00	4.48E-01	G
BI-214	4.1852E-01	609.32	4.185E-01	(P	6.694E-02	3.20E-02	G K
		1764.51	5.157E-01	+ P	8.875E-02	6.57E-02	G
		1120.28	5.725E-01	+ P	2.990E-01	1.30E-01	G
RA-224	9.3116E-01	241.00	9.312E-01	?(	9.882E-01	3.05E-01	G
RA-226	1.6776E+00	185.99	1.678E+00	(P	9.502E-01	3.34E-01	G
AC-228	7.9866E-01	911.07	8.286E-01	@(P	1.105E-01	6.08E-02	G K
		968.90	7.046E-01	(P	1.623E-01	7.31E-02	G
		338.40	8.632E-01	(P	2.642E-01	1.08E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TH-227	-3.4762E-01						
		236.00	3.476E-01	?(	4.052E-01	1.24E-01	G K
		256.25	8.718E-02	& P	3.925E-01	1.17E-01	G
PA-234	3.1974E-02						
		98.44	3.197E-02	% (P	2.078E-01	6.23E-02	G K
		946.00	3.430E-02	& P	1.526E-01	4.46E-02	G
		131.28	1.162E-01	& P	1.710E-01	5.23E-02	G
		94.67	3.461E-03	% P	3.682E-01	1.10E-01	G
		883.24	2.269E-03	%	2.060E-01	5.74E-02	G
		926.70	1.253E-01	%	2.401E-01	7.34E-02	G
		569.26	3.280E-02	% P	3.009E-01	8.72E-02	G
TH-234	6.8115E-01						
		63.29	2.338E-02	& (P	6.121E+00	1.82E+00	G K
		92.80	1.389E+00	% P	1.993E+00	6.07E-01	G
		92.38	1.750E+00	& (P	2.346E+00	7.15E-01	G
AM-241	8.5887E-04						
		59.54	8.589E-04	% (P	9.259E-01	2.74E-01	G

(- This peak used in the nuclide activity average.

- * - Peak is too wide, but only one peak in library.
- ! - Peak is part of a multiplet and this area went negative during deconvolution.
- ? - Peak is too narrow.
- @ - Peak is too wide at FW25M, but ok at FWHM.
- % - Peak fails sensitivity test.
- \$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
- + - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
- = - Peak outside analysis energy range.
- & - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
- P - Peakbackground subtraction
- } - Peak is too close to another for the activity to be found directly.

Nuclide Codes:

T - Thermal Neutron Activation
 F - Fast Neutron Activation
 I - Fission Product
 N - Naturally Occurring Isotope
 P - Photon Reaction
 C - Charged Particle Reaction
 M - No MDA Calculation

Peak Codes:

G - Gamma Ray
 X - X-Ray
 P - Positron Decay
 S - Single-Escape
 D - Double-Escape
 K - Key Line
 A - Not in Average

R - Coincidence Corrected C - Coincidence Peak
 H - Halflife limit exceeded

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity pCi/gm	Time Corrected Activity pCi/gm	Uncertainty Counting pCi/gm	3 Sigma Total pCi/gm	MDA pCi/gm
BE-7	#A	7.9182E-02	8.0541E-02	2.4484E-01	2.4488E-01	2.692E-01
K-40		1.4325E+01	1.4325E+01	1.1769E+00	1.4411E+00	
MN-54	#A	1.5628E-02	1.5674E-02	2.4023E-02	2.4040E-02	2.586E-02
CO-57	#B	6.8422E-03	6.8653E-03	4.3656E-02	4.3658E-02	4.842E-02
CO-60	#B	-2.5070E-03	-2.5082E-03	6.2786E-01	6.2786E-01	3.179E-02
Sr-85	#A	-1.1242E-02	-1.1401E-02	3.5852E-02	3.5858E-02	3.939E-02
Kr-85	#A	-2.5919E+02	-2.5919E+02	8.1605E+02	8.1619E+02	9.093E+02
Y-88	#B	-7.6889E-05	-7.7547E-05	3.5461E-01	3.5461E-01	1.820E-02
NB-94	#B	6.7584E-03	6.7584E-03	2.4129E-02	2.4132E-02	2.748E-02
Ag-108M	#B	-1.2956E-02	-1.2956E-02	3.5242E-02	3.5250E-02	3.933E-02
CD-109	#A	3.8247E-01	3.8324E-01	1.6565E+00	1.6566E+00	1.834E+00
SN-113	#B	1.5599E-02	1.5723E-02	3.6940E-02	3.6951E-02	4.061E-02
SB-125	#F	1.0619E-01	1.0629E-01	7.2536E-02	7.2798E-02	9.630E-02
I-131	#B	-9.6437E-03	-1.0798E-02	3.9448E-02	3.9453E-02	3.688E-02
CS-134	#B	2.2091E-02	2.2118E-02	1.6496E-02	1.6546E-02	3.240E-02
CS-137	#A	3.2641E-03	3.2644E-03	3.2737E-02	3.2737E-02	3.766E-02
CE-139	#A	-6.6625E-04	-6.7066E-04	3.8728E-02	3.8728E-02	4.308E-02
EU-152	#B	2.0000E-02	2.0004E-02	1.2762E-01	1.2762E-01	1.420E-01
EU-154	#B	2.1739E-02	2.1745E-02	8.5022E-02	8.5031E-02	9.434E-02
EU-155	#B	8.9677E-02	8.9722E-02	2.0384E-01	2.0390E-01	2.245E-01
HG-203	#B	-2.6384E-04	-2.6904E-04	3.4769E-02	3.4769E-02	3.453E-02
TL-208		2.5847E-01	2.5847E-01	5.3438E-02	5.5505E-02	
PB-212		8.3788E-01	8.3788E-01	1.0438E-01	1.1516E-01	
PB-214	#	4.9653E-01	4.9653E-01	9.8637E-02	1.0276E-01	
BI-212		7.1648E-01	7.1648E-01	3.2330E-01	3.2596E-01	
BI-214		4.1852E-01	4.1852E-01	9.5868E-02	9.8900E-02	
RA-224	#A	9.3116E-01	9.3116E-01	9.1562E-01	9.1721E-01	9.882E-01
RA-226	#	1.6776E+00	1.6776E+00	1.0005E+00	1.0053E+00	
AC-228		7.9866E-01	7.9866E-01	1.4220E-01	1.4957E-01	
TH-227	#A	-3.4762E-01	-3.4762E-01	3.7336E-01	3.7391E-01	4.052E-01
PA-234	#B	3.1974E-02	3.1974E-02	1.8677E-01	1.8678E-01	2.078E-01
TH-234	#B	6.8115E-01	6.8115E-01	8.3523E-01	8.3609E-01	6.121E+00
AM-241	#A	8.5886E-04	8.5887E-04	8.2325E-01	8.2325E-01	9.259E-01

- All peaks for activity calculation had bad shape.
 * - Activity omitted from total
 & - Activity omitted from total and all peaks had bad shape.
 < - MDA value printed.
 A - Activity printed, but activity < MDA.
 B - Activity < MDA and failed test.
 C - Area < Critical level.
 F - Failed fraction or key line test.

H - Halflife limit exceeded

----- S U M M A R Y -----

Total Activity (1120.0 to 2000.7 keV) 1.9528685E+01 pCi/gm
Total Decayed Activity (1120.0 to 2000.7 keV) 1.9528687E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
 DAT

Reviewed by: _____
 Supervisor

Laboratory: YAEC Chemistry Lab

Sample description
FSS-OOL-16-01-010-F

Spectrum Filename: C:\GammaVision\Spectra\103F_26JUL2006_1824.An1

Acquisition information

Start time: 26-Jul-2006 18:24:25
Live time: 2000
Real time: 2001
Dead time: 0.07 %
Detector ID: 4

Detector system

Det 103 - DSPE-471

Calibration

Filename: D3_1LSa.Clb
Detector_103 1.0 Liter Sand Geometry

Energy Calibration

Created: 08-Aug-2005 11:09:41
Zero offset: 0.409 keV
Gain: 0.500 keV/channel
Quadratic: 1.092E-08 keV/channel²

Efficiency Calibration

Created: 08-Aug-2005 11:11:25
Type: Polynomial
Uncertainty: 0.993 %
Coefficients: -0.264059 -5.138468 0.638383
-0.089199 0.005011 -0.000129

Library Files

Main analysis library: FSS_Rev_1.Lib
Library Match Width: 1.000
Peak stripping: Library based

Analysis parameters

Analysis engine: Env32 G53W4.20
Start channel: 100 (50.41keV)
Stop channel: 4000 (2000.67keV)
Peak rejection level: 41.667%
Peak search sensitivity: 3
Sample Size: 1.9360E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.9360E+03) =
5.1653E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

Fraction Limit: 0.000%
Background width: average of five points.

Half lives decay limit: 12.000
 Activity range factor: 2.000
 Min. step backg. energy 0.000
 Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	25-Jul-2006 11:10:00
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	103_150K_05AUG05.Pbc 08-Aug-2005 12:54:15
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 13 cutoff 20.00000 %
 Energy Calibration
 Normalized diff: 0.1458

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. pCi/gm	Nuc
74.93	65.	32.93	0.99	9.052E-03	74.81	9.600	PBC<MDA	PB212
77.23	110.	17.34	0.99	1.011E-02	77.11	17.500	5.483E-01	PB212
					77.11	10.700	8.967E-01	PB214
92.93	72.	39.05	1.50	1.645E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
92.94	84.	34.44	1.50	1.631E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
128.97	63.	38.35	1.06	2.436E-02				
186.22	106.	32.62	1.18	2.566E-02	185.99	3.280	PBC<MDA	RA226
238.96	624.	4.86	1.09	2.319E-02	238.63	43.100	4.272E-01	PB212
242.08	102.	22.29	1.10	2.302E-02	241.00	3.900	7.933E-01	RA224
					241.92	7.470	4.151E-01	PB214
295.33	174.	11.28	1.13	2.025E-02	295.22	19.200	3.046E-01	PB214
299.99	41.	38.74	1.13	2.002E-02				
338.46	124.	16.32	1.47	1.830E-02	338.40	12.010	3.903E-01	AC228
352.02	298.	9.84	1.07	1.775E-02	351.99	37.100	3.096E-01	PB214
464.08	53.	30.52	1.20	1.423E-02	463.51	10.000	2.556E-01	SB125
510.75	114.	22.80	1.57	1.317E-02	510.72	22.500	2.052E-01	TL208
583.29	196.	9.46	1.37	1.184E-02	583.14	86.000	1.310E-01	TL208
609.46	239.	8.76	1.10	1.144E-02	609.32	46.090	3.073E-01	BI214
727.83	58.	23.22	0.84	9.958E-03	727.17	11.800	3.420E-01	BI212
795.06	23.	41.39	1.50	9.301E-03	795.76	85.400	PBC<MDA	CS134
911.44	144.	10.47	1.88	8.399E-03	911.07	29.000	4.029E-01	AC228
968.68	121.	14.63	1.59	8.027E-03	968.90	17.460	6.020E-01	AC228
1121.89	92.	15.98	1.64	7.204E-03	1120.28	15.040	5.805E-01	BI214
1461.12	841.	3.50	1.86	5.931E-03	1460.75	10.700	9.038E+00	K40
1765.03	36.	16.67	0.93	5.141E-03	1764.51	15.920	2.791E-01	BI214

***** U N I D E N T I F I E D P E A K S U M M A R Y *****

Channel	Peak Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV	Suspected Nuclide
599.12	299.92	106.	41.	0.021	116.23	1.131	TH-227 1D

s - Peak fails shape tests.
 D - Peak area deconvoluted.
 L - Peak written from unknown list.
 C - Area < Critical level.

 This section based on library: FSS_Rev_1.Lib

***** I D E N T I F I E D P E A K S U M M A R Y *****

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV
PB-212	148.79	74.81	223.	65.	0.033	98.79	0.993D
PB-212	153.39	77.11	226.	110.	0.055	52.02	0.995A
RA-226	371.53	186.19	474.	95.	0.047	89.44	1.500
PB-212	476.99	238.92	428.	623.	0.312	19.57	1.038
RA-224	482.85	241.85	482.	101.	0.050	97.29	1.500s
PB-214	482.87	241.86	469.	87.	0.043	110.54	1.500s
PB-214	589.69	295.27	199.	167.	0.083	45.02	0.848
AC-228	676.07	338.46	120.	123.	0.061	48.96	1.469s
PB-214	703.18	352.02	176.	292.	0.146	29.53	1.072
SB-125	925.87	463.37	90.	36.	0.018	116.98	1.500s
TL-208	1020.61	510.75	178.	87.	0.044	68.40	1.571s
TL-208	1165.68	583.29	63.	191.	0.096	28.37	1.365
BI-214	1218.02	609.46	75.	232.	0.116	26.28	1.101
BI-212	1454.73	727.83	46.	58.	0.029	69.67	0.843s
CS-134	1589.17	795.06	36.	23.	0.012	124.18	1.500s
AC-228	1821.90	911.44	35.	141.	0.070	31.40	1.880s
AC-228	1936.36	968.67	57.	126.	0.063	43.55	1.596
BI-214	2242.76	1121.89	34.	90.	0.045	47.93	1.635s
K-40	2921.11	1461.12	25.	822.	0.411	10.51	1.862
BI-214	3528.81	1765.03	3.	33.	0.016	50.00	0.929s

s - Peak fails shape tests.
 D - Peak area deconvoluted.
 A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****							
- Nuclide -	Average	----- Peak -----					
Name	Code	Activity	Energy	Activity	Code	MDA Value	
		pCi/gm	keV	pCi/gm		pCi/gm	COMMENTS
BE-7		2.6852E-03	477.56	2.685E-03	%	2.060E-01 5.85E-02	G
K-40		9.0383E+00	1460.75	9.038E+00	(P	2.866E-01 3.24E-01	G
MN-54		-1.8060E-03	834.81	-1.806E-03	%(P	2.964E-02 8.40E-03	G
CO-57		-4.5264E-03	122.07	-4.526E-03	&(P	3.692E-02 1.10E-02	G K
			136.43	-3.100E-02	%	2.902E-01 8.64E-02	G
CO-60		-2.9116E-03	1332.51	-2.912E-03	%(P	3.089E-02 8.08E-03	G K
			1173.23	-4.444E-03	% P	3.477E-02 9.65E-03	G K
Sr-85		-7.9889E-03	514.00	-7.989E-03	&(	3.136E-02 9.30E-03	G
Kr-85		-1.8191E+02	513.99	-1.819E+02	&(	7.139E+02 2.12E+02	G
Y-88		-2.7667E-03	1836.01	-2.767E-03	%(P	2.034E-02 5.35E-03	G K
			898.02	-1.081E-05	% P	2.596E-02 7.12E-03	G
NB-94		1.8691E-04	871.10	1.869E-04	%(	2.176E-02 5.95E-03	G K
			702.50	7.475E-03	%	2.282E-02 6.75E-03	G K
Ag-108M		-1.2839E-02	722.95	-1.284E-02	%(	3.444E-02 1.03E-02	G K
			614.37	-3.027E-03	& P	3.192E-02 9.23E-03	G
			433.93	-1.703E-03	%	2.562E-02 7.41E-03	G
CD-109		2.6686E-02	88.04	2.669E-02	%(	1.578E+00 4.69E-01	G
SN-113		-2.1767E-03	391.71	-2.177E-03	%(	4.025E-02 1.17E-02	G K
			255.04	3.740E-01	%	1.179E+00 3.54E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	6.5155E-02	427.95	2.698E-02	&(P	7.045E-02	2.11E-02	G K
		600.77	4.237E-02	% P	1.298E-01	3.85E-02	G
		636.15	7.687E-02	% P	1.875E-01	5.61E-02	G
		463.51	1.781E-01	@(P	2.300E-01	7.19E-02	G
		176.29	1.498E-01	&	4.279E-01	1.29E-01	G
I-131	-2.8458E-03	364.48	2.846E-03	%(P	3.231E-02	9.40E-03	G K
		636.97	1.491E-01	%	2.925E-01	8.93E-02	G
		284.29	2.065E-03	& P	4.571E-01	1.34E-01	G
CS-134	6.2468E-03	604.66	6.359E-03	%(	2.796E-02	8.22E-03	G K
		795.76	2.065E-02	(P	2.694E-02	8.58E-03	G
		569.29	2.723E-02	% P	1.607E-01	4.60E-02	G
		801.84	5.684E-02	& P	3.386E-01	9.63E-02	G
CS-137	4.2020E-03	661.62	4.202E-03	&(P	2.930E-02	8.40E-03	G
CE-139	8.6083E-03	165.85	8.608E-03	%(	3.431E-02	1.03E-02	G
EU-152	-1.2791E-02	121.78	1.279E-02	&(P	1.144E-01	3.40E-02	G K
		344.30	2.288E-02	% P	8.169E-02	2.43E-02	G
		1408.08	1.859E-02	&	1.075E-01	2.99E-02	G
		964.00	1.366E-01	% P	1.957E-01	6.13E-02	G
		1112.07	3.728E-02	&	2.462E-01	7.08E-02	G
		778.90	1.217E-02	%	1.950E-01	5.51E-02	G
EU-154	-8.4305E-03	123.10	8.430E-03	%(	8.217E-02	2.45E-02	G K
		1274.80	2.698E-03	&	7.767E-02	2.13E-02	G
		723.30	5.205E-02	%	1.612E-01	4.80E-02	G
		1004.80	3.670E-02	%	1.682E-01	4.88E-02	G
EU-155	-4.8293E-03	86.45	4.829E-03	%(	1.848E-01	5.49E-02	G K
		105.31	4.462E-02	%	1.733E-01	5.20E-02	G
HG-203	-7.1517E-03	279.17	7.152E-03	&(P	3.286E-02	9.78E-03	G K
		72.87	2.422E-01	% P	1.668E+00	4.98E-01	G
		70.83	2.170E-01	%	2.799E+00	8.30E-01	G
		82.50	5.536E-03	%	2.903E+00	8.60E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	1.3101E-01	583.14	1.310E-01	(P	2.716E-02	1.27E-02	G
		510.72	2.052E-01	+ P	1.528E-01	6.11E-02	G
PB-212	4.3494E-01	238.63	4.349E-01	(P	6.919E-02	2.90E-02	G K
		77.11	4.349E-01	} P	2.867E-01	7.54E-02	G
		74.81	5.250E-01	+ P	5.806E-01	1.81E-01	G
PB-214	3.1170E-01	351.99	3.096E-01	(P	6.836E-02	3.11E-02	G K
		295.22	2.997E-01	(P	1.229E-01	4.61E-02	G
		77.11	0.000E+00	} P	6.937E-01	0.00E+00	G
		241.92	3.527E-01	(	4.207E-01	1.30E-01	G
BI-212	3.4196E-01	727.17	3.420E-01	@(P	2.045E-01	8.01E-02	G K
		1620.56	1.105E-01	& P	8.498E-01	2.31E-01	G
		785.42-2.546E-01	%	1.429E+00	4.15E-01	G	
BI-214	3.0007E-01	609.32	3.073E-01	(P	5.697E-02	2.77E-02	G K
		1764.51	2.791E-01	(P	9.499E-02	5.12E-02	G
		1120.28	5.805E-01	+ P	1.918E-01	9.48E-02	G
RA-224	7.8028E-01	241.00	7.803E-01	(	8.144E-01	2.53E-01	G
RA-226	7.8522E-01	185.99	7.852E-01	(P	8.638E-01	2.66E-01	G
AC-228	3.9922E-01	911.07	4.029E-01	(P	8.716E-02	4.32E-02	G K
		968.90	6.284E-01	+ P	1.885E-01	9.13E-02	G
		338.40	3.903E-01	(P	1.708E-01	6.43E-02	G
TH-227	-1.6495E-01	236.00-1.649E-01	%	(	2.842E-01	8.66E-02	G K
		256.25	4.791E-02	% P	3.607E-01	1.07E-01	G
PA-234	2.5977E-02	98.44	2.598E-02	%(P	1.640E-01	4.89E-02	G K
		946.00	2.787E-02	% P	1.146E-01	3.31E-02	G
		131.28-4.020E-02	% P	1.629E-01	4.88E-02	G	
		94.67-4.955E-02	% P	3.069E-01	9.16E-02	G	
		883.24	2.051E-03	&	2.201E-01	6.13E-02	G
		926.70-6.426E-04	%	2.332E-01	6.45E-02	G	

Nuclide	Ave activity	Energy	Activity	Code	Peak MDA	Comments
		569.26	4.034E-02	% P	2.381E-01	6.82E-02 G
TH-234	5.8913E-01					
		63.29	5.891E-01	%(P	3.938E+00	1.16E+00 G K
		92.80	1.018E+00	% P	1.633E+00	4.95E-01 G
		92.38	1.399E+00	% P	1.913E+00	5.83E-01 G
AM-241	3.5223E-02					
		59.54	3.522E-02	%(P	7.289E-01	2.15E-01 G

(- This peak used in the nuclide activity average.

- * - Peak is too wide, but only one peak in library.
- ! - Peak is part of a multiplet and this area went negative during deconvolution.
- ? - Peak is too narrow.
- @ - Peak is too wide at FW25M, but ok at FWHM.
- % - Peak fails sensitivity test.
- \$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
- + - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
- = - Peak outside analysis energy range.
- & - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
- P - Peakbackground subtraction
- } - Peak is too close to another for the activity to be found directly.

Nuclide Codes:

T - Thermal Neutron Activation
 F - Fast Neutron Activation
 I - Fission Product
 N - Naturally Occurring Isotope
 P - Photon Reaction
 C - Charged Particle Reaction
 M - No MDA Calculation
 R - Coincidence Corrected
 H - Half-life limit exceeded

Peak Codes:

G - Gamma Ray
 X - X-Ray
 P - Positron Decay
 S - Single-Escape
 D - Double-Escape
 K - Key Line
 A - Not in Average
 C - Coincidence Peak

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****						
Nuclide		Time of Count	Time Corrected	Uncertainty	3 Sigma	
		Activity	Activity	Counting	Total	MDA
		pCi/gm	pCi/gm	pCi/gm	pCi/gm	pCi/gm
BE-7	#A	2.6402E-03	2.6852E-03	1.7564E-01	1.7564E-01	2.025E-01
K-40		9.0383E+00	9.0383E+00	9.7169E-01	1.1043E+00	
MN-54	#A	-1.8008E-03	-1.8060E-03	3.4406E-02	3.4406E-02	2.955E-02
CO-57	#B	-4.5113E-03	-4.5264E-03	3.5211E-02	3.5212E-02	3.680E-02
CO-60	#B	-2.9102E-03	-2.9116E-03	1.2833E-01	1.2833E-01	3.087E-02

Sr-85	#A	-7.8785E-03	-7.9889E-03	2.7914E-02	2.7918E-02	3.092E-02
Kr-85	#A	-1.8191E+02	-1.8191E+02	6.3553E+02	6.3562E+02	7.139E+02
Y-88	#B	-2.7433E-03	-2.7667E-03	1.7116E-02	1.7117E-02	2.017E-02
NB-94	#B	1.8691E-04	1.8691E-04	1.7863E-02	1.7863E-02	2.176E-02
Ag-108M	#B	-1.2839E-02	-1.2839E-02	3.0927E-02	3.0936E-02	3.444E-02
CD-109	#A	2.6633E-02	2.6686E-02	1.4065E+00	1.4065E+00	1.575E+00
SN-113	#B	-2.1597E-03	-2.1767E-03	3.5172E-02	3.5172E-02	3.993E-02
SB-125	#B	6.5097E-02	6.5155E-02	7.8894E-02	7.8985E-02	7.038E-02
I-131	#B	-2.5437E-03	-2.8458E-03	3.6902E-02	3.6903E-02	2.888E-02
CS-134	#B	6.2393E-03	6.2468E-03	7.7860E-03	7.7944E-03	2.793E-02
CS-137	#A	4.2017E-03	4.2020E-03	2.5209E-02	2.5210E-02	2.929E-02
CE-139	#A	8.5520E-03	8.6083E-03	3.0829E-02	3.0833E-02	3.408E-02
EU-152	#B	-1.2788E-02	-1.2791E-02	1.1887E-01	1.1887E-01	1.143E-01
EU-154	#B	-8.4280E-03	-8.4305E-03	7.3383E-02	7.3385E-02	8.214E-02
EU-155	#B	-4.8269E-03	-4.8293E-03	1.6468E-01	1.6468E-01	1.847E-01
HG-203	#B	-7.0146E-03	-7.1517E-03	2.9484E-02	2.9487E-02	3.223E-02
TL-208		1.3101E-01	1.3101E-01	3.8003E-02	3.8756E-02	
PB-212		4.3494E-01	4.3494E-01	8.6772E-02	9.0371E-02	
PB-214		3.1170E-01	3.1170E-01	9.3833E-02	9.5562E-02	
BI-212	#	3.4196E-01	3.4196E-01	2.4027E-01	2.4109E-01	
BI-214		3.0007E-01	3.0007E-01	8.1065E-02	8.2916E-02	
RA-224	#A	7.8028E-01	7.8028E-01	7.5911E-01	7.6046E-01	8.144E-01
RA-226	#A	7.8522E-01	7.8522E-01	7.9834E-01	7.9964E-01	8.638E-01
AC-228		3.9922E-01	3.9922E-01	1.1766E-01	1.1992E-01	
TH-227	#B	-1.6495E-01	-1.6495E-01	2.5986E-01	2.6004E-01	2.842E-01
PA-234	#B	2.5977E-02	2.5977E-02	1.4666E-01	1.4667E-01	1.640E-01
TH-234	#B	5.8913E-01	5.8913E-01	3.4880E+00	3.4882E+00	3.938E+00
AM-241	#A	3.5223E-02	3.5223E-02	6.4453E-01	6.4453E-01	7.289E-01

- # - All peaks for activity calculation had bad shape.
- * - Activity omitted from total
- & - Activity omitted from total and all peaks had bad shape.
- < - MDA value printed.
- A - Activity printed, but activity < MDA.
- B - Activity < MDA and failed test.
- C - Area < Critical level.
- F - Failed fraction or key line test.
- H - Halflife limit exceeded

----- S U M M A R Y -----
 Total Activity (86.9 to 2000.7 keV) 1.0957190E+01 pCi/gm
 Total Decayed Activity (86.9 to 2000.7 keV) 1.0957190E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
 DAT

Reviewed by: _____
 Supervisor

Laboratory: YAEC Chemistry Lab

Sample description
FSS-OOL-16-01-003-F

Spectrum Filename: C:\GammaVision\Spectra\103F_26JUL2006_1902.An1

Acquisition information

Start time: 26-Jul-2006 19:02:21
Live time: 2000
Real time: 2002
Dead time: 0.11 %
Detector ID: 4

Detector system

Det 103 - DSPE-471

Calibration

Filename: D3_1LSa.Clb
Detector_103 1.0 Liter Sand Geometry

Energy Calibration

Created: 08-Aug-2005 11:09:41
Zero offset: 0.409 keV
Gain: 0.500 keV/channel
Quadratic: 1.092E-08 keV/channel²

Efficiency Calibration

Created: 08-Aug-2005 11:11:25
Type: Polynomial
Uncertainty: 0.993 %
Coefficients: -0.264059 -5.138468 0.638383
-0.089199 0.005011 -0.000129

Library Files

Main analysis library: FSS_Rev_1.Lib
Library Match Width: 1.000
Peak stripping: Library based

Analysis parameters

Analysis engine: Env32 G53W4.20
Start channel: 100 (50.41keV)
Stop channel: 4000 (2000.67keV)
Peak rejection level: 41.667%
Peak search sensitivity: 3
Sample Size: 2.0660E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 2.0660E+03) =
4.8403E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

Fraction Limit: 0.000%
Background width: average of five points.

Half lives decay limit: 12.000
 Activity range factor: 2.000
 Min. step backg. energy 0.000
 Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	25-Jul-2006 11:00:00
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	103_150K_05AUG05.Pbc 08-Aug-2005 12:54:15
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 17 cutoff 20.00000 %
 Energy Calibration
 Normalized diff: 0.2102

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. pCi/gm	Nuc
74.89	144.	19.41	0.99	9.052E-03	74.81	9.600	1.081E+00	PB212
77.19	153.	15.87	0.99	1.011E-02	77.11	17.500	7.704E-01	PB212
					77.11	10.700	1.260E+00	PB214
87.21	89.	33.85	1.00	1.443E-02	86.45	32.740	1.267E-01	EU155
					88.04	3.790	1.051E+00	CD109
90.07	81.	36.18	1.00	1.551E-02				
93.95	71.	41.54	1.00	1.687E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
128.84	105.	34.27	1.45	2.435E-02				
186.36	162.	23.98	1.23	2.565E-02	185.99	3.280	1.160E+00	RA226
238.99	1068.	3.76	1.09	2.318E-02	238.63	43.100	6.907E-01	PB212
241.82	140.	19.22	1.10	2.303E-02	241.00	3.900	1.015E+00	RA224
					241.92	7.470	5.311E-01	PB214
270.05	109.	28.16	1.47	2.152E-02				
295.44	243.	10.95	0.89	2.024E-02	295.22	19.200	4.018E-01	PB214
300.24	83.	30.92	1.35	2.001E-02				
327.86	120.	25.36	1.22	1.875E-02				
338.52	252.	10.87	1.14	1.830E-02	338.40	12.010	7.461E-01	AC228
351.97	412.	6.89	1.01	1.775E-02	351.99	37.100	4.040E-01	PB214
463.39	75.	28.04	1.42	1.425E-02				
463.39	75.	28.04	1.42	1.425E-02	463.51	10.000	3.388E-01	SB125
510.65	163.	19.64	1.72	1.317E-02	510.72	22.500	3.004E-01	TL208
583.34	378.	6.82	1.37	1.184E-02	583.14	86.000	2.403E-01	TL208
609.40	299.	8.48	1.53	1.144E-02	609.32	46.090	3.624E-01	BI214
727.06	83.	20.95	1.49	9.966E-03	727.17	11.800	4.601E-01	BI212
794.65	68.	26.80	1.50	9.311E-03				
794.65	68.	26.80	1.50	9.311E-03	795.76	85.400	5.632E-02	CS134

861.07	55.	38.14	1.10	8.764E-03					
911.43	274.	7.26	1.76	8.399E-03	911.07	29.000	7.255E-01	AC228	
964.75	61.	20.33	1.54	8.052E-03	964.00	14.580	3.341E-01	EU152	
969.46	179.	8.94	1.54	8.023E-03	968.90	17.460	8.358E-01	AC228	
1120.60	106.	26.81	1.32	7.210E-03	1120.28	15.040	6.308E-01	BI214	
1461.19	1406.	2.71	1.86	5.931E-03	1460.75	10.700	1.430E+01	K40	
1619.55	28.	18.90	0.67	5.488E-03	1620.56	2.750	1.212E+00	BI212	

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1764.96	81.	11.11	1.88	5.141E-03	1764.51	15.920	6.211E-01	BI214

***** U N I D E N T I F I E D P E A K S U M M A R Y *****

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV	Suspected Nuclide
173.59	87.28	414.	89.	0.045	101.55	1.001	PB-214 1D
179.30	90.14	388.	81.	0.040	108.54	1.003	PB-214 1D
539.26	270.05	344.	109.	0.054	84.48	1.468	AC-228 s
599.62	300.24	251.	83.	0.042	92.76	1.349	PB-212
654.87	327.86	288.	120.	0.060	76.09	1.220	AC-228 s
1721.18	861.07	110.	55.	0.027	114.42	1.104	TL-208
1929.43	964.70	42.	64.	0.032	57.51	1.538	AC-228 D

s - Peak fails shape tests.
 D - Peak area deconvoluted.
 L - Peak written from unknown list.
 C - Area < Critical level.

 This section based on library: FSS_Rev_1.Lib

***** I D E N T I F I E D P E A K S U M M A R Y *****

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV
HG-203	146.89	73.86	884.	-105.	-0.053	123.17	1.500s
PB-212	148.79	74.81	335.	144.	0.072	58.24	0.993D
PB-212	153.39	77.11	357.	153.	0.077	47.60	0.995A
RA-226	371.86	186.35	737.	140.	0.070	78.25	1.500s
PB-212	477.22	239.03	572.	1126.	0.563	13.43	1.070
RA-224	481.98	241.41	754.	115.	0.057	105.46	1.500s
PB-214	590.02	295.44	225.	239.	0.119	32.84	0.889
AC-228	676.19	338.52	208.	251.	0.125	32.61	1.143
PB-214	703.07	351.97	177.	407.	0.203	20.67	1.013
SB-125	925.57	463.23	148.	64.	0.032	86.73	1.500
TL-208	1020.41	510.65	259.	136.	0.068	58.91	1.723s
TL-208	1165.77	583.34	120.	374.	0.187	20.47	1.371
BI-214	1217.89	609.40	129.	292.	0.146	25.44	1.534
BI-212	1453.19	727.06	85.	83.	0.041	62.84	1.486s
CS-134	1588.55	794.75	56.	49.	0.024	77.78	1.500s
AC-228	1821.88	911.43	54.	270.	0.135	21.78	1.762
EU-152	1928.96	964.97	90.	52.	0.026	87.35	1.538
AC-228	1936.81	968.90	43.	179.	0.090	27.22	1.541D
BI-214	2240.18	1120.60	159.	105.	0.052	80.43	1.323s
K-40	2921.25	1461.19	29.	1387.	0.694	8.12	1.865
BI-212	3237.90	1619.55	0.	28.	0.014	56.69	0.667s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BI-214	3528.68	1764.96	3.	78.	0.039	33.33	1.882s

s - Peak fails shape tests.
 D - Peak area deconvoluted.
 A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	- Average Code Activity pCi/gm	----- Energy keV	Peak Activity pCi/gm	----- Code MDA Value pCi/gm	----- COMMENTS
BE-7	-1.3836E-02	477.56	1.384E-02	&(2.312E-01 6.68E-02	G
K-40	1.4297E+01	1460.75	1.430E+01	(P 2.848E-01 3.92E-01	G
MN-54	1.1681E-02	834.81	1.168E-02	%(P 2.954E-02 8.85E-03	G
CO-57	1.2216E-02	122.07	1.222E-02	%(P 4.290E-02 1.29E-02	G K
		136.43	5.257E-03	% 3.674E-01 1.10E-01	G
CO-60	2.2354E-03	1332.51	2.235E-03	%(P 3.236E-02 8.95E-03	G K
		1173.23	4.143E-03	% P 4.248E-02 1.22E-02	G K
Sr-85	-1.6478E-02	514.00	1.648E-02	&(3.940E-02 1.19E-02	G
Kr-85	-3.7513E+02	513.99	3.751E+02	&(8.967E+02 2.71E+02	G
Y-88	-1.8153E-03	1836.01	1.815E-03	&(P 2.198E-02 5.76E-03	G K
		898.02	1.169E-02	& P 2.882E-02 8.62E-03	G
NB-94	3.0594E-03	871.10	3.059E-03	%(3.046E-02 8.76E-03	G K
		702.50	9.733E-03	% 2.849E-02 8.50E-03	G K
Ag-108M	-5.3252E-03	722.95	5.325E-03	%(3.997E-02 1.17E-02	G K
		614.37	1.416E-02	% P 3.697E-02 1.11E-02	G
		433.93	1.906E-03	& 3.163E-02 9.25E-03	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CD-109	1.1178E+00	88.04	1.118E+00	%	1.780E+00	5.43E-01	G
SN-113	-8.2037E-03	391.71-8.204E-03		%	4.469E-02	1.32E-02	G K
		255.04-2.055E-02		&	1.483E+00	4.39E-01	G
SB-125	6.3451E-02	427.95-1.474E-02		%	9.518E-02	2.81E-02	G K
		600.77 1.507E-02		%	1.591E-01	4.63E-02	G
		636.15 5.453E-02		%	2.516E-01	7.39E-02	G
		463.51 2.949E-01		(P	2.726E-01	8.69E-02	G
		176.29-1.402E-02		%	5.078E-01	1.51E-01	G
I-131	5.1076E-03	364.48 5.108E-03		%	3.754E-02	1.11E-02	G K
		636.97 0.000E+00		&	4.158E-01	1.19E-01	G
		284.29-1.237E-01		%	5.487E-01	1.64E-01	G
CS-134	1.1770E-02	604.66-1.327E-02		%	3.676E-02	1.10E-02	G K
		795.76 4.039E-02		*(P	3.111E-02	1.05E-02	G
		569.29 1.954E-02		& P	1.902E-01	5.53E-02	G
		801.84 4.373E-03		%	3.339E-01	9.43E-02	G
CS-137	2.2607E-02	661.62 2.261E-02		%	3.911E-02	1.19E-02	G
CE-139	4.9803E-04	165.85 4.980E-04		%	3.666E-02	1.09E-02	G
EU-152	1.1607E-01	121.78 3.042E-02		%	1.306E-01	3.92E-02	G K
		344.30-2.994E-03		& P	1.074E-01	3.15E-02	G
		1408.08 1.784E-02		%	1.283E-01	3.61E-02	G
		964.00 2.879E-01		(P	2.614E-01	8.47E-02	G
		1112.07 3.791E-02		%	2.718E-01	7.87E-02	G
		778.90 7.545E-02		%	1.836E-01	5.51E-02	G
EU-154	-7.2994E-03	123.10-7.299E-03		&	1.021E-01	3.05E-02	G K
		1274.80-2.052E-02		&	1.152E-01	3.35E-02	G
		723.30-7.860E-02		%	2.167E-01	6.51E-02	G
		1004.80 3.223E-02		%	2.036E-01	5.92E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	1.1238E-01	86.45	1.124E-01	% (	2.173E-01	6.60E-02	G K
		105.31	2.212E-02	%	2.238E-01	6.69E-02	G
HG-203	1.1817E-02	279.17	1.182E-02	& (P	3.463E-02	1.04E-02	G K
		72.87	5.639E-01	% P	1.808E+00	5.45E-01	G
		70.83	2.786E+00	+	3.733E+00	1.14E+00	G
		82.50	5.988E-01	%	3.479E+00	1.04E+00	G
TL-208	2.4028E-01	583.14	2.403E-01	(P	3.449E-02	1.66E-02	G
		510.72	3.004E-01	+ P	1.714E-01	7.06E-02	G
PB-212	7.4639E-01	238.63	7.366E-01	(P	7.468E-02	3.34E-02	G K
							Energy duplication
		77.11	5.661E-01	} P	3.352E-01	8.98E-02	G
		74.81	1.081E+00	+ P	6.628E-01	2.14E-01	G
PB-214	4.0324E-01	351.99	4.040E-01	(P	6.430E-02	2.82E-02	G K
		295.22	4.018E-01	(P	1.222E-01	4.48E-02	G
							Energy duplication
		77.11	3.286E-01	} P	8.783E-01	1.98E-01	G
		241.92	3.550E-01	%	4.996E-01	1.53E-01	G
BI-212	4.6007E-01	727.17	4.601E-01	(P	2.545E-01	9.69E-02	G K
		1620.56	1.212E+00	+ P	3.194E-01	2.29E-01	G
		785.42	5.877E-01	%	1.513E+00	4.54E-01	G
BI-214	3.6242E-01	609.32	3.624E-01	(P	6.899E-02	3.14E-02	G K
		1764.51	6.211E-01	+ P	8.901E-02	7.19E-02	G
		1120.28	6.308E-01	+ P	3.711E-01	1.72E-01	G
RA-224	8.3303E-01	241.00	8.330E-01	& (	9.499E-01	2.93E-01	G
RA-226	1.0911E+00	185.99	1.091E+00	*(P	1.004E+00	3.11E-01	G
AC-228	7.6279E-01	911.07	7.255E-01	(P	9.901E-02	5.33E-02	G K
		968.90	8.362E-01	(P	1.550E-01	7.59E-02	G
		338.40	7.461E-01	(P	2.082E-01	8.15E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TH-227	2.1308E-02	236.00	2.131E-02	&(	4.874E-01	1.46E-01	G K
		256.25	5.015E-02	& P	3.993E-01	1.19E-01	G
PA-234	1.1189E-02	98.44	1.119E-02	% (P	2.018E-01	6.02E-02	G K
		946.00	1.556E-02	& P	1.581E-01	4.54E-02	G
		131.28	5.589E-02	% P	1.971E-01	5.93E-02	G
		94.67	4.217E-02	% P	3.215E-01	9.61E-02	G
		883.24	4.731E-02	%	2.717E-01	7.92E-02	G
		926.70	1.049E-02	%	2.136E-01	5.96E-02	G
TH-234	1.4699E+00	569.26	2.906E-02	& P	2.819E-01	8.19E-02	G
		63.29	1.470E+00	&(P	5.514E+00	1.65E+00	G K
		92.80	1.200E+00	& P	1.960E+00	5.95E-01	G
		92.38	1.400E+00	& P	2.351E+00	7.13E-01	G

AM-241 -1.4243E-01 59.54-1.424E-01 % (P 1.023E+00 3.06E-01 G

(- This peak used in the nuclide activity average.

- * - Peak is too wide, but only one peak in library.
- ! - Peak is part of a multiplet and this area went negative during deconvolution.
- ? - Peak is too narrow.
- @ - Peak is too wide at FW25M, but ok at FWHM.
- % - Peak fails sensitivity test.
- \$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
- + - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
- = - Peak outside analysis energy range.
- & - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
- P - Peakbackground subtraction
- } - Peak is too close to another for the activity to be found directly.

Nuclide Codes:

T - Thermal Neutron Activation
 F - Fast Neutron Activation
 I - Fission Product
 N - Naturally Occurring Isotope
 P - Photon Reaction
 C - Charged Particle Reaction
 M - No MDA Calculation

Peak Codes:

G - Gamma Ray
 X - X-Ray
 P - Positron Decay
 S - Single-Escape
 D - Double-Escape
 K - Key Line
 A - Not in Average

R - Coincidence Corrected C - Coincidence Peak
 H - Halflife limit exceeded

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***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****
          Time of Count   Time Corrected   Uncertainty   3 Sigma
Nuclide   Activity       Activity       Counting      Total         MDA
          pCi/gm        pCi/gm        pCi/gm       pCi/gm       pCi/gm
-----
BE-7  #A  -1.3598E-02  -1.3836E-02  2.0052E-01  2.0052E-01  2.273E-01
K-40              1.4297E+01  1.4297E+01  1.1767E+00  1.4400E+00
MN-54  #A  1.1646E-02  1.1681E-02  2.6547E-02  2.6555E-02  2.945E-02
CO-57  #B  1.2174E-02  1.2216E-02  3.8716E-02  3.8722E-02  4.276E-02
CO-60  #B  2.2343E-03  2.2354E-03  2.6837E-02  2.6838E-02  3.235E-02
Sr-85  #A  -1.6245E-02  -1.6478E-02  3.5690E-02  3.5703E-02  3.884E-02
Kr-85  #A  -3.7512E+02  -3.7513E+02  8.1228E+02  8.1257E+02  8.967E+02
Y-88   #B  -1.7997E-03  -1.8153E-03  1.8946E-02  1.8946E-02  2.179E-02
NB-94  #B  3.0594E-03  3.0594E-03  2.6270E-02  2.6271E-02  3.046E-02
Ag-108M#B -5.3251E-03  -5.3252E-03  3.5107E-02  3.5109E-02  3.997E-02
CD-109 #A  1.1155E+00  1.1178E+00  1.6285E+00  1.6297E+00  1.777E+00
SN-113 #B  -8.1381E-03  -8.2037E-03  3.9719E-02  3.9722E-02  4.433E-02
SB-125 #B  6.3393E-02  6.3451E-02  5.6123E-02  5.6244E-02  9.510E-02
I-131  #B  4.5523E-03  5.1076E-03  3.3228E-02  3.3229E-02  3.346E-02
CS-134 #B  1.1755E-02  1.1770E-02  9.1704E-03  9.1958E-03  3.672E-02
CS-137 #A  2.2605E-02  2.2607E-02  3.5837E-02  3.5861E-02  3.910E-02
CE-139 #A  4.9469E-04  4.9803E-04  3.2614E-02  3.2615E-02  3.641E-02
EU-152 #B  1.1605E-01  1.1607E-01  1.0246E-01  1.0266E-01  1.305E-01
EU-154 #B  -7.2973E-03  -7.2994E-03  9.1501E-02  9.1501E-02  1.021E-01
EU-155 #B  1.1233E-01  1.1238E-01  1.9802E-01  1.9812E-01  2.172E-01
HG-203 #B  1.1585E-02  1.1817E-02  3.1238E-02  3.1245E-02  3.395E-02
TL-208          2.4028E-01  2.4028E-01  4.9760E-02  5.1678E-02
PB-212          7.4639E-01  7.4639E-01  1.0128E-01  1.1016E-01
PB-214          4.0324E-01  4.0324E-01  7.9499E-02  8.2874E-02
BI-212          4.6007E-01  4.6007E-01  2.9082E-01  2.9204E-01
BI-214          3.6242E-01  3.6242E-01  9.4252E-02  9.6572E-02
RA-224 #A  8.3303E-01  8.3303E-01  8.7848E-01  8.7981E-01  9.499E-01
RA-226 #    1.0911E+00  1.0911E+00  9.3254E-01  9.3469E-01  1.004E+00
AC-228          7.6279E-01  7.6279E-01  1.2197E-01  1.2976E-01
TH-227 #B  2.1308E-02  2.1308E-02  4.3813E-01  4.3814E-01  4.874E-01
PA-234 #B  1.1189E-02  1.1189E-02  1.8056E-01  1.8057E-01  2.018E-01
TH-234 #B  1.4699E+00  1.4699E+00  4.9599E+00  4.9606E+00  5.514E+00
AM-241 #A  -1.4243E-01  -1.4243E-01  9.3775E-01  9.3779E-01  1.023E+00
  
```

- All peaks for activity calculation had bad shape.
 * - Activity omitted from total
 & - Activity omitted from total and all peaks had bad shape.
 < - MDA value printed.
 A - Activity printed, but activity < MDA.
 B - Activity < MDA and failed test.
 C - Area < Critical level.
 F - Failed fraction or key line test.

H - Halflife limit exceeded

----- S U M M A R Y -----
Total Activity (1120.0 to 2000.7 keV) 1.7272282E+01 pCi/gm
Total Decayed Activity (1120.0 to 2000.7 keV) 1.7272282E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
 DAT

Reviewed by: _____
 Supervisor

Laboratory: YAEC Chemistry Lab

Sample description
FSS-OOL-16-01-004-F

Spectrum Filename: C:\GammaVision\Spectra\107F_19JUL2006_1842.An1

Acquisition information

Start time: 19-Jul-2006 18:42:16
Live time: 2000
Real time: 2003
Dead time: 0.14 %
Detector ID: 2

Detector system

Det 107- DSPE- 634

Calibration

Filename: D7_1LSa.Clb
Detector 107 Calibration for 1 Liter Sand Marinelli

Energy Calibration

Created: 29-Oct-2004 06:48:53
Zero offset: 0.157 keV
Gain: 0.500 keV/channel
Quadratic: -1.676E-08 keV/channel²

Efficiency Calibration

Created: 29-Oct-2004 06:51:32
Type: Polynomial
Uncertainty: 1.174 %
Coefficients: -0.279532 -4.778179 0.614896
-0.087174 0.005356 -0.000131

Library Files

Main analysis library: FSS_Rev_1.Lib
Library Match Width: 1.000
Peak stripping: Library based

Analysis parameters

Analysis engine: Env32 G53W4.20
Start channel: 100 (50.16keV)
Stop channel: 4000 (2000.15keV)
Peak rejection level: 41.667%
Peak search sensitivity: 3
Sample Size: 1.7600E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.7600E+03) =
5.6818E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

Fraction Limit: 0.000%
Background width: average of five points.

Half lives decay limit: 12.000
 Activity range factor: 2.000
 Min. step backg. energy 0.000
 Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	13-Jul-2006 18:20:00
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	107_150K_28APR05.Pbc 01-May-2005 05:30:33
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 21 cutoff 20.00000 %
 Energy Calibration
 Normalized diff: 0.1802

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. pCi/gm	Nuc
74.91	418.	11.40	1.18	2.842E-02	74.81	9.600	1.164E+00	PB212
77.08	635.	8.60	1.18	2.945E-02	77.11	17.500	9.427E-01	PB212
					77.11	10.700	1.530E+00	PB214
86.96	235.	17.79	1.19	3.296E-02	86.45	32.740	1.683E-01	EU155
					88.04	3.790	1.443E+00	CD109
89.95	151.	26.83	1.19	3.372E-02				
93.33	225.	17.68	1.19	3.448E-02	92.38	2.570	1.893E+00	TH234
					92.80	3.000	1.530E+00	TH234
129.38	99.	37.60	0.77	3.819E-02				
133.69	86.	39.41	0.84	3.827E-02				
185.72	331.	16.82	1.81	3.612E-02	185.99	3.280	2.149E+00	RA226
209.46	128.	33.89	1.04	3.427E-02				
238.72	1488.	3.44	1.30	3.188E-02	238.63	43.100	8.222E-01	PB212
					241.00	3.900	9.225E+00	RA224
241.89	239.	16.00	1.30	3.163E-02	241.92	7.470	7.711E-01	PB214
270.15	111.	35.15	1.64	2.945E-02				
295.54	402.	11.45	1.52	2.765E-02	295.22	19.200	5.746E-01	PB214
338.50	349.	11.30	1.50	2.500E-02	338.40	12.010	8.836E-01	AC228
352.08	606.	6.19	1.61	2.425E-02	351.99	37.100	5.125E-01	PB214
409.25	72.	35.50	1.90	2.156E-02				
463.21	95.	33.95	1.19	1.954E-02				
463.21	95.	33.95	1.19	1.954E-02	463.51	10.000	3.640E-01	SB125
510.89	265.	12.61	1.73	1.808E-02	510.72	22.500	4.366E-01	TL208
583.31	584.	7.32	1.77	1.629E-02	583.14	86.000	3.175E-01	TL208
609.62	525.	5.92	1.97	1.574E-02	609.32	46.090	5.514E-01	BI214
727.27	149.	17.88	2.13	1.374E-02	727.17	11.800	6.984E-01	BI212
785.54	54.	33.70	1.06	1.297E-02	785.42	2.000	1.600E+00	BI212

795.11	95.	27.61	0.82	1.285E-02				
795.11	95.	27.61	0.82	1.285E-02	795.76	85.400	6.666E-02	CS134
860.83	105.	21.29	1.05	1.211E-02				
911.29	429.	6.33	2.11	1.161E-02	911.07	29.000	9.695E-01	AC228
959.29	39.	31.17	1.80	1.113E-02	964.00	14.580	1.866E-01	EU152
964.76	70.	20.69	1.80	1.113E-02				
969.25	221.	8.72	1.80	1.109E-02	968.90	17.460	8.691E-01	AC228
1120.04	135.	18.37	1.55	9.971E-03	1120.28	15.040	6.867E-01	BI214
1461.07	1761.	2.44	2.50	8.190E-03	1460.75	10.700	1.539E+01	K40

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1764.99	83.	11.53	2.31	7.082E-03	1764.51	15.920	5.577E-01	BI214

***** U N I D E N T I F I E D P E A K S U M M A R Y *****

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV	Suspected Nuclide
173.58	86.88	757.	235.	0.118	53.37	1.187	BI-207 D
179.56	89.87	740.	151.	0.075	80.49	1.189	PB-214 D
186.32	93.25	681.	225.	0.113	53.04	1.191	U-235 D
418.57	209.46	677.	128.	0.064	101.68	1.040	AC-228 s
539.93	270.15	502.	111.	0.055	105.46	1.638	AC-228 s
818.10	409.25	216.	72.	0.036	106.49	1.897	AC-228 s
1721.23	860.83	108.	106.	0.053	50.70	1.055	TL-208 s
1929.90	964.86	71.	69.	0.034	63.27	1.797	AC-228 D

s - Peak fails shape tests.
 D - Peak area deconvoluted.
 L - Peak written from unknown list.
 C - Area < Critical level.

 This section based on library: FSS_Rev_1.Lib

***** I D E N T I F I E D P E A K S U M M A R Y *****

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV
HG-203	145.42	72.87	2874.	-232.	-0.116	100.67	1.500s
PB-212	149.29	74.81	933.	414.	0.207	34.23	1.178D
PB-212	153.89	77.11	1041.	437.	0.218	28.58	1.179A
PB-214	153.89	77.11	1717.	189.	0.095	89.16	1.500A
EU-155	174.02	87.18	1789.	205.	0.103	89.97	1.500s
TH-234	185.80	93.07	1640.	217.	0.109	78.77	1.500s
TH-234	185.75	93.04	1594.	205.	0.103	77.47	1.500s
RA-226	371.08	185.72	958.	331.	0.166	50.47	1.809s
TH-227	471.73	236.05	1626.	-171.	-0.086	102.74	1.500s
PB-212	476.89	238.63	525.	1455.	0.727	10.18	1.297D
RA-224	477.18	238.77	876.	1387.	0.694	12.09	1.500
PB-214	483.47	241.92	631.	218.	0.109	52.45	1.299D
PB-214	590.70	295.54	541.	398.	0.199	34.34	1.519s
AC-228	676.61	338.50	379.	346.	0.173	33.89	1.496s
PB-214	703.77	352.08	291.	601.	0.300	18.58	1.614s
SB-125	926.06	463.23	207.	57.	0.028	108.81	1.500s
TL-208	1021.37	510.89	258.	231.	0.116	37.82	1.730s
TL-208	1166.20	583.31	287.	579.	0.290	21.96	1.768s
BI-214	1218.81	609.62	143.	521.	0.261	17.77	1.968s
BI-212	1454.11	727.27	152.	148.	0.074	53.65	2.128s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BI-212	1570.65	785.54	102.	54.	0.027	101.10	1.061s
CS-134	1590.31	795.37	119.	49.	0.025	102.19	1.684s
AC-228	1822.14	911.29	88.	425.	0.213	19.00	2.110s
EU-152	1918.14	959.29	56.	39.	0.020	93.51	1.796s
AC-228	1937.36	968.90	91.	219.	0.110	27.05	1.799D
BI-214	2239.66	1120.04	121.	134.	0.067	55.11	1.547s
K-40	2921.73	1461.07	26.	1756.	0.878	7.32	2.496
BI-214	3529.63	1764.99	4.	82.	0.041	34.59	2.312

s - Peak fails shape tests.
 D - Peak area deconvoluted.
 A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity pCi/gm	Energy keV	Peak Activity pCi/gm	Code	MDA Value pCi/gm	COMMENTS
BE-7		-8.9982E-03	477.56	8.998E-03	%	(2.883E-01 8.43E-02	G
K-40		1.5386E+01	1460.75	1.539E+01	(P	2.308E-01 3.76E-01	G
MN-54		-4.4568E-04	834.81	4.457E-04	&(P	3.399E-02 9.79E-03	G
CO-57		5.8476E-03	122.07	5.848E-03	%(P	3.713E-02 1.11E-02	G K
			136.43	7.825E-02	% P	3.060E-01 9.21E-02	G
CO-60		3.6235E-03	1332.51	3.624E-03	%(P	3.095E-02 8.69E-03	G K
			1173.23	1.795E-02	% P	4.100E-02 1.21E-02	G K
Sr-85		-1.5377E-02	514.00	1.538E-02	%	(3.939E-02 1.19E-02	G
Kr-85		-3.6404E+02	513.99	3.640E+02	%(P	8.569E+02 2.57E+02	G
Y-88		-4.2323E-03	1836.01	4.232E-03	%(P	2.719E-02 7.40E-03	G K
			898.02	6.279E-03	% P	2.997E-02 8.72E-03	G
NB-94		-1.2981E-03	871.10	1.298E-03	%(P	2.428E-02 6.89E-03	G K
			702.50	1.048E-02	% P	2.718E-02 8.15E-03	G K

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ag-108M	-1.6871E-02	722.95	1.687E-02	&(	4.280E-02	1.29E-02	G K
		614.37	1.533E-02	%	3.886E-02	1.17E-02	G
		433.93	3.447E-03	% P	3.013E-02	8.83E-03	G
CD-109	1.2889E-01	88.04	1.289E-01	%(P	1.289E+00	3.87E-01	G
SN-113	7.0236E-04	391.71	7.024E-04	&(P	4.083E-02	1.19E-02	G K
		255.04	2.135E-01	&	1.202E+00	3.58E-01	G
SB-125	5.4711E-02	427.95	2.646E-03	&(P	7.867E-02	2.28E-02	G K
		600.77	3.675E-02	% P	1.406E-01	4.16E-02	G
		636.15	8.223E-02	% P	2.298E-01	6.87E-02	G
		463.51	2.245E-01	@(P	2.755E-01	8.55E-02	G
		176.29	4.413E-02	& P	4.832E-01	1.44E-01	G
I-131	-7.1570E-04	364.48	7.157E-04	&(	5.421E-02	1.59E-02	G K
		636.97	1.305E-02	%	6.682E-01	1.94E-01	G
		284.29	1.069E-01	%	7.581E-01	2.26E-01	G
CS-134	1.5729E-02	604.66	8.127E-04	&(P	7.066E-02	2.10E-02	G K
		795.76	3.463E-02	(P	3.771E-02	1.19E-02	G
		569.29	3.417E-02	%	1.632E-01	4.81E-02	G
		801.84	8.297E-02	% P	3.501E-01	1.03E-01	G
CS-137	1.6783E-02	661.62	1.678E-02	%(P	3.627E-02	1.09E-02	G
CE-139	-6.9527E-03	165.85	6.953E-03	&(P	3.862E-02	1.16E-02	G
EU-152	7.1786E-02	121.78	1.456E-02	%(P	1.106E-01	3.31E-02	G K
		344.30	1.519E-02	% P	9.906E-02	2.94E-02	G
		1408.08	3.451E-02	% P	1.398E-01	4.06E-02	G
		964.00	1.866E-01	&(P	1.784E-01	5.83E-02	G
		1112.07	2.414E-02	& P	2.436E-01	6.99E-02	G
		778.90	4.238E-02	% P	2.197E-01	6.44E-02	G
EU-154	-8.0326E-04	123.10	8.033E-04	&(P	7.932E-02	2.37E-02	G K
		1274.80	1.037E-02	& P	9.840E-02	2.83E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		723.30	7.798E-02	& P	2.094E-01	6.29E-02	G
		1004.80	4.240E-04	& P	2.058E-01	5.91E-02	G
EU-155	1.4679E-01	86.45	1.468E-01	*(	1.430E-01	4.40E-02	G K
		105.31	4.141E-02	% P	1.613E-01	4.86E-02	G
HG-203	-5.2281E-03	279.17	5.228E-03	%(P	3.074E-02	9.11E-03	G K
		72.87	1.109E+00	& P	1.206E+00	3.69E-01	G
		70.83	6.872E-01	%	1.885E+00	5.70E-01	G
		82.50	4.322E-01	%	2.154E+00	6.48E-01	G
TL-208	3.1748E-01	583.14	3.175E-01	@(P	4.473E-02	2.34E-02	G
		510.72	4.366E-01	+ P	1.463E-01	6.31E-02	G
PB-212	8.1257E-01	238.63	8.126E-01	(P	6.116E-02	2.79E-02	G K
							Energy duplication
		77.11	6.479E-01	}	2.271E-01	6.17E-02	G
		74.81	1.163E+00	+ P	4.071E-01	1.34E-01	G
PB-214	5.3367E-01	351.99	5.125E-01	*(P	7.017E-02	3.20E-02	G K
		295.22	5.746E-01	*(P	1.606E-01	6.65E-02	G
							Energy duplication
		77.11	4.594E-01	} P	4.752E-01	1.37E-01	G
		241.92	7.099E-01	+ P	3.891E-01	1.25E-01	G
BI-212	6.9844E-01	727.17	6.984E-01	*(P	2.853E-01	1.26E-01	G K
		1620.56	4.424E-01	& P	9.212E-01	2.79E-01	G
		785.42	1.600E+00	+ P	1.474E+00	5.52E-01	G
BI-214	5.5302E-01	609.32	5.514E-01	(P	6.183E-02	3.30E-02	G K
		1764.51	5.577E-01	(P	8.266E-02	6.50E-02	G
		1120.28	6.867E-01	+ P	2.762E-01	1.27E-01	G
RA-224	8.6143E+00	241.00	8.614E+00	&(P	8.733E-01	3.48E-01	G
RA-226	2.1489E+00	185.99	2.149E+00	*(	9.526E-01	3.61E-01	G
AC-228	9.2182E-01	911.07	9.695E-01	@(P	1.059E-01	6.20E-02	G K
		968.90	8.688E-01	(P	1.868E-01	7.92E-02	G
		338.40	8.836E-01	(P	2.390E-01	1.01E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TH-227	-3.6535E-01	236.00	3.653E-01	?(P	4.070E-01	1.25E-01	G K
		256.25	8.193E-03	& P	3.873E-01	1.14E-01	G
PA-234	3.5422E-02	98.44	3.542E-02	&(	1.486E-01	4.47E-02	G K
		946.00	4.773E-02	&	1.917E-01	5.68E-02	G
		131.28	4.111E-02	&	1.715E-01	5.16E-02	G
		94.67	1.115E-01	%	2.783E-01	8.42E-02	G
		883.24	6.662E-03	%	2.810E-01	8.11E-02	G
		926.70	2.781E-04	&	2.886E-01	8.26E-02	G
		569.26	5.038E-02	%	2.408E-01	7.10E-02	G
TH-234	1.3659E+00	63.29	8.959E-01	%(P	1.699E+00	5.15E-01	G K
		92.80	1.528E+00	(P	1.405E+00	4.32E-01	G
		92.38	1.890E+00	(P	1.668E+00	5.15E-01	G

AM-241 -6.9009E-02 59.54-6.901E-02 %(P 2.202E-01 6.64E-02 G

(- This peak used in the nuclide activity average.

- * - Peak is too wide, but only one peak in library.
- ! - Peak is part of a multiplet and this area went negative during deconvolution.
- ? - Peak is too narrow.
- @ - Peak is too wide at FW25M, but ok at FWHM.
- % - Peak fails sensitivity test.
- \$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
- + - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
- = - Peak outside analysis energy range.
- & - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
- P - Peakbackground subtraction
- } - Peak is too close to another for the activity to be found directly.

Nuclide Codes:

T - Thermal Neutron Activation
 F - Fast Neutron Activation
 I - Fission Product
 N - Naturally Occurring Isotope
 P - Photon Reaction
 C - Charged Particle Reaction
 M - No MDA Calculation

Peak Codes:

G - Gamma Ray
 X - X-Ray
 P - Positron Decay
 S - Single-Escape
 D - Double-Escape
 K - Key Line
 A - Not in Average

R - Coincidence Corrected C - Coincidence Peak
 H - Halflife limit exceeded

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***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****
          Time of Count   Time Corrected   Uncertainty   3 Sigma
Nuclide   Activity       Activity       Counting      Total        MDA
          pCi/gm        pCi/gm        pCi/gm       pCi/gm      pCi/gm
-----
BE-7  #A  -8.3223E-03  -8.9982E-03  2.5276E-01  2.5276E-01  2.667E-01
K-40           1.5386E+01  1.5386E+01  1.1289E+00  1.4492E+00
MN-54 #A  -4.3977E-04  -4.4568E-04  1.1919E-01  1.1919E-01  3.354E-02
CO-57 #B   5.7580E-03  5.8476E-03  3.3399E-02  3.3401E-02  3.656E-02
CO-60 #B   3.6157E-03  3.6235E-03  2.6063E-02  2.6064E-02  3.088E-02
Sr-85 #A  -1.4419E-02  -1.5377E-02  3.5635E-02  3.5647E-02  3.694E-02
Kr-85 #A  -3.6403E+02  -3.6404E+02  9.0879E+02  9.0905E+02  8.568E+02
Y-88  #B  -4.0700E-03  -4.2323E-03  3.5088E-02  3.5089E-02  2.615E-02
NB-94 #B  -1.2981E-03  -1.2981E-03  2.3639E-02  2.3639E-02  2.428E-02
Ag-108M#B -1.6870E-02  -1.6871E-02  3.8678E-02  3.8691E-02  4.280E-02
CD-109 #A  1.2771E-01  1.2889E-01  1.1613E+00  1.1613E+00  1.277E+00
SN-113 #B   6.7737E-04  7.0236E-04  3.5781E-02  3.5781E-02  3.938E-02
SB-125 #B   5.4486E-02  5.4711E-02  6.2477E-02  6.2560E-02  7.835E-02
I-131 #B  -4.2609E-04  -7.1570E-04  4.7740E-02  4.7740E-02  3.227E-02
CS-134 #B   1.5643E-02  1.5729E-02  1.6247E-02  1.6273E-02  7.027E-02
CS-137 #A   1.6777E-02  1.6783E-02  3.2762E-02  3.2777E-02  3.626E-02
CE-139 #A  -6.7450E-03  -6.9527E-03  3.5655E-02  3.5658E-02  3.747E-02
EU-152 #B   7.1721E-02  7.1786E-02  6.7347E-02  6.7465E-02  1.105E-01
EU-154 #B  -8.0218E-04  -8.0326E-04  1.4306E-01  1.4306E-01  7.921E-02
EU-155 #    1.4645E-01  1.4679E-01  1.3207E-01  1.3232E-01  1.427E-01
HG-203 #B  -4.7805E-03  -5.2281E-03  3.2644E-02  3.2646E-02  2.811E-02
TL-208 #    3.1748E-01  3.1748E-01  7.0250E-02  7.2709E-02
PB-212     8.1257E-01  8.1257E-01  8.3605E-02  9.6400E-02
PB-214     5.3367E-01  5.3367E-01  9.9979E-02  1.0483E-01
BI-212 #    6.9844E-01  6.9844E-01  3.7802E-01  3.8026E-01
BI-214     5.5302E-01  5.5302E-01  9.9109E-02  1.0435E-01
RA-224 #    8.6143E+00  8.6143E+00  1.0434E+00  1.1608E+00  8.733E-01
RA-226 #    2.1489E+00  2.1489E+00  1.0846E+00  1.0920E+00
AC-228     9.2182E-01  9.2182E-01  1.4688E-01  1.5665E-01
TH-227 #A  -3.6535E-01  -3.6535E-01  3.7596E-01  3.7658E-01  4.070E-01
PA-234 #B   3.5422E-02  3.5422E-02  1.3422E-01  1.3424E-01  1.486E-01
TH-234 #B   1.3659E+00  1.3659E+00  9.5059E-01  9.5361E-01  1.699E+00
AM-241 #A  -6.9007E-02  -6.9009E-02  2.0417E-01  2.0421E-01  2.202E-01
  
```

- All peaks for activity calculation had bad shape.
 * - Activity omitted from total
 & - Activity omitted from total and all peaks had bad shape.
 < - MDA value printed.
 A - Activity printed, but activity < MDA.
 B - Activity < MDA and failed test.
 C - Area < Critical level.
 F - Failed fraction or key line test.

H - Halflife limit exceeded

----- S U M M A R Y -----

Total Activity (1120.2 to 2000.1 keV) 2.1371946E+01 pCi/gm
Total Decayed Activity (1120.2 to 2000.1 keV) 2.1371962E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
 DAT

Reviewed by: _____
 Supervisor

Laboratory: YAEC Chemistry Lab

Sample description
FSS-OOL-16-01-017-F

Spectrum Filename: C:\GammaVision\Spectra\107F_26JUL2006_1719.An1

Acquisition information

Start time: 26-Jul-2006 17:19:40
Live time: 2000
Real time: 2002
Dead time: 0.09 %
Detector ID: 2

Detector system

Det 107- DSPE- 634

Calibration

Filename: D7_1LSa.Clb
Detector 107 Calibration for 1 Liter Sand Marinelli

Energy Calibration

Created: 29-Oct-2004 06:48:53
Zero offset: 0.157 keV
Gain: 0.500 keV/channel
Quadratic: -1.676E-08 keV/channel²

Efficiency Calibration

Created: 29-Oct-2004 06:51:32
Type: Polynomial
Uncertainty: 1.174 %
Coefficients: -0.279532 -4.778179 0.614896
-0.087174 0.005356 -0.000131

Library Files

Main analysis library: FSS_Rev_1.Lib
Library Match Width: 1.000
Peak stripping: Library based

Analysis parameters

Analysis engine: Env32 G53W4.20
Start channel: 100 (50.16keV)
Stop channel: 4000 (2000.15keV)
Peak rejection level: 41.667%
Peak search sensitivity: 3
Sample Size: 1.7100E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.7100E+03) =
5.8480E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

Fraction Limit: 0.000%
Background width: average of five points.

Half lives decay limit: 12.000
 Activity range factor: 2.000
 Min. step backg. energy 0.000
 Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	25-Jul-2006 11:20:00
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	107_150K_28APR05.Pbc 01-May-2005 05:30:33
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 16 cutoff 20.00000 %
 Energy Calibration
 Normalized diff: 0.1784

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. pCi/gm	Nuc
75.03	220.	23.99	1.50	2.849E-02				
75.03	220.	23.99	1.50	2.849E-02	74.81	9.600	6.366E-01	PB212
76.95	383.	13.52	1.50	2.957E-02				
76.95	383.	13.52	1.50	2.957E-02	77.11	17.500	5.855E-01	PB212
					77.11	10.700	9.457E-01	PB214
76.95	379.	13.52	1.50	2.957E-02				
76.95	379.	13.52	1.50	2.957E-02	77.11	17.500	5.782E-01	PB212
					77.11	10.700	9.457E-01	PB214
92.91	118.	34.15	1.50	3.438E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
92.91	127.	35.21	1.50	3.429E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
186.31	205.	21.68	1.67	3.608E-02	185.99	3.280	1.369E+00	RA226
209.50	89.	28.97	1.23	3.427E-02				
238.78	956.	4.05	1.30	3.187E-02	238.63	43.100	5.408E-01	PB212
241.94	125.	23.81	1.30	3.162E-02				
295.36	191.	11.45	1.34	2.767E-02	295.22	19.200	2.771E-01	PB214
300.29	64.	28.15	1.34	2.734E-02				
328.35	80.	30.90	0.83	2.558E-02				
338.65	169.	16.95	1.23	2.499E-02	338.40	12.010	4.358E-01	AC228
352.15	415.	7.84	1.68	2.425E-02	351.99	37.100	3.600E-01	PB214
463.19	74.	28.84	1.76	1.954E-02				
463.19	74.	28.84	1.76	1.954E-02	463.51	10.000	2.879E-01	SB125
510.44	162.	15.76	1.83	1.809E-02	510.72	22.500	2.493E-01	TL208
583.25	399.	8.24	1.59	1.629E-02	583.14	86.000	2.223E-01	TL208
609.56	324.	7.52	1.32	1.574E-02	609.32	46.090	3.482E-01	BI214
661.38	48.	31.26	1.43	1.478E-02	661.62	84.620	2.824E-02	CS137

727.34	105.	19.78	1.67	1.374E-02	727.17	11.800	5.054E-01	BI212
795.08	66.	27.42	1.62	1.285E-02				
795.08	66.	27.42	1.62	1.285E-02	795.76	85.400	4.710E-02	CS134
860.54	34.	37.32	1.03	1.211E-02				
911.47	267.	9.75	2.17	1.160E-02	911.07	29.000	6.176E-01	AC228
968.52	198.	11.83	2.36	1.110E-02	968.90	17.460	7.979E-01	AC228
1120.08	121.	22.27	1.57	9.971E-03	1120.28	15.040	6.336E-01	BI214
1461.27	1186.	3.01	2.18	8.189E-03	1460.75	10.700	1.065E+01	K40
1764.79	55.	14.13	2.47	7.084E-03	1764.51	15.920	3.855E-01	BI214

***** U N I D E N T I F I E D P E A K S U M M A R Y *****

Channel	Peak Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV	Suspected Nuclide
418.64	209.50	288.	89.	0.045	86.92	1.233	AC-228
477.20	238.91	274.	956.	0.478	12.16	1.297	PB-212 D
483.51	242.06	380.	125.	0.062	71.43	1.299	PB-214 D
600.19	300.28	136.	68.	0.034	81.35	1.924	PB-212 s
656.32	328.35	203.	80.	0.040	92.71	0.831	RH-106M s
1720.65	860.54	52.	34.	0.017	111.95	1.032	TL-208 s

s - Peak fails shape tests.
 D - Peak area deconvoluted.
 L - Peak written from unknown list.
 C - Area < Critical level.

 This section based on library: FSS_Rev_1.Lib

***** I D E N T I F I E D P E A K S U M M A R Y *****

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV
HG-203	146.35	73.34	1164.	-132.	-0.066	112.47	1.500s
PB-212	149.73	75.03	1338.	220.	0.110	71.97	1.500s
PB-212	153.89	77.11	1152.	383.	0.192	40.56	1.500D
PB-214	153.89	77.11	1157.	379.	0.189	40.56	1.500D
TH-234	185.49	92.91	1075.	127.	0.064	105.63	1.500s
TH-234	185.48	92.91	1053.	118.	0.059	102.46	1.500s
RA-226	372.26	186.31	612.	205.	0.103	65.04	1.671s
PB-212	477.20	238.78	636.	931.	0.466	14.82	1.500s
PB-214	590.35	295.36	270.	173.	0.086	45.02	1.500
AC-228	676.91	338.65	227.	166.	0.083	50.86	1.227
PB-214	703.86	352.12	193.	385.	0.192	21.28	1.500s
SB-125	926.43	463.42	120.	54.	0.027	90.67	1.500s
TL-208	1020.47	510.44	174.	128.	0.064	47.29	1.826s
TL-208	1166.08	583.25	163.	394.	0.197	24.73	1.590s
CS-134	1213.41	606.92	266.	-69.	-0.035	107.05	1.555s
BI-214	1218.70	609.56	94.	320.	0.160	22.57	1.324
CS-137	1322.33	661.38	72.	45.	0.022	93.79	1.425
BI-212	1454.24	727.34	97.	104.	0.052	59.34	1.673s
CS-134	1589.90	795.17	50.	34.	0.017	99.32	1.684
AC-228	1822.50	911.47	100.	263.	0.132	29.24	2.174s
AC-228	1936.60	968.52	85.	196.	0.098	35.48	2.358s
BI-214	2239.72	1120.08	120.	120.	0.060	66.82	1.566
K-40	2922.14	1461.27	25.	1181.	0.590	9.04	2.185
BI-214	3529.22	1764.79	3.	55.	0.028	42.40	2.472s

s - Peak fails shape tests.
 D - Peak area deconvoluted.
 A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****						
- Nuclide - Name	Average Code Activity pCi/gm	----- Energy keV	Peak Activity pCi/gm	----- Code MDA Value pCi/gm	COMMENTS	
BE-7	1.5435E-01	477.56	1.543E-01	%(2.066E-01	6.44E-02	G
K-40	1.0648E+01	1460.75	1.065E+01	(P 2.351E-01	3.22E-01	G
MN-54	-9.3211E-03	834.81	-9.321E-03	&(P 2.858E-02	8.47E-03	G
CO-57	1.9266E-04	122.07	1.927E-04	%(P 3.197E-02	9.50E-03	G K
		136.43	-2.921E-04	% P 2.689E-01	8.00E-02	G
CO-60	-2.6953E-03	1332.51	-2.695E-03	%(P 2.933E-02	7.82E-03	G K
		1173.23	-5.392E-03	% P 3.883E-02	1.09E-02	G K
Sr-85	-7.8898E-03	514.00	-7.890E-03	%(2.769E-02	8.25E-03	G
Kr-85	-2.1041E+02	513.99	-2.104E+02	%(P 6.365E+02	1.88E+02	G
Y-88	-9.5016E-04	1836.01	-9.502E-04	%(P 2.036E-02	5.00E-03	G K
		898.02	6.907E-03	& P 2.743E-02	8.00E-03	G
NB-94	6.3194E-03	871.10	6.319E-03	&(P 2.314E-02	6.79E-03	G K
		702.50	-5.939E-03	% P 2.600E-02	7.62E-03	G K
Ag-108M	2.9582E-03	722.95	2.958E-03	&(2.836E-02	8.20E-03	G K
		614.37	-1.160E-02	& 3.076E-02	9.23E-03	G
		433.93	3.719E-03	% P 2.292E-02	6.70E-03	G
CD-109	8.4896E-02	88.04	8.490E-02	&(P 1.055E+00	3.16E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SN-113	-2.4840E-03	391.71	2.484E-03	% (P	3.190E-02	9.21E-03	G K
		255.04	2.804E-01	%	1.150E+00	3.44E-01	G
SB-125	4.7231E-02	427.95	1.005E-02	% (P	7.802E-02	2.28E-02	G K
		600.77	2.930E-02	& P	1.393E-01	4.07E-02	G
		636.15	2.161E-05	% P	1.818E-01	5.12E-02	G
		463.51	2.168E-01	(P	2.174E-01	6.90E-02	G
		176.29	3.416E-02	% P	4.032E-01	1.20E-01	G
I-131	9.7688E-04	364.48	9.769E-04	% (	2.952E-02	8.61E-03	G K
		636.97	6.649E-02	%	3.523E-01	1.03E-01	G
		284.29	4.120E-04	%	3.991E-01	1.17E-01	G
CS-134	-3.5419E-02	604.66	3.542E-02	? (P	4.032E-02	1.25E-02	G K
		795.76	2.482E-02	+ P	2.571E-02	8.34E-03	G
		569.29	7.091E-03	%	1.493E-01	4.30E-02	G
		801.84	2.424E-02	& P	2.007E-01	5.65E-02	G
CS-137	2.8243E-02	661.62	2.824E-02	(P	2.677E-02	9.53E-03	G
CE-139	4.7145E-05	165.85	4.715E-05	% (P	2.858E-02	8.45E-03	G
EU-152	3.2113E-02	121.78	3.211E-02	% (P	8.484E-02	2.56E-02	G K
		344.30	2.050E-02	% P	8.043E-02	2.39E-02	G
		1408.08	1.653E-02	% P	1.074E-01	3.00E-02	G
		964.00	3.334E-02	% P	2.416E-01	7.04E-02	G
		1112.07	2.976E-03	% P	3.135E-01	9.02E-02	G
		778.90	5.397E-02	% P	2.141E-01	6.29E-02	G
EU-154	1.1399E-04	123.10	1.140E-04	& (P	5.875E-02	1.74E-02	G K
		1274.80	7.132E-03	& P	9.389E-02	2.67E-02	G
		723.30	1.187E-02	& P	1.250E-01	3.60E-02	G
		1004.80	8.486E-04	& P	1.752E-01	4.97E-02	G
EU-155	7.6274E-02	86.45	7.627E-02	% (	1.174E-01	3.58E-02	G K
		105.31	3.990E-02	& P	1.327E-01	4.00E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
HG-203	6.6876E-03	279.17	6.688E-03	&(P	2.709E-02	8.07E-03	G K
		72.87-3.857E-01		& P	8.852E-01	2.68E-01	G
		70.83-1.153E+00		+	1.409E+00	4.32E-01	G
		82.50-5.670E-01		&	1.737E+00	5.24E-01	G
TL-208	2.2789E-01	583.14	2.223E-01	@(P	3.508E-02	1.85E-02	G
		510.72	2.493E-01	*(P	1.246E-01	4.96E-02	G
PB-212	5.6173E-01	238.63	5.354E-01	@(P	6.913E-02	2.69E-02	G K
							Energy duplication
		77.11	5.855E-01	*(	2.456E-01	7.92E-02	G
		74.81	6.366E-01	*(P	5.003E-01	1.55E-01	G
PB-214	3.3774E-01	351.99	3.377E-01	*(P	5.915E-02	2.43E-02	G K
		295.22	2.571E-01	- P	1.179E-01	3.96E-02	G
							Energy duplication
		77.11	9.457E-01	+ P	4.025E-01	1.29E-01	G
		241.92-1.043E-01		% P	4.736E-01	1.42E-01	G
BI-212	5.0541E-01	727.17	5.054E-01	(P	2.372E-01	1.01E-01	G K
		1620.56	4.651E-01	% P	6.370E-01	2.08E-01	G
		785.42	3.838E-01	% P	1.051E+00	3.11E-01	G
BI-214	3.5775E-01	609.32	3.482E-01	(P	5.225E-02	2.66E-02	G K
		1764.51	3.855E-01	*(P	7.551E-02	5.54E-02	G
		1120.28	6.336E-01	+ P	2.831E-01	1.42E-01	G
RA-224	4.5194E-01	241.00	4.519E-01	%(P	8.223E-01	2.50E-01	G
RA-226	1.3695E+00	185.99	1.369E+00	*(	7.873E-01	2.97E-01	G
AC-228	6.1757E-01	911.07	6.176E-01	(P	1.157E-01	6.12E-02	G K
		968.90	7.979E-01	+ P	1.868E-01	9.54E-02	G
		338.40	4.358E-01	- P	1.921E-01	7.54E-02	G
TH-227	-2.3057E-01	236.00-2.306E-01		%(P	3.241E-01	9.91E-02	G K
		256.25	9.626E-02	% P	3.163E-01	9.47E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PA-234	-2.4186E-02						
		98.44	2.419E-02	%	(	1.067E-01	3.20E-02 G K
		946.00	3.294E-02	&		1.155E-01	3.39E-02 G
		131.28	2.097E-02	&		1.251E-01	3.74E-02 G
		94.67	7.185E-02	%		2.257E-01	6.81E-02 G
		883.24	4.740E-02	%		1.948E-01	5.69E-02 G
		926.70	6.148E-02	%		2.387E-01	7.01E-02 G
		569.26	1.057E-02	%		2.212E-01	6.38E-02 G

TH-234	7.3182E-01						
		63.29	3.305E-01	%	(P	1.422E+00	4.25E-01 G K
		92.80	9.023E-01		(P	1.180E+00	3.60E-01 G
		92.38	1.142E+00		(P	1.395E+00	4.27E-01 G

AM-241	2.2062E-03						
		59.54	2.206E-03	%	(P	1.752E-01	5.21E-02 G

(- This peak used in the nuclide activity average.

- * - Peak is too wide, but only one peak in library.
- ! - Peak is part of a multiplet and this area went negative during deconvolution.
- ? - Peak is too narrow.
- @ - Peak is too wide at FW25M, but ok at FWHM.
- % - Peak fails sensitivity test.
- \$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
- + - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
- = - Peak outside analysis energy range.
- & - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
- P - Peakbackground subtraction
- } - Peak is too close to another for the activity to be found directly.

Nuclide Codes:

T - Thermal Neutron Activation
 F - Fast Neutron Activation
 I - Fission Product
 N - Naturally Occurring Isotope
 P - Photon Reaction
 C - Charged Particle Reaction
 M - No MDA Calculation
 R - Coincidence Corrected
 H - Half-life limit exceeded

Peak Codes:

G - Gamma Ray
 X - X-Ray
 P - Positron Decay
 S - Single-Escape
 D - Double-Escape
 K - Key Line
 A - Not in Average
 C - Coincidence Peak

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count	Time Corrected	Uncertainty	3 Sigma	MDA
	Activity	Activity	Counting	Total	
	pCi/gm	pCi/gm	pCi/gm	pCi/gm	pCi/gm
BE-7 #A	1.5186E-01	1.5435E-01	1.9328E-01	1.9349E-01	2.032E-01
K-40	1.0648E+01	1.0648E+01	9.6603E-01	1.1527E+00	
MN-54 #A	-9.2952E-03	-9.3211E-03	2.6966E-02	2.6972E-02	2.850E-02
CO-57 #B	1.9205E-04	1.9266E-04	2.8510E-02	2.8510E-02	3.187E-02
CO-60 #B	-2.6941E-03	-2.6953E-03	2.0512E-01	2.0512E-01	2.932E-02
Sr-85 #A	-7.7851E-03	-7.8898E-03	2.4758E-02	2.4763E-02	2.733E-02
Kr-85 #A	-2.1041E+02	-2.1041E+02	7.5569E+02	7.5580E+02	6.364E+02
Y-88 #B	-9.4247E-04	-9.5016E-04	2.4411E-02	2.4411E-02	2.020E-02
NB-94 #B	6.3194E-03	6.3194E-03	2.0366E-02	2.0370E-02	2.314E-02
Ag-108M#B	2.9581E-03	2.9582E-03	2.4601E-02	2.4602E-02	2.836E-02
CD-109 #A	8.4734E-02	8.4896E-02	9.4781E-01	9.4782E-01	1.053E+00
SN-113 #B	-2.4654E-03	-2.4840E-03	6.5358E-02	6.5358E-02	3.166E-02
SB-125 #B	4.7190E-02	4.7231E-02	4.5074E-02	4.5161E-02	7.795E-02
I-131 #B	8.7710E-04	9.7688E-04	2.5825E-02	2.5825E-02	2.651E-02
CS-134 #A	-3.5378E-02	-3.5419E-02	3.8205E-02	3.8262E-02	4.028E-02
CS-137	2.8241E-02	2.8243E-02	2.8584E-02	2.8633E-02	
CE-139 #A	4.6849E-05	4.7145E-05	2.5361E-02	2.5361E-02	2.840E-02
EU-152 #B	3.2107E-02	3.2113E-02	7.6831E-02	7.6852E-02	8.482E-02
EU-154 #B	1.1396E-04	1.1399E-04	5.2210E-02	5.2210E-02	5.873E-02
EU-155 #B	7.6238E-02	7.6274E-02	1.0742E-01	1.0751E-01	1.173E-01
HG-203 #B	6.5644E-03	6.6876E-03	2.4219E-02	2.4222E-02	2.659E-02
TL-208 #	2.2789E-01	2.2789E-01	5.7009E-02	5.8577E-02	
PB-212 #	5.6173E-01	5.6173E-01	8.4636E-02	9.0906E-02	6.913E-02
PB-214 #	3.3774E-01	3.3774E-01	7.2838E-02	7.5520E-02	5.915E-02
BI-212 #	5.0541E-01	5.0541E-01	3.0365E-01	3.0512E-01	
BI-214	3.5775E-01	3.5775E-01	8.1827E-02	8.4510E-02	
RA-224 #A	4.5194E-01	4.5194E-01	7.4988E-01	7.5035E-01	8.223E-01
RA-226 #	1.3695E+00	1.3695E+00	8.9076E-01	8.9443E-01	
AC-228	6.1757E-01	6.1757E-01	1.8349E-01	1.8708E-01	
TH-227 #B	-2.3057E-01	-2.3057E-01	2.9887E-01	2.9918E-01	3.241E-01
PA-234 #B	-2.4186E-02	-2.4186E-02	9.5972E-02	9.5981E-02	1.067E-01
TH-234 #B	7.3182E-01	7.3182E-01	8.2141E-01	8.2241E-01	1.422E+00
AM-241 #A	2.2062E-03	2.2062E-03	1.5618E-01	1.5618E-01	1.752E-01

- # - All peaks for activity calculation had bad shape.
- * - Activity omitted from total
- & - Activity omitted from total and all peaks had bad shape.
- < - MDA value printed.
- A - Activity printed, but activity < MDA.
- B - Activity < MDA and failed test.
- C - Area < Critical level.
- F - Failed fraction or key line test.
- H - Half-life limit exceeded

----- S U M M A R Y -----
Total Activity (295.2 to 2000.1 keV) 1.3754030E+01 pCi/gm
Total Decayed Activity (295.2 to 2000.1 keV) 1.3754034E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
DAT

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

Sample description
FSS-OOL-16-01-006-F

Spectrum Filename: C:\GammaVision\Spectra\107F_26JUL2006_1756.An1

Acquisition information

Start time: 26-Jul-2006 17:56:35
Live time: 2000
Real time: 2002
Dead time: 0.11 %
Detector ID: 2

Detector system

Det 107- DSPE- 634

Calibration

Filename: D7_1LSa.Clb
Detector 107 Calibration for 1 Liter Sand Marinelli

Energy Calibration

Created: 29-Oct-2004 06:48:53
Zero offset: 0.157 keV
Gain: 0.500 keV/channel
Quadratic: -1.676E-08 keV/channel²

Efficiency Calibration

Created: 29-Oct-2004 06:51:32
Type: Polynomial
Uncertainty: 1.174 %
Coefficients: -0.279532 -4.778179 0.614896
-0.087174 0.005356 -0.000131

Library Files

Main analysis library: FSS_Rev_1.Lib
Library Match Width: 1.000
Peak stripping: Library based

Analysis parameters

Analysis engine: Env32 G53W4.20
Start channel: 100 (50.16keV)
Stop channel: 4000 (2000.15keV)
Peak rejection level: 41.667%
Peak search sensitivity: 3
Sample Size: 1.9340E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.9340E+03) =
5.1706E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

Fraction Limit: 0.000%
Background width: average of five points.

Half lives decay limit: 12.000
 Activity range factor: 2.000
 Min. step backg. energy 0.000
 Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	25-Jul-2006 10:05:00
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	107_150K_28APR05.Pbc 01-May-2005 05:30:33
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 21 cutoff 20.00000 %
 Energy Calibration
 Normalized diff: 0.2365

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. pCi/gm	Nuc
74.86	290.	21.03	1.50	2.849E-02				
74.86	290.	21.03	1.50	2.849E-02	74.81	9.600	7.419E-01	PB212
77.10	404.	14.69	1.50	2.957E-02	77.11	10.700	8.932E-01	PB214
					77.11	17.500	5.461E-01	PB212
77.10	409.	14.69	1.50	2.957E-02	77.11	10.700	8.932E-01	PB214
					77.11	17.500	5.525E-01	PB212
87.19	182.	20.23	1.19	3.308E-02	86.45	32.740	1.187E-01	EU155
					88.04	3.790		PBC<MDA CD109
89.50	123.	30.42	1.19	3.367E-02				
93.11	233.	15.88	1.19	3.448E-02	92.38	2.570	1.784E+00	TH234
					92.80	3.000	1.445E+00	TH234
185.65	200.	23.67	1.86	3.613E-02	185.99	3.280	1.180E+00	RA226
209.05	160.	23.36	1.65	3.430E-02				
238.79	1268.	3.55	1.30	3.187E-02	238.63	43.100	6.363E-01	PB212
					241.92	7.470	3.744E+00	PB214
242.02	187.	15.21	1.30	3.161E-02				
270.13	116.	32.12	1.66	2.945E-02				
277.88	65.	39.40	1.43	2.889E-02				
277.88	65.	39.40	1.43	2.889E-02	279.17	81.500		PBC<MDA HG203
295.45	311.	8.35	1.34	2.766E-02	295.22	19.200	4.031E-01	PB214
300.69	59.	34.75	1.34	2.731E-02				
338.51	228.	12.68	0.98	2.500E-02	338.40	12.010	5.242E-01	AC228
352.14	562.	6.95	1.52	2.425E-02	351.99	37.100	4.323E-01	PB214
410.25	70.	36.03	1.08	2.151E-02				
462.80	115.	23.64	1.92	1.955E-02				
462.80	115.	23.64	1.92	1.955E-02	463.51	10.000	4.025E-01	SB125
511.12	241.	11.87	1.98	1.807E-02	510.72	22.500	3.561E-01	TL208

583.46	459.	6.96	1.51	1.628E-02	583.14	86.000	2.266E-01	TL208
609.57	399.	7.16	1.60	1.574E-02	609.32	46.090	3.797E-01	BI214
727.56	124.	14.73	2.31	1.374E-02	727.17	11.800	5.356E-01	BI212
795.37	54.	25.81	1.28	1.284E-02				
795.37	54.	25.81	1.28	1.284E-02	795.76	85.400	3.386E-02	CS134
861.07	93.	16.21	1.61	1.210E-02				
911.53	343.	6.39	1.81	1.160E-02	911.07	29.000	7.036E-01	AC228
964.97	70.	16.90	1.80	1.113E-02				
969.43	196.	8.52	1.80	1.109E-02	968.90	17.460	7.004E-01	AC228
1120.56	118.	13.55	2.26	9.968E-03	1120.28	15.040	5.457E-01	BI214
1378.33	52.	24.20	1.33	8.555E-03				
1461.29	1395.	2.72	2.30	8.189E-03	1460.75	10.700	1.109E+01	K40

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1621.48	26.	23.13	1.23	7.569E-03	1620.56	2.750	8.895E-01	BI212
1765.12	58.	13.13	1.69	7.082E-03	1764.51	15.920	3.538E-01	BI214

***** U N I D E N T I F I E D P E A K S U M M A R Y *****
 Peak Centroid Background Net Area Intensity Uncert FWHM Suspected
 Channel Energy Counts Counts Cts/Sec 3 Sigma % keV Nuclide

174.05	87.34	591.	182.	0.091	60.70	1.187	PB-214	1D
178.66	89.64	636.	123.	0.061	91.26	1.188	PB-214	1D
417.75	209.05	495.	160.	0.080	70.09	1.651	AC-228	s
477.21	238.96	377.	1268.	0.634	10.64	1.297	PB-212	D
483.66	242.18	312.	187.	0.094	45.63	1.299	PB-214	D
539.88	270.13	424.	116.	0.058	96.35	1.660	AC-228	s
555.38	277.88	256.	65.	0.032	118.21	1.434	NP-239	l
601.00	300.68	180.	59.	0.029	104.26	1.341	PB-212	1D
820.10	410.25	198.	70.	0.035	108.09	1.082	EU-152	
1721.70	861.07	49.	93.	0.046	48.63	1.610	TL-208	s
1930.50	965.02	37.	68.	0.034	52.80	1.797	AC-228	D
2756.24	1378.33	28.	52.	0.026	72.61	1.327	BI-214	s

s - Peak fails shape tests.
 D - Peak area deconvoluted.
 L - Peak written from unknown list.
 C - Area < Critical level.

 This section based on library: FSS_Rev_1.Lib

***** I D E N T I F I E D P E A K S U M M A R Y *****
 Nuclide Peak Centroid Background Net Area Intensity Uncert FWHM
 Channel Energy Counts Counts Cts/Sec 3 Sigma % keV

PB-212	149.40	74.86	1772.	290.	0.145	63.09	1.500s
PB-214	153.89	77.11	1606.	404.	0.202	44.06	1.500D
PB-212	153.89	77.11	1601.	409.	0.205	44.06	1.500D
TH-234	185.83	93.08	1395.	212.	0.106	74.50	1.500s
TH-234	185.81	93.08	1357.	202.	0.101	72.87	1.500s
RA-226	370.95	185.65	729.	200.	0.100	71.01	1.860s
TH-227	472.08	236.22	1345.	-161.	-0.081	99.63	1.500s
PB-212	477.22	238.79	822.	1248.	0.624	12.73	1.500s
PB-214	590.50	295.44	345.	309.	0.155	30.15	1.500s
AC-228	676.64	338.51	248.	225.	0.113	38.05	0.982
PB-214	703.83	352.11	236.	527.	0.264	17.77	1.500
SB-125	925.64	463.02	155.	74.	0.037	76.38	1.500s
TL-208	1021.83	511.12	199.	207.	0.104	35.61	1.977s
TL-208	1166.51	583.46	156.	454.	0.227	20.87	1.512s
BI-214	1218.72	609.57	127.	394.	0.197	21.48	1.602s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BI-212	1454.69	727.56	79.	124.	0.062	44.19	2.308s
CS-134	1589.79	795.11	75.	50.	0.025	84.00	1.684
AC-228	1822.62	911.53	57.	339.	0.169	19.16	1.809
AC-228	1937.36	968.90	64.	194.	0.097	27.35	1.799D
BI-214	2240.69	1120.56	52.	117.	0.059	40.65	2.264s
K-40	2922.19	1461.29	16.	1391.	0.695	8.16	2.300
BI-212	3242.58	1621.48	4.	26.	0.013	69.39	1.225s
BI-214	3529.90	1765.12	1.	57.	0.029	39.39	1.689

s - Peak fails shape tests.
 D - Peak area deconvoluted.
 A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name Code	Average Activity pCi/gm	Energy keV	Peak Activity pCi/gm	Code	MDA Value pCi/gm	COMMENTS
BE-7	4.9836E-02	477.56	4.984E-02	% (	1.991E-01 5.90E-02	G
K-40	1.1087E+01	1460.75	1.109E+01	(P	1.717E-01 3.03E-01	G
MN-54	-7.8665E-03	834.81	-7.867E-03	%(P	2.722E-02 8.05E-03	G
CO-57	3.4583E-03	122.07	3.458E-03	%(P	3.386E-02 1.01E-02	G K
		136.43	-4.001E-02	& P	2.673E-01 8.01E-02	G
CO-60	7.5642E-03	1332.51	7.564E-03	%(P	2.594E-02 7.47E-03	G K
		1173.23	4.605E-04	% P	3.593E-02 1.02E-02	G K
Sr-85	-1.5796E-02	514.00	-1.580E-02	%(	3.261E-02 9.89E-03	G
Kr-85	-3.8688E+02	513.99	-3.869E+02	%(P	7.460E+02 2.25E+02	G
Y-88	-8.4053E-04	1836.01	-8.405E-04	%(P	2.387E-02 6.26E-03	G K
		898.02	-3.980E-03	& P	2.918E-02 8.37E-03	G
NB-94	-2.9111E-03	871.10	-2.911E-03	&(P	2.473E-02 7.14E-03	G K
		702.50	5.472E-03	& P	2.570E-02 7.56E-03	G K

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ag-108M	-1.2421E-02	722.95	1.242E-02	&(	3.598E-02	1.08E-02	G K
		614.37	2.382E-02	%	3.597E-02	1.11E-02	G
		433.93	2.149E-03	% P	1.976E-02	5.70E-03	G
CD-109	9.2806E-02	88.04	9.281E-02	%(P	1.067E+00	3.20E-01	G
SN-113	-3.1274E-03	391.71	3.127E-03	&(P	3.630E-02	1.06E-02	G K
		255.04	3.988E-01	%	9.473E-01	2.86E-01	G
SB-125	7.3194E-02	427.95	8.657E-03	&(P	7.426E-02	2.18E-02	G K
		600.77	1.849E-02	% P	1.115E-01	3.24E-02	G
		636.15	7.925E-03	& P	1.837E-01	5.24E-02	G
		463.51	2.642E-01	(P	2.173E-01	6.98E-02	G
		176.29	2.754E-02	% P	3.994E-01	1.19E-01	G
I-131	-4.9774E-03	364.48	4.977E-03	&(	2.930E-02	8.67E-03	G K
		636.97	1.420E-02	%	3.371E-01	9.70E-02	G
		284.29	1.152E-01	&	3.991E-01	1.20E-01	G
CS-134	-1.7241E-02	604.66	1.724E-02	&(P	3.191E-02	9.71E-03	G K
		795.76	3.178E-02	+ P	2.743E-02	8.99E-03	G
		569.29	3.206E-02	%	1.467E-01	4.33E-02	G
		801.84	2.328E-02	& P	2.655E-01	7.63E-02	G
CS-137	-4.6610E-03	661.62	4.661E-03	&(P	3.026E-02	8.68E-03	G
CE-139	6.6619E-03	165.85	6.662E-03	&(P	3.007E-02	9.02E-03	G
EU-152	1.3744E-03	121.78	1.374E-03	%(P	6.940E-02	2.06E-02	G K
		344.30	1.189E-02	% P	8.339E-02	2.47E-02	G
		1408.08	2.996E-03	% P	1.243E-01	3.45E-02	G
		964.00	1.573E-03	% P	2.838E-01	8.26E-02	G
		1112.07	2.552E-04	& P	2.369E-01	6.76E-02	G
		778.90	2.894E-02	% P	1.686E-01	4.87E-02	G
EU-154	-4.7839E-03	123.10	4.784E-03	%(P	7.256E-02	2.17E-02	G K
		1274.80	2.132E-02	% P	8.782E-02	2.57E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		723.30	4.307E-03	% P	1.547E-01	4.49E-02	G
		1004.80	5.109E-02	% P	1.354E-01	4.04E-02	G
EU-155	8.3901E-02	86.45	8.390E-02	% (	1.188E-01	3.63E-02	G K
		105.31	3.252E-02	% P	1.389E-01	4.18E-02	G
HG-203	1.7620E-02	279.17	1.762E-02	% (P	2.546E-02	7.82E-03	G K
		72.87	1.474E-01	% P	8.375E-01	2.52E-01	G
		70.83	6.582E-01	&	1.480E+00	4.48E-01	G
		82.50	7.399E-01	&	1.734E+00	5.25E-01	G
TL-208	2.2657E-01	583.14	2.266E-01	@ (P	3.036E-02	1.59E-02	G
		510.72	3.561E-01	+ P	1.175E-01	4.92E-02	G
PB-212	6.3442E-01	238.63	6.344E-01	* (P	6.929E-02	2.73E-02	G K
							Energy duplication
		77.11	5.525E-01	-	2.554E-01	8.11E-02	G
		74.81	7.419E-01	+ P	5.080E-01	1.58E-01	G
PB-214	4.0842E-01	351.99	4.094E-01	(P	5.772E-02	2.45E-02	G K
		295.22	4.065E-01	* (P	1.173E-01	4.14E-02	G
							Energy duplication
		77.11	8.932E-01	+ P	4.184E-01	1.33E-01	G
		241.92	6.502E-03	% P	4.637E-01	1.38E-01	G
BI-212	5.3564E-01	727.17	5.356E-01	* (P	1.898E-01	7.98E-02	G K
		1620.56	8.895E-01	+ P	3.837E-01	2.10E-01	G
		785.42	4.422E-01	% P	1.249E+00	3.72E-01	G
BI-214	3.7306E-01	609.32	3.797E-01	* (P	5.313E-02	2.75E-02	G K
		1764.51	3.538E-01	(P	4.566E-02	4.72E-02	G
		1120.28	5.457E-01	+ P	1.690E-01	7.45E-02	G
RA-224	5.1332E-01	241.00	5.133E-01	% (P	8.283E-01	2.52E-01	G
RA-226	1.1802E+00	185.99	1.180E+00	* (	7.584E-01	2.79E-01	G
AC-228	7.0206E-01	911.07	7.036E-01	(P	7.867E-02	4.55E-02	G K
		968.90	6.995E-01	(P	1.444E-01	6.45E-02	G
		338.40	5.242E-01	- P	1.770E-01	6.74E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TH-227	-3.1286E-01	236.00	3.129E-01	&(P	3.373E-01	1.04E-01	G K
		256.25	4.947E-02	& P	3.460E-01	1.03E-01	G
PA-234	-2.6628E-02	98.44	2.663E-02	% (	1.096E-01	3.29E-02	G K
		946.00	4.391E-02	&	1.595E-01	4.73E-02	G
		131.28	1.438E-02	&	1.279E-01	3.82E-02	G
		94.67	1.004E-01	%	2.273E-01	6.89E-02	G
		883.24	4.765E-02	%	2.051E-01	6.02E-02	G
		926.70	2.851E-02	%	2.498E-01	7.23E-02	G
TH-234	1.1251E+00	59.54	4.394E-02	&(P	1.894E-01	5.69E-02	G
		63.29	5.705E-01	%(P	1.483E+00	4.47E-01	G K
		92.80	1.367E+00	(P	1.181E+00	3.65E-01	G
AM-241	-4.3943E-02	92.38	1.684E+00	(P	1.401E+00	4.34E-01	G

(- This peak used in the nuclide activity average.

- * - Peak is too wide, but only one peak in library.
- ! - Peak is part of a multiplet and this area went negative during deconvolution.
- ? - Peak is too narrow.
- @ - Peak is too wide at FW25M, but ok at FWHM.
- % - Peak fails sensitivity test.
- \$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
- + - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
- = - Peak outside analysis energy range.
- & - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
- P - Peakbackground subtraction
- } - Peak is too close to another for the activity to be found directly.

Nuclide Codes:

T - Thermal Neutron Activation
 F - Fast Neutron Activation
 I - Fission Product
 N - Naturally Occurring Isotope
 P - Photon Reaction
 C - Charged Particle Reaction
 M - No MDA Calculation

Peak Codes:

G - Gamma Ray
 X - X-Ray
 P - Positron Decay
 S - Single-Escape
 D - Double-Escape
 K - Key Line
 A - Not in Average

R - Coincidence Corrected C - Coincidence Peak
 H - Halflife limit exceeded

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity pCi/gm	Time Corrected Activity pCi/gm	Uncertainty Counting pCi/gm	3 Sigma Total pCi/gm	MDA pCi/gm
BE-7	#A	4.8985E-02	4.9836E-02	1.7699E-01	1.7702E-01	1.957E-01
K-40		1.1087E+01	1.1087E+01	9.0780E-01	1.1193E+00	
MN-54	#A	-7.8434E-03	-7.8665E-03	2.5687E-02	2.5691E-02	2.714E-02
CO-57	#B	3.4466E-03	3.4583E-03	3.0400E-02	3.0401E-02	3.374E-02
CO-60	#B	7.5606E-03	7.5642E-03	2.2396E-02	2.2400E-02	2.593E-02
Sr-85	#A	-1.5574E-02	-1.5796E-02	2.9678E-02	2.9692E-02	3.215E-02
Kr-85	#A	-3.8687E+02	-3.8688E+02	7.7700E+02	7.7733E+02	7.460E+02
Y-88	#B	-8.3331E-04	-8.4053E-04	3.0539E-02	3.0539E-02	2.367E-02
NB-94	#B	-2.9111E-03	-2.9111E-03	2.2605E-02	2.2606E-02	2.473E-02
Ag-108M	#B	-1.2421E-02	-1.2421E-02	3.2357E-02	3.2365E-02	3.598E-02
CD-109	#A	9.2618E-02	9.2806E-02	9.6026E-01	9.6027E-01	1.065E+00
SN-113	#B	-3.1024E-03	-3.1274E-03	5.7290E-02	5.7291E-02	3.601E-02
SB-125	#B	7.3127E-02	7.3194E-02	5.8041E-02	5.8202E-02	7.419E-02
I-131	#B	-4.4392E-03	-4.9774E-03	2.6019E-02	2.6021E-02	2.613E-02
CS-134	#B	-1.7220E-02	-1.7241E-02	2.9929E-02	2.9946E-02	3.187E-02
CS-137	#A	-4.6606E-03	-4.6610E-03	6.4346E-02	6.4347E-02	3.025E-02
CE-139	#A	6.6174E-03	6.6619E-03	2.7056E-02	2.7059E-02	2.987E-02
EU-152	#B	1.3741E-03	1.3744E-03	6.1688E-02	6.1688E-02	6.939E-02
EU-154	#B	-4.7825E-03	-4.7839E-03	7.2122E-02	7.2122E-02	7.254E-02
EU-155	#B	8.3858E-02	8.3901E-02	1.0888E-01	1.0898E-01	1.188E-01
HG-203	#B	1.7276E-02	1.7620E-02	2.3457E-02	2.3480E-02	2.496E-02
TL-208	#	2.2657E-01	2.2657E-01	4.7746E-02	4.9586E-02	
PB-212	#	6.3442E-01	6.3442E-01	8.1782E-02	8.9957E-02	6.929E-02
PB-214	#	4.0842E-01	4.0842E-01	7.2423E-02	7.6334E-02	5.772E-02
BI-212		5.3564E-01	5.3564E-01	2.3916E-01	2.4125E-01	
BI-214		3.7306E-01	3.7306E-01	8.1024E-02	8.3967E-02	
RA-224	#A	5.1332E-01	5.1332E-01	7.5719E-01	7.5780E-01	8.283E-01
RA-226	#	1.1802E+00	1.1802E+00	8.3806E-01	8.4095E-01	
AC-228		7.0206E-01	7.0206E-01	1.1863E-01	1.2567E-01	
TH-227	#A	-3.1286E-01	-3.1286E-01	3.1224E-01	3.1279E-01	3.373E-01
PA-234	#B	-2.6628E-02	-2.6628E-02	9.8809E-02	9.8820E-02	1.096E-01
TH-234	#B	1.1251E+00	1.1251E+00	8.6964E-01	8.7188E-01	1.483E+00
AM-241	#A	-4.3943E-02	-4.3943E-02	1.7689E-01	1.7690E-01	1.894E-01

- All peaks for activity calculation had bad shape.
 * - Activity omitted from total
 & - Activity omitted from total and all peaks had bad shape.
 < - MDA value printed.
 A - Activity printed, but activity < MDA.
 B - Activity < MDA and failed test.
 C - Area < Critical level.
 F - Failed fraction or key line test.

H - Halflife limit exceeded

----- S U M M A R Y -----

Total Activity (1120.2 to 2000.1 keV) 1.4104575E+01 pCi/gm
Total Decayed Activity (1120.2 to 2000.1 keV) 1.4104577E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
 DAT

Reviewed by: _____
 Supervisor

Laboratory: YAEC Chemistry Lab